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KEY TO PRONUNCIATION

For a full explanation of the various sounds indicated, see the KEY TO PRONUNCIATION in Vol. I.

ā as in ale, fate.
ȧ " " senate, chaotic.
â " " glare, care, and as *e* in there.
ă " " am, at.
ä " " arm, father.
à " " ant, and final *a* in America, armada, etc.
a " " final, regal, pleasant.
ą " " all, fall.
ē " " eve.
ė̄ " " elate, evade.
ĕ " " end, pet.
ẽ " " fern, her, and as *i* in sir, etc.
e " " agency, judgment.
ī " " ice, quiet.
i̇ " " quiescent.
ĭ " " ill, fit.
ō " " old, sober.
ȯ " " obey, sobriety.
ô " " orb, nor.
ŏ " " odd, forest, not.
o " " atom, carol.
oi " " oil, boil.
o͞o " " food, fool, and as *u* in rude, rule.
ou " " house, mouse
ū " " use, mule.
u̇ " " unite.
ŭ " " cut, but.
u " " full, put, or as *oo* in foot, book.
û " " urn, burn.
y " " yet, yield.
B " " Spanish Habana, Córdoba, where it is like English *v* but made with the lips alone.

ch as in chair, cheese.
D " " Spanish Almodovar, pulgada, where it is nearly like *th* in English then.
g " " go, get.
G " " German Landtag = *ch* in Ger. ach, etc.
H " " Spanish Jijona, *g* in Spanish gila; like English *h* in hue, but stronger.
hw " *wh* in which.
K " " German ich, Albrecht = *g* in German Arensberg, Mecklenburg, etc.
n̲ " " sinker, longer.
ng " " sing, long.
N " " French bon, Bourbon, and *m* in the French Étampes; here it indicates nasalizing of the preceding vowel.
sh " " shine, shut.
th " " thrust, thin.
TH " " then, this.
zh " " azure, and *s* in pleasure.

An apostrophe ['] is sometimes used as in tā'b'l (table) kăz"m (chasm), to indicate the elision of a vowel or its reduction to a mere murmur.

For foreign sounds, the nearest English equivalent is generally used. In any case where a special symbol, as G, H, K, N, is used, those unfamiliar with the foreign sound indicated may substitute the English sound ordinarily indicated by the letter. For a full description of all such sounds, see the article on PRONUNCIATION.

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THE NEW INTERNATIONAL ENCYCLOPÆDIA

CHÆRONEA, kĕr′ō-nē′ȧ (Lat., from Gk. Χαιρώνεια, *Chairōneia*). An ancient town of Bœotia, near the Cephissus, on the borders of Phocis, at the head of the last defile where a stand could be made against an invader of central Greece (Map: Greece, Ancient, C 2). Here, in 338 B.C., Philip of Macedon signally defeated the united forces of the Athenians and Bœotians, and so crushed the liberties of Greece. A mound of earth, about a mile from the modern village of Kapræna, which occupies the site of the old city, still marks the place where the Thebans who fell in the battle were buried; the grave was also marked by a magnificent colossal lion (quite recently restored). At Chæronea also, 86 B.C., Sulla defeated Archelaus, the general of Mithridates. Plutarch was a native of this town.

CHÆTODONTIDÆ, kē′tō-dŏn′tĭ-dē (Neo-Lat. nom. pl., from Gk. χαίτη, *chaitē*, mane + ὀδούς, *odous*, tooth). A family of tropical spiny-rayed fishes. See BUTTERFLY FISH.

CHÆTOGNATHA, kē-tŏg′nȧ-thȧ (Neo-Lat. nom. pl., from Gk. χαίτη, *chaitē*, mane + γνάθος *gnathos*, jaw). An aberrant marine worm, cylindrical or fish-shaped, belonging to a division of the Nemathelminthes. It includes the arrow worms (*Sagitta*) and the related genus *Spadella*.

CHÆTOPODA, kē-tŏp′ō-dȧ (Neo-Lat. nom. pl., from Gk. χαίτη, *chaitē*, mane + πούς, *pous*, foot). Marine worms. See ANNULATA.

CHAFARINAS, chȧ-fȧ-rē′nȧs, or ZAFFARINES. A group of three small islands belonging to Spain, situated off the coast of Morocco, opposite the mouth of the Muluya River, in long. 2° 26′ W. The Chafarinas, the *Tres Insulæ* of the ancients, have long been known for the natural harbor or refuge they afford. There are fortifications on the middle island. Spain took possession of the group in 1848 and is building a breakwater to unite the middle island, Isabella II, with the near-by islet El Rey, for the purpose of inclosing a deep and sheltered anchorage for large ships. Pop., 1900, 426; 1910, 736.

CHAFER, or **COCKCHAFER** (AS. *ceafor*, Ger. *Käfer*, OHG. *kevar*, *chevaro;* probably connected with Ger. *Keifer*, MHG. *kiver*, AS. *ceáfl*, OS. *kāfl*, jawbone), ETC. A beetle of the family Scarabæidæ. In England all scarabs (dung beetles) are so called, the name being found frequently as the last part of such compounds as cockchafer, leaf chafer, rose chafer, etc. The cockchafer, May beetle, or dor bug (*Melolontha vulgaris*) is substantially the same as the Junebug (q.v.) of the United States. See SCARABÆIDÆ.

CHAF′FEE, ADNA ROMANZA (1842–1914). An American soldier. He was born at Orwell, Ohio, and in 1861 entered the Sixth United States Cavalry. He was promoted to be first lieutenant in 1865, and in the same year received the brevet of captain for gallant conduct at Dinwiddie Court House. In 1897 he was made lieutenant colonel, and in 1898 saw service in Cuba during the Spanish-American War, distinguishing himself at El Caney, and was brevetted major general of volunteers. In 1900 he was sent to take command of the United States forces in China, being promoted to be major general of volunteers, and took an important part in the expedition against Peking. Subsequently he was put in command of the United States army in the Philippine Islands. In 1901 he was appointed major general in the regular army. He succeeded Gen. S. B. M. Young as lieutenant general and chief of staff in 1904 and was retired on Feb. 1, 1906.

CHAFFINCH (so called because the *finch* is fond of *chaff*, or grain). A handsome and familiar European finch (*Fringilla cœlebs*) and one of the foremost cage birds, especially in Germany. It is common in England and known there by many provincial names. The male, in summer, has the top of the head and nape of the neck bluish gray; the back chestnut; the wings almost black, with two conspicuous white bars; the tail nearly black. The colors of the female (and of the male in winter) are much duller than those of the summer male. In the colder northern countries it is migratory, but spends the winter in flocks in England and all around the Mediterranean, where it is shot in great numbers for market, especially in Italy. It builds a very soft and beautiful nest, garnished with lichens and placed in a bush, and lays spotted eggs. Its food is highly varied, and its habits generally are typically fringilline.

The chaffinch is one of the birds most sought by bird catchers, as well as reared from the nest, to be a cage songster. Its naturally loud, clear, and thrilling voice is susceptible of being trained almost to articulate human words; and so docile is it that the German bird trainers teach these finches several distinct tunes and trills besides

cultivating their own powers of melody and imitation. Bechstein, in *Naturgeschichte der Stubenvögel* (Gotha, 1792), gives an extended account of these vocal accomplishments, the proper acquirement of which renders chaffinches among the most valuable of cage birds. See CAGE BIRD, and Plate of CAGE BIRDS.

CHA'FIN, EUGENE WILDER (1852–1920). An American temperance advocate and Prohibition party candidate for President of the United States, born at East Troy, Wis. Admitted to the bar in 1875, he was in practice at Waukesha, Wis., from 1876 to 1900, and from 1901 to 1904 was superintendent of the Washingtonian Home, Chicago. He was the Prohibition candidate for Congress (Wisconsin) in 1882 and (Chicago) in 1902, for Attorney-General of Wisconsin in 1886 and 1900, for Governor of Wisconsin in 1898, for Attorney-General of Illinois in 1904, and for President of the United States in 1908 and 1912. In 1908 he was admitted to the bar of the Supreme Court of the United States, and in the following year moved to Arizona. He is author of *Voters' Handbook* (1876); *Lives of the Presidents* (1896); *Lincoln, the Man of Sorrow* (1908); *Washington as a Statesman* (1909). Chafin became known as one of the most active speakers and organizers in the temperance and prohibition movements.

CHAGA, chä'gȧ, or **WA CHAGA,** wä chä'gȧ. A Bantu people on the southern slopes of Mount Kilimanjaro, German East Africa. They are an interesting people, friendly, exceedingly superstitious, much harassed by the Masai, and in turn raiding the Wa Gweno and other tribes. The Chaga possess considerable skill in ironworking, their assegais being the largest and finest in Africa. Their hide shields are large, oval, decorated with colored symbols; the present form, borrowed from the Masai, has superseded the old type of shield, which was of buffalo hide, long, narrow, and decorated only with incised lines. They employ poisoned arrows. They brew beer in large wooden vessels and have partially domesticated the wild bee. They hunt also the abundant fauna on the slopes of Kilimanjaro, but do not ascend very high up the mountains. Consult Bruno Gutmann, *Dichten und Denken der Dschagganeger* (Leipzig, 1909).

CHAGOS (chä'gŏs) **ISLANDS.** A small archipelago in the Indian Ocean, situated between lat. 4° 44′ to 7° 39′ S. and long. 70° 55′ to 72° 52′ E. (Map: World, Eastern Hemisphere, K 28). They are mostly of coral formation. The chief island of the group, Diego Garcia, is over 12 miles long and over 6 miles wide; pop. 1911, 517. The chief product is coconut oil. The group belongs to Great Britain and is an administrative dependency of Mauritius. It has an aggregate land area of 76 square miles.

CHAGRES, chä'grȧs. A river of Panama rising in the Cordillera de San Blas, flowing southwest, west, and northwest into the Caribbean Sea (Map: Panama Canal). The mouth of the old river bed is about 7 miles west of Colon. The river supplies the water required to operate the locks of the Panama Canal, which follows the bed of the stream from Mindi to Gamboa. The tremendous rise of this river during freshets, as much as 32 feet in 24 hours, presented one of the most formidable engineering problems in connection with the construction of the canal. The building of the Gatun Dam, thereby forming Gatun Lake, successfully solved the problem.

CHAHA, chä'hȧ, or **CHAJA.** See SCREAMER.

CHAILLÉ-LONG, shȧ'yȧ'lôN', CHARLES (1842–1917). An American diplomat and explorer. He was born in Maryland, of French descent, and served in the Union army during the Civil War. In 1869 he was appointed lieutenant colonel in the Egyptian army, and four years later became chief of staff to General Gordon, then engaged in suppressing the slave trade on the White Nile. Soon afterward he was sent by the Khedive to the court of the King of Uganda, who acknowledged himself the vassal of Egypt. He published an account of this expedition in *Central Africa: Naked Truths of Naked People* (1876). Returning to New York, he studied law at Columbia and in 1882 went to Alexandria to practice international law. There he rendered important services during the Alexandria massacre and the subsequent bombardment by the English squadron. In the absence of the United States Consul General and consular agents, he reëstablished the consulate and protected many Europeans and Americans. Later in the same year he practiced international law in Paris, and in 1887 was appointed United States Consul General and Secretary of Legation in Korea. He was secretary of the Universal Postal Congress at Washington in 1897, and special representative of the United States to the Paris Exposition in 1900. In 1884 he published *The Three Prophets: Chinese Gordon, the Mahdi, and Arabi Pasha.* Other publications: *L'Afrique Centrale* (1877); *Les Sources du Nil* (1891); *L'Egypte et ses provinces perdues* (1892); *La Corée ou Chosen* (1894).

CHAIN (OF. *chaine,* Fr. *chaîne,* Dutch *keten, ketting,* MLG. *kedene, kede,* Ger. *Kette,* OHG. *chettina,* from Lat. *catena,* chain). A series of flexibly connected links of metal or other material designed for ornament or to serve the purpose of cord, rope, or cables. Chains are evidently of very ancient origin. Nearly all old writers speak of their use, and they are repeatedly referred to in the Bible. Remnants of chains of Roman manufacture are preserved in museums, and they show a variety of link formations and excellent workmanship. The uses made of chains by the ancients were few and unimportant compared with the multitude of uses to which they are applied at present. They served for ornament, as emblems of investiture and badges of office, and as fetters for captors, but cordage was employed for all other purposes to which chains are now extensively applied. Chains are now employed as ornaments and for the various purposes of a band, cord, rope, or cable in hoisting and hauling operations, in transmitting power, and in connecting, confining, and restraining objects. The modern chain of commerce, therefore, embraces chains varying in size and material, from the threadlike article of pure gold to the ship's cable of iron, each link of which weighs from 100 to 200 pounds, and will withstand a breaking strain of many tons.

Structurally chains may be somewhat roughly divided into those whose separate links are each composed of a single piece of metal and those whose links are each made up of several separate pieces of metal. The ordinary oval-link hoisting chain is an example of the first class, while the bicycle chain exemplifies quite well the second class. Chains may be also loosely divided into handmade and machine-made chains. It is also common practice to define

chains by special names based upon the form of the link, as stud chains, open-link chains, and twisted-link chains; or upon the use to which the chain is put, as crane chain, chain cable, and bicycle chain; or upon the name of the inventor or some other real or apparent peculiarity.

Chains are made in a variety of ways, depending upon the material used, the size, the link formation, the purpose to which the article is to be put, etc. Chains for cranes, ship's cables, dredges, etc., are always handmade, i.e., each link is welded by hand and often is both formed and welded by hand from rolled bar iron. The various stages of operation are substantially as follows: The workman, taking a round bar or rod of iron of the proper diameter, heats it in a forge and then by means of a chisel cuts off a piece long enough to form a single link. This piece is again heated and then bent by hammer blows around a suitably shaped nose until it has a U-shape. The U-shaped piece is then hooked into the last completed link of the chain and the unconnected ends thrust again into the forge to receive a welding heat. The final process is to weld together the unconnected ends around a nose of suitable shape and to bring the link to perfect form and dimensions. In chains made as just described, the weld is usually at the end of the link. When making large ship's cables, the chain maker often uses presses for bending the bars into link form, and the bending is so done as to bring the weld at the side of the link. The welding in large cables may also be done by power hammers.

In making stud chains or twisted-link chains the only change in the mode of procedure described above is the introduction of the necessary additional operation of inserting the brace or stud or of twisting the link, just previous to closing up the ends of the U-piece for the final welding operation. A stud chain is an open-link chain, in each link of which a transverse stud or brace is placed to prevent the sides of the links from closing up or drawing together when the chain is subjected to a heavy pull or load. Twisted links are of great advantage when a chain has to be wound on a drum, since they lie flat and smooth on the drum.

Generally speaking, all chains over one inch in size are made by hand. Machine-made iron chains are of two kinds, known as welded chains and weldless chains. In making welded chains by machine the rod of iron is first run through a machine called a winder, which winds it round a mandrel and turns it out in the form of a long spiral spring. This rod is then cut by a machine so that each twist or spiral is severed from the next and the stock is in the form of rings whose open ends only need to be welded together to form complete closed links. The welding is done by heating the ring and placing it in dies, which, under the blows of a trip hammer operated by the workman's foot, form it into shape and weld together the open ends.

These small sizes of machine-welded chains are often made with twisted links, but are never made in the form of stud chains. Weldless machine-made chains are manufactured by automatic machinery which takes the rolled iron, cuts it into lengths, forms these lengths into links, and connects or couples the links into completed chains. In weldless chains the links are formed by twisting or locking the unconnected ends of the short lengths of rod. There are numerous forms of such connections, and certain advantages are claimed for each form. Chains of this construction are made only in the small sizes which are used for horse halters, cow ties, dog chains, fence chains, and similar purposes. For many of these brass, bronze, and composition metals are used instead of iron, but the process of manufacturing the chain is otherwise unchanged. With the exception of the stud chain, the chains so far described have each link composed of a single piece of metal bent to form and welded, twisted into a closed ring.

Chains for transmitting power are of an entirely different construction. In certain of these each link is made of several pieces of metal connected by rivets, bolts, or stud screws, and is so formed as to engage with the teeth of a sprocket wheel. The bicycle chain is an excellent example of this variety. Chains of this kind are made by assembling by hand the several parts composing each link and connecting them; the separate parts are themselves cut, stamped, turned, threaded, or otherwise formed by machinery designed especially for the purpose. Drive chains may be made of malleableized cast iron, each link a separate unit, and so formed that one link can be slid sidewise to lock with the next one, but cannot unlock except in a position which the links will never occupy relatively to each other in service.

Silent chains are those in which each link is made up of several plates set edgewise and side by side, and with profiles on the inner or driving side which fit the epicycloidal or involute profiles of the ordinary spur-gear wheel. Such chains are much used in driving the pump and valve-gear shafts in motor vehicles, and in transmitting motion and power to the driving or rear axle of such vehicles. The drive chain has a flexibility against the twisting action by road shocks far greater than any other means of transmitting power at the low speeds required. See BELT; LINK.

A chain used almost exclusively in plumbing for securing washbowl stoppers, etc., is called safety chain. Each link is stamped from a sheet of metal and has an eye at each end. The first link is bent around so that the eyes lie together; the next link is then threaded through the two eyes and bent to bring its eyes together.

Watch chains, neck chains, and other chains made of precious metal for ornament form a class by themselves. Some of the larger and heavier chains of this class, which are made in the simple forms common to the chains of brass and iron which have been described, are made by methods closely corresponding to those used in making iron and brass chains. The smaller sizes of wire chains are made by machinery with twisted and locked links, others are formed by methods analogous to that adopted in producing machine-made welded chains of iron, the links being closed by brazing instead of by welding. In still other forms the links are stamped and cut from metal plate and are assembled and brazed together by hand.

The strength of chains is a very important matter in certain uses to which chains are put. For example, the safety of an anchored ship and the lives of its crew may often depend upon the strength of its chain cable. For this reason the British Admiralty and corresponding organizations in other countries require all chain cable to undergo severe tests before it is used on shipboard. Similar tests are required by rail-

ways, builders of cranes and dredges, and other large users of chain. The size of chains is defined by the diameter of the bar of which the links are made; thus, a 1-inch chain is one whose links are made by bars of 1 inch in diameter. According to tests made by the United States Testing Board, "with proper material and construction the ultimate resistance of chains may be expected to vary from 155 per cent to 170 per cent of that of the bar used in making the links and to show an average of about 163 per cent." This conclusion refers only to hand-welded chain cable. The Pennsylvania Railroad requires its 1½-crane chain to stand without giving way a pull of 70,000 pounds, and not to break under a load of 16,000 pounds. The British Admiralty requires a 2-inch stud-chain cable to withstand a proof load of 72 tons before it is used. These figures are selected at random for the purpose of illustration. For a statement of the test requirements of the Pennsylvania Railroad, the British Admiralty, and the United States Testing Board, see Kent, *Mechanical Engineer's Pocket Book* (8th ed., New York, 1913). Special literature on the manufacture of chains is very scarce, and such as there is will be found scattered through the engineering papers and the proceedings of the various engineering societies.

CHAIN, Anchor. See Cable; Anchor.

CHAIN, Engineer's, or Surveyor's. See Engineering Instruments.

CHAIN BRIDGE. See Bridge.

CHAIN CABLE. See Cable.

CHAIN CORAL. See Halysites.

CHAIN CREEPER. See Bauhinia.

CHAIN MAIL, or **CHAIN ARMOR.** A coat of hammered iron links, interwoven into the form of a garment. It was much more flexible and convenient than either the byrnie or plate armor, but was not so good a protection as the latter. It was much used from the twelfth to the fourteenth century. See Armor; Coat of Mail.

CHAIN SHOT. A projectile composed of two shots fastened together by a short chain, and used chiefly at sea to cut or destroy the enemy's rigging. It has long been obsolete.

CHAIN SNAKE. A North American harmless snake (*Ophibolus getulus*), found from the Hudson River and Great Lakes to Mexico, and subject to great variation in color and markings. The typical form of the East and South is lustrous black, crossed by about 30 yellow lines which unite along the sides, forming a chain-like pattern; the belly is yellowish, blotched with black; headplates black, with yellow spots. The lighter and larger variety west of the Mississippi is *sayi*, and that of the Pacific coast *boylii*. In the last the markings are ivory-

CHAIN SNAKE — TOP AND PROFILE VIEWS.

white, and in the form of bands encircling the body and broadening, but not coalescing, along the sides, so that it has been described as "cream colored, sharply marked by rings of black," instead of the reverse. Everywhere these snakes are large (4 to 5 feet), strong, active, and mainly nocturnal. They do not take to water nor climb trees, and feed mainly upon small mammals, amphibians, and reptiles, including other snakes; and they are protected by the country people of the South and West, as one of the "king" snakes (q.v.), because they constantly destroy venomous reptiles. The chain snake kills these serpents by constricting tightly, disregarding their repeated bites, as it is quite immune to their poison. See Plate of Snakes, American Harmless.

CHAIX D'EST ANGE, shā'dā'tänzh', Gustave Louis Adolphe Victor Charles (1800–76). A French advocate. He was a brilliant pleader. In 1857 Napoleon III appointed him *procureur général* and soon after Councilor of State. In 1862 he was made senator; in 1863 Vice President of the Council of State; and in 1864 President of the Department of Public Works and Fine Arts. He retired in 1870. Consult Rousse, *Chaix d'Est Ange* (3 vols., Paris, 1862–77).

CHAJ'JUG. See Hayyuj.

CHAKA, chä'kà, or **TCHAKA.** A chief of the Zulus. See Zululand.

CHALAZA, kà-lā'zà (Neo-Lat., from Gk. χάλαζα, *chalaza*, hailstone, pimple). The basal region of an ovule, in which there is no differentiation of integument. See Ovule.

CHALAZOGAMY, kāl'à-zŏg'à-mĭ (from Gk. χάλαζα, *chalaza*, hailstone, pimple + γάμος, *gamos*, marriage, from γαμεῖν, *gamein*, to marry).

Casuarina showing chalazogamy: *p*, pollen tube descending to the chalazal region of the ovule and entering the bundle region (*b*), turning upward into the nucellus (*n*), entering the embryo sac (*e*) from below, and thus approaching the egg

The passage of the pollen tube through the chalaza of the ovule. In seed plants the pollen tube ordinarily reaches the egg by passing through the micropyle, which is a small passageway left by the integument of the ovule. In certain cases, however, it has been discovered that the pollen tube does not enter in this way, but pierces the ovule in the general region of the chalaza, which is the base of the ovule, where the integument and body of the ovule are indistinguishable. In this way the tube approaches the egg from beneath and burrows its way through the intervening tissue. This phenomenon

is known as "chalazogamy," as distinguished from the ordinary method, which has been called "porogamy." Chalazogamy has been discovered as yet only in connection with the amentaceous trees, those in which it has been recorded being birch, alder, hornbeam, walnut, hazel, casuarina, and elm. While in most of these cases the pollen tube enters through the chalazal region, in the elm it passes into the ovule above the chalaza. However, the term "chalazogamy" has been extended to include all cases in which the pollen tube does not enter by way of the micropyle. When chalazogamy was first discovered in *Casuarina*, it was thought to indicate that this genus was the most primitive of the flowering plants. This view has continued to be held by certain botanists with the multiplication of cases of chalazogamy. These cases are so well scattered, however, that the general opinion is that chalazogamy is not a primitive feature, but may occur in any group of plants when the conditions are appropriate.

CHALCAN'THITE. A natural hydrous sulphate of copper, having the same composition, appearance, and properties as the artificial product known as blue vitriol.

CHALCE'DON, or **CALCHE'DON** (Lat., from Χαλκηδών, *Chalkēdōn*, or Καλχηδών, *Kalchēdōn*). A city of ancient Bithynia, at the entrance of the Bosporus, opposite Byzantium. It was founded about 677 B.C. by a colony from Megara and soon became a place of considerable trade and importance. It contained several temples, one of which, dedicated to Apollo, had an oracle. After the liberation of the Greek cities from Persian rule, Chalcedon joined the Athenian League, but at the end of the Peloponnesian War came into possession of the Spartans. With the rest of Bithynia, it was bequeathed to the Romans by King Nicomedes III. (See BITHYNIA.) During the Mithridatic War it was the scene of a bold exploit of the Pontic sovereign. Bithynia having been invaded by Mithridates, all the wealthy Romans in the district fled for refuge to Chalcedon, whereupon he broke the chains that protected the port, burned four ships, and towed away the remaining 60. Under the Empire Chalcedon was made a free city, and it was the scene of a general council, held 451 A.D. Chosroës II, King of Persia, captured it 616 A.D., after which it declined, until it was finally demolished by the Turks, who used its ruins to build mosques and other edifices in Constantinople. Chalcedon was the birthplace of the philosopher Xenocrates.

The Council of Chalcedon, to which allusion has been made, was the fourth general council, and was assembled by the Emperor Marcian for the purpose of drawing up a form of doctrine in regard to the nature of Christ, which should equally avoid the errors of the Nestorians (q.v.) and those of the Monophysites (q.v.). Six hundred bishops, almost all of the Eastern or Greek church, were present. The doctrine declared to be orthodox was that in Christ there were two natures, which could not be intermixed (this clause was directed against the Monophysites), and which also were not in entire separation (this was directed against the Nestorians), but which were so conjoined that their union destroyed neither the peculiarity of each nature nor the oneness of Christ's person.

CHALCEDONY, kăl-sĕd'ô-nĭ (Lat. *chalcedonius*, a gem named after Gk. Χαλκηδών, *Chalkēdōn*, a city in Asia Minor, where it abounded, Gk. χαλκηδών, *chalkēdōn*, chalcedony). A crystalline variety of quartz of various shades of white, yellow, brown, green, and blue. It is transparent or translucent, and some of the milk-white varieties are opaque. It occurs in mammillary, botryoidal, and stalactitic shapes, and as a lining or filling of cavities in rocks. The principal varieties of chalcedony are *agate*, which is banded and striped; *carnelian*, which is clear and of various shades of red; *chrysoprase*, an apple-green variety, in which the color is due to nickel oxide; *heliotrope* or *bloodstone*, of a dark-green color, with small spots of jasper; *onyx*, consisting of bands of different colors, usually black and white; *plasma*, of a deep-green color; and *sardonyx*, a red-banded variety of onyx, all of which are described in special articles under their names. The variety of its colors and the high lustre that it takes by polishing render chalcedony valuable for brooches, necklaces, and other ornaments, and some varieties of it are cut as seal stones. Chalcedony is found in Great Britain, in Brazil, and in a number of localities in Colorado and California. The formation of the famous agatized wood of Chalcedony Park, Ariz., is caused by a natural replacement of the woody fibre by chalcedony from siliceous waters.

CHALCEDONYX, kăl-sĕd'ô-nĭks (from Gk. χαλκηδών, *chalkēdōn*, chalcedony + ὄνυξ, *onyx*, finger nail, onyx, Lat. *onyx*. See CHALCEDONY). A variety of agate consisting of alternate layers of a white opaque and a grayish translucent chalcedony.

CHALCHIHUITL, chăl'chê-wē't'l (Mexican). A green mineral referred to by Spanish writers contemporary with Cortés. It was held in high repute by the ancient Mexicans, who valued it more than gold. The Mexicans believed that the art of cutting and polishing chalchihuitl had been taught them by the god Quetzalcoatl. The best authorities believe the mineral to have been the bluish-green variety of turquoise from Los Cerillos mines, New Mexico, although some still think it is a variety of jadeite. A blue calamine from Chihuahua, Mexico, has recently been claimed to be chalchihuitl.

CHALCIDICE, kăl-sĭd'ĭ-sē (Lat., from Gk. Χαλκιδική, sc. χώρα, *chōra*, district, *Chalkidikē*, of Chalcis). The ancient name of three districts in Grecian or partly Grecian lands. 1. In Eubœa, the land belonging to the inhabitants of the town of Chalcis, on the southwestern side of the island, near the Strait of Euripus. (See CHALCIS.) 2. A district of Macedonia, between the Thermaic and the Strymonic gulfs (Map: Greece, Ancient, C 1). The lower part of this district forms three peninsulas, called, from west to east, Pallene (or, more anciently, Phlegra), Sithonia, and Acte or Athos. This district received its name from Chalcis, in Eubœa, having been settled in the eighth century B.C. by colonists from that place. Among the flourishing towns of Chalcidice were Olynthus and Potidæa. 3. A district in Syria, extending eastward from the Orontes River to the desert, and called Chalcidice from the town of Chalcis, lying therein.

CHALCIDIDÆ. See CHALCIS FLIES.

CHALCIS, kăl'sĭs (Lat., from Gk. Χαλκίς, *Chalkis*). The capital of the island and the Nomarchy of Eubœa, Greece, situated on the Euripus, the strait which separates the island from Bœotia (Map: Greece, E 3, and Ancient Greece, C 2). The Euripus is divided into two channels, of unequal breadth and depth, by a rock which is

surmounted by a castle, partly of Venetian and partly of Turkish construction. A shallow channel, 85 feet wide, separates the rock from Bœotia and is crossed by a stone bridge. The main channel, about 120 feet wide, through which a strong current flows, was at one time crossed by a drawbridge, which has been removed in modern times in connection with operations for widening and deepening the channel. The site seems to have been occupied in very early times, and during the ninth and eighth centuries B.C. the inhabitants were active colonizers, especially towards the north, where they gave their name to the Chalcidian Peninsula on the Macedonian coast. (See CHALCIDICE, 2.) They also appear early as allies of the Corinthians in the Greek colonization of Italy and Sicily, where they settled Cumæ and Naxos, and gave their alphabet to the Italians, via Cumæ (q.v.). After a long war with its rival, Eretria, Chalcis acquired the undisputed headship of Eubœa and rapidly rose to wealth and importance. Its government was strongly aristocratic, but after a crushing defeat at the hands of the Athenians (506 B.C.) the nobles were driven out and a democracy established. It subsequently fell under the power of the Macedonians and the Romans and was at this time a place of great military importance, nearly 9 miles in circumference, and had many fine temples, theatres, and other public buildings. The orator Isæus and the poet Lycophron were born at Chalcis; Aristotle died there. In the Middle Ages it was prosperous under the Venetians, who held it for nearly three centuries, until its conquest by the Turks in 1470. Not many ancient remains now exist. The streets are narrow, but the houses, many of which owe their origin to the Venetians, are substantial and spacious. It suffered from an earthquake in 1894. Pop., 1896, 8661; (commune), 15,989; 1907, 19,950.

CHALCIS (kăl′sĭs) **FLIES,** or **CHALCIDIDÆ,** kăl-sĭd′ĭ-dē (Neo-Lat. nom. pl., from Gk. *χαλκίς, chalkis,* lizard, either from Χαλκίς, *Chalkis,* a city of Eubœa, or, more probably, like the name of the town itself, from *χαλκός, chalkos,* copper). A group of very small Hymenoptera, characterized by elbowed feelers. They number thousands of species and are truly parasitic, except a few gall-making and seed-feeding genera. One large section glues its eggs upon the backs of caterpillars of moths. These eggs hatch in about two days, when the grubs quickly bury their heads in the skin of their host and begin to feed, growing more rapidly than any other known insect larvæ, and reaching full growth within three or four days. The first to mature then withdraws its head, preparatory to pupating—an act which at once causes the death of the exhausted caterpillar and consequently of many belated grubs. The more advanced survivors spin and attach their cocoon to the underside of the empty skin of the dead host, which thus furnishes a roof, and within about eight days complete their transformation and emerge as adult chalceids. The fact that they attack many fly maggots, caterpillars, etc., greatly injurious to cultivated plants, and destroy them with much speed and certainty, places them among the most valuable aids mankind has in its warfare against insect pests. It is due to these insects, principally, that the cotton worm of the South is kept down, and millions of dollars' worth of cotton saved each year. "Nowhere in Nature," remarks L. O. Howard, "is there a more marked example of the correlation between structure and habits than occurs in this family. . . . So that it is possible for an experienced person, on seeing a new species of chalcis fly, to tell precisely what kind of insect it will be found parasitic upon." See Howard, *The Insect Book* (New York, 1901); also papers, often illustrated, by Howard and Ashmead, in the publications of the United States National Museum and Department of Agriculture.

CHALCIS FLY.

CHAL′COCITE. A copper sulphide occurring in crystals of the orthorhombic system, but more frequently met with in granular or compact masses. The lustre is metallic, and the color lead gray, which tarnishes to dull black on exposure. Chalcocite occurs commonly associated with other copper minerals, as in the Cornwall mines, where beautiful specimens are found. It also occurs in Bohemia, Saxony, Mexico, South America, and at Bristol, Conn. See COPPER.

CHALCOGRAPHY, kăl-kŏg′rȧ-fĭ (from Gk. *χαλκός, chalkos,* copper + *γράφειν, graphein,* to write). A modern term used to signify engraving on copper and steel plates. It is more properly called "line engraving" (q.v.).

CHALCONDYLAS, kăl-kŏn′dĭ-lȧs, or **CHALCON′DYLES,** DEMETRIUS (c.1424–c.1511). A Greek scholar. He was born in Athens, and after teaching Greek in various cities of Italy, from 1447 onward, was called by Lorenzo de' Medici to the chair of Greek in Florence (1471), where Pope Leo X was one of his pupils. After the death of the Prince (1492), he was professor of Greek in Milan, where he died. Chalcondylas wrote a Greek grammar, entitled *Erotemata* (c.1493), worked out in the form of questions and answers, and published editions of Homer (1488), of Isocrates (1493), and of the *Lexicon* of Suidas (1499). Consult Hody, *De Græcis Illustribus* (London, 1742).

CHALCOPYRITE, kăl′kŏ-pī′rīt (from Gk. *χαλκός, chalkos,* copper + *πυρίτης, pyritēs,* flint, from *πῦρ, pyr,* fire), commonly called COPPER PYRITES. A copper-iron sulphide that crystallizes in the tetragonal system. It has a metallic lustre, is of a brass-yellow color, and is often tarnished or iridescent. It occurs widely disseminated in metallic veins and in the older rocks, frequently with pyrite or iron sulphide, and sometimes with nickel and cobalt sulphide. This mineral occurs in large deposits in Sweden, in the Harz Mountains, in Bohemia, Hungary, New South Wales, and in South Africa. In the United States it is found quite largely in Colorado, Montana, Arizona, Utah, and California, where it frequently carries gold and silver. It is also found in Vermont, Tennessee, and North Carolina, and is here mined as a copper ore. When tarnished, it is sometimes called *peacock ore,* owing to the iridescent film of brilliant colors with which it becomes coated.

CHALDÆA, kăl-dē′ȧ. See BABYLONIA.

CHALDÆAN (kăl-dē′*an*) **RITE,** CHRISTIANS OF THE, also called SYRO-CHALDÆANS, or SYRO-ORIENTALS. A branch of the Nestorians who

acknowledge the Pope of Rome. They use the Eastern rite and are under the Patriarch of Babylon, usually residing at Mosul. Their number is estimated at about 66,000. See NESTORIANS.

CHALDÆANS (from Lat. *Chaldæi*, Gk. Χαλδαῖοι, *Chaldaioi*, Heb. *Kasdīm*, Assyr. *Kaldi*). Properly a designation of a Semitic people, whose original home was southeast of Babylonia, on the Persian Gulf, in the Sea Land (Mat Tamti). There was a considerable number of Kaldu states, such as Bit Ammukani, Bit Dakan, Bit Shilani, Bit Shaali, and Bit Yakin. Of these the most important seems to have been Bit Yakin. Hommel's theory that Ur (Muḳḳayar) belonged to the realm of the Kaldu as early as the third millennium B.C. is not convincing. It is possible that already the Pashe dynasty (1185–1051) was Chaldæan. In the case of Mat Tamti (1051–1030) and Bit Bazi (1030–1010), this is quite probable. Adadnirari III, in 803, received tribute from Kaldu princes. In 723 Ukinzir, of Bit Ammukani, consequently a Chaldæan, ascended the throne of Babylon. Marduk-apaliddin (Merodach Baladan), ruler of Bit Yakin, made himself King of Babylon in 721 and maintained himself with the aid of Elamites and Aramæans until 709. In 702 he returned for nine months, but was driven back to Bit Yakin by Sennacherib. In 693–689 another Chaldæan, Mushezib Marduk, occupied the throne of Babylon. But it was with Nabuapaluzur (Nabopolassar) (625–604) and Nabukuduruzur (Nebuchadnezzar), his son (604–562), that Chaldæan princes seated themselves upon this throne who were able to make Babylonia a world power. Nabukuduruzur's son, Amil Marduk (Evil Merodach), who reigned 562–560, was overthrown by Nergalsharuzur (560–556), and the son of this usurper, Labashi Marduk (556), was the last Chaldæan King. He was supplanted by a Babylonian, Nabunaid (Nabonidos), who reigned 556–549. The period of foreign conquests and a powerful inner administration had made the terms "Chaldæan" and "Babylonian" practically synonymous with foreigners. Hebrew writers of the postexilic period speak of the Babylonians as Chaldæans (Kasdim). In the second century B.C. the term "Chaldæan" was used by the author of the Book of Daniel as a designation of a class of magicians. Concerning the Chaldæan language we have no other information than that which may be gleaned from proper names. These suggest a closer kinship to the Babylonian than to either Arabic or Aramaic. After the conquest of Babylon the native Chaldæan dialect was no doubt crowded out by Babylonian and Aramaic. The latter was regarded by the author of Dan. ii. 4a not altogether erroneously as the "language of the Chaldæans," though the language of the following chapters is not the East Aramaic spoken in Babylonia to some extent, but the Judæan dialect. (See DANIEL, BOOK OF.) Hence Aramaic was called "Chaldee" by Jerome, and the confusing term has remained in use until recent times. The failure to distinguish between Babylonians and Chaldæans has added to this confusion. It is probable that the Chaldæan system of astronomy and astrology was developed by this people in Babylonia, on the basis of earlier observations in the beginning of the first millennium B.C. The Chaldi, a people related to the modern Georgians of the Caucasus, were called by the old geographers "Pontic Chaldæans," but they were Chaldæans in name only and non-Semitic. (See CHALDIANS.) Consult: Delattre, "Les Chaldéens," in *Revue des questions historiques* (Paris, 1896); Winckler, *Untersuchungen zur altorientalischen Geschichte* (Leipzig, 1889); Brinton, *Protohistoric Ethnography of Western Asia* (Philadelphia, 1895); Ed. Meyer, *Geschichte des Altertums*, i, 2, pp. 434, 592 ff. (3d ed., 1913).

CHALDEE PARAPHRASE. See TARGUM.

CHALDIANS, kăl'dĭ-anz (Gk. Χαλδαῖοι, *Chaldaioi*, Χάλδοι, *Chaldoi*, Lat. *Chaldi*). A people inhabiting Armenia before the arrival of the Haik. The early Assyrian kings called this country Nairi. It was then inhabited by petty nomadic tribes of uncertain ethnic relation. About 900 B.C. the Chaldians seem to have entered the country from the northeast and founded a powerful kingdom. The name by which they designated themselves, and the land which they conquered, was that of their chief god, Chaldis. It is impossible as yet to determine to what family of nations they belonged. But a connection may be suspected with such people as the Mushki, Kashki, Tabal, Kummuch, and Chatti. The Assyrians, from the time of Asurnazirpal III (885–860), called them Urartu, which may have been the name of the first tribe or district with which they became acquainted. It is possible that Arame, against whom Shalmaneser III (860–825) fought in 857 and 845 B.C., was the first Chaldian King who succeeded in uniting under his sceptre the territory around Lake Van. In 833 Shalmaneser III warred with a Sarduris, who is possibly to be identified with the Sarduris, son of Lutipris, of whom three inscriptions in Assyrian have been found. These agree most closely with the Assyrian inscriptions of the time in form and character. Ispuinis, who is called Ushpina by Samsi Adad V (825–812), associated with himself his son, Menuas. It is possible that Ispuinis was the conqueror and organizer of the territory of Biaina and that he made Tuspas the capital. Menuas is known to us chiefly through his building enterprises. The canals he constructed reveal the great architectural skill of the builders and their remarkable knowledge of hydraulics. They also show the great extent of territory and large resources of the King. In 802, 792, and 785 Adad Nirari V (812–783) made campaigns against Menuas. About 80 inscriptions in the Chaldian language of this King have been found. Argistis (785–760), a great conqueror, further extended the boundaries of Chaldia. He left a long inscription on the rock of Van and many others. In vain Shalmaneser IV (783–773) repeatedly invaded his territory. He was defeated, and the power of the Chaldian King grew apace. Sarduris II (760–730) appears to have a right to call himself "King of Kings," as he was the actual liege lord over Melitene, Commagene, Arpad, Cilicia, and some adjoining districts. Owing to the weakness of Assyria during the generation from Shalmaneser IV to Tiglath-pileser IV, Chaldia became quite the most important power in western Asia. In the struggle for empire between Chaldia and Assyria Tiglath-pileser III (745–728) was able in 735, by an expedition into the very heart of Chaldia, to establish the Assyrian power in Asia by greatly weakening the rival state, yet was obliged to retire without being able to capture the impregnable capital. The final struggle between Rusas I (730–712) and Sargon II (722–705) ended in the loss of

Chaldian supremacy. The Assyrian reports are indeed wrong in stating that Rusas committed suicide. He was even able to extend his power somewhat after the alleged defeat, north and east. But in the west and the south Assyria had effectually checked the growth of Chaldia. And towards the end of Sargon's reign the Kimmerians fell upon Chaldia from the north. This invasion Argistis III, mentioned by Sargon in 709, or his successor, Rusas II, seems to have still been in a position to repulse. But their territory unquestionably suffered much. Internally these reigns are marked by great advance in architecture, sculpture, and other arts. Rusas II built an important residence city at Toprakkaleh, near Van, called Rusachina, the ruins of which have been excavated. Erimenas is known only as the father of Rusas III, who appears to have been the father of Sarduris III, mentioned in an inscription of Asurbanipal (668–625) as having finally submitted to Assyrian suzerainty. If this is more than a vain boast, it may mean that the Scythians (Ashkuza), having established themselves in the territory of the Mannai and become allies of the Assyrians about 630, forced their western neighbors to seek safety from repeated raids in acknowledging Assyrian authority. It is possible that, with the fall of the Scythian power through the Medes, the Chaldians also were incorporated in the Median Empire immediately before or soon after the destruction of Nineveh, in 606. The invasion of the Haik, the modern Armenians, in the sixth century B.C., drove the Chaldians into exile. While the Assyrian form of the name survived in the biblical Ararat (Gen. viii. 4; Jer. li. 27; 2 Kings xix. 37; Isa. xxxvii. 38) and in the Alarodioi, who, according to Herodotus, served in the army of Xerxes, the name "Chaldian" has been preserved in the Chaldaioi of Sophocles, Xenophon, Strabo, and Plutarch, in the Chaldoi and the theme Chaldia of Byzantine times, in numerous place names, and in the Armenian Chaltiq. The Chaldians are also identical with the Χάλυβες, *Chalybes*, of the Greeks, as Lehmann-Haupt has shown. Possibly there is even a remnant of the old Chaldians in Chalt, near Baiburt.

The Chaldians worshiped as their highest god Chaldis, by the side of him Ardinis, a sun god, and Teisbas, a storm god, as well as a host of minor deities conceived as the sons of Chaldis. Their civilization was no doubt borrowed from Assyria, but in some respects advanced beyond the point reached by the Assyrians themselves. They were probably the discoverers of the methods of ironworking, for which the region became famous among the Greeks. Unlike the Assyrians, they erected their buildings of massive walls of stone. The country was intersected with fine roads and canals, showing great technical knowledge. Their sculptures are more lifelike than the Assyrian. They excelled in mosaics, filigree work, and ceramics.

The Chaldian language was written in cuneiform characters, borrowed from the Assyrian, but simplified by giving only one value to each sign, avoiding signs representing closed syllables, and using as a rule separate signs for the vowels, thus made to approach to a purely alphabetical system. The family to which it belongs has not been determined. It has some affinity with the Georgian and may belong to the same group as Mitannian, Hittite, and some early Asianic languages. Nearly 200 native inscriptions have been discovered in all parts of modern Armenia, presenting some dialectical differences. They were first studied by Schultz and Hincks, who worked out the general idea with the aid of Assyrian ideographs. Guyard first noticed the identity of the imprecations at the end of the inscription with those found on Assyrian documents. Sayce established the main outlines of the grammar. D. H. Müller cleared up many difficulties. Belck and Lehmann discovered most of the inscriptions, and Sandalgian has brought them together in a corpus.

Bibliography. A good account of the Chaldians is found in Maspero, *The Passing of the Empires* (London, 1899). Consult: Sayce, in *Journal of the Royal Asiatic Society*, xiv–xx (London, 1882–94); Belck and Lehmann, *Zeitschrift für Ethnologie* (Berlin, 1892 et seq.); id., in *Zeitschrift für Assyriologie* (Leipzig, 1892 et seq.) and in *Verhandlungen der Berliner anthropologischen Gesellschaft* (Berlin, 1892 et seq.); Müller, *Die Keilinschrift von Aschrut Daga* (Vienna, 1890); Nikolsky, *Les inscriptions cunéiformes de Koelani Girlan* (1893); Olmstead, in *American Journal of Semitic Languages* (Chicago, 1901); Lehmann-Haupt, "Materialien zur alten Geschichte Armeniens und Mesopotamiens," in *Abhandlungen der Gött. Ges.* 1907); id., *Armenien einst und jetzt* (1910); Bagel, "Vorarmenische Keilinschriften," in *Der Zeitgeist* (1912); Ed. Meyer, *Geschichte des Altertums*, i, 2, pp. 698 f. (3d ed., 1913).

CHÂLET, shȧ'lȧ' (from ML. *castelletum*, dim. of *castellum*, fort, castle, from *castrum*, fort). The French-Swiss name for the wooden summer hut of the Swiss herdsmen on the mountains; but the term is also extended to include Swiss houses generally as well as picturesque and ornate villas built in imitation of them.

CHALEURS BAY, or **BAIE DES CHALEURS,** bȧ dȧ shȧ'lēr' (Fr., bay of heat). An inlet on the west side of the Gulf of St. Lawrence, which partly separates New Brunswick from Quebec (Map: Newfoundland, D 5). It is about 85 miles in length from east to west and has a maximum width of over 20 miles. While its depth is only about 250 feet in the channel, yet a depth of 100 feet is found quite near the shore, thus affording commodious anchorage and easy access to the land. Chaleurs Bay receives numerous small streams, chief of which are the Nepisiguit River from the south and the Patapedia River from the west. Fishing is the chief industry. A number of towns skirt the shore. Chaleurs Bay receives its name from Jacques Cartier, who entered it in the hottest month of 1535.

CHALICE, chăl'ĭs (Fr. *calice*, It. *calice*, AS. *calic*, Ger. *Kelch*, OHG. *chelih*, from Lat. *calix*, Skt. *kalaśa*, cup). This ancient name for a drinking cup has been retained for the vessels used for the wine in the holy sacrament. Some of the earliest were made of wood or horn; others, of which there are some superb Byzantine examples, of glass, crystal, or agate. But on account of their fragility, these materials fell into general disuse in favor of precious metals; and most mediæval, Renaissance, and modern chalices are of gold, silver gilt, or silver, often decorated with enamels and set with precious stones. They were among the objects on which the goldsmith lavished the greatest care. Many examples remain in industrial and other muse-

ums and in church treasuries throughout Europe; in some cases small parish or cathedral churches have preserved their old pieces more carefully than have the larger institutions.

There were two classes of chalices: the ordinary chalice, used by the priest at the altar, and the ministering chalice, for the communion of the congregation. (See COMMUNION IN BOTH KINDS.) The latter was larger and frequently had two handles. The chalice always consisted of three parts—a bowl, a long neck, and a foot. It varied very much in shape. The earliest (fourth to eighth century) had a deep, slender bowl, which became broader and more semicircular in the Romanesque age, and then changed radically during the Gothic period, passing first to a broader flat bowl, with enlarged foot, and then to a conical, tunnel-shaped bowl with longer neck, often broken with bulbs. The bowl itself, which was originally the most decorative part, tended to become the simplest with smooth surface. The chalice is the symbol of St. John the Evangelist. Consult Giefers, *Ueber den Altarkelch* (Paderborn, 1856), and Corblet, *Histoire du sacrement de l'Eucharistie* (Paris, 1885).

CHALK (AS. *cealc*, Ger. *Kalk*, Fr. *chaux*, Ir. *cailc*, from Lat. *calx*, lime). A soft, earthy variety of limestone or carbonate of lime, which often forms beds of great thickness and extent. It is usually yellowish or white in color, has an earthy texture, is rough to the touch, and adheres slightly to the tongue. The average chemical composition is about that of English chalk —calcium carbonate, 97.90 per cent; silica, 0.66 per cent; magnesium carbonate, 0.10 per cent; ferric oxide, 0.35 per cent.

Chalk is formed by the accumulation on the ocean bottom of the tiny shells of Foraminifera, fragments of molluscan shells, sea-urchins' spines, and sponge spicules, which can be seen under the microscope. It is very abundant in certain areas and also in certain geological formations, the Cretaceous system being so named on account of the thick and extensive deposits of chalk which it contains. These deposits are especially abundant in England and France, where the great white cliffs of chalk on both sides of the English Channel, notably in the vicinity of Dover, England, and Dieppe, France, are conspicuous objects. In the United States chalk is known to occur in the Cretaceous formation of Iowa, in the Tertiary of Texas and Arkansas, and in other States.

Chalk is not much used as a building stone, chiefly because of its low resistance to the weather. In England some of the harder beds are occasionally employed for structural purposes. It is burned to lime, and the mortar is used generally in the construction of buildings in London. In England chalk has been used for many years as an ingredient of Portland cement, and more recently the Arkansas chalk has been employed for the same purpose. When ground and mixed with water it forms "whitewash." If the ground material is freed from grit by washing, it is known as "whiting," which is used for cleaning silver and making putty. "Gilder's white" and "Paris white" are forms of the same material which have been more carefully washed. On account of its color and softness, it finds general application as a marking material, but when so used has to be mixed with some bonding substance. (See CRAYON.) Like lime and gypsum, chalk is used in farming to ameliorate the texture of the soil. In a purified condition it is administered as medicine to correct acidity of the stomach. The flint concretions so abundant in the chalk of Europe are used for pebbles in ball mills. See CRETACEOUS SYSTEM; SOIL; PORTLAND CEMENT; LIME.

CHALK, BLACK. See CRAYON.

CHALK FORMATION. See CRETACEOUS SYSTEM.

CHALKIS. See CHALCIS.

CHALLEMEL-LACOUR, shâl'mĕl' lȧ'kōōr', PAUL AMAND (1827–96). A French publicist and politician. He became professor of philosophy at the Lyceum of Pau in 1849, and at the time of the coup d'état, while holding a similar position at the Lyceum of Limoges, was arrested because of his pronounced Republican opinions. After a few months of imprisonment he was expelled from France. He went to Belgium, where he lectured on literature, and thence to Germany and Italy. In 1856 he became professor of French literature at the Polytechnic Institute of Zurich, and in 1859, being amnestied, returned to France. He soon became known as one of the ablest contributors to the *Temps*, the *Revue Moderne*, and other influential journals. For a short time he was editor of the *Revue des Deux Mondes*. After the fall of the Second Empire he became Prefect of the Department of the Rhône. He was elected deputy (1872), senator (1876), President of the Senate (1893). He was, from 1880 to 1882, Ambassador to England, and became Minister of Foreign Affairs in 1883. In 1893 he was elected a member of the French Academy. He translated Ritter's *Geschichte der Philosophie* (1861) and *La philosophie individualiste: étude sur Guillaume de Humboldt* (1864), and edited, in 1869, the *Works* of Madame d'Epinay, the friend of Rousseau. In 1897 appeared *Œuvres oratoires de Challemel-Lacour*, edited by Joseph Reinach. His essays were collected as *Etudes et réflections d'un pessimiste* (1901).

CHALLENGE (OF. *chalenge, chalonge*, It. *calogna*, accusation, from Lat. *calumnia*, false accusation, from *calvi*, to deceive). In English and American law, the criminal offense of inciting another to fight with deadly weapons. No set phrase or form of words is necessary to constitute a challenge. Any language which, when connected with the circumstances of a quarrel and the conduct of the parties, shows an intention to invite or solicit a meeting in order to fight with deadly weapons, amounts to a challenge. Giving a challenge, or knowingly bearing one, or even inciting to a challenge, is a criminal offense at common law. The tendency of modern statutes is to subject all persons connected with a challenge to severe criminal punishment and to disqualify them from holding public office thereafter. See DUELING.

In civil and criminal procedure, a formal exception taken to one or more persons summoned to serve as jurors. When exception is taken to the entire panel, it is called a challenge *to the array*, or *to the panel*, or a motion to set aside the panel, or to quash the array. A challenge is said to be *for cause* when it is based upon a state of facts which, if established, renders the juror incompetent, as that he is pecuniarily interested in the case, or disqualified by reason of age, sex, or mental condition. A challenge is said to be *to the favor* when founded on a charge that the juror is biased or subject to some improper influence. A *peremptory* challenge is one for which no reason need be

assigned. The number of peremptory challenges allowable in civil or criminal cases is regulated by statute. Challenges are to be made after the appearance of the jurors and before they are sworn. For further particulars, see JURY.

CHAL'LENGER EXPEDI'TION. A scientific exploration of the open sea sent out by the British government in 1872–76. In 1872 the *Challenger*, a corvette of 2306 tons, was completely fitted out and furnished with every scientific appliance for examining the sea from surface to bottom, e.g., with natural-history workroom, chemical laboratory, and aquarium. The ship was placed in charge of a naval surveying staff under Captain Nares and of a scientific staff, with Prof. Wyville Thomson at their head, for the purpose of sounding the depths, mapping the basins, and determining the physical and biological conditions of the Atlantic, the Southern, and the Pacific oceans. During three and a half years the *Challenger* cruised over 68,900 nautical miles. Investigations were made at 362 stations, at each of which were determined the depth of channel, the bottom, surface, and intermediate temperatures, currents, and fauna, and the atmospheric and meteorological conditions. The route was by Madeira, the Canaries, the West Indies, Nova Scotia, Bermudas, Azores, Cape Verde, Fernando Noronha, Bahía, Tristan d'Acunha, Cape of Good Hope, Kerguelen, Melbourne, the China Sea, Hongkong, Japan, Valparaiso, Straits of Magellan, Montevideo, Vigo, and Portsmouth. Between the Admiralty Islands and Japan the *Challenger* made her deepest sounding, 4575 fathoms. Consult Wyville Thomson and Dr. John Murray, editors of the copious *Reports on the Scientific Results of the Voyage of H. M. S. Challenger* (50 vols., London, 1880–95). They fall into a *Narrative* (2 vols., 1882–85); *Zoölogy* (30 vols., 1880–89); *Physics and Chemistry* (3 vols., 1884–89); *Botany* (1885–86). A popular narrative of the cruise is Moseley's *A Naturalist on the Challenger* (London, 1879).

CHAL'LIS, JAMES (1803–82). An English astronomer. He was born at Braintree, Essex, and was educated at Trinity College, Cambridge. He became a fellow of his college in 1826 and Plumian professor of astronomy and experimental philosophy at Cambridge in 1836 and from then until 1861 was also director of the Cambridge Observatory. His labors were directed principally to the determination of the positions of sun, moon, and planets, with the object of increasing tabular accuracy. Among the valuable improvements devised by him were the collimating eyepiece, the transit reducer, and the meteoroscope. In addition to 225 contributions to scientific publications, he published several independent works on astronomy, mathematics, and physics.

CHAL'LONER, RICHARD (1691–1781). An English Catholic prelate, born at Lewes, Sussex. He was the son of a dissenter, but was brought up among Roman Catholics and sent to an English college at Douai, where he finally became professor of divinity and vice rector. In 1730 he joined the English Mission in London, and on the death of Dr. Benjamin Petre, in 1758, he became vicar apostolic of the London district. During much of his residence he was subjected to persecutions. He was the author of numerous controversial and devotional works, the most popular one being *The Garden of the Soul* (1740), which has been translated into various languages and continues to be the most popular prayer book among English Catholics. As an antidote to Foxe's well-known *Book of Martyrs*, he wrote *Memoirs of Missionary Priests and Other Catholics of Both Sexes that Have Suffered Death in England on Religious Accounts* (1741–42). He published a version of the Douai Bible, which is substantially that used by English-speaking Catholics, and the lives of English, Scottish, and Irish saints under the title of *Britannia Sancta*. For his *Life*, consult Barnard (1784) and Burton (London, 1909).

CHALMERS, chä'mērz *or* cha'merz, ALEXANDER (1759–1834). A Scottish biographer and editor. He was educated in Aberdeen and early in life edited several newspapers in London, besides contributing to periodicals, but he devoted himself chiefly to writing prefaces for new editions of English classics. Of the many works edited by him, *The British Essayists*, in 45 volumes, is still regarded as useful. His fame rests more particularly on his *General Biographical Dictionary* (32 vols., 1812–14), in which, however, the various articles are for the most part long and tedious and lacking in research and accuracy.

CHALMERS, GEORGE (1742–1825). A Scottish antiquarian and historian, born at Fochabers in the County of Moray. He was educated in Aberdeen, studied law in Edinburgh, emigrated to America in 1763, and practiced law in Baltimore until the Revolution. Being a Loyalist, he then returned to Great Britain, and from 1786 until his death was chief clerk of the Board of Trade. He wrote a number of works on the Colonies, and biographies of De Foe, Thomas Paine, and Mary, Queen of Scots; but his most important work is *Caledonia: An Account, Historical and Topographical, of North Britain* (1807–24), which displays profound research into the history of Scotland and is not yet entirely superseded.

CHALMERS, GEORGE PAUL (1836–78). A Scottish landscape, genre, and portrait painter. He was born in Montrose and studied at the Trustees School in Edinburgh under Scott Lauder. In 1871 he was elected to the Royal Scottish Academy. His landscapes, such as "The End of the Harvest" (1873) and "Rain in Slichagan" (1878), are fine examples of mood painting. They are rich and beautiful in color and prove Chalmers to be one of the most important precursors of modern Scottish landscape painting. His greatest achievement, "The Legend" (Edinburgh), executed in the manner of Josef Israels, was unfinished at the time of his violent death. Among his genre pictures "The Prayer" is especially popular, and of his portraits that of J. C. Bell (1870) is of exceptional merit. Consult his biography by Pinnington (Glasgow, 1897), and Caw, *Scottish Painting* (Edinburgh, 1908).

CHALMERS, THOMAS (1780–1847). A Scottish theologian. He was born in Anstruther, Fifeshire, Easter Day, March 17, 1780, educated at the University of St. Andrews, and in his nineteenth year licensed to preach the gospel. In 1803 he was ordained minister of the parish of Kilmany, in Fifeshire, near St. Andrews. At this period his attention was entirely absorbed by mathematics, political economy, and natural philosophy, to the neglect of the studies appertaining to his profession. But personal illness, new anxieties, the reading of Wilberforce's *View of Practical Religion*, and thought required

for his article on Christianity for Brewster's *Edinburgh Encyclopædia* (1810) awakened his dormant spiritual nature, and he grew earnest, eloquent, devout, and faithful to his pastoral duties. In July, 1815, he was translated to the Tron church and parish, Glasgow, where his magnificent oratory took the city by storm. His *Astronomical Discourses* (1817) had a prodigious popularity. During the same year he visited London, where his preaching excited as great sensation as at home. But Chalmers's energies could not be exhausted by mere oratory. Discovering that his parish was in a state of great ignorance and immorality, he began to devise a scheme for overtaking and checking the alarming evil. It seemed to him that the only means by which this could be accomplished was by "revivifying, remodeling, and extending the old parochial economy of Scotland," which had proved so fruitful of good in the rural parishes. In order to wrestle more closely with the ignorance and vice of Glasgow, Chalmers, in 1819, became minister of St. John's parish, "the population of which was made up principally of weavers, laborers, factory workers, and other operatives." Of its 2000 families, more than 800 had no connection with any Christian church and the children were growing up in ignorance. He broke up his parish into 25 districts, each of which he placed under separate management, and established two week-day schools and between 40 and 50 local Sabbath schools, for the instruction of the "poorer and neglected classes," more than 1000 of whom attended. In a multitude of other ways he sought to elevate and purify the lives of his parishioners. See Chalmers's *Christian and Civic Economy of Large Towns* (3 vols., 1821–26). His plan of parochial work carried out in Glasgow, although abandoned soon after its inception and not elsewhere imitated, may be called the suggestion of the modern method of dealing with the dependent classes, as seen in the charity organization societies and in settlement work. His parental relation to these movements has received recognition in the condensed edition of his *Christian and Civic Economy*, by Prof. C. R. Henderson (New York, 1900), and in a similar work published in London in the same year, *Chalmers on Charity, a Selection of Passages and Scenes to Illustrate the Social Teaching and Practical Work of Thomas Chalmers*, edited by N. Masterman.

But such herculean toils began to undermine his constitution, and in 1823 he accepted the offer of the moral philosophy chair in St. Andrews, where he wrote his treatise on the *Use and Abuse of Literary and Ecclesiastical Endowments* (1827). In 1828 he was transferred to the chair of theology in Edinburgh, and in 1832 published a work on political economy in connection with the moral state and moral prospects of society. In 1833 appeared his Bridgewater treatise, *On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man*. It was received with great favor, and obtained for the author many literary honors, the Royal Society of Edinburgh electing him a fellow, and the French Institute a corresponding member, while the University of Oxford conferred upon him the degree of D.C.L. In 1834 he was appointed convener of the church-extension committee; and after seven years of enthusiastic labor announced that upward of £300,000 had been collected from the nation and 220 new churches built. Meanwhile, however, troubles were springing up in the bosom of the church itself. The evangelical party had become predominant in the General Assembly, and came forward as the vindicators of popular rights; the struggles in regard to patronage between them and the "moderate" or "Erastian" party became keener and more frequent, until the decision of the civil courts in the famous "Auchterarder" and "Strathbogie" cases brought matters to a crisis; and on May 18, 1843, Chalmers, followed by 470 clergymen, left the church of his fathers, rather than sacrifice those principles which he believed essential to the purity, honor, and independence of the church. (See PRESBYTERIANISM.) The rapid formation and organization of the Free church were greatly owing to his indefatigable exertions, in consequence of which he was elected principal of the Free Church College and spent the close of his life in the zealous performance of his duties and in perfecting his *Institutes of Theology*. He died suddenly at Morningside, Edinburgh, May 30, 1847.

The works of Chalmers contain valuable, and in some cases original, contributions to the sciences of natural theology, Christian apologetics, and political economy; while on minor topics, such as the church-establishment question, they exhibit both novelty and ingenuity of argument. As an orator, Chalmers was unique and unrivaled. His works were collected (23 vols., 1836–42); posthumous works (9 vols., 1847–49); select works (12 vols., 1854–79). For his life, consult: Hanna, *Memoirs of the Life and Writings of Thomas Chalmers* (New York, 1850); Fraser, *Thomas Chalmers* (New York, 1882); Mrs. Oliphant, *Thomas Chalmers, Philosopher and Statesman* (London, 1893); Blaikie, *Thomas Chalmers* (New York, 1897).

CHAL'ON, JOHN JAMES (1778–1854). An English landscape and genre painter. He was born in Geneva, Switzerland, but studied at the Royal Academy, London, of which he became a member in 1841. He painted with great facility in water color and oils, and his pictures include landscapes, marine views, figure and animal subjects. His best-known work is "Napoleon on Board the Bellerophon" (Greenwich Hospital). "A View of Hastings" (South Kensington Museum) and his book of humorous "Sketches of Parisian Manners" also deserve mention.—ALFRED EDWARD (1781–1860), his more celebrated brother, was also born at Geneva and studied at the Royal Academy, later becoming a member. He was the most fashionable miniature and portrait painter of his day and was appointed painter in water color to Queen Victoria, whom he portrayed, as he did also her court ladies. Later critics consider his portraits lacking pictorial qualities and characterization. One of his best oil paintings is "John Knox Reproving Queen Mary's Ladies." He was a clever imitator, especially of Watteau.

CHÂLONS-SUR-MARNE, shä'lôN' sụr märn'. A garrison town of France, capital of the Department of Marne, 107 miles east of Paris by rail, on the right bank of the river Marne, which is here crossed by a handsome stone bridge (Map: France, N., K 4). Châlons-sur-Marne is an old walled town and the seat of a bishopric. The situation is agreeable, and the town contains some fine public buildings, the principal of which is the cathedral of St. Etienne, in which is one of the finest grand altars in France. Also the churches Notre Dame, St. Alpin, St. Jean,

and St. Loup are notable examples of mediæval architecture, as well as a few mansions of the fifteenth and sixteenth centuries. On the east side of the town there is the splendid *Promenade du Jard*, or park, which covers 19 acres. Châlons has a school of industry, a communal college, a seminary, a museum, and a library. It is a centre of the champagne trade, manufactures woolens, cotton, leather, etc., and has a considerable trade in grain, hemp, and rapeseed oil. Pop. (commune), 1901, 26,737; 1911, 31,367. Châlons is of great historical importance. It was known as the Roman Catalaunum, or chief town of the Catalauni, in the third century; witnessed the defeat of Tetricus by Aurelian in 274 A.D.; of the Alemanni by Jovinus in 266; and here or in the district (Catalaunian Fields), in 451, was fought one of the 15 decisive battles of the world (according to Sir Edward Creasy), when the Romans and their allies, the Visigoths, defeated Attila and his Huns. The town successfully resisted the English attacks in 1430–34; in 1589 Henry IV, King of France, held the Parlement of Paris here; it was taken by the Prussians in 1814 and by the Russians in the following year. In 1870 it was occupied by the Germans after the evacuation by MacMahon of the celebrated camp established here in 1856 by Napoleon III. See Barthélemy, *Histoire de la ville de Châlons* (1888).

CHÂLONS-SUR-SAÔNE, shȧ'lôn' sụr sōn. The capital of an arrondissement of the Department Saône-et-Loire, France, about 33 miles north of Mâcon (Map: France, N., K 6). It is situated on the right bank of the Saône, where that river is joined by the Canal du Centre, which unites the Saône with the Loire. Vineyards, woods, meadows, and cultivated fields surround it. It is irregularly built, although along the river the houses are modern, and the quays are excellent. It has two fine churches, a communal college, a library, a school of design, and an archæological museum. Its manufactures include wine, hats, hosiery, vinegar, oil, pottery, jewelry, and imitation pearls; and it has a large trade in the agricultural and other produce of the district. Le Petit-Creusot, a branch of the famous Creusot engineering works, constructs bridges, iron steamboats, and structural steel, and with its glass works, chemical works, and straw-hat manufactories, Châlons ranks as the second industrial city of Burgundy. Steamboats navigate the Saône from Châlons-sur-Saône downward. Pop. (commune), 1901, 29,058; 1911, 31,550. Châlons-sur-Saône occupies the site of the ancient Cabillonum, or Caballinum of the Ædui.

CHALOTAIS, shȧ'lō'tȧ', Louis René de Caradeuc, La. See La Chalotais, Louis René de Caradeuc.

CHALUKYAS, chȧ-lōō'kyȧs. The names of several dynasties of Hindu kings. The early and western Chalukyas of Bādāmi and Kalyāna ruled during the sixth and seventh centuries A.D., and another line of the same dynasty reigned over Kalyāna from 973 to 1183 A.D. The other important lines of the Chalukyas were the eastern (615–1127 A.D.) and the Chalukyas of Anhilvād (941–1296 A.D.). Consult V. A. Smith, *Early History of India* (Oxford, 1908).

CHALYBEATE (kȧ-lĭb'ē-ȧt) **WAT'ERS** (from Lat. *chalybs*, Gk. χάλυψ, *chalyps*, from Χάλυβες, *Chalybes*, ironworkers in Asia Minor). Natural mineral waters that contain considerable amounts of iron in solution. The carbonate is generally held in solution by an excess of carbonic acid and is precipitated as soon as the latter has escaped into the air. This accounts for the characteristic deposits of ochre or ferric oxide on the surface of stones near the mouth of chalybeate-water springs. Chalybeate springs may be subdivided into *carbonated chalybeate* (or *carbonated ferruginous*) and *sulphated chalybeate*. Examples of the former are Islington Spa, Oddy's Saline Water, and Tunbridge Wells, England; and Bailey Springs, Ala., and Rawley Springs, Va., in the United States. An excess of carbonic acid communicates to the water a sparkling aspect and a pleasant acidulous taste. Of such a character are the mineral springs at Pyrmont in Germany, and they are called *carbonated chalybeate* or *carbonated ferruginous*. The sulphated chalybeate waters contain ferrous sulphate dissolved in them, and of this character are the Sand Rock Spring on the Isle of Wight, and the springs at Moffat and Vicarsbridge in England, and the Rockbridge Alum Springs, Va., and the Texas Sour Springs in the United States. Chalybeate waters have a more or less astringent or styptic taste, and show a purplish-black tint when mixed with some varieties of wine, owing to the tannin present in the latter. A pale-blue color is produced when a few drops of potassium ferrocyanide are added. Chalybeate waters are frequently prescribed in cases of debility, and as the carbonated varieties are lighter on the stomach, they are generally preferred. The chalybeate waters should be avoided in plethoric, febrile, and inflammatory conditions of the system. See Carbonated or Acidulous Waters; Mineral Waters.

CHAM, shăn (1819–79). The pseudonym of Count Amédée de Noé, a French caricaturist. He was born in Paris, the son of a peer of France. He was intended for science, but, preferring painting, he studied with Paul Delaroche and afterward with Charlet and developed a talent for the grotesque. Beginning in 1842, he contributed, chiefly to *Charivari* (the *Punch* of Paris), an immense number of caricatures, and some sketches more remarkable for their wit than for artistic merit, under the signature of "Cham." His political cartoons were singularly sharp and effective.

CHAMÆROPS, kȧ-mē'rōps (Lat., from Gk. χαμαίρωψ, *chamairōps*, from χαμαί, *chamai*, on the ground + ῥώψ, *rhōps*, bush). A genus of palms with fan-shaped leaves. It is less exclusively tropical than palms are in general, and one species, *Chamærops humilis*, is the only palm truly indigenous to Europe. It extends as far northward as the neighborhood of Nice. It is sometimes called the palmetto. The flowers are in spathes about 6 to 8 inches long; the fruit is a three-sided, blackish, spongy drupe, which is eaten, as are also the young shoots. This palm is one of the most tolerant of all palms to cold and on that account is commonly grown. In its native regions the leaves are much used for thatching and for making brooms, hats, chair bottoms, etc. They abound in an excellent fibre, which the Arabs mix with camel's hair and make into tent covers; cordage and sometimes sailcloth are made of it in Spain; it is imported into France, and used for making carpets, under the name of African hair. The French in Algeria make paper and paste-

board of it; and it is a valuable commercial commodity, as a material for paper making, cordage, upholstery, etc. Other species, sometimes referred to this genus, abundant in India, China, etc., serve similar purposes and deserve attention in connection with paper. To this genus is referred also the West Indian palm, which yields the material for chip hats. See BRAZILIAN GRASS.

CHAMALHARI, chŭm'â-lä'rē. A peak of the Himalayas (q.v.), in northwestern Bhutan (Map: India, E 3). It has an altitude of 23,929 feet.

CHAMBA, chŭm'bâ. One of the feudatory Punjab states in the Lahore division of north India, between lat. 32° 10′ and 33° 13′ N., and long. 75° 45′ and 77° 3′ E. (Map: India, C 2). The Rajah owns all the land. Area. 3126 square miles. Pop., 1891, 124,032; 1901, 127,834; 1911, 135,873.

CHAMBERED NAUTILUS, THE. A noted poem by Oliver Wendell Holmes, published in 1857, in his *Autocrat of the Breakfast-Table*.

CHAMBERLAIN, chām'bēr-lĭn. A city and the county seat of Brule Co., S. Dak., 85 miles (direct) southeast of Pierre, on the Missouri River, and on the Chicago, Milwaukee, and St. Paul Railroad (Map: South Dakota, E 4). It is the centre of a productive stock-raising region and there are two flour mills, a cement factory, and bottling works. Chamberlain is the seat of Columbus College and has a public library and a sanitarium. In the river, opposite the city, is an island park of 1000 acres, the gift of the Federal government to the city. Chamberlain has adopted the commission form of government. Pop., 1900, 874; 1910, 1275.

CHAMBERLAIN (OF. *chambrelein, chamberlain*, Fr. *chambellan*, Sp. *camarlengo*, It. *camarlingo*, from ML. *camarlingus*, from OHG. *chamarlino, chamarling*, chamberlain, from *chamara*, Ger. *Kammer*, room, from Lat. *camera*, room, Gk. καμάρα, *kamara*, room with vaulted ceiling; connected with Lat. *camur*, crooked, Gk. κάμπτειν, *kamptein*, to bend, Ir. *cam*, crooked), LORD. In Great Britain an officer of state dating from very early times, formerly an influential member of the government and still of high standing in the royal household. He indorses the king's answer on petitions and often communicates his Majesty's pleasure to Parliament and to the Council. He has control over all the officers and servants of the royal chambers, except those of the bedchamber, as well as of all tradesmen connected with the royal household. Cards of admission to the King's drawing-room and other royal functions must be obtained from him. All theatres in towns in which a royal palace is situated require to be licensed by the Lord Chamberlain, and no new play can be performed anywhere without his license. One of the leading members of his staff is the Examiner of Plays, whose duties are to attend to these matters. In accordance with ancient custom, the Lord Chamberlain is still a member of the Privy Council, but his tenure of office depends on that of the political party to which he belongs.

CHAMBERLAIN, THE LORD GREAT. In Great Britain an hereditary officer of great antiquity and formerly of great importance. He has the government of the palace at Westminster, and during the sitting of Parliament has charge of the House of Lords and issues tickets of admission on the opening or prorogation of Parliament.

CHAMBERLAIN, ALEXANDER FRANCIS (1865–1914). A Canadian-American ethnologist and educator, born at Kenninghall, England. He graduated in 1886 at Toronto University and from 1886 to 1891 was examiner in modern languages successively at Toronto University, Trinity University, and in the educational department of Ontario Province. He was appointed lecturer (1892) and afterward assistant professor of anthropology at Clark University. Under the auspices of the British Association he made a special investigation of the Kootenay (British Columbia) Indians. He was editor of the *Journal of American Folk-Lore* in 1901–08. He was elected a fellow of the American Association for the Advancement of Science and, in addition to contributions to the *Journal of American Folk-Lore* and other periodicals, published *Report on the Kootenay Indians* (1892); *Language of the Mississaga Indians* (1892); *The Mythology of the Columbian Discovery* (1893); *Child and Childhood in Folk-Thought* (1896); *The Child: A Study in the Evolution of Man* (1900); *Poems* (1904). He contributed to the second edition of the NEW INTERNATIONAL ENCYCLOPÆDIA on South American and Asiatic tribes and peoples.

CHAMBERLAIN, RT. HON. (JOSEPH) AUSTEN (1863–). A prominent British statesman, son of Joseph Chamberlain. He was educated at Rugby and Cambridge and elected to Parliament from East Worcestershire in 1892. From 1895 to 1900 he served as Civil Lord of the Admiralty, from 1900 to 1902 as Financial Secretary to the Treasury. He was then made Postmaster-General and in 1903 Chancellor of the Exchequer. The promotion to this latter post was given partly as a recognition of ability, partly as an acknowledgment that the Conservatives, although not yet prepared to adopt in its entirety the fiscal policy of Joseph Chamberlain, still desired to propitiate the latter statesman and his more extreme followers. After the downfall of the Balfour ministry (1905) Austen Chamberlain became the leader of the more rigid tariff-reform element in his party. In 1911 he was a prominent candidate for the Unionist leadership made vacant by the resignation of Mr. Balfour; in 1913 he was made chairman of the important royal commission on Indian finance. Although somewhat eclipsed on the public stage by the more dramatic rôles played by F. E. Smith, Sir Edward Carson, Bonar Law, and other Unionists, Austen Chamberlain displayed a prodigious even if quiet activity in everything pertaining to British fiscal policy.

CHAMBERLAIN, BASIL HALL (1850–). A distinguished English Japanese scholar. He was born in Southsea, England, the grandson of Basil Hall, and was educated in France and by private tutors in England. For many years he was professor of Japanese and philology in the Imperial University of Tokio, Japan. His combination of scholarship with a light and interesting style is perhaps most evident in his *Things Japanese* (1890; 5th ed., 1905). His other works include: *The Classical Poetry of the Japanese* (1880); a version of the *Kojiki* (1883); *Language, Mythology, and Geographical Nomenclature of Japan in the Light of Aino Studies* (1887); *Aino Folk Tales* (1888); *Luchuan Grammar* (1895); *Handbook of Colloquial Japanese* (4th ed., 1907); Murray's *Japan* (1891; 9th ed., 1913, with W. B.

Mason); *Japanese Poetry* (1911); volumes in the "Japanese Fairy Tale Series"; and contributions to the *Transactions* of the Asiatic Society of Japan and of other Oriental societies.

CHAMBERLAIN, CHARLES JOSEPH (1863–). An American botanist, born at Sullivan, Ohio. He was educated at Oberlin College and at the University of Chicago, where he was assistant and associate in botany from 1897 to 1901, instructor in 1901–07, assistant professor of morphology and cytology in 1908–11, and became associate professor in 1911. Besides his contributions to the *Botanical Gazette*, he is author of *Methods in Plant Histology* (1901) and joint author with John M. Coulter (q.v.) of *The Morphology of Gymnosperms* (1901) and *The Morphology of Angiosperms* (1903).

CHAMBERLAIN, DANIEL HENRY (1835–1907). An American politician. He was born at West Brookfield, Mass., and was educated at Yale and at the Harvard Law School. In 1864 he entered the Union army and served until the close of the Civil War, chiefly as a staff officer. At the close of the war he settled in South Carolina, where he became a cotton planter and was a member of the State Constitutional Convention (1867–68), Attorney-General (1868–72), and Governor (1874–76). He was inaugurated a second time, but his election was contested by Wade Hampton, and he relinquished his office (1877) and removed to New York to practice his profession. His publications include *The Campaign in South Carolina* (1876) and *Charles Sumner and the Treaty of Washington* (1902). Consult Allen, *Governor Chamberlain's Administration in South Carolina* (1888).

CHAMBERLAIN, GEORGE EARLE (1854–). An American legislator and public official. He was born near Natchez, Miss., and graduated from the academic and law departments of Washington and Lee University in 1876. Taking up the practice of law in Oregon, he early became prominent politically. He was in succession a member of the State Legislature, district attorney for the third judicial district, Attorney-General of the State, and, having removed to Portland, district attorney for the fourth judicial district. In 1902 he was elected Democratic Governor of Oregon and in 1906 was reëlected. Three years later he was chosen United States Senator for the term ending 1915. In the first session of the Sixty-third Congress he was chairman of the Public Lands Committee, and he was also a member of numerous important committees.

CHAMBERLAIN, HENRY RICHARDSON (1859–1911). An American journalist, born at Peoria, Ill. He took up journalistic work in 1877, was in succession correspondent of the New York *Sun*, managing editor of the New York *Press*, and managing editor of the Boston *Journal*. In 1893 he was made correspondent of the *Sun* in London, with general oversight of the Laffan News Bureau in Europe. He reported the Macedonian disturbances, the details of the Panama Canal scandal, the Russian political crisis of 1906, and the Messina earthquake. He became known for his extensive knowledge of European politics. His publications include *The Farmers' Alliance* (1891) and *Six Thousand Tons of Gold* (1894).

CHAMBERLAIN, HOUSTON STEWART (1855–). A versatile German writer. He was born Sept. 9, 1855, at Portsmouth, England, the son of an admiral in the British navy. His earliest education he received at Versailles, and later attended Cheltenham College, Gloucester. At first he planned to follow a military career, but poor health compelled him to abandon this intention. In 1870 he left England and settled in Germany, at first in Stettin. Here Professor Kuntze aroused his interest in Germanic culture and civilization, the study of which occupied him for many years and resulted in his most original and very remarkable work, *Die Grundlagen des 19 Jahrhunderts*, published in two parts in 1899 and 1901 (reprinted subsequently in several editions, and translated into English by Lord Redesdale in 1910). In 1908 he married a daughter of Richard Wagner. In 1879–81 he studied natural sciences in Geneva, and at the same time music under A. Ruthard. In 1885 he took up his residence in Dresden and began his activity as a contributor to several prominent German, English, and French periodicals, writing with equal facility in all three languages. In 1889 he settled permanently in Vienna. His chief work on music is his comprehensive and excellent biography of Richard Wagner, which he published in German (1896), English (1897), and French (1899). Other works concerning Wagner are: *Das Drama Richard Wagners* (1892); *R. Wagners echte Briefe au F. Präger* (1894); *Die ersten 20 Jahre der Bayreuther Festspiele* (1896); *Parsifalmärchen* (1900). His other works are: *Worte Christi* (1901); *Heinrich von Stein* (1903); *Immanuel Kant* (1905); *Goethe* (1912).

CHAMBERLAIN, JACOB (1835–1908). An American missionary of the Reformed Dutch church, born at Sharon, Conn. He graduated at the Western Reserve College, 1856, and New Brunswick Theological Seminary, 1859, and received the degree of M.D. (College of Physicians and Surgeons, New York City), 1859. In December of 1859 he went as missionary to the Arcot Mission, southern India. He is recognized as one of the leading missionaries of India. His linguistic attainments were remarkable and he played a prominent part in translating the Scriptures into Telugu. In English he published: *A Home, or Christian Giving* (1879); *Break Cocoanuts over the Wheels; or, All Pull for Christ* (1885); *Native Churches and Foreign Missionary Societies* (1879); *Winding Up; In the Tiger Jungle* (1896); *The Cobra's Den and Other Stories of Missionary Work among the Telugus of India* (1900); and other books on mission subjects.

CHAMBERLAIN, RT. HON. JOSEPH (1836–1914). A distinguished British statesman, born in London, July 8, 1836. He was educated at the University College School, entered the screw-manufacturing firm of Nettlefold and Chamberlain, Birmingham, of which his father was a partner, and retired in 1874 with a large fortune. He early distinguished himself in local debating societies by his radical opinions and ready, forceful eloquence. He became very popular in the northern industrial centres, and was three times elected mayor of Birmingham, 1873–76. His mayoralty was marked by extensive municipal improvements looking largely to the amelioration of the condition of the poorer classes and carried out against much opposition. After an unsuccessful contest at Sheffield in 1874 he entered Parliament in 1876 on a Birmingham by-election. He was returned at the general election of 1880 and became President of the Board of Trade under Gladstone with

membership in the cabinet. He achieved wide fame as the advocate of popular reforms, including measures aiming at the restitution of the land to small proprietors, free education, a system of graduated taxation and increased powers of local self-government. In 1885 he was returned to Parliament for Birmingham, West, became President of the Local Government Board under Gladstone in January of the following year, but resigned in March because of his antagonism to Gladstone's Home Rule Bill, and with Lord Hartington organized the Liberal Unionist party which helped to bring about the defeat of the measure and the fall of the Gladstone ministry. In 1888 he was one of the British commissioners sent to Washington to effect a settlement of the Canadian fisheries dispute. In November he married, as his third wife, Miss Endicott, daughter of President Cleveland's Secretary of War. When Lord Hartington became Duke of Devonshire (1891), Mr. Chamberlain succeeded him as leader of the Liberal Unionist party in the House of Commons. In the Salisbury cabinet of 1895, which marked the definite amalgamation of the Conservative and the Liberal Unionist party, he became Secretary for the Colonies. The former Republican and Radical now entered upon a policy of aggressive imperialism. The great event of his administration was the war with the Boer republics, which was hastened, if not caused, by the Jameson Raid and the intrigues of Cecil Rhodes's South African Company, in which Mr. Chamberlain was charged with being implicated. A committee of the House of Commons in 1897 acquitted him of all complicity in the raid, but his name nevertheless remained the one particularly associated with the policy which ended in the extinction of the South African republics. In the general election of 1900, the so-called "Khaki" election, which was brought about largely by Mr. Chamberlain in order to take advantage of the patriotic fervor animating the nation, he was the principal mark for the Liberal attack, but came out triumphant. A noteworthy achievement of the same year was the passage of the act constituting the Australian Commonwealth. The retirement of Lord Salisbury in 1902 and the succession of Mr. Balfour as Premier brought no change in the Colonial Office. In the winter of 1902–03 Mr. Chamberlain visited South Africa, where his speeches left no doubt of his intention to continue a firm imperialistic policy.

In May, 1903, Mr. Chamberlain injected a new and momentous question into the field of political discussion by bringing forward proposals for a system of preferential tariffs with the colonies as the only means for promoting a closer union of the Empire. The question of establishing more intimate relations between the United Kingdom and the colonies had occupied him as early as 1897, when he presided over a conference of colonial premiers assembled in London on the occasion of Queen Victoria's jubilee. A second conference met in 1902. Mr. Chamberlain's proposals, by openly advocating the imposition of a tax on foreign food products in violation of the traditional free-trade policy which had remained unchallenged for 60 years, produced a profound impression, and led ultimately to an unprecedented change in the balance of parties. (For the fiscal controversy, see GREAT BRITAIN.) In September, 1903, he resigned from the cabinet in order to have a free hand in expounding his views to the country, which, he admitted, was not as yet prepared to accept them. In 1904 he succeeded in reorganizing the Liberal Unionist party machinery on a basis which made it a tariff-reform party. His outspoken views, in contrast to the halfway position assumed by Mr. Balfour, made him in 1904 and 1905 the strongest man on the ministerial side. Mr. Balfour saw himself gradually impelled towards a common position with Mr. Chamberlain, and the latter's insistence on an aggressive tariff-reform policy contributed to the resignation of the Balfour cabinet in December, 1905. The general election, fought out principally on the fiscal question and resulting in the overwhelming defeat of the Unionist party, was accepted by most as an unmistakable repudiation of tariff reform. But Mr. Chamberlain chose to interpret his personal triumph in Birmingham, which he carried solidly for the Unionists, as a vindication of his judgment in insisting on a forward policy. Although illness after 1906 largely restricted his activities, he continued to hold his seat in Parliament and to inspire the progress of the tariff-reform movement for several years, not finally retiring from that body till the early part of 1914. Consult: Morris, *The Right Hon. Joseph Chamberlain* (New York, 1901); Jeyes, *Mr. Chamberlain: His Life and Public Career* (London, 1903); Creswicke, *Life of Joseph Chamberlain* (3 vols., London, 1904); Mackintosh, *Joseph Chamberlain* (London, 1906).

CHAMBERLAIN, JOSHUA LAWRENCE (1828–1914). An American soldier and educator. He was born in Brewer, Me., graduated at Bowdoin College in 1852 and at the Bangor Theological Seminary in 1855, and was professor of modern languages at Bowdoin when the Civil War broke out. He then enlisted in the Union army and served with distinction throughout the war, was several times wounded, and left the service (1865) with the brevet rank of major general. From 1866 to 1871 he was Governor of Maine, and in 1871–83 was president of Bowdoin College. When the Democrats and Fusionists under Governor Garcelon got possession of the State Legislature in 1879–80, and the Republicans organized a rival body, peace was preserved by the militia of the State under the command of General Chamberlain until the legality of the Republican Legislature was established by decision of the Supreme Court. (See MAINE, *History.*) He resigned the presidency of Bowdoin in 1883, and removed to New York to practice law. He published *Maine: Her Place in History* (1877); *American Ideals* (1890); *Ethics and Politics of the Spanish War* (1898); *Property: Its Office and Sanction* (1900); *De Monts and Acadia* (1904); *Ruling Powers in History* (1905), and edited an extensive work entitled *Universities and their Sons* (1898).

CHAMBERLAIN, MELLEN (1821–1900). An American librarian and historical writer. He was born in Pembroke, N. H., graduated at Dartmouth in 1844 and at the Harvard Law School in 1848, and in 1849 began the practice of the law in Chelsea, Mass. He subsequently served for some years in the Massachusetts Legislature; was chairman of the Judiciary Committee in the Senate; became a justice of the Boston Municipal Court in 1866; and from 1870 to 1878 was Chief Justice. From 1878 to 1890 he was librarian in chief of the Boston Public Library. He devoted much of his time to the

study of American history and wrote a number of monographs and essays of considerable value, some of which were collected into a volume entitled *John Adams, the Statesman of the Revolution, and Other Essays* (1898). Among his other publications are: *The Journals of Captain Henry Dearborn, 1775–83* (1886–87); several chapters, notably the one entitled "The Revolution Impending," in Winsor's *Narrative and Critical History of America* (1884–89); *The Authentication of the Declaration of Independence* (1885); *The Constitutional Relations of the American Colonies to the English Government at the Commencement of the American Revolution* (1887).

CHAMBERLAIN, Montague (1844–). A Canadian ornithologist, born at St. John, New Brunswick. In 1890 he became recorder of Harvard University, and from 1893 to 1900 was secretary of the Lawrence Scientific School. He was one of the founders of the American Ornithological Union. Besides a revision of *Nuttall's Handbook of the Birds of Eastern North America* (1872), he published the following important works and lectures: *Canadian Birds* (1870); *Nuttall's Ornithology, Revised and Extended* (1891, 1896); *Birds of Greenland* (1892); *Some Canadian Birds* (1895); *The Church Army* (1897); *The Penobscot Indians* (1899).

CHAMBERLAIN, Sir Neville Bowles (1820–1902). An English soldier, born in Brazil. He entered the Indian army in 1837 and served throughout the Afghan War of 1839–42, during which he was six times wounded. In 1842 he was attached to the Governor-General's bodyguard, with which he in 1843 participated in the battle of Maharajpur. He was promoted to be lieutenant colonel, commanded the Punjab frontier force from 1854 to 1857, in the latter year became adjutant general of the Indian army, and during the Mutiny (1857–58) distinguished himself, being present at the taking of Delhi. He was commissioned lieutenant general in 1872, full general in 1877, and field marshal in 1900. In 1876–81 he was commander in chief of the Madras army, in 1878 was a member of a special mission to the Ameer of Afghanistan, and for some time was military member of the Council of the Viceroy of India. It was said of him before his retirement from active service that he had been more often wounded than any other officer of the British army.

CHAMBERLIN, Agnes. A Canadian illustrator and author, the daughter of Susannah Moodie, a Canadian author (one of the Strickland sisters). She was born and educated in Belleville, Ontario. She wrote and illustrated *Canadian Wild Flowers*, the first Canadian publication of its kind, the three editions of which necessitated the coloring of 15,000 plates. She also illustrated Mrs. Traill's *Studies of Plant Life*. In 1876 her drawings were exhibited at the Philadelphia Centennial Exhibition. The set of Canadian fungi published by the Geological Survey of Canada was made from her drawings.

CHAMBERLIN, Thomas Chrowder (1843–). An American geologist, born at Mattoon, Ill. He graduated in 1866 at Beloit College, studied science at Michigan University, and from 1869 to 1873 was professor of natural science at the State Normal School, Whitewater, Wis. From 1873 to 1882 he was professor of geology at Beloit College, and from 1887 to 1892 was president of the University of Wisconsin. In 1892 he took charge of the geological department of the University of Chicago, and later became editor of the *Journal of Geology*. In 1873–76 he was assistant State geologist for Wisconsin, in 1876–82 was chief geologist, and in 1882 was a United States geologist in charge of the glacial division. While engaged in this active geological work he collected and published a large amount of new material relative to the character of the glacial deposits in the Northern States, upon which he based some interesting theories. He has also made a study of modern glaciers, with valuable scientific results. He was geologist of the Peary Arctic relief expedition in 1894. The planetesimal hypothesis, which he formulated in company with Moulton as an explanation of the origin of the planetary system, has commanded general attention in the scientific world. He was president of the Geological Society of America in 1894 and of the American Association for the Advancement of Science in 1908. His publications include: *Outline of a Course of Oral Instruction* (1872); *Geology of Wisconsin* (1877–83); *Contribution to the Theory of Glacial Motion* (1904); with R. D. Salisbury, *Geology* (3 vols., 1907–09), and many geological papers.

CHAMBER MUSIC. A term used to designate music that is specially adapted for performance in a small auditorium. The name originally designated both vocal and instrumental music, not intended for the church or theatre; but it is now entirely restricted to works written for the combination of instruments employed in trios, quartets, etc., up to nonets or decimets, where each instrument is represented by only one performer. Compositions for piano with some other instrument (violin, 'cello, clarinet), and even for one or more solo voices with piano and some other instrument, are included. There is a distinct chamber-music style, just as we distinguish orchestral style, piano style, vocal style, etc. Chamber music demands nothing less than absolute mastery of all technical details from both composer and performer. During the seventeenth and early part of the eighteenth century the history of chamber music is intimately connected with that of the violin. Consult: J. Wasielewski, *Die Violine und ihre Meister* (Stuttgart, 1904); N. Kilburn, *The Story of Chamber Music* (London, 1904); E. Krause, *Die Entwicklung der Kammermusik* (Hamburg, 1904); A. Schering, *Geschichte des Instrumentalkonzerts* (Leipzig, 1905).

CHAMBER OF COMMERCE. A body of merchants and traders, associated for the purpose of promoting the interests of its own members, of the town or district to which the society belongs, and of the community generally, in so far as these have reference to trade and merchandise. In America and England the chambers of commerce are voluntary associations with no recognized official functions. They exert an influence upon the course of legislation through the adoption of resolutions, through the investigation of conditions affecting trade and publication of findings. Not infrequently the views of important chambers of commerce are sought by legislators engaged in the drafting of regulations affecting industry.

In the countries of continental Europe the chamber of commerce is endowed with official character, and is often vested with administrative functions concerning trade. In some coun-

tries it is made their duty to express their opinion in advance upon proposed legislation, and in the Hanse cities they must by law be consulted before certain kinds of legislation can be considered.

Chambers of commerce originated on the continent of Europe, when, with the gradual disintegration of the old guild system, they were clothed with some of the municipal and administrative functions which had in earlier times been exercised by the craft guilds. The first of these organizations on record is that of Marseilles, which grew out of a commission of merchants established in 1599, and enlarged in 1650 and given practically the form of a chamber of commerce. Similar bodies were created at Dunkirk in 1700, and in the following year at Rouen, Toulouse, Lyons, Bordeaux, and other points. During the Napoleonic period, when the French influence extended to Holland, Germany, Austria, and Italy, similar organizations were established in the principal cities of those countries. Before this time they had spread to Scotland, where the year 1773 witnessed the establishment of the Glasgow Chamber of Commerce, and to the American Colonies, where the New York Chamber of Commerce was organized in 1768. It was not until the early part of the nineteenth century that the institution took root in England. The Chamber of Commerce of Manchester was organized in 1820, but that of London not until 1882. At the present time such organizations, whether under the original name of chamber of commerce or under that of board of trade, are well-nigh universal, and no town of any considerable importance lacks such a corporate representation of its mercantile interests.

CHAMBERS (OF. *chambre, cambre,* It. *camara,* Ger. *Kammer,* OHG. *chamara,* chamber, from Lat. *camera,* room, Gk. *καμάρα, kamara,* room with vaulted ceiling; connected with Lat. *camur,* crooked, Gk. *κάμπτειν, kamptein,* to bend, Ir. *cam,* crooked). In English and American law, the private room or office of a judge in which he hears motions, signs papers, or does other business pertaining to his office. A judge is said to act at "chambers" when any legal proceeding is carried on before him out of court, either at his office or residence, or other convenient place, including the court room itself, provided he is acting in his individual capacity as judge and not formally as the presiding officer of the court. The practice of making orders and transacting other judicial business in chambers is of considerable antiquity and appears to have grown up insensibly to avoid the serious inconveniences of short and infrequent terms of the courts. The validity of orders made out of court was long disputed, but was conclusively established early in the last century. The practice received its first statutory sanction by Act of Parliament in 1821.

In general, *ex parte* proceedings and proceedings incidental to an action or to the main proceeding may be carried on at chambers. Modern statutes have increased materially the business which may be transacted in this manner; and the codes of civil procedure adopted in several of the United States expressly provide that certain acts may be done by the *court,* and others by a *judge* of the court.

Under the English statutes, 16 Vict., c. 80, and 36 and 37 Vict., c. 66, the office of master in chancery (q.v.) was abolished, and the business formerly transacted by him was directed to be transacted under the direction of a judge at chambers by officers of the court. Consult the authorities referred to under PRACTICE; also Coe, *Practice at the Judges' Chambers, Queen's Bench,* etc. (London, 1876). See MASTER IN CHANCERY.

CHAMBERS, CHARLES EDWARD STUART. See CHAMBERS, WILLIAM.

CHAMBERS, chām'bĕrz, CHARLES HADDON (1860–1921). An English playwright. He was born April 22, 1860, and educated at Sydney, N. S. W., where he entered the civil service in 1875. Two years afterward he turned for a time to a life of more adventurous experiences in the "bush." His first visit to England was in 1880, and in 1882 he went to London to engage in literary work. His first work was in the way of articles and stories for the periodicals, but about 1886 he began dramatic writing. After several minor achievements he made his first great success with *Captain Swift,* which was produced at the Haymarket Theatre, June 20, 1888. Subsequently he wrote *The Idler,* first produced in New York at the Lyceum Theatre, and a few weeks later at the St. James, London (1891); *The Honorable Herbert* (Vaudeville, 1892); *John a' Dreams* (Haymarket, 1894); *The Tyranny of Tears* (1899); *The Awakening* (1901); *The Golden Silence* (1903); *Sir Anthony* (1906); *Passers-By* (1911); *Tante* (1913). Both *The Tyranny of Tears,* with John Drew, and *Tante,* with Ethel Barrymore, were presented in New York in 1913.

CHAMBERS, EDMUND KERCHEVER (1866–). An English scholar and educator. He was born in Berkshire, and was educated at Marlborough and at Corpus Christi College, Oxford, where he was Chancellor's English essayist in 1891. In the next year he entered the Education Department and became Assistant Secretary of the Board of Education. He was created C.B. in 1912. His most important work was on early English poetry, especially the drama. He wrote *The Mediæval Stage* (1903) and *The Tudor Revels* (1906), and the article on "Shakespeare" for the 11th edition of the *Encyclopædia Britannica;* and edited *English Pastorals* (1895), Donne's *Poems* (1896), Vaughan's *Poems* (1896), *The Red-Letter Shakespeare* (1904–08), and *Early English Lyrics* (1907), with F. Sidgwick.

CHAMBERS, EDWARD THOMAS DAVIES (1852–). A Canadian journalist and author. He was born at Saffron Walden, England, and was educated there and in Canada, to which he went in 1870. After two years of school teaching he entered journalism and established *Progress,* the first newspaper printed in Argenteuil Co., Quebec. He became a member of the staff of the *Daily Chronicle* (Quebec City) and in 1897 editor of this paper; later editor of the *Mercury* and of *North American Notes and Queries.* He contributed frequently to British, American, and Canadian magazines on subjects relating to Canadian scenery, resources, and, especially, hunting and fishing. In 1884–94 he was an alderman of Quebec and for a time was promayor. He was prominent in organizing the Champlain celebration in 1906 and the Quebec tercentenary celebration in 1908. His publications include: *The Port of Quebec: Its Facilities and Prospects* (1890); *The Haunts of the Ouananiche* (1891); *Quebec, Lake St. John and the Saguenay* (1895); *The Ouananiche and*

Its Canadian Environment (1895); *The Anglers' Guide to Eastern Canada* (1898); *The Sportsman's Companion* (1899); *The Quebec Tercentenary Commemorative History* (1909).

CHAMBERS, EPHRAIM (c.1680–1740). An English encyclopædist. In early life he was an apprentice to a map and globe maker in London, where he formed the plan of compiling an encyclopædia on a larger scale than that of John Harris's *Lexicon Technicum* (1704), then the only work of the kind in the language. He published by subscription the first edition of his *Cyclopædia, or an Universal Dictionary of Arts and Sciences*, in 1728. Ten years later the second edition appeared, and in the year following the third. The fourth was issued in 1741, a year after the editor's death, and many other editions have since been issued. A French translation of it gave rise to Diderot's and D'Alembert's *Encyclopédie*. It was also expanded into Dr. Rees's once well-known *Encyclopædia*. Chambers was an avowed freethinker, irascible, kind to the poor, and extremely frugal.

CHAMBERS, ERNEST JOHN (1862–). A Canadian journalist and author. He was born at Penkridge, Staffordshire, England, but early went to Canada and was educated at the Montreal high school. He entered journalism in Montreal in 1880, and in 1885 during the second Northwest Rebellion under Louis Riél (q.v.) was correspondent for the Montreal *Star*. In 1893–96 he was joint proprietor and editor of the *Canada Military Gazette*, and in 1894 he established the *Metropolitan*, a weekly journal. In 1904 he removed to Ottawa, having received the government appointment of Gentleman Usher of the Black Rod. In 1908 he became the editor and publisher of *The Parliamentary Guide*. He published: *The Book of Montreal* (1903); *The Book of Canada* (1905); *The Canadian Marine* (1906); *The History of the Royal Northwest Mounted Police* (1906); *Canada's Fertile Northland* (1908). He also wrote many regimental histories of the Canadian militia.

CHAMBERS, GEORGE FREDERICK (1841–1915). An English author. He was educated at Brighton, and at King's College, London, and held several local government posts, becoming a member of the Lewisham Borough Council in 1904. Among his many books on very diverse subjects are: *Handbook of Descriptive and Practical Astronomy* (3 vols., 4th ed., 1889–90), *Pictorial Astronomy* (1891), *The Story of the Sun, Stars, Eclipses, Weather, Comets* (4 vols., 1895–99), and *Astronomy for Amateurs* (1912); digests of laws of public health, etc., and textbooks of law; and guidebooks of Sussex (1877) and Eastbourne, including *Old Memories of Eastbourne* (1910).

CHAMBERS, ROBERT (1802–71). A Scottish publisher and author, born at Peebles, July 10, 1802. He attended the local grammar school, where he learned Latin; and at home read through the fourth edition of the *Encyclopædia Britannica*. The family moved to Edinburgh in 1813, where, five years later, Robert set up as a bookseller, read extensively, and began writing. His *Traditions of Edinburgh* (1823) procured him the friendship of Sir Walter Scott, who contributed various memoranda for the work. It was followed by a large number of books, among which are *Popular Rhymes of Scotland* (1826), *Picture of Scotland* (1826), and *History of the Rebellions in Scotland* (1828–29). He also edited *Scottish Ballads and Songs* (1829), the *Biographical Dictionary of Eminent Scotsmen* (4 vols., 1832–34), and many other collections. The success of *Chambers's Edinburgh Journal*, founded in 1832 by his brother, William Chambers, was materially promoted by his many essays, moral and humorous. His great work, however, is the *Vestiges of the Natural History of Creation*, published anonymously in 1844. It is a brilliant exposition of development in the natural world, and it prepared the public for the theories of Darwin. Among his later works are: *Ancient Sea Margins* (1848), *Life and Works of Robert Burns* (1851), *Domestic Animals of Scotland* (1859–61), and *The Book of Days*, a miscellany (1863). Ever since 1832 he had been a member of the firm of William and Robert Chambers, printers and publishers. He died March 17, 1871. A collection of his miscellaneous papers appeared in 7 vols. (1847).

CHAMBERS, ROBERT. See CHAMBERS, WILLIAM.

CHAMBERS, ROBERT WILLIAM (1865–). An American novelist and writer of short stories, who has scored many a popular success. He began his career as an artist after studying at the Julian Academy, Paris, and became an illustrator for various New York weeklies; but he soon practically abandoned the brush for the pen. The long list of his writings includes: *In the Quarter* (1893); *The Red Republic* (1894); *Lorraine* (1896); *The Cambric Mask* (1899); *The Conspirators* (1900); *The Fighting Chance* (1906); *The Firing Line* (1908); *The Green Mouse* (1910); *Adventures of a Modest Man* (1911); *Streets of Ascalon* (1912); *Gay Rebellion* (1913); *The Business of Life* (1913). Among his early productions was a drama, entitled *The Witch of Ellengowan*, and written for Ada Rehan, which was performed at Daly's Theatre.

CHAMBERS, TALBOT WILSON (1819–96). An American clergyman. He was born at Carlisle, Pa., graduated in 1834 at Rutgers College, studied in 1836–37 at Princeton Theological Seminary, and in 1838 was licensed to preach. From 1839 to 1849 he was pastor of the Second Reformed Dutch Church, Somerville, N. J., and from 1849 to 1871 one of the pastors of the Collegiate Dutch Church of New York City. He was a member of the Old Testament Company of the American Bible Revision Committee. He published: *The Noon Prayer-Meeting in Fulton Street* (1857); *Memoir of Theodore Frelinghuysen* (1863); expositions of Amos and Zechariah (in the Schaff-Lange *Commentary*, 1874); *The Psalter: A Witness to the Divine Origin of the Bible* (1875); a *Companion to the Revised Version of the Old Testament* (1885).

CHAMBERS, W(ASHINGTON) IRVING (1856–). An American naval officer, born in Kingston, N. Y. He graduated from the United States Naval Academy in 1876, served on various vessels, and in 1883 was appointed to service in the office of naval intelligence. During 1884 he was a member of the Greely relief expedition and was engaged in the special survey of the Nicaragua Canal Route. Thereafter in succession he served in the office of naval intelligence, at the Naval War College, as inspector of ordnance at sea, and at the naval torpedo station. In 1907–09 he was chief of the Bureau of Ordnance and in 1909–11 assistant to the aid for material. After that he was in charge of the development of aviation in the Bureau of Navigation.

CHAMBERS, William (1800–83). A Scottish publisher and author, elder brother of Robert Chambers. He was born at Peebles and when 19 years old began business as a bookseller in Edinburgh. Between 1825 and 1830 he wrote the *Book of Scotland* and, jointly with his brother, the *Gazetteer of Scotland.* His venture, *Chambers's Edinburgh Journal,* was a success from the first. The two brothers established in 1832 the firm of W. & R. Chambers, thereafter writing, editing, and printing various popular and notable works, including their 10-volume *Cyclopædia* (1859–68). William Chambers wrote independently, among other books, *Things as they Are in America* (the result of a visit to the United States in 1853). He was Lord Provost of Edinburgh in 1865–69, and in 1872 the University of Edinburgh conferred upon him the degree of LL.D., in recognition, especially, of his services in improving the older part of the city. He died May 20, 1883, and Robert Chambers (1832–88), eldest son of the Robert Chambers named above, became editor of the *Journal* and head of the firm. On his death, in 1888, he was in turn succeeded by his son, Charles Edward Stuart Chambers (1859–), who is also a well-known editor. Consult Chambers, *Memoir of W. and R. Chambers* (Edinburgh, 1872; 13th ed., with additions, 1884).

CHAMBERS, Sir William (1726–96). An English architect. He was born in Stockholm, but was brought to England in his infancy. In his youth, as a supercargo in the service of the Swedish East India Company, he made a voyage to China, and there produced sketches, which were published under the title *Designs for Chinese Buildings.* At the age of 18 he left the sea and studied architecture in Italy and Paris. He returned to England in 1755 and became the foremost living English architect, continuing the propaganda for the Palladian style begun by Inigo Jones. His masterpiece is the remodeling of Somerset House in 1776. He also designed buildings for Kew Gardens, the pagoda among them. He wrote several books, including a *Dissertation on Oriental Gardening,* in which he praised extravagantly the Chinese artificial system of laying out grounds. The book called forth several keen satires, of which the most widely circulated was *An Heroic Epistle to Sir William Chambers,* probably written by William Mason. It is said that Horace Walpole had a hand in it also. Chambers's high reputation as a writer rests upon his standard work for classic architecture, *A Treatise on the Decorative Part of Civil Architecture,* which exercised a potent influence on the architecture of his time. He was created Knight of the Polar Star by the King of Sweden (1771), and George III permitted him to use his title in England.

CHAMBERSBURG. A borough and the county seat of Franklin Co., Pa., 52 miles by rail southwest of Harrisburg, on the Cumberland Valley and the Western Maryland railroads, and on Conococheague Creek (Map: Pennsylvania, F 8). It is finely situated in the broad Cumberland valley and in a populous and well-cultivated region. Chambersburg is the seat of Wilson College (Presbyterian) for women, organized 1870; Penn Hall Preparatory School for girls; and it has a small courthouse, hospital, children's home, old people's home, public library, memorial fountain, and many handsome churches, while in the vicinity are Wolf Lake, Mont Alto, and several parks. There are manufactures of hosiery, flour, furniture, wool, dresses, paper, iron, milling machinery, engines, boilers, soap, steam and hydraulic machinery, iron castings, silk, ice, and condensed milk; and the shops of the Cumberland Valley Railroad are situated here. The city owns and operates its water works and electric light plant. Its government has its source in special acts of the State Legislature, which provide for a chief burgess, elected every three years, and a borough council. Pop., 1890, 7863; 1900, 8864; 1910, 11,800; 1920, 13,171.

Chambersburg was first settled (in 1730) by Benjamin Chambers, an immigrant from Ireland, and was for many years called "Falling Spring." It was incorporated in 1803. On July 30, 1864, the Confederate General McCausland burned the town in default of the payment of a ransom of $100,000. It was entirely rebuilt after the war. Consult *History of Franklin County* (Chicago, 1887).

CHAMBERTIN, shäN′bĕr′tăN′. A red wine of Burgundy, which is famous for having been a favorite with both Louis XIV and Napoleon. The grape is grown on the hills near Dijon, and the vineyard (Chambertin) is divided among several proprietors. See Wine.

CHAMBÉRY, shäM′bâ′rē′. The capital of the Department of Savoie, France, situated in an elevated valley about 6 miles south of Lake Bourget, at an elevation of over 800 feet (Map: France, S., K 3). It is not a modern city, and most of its streets are flanked by old and gloomy buildings. It contains a cathedral dating from the fifteenth century and a number of interesting old churches. The castle of the dukes of Savoie, which was repeatedly demolished by fire, has been restored, and is now used by the administrative authorities of the department. There are also a museum, a fine library of 40,000 volumes, a number of institutions for higher and secondary education, and a theatre. The chief industries are the manufacture of lace, silk fabrics, leather, soap, paper. Pop. (commune), 1901, 22,108; 1911, 22,958.

CHAMBE′ZI. A river of Africa, one of the head streams of the Congo (Map: Congo Free State, F 5). It rises in the plateau between the lakes of Tanganyika and Nyassa and, flowing southwest, enters Lake Bangweolo in the wet season, but during the dry season skirts the southern border of the shrunken lake and flows directly into the Luapula River.

CHAMBIGES, shäN′bêzh′, Martin (?–1532). A French architect of the late Gothic period. He built parts of three of the finest cathedrals in France—Sens (transept, 1494; portals, 1501–13), Troyes (façade, 1502), and Beauvais (transept, 1500–32)—and was one of the few really great architects of his age. His son, Pierre Chambiges, besides assisting his father, took part in the building of the Hôtel de Ville in Paris (1533–34), with Domenico da Cortona (Bogador), and of the Château de Fontainebleau (1538), but his claim to originality rests on the remarkable Château de Saint-Germain, near Paris, which stands between the Gothic and Classic styles, and between Feudal and Renaissance castles, in a style peculiar to itself.

CHAM′BLISS, Charles Edward (1871–). An American entomologist, born at Petersburg, Va. He was educated at the University of Tennessee, where from 1894 to 1900 he was an instructor in zoölogy and entomology, acting at the same time as entomologist of the Ten-

nessee Agricultural Experiment Station. Subsequently he was State entomologist of Tennessee, associate professor of zoölogy and entomology at Clemson College, and State entomologist of South Carolina. In 1908 he took charge of the rice investigations of the United States Department of Agriculture. He published *A Preliminary Report on Rice-Growing in the Sacramento Valley* (1912), a bulletin of the United States Department of Agriculture.

CHAMBLY (shăn'blē') **RIVER.** See RICHELIEU.

CHAMBORD, shăn'bôr'. A celebrated castle of the Renaissance in France. It is situated in the Department of Loir-et-Cher, about 12 miles east of Blois, in the midst of a park 21 miles in circumference. It was begun by Francis I in 1526, and was continued by his successors of the houses of Valois and Bourbon. The building marks the transition between the fortified castle and the Italian palace, and is surmounted by a vast number of turrets, minarets, and cones. The most prominent features of the structure are its six round towers, each 60 feet in diameter. The double spiral staircase in the central tower is so contrived that persons ascending and descending may pass each other without meeting. The castle, which contains 440 chambers, was the residence of Francis I, Henri II, and Louis XIV, and the scene of the first presentation of Molière's *Bourgeois gentilhomme.* Among the other occupants of Chambord were Marshal Saxe, Stanislas Leszczynski, King of Poland, and Marshal Berthier, upon whom it was bestowed by Napoleon. In 1821 it was bought from Berthier's widow by a number of Legitimists and presented to the infant Duc de Bordeaux, who was afterward known as the Comte de Chambord. The possession of this celebrated château was passed on by bequest to the Parma family in 1883. Consult Millot, *Les châteaux historiques: Chambord* (Paris, 1875).

CHAMBORD, HENRI CHARLES FERDINAND MARIE DIEUDONNÉ D'ARTOIS, DUC DE BORDEAUX, COMTE DE (1820–83). A Bourbon claimant to the French throne. He was the son of the Duc de Berry, who was murdered by Louvel on Feb. 13, 1820, and the grandson of Charles X. Seven months after the death of the Duc de Berry, who was heir presumptive to the throne of France, his widow gave birth to a prince, who received the title of Duc de Bordeaux—that of count, by which he was subsequently known, being derived from the castle of Chambord (q.v.), presented to him at his christening. He was baptized amid circumstances of great pomp, with water brought by Chateaubriand from the river Jordan, and received the appellation of *l'enfant du miracle.* Chambord was chosen by Charles X to succeed him when, in 1830, he abdicated the French throne; and at the death of Charles the Legitimists proclaimed Chambord King. In 1839 the Prince visited Italy, accompanied by his mother, and was received by the petty courts with great distinction. After the death of the Duc d'Angoulême, in 1844, the heads of the different factions of Legitimists met in London to pay their united homage, and the Duc de Bordeaux made a "pilgrimage to Belgrave Square" to receive it. In 1846 he married a sister of the Duc de Modena, who had never acknowledged the monarchy of July. After the revolution of 1848 many Legitimists were returned to the National Assembly, and in 1850 the Comte de Chambord appeared at Wiesbaden, where a congress of his adherents assembled to consult as to their future policy. As the Comte de Chambord was without heirs, a union of the partisans of the elder Bourbons with the Orleanists was effected, but no attempts were made to carry out the arrangement. After the fall of Napoleon III, in 1870, repeated attempts were again made to effect a coalition between the supporters of the Bourbons and the Orleanist claims; but whatever chance there might have been for a royal restoration during the troubled days of the Third Republic before 1880 was ruined by the Comte de Chambord's obstinate refusal to abandon his extreme Legitimist views, which he aired more than once in "royal" proclamations. He died at Frohsdorf, in Lower Austria, which had been his residence for many years, Aug. 24, 1883.

CHAMBRE ARDENTE, shăn'brär'dänt' (fiery room). A tribunal established by Francis I in 1535 for the trial and execution of heretics apprehended by the Inquisition. It derived its name from the manner of execution, which was chiefly by burning. It flourished during the civil wars and the time of the League, but sank into abeyance under the early Bourbons. Louis XIV, however, employed it in the investigation of the numerous reports of poisonings that followed the apprehension of the Marquise de Brinvilliers (q.v.). It was discovered that a certain hag named La Voisin, posing as a sorceress, had been driving a lively trade in poisons—"succession powders," they were called—with such as were afflicted with superfluous husbands, fathers, or rival heirs. Many persons of the highest court circles, the Marshal Luxembourg among them, were summoned before the tribunal, but the affair ended with the execution of the sorceress only, in 1680. With this the Chambre Ardente ceased its activity. Consult Weiss, *La chambre ardente* (Paris, 1889), and Ravaisson, *Archives de la Bastille* (Paris, 1866–84).

CHAMBRE DES DÉPUTÉS, shăn'br' dā dā'pụ'tā'. The building in Paris in which the sessions of the French Legislature are held. It is called also "Palais du Corps Législatif" and "Palais Bourbon," and was built in 1722 for the Duchess of Bourbon, becoming national property in 1790. It fronts the Seine opposite the Pont de la Concorde. The style is that of a Greek temple, with 12 Corinthian columns. The steps and façade are ornamented with statues and reliefs.

CHAMBRE INTROUVABLE, shăn'brăn'-trōō'vä'bl'. The name given to a packed assembly of deputies in France which sat from October, 1815, to April, 1816. The epithet (meaning "chamber whose like cannot be found") originated with Louis XVIII, by whom, after his restoration, this chamber had been summoned. Louis, no doubt, used the term ironically, for he realized the injury which was sustained by his cause through the fanaticism of these deputies; but they, for the most part, accepted the name seriously as a compliment. The former chamber, which had shown much moderation, had been dissolved under the influence of the court party, and the ministry, led by Talleyrand, had exerted itself to procure the election of a submissive chamber. The ultra-Royalists were for a time in the ascendant. The number of the deputies was arbitrarily raised from 259 to 392, and many of the elections, especially in the south, took place under the supervision of the partisans of reaction or of foreign troops. At the elections in Nîmes more than 100 persons were

killed by the Royalist bands. At last, on October 7, the King opened the chamber, on which he enjoined quiet and moderation; but when, in one of the first sittings, Boyer d'Argenson asked for the intervention of the chamber in behalf of the Protestants, who were being slaughtered in the south by the ultra-Royalist bands, the speaker was called to order, and the chamber from that time ceased to observe any bounds or moderation. The fanatical legislation that followed inspired the ministers, the King, and especially the Emperor Alexander, with so much aversion and fear that the chamber was dissolved on April 5, 1816, an event which was received with universal rejoicing. The electoral law of Feb. 5, 1817, prevented the return of a similar chamber, and it was only by the modified electoral law of 1820 that ultra-royalism regained a predominating influence in the Parliament. See WHITE TERROR.

CHAMBURU, chäm-bo͞o′ro͞o. A species of papaw (q.v.), native of Brazil.

CHAMECK, shä-mĕk′ (Brazil). The coaita. See SPIDER MONKEY.

CHAMELEON, kȧ-mē′lê-ŭn (Lat. *chamæleon*, Gk. χαμαιλέων, *chamaileōn*, from χαμαί, *chamai*, on the ground + λέων, *leōn*, lion). An African lizard of the family Chamæleontidæ, of very peculiar form and structure, and placed at the head of the order Lacertilia. The body is much compressed, the dorsal line sharp, in some of the species rising into an elevated crest; the back of the head is also elevated into a sort of cone. The neck is very short and does not admit of the head being turned, for which, however, compensation is found in the remarkable powers of motion possessed by the large, prominent eyes, which move independently of one another and are covered with a membrane pierced only with a small hole for the pupil to look through. There are no external ears. The skin is not covered with scales, but, like shagreen, is rough with granules. The legs raise the body rather higher than in most of the saurians; the toes, both of the fore and hind feet, are divided into two sets —one directed forward and the other backward —so that each foot has the power of grasping like a hand. The tail is long and prehensile. The lungs are very large and are connected with air cells that lie among the muscles and beneath the skin, so that the animal has a remarkable power of inflating itself with air. The tongue is remarkably extensile and is the organ by which the animal seizes the insects which constitute its food, being darted at them with unerring aim, while a viscous saliva causes them to adhere to it, and they are carried with it into the mouth. For illustration of the chameleon's method of catching insects, see the article LIZARD.

The chameleons are slow in their movements, except those of the eyes and the tongue, and remain long fixed in one spot, awaiting the approach of insects, which they seize on their coming within reach. They all live among the branches of trees, but lay their large eggs (10 or 12) under leaves on the ground. Their power of fasting is great and, along with their gulping of air, gave rise to the fable, current among the ancients and until recent times, of their living on air, and led to other fables and to their ancient use in medicine. Their celebrated power of changing color is not equally fabulous, and may be used to render the animal less easy of observation, by assimilating it to the color of surrounding objects. It may depend in part on the action of light; it is certainly connected with the fear and other passions of the creature. Milne-Edwards has discovered that it depends upon the presence of two differently colored layers of pigment underneath a transparent skin. Both may show simultaneously, or blend, or one may replace the other. This power of changing color is possessed by many lizards and is explained more fully under METACHROSIS. One species (*Chamælcon vulgaris*) is found wild along the European shore of the Mediterranean and is often made captive.

American Chameleons are the small, slender lizards of the iguanid genus *Anolis*, very common throughout tropical America and represented in the southern United States by a single species (*Anolis carolinensis*), often also called "scorpion." It is 3 to 3½ inches long in body, with a tail 5 to 6 inches long. Below it is white, above emerald green, or the color of any natural object upon which it rests. Beneath the capacious mouth is a large dewlap, which "can be vertically expanded like a fan, when it is of a deep-red shade, or may be retracted so as to be scarcely visible." They are extremely active during the warm hours of the day, and extremely amusing as they dart and scramble about bushes, rocks, or buildings in search of insects, of which they destroy a vast number. In Jamaica and the Antilles they are often household pets. A closely allied tropical species is illustrated on the Colored Plate of LIZARDS. Consult Parker and Starratt, "The Effect of Heat on the Color Changes in the Skin of Anolis Carolinensis," *Proceedings, American Academy of Arts and Sciences*, vol. xl, No. 10 (Boston, 1904).

CHAMELEON. A southern constellation within the Antarctic polar circle.

CHAMFER (OF. *chamfrein, chamfrain*, of uncertain origin). In architecture, an angle or arris which is obliquely beveled or cut off is said to be chamfered. The chamfer is sometimes a *concave* or *hollow* chamfer; when it does not extend over the entire length of the arris, it is called a *stopped* chamfer. It was most used in mediæval architecture, and in Gothic buildings it is greatly varied and decorated. It is frequently employed in modern architectural woodwork.

CHAMFORT, shän′fôr′, SÉBASTIEN ROCH NICOLAS (1741–94). A French epigrammatist, the best talker and raconteur of his generation in France. He was born in Auvergne, an illegitimate child, was educated on a scholarship in Paris, and achieved a distinction in classical studies that led him in afteryears to write, "What I learned I have forgotten. The little that I do know I have guessed." He left school to become an abbé, "a costume, not a profession," he said, adding when offered a benefice that he "preferred honor to honors." For the moment, however, he got neither. Booksellers declined his books, and for a year he lived by writing other people's sermons and on chance journalistic crumbs. Then he won an academic prize and became the fashion in the literary salons, where he led a life of gallantry from which he had presently to seek rest and recuperation at Spa and elsewhere. Returning, he wrote a successful drama, *La jeune Indienne* (1764). He made a living—scanty, to be sure—more by his tongue than by his pen, paying for his entertainment by the diversion that he gave to his hosts, especially Madame Helvétius, and

Chabanon, who resigned to him a pension of 1200 livres on the *Mercure de France*. Occasionally he won academic prizes, as by his eulogies on Molière and La Fontaine. But with every epigram his reputation grew. The King added 1200 livres to his pension, and the Prince de Condé made him his secretary, a post that he found uncongenial to his Bohemianism. He withdrew to Autreuil and married a clever woman of 48, who died six months after. Then he went to Holland, but returned to accept a seat in the Academy in 1781. An unfortunate and mysterious love affair soon made him quit the court forever; but he gathered about him at the house of M. de Vaudreuil a congenial circle, which included Mirabeau (q.v.), whom Chamfort helped with his orations. He worked actively for the Revolution with tongue and pen, for a time as secretary of the Jacobin Club and as street orator. He was among the stormers of the Bastille. But, with the fall of the Girondists, his political life ended, and his criticisms of the Terrorists soon made them anxious to silence his bitter tongue with the guillotine. This he escaped by suicide with dagger and pistol. He did not die immediately, however, but lived to bequeath to the world two final epigrams. "I declare," he dictated—and signed the declaration with his blood before the police who came to arrest him—"that I wished to die free rather than be led slave to prison." To the Abbé Sieyès, who owed his political fortune to Chamfort's epigram on the Third Estate, "It is everything and has nothing," he said, as his last word, "I am going at last from a world where the heart must either break or turn to bronze." No writing of Chamfort's is worth recalling save his aphorisms (*Maximes et pensées*), which, after those of La Rochefoucauld, are the keenest, the most incisive, and the most pregnantly cynical in modern literature. They are restrained in utterance, violent in implication, subtle in manner, iconoclastic in effect. Chamfort's *Œuvres complètes* is in 5 vols. (1824–25); a selection from his writings appeared as *Œuvres de Chamfort* (1852), with a critical preface by Houssaye. In 1879 appeared *Œuvres choisis* (2 vols.), with preface and notes by M. de Lescure. Consult Sainte-Beuve, *Causeries du lundi*, vol. iv (Paris, 1857–62), and Pelisson, *Chamfort, Etude sur sa vie, son caractère et ses écrits* (Paris, 1895). See EPIGRAM.

CHAMFRON, chăm'frŏn, or **CHAMFRAIN,** chăm'frān (Fr. *chanfrein*, of uncertain origin). A frontlet of metal, forming part of the armor worn by a charger in late mediæval times. It protected the forehead, eyes, and nostrils, and was frequently provided with a projecting spike. It came into use about the beginning of the fourteenth century. In the fifteenth century the chamfron was sometimes adorned with precious metals and became an object of great cost. To prevent shying in tourneys, the chamfron was often made so that the horse could see nothing in front of him. See illustration under CAVALRY.

CHAMIDÆ, kăm'ĭ-dē (Neo-Lat. nom. pl., from Gk. χαίνειν, *chainein*, to gape). A group of curious marine Pelecypoda, allied to the genus *Cardita*, and having shells with unequal valves, that exhibit a tendency to spiral development of the beaks. In the recent forms and many of the fossil representatives, which are far more numerous than those now living, one of the valves is attached to some supporting object by direct cementation of the outer wall of the valve, and there is usually a considerable thickness of the shell wall of this valve. The only living genus, *Chama*, is less different from the normal clam form, as seen in *Cardita*, than are its numerous fossil relatives from the Mesozoic and Tertiary rocks. *Chama* has a shell of which the larger (attached) valve is convex with a somewhat spiral nonelevated beak, and a smaller spiral flattened valve that suggests a lid for the larger one, which latter contains in its cavity the bulk of the animal. This genus, with about 55 living species, is found abundantly in warm seas, especially the Red Sea and the Indian Ocean, where its shells are common on coral reefs, fastened into the cavities of the coral masses. Fossil species of *Chama*, little different from the modern forms, are found first in the Cretaceous rocks, and the genus attained its maximum in the Eocene, when it was quite abundant in the European Mediterranean Sea of that period. The related fossil genera, found in the Mesozoic rocks, present some curious forms, due to extreme inequality or to spiral extension of the beaks of the valves. *Diceras*, of the Upper Jura, has the two valves of slightly unequal size, with their beaks twisted spirally outward, so that they resemble a pair of ram's horns. *Requienia*, of the Cretaceous, resembles a turreted gastropod with the aperture of its spirally rolled larger (left) valve closed by the operculum-like flattened right valve. Other allied genera are *Monopleura*, *Caprina*, etc., all from the Cretaceous rocks. For description of similar and closely allied, though even more aberrant, fossil pelecypods, see the articles on HIPPURITES; and, for illustrations, see RUDISTÆ.

CHAMIER, shȧ-mēr', FREDERICK (1796–1870). An English novelist. He was born in London, entered the navy in 1809, and distinguished himself in the American War of 1812. He retired in 1833 and was promoted captain in 1856. The success of Marryat in depicting sea life led Chamier to enter the same field, in which he was not without success, though in invention and humor he falls short of his model. His best romances are: *Ben Brace* (1835); *The Arethusa* (1836); *Life of a Sailor* (1837); *Jack Adams* (1838); *Tom Bowling* (1841); *Jack Malcolm's Log* (1846). All of his novels have been translated into German. He also wrote a *Review of the French Revolution of 1848* (1849), in which he gives a prejudiced view of some of the prominent actors.

CHAMINADE, shȧ'mē'nȧd', CÉCILE LOUISE STÉPHANIE (1861–). A French composer, born in Paris. She studied under Le Couppey, Savard, Marsick, and Godard, and made her début as a pianist when 18. Her compositions at one time enjoyed great popularity, because of their melodiousness and piquant rhythm. For a time she was vastly overrated. Although her visit to the United States in 1908 proved very successful for the moment, she failed to regain her hold on the musical public. Among her best-known instrumental pieces are: *La lisonjera* ('The Flatterer'); *Pas des amphores; Pas des écharpes* ('Scarf Dance'); *Au matin* for two pianos; *Callirhoë*, a ballet symphony performed first in 1888 in Marseilles; *Les amazones*, a lyric symphony; two suites for orchestra; a concert-stück for piano and orchestra. Her songs also were formerly in great vogue.

CHAMISO, chȧ-mē'sō. A plant of the order Rosaceæ. See Colored Plate of CALIFORNIA SHRUBS.

CHAMISSO, shä-mēs'sō, Adelbert von (1781–1838). An eminent German poet and naturalist. Although born in Champagne, France, he in childhood shared the exile of his parents, fleeing from the terrors of the French Revolution. In 1796 he became a page of the Queen of Prussia, and though his parents afterward returned to France, education had made Germany more congenial to his poetic nature, and he identified himself wholly with his adopted country. In 1798 he entered the army as ensign and in 1801 became lieutenant. He showed his interest in the military calling by two technical treatises published in 1798 and 1799. Already he had joined a romantic brotherhood, which included several young men destined to fame, Varnhagen, Hitzig, De la Motte-Fouqué, and others. He studied Homer diligently, translated much into German, and in 1803 essayed a *Faust*, the only one of his early poems preserved in his *Works*. He also coöperated as editor of the *Musenalmanach* (1804–07). In 1806 he resigned from the army and went to France, hoping to secure a position as teacher in the gymnasium at Napoléonville; disappointed in this, he spent several years in futile and discontented Bohemian wanderings. He was in France again in 1810, when he undertook to turn into French Schlegel's noted *Lectures on Art and Literature*, staying with him and Madame de Staël at Chaumont, and later following her to Coppet, where her relations with Jean de Rocca brought him to his senses. Here he began to study botany under Aug. de Staël, and in 1812 he matriculated as a student of medicine in Berlin. In the next year, during the War of Liberation, he retired to Kunersdorf, and while there wrote his most noteworthy prose work, *Peter Schlemihl*, a wonderful tale of the loss of a shadow by compact with the devil—an idea familiar to folklore and already developed by Goethe in his *Märchen*, and by Körner in his *Teufel von Salamanca*, but here given its enduring and classic form. He took part in Captain Kotzebue's Russian polar expedition (1815–18), and in 1835 published in a *Journal* an account of it which in style and power of description is among the classics of travel. He returned to Berlin in 1819, and was appointed assistant custodian of the botanical garden. While here he married Antoine Piaste. Having recovered an indemnity of 100,000 francs for his French estates, he visited Paris in 1825. His greatest literary activity dates from his return, when he settled down to domestic life and peaceful production stimulated by the genial companionship of his wife, to whose inspiration we owe especially the charming poetic cycles *Frauen-Liebe und -Leben*, and *Lebens-Lieder und -Bilder*. He also made an admirable translation of the *Song of Thrym*, from the *Edda*, and many versions of poems in other languages. From 1832 till his death he was editor of the *Musenalmanach*, which he made an annual of much literary importance. His poetry is rather small in amount, but widely popular in Germany. Some of his lyrics, ballads, and romances rank among the finest in German literature, especially *Das Schloss Boncourt*, *Die alte Waschfrau*, and *Die Kreuzschau*. His international reputation rests on the many translations of his *Peter Schlemihl*. His collected *Works* fill 6 vols. (Leipzig, 1836–39; 6th ed., Berlin, 1874), containing also his *Biography* by Hitzig and his *Letters*. Consult also: Fulda, *Chamisso und seine Zeit* (Leipzig, 1881); Du Bois-Reymond, *Chamisso als Naturforscher* (Leipzig, 1889); Kossmann, *Der deutsche Musenalmanach, 1833–1839* (The Hague, 1909); and Geiger, *Aus Chamissos Frühlingzeit* (Berlin, 1905).

CHAMOIS, shăm'mĭ, *Fr. pron.* shă-mwȧ' (Fr., It. *camozza;* probably from MHG. *gemeze, gemz*, Ger. *Gemse*, chamois; cf. also Sp., Portug. *gamo*, fallow deer), or Gemse. A goat antelope (*Rupicapra rupicapra* or *tragus*), inhabiting the high mountains of southern Europe. It occurs in the Pyrenees, where it is called "izard"; in the mountains of the coasts of Spain, Dalmatia, and Greece; in the Alps, Carpathian, Caucasus, and Taurus ranges, and in Georgia. The izard of Spain and the atchi of the Caucasus and beyond differ somewhat from the typical chamois of Tirol, but only as local races. The chamois is about the size of a large goat, but the neck is longer in proportion, and the body shorter. The color is brown, deeper in winter than in summer; the tail is black; the head a pale yellow, with a dark-brown band along each cheek. The horns, seldom more than 6 or 7 inches long, rising nearly straight up from the forehead, are black and so bent back at the tip as to form a hook. (See Plate of Goat Antelopes.) The usual summer resort of the chamois is in the higher regions of the mountains which it inhabits, not far from the snow line, and it is often to be seen lying on the snow. In winter it descends to the higher forests, where, indeed, the females and their young fawns spend most of the time. The aromatic and bitter plants of the mountain pastures are its favorite food. Flocks of 100 are sometimes seen; but in the Swiss Alps, where the numbers have been much reduced by hunting, the flocks are generally very small and often consist only of a few individuals. Old males often live solitarily. The chamois produces one or two young at a birth, in May or June.

It is an animal of extraordinary agility, and flocks may often be observed sporting in a remarkable manner among the rocky heights. It can leap over ravines 16 to 18 feet wide; a wall 14 feet high presents no obstacle to it; and it passes readily up or down precipices which almost no other quadruped could attempt. It is said to descend obliquely almost perpendicular precipices of more than 20 feet, striking its feet once or twice against the rock, as if to stay and guide its descent, and alighting securely, often on a very narrow ridge of rock, with its hind feet first, and bringing the fore feet almost into contact with them. When a flock of chamois are feeding (usually early in the morning), one is always on the watch, and by a sort of whistle announces apprehended danger.

The hunting of the chamois is attended with great hardship and much danger, but calls forth the highest qualities of both sportsmanship and mountaineering, since no great numbers exist, nor is any free hunting to be had except in the remotest and loftiest Carpathians, or else in Persia. This is due to the fact that for many years the Alpine resorts, and much of the region to the eastward, have been most strictly preserved by royal decree or private ownership, and only a very limited number of animals permitted to be killed annually; yet much poaching is done. The finest and proper way is to stalk the quarry alone, or with only a guide, but battue methods are frequently followed in Bavaria and Transylvania. The flesh of the chamois is highly esteemed. Its skin is made into leather, and from it the original "shammoy," or "shammy

leather," so much prized for softness and warmth, was obtained. (See LEATHER.) Its horns and hoofs are mounted as ornaments, alpenstock handles, etc., and form a valuable article of trade at mountain resorts. When taken young, the chamois is easily tamed.

CHAMOMILE, kăm'ô-mīl, or **CAMOMILE** (OF. *camamille*, ML. *camamilla*, Lat. *chamomilla*, from Gk. χαμαί, *chamai*, on the ground + μῆλον, *mēlon*, apple). A genus of plants of the natural order Compositæ, suborder Tubulifloræ, distinguished by imbricated bracts, a scaly conical receptacle, a ray of one row of female florets, those of the disk hermaphrodite, the achænia obscurely four-cornered, and destitute of pappus. The species are annual and perennial herbaceous plants, chiefly natives of Europe and other temperate parts of the world. The common chamomile (*Anthemis nobilis*), the Roman or true chamomile, the most important species of the genus, well known for its medicinal virtues, is a perennial plant with a stem about a foot long, procumbent and much branched, each branch terminated by a flower (head of flowers) more than an inch broad, with yellow disk and white ray, the whole plant intensely bitter and highly aromatic. It contains a bitter principle, tannin, and a volatile oil, *oil of chamomile,* which abounds most of all in the involucre. The dried flowers are used in medicine; the infusion, or "tea," made from them is used to a slight extent as a stomachic tonic, especially in convalescence. The German chamomile, or *Matricaria,* consists of the flowers of *Matricaria chamomilla.* This is called wild chamomile in Great Britain. Its flowers are smaller and the taste and odor stronger and less pleasant. This plant is so abundant in some parts of the south of England as to fill the whole air with its scent. The other British species of chamomile are mere weeds; one of them (*Anthemis cotula*) is so acrid as to blister the fingers if much handled. The flowers of the oxeye or dyer's chamomile (*Anthemis tinctoria*), a native of many parts of the continent of Europe, yield a beautiful yellow dye, on account of which the plant is often cultivated.

CHAMONIX, shȧ'mō'nē', or **CHAMOUNI,** shȧ'mōō'nē' (Lat. *Campus munitus*). The name of a wild and romantic valley and village among the Alps in the Department of Haute-Savoie, France. It lies at an elevation of about 3400 feet above sea level, is about 13 miles long and 1 mile broad, and is traversed by the Arve. It begins at the northeast, from the Col-de-Balme, over which there is a mule path to Martigny, in the upper valley of the Rhône. From the other end issues the road to Geneva, which is 53½ miles from Chamonix. On the north side lie Mont le Brévent and the chain of the Aiguilles Rouges, and on the south is the giant group of Mont Blanc, with its enormous glaciers. The chief of these glaciers are the Glacier des Bossoms, des Bois, d'Argentière, and du Tour. By ascending to a point called Montanvert, we come upon the upper course of a glacier, where it expands into a great mountain lake of ice called the Mer de Glace, in which there is a solitary rock or oasis called Le Jardin, about 7 acres in extent, and covered with the most beautiful herbage. Until 1741 the valley was almost unknown; the region was considered a wilderness, and known by the name of Les Montagnes Maudites, or 'accursed mountains.' In that year it was visited by two Englishmen, Pococke and Wyndham, who ascended as far as Montanvert. It was only, however, in 1775 that the attention of travelers was effectually called to it by Saussure and Bourrit. The valley is rich in peculiar plants and furnishes an aromatic and perfectly white honey. The village of Chamonix owes its origin to the Benedictine convent founded between 1088 and 1099. The inhabitants depend for a livelihood partly upon the tourists who visit the valley and partly upon the pastures and upon hunting. There are several good hotels, and the best guides are to be found here for the neighboring Alps. It is from Chamonix that Mont Blanc is usually ascended. Consult Whymper, *Chamonix and the Range of Mont Blanc* (London, 1896).

CHAMOUCHOUAN (shä'mōō-chwän') **RIVER,** or ASHUAPMOUCHOUAN. A northwestern affluent of Lake St. John (q.v.), Quebec, Canada, and the outlet of Chamouchouan, Obatogaman, Shabogama, and other lakes of the district.

CHAMPAGNE, shăn'pā'ny' (Fr., flat country, It. *campagna,* Lat. *campania,* plain, from *campus,* field). A former province of France, now included within the departments of Marne, Haute-Marne, Seine-et-Marne, Aube, Ardennes, Aisne, and Yonne. The province was about 180 miles long by 150 broad, its surface presenting extensive plains with ranges of hills, especially in the north and east, from the vineyards of which is produced the famous champagne wine. In ancient times Champagne was subjugated by Cæsar, and afterward was annexed to the kingdom established by the Franks. After the tenth century it had its own counts, who were vassals of the French kings. The capital was Troyes. By the marriage of Philip IV with Joanna, heiress to the Kingdom of Navarre, in 1284, Champagne and Brie came to the French crown and were incorporated in 1361.

CHAMPAGNE, shăn'pā'ny', or **CHAMPAIGNE,** PHILIPPE DE (1602–74). A French religious and portrait painter, of Flemish extraction. He was born in Brussels, studied under Fouquières, Jean Bouillon, Michel de Bordeaux, and at 19 removed to Paris. There he was associated with Nicolas Poussin in decorating the Luxembourg Palace and several convents for Queen Maria de' Medici. Later he was in the service of Louis XIII and Richelieu, whose portraits he painted many times, besides those of the Queen, Turenne, Mazarin, Henrietta Maria of England, and other celebrated personages. A series of family misfortunes deepened his naturally strong religious convictions and led to a close connection with the Jansenists of Port Royal, for whom he painted the magnificent altarpiece of the "Last Supper" (Louvre). One of his best portraits is the touching likeness of his daughter Catherine, who had become a nun. Among other religious pictures dating from this time is the series of the "Life of St. Benedict" (Brussels). In his latter years his nephew, Jean Baptiste, was associated with him in painting the frescoes in the royal apartments at Vincennes and the Dauphin's room in the Tuileries. Philippe de Champagne happily combined the realism of Flemish art with the spiritual qualities of the French. Although somewhat lacking in imagination and cold in color, especially in his later pictures, he is nevertheless a painter of the first rank, and many of his portraits are veritable

CHAMONIX

HOTEL AND AIGUILLE DU DRU (UPPER)
MER DE GLACE AND HOTEL (LOWER)

masterpieces. The Louvre is richest in his works, which are also in most European collections, in the Boston Museum ("Arnaud d'Andilly"), and in the Museum of the New York Historical Society. For his biography, consult A. Gazier (Paris, 1893) and Stein (ib., 1891).

CHAMPAGNE (shăm-pān') **WINE.** See WINE.

CHAMPAGNY, shän'pâ'nyē', FRANÇOIS JOSEPH NOMPÈRE DE (1804–82). A French publicist, born in Vienna, where his father (see the next title) was French Ambassador. He was a member of the Neo-Catholic party and with Montalembert contended for Catholic schools of instruction independent of the University of France. He contributed to the *Correspondant* and *Ami de la Religion.* In 1869 he was elected to the French Academy for his most pretentious work, a history of the Roman Empire: *Les Césars* (4 vols., 1841–43), *Les Antonins* (3 vols., 1863), and *Les Césars du IIIe siècle* (3 vols., 1870).

CHAMPAGNY, shän'pâ'nyē', JEAN BAPTISTE NOMPÈRE DE, DUC DE CADORE (1756–1834). A French courtier and diplomat, born at Roanne. He served in the American Revolution. In 1789 he was elected to the States-General, and as a supporter of the Third Estate became a prominent member of the General Assembly. During the Reign of Terror he was imprisoned (1793), but was released after Robespierre's fall, and was made a Councilor of State by Napoleon (1799). He became Ambassador to Vienna (1801–04), Minister of the Interior (1804–07), and Minister of Foreign Affairs (1807–11). In 1809 he accompanied the Emperor to Austria, where he negotiated the Treaty of Vienna, and he helped arrange the marriage with Marie Louise. He quarreled with Napoleon in 1811, but joined him during the Hundred Days. After the restoration of the Bourbons (1814) he retired from public life, but in 1819 was restored to the Chamber of Peers.

CHAMPAIGN, shăm-pān'. A city in Champaign Co., Ill., 128 miles south by west of Chicago, on the Illinois Central, the Cleveland, Cincinnati, Chicago, and St. Louis, the Illinois Traction and the Wabash railroads (Map: Illinois, D 3). It is situated in an agricultural region and has an ice and cold-storage plant, railroad shops of the Illinois Central, extensive foundries, and tool and textile factories. It is the twin town of Urbana, which contains the University of Illinois, and it has a fine public library, several parks, and a high school. Settled in 1855, Champaign was incorporated five years later. Its government is administered by a mayor, elected every two years, and a city council. The electric light plant is owned by the city. Pop., 1900, 9098; 1910, 12,421; 1920, 15,873.

CHAMPAIGNE, PHILIPPE DE. See CHAMPAGNE, PHILIPPE DE.

CHAMP DE MAI, shän de mâ. See CHAMP DE MARS.

CHAMP DE MARS, märs (Fr., Field of Mars, Lat. *Campus Martius*). The name given to the annual meetings held in the month of March by the Franks of Gaul in the fifth century and later. These were either national assemblies called for the purpose of deliberation upon important matters and for the trial of important cases, or else military reviews. The Champs de Mars were not held as frequently under the later Merovingians, but were revived by Pepin, who held his meetings, however, in May (hence the name CHAMP DE MAI). Under Charles the Great similar meetings were held in one of the summer months and had varied functions.

CHAMP DE MARS (Fr., Field of Mars). A great parallelogram in Paris, between the Seine and the Ecole Militaire, formerly used especially for military purposes and drills. It is 1093 yards long and 537 wide, with four rows of trees on each side, and until 1861 it was surrounded by high embankments. It has been the scene of many remarkable political and public celebrations, from the Feasts of the Federation in 1790 and of the Champ de Mai in 1815, to the universal expositions of 1867, 1878, and 1889. For the last the Eiffel Tower was built at one end of the Champ.

CHAMPEAUX, shän'pō', GUILLAUME DE. See GUILLAUME DE CHAMPEAUX.

CHAMPERICO, chäm'pâ-rē'kō. A port of Guatemala, situated on the Pacific coast, at the mouth of the Salamo, 100 miles southwest of Guatemala (Map: Central America, B 3). The town is connected with Acapulco, Mexico, by steamship and with the interior by railroad and is the residence of a United States consular agent. Its chief article of export is coffee. Pop., 1500.

CHAMPERTY, shăm'pĕr-tĭ, or **CHAMPARTY** (OF. *champart*, from ML. *campipars, campars, campartagium,* from Lat. *campi pars,* part of the field, from *campi partitio,* a division of lands). The common-law offense of promoting or maintaining a suit for the purpose of sharing in the proceeds. The practice has been strictly forbidden by statute in England from very early times (3 Edw. I, c. 25; 13 Edw. I, c. 49; etc.) and gave rise to a tort action for damages and subjected the offender also to criminal liability. In Scotland the rule of the civil law by which the *pactum de quotâ litis* was held to be a *pactum illicitum,* and as such void, has all along been part of the common law. Such practices were also forbidden by statute to members of the college of justice (1594, c. 216). There is this difference between the laws of the two countries, however, that whereas in England the offense has always been punished criminally, in Scotland the only penalty which it entails, beyond nullity of the bargain, is deprivation of office. According to Blackstone, the word "signifies the purchasing of a suit, or a right of suing—a practice so much abhorred by our law that it is one main reason why a chose in action, or thing of which one hath the right but not the possession, is not assignable at common law, because no man should purchase any pretense to sue in another's right."

In many of the United States, however, champertous agreements are authorized by statute; and, both in England and in this country, the prevailing tendency is towards freedom of contract between litigant and lawyer, and between the owner of a *chose in action* (q.v.) and any one who is willing to buy it. See MAINTENANCE.

CHAMPFLEURY, shän'flē'rē'. The pseudonym of Jules Fleury-Husson (1821–89). A French novelist and miscellaneous writer, born at Laon. His early work was an essential, if an apparently accidental, contribution to the naturalistic movement in French fiction, though most of his novels are romantic. In these he appears as a quiet and genial observer of the follies of mankind, not a satirist of its vices.

In *Chien-Caillou* (1847), and especially in his best novel, *Les bourgeois de Molinchart* (1854), he forms a most interesting connecting link between Balzac in his *Scènes de la vie de province* and Flaubert (q.v.) in the epoch-making *Madame Bovary* (1856). Champfleury wrote also three volumes of *Etudes littéraires*, and a *Bibliographie céramique*, based on the collections of the porcelain manufactory at Sèvres, of which, in 1872, he was made custodian. Consult Troubat, *Souvenirs sur Champfleury et le Réalisme* (Paris, 1905). See REALISM AND NATURALISM.

CHAMPION (from ML. *campio*, combatant, from *campus*, [battle]field). In the judicial combats of the Middle Ages women, children, and aged persons were usually allowed to appear by deputy in the lists. Such a deputy was called a champion. Those who followed this profession were frequently of a low class and were regarded as disreputable and in case of defeat were liable to equal punishment with their clients. Sometimes they were obliged to wear a peculiar armor and dress of leather and were not allowed to fight on horseback. Champions are mentioned as early as the time of Charlemagne. A noble was not required to meet a plebeian, nor were the clergy allowed to enter the lists. In the age of chivalry the champion was a knight, who entered the lists in behalf of an injured lady, or child, or any one incapable of self-defense. The term "champion" was also applied to the knight who saw that no injury or insult was offered to ladies at tournaments. In England, formerly, on coronation day a knight fully armed would challenge all who denied the King's right to the throne. The custom, which dates back to William the Conqueror, became, in the time of Richard III, the hereditary right of the Dymoke family and was last observed at the coronation of George IV.

CHAMPION HILLS. A group of hills in Hinds Co., Miss., 20 miles east of Vicksburg, where, May 16, 1863, during the Civil War, a Federal force of about 15,000 (actually engaged), under General Grant, defeated a somewhat larger Confederate force under General Pemberton, the battle lasting about four hours, and the losses in killed, wounded, captured, and missing being about 2450 for the Federals and 5500 for the Confederates (Map: Mississippi, D 6).

CHAMPLAIN, shăm-plān′. A lake lying between Vermont and New York (Map: New York, G 1). It is 110 miles long and increases in width from ¼ of a mile in the south to 13 miles in the north. Its area is about 600 square miles, of which two-thirds is in Vermont. The northern extremity extends 6 miles into Canada. It is about 95 feet above the sea, has a maximum depth of some 300 feet, and is navigable for the largest vessels. It is drained at the north by the Richelieu River (q.v.), which empties into the St. Lawrence. It is connected with the Hudson by a canal from Whitehall. Its principal islands are those composing Grand Isle Co., Vt. Grand Isle, 12 miles long and 1 to 4 miles wide, contains two townships—Grand Isle and South Hero. North Hero, 14 miles long, 2 to 3 miles wide, and Isle La Motte, 6 miles long and 1 to 2 miles wide, are the other main islands of the group. Alburg Peninsula, about 12 miles long and projecting south from Canada into the lake, completes the territory of Grand Isle County. The general shore line is sinuous and offers many fine bays and bold promontories. The scenery in this region is beautiful. The Green Mountain Range (q.v.) lies about 20 miles east of the lake; on the west are the Adirondacks. The chief towns along the water line are Rouse Point, Plattsburg, Port Henry, Crown Point, and Whitehall in New York, and Burlington in Vermont. Lake Champlain receives the discharge of Lake George and of several small rivers. It was discovered by Samuel de Champlain in 1609, who gave it his own name. Its amphitheatre was the scene of much activity during the French and Indian War and also during the American Revolution. The Champlain Society, with headquarters at Toronto, has published important historical writings dealing with the history of New France. In July, 1909, a celebration in Lake Champlain in honor of the tercentenary of its discovery assumed an international character.

The Battle of Lake Champlain. The name given to a decisive naval engagement of the War of 1812, fought off the town of Plattsburg, on Sept. 11, 1814, between a British fleet under Capt. George Downie and an American squadron under Com. Thomas Macdonough. In July, 1814, a British army of about 11,000 men, under Sir George Prevost, undertook the invasion of New York, by the way of the western shore of Lake Champlain. To reënforce this movement it was necessary, however, to dispose of the small American fleet which was then at Plattsburg. In preparation for the coming naval battle, both sides increased their strength by the building of ships. On September 11 the British fleet entered Plattsburg harbor and assailed the American squadron, which was awaiting their attack at anchor. Macdonough had chosen an advantageous position, with his line of battle so disposed as to make it impossible for the enemy to turn either flank. The two fleets were about equally matched in fighting strength, the American squadron numbering 14 vessels of some 2250 tons, with 882 men and 86 guns; while the strength of the British comprised 16 vessels of 2400 tons, with 937 men and 92 guns. The advantage in training and seamanship was probably on the side of the British. The battle lasted about two and one-half hours and ended in a victory for the Americans. Owing to the close range at which the ships engaged, the loss was heavy on both sides, the Americans losing about 200, as against more than 300 for the British. As a result of the battle, the plan of British invasion by land was abandoned, and Prevost retreated in haste to Canada. The victory was also effective in hurrying on the close of hostilities. Consult: Roosevelt, *The Naval War of 1812* (New York, 1882); Johnson, *History of the War of 1812–15* (New York, 1882); Mahan, *Sea Power in its Relations to the War of 1812* (2 vols., Boston, 1905).

CHAMPLAIN, SAMUEL DE (1567–1635). A French explorer and colonizer, the founder of Quebec, and the most prominent figure in the early history of New France. He was born at Brouage, in Saintonge, the son of a ship captain; received a careful training in the principles of navigation and cartography; entered the army, and served in Brittany as quartermaster of cavalry under D'Aumont, Saint-Luc, and Brissac. In 1598 he accompanied his uncle, recently appointed pilot general of Spain, when the latter carried home from Blavet the Spanish soldiers who had served in France as allies of the Leaguers, and in January, 1599, he was placed in command of the *Saint-Julien*, which,

with several other vessels, started at that time for the West Indies. After an absence of more than two years, during which he visited various Spanish settlements in America, including Mexico City and New Granada, Champlain returned to France and made a careful report of his observations to Henry IV. This report, entitled *Bref discours des choses plus remarquables que Samuel Champlain a reconnu aux Indes Occidentales*, remains in manuscript at Dieppe and was not printed in the original until 1870, though an English translation was published by the Hakluyt Society in 1859. In it Champlain suggests the building of a canal across the Isthmus of Panama, "by which," he says, "the voyage to the South Sea would be shortened by more than 1500 leagues." In 1603 he accompanied the expedition sent out by Amyar de Chastes to choose a site for a proposed settlement, explored the St. Lawrence to the Lachine Rapids and the Saguenay for 30 or 40 miles, and soon after his return published a small work entitled *Des sauvages: ou voyage de Samuel Champlain de Brouage fait en la France Nouvelle*, which, together with his other works, has been of the utmost value to historians and gives an especially interesting account of the character and habits of the Indians. In the following year Champlain went to America with De Monts (q.v.), who, on De Chastes's death (1603), had secured the privilege of colonizing Acadia, and during the next three years, in the course of four separate voyages, explored the Bay of Fundy and the New England coast from the mouth of the St. Croix to Vineyard Sound, though he also spent much of his time during this period at the settlement which was established first at St. Croix and afterward at Port Royal, near the present Annapolis, Nova Scotia (q.v.). In 1607 he returned with the discouraged colonists to France, but in 1608 came again to America, this time as Lieutenant Governor (an office which he held until his death), and on July 3 began to lay the foundations of Quebec (q.v.).

In 1609 he accompanied a band of Montagnais, Huron, and Algonquin Indians on an expedition against the Iroquois, discovered the lake which bears his name, and on July 30, near the present Ticonderoga, was instrumental in defeating a band of Mohawks—an event of great historical importance, since it definitely committed France to the policy, probably adopted by Champlain, whereby the French endeavored, by antagonizing the Five Nations, to secure the alliance of the diverse tribes of Canada, while the Iroquois were impelled to unite first with the Dutch and afterward with the English. From 1609 until his death Champlain spent part of almost every year in France, zealously looking after the interests of the colony, and while in Paris in 1610 he married Mademoiselle Hélène Boullé, then only 12 years of age, who, however, did not come to Canada until 1620. In 1610 he again took an active part in a battle with the Iroquois, who had formed a barricade of trees near the Sorel, and in 1611 he established a temporary trading post on the site of the present Montreal. On the reorganization of the government of New France in 1612, he was reappointed Lieutenant Governor under De Soissons, and subsequently held this position under the Prince de Condé, the Duc de Montmorency, the Duc de Ventadour, and Cardinal Richelieu. In 1613, lured by the tales of one Vignau, who claimed to have found a great lake at the sources of the Ottawa and a salt sea not far distant, Champlain proceeded up the Ottawa as far as Allumette Island. Two years later he accompanied a band of Indians, known as "The Great War Party," on an expedition against the Iroquois, and, after a circuitous journey by way of the Ottawa, Lake Nipissing, Georgian Bay, Trent River, and Lake Erie, unsuccessfully attacked the great Seneca fortress, probably near the eastern end of Oneida Lake in New York. This was the last of his expeditions either for war or for exploration, and he passed the rest of his life for the most part in Quebec and in Paris. In 1619 he published a third volume, *Voyages et découvertes faites en la Nouvelle France, depuis l'année 1615 jusques à la fin de l'année 1618;* and in 1632 he issued his last work, *Les voyages de la Nouvelle France occidentale, dicte Canada, faites par le Sieur de Champlain Xainctongeois . . . et toutes les découvertes qu'il a faites en ce pais depuis l'an 1603 jusques en l'an 1629*, which is in part an abridgment of his three previous works relating to Canada. In July, 1629, he was forced to surrender Quebec to an English fleet under Gervaise Kirke, and, after being detained for some time as a prisoner in England, he went to France, whence, in 1633, he again came to Quebec (New France having been restored by England in the previous year), and there on Christmas Day, 1635, he died.

Bold and intrepid, farseeing and resourceful, tactful in his dealings with his white subordinates and his red allies, born to command, and thoroughly imbued with the spirit of adventure and discovery, he was the real founder of French power in America, and richly earned his title, "The Father of New France." "Of the pioneers of the North American forests," says Parkman, "his name stands foremost on the list. It was he who struck the deepest and boldest strokes into the heart of their pristine barbarism. . . . His character belonged partly to the past, partly to the present. The *preux chevalier*, the crusader, the romance-loving explorer, the curious knowledge-seeking traveler, the practical navigator, all found their share in him. . . . His books mark the man—all for his theme and purpose, nothing for himself. Crude in style, full of the superficial errors of carelessness and haste, rarely diffuse, often brief to a fault, they bear on every page the palpable impress of truth." In 1870 a complete edition of Champlain's works was issued under the editorship of Laverdière and Casgrain, as *Œuvres de Champlain, publiées sous le patronage de l'Université Laval* (6 vols., Quebec, 1870), and an English translation of the *Voyages* was published by the Prince Society, under the title, *Voyages of Samuel de Champlain, Translated from the French by Charles P. Otis, with Historical Illustrations and Memoir by Rev. E. F. Slafter* (3 vols., Boston, 1878–82), Grant (ed.). Consult also *Voyages of Samuel de Champlain, 1604–1618* (New York, 1907). For sketches of Champlain, consult: Dionne, *Champlain* (Toronto, 1905); Parkman, *Pioneers of France in the New World* (Boston, 1865); Winsor, *Narrative and Critical History of America*, vol. iv (8 vols., Boston, 1886–89); G. Gravier, *Vie de Samuel Champlain* (Paris, 1900); and an excellent, though brief, biography by Sedgwick in the "Riverside Biographical Series" (Boston, 1902); Dix, *Champlain, the Founder of New France* (New York, 1903); Colby, *Canadian Types of*

the Old Régime (New York, 1908); Gosselin, "Champlain et Hudson," *Proceedings, Royal Society of Canada*, 3d series, vol. iii (Ottawa, 1910); *Report, New York Lake Champlain Tercentenary Commission* (Albany, 1911); Hanotaux, *La France vivante en Amérique du Nord* (Paris, 1913). See CHAMPLAIN (lake).

CHAMPLAIN STAGE. A series of marine clays with interbedded sands and gravels found in the St. Lawrence and Champlain valleys that was deposited during Glacial time, when those valleys were occupied by arms of the sea. The beds were formed probably after the ice sheet had retreated northward into Canada. They mark a very considerable depression of the land surface in that section, since raised beaches of the clays are now observed at altitudes up to 500 feet or more above sea level. The Hudson valley was also lower at that time than it is now. Within the clays are found shells of marine organisms and bones of the whale and walrus. A very complete skeleton of a whale was unearthed at Burlington, Vt., and is now on exhibit in the State Capitol at Montpelier. The Champlain strata extend as far southwest as the eastern end of Lake Ontario.

CHAMP LEVÉ, shän' le-vā'. See ENAMEL.

CHAMPLIN, chămp'lĭn, JAMES TIFT (1811–82). An American educator. He was born in Colchester, Conn., graduated at Brown University in 1834, and entered the Baptist ministry. He was professor of ancient languages in Waterville College (now Colby College) from 1841 to 1857, and was president from 1857 to 1872. He published a number of college textbooks, including a *Text-Book of Intellectual Philosophy* (1860), *First Principles of Ethics* (1861), *Text-Book of Political Economy* (1868), *and Scripture Reading Lessons* (1876).

CHAMPLIN, JOHN DENISON (1834–1915). An American writer. He was born in Stonington, Conn., graduated at Yale in 1856, studied law in Litchfield, Conn., and was admitted to the bar in 1859. In 1862 he began newspaper work, and from 1865 to 1869 was editor of the Litchfield *Sentinel*. He edited *Fox's Mission to Russia* (1873), was one of the corps of editors of Appleton's *American Cyclopædia* (1873–77), and was one of the editors of the *Standard Dictionary* (1892–94). He also edited *Young Folks' Cyclopædia of Common Things* (1879); *Young Folks' Cyclopædia of Persons and Places* (1880); *Young Folks' Cyclopædia of Literature and Art* (1901); *Young Folks' Cyclopædia of Games and Sports*, with Arthur E. Bostwick (New York, 1890); *Young Folks' Cyclopædia of Natural History* (1905); *Cyclopædia of Painters and Paintings*, in collaboration with Perkins (4 vols., 1886–88); *Cyclopædia of Music and Musicians*, in collaboration with Apthorp (3 vols., 1888–90); and *Orations, Addresses, and Speeches of Chauncey M. Depew* (8 vols., 1910). In 1911 appeared his *The Tragedy of Anne Hutchinson* and *The Tragedy of Canonchet*.

CHAMPMESLÉ, shän'mā'lā', MARIE DESMARES (1642–98). A celebrated French actress, born in Rouen, and married in 1666 to Charles Chevillet de Champmeslé, who was an important comedian and playwright of his day. She had already begun her career in the provinces when she came with her husband in 1669 to the Théâtre du Marais in Paris. Her great reputation seems to have started with her acting of Hermione in *Andromaque* at the Hôtel de Bourgogne the following year. Racine was notoriously captivated by her charms, and the public appreciation of her acting was almost as enthusiastic. She and her husband went over in a few years to the Théâtre Grénégaud, and in 1680 at the union of the companies they became members of the new Comédie Française. During her brilliant career "La Champmeslé" created a large number of the famous rôles, among them Bérénice, Ariane, Phèdre, Vénus in *Les amours de Vénus et d'Adonis*, Atalide in *Bajazet*, Monime in *Mithridate*, Iphigénie in *Iphigénie en Aulide*, and the same character in *Oreste et Pylade*. She left the stage, in the vain attempt to restore her health at Auteuil, where she died.

CHAMPNEY, chămp'nĭ, BENJAMIN (1817–1907). An American landscape painter. He was born at New Ipswich, N. H., and studied in Boston and Paris. His best works are paintings of White Mountain scenery and flower pieces. He also painted a panorama of the Rhine, exhibited in Boston and other places, and wrote *Sixty Years' Memories of Art and Artists* (1900). His studio at North Conway was a noted resort, visited by people from all parts of the country.

CHAMPNEY, JAMES WELLS (1843–1903). An American genre and portrait painter. He was born in Boston and first studied wood engraving there, then went to Europe and studied at the Antwerp Academy and under Edouard Frère in Paris. His paintings include landscape and genre subjects, but he is best known for his excellent pastel portraits, among which are those of William Winter, Henry M. Stanley, and Mary Mannering as "Daphne." His etchings and illustrations were also very popular. His wife, ELIZABETH WILLIAMS CHAMPNEY (1850–), is the author of the "Witch Winnie Books," the series of "Vassar Girls Abroad," *Romance of the Feudal Châteaux* (1900), and many other works.

CHAMPNEYS, chămp'nĭz, BASIL (1842–). An English architect and author. He graduated at Trinity College, Cambridge, and studied architecture as a pupil of John Prichard of Llandaff, built the divinity and literary schools at Newnham, the Archæological Museum at Cambridge, Indian Institute (New College), Mansfield College (Oxford), Butler Museum (Harrow), the Quincentenary Buildings (Winchester College), Rylands Library (Manchester), Bedford College, and many churches and schools. The royal medal for 1912 was presented to him by the Institute of British Architects. His publications include *A Quiet Corner of England* (1875) and *Coventry Patmore, Memoirs and Correspondence* (1900).

CHAMPOLLION, shän'pō'lyôn', JEAN FRANÇOIS (1790–1832). A French Egyptologist. He was born Dec. 23, 1790, at Figeac, Department of Lot. He is often called Champollion le Jeune, in distinction from his brother Champollion Figeac, a professor at Grenoble, who educated him. In 1807 he went to Paris to pursue his various Oriental studies, and in 1809 was appointed professor of history at the lyceum of Grenoble. In 1814 he published *L'Egypte sous les Pharaons*, a study of the geography of ancient Egypt. Afterward he essayed the decipherment of the Egyptian hieroglyphics to which the discovery of the Rosetta stone had attracted widespread interest. His brilliant results were first communicated in his *Lettre à Monsieur Dacier* to the public (1822), and were more fully stated in his *Précis du système hiéroglyphique* (1824).

It is now generally recognized that the attempts to ascribe priority in the decipherment of hieroglyphics to Dr. Thomas Young, and even to charge Champollion with plagiarizing Young's discoveries, were entirely unjust. Champollion worked independently, and in any case Young's results published in 1819 were of slight importance as compared with those obtained by Champollion. Champollion was sent by the French government to study the museums of Italy in 1824, and in 1828 to Egypt, where he joined a Tuscan expedition, headed by Rosellini. After his return he became a member of the French Académie des Inscriptions (1830), and in 1832 professor of Egyptology at the Collège de France. His premature death was doubtless due to constant overwork. His genius and his untiring industry are most clearly shown in his posthumous works. His *Grammaire égyptienne* (1836) and his *Dictionnaire hiéroglyphique* (1841) were both unfinished at his death. His *Notices manuscripts* (1844 et seq.), at first in incomplete form, gives a more adequate idea of the results of his Egyptian journey than the more extensive *Monuments de l'Egypte*, published 1835 et seq. Of the numerous books and essays published during his lifetime, the most noteworthy are: *Panthéon égyptien* (1824); *Sur l'écriture hiératique* (1821); *Sur l'écriture démotique* (1824). After Champollion's death Egyptology retrograded temporarily, and much time was wasted in fruitless disputes on the merits of Champollion's system. At present no one doubts the enormous debt of gratitude owed by science to the great decipherer, whose system has been brilliantly confirmed by modern discoveries, although it has been greatly developed and improved in matters of detail. Consult Aimé Champollion, *Les deux Champollion, leur vie et leurs œuvres* (Grenoble, 1888).

CHAMPOLLION, Jean Jacques (1778–1867), usually called Champollion Figeac. A distinguished French archæologist, elder brother of J. F. Champollion, the founder of Egyptology. He was born at Figeac, in the Department of Lot, Oct. 5, 1778. After completing his collegiate studies, he was for a time librarian and afterward professor of Greek at Grenoble. In 1828 he was appointed keeper of manuscripts in the Royal Library in Paris, and 20 years later became librarian at Fontainebleau. He was at the same time professor in the Ecole des Chartes. He died May 9, 1867, in his eighty-ninth year. Champollion first published a number of works on French history and philology. Among them were: *Antiquités de Grenoble* (1807); *Recherches sur les patois ou idiomes de France* (1809); *Nouveaux éclaircissements sur la ville de Cularo, aujourd'hui Grenoble* (1814). Then, at his brother's suggestion, he turned his attention to Egyptian archæology, limiting his studies, however, to the Greek documents bearing upon the subject. His *Annales des Lagides* (1819, with *Supplément*, 1821) was crowned by the Institute, and he published later, utilizing his brother's manuscript collections, *L'Egypte ancienne et moderne* (1840) and *L'écriture démotique égyptienne* (1843). Among his other works are: *Traité élémentaire d'archéologie* (2d ed., 1843); *Histoire des peuples anciens et modernes, l'Asie centrale, l'Inde, et la Chine* (1857); *Monographie du palais de Fontainebleau* (1859–64); *Documents paléographiques relatifs à l'histoire des beaux-arts et des belles-lettres pendant le moyen âge* (1868). Champollion also collaborated actively in editing the manuscripts left by his brother. Consult Aimé Champollion, *Les deux Champollion, leur vie et leurs œuvres* (Grenoble, 1888).

CHAMPS ELYSÉES, shăn'zā'lē'zā'. The fashionable promenade of Paris—a magnificent avenue, extending from the Place de la Concorde to the Arc de Triomphe de l'Etoile, about 1⅓ miles. It was laid out in 1616 by Marie de' Medicis. The lower end forms a park, on either side of which are placed the Palais de l'Elysée, built in 1718 for Count d'Evreux, and the two Palais des Beaux-Arts, occupying the site of the old Palais de l'Industrie. The afternoon concourse of carriages is one of the sights of Paris. The lower end of the avenue abounds in cafés chantants and restaurants. Though a pleasure promenade, the shifting of the commercial centre of Paris to the west is slowly driving the residential section away from this avenue.

CHANAK KALESSI, chà-näk' kä'lĕs-sē', or Kale Sultanie (sometimes called Dardanelles) (Turkish, Pot Castle). The chief town of the Sanjak of Bigha in Asiatic Turkey, situated on the Dardanelles (Map: Turkey in Asia, B 2). It is of considerable strategical importance, and is the seat of the Turkish defenses of the straits and islands of the Mediterranean. It has a well-developed pottery industry and a population of about 10,000. The Trojan War is supposed to have been waged in the surrounding country.

CHANAR, chà-när', or **ESPINAL,** ă'spē-näl'. Names applied to the thorny xerophytic (dry region) thickets of Argentina. See Thicket.

CHANCE (OF. *cheance*, from ML. *cadentia*, fall, from Lat. *cadere*, to fall). A word which in its original and strict meaning may be defined as the causelessness of an event. (See Causality.) But with the growing insight into the universal prevalence of causality, chance in this sense of the term is in most scientific and philosophical circles no longer regarded as possible. The word continues to be used in a different sense, viz., the unknown cause of an event. The cause may be entirely unknown, or unknown only in detail. In either case there is a lack of predictability, and in so far as an event is unpredictable it is said to be due to chance. The only case where chance is still believed in as the absence of causality is the case of volition. (See Determinism; Free Will.) The unpredictable event is itself called an accident, sometimes also itself a chance. See Probability.

CHANCE, Julie Grinnell (Julien Gordon). An American novelist, born in Paris, France. She was married to Col. S. Van Rensselaer Cruger, and after his death to Wade Chance (in 1908). Under the pen name of "Julien Gordon" she wrote many novels displaying much insight into social conditions in the United States and European countries: *A Wedding and Other Stories; A Diplomat's Diary; Poppœa; A Successful Man; Eat not thy Heart; Mademoiselle Reseda; A Puritan Pagan; Mrs. Clyde* (1901); *The Wage of Character* (1901); *World's People* (1902); and a volume of *Poems* (1905).

CHAN'CEL (OF., from ML. *cancellus*, screen, Lat. *cancelli*, grating, dim. of *cancer*, lattice). The end of the church opposite the entrance, so called from the *cancellus* which in the Roman basilica screened the judicial tribune from the rest of the edifice. Usually in fact, and always in ritual, the east end, the choir end, was called

the chancel because it was divided from the body of the church by a screen or rail which marked the beginning of the part reserved for the clergy. In Roman Catholic churches the screen was usually not high except in monastic churches and Gothic cathedrals, but in Greek and Russian churches it completely shuts off the spectator (see ICONOSTASIS), as it did also in many mediæval English churches. The division was made sometimes so as to include the place for singers in the nave, sometimes it divided off only the altar and what was behind it to the end of the apse. In fact, it was used in England as practically synonymous with choir. A chancel aisle is the aisle or ambulatory of the choir. See APSE; BASILICA; CHOIR; CHURCH; REREDOS.

CHAN'CELLOR (OF. *chanceler*, Fr. *chancelier*, Lat. *cancellarius*, porter, doorkeeper, from *cancelli*, lattice). Under the later Roman emperors the chancellor was an usher or officer whose duty it was to stand at the railing or latticework (*cancelli*) to protect the judicial officer from the crowding of the people and to act as intermediary between him and those having business with the court. Upon the breaking up of the Roman Empire the officer of the crown in both the Eastern Empire and the Roman-German Empire and the kingdoms of the West, whose duty it was as notary or scribe to prepare and seal all important documents, was known as a chancellor. His position was one of great influence, and he became the chief officer of the crown. The office was also adopted by the ecclesiastical court at Rome as an inheritance from the Roman Empire, and the office was in turn created in the several bishoprics, each diocese having its chancellor. In France the chancellor was an officer of state of great power and dignity. He was charged with the care of the great seal; he presided over the King's councils, and under him several other officers bearing the name of chancellor were employed in the administration of justice and the preservation of public order. During the Revolution the office was abolished (1790). It was revived by Napoleon I, though deprived of many of its functions. It was continued by the Bourbons, but finally, in 1848, merged with the Ministry of Justice. The chief functionary of the Austrian Empire and of other European states has often been termed "chancellor," and on the establishment of the German Empire Bismarck, as the Prime Minister and chief administrative officer, was made Chancellor of the Empire (Reichskanzler), an office which has been continued in his successors.

In England the chancellor, known as the Lord Chancellor or Lord High Chancellor, is the highest judicial officer of the crown, the law adviser of the government and the Keeper of the Great Seal. The existence of the office in England, as in the other states of Europe, is to be ascribed to the influence of the constitution of the Roman Empire, this influence being exercised chiefly through the medium of the Church. In the early history of the office the chancellor was always an ecclesiastic and the confidential adviser of the sovereign in state affairs. It is for this reason that he has been called the keeper of the King's conscience, and it is to this peculiar method of exercising his judicial functions upon equitable or conscientious, as distinguished from purely legal, principles that the Court of Chancery (q.v.), over which he presided, became of the highest importance in English jurisprudence. The Lord High Chancellor is the highest civil officer of the crown, ranking next after the royal family and the Archbishop of Canterbury. The chancellor is a privy councilor by his office, a member of the cabinet, and prolocutor, or presiding officer in the House of Lords, by prescription. The writs for the convocation of Parliament are issued in his name. Though the form in which his tenure of office is terminated is by the resumption of the Great Seal by the sovereign, the chancellor practically resigns office with the party to which he is attached. He has the appointment of all justices of the peace throughout the kingdom, but this privilege he exercises generally on the recommendation of the Lords Lieutenants of the several counties. But the most important and, as it now seems, somewhat anomalous branch of his patronage arises out of his having been originally an ecclesiastic. Though the last bishop who held the office was John Williams, Archbishop of York, who was Lord Keeper from July 10, 1621, to Nov. 1, 1625, the chancellor still continues to be patron of all the crown livings of the value of £20 per annum, or under, and visitor of all hospitals and colleges of the King's foundation. As representing the paternal character of the sovereign, again, the chancellor is the general guardian of all infants, idiots, and lunatics, and has the supervision of all charitable trusts in the kingdom. The chancellor appoints in general all the judges of the superior courts, except the two Chief Justices, who are nominated by the Prime Minister of the day. All these functions the chancellor performs in addition to his extensive duties as the supreme judge of the Court of Chancery, both as an ordinary court of common law and of record and as an extraordinary court of equity. Much inconvenience had arisen from the accumulation of duties in the single person of this high dignitary, and various expedients had been devised for lessening the evil. Vice chancellors had been appointed, and the duties of the Master of the Rolls had been extended. One of the most important changes effected by the Judiciary Acts (1874–75) was the consolidation of all the vice chancellors' courts into one division, called the "Chancery Division of the High Court" under the presidency of the Lord Chancellor. The salary of the chancellor is £10,000 a year, and he has an annuity of £5000 on his retirement from office. The style of the chancellor, since the union with Scotland, has been Lord High Chancellor of Great Britain; but he has scarcely any jurisdiction in Scotland, and in Ireland there is a separate chancellor, having powers in most respects the same as those of the chancellor of Great Britain. To slay the chancellor is treason under 25 Edw. III, c. 2.

The *Chancellor of the Exchequer* is the Minister of Finance under the British government. He is a member of the cabinet and of the House of Commons. Formerly he was a judge ex officio of the Chancery Division of the Court of Exchequer, but the equity jurisdiction of the Court of Exchequer was transferred to the Court of Chancery by Statute of 5 Vict. V, since which he has had no judicial functions. See CURIA REGIS; EXCHEQUER.

The *Chancellor of the Duchy of Lancaster* is an officer who formerly presided over the courts of law and equity in the Duchy of Lancaster.

He is a member of the cabinet. The office is now a sinecure.

In several of the United States the term "chancellor" has been applied to the chief judicial officer of the Court of Chancery when such court has been maintained as a distinct court from the courts of common law. In several of the States the judges of law courts have been given equity jurisdiction, thus doing away with the separate Court of Chancery. The title has not been used in New York since 1848, when the law courts of that State were given equity jurisdiction. The court and title still exist in Delaware, New Jersey, and some other States. (See CHANCERY; EQUITY.) In Oxford and Cambridge the title "chancellor" is bestowed on the honorary head of the university, usually some person of distinction. He has little or no connection with university administration, which is in the hands of the vice chancellor, chosen from among the heads of the colleges. In the United States chancellor is used in a few instances for president, to designate the head of an educational institution.

In the ecclesiastical use of the term the *chancellor of a cathedral* is a dignified official, usually a canon, who superintends the arrangements for the celebration of the religious services. His office is quite distinct from that of the *chancellor of a diocese*, who is vicar-general to the bishop, and an ecclesiastical judge appointed to assist the bishop in questions of ecclesiastical law and hold his courts for him.

CHANCELLOR, CHARLES WILLIAMS (1833–). An American physician, born in Virginia. He was educated at the University of Virginia and practiced medicine at Alexandria. During the Civil War he was medical director on the staff of General Pickett. In 1868 he was appointed professor of surgery in the Washington College of Maryland, and from 1893 to 1897 was United States Consul at Havre, France. He is the author of: *Charitable Institutions of Maryland* (1875); *Mineral Water and Seaside Resorts* (1883); *Drainage of the Marsh Lands of Maryland* (1884); *Heredity* (1886); *Sewerage of Cities* (1886).

CHANCELLOR, RICHARD (?–1556). An English navigator, who in 1550 was the companion of Roger Bodenham on his voyage to Candia and Chios. In 1553 he was appointed pilot general of the northern expedition under Sir Hugh Willoughby, the purpose of which was primarily to seek a northeast passage to China. During a hurricane off the Lofoden Islands the ships were scattered. The *Edouard Bonaventure*, under Chancellor, alone entered the White Sea, landing near the present site of Archangel. From here Chancellor proceeded to Moscow, where he was well received by the Czar, with whom he succeeded in negotiating a treaty of commerce, and shortly afterward the Muscovy Company was established. Chancellor and his crew were shipwrecked and drowned while returning from a second voyage to Russia in 1556.

CHANCELLOR, WILLIAM ESTABROOK (1867–). An American lecturer and author, born at Dayton, Ohio. He was educated at Amherst College and Harvard Law School, and in 1895–96 was instructor in history at Erasmus Hall High School, Brooklyn, N. Y. He served as superintendent of schools at Bloomfield, N. J., in 1897–1904, at Paterson, N. J., in 1904–06, in the District of Columbia in 1906–08, and then at Norwalk, Conn. He lectured on more than 3000 occasions in 42 States, and at Chicago, Wooster, George Washington, Johns Hopkins, and Northwestern universities. His works include: *Mathematical Series* (10 vols., 1902); *American History* (1903); *Graded City Spellers* (1903); *Evening School Text Books* (5 vols., 1904–11); *Our Schools* (1904); *Washington Word List* (1906); *A Theory of Education* (1907); *Our City Schools* (1908); *Class Teaching and Management* (1910); *Our Presidents and their Office* (1911); *The Life of Silas Wright* (1913).

CHANCELLOR OF THE EXCHEQUER. See EXCHEQUER.

CHAN'CELLORSVILLE, BATTLE OF. One of the most important battles of the Civil War, fought May 2–4, 1863, at Chancellorsville, Va., 11 miles west of Fredericksburg, between the Federal Army of the Potomac, numbering about 130,000, under General Hooker, and the Confederate Army of Northern Virginia, numbering about 60,000, under General Lee. Hooker had superseded Burnside on January 26, and by the middle of April had succeeded in thoroughly reorganizing his army, restoring its *morale*, and

CHANCELLORSVILLE.

preparing it for action. At this time the Federal and Confederate armies lay facing each other across the Rappahannock at Fredericksburg. Hooker resolved to turn the Confederate left flank, first sending nearly all his cavalry, under Stoneman, to destroy Lee's communications with Richmond. The main movement began on April 27, when Hooker sent a portion of the army, under Sedgwick, to distract Lee's attention by crossing below Fredericksburg, while the main force effected a crossing above the town. This movement was successfully executed, and during the night of April 30 the main force was concentrated at Chancellorsville, on Lee's left flank. Lee then turned to face Hooker, and on May 1 the latter timidly drew in his advance and placed himself on the defensive. Early on May 2 Lee ordered Jackson, who had been stationed on his extreme right, with 30,000 men, to make a wide détour, and, swinging round to the extreme right of the Federal position, make an unexpected assault upon the enemy's flank. The direction of this movement was not apparent to the Federals, who began to regard it in the nature of a retreat. About 6 P.M., after a march of some 15 miles, Jackson fell suddenly upon the flank and rear of Howard's corps, which constituted the right flank of the Federal army, and, taking it by surprise, stampeded it. Jackson, while in advance of his troops, was fired upon and mortally wounded by his own men, who mistook his escort for a

detachment of Federals. During the progress of this movement Lee sought to divert the attention of Hooker by a lively demonstration on his front. On the morning of May 3 Lee made a vigorous attack on front and flank, in which Jackson's force, now commanded by Stuart, played a leading part. The brunt of the assault fell upon General Sickles, on the Federal right, and General Slocum, at the centre. Hooker, who was stunned by the impact of a ball on a pillar against which he was leaning, showed indecision; Sickles, who had stayed Stuart's fierce onslaught, fell short of ammunition; some 30,000 fresh troops were not called into action; and at last the Federal line gave way, the army, however, falling back only a short distance to a strong defensive position. Lee was deterred from immediately following up his advantage by the news that his position was threatened on the right by the advance of the Federal force under Sedgwick. At night, on May 2, Hooker had sent word to Sedgwick to advance on Chancellorsville from Fredericksburg. On May 3 Sedgwick attempted to execute the order and capture Fredericksburg and the heights behind it. Lee sent reënforcements which checked his advance, and on the night of May 4–5 Sedgwick recrossed the Rappahannock. Lee then prepared to advance against Hooker on the 5th, but the latter hastily withdrew his army across the river during a heavy storm. In the four days, May 1–4, the Federals had lost about 17,300 in killed, wounded, and missing; the Confederates about 12,465. Lee had clearly outgeneraled Hooker at every point, and had won an important victory with greatly inferior forces; but his success was almost counterbalanced by his loss of Jackson. Emboldened by this victory and the apparent demoralization of the Federal army, he planned his invasion of Pennsylvania, which ended in the battle of Gettysburg (q.v.). Consult: Dodge, *The Campaign of Chancellorsville* (Boston, 1881); Doubleday, *Chancellorsville and Gettysburg* (2d ed., New York, 1882); Johnson and Buel (eds.), *Battles and Leaders of the Civil Law*, vol. iii (4 vols., New York, 1887); *Official Records*, vol. xxv (Washington, 1889).

CHANCE MEDLEY (Eng. *chance* + *medley*), and CHAUD MEDLEY, or MELLÉ (OF. *chaude*, hot + *medlée*, fray). French expressions borrowed by the Scottish law. Though sometimes used interchangeably, they are, in reality, distinct in meaning—the former signifying a casual affray, the latter an affray in the heat of blood or passion. Both are, in the United States and in most countries, recognized as pleas in mitigation of the offense of homicide (q.v.). See also DEFENSE; SANCTUARY.

CHAN'CERY (Fr. *chancellerie*, It., ML. *cancelleria*, from *cancellarius*, chancellor, from Lat. *cancelli*, lattice), COURT OF. In English law, the court presided over by the Lord High Chancellor, and until recently the highest court in England, inferior only to Parliament. Originally a chancery was the office of a secretary or chancellor (q.v.), where official documents were put in form, sealed, and dispatched, or filed as records.

The jurisdiction of the Court of Chancery was developed subsequently to the establishment of the English courts of law, and consisted of that portion of the King's judicial prerogative in civil causes which he had not delegated to the courts of law. Whenever, in the early history of the common law, a suitor conceived that he had suffered an injury or wrong for which the courts of law afforded no remedy by means of a common-law writ (q.v.), his only recourse was to petition the crown. These petitions came to be addressed to the chancellor, who, as the chief officer and adviser of the crown and Keeper of the Great Seal, was deemed to be a personal representative of the King and thus endowed with his judicial prerogative. The practice of obtaining relief in this manner gradually took on the character of a judicial proceeding, and the chancellor's office, or chancery, came to be known as the Court of the Chancellor or the Court of Chancery, or, in modern times, as the Court of Equity (q.v.). To this peculiar origin of chancery jurisdiction are due several peculiarities in the manner in which jurisdiction is exercised which are fundamental in equity jurisprudence. Thus, as the chancellor was the personal representative of the King, his authority was personal. It could be exercised at any time, whether in term time or vacation, and at any place in the kingdom. Unlike the judges of the courts of law, he could command an act to be or not to be done. As, by virtue of his office, his commands were the commands of the sovereign, he who refused obedience was guilty of contempt of the King, and his disobedience was punishable by imprisonment; and, as an ecclesiastic, the chancellor could invoke the power of the Church and punish the contempt by excommunication. By reason of these powers of the chancellor, the Court of Chancery became a court acting in personam, as distinguished from courts of law, which acted in rem.

The common-law procedure was founded on the theory that the parties to an action owed no obedience to the court. Thus, if the plaintiff brought an action at law to recover property wrongfully withheld from him by the defendant, or to recover damages for tort or breach of contract, the court could give judgment for the plaintiff, and then by its writ direct the sheriff to seize the property and deliver it to the plaintiff or levy upon the defendant's property and then satisfy the judgment; but if the defendant concealed the property of the plaintiff or his own, or removed it from the jurisdiction, the court of law was powerless to act. On the other hand, the Court of Equity, in a proper case, could direct the defendant to perform his contract, or to turn over property to the plaintiff, or to do any act required by justice or the necessities of the case. It followed, from the difference in the character of the jurisdiction that was exercised by the two courts, that while the relief afforded by the court of law was necessarily remedial, the relief afforded in chancery might be, and frequently was, preventive. Thus the court of law had no power to restrain a defendant from doing an act which might injure the plaintiff in the future, but the chancellor, by reason of his power to command, might issue an injunction directing the defendant to refrain from such an act.

Another important consequence of the difference in kind of jurisdiction exercised by the two courts was the ability of the chancellor to deal with a many-sided controversy. A controversy at law was necessarily two-sided. The law court could only find a verdict and direct a judgment for either the plaintiff or the defendant; but, inasmuch as the chancellor might

require obedience to his decrees on pain of punishment for contempt, it was possible for him, in a single proceeding, to determine and adjust the rights of numerous parties, not only as between plaintiff and defendant, but as between those who, nominally codefendants, actually had some controversy among themselves. As recourse to the chancellor was originally due to the inability of the litigant to obtain relief at law, it became a fundamental principle of the Court of Chancery that it would take jurisdiction of the cause only when it appeared that there was no adequate remedy at law. Moreover, as the chancellor was originally an ecclesiastic and the "keeper of the King's conscience," he was said to exercise his jurisdiction on conscientious or equitable principles, for the purpose of doing justice, without regard to the strict rules of the common law. This gave rise to certain basic equitable principles unknown to the law, which, however, when once established by precedent, were applied by the Court of Equity in much the same manner that courts of law applied legal principles.

Upon these principles chancery, as do our modern courts of equity, afforded relief in cases of fraud (q.v.) and mistake (q.v.). It compelled defendants before it to give discovery (q.v.), administered trusts, etc., all matters of which courts of law took no cognizance. It also obtained an administrative jurisdiction over the affairs of married women, infants, and insane persons, by virtue of the chancellor representing the King in his administrative capacity.

Thus there grew up with the common law a great legal system which, while consistent with and, indeed, supplementary to it, was largely independent of it. Its office was to mitigate the rigor of the rules of the common law and supply its deficiencies, and this it was able to do because of the manner in which it exercised its jurisdiction. The jurisdiction of the Court of Chancery is (*a*) coördinate, (*b*) supplementary, and (*c*) exclusive.

Jurisdiction is said to be coördinate when the litigant has his election to seek relief at law or in chancery. Hence, for breach of contract the plaintiff has the alternative of recovering damages at law; or, if legal damages are inadequate, securing specific performance of the contract by decree of the chancellor.

The jurisdiction of chancery is said to be supplemental when, for the purpose of protecting rights recognized and enforced by courts of law, it confers and enforces new equitable rights; thus the right of the mortgagor to redeem mortgaged property and of the mortgagee to foreclose in equity, and, in a similar manner, the exercise of its jurisdiction over waste (q.v.), are typical examples of the supplemental jurisdiction of chancery. (See MORTGAGE.) The jurisdiction of chancery is exclusive when its powers are exerted in protecting purely equitable rights—i.e., rights which are recognized in chancery, but of which the law takes no cognizance. The most notable example is the jurisdiction exercised in chancery over uses and trusts (q.v.).

Before 1873 the constitution of the Court of Chancery in England consisted of the Lord High Chancellor, the Master of the Rolls, and three vice chancellors. In that year an act was passed by which the Court of Chancery became one division of the High Court of Justice, retaining only its equity jurisdiction, its ordinary jurisdiction being transferred to other divisions of the court. This forms an important part of that "fusion of law and equity" under the Judicature Acts (1873–76), which has so simplified and made orderly the practice of English courts.

In the United States the terms "court of chancery" and "chancery" are used in some States as equivalent to "courts of equity" and "equity." The principles and practice of equity were generally transferred to this country as they existed in England; but in most of the States there are no separate courts of chancery, the same judge sitting, according to the nature of the case, either as a common-law or equity court. A few States, however, instituted courts of chancery under that name; these were Alabama, Delaware, Florida, Mississippi, New Jersey, Tennessee, and Vermont. As early as 1848 the State of New York not only abolished the distinction between courts of equity and common law, but did away with the old forms of practice in both.

Many of the States have followed this reform. By the United States Constitution, Federal courts are especially given jurisdiction in equity as well as in common law, and the distinction between procedure at law and equity has been maintained, though both systems are administered by the same courts. Consult: Kerly, *Historical Sketch of the Equitable Jurisdiction of the Court of Chancery* (Cambridge, Eng., 1890); Gilbert, *History and Practice of the High Court of Chancery* (London, 1758; first Amer. ed., Washington, 1874); Marsh, *History of the Court of Chancery and of the Rise and Development of the Doctrines of Equity* (Toronto, 1890). See EQUITY; EQUITY PLEADING; PRACTICE.

CHANCES, THE. A comedy by John Fletcher, first printed in the folio edition of 1647. It was altered by George Villiers, Duke of Buckingham, in 1682; but "the licentiousness of that nobleman's pen rendering the play improper for representation" at later and more refined periods, it was revised a second time by Garrick in 1773. Its source is Cervantes' novel *La Señora Cornelia*. A musical drama entitled *Don John, or the Two Violettas*, produced in 1821, was based on it.

CHANDA, chŭn'dȧ. The capital of a district of the same name, in the Nagpur division, Central Provinces, British India (Map: India, C 4), lat. 19° 57′ N., long. 78° 58′ E. The town stands on the left bank of the Virâi, near its junction with the Jharpat, 90 miles south of the town of Nagpur. Its walls, built of cut stone and surrounded by a high parapet, are 6 miles round, from 15 to 20 feet high, 10 feet thick, and flanked with rough towers large enough for the heaviest guns. Its archæological remains, temples, regal tombs, and gigantic monolithic figures of the later Gond kings are interesting. Being surrounded by mountains and forests, it is well supplied with water. Outside the walls is a large water tank constructed under Gond rule, and a collection of ancient statuary known as Rayappā's idols, the largest of which is 26 × 18 × 3 feet. Pop., 1901, 17,803; 1911, 19,866. Chanda is the commercial centre of the district with manufactures of silk, cotton, dyestuffs, slippers, bamboo work, and gold and silver work. It has numerous schools and a mission station. The district contains considerable iron and coal deposits. Area, 10,156 square miles. Pop., 1891, 697,600; 1901, 581,315; 1911, 677,544.

CHANDÂLA, chŭn-dä'lȧ (Skt. *caṇḍāla*).

The lowest of the impure classes in Hindu caste. See CASTE.

CHANDELEUR (shăn'de-lo͝or') **ISLANDS.** A group of about 15 small islands lying in the Gulf of Mexico from 20 to 30 miles off the east coast of Louisiana, from which mainland they are separated by Chandeleur Sound (Map: Louisiana, G 4). A lighthouse on the north end of the northernmost island is in lat. 30° 2′ N. and long. 88° 52′ W.; it has a fixed white light.

CHANDERNAGAR, or **CHANDERNAGORE,** chŭn'dĕr-nŭg'ĕr (Skt. *candranagara,* city of the moon, from *candra,* moon + *nagara,* city). A city in India with a territory of about 3 square miles, belonging to France, situated on the west bank of the Hugli, 21 miles above Calcutta by rail, in lat. 22° 52′ N. and long. 88° 23′ E. (Map: India, E 4). A former rival to Calcutta in commercial importance, its trade has declined owing to the silting of its river approaches. It is under the French Governor-General of Pondicherry. The population (1901, 26,831) includes a French subgovernor with a small military detachment, and a few Europeans and Eurasians, the great bulk being natives. The settlement dates from 1673. It was taken three times by the English, but was finally restored to France in 1816.

CHAND'LER, CHARLES FREDERICK (1836–1925). An American chemist, born at Lancaster, Mass. He was educated at the Lawrence Scientific School of Harvard University and at the universities of Göttingen and Berlin. After being director of the chemical department of Union College, Schenectady, N. Y. (1857), he was appointed professor of chemistry in the New York College of Pharmacy (1858). In 1864 he became professor of analytical and applied chemistry in the School of Mines, Columbia University, and in 1876 he was appointed to the chair of chemistry and medical jurisprudence in the College of Physicians and Surgeons. In 1865 he became chemist, and in 1873 president, of the Board of Health of the City of New York. He was president of the American Chemical Society in 1881 and 1889, of the British Society of Chemical Industry in 1899, and of the Chemists' Club in 1899–1900. In association with his brother, Prof. W. H. Chandler, of Lehigh University, he, in 1870, established the monthly publication entitled the *American Chemist* (1870–77). His numerous papers, most of which are published in the above-mentioned journal and in the annual reports of the Health Department of New York, include: *Report on Waters for Locomotives and Boiler Incrustations* (1865); *Chemistry of Gas Lighting* (1876); *Dangerous Kerosene; Lecture on Water* (1871); *Photo-Mechanical Processes* (1890); *Report on Dangerous Cosmetics* (1870); *Report on Petroleum as an Illuminator* (1871); *Report on the Waters of the Hudson River* (1872); *Synopsis of Organic Chemistry* (printed for the class of '65, Union College, Schenectady, 1864); *Manual of Qualitative Analysis* (pamphlet, 1873). Among the numerous reforms introduced during the administration of Professor Chandler were the segregation of slaughterhouses and the passage of the Tenement House Act, providing that the plans of every tenement house must first be submitted to the Board of Health.

CHANDLER, FRANCIS WARD (1844–1926). An American architect, born in Boston. He worked with Ware and Van Brunt, architects, in 1864–67, and after that studied in Paris for two years. In 1869–70 he was assistant in the architectural department of the Massachusetts Institute of Technology, and in 1871–74 assistant architect in the Treasury Department, Washington. For six years he was in partnership with E. C. Cabot, Boston, in 1888 becoming professor of architecture at the Massachusetts Institute of Technology. Besides editing *Municipal Architecture in Boston* (1898) and writing articles for the *Technology Quarterly,* he is author of *Construction Details* (1892) and *Notes on Limes, Cements, Mortars, and Concretes* (1892).

CHANDLER, SETH CARLO (1846–1913). An American astronomer, born in Boston, Mass. He was long attached to the Harvard Observatory; was awarded the gold medal of the Royal Astronomical Society of London in 1896 for his determination of the laws of the variations of latitude or movements of the earth's pole and his researches on variable stars, of which he has prepared a catalogue. He was elected a member of the National Academy of Sciences in 1888 and is the inventor of the instrument known as the almucantar (q.v.). In 1896 he assumed the editorship of the *Astronomical Journal.*

CHANDLER, WILLIAM EATON (1835–1917). An American politician. He was born in Concord, N. H., and graduated at the Harvard Law School in 1854. He was Speaker of the New Hampshire Legislature in 1863–64, and was First Assistant Secretary of the Treasury under Secretary McCulloch from 1865 to 1867. He was Secretary of the Navy from 1882 to 1885, and it was during his administration that the building of the modern navy was begun. He was United States Senator from New Hampshire in 1887–1901, when he became president of the Spanish Treaty Claims Commission, and was a member of the New Hampshire Constitutional Convention in 1902.

CHANDLER, ZACHARIAH (1813–79). An American merchant and politician. He was born at Bedford, N. H., was educated in a common school, and in 1833 removed to Detroit, Mich., where he became a wealthy and prosperous dry-goods merchant. He was an active member of the Whig party and in 1851 was elected mayor of the city. In 1852 he was nominated for Governor, but was defeated. He took an active part in the organization of the Republican party, and in 1857 was sent to the United States Senate, where he soon became conspicuous as a radical opponent of all schemes for the extension of slavery. When the Civil War broke out, he was one of the foremost advocates of a vigorous prosecution of hostilities, and urged that 500,000 volunteers instead of 75,000 be called for at the start. He was reëlected to the Senate in 1863 and again in 1869; served as Secretary of the Interior in the cabinet of President Grant from 1875 to 1877; was chairman of the Republican National Committee in 1876, taking an active part in the presidential campaign; and in February, 1879, was again elected to the Senate, where he soon attracted general attention by a virulent attack on Jefferson Davis. He died suddenly in Chicago, whither he had gone to make a political speech. He was a man of great force and of unusual administrative capacity, but excited widespread antagonism by his radicalism in politics and his unscrupulousness. See his *Life* by W. E. Curtis (New York, 1879).

CHANDOGYA, chŭn'dō-jī'ä. In Hindu literature, the name of a Brāhmaṇa of the Sāmaveda, in 10 books, of which the eight known in Europe

up to the present day form the important *Chandogya Upanishad*, treating of the values of the sacred syllable Om. It has been translated by Müller in vol. i of the *Sacred Books of the East*.

CHANDOS, chăn'dŏs, Sir John (?–1370). An English soldier. He participated in the siege of Cambrai (1337) and in the battles of Crécy (1346) and of Poitiers (1356). In the last-named engagement he saved the life of the Black Prince and for this was rewarded by being made regent and lieutenant of the English King in France. Having been made Constable of Guienne, he won the victories of Auray (1364) and Navarette in Spain (1369) over Du Guesclin, whom he captured each time. He became Seneschal of Poitiers in 1369, but in the next year was mortally wounded in an engagement near the bridge at Lussac. Chandos was one of the original knights of the Order of the Garter.

CHANDRAGUPTA, chŭn'drà-gōōp'tà. See Sandrocottus.

CHA'NEY, Lucian West (1857–). An American biologist, born at Heuvelton, N. Y. Educated at Carleton College, he spent three years as principal and superintendent of schools in Minnesota, and then returned to Carleton to be instructor in biology in 1882 and professor from 1883 to 1908. In 1907 he became a special agent of the United States Bureau of Labor to investigate dangerous occupations of women and children, and in 1909 was appointed the bureau's expert in industrial hygiene. He also explored Rocky Mountain glaciers and was a delegate to various economic and geographic congresses.

CHAN'FRON, or Chan'frain. See Chamfron.

CHANGARNIER, shän'gär'nyâ', Nicolas Anne Théodule (1793–1877). A French general, born at Autun. He was educated at the military school of Saint-Cyr, entered the army, and took part, in 1823, in the Spanish expedition. In 1830 he went as captain to Algeria, where he distinguished himself and rose to the rank of general of division. After the revolution of 1848 he superseded Cavaignac (q.v.) as Governor of Algeria, but when chosen a member of the National Assembly he returned to Paris in the same year and was appointed commander in chief of the National Guard, and, when Louis Napoleon became President, of the troops in Paris. He was a member of the Assembly and held at the same time his double office in the army, until the coup d'état of December, 1851, when he was exiled. He returned to France in 1859 after the proclamation of general amnesty. On the outbreak of the Franco-German War Changarnier offered his services to the government, but they were rejected by Marshal Lebœuf, the Minister of War. In August, however, the Emperor asked him to join the army of Bazaine. He assisted in the defense of Metz and was employed by Bazaine in the negotiations with Prince Frederick Charles which led to the capitulation of Bazaine's army, on Oct. 27, 1870. He returned to France in 1871 and served in the Assembly until 1873, when he participated in the proceedings which caused the downfall of Thiers. In 1875 he voted against the constitutional law recognizing the Republic, and in the Senate, of which he was made a life member, in the same year, he showed himself an enemy of Republican institutions. He died in Paris, Feb. 14, 1877.

CHANG-CHOW, chäng'chou'. The capital of the Department of Chang-chow, Fu-kien, China, on the Kiu-lung estuary, 35 miles west of Amoy (Map: China, E 7). It is a walled city, inclosed within a circuit of 4½ miles, and has broad granite-paved streets with fine stores. The chief building is a Buddhist temple, dating from the eighth century. A wooden bridge nearly 800 feet long, resting on 25 stone piles, spans the river. The town has manufactures of silk, sugar, crystal, and bricks, and carries on an extensive domestic and export trade in tea and sugar. Pop. (est.), between 900,000 and 1,000,000.

CHANGELING. It was at one time a common superstition that infants were taken from their cradles by fairies, who substituted for them their own weakly and starving elves. The children so left were called *changelings* and were known by their peevishness as well as their backwardness in walking and speaking. As it was supposed that the fairies had no power to change children that had been christened, infants were carefully watched until that ceremony had been performed. This superstition is alluded to by Shakespeare, Spenser, and other poets.

CHANGELING, The. A drama, by Middleton and Rowley, produced in 1623 and published in quarto in 1653. After the Restoration, in 1661, it was successfully revived. It is in great measure founded on an episode in Reynolds's *The Triumphs of God's Revenge*.

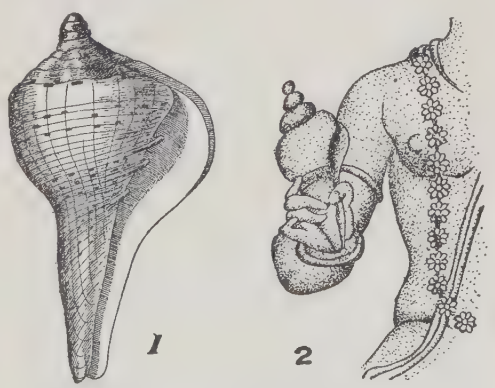
CHANGE-OF-DAY LINE. See International Date Line.

CHANGO, chän'gō. An Indian tribe living in the rainless coast region bordering upon the desert of Atacama, northern Chile; their territory formerly included the region between 22° and 24° S. lat., particularly the country about Cobija. Their language, now extinct, constituted, apparently, a distinct stock. Consult Boman, *Antiquités de la Région Andine*, vol. i, pp. 67–73 (Paris, 1910), and Chamberlain, in *Journ. de la Soc. des Amér. de Paris*, N. S., vol. vii, p. 183 (1910).

CHANGRA. See Goat.

CHANG-SHA, chäng'shä'. Capital of the Chinese Province of Hu-nan, situated on the Sian-kiang, about 350 miles north of Canton (Map: China, D 6). It is surrounded by a wall and has an important silk industry. Pop., 1911 (est.), 250,000.

CHANK SHELL (Hind. *śankh*, from Skt. *śankha*, conch shell). The top-shaped shell of any of several gastropod mollusks of the genus



1. Chank Shell. 2. Arm of Vishnu, with Chank Shell.

Turbinella, specifically *Turbinella pyrum*. They are obtained chiefly by diving in water 12 or 15 feet deep, along the coasts of southern India and Ceylon, the chief fishery being at Tuticorin,

on the Gulf of Manar, where about 325,000 are obtained each winter, and are chiefly sent to Dacca. They are much used as ornaments, often elaborately carved, by Hindu women, the arms and legs being encircled with them; and many of them are buried with the bodies of opulent persons. This esteem among the Hindus is due to the fact that the shell is a sacred emblem of Vishnu, who is usually represented as holding one.

CHAN'LER, WILLIAM ASTOR (1867–). An American politician and traveler, born in Newport, R. I. After extensive foreign tours he undertook, with Chevalier Ludwig von Höhnel, the exploration of the region east and west of Mount Kenia in Africa. They left Zanzibar in September, 1892, and reached the coast again in July, 1893. Their experiences and scientific work on this trip Chanler embodied in his book, *Through Jungle and Desert* (1896). Upon his return to the United States he entered political life and became a member of the New York State Legislature, from the fifth assembly district in 1897, and from the fourteenth in 1899. He served with special commendation from Shafter, general in command, in the battles before Santiago, Cuba (July 1–2, 1898).

CHANNEL. See ENGLISH CHANNEL.

CHANNEL OF A STREAM. The hollow or depression between the banks through which the water flows. A river may have several channels in parts of its course. In such a case the main channel has been defined by judicial authority to be "that bed of the river over which the principal volume of water flows." It may or may not be coincident with the deepest water or the best currents for navigation. See RIPARIAN RIGHTS; RIVER.

CHANNEL, or **CHANNELING** (OF. *chanel*, from Lat. *canalis*, groove, connected with Skt. *khan*, OPers. *kan*, to dig). The name given to any concave grooving of architectural features. Its most common occurrence is on the shafts of classic columns. It is usual to distinguish the shallow channels on a Doric column, which are separated by *arrises* or sharp edges, from the narrower and deeper "flutes" of Ionic and Corinthian columns, which are separated by narrow fillets. The triglyphs of a Doric frieze are decorated by two vertical channels of V-section, and two half-channels or chamfers at the edges. Many Roman and Renaissance cornices have the face or front of the corona adorned with vertical flutes or channelings, and during the late Empire and early Christian periods, sarcophagi were sometimes covered with a decoration of curious S-shaped channels. See COLUMN; ARCHITECTURE; DORIC ORDER; IONIC ORDER.

CHANNEL BASS. A sciænid fish. See REDFISH.

CHAN'NELBILL'. A large Australian cuckoo (*Scythrops novæ-hollandæ*), having a very large and curiously grooved beak, so that it was long considered a species of hornbill. See Plate of CUCKOOS.

CHANNEL CAT. See CATFISH.

CHANNELING MACHINES. See QUARRYING.

CHANNEL ISLANDS (Fr. *l'Archipel de la Manche*, the Channel Archipelago). A group of islands geographically connected with France, but politically attached to the United Kingdom, in the English Channel, to the west of the peninsula of Cotentin. The islands lie 10 to 30 miles distant from the Normandy coast, and 50 to 120 miles south of the English coast (Map: France, N., C 3). They include Jersey, Guernsey, Alderney, and Sark, and a number of islets. Their combined area is about 75 square miles.

Famous for their strategic position, history, antiquities, genial climate, and picturesque and varied scenery, they constitute favorite and fashionable resorts for English, French, and even American invalids and tourists. The small and highly cultivated farmholdings, ranging from 5 to 12 acres, and the good military roads, give the islands the appearance of carefully laid-out pleasure grounds, and gained from Victor Hugo, long a resident, the designation of "gardens of the sea." The principal industry is agriculture. The soil produces good crops; horticulture and floriculture flourish, potatoes are extensively cultivated for exportation, the annual yield in Jersey exceeding 60,000 tons, valued at $1,320,000, while Guernsey supplies London and Paris with enormous quantities of fruit, grown under glass. The chief fertilizer is *vraic*, or seaweed, the regular gathering of which, controlled by legislation, is one of the characteristic insular scenes. A large quantity of kelp is used in the manufacture of iodine, its value to Guernsey being estimated at $150,000 annually. The three larger islands are noted for distinctive breeds of cattle, the purity of each breed being jealously guarded; they are remarkable for their small size, symmetry, color, and beauty, and for the yield and quality of their milk, making dairy farming a profitable industry. Cattle in 1912 numbered 18,853; horses, 3726; swine, 8466. There are important fisheries of turbot, John Dory, conger eels, oysters, lobsters, monster crabs, etc. The quarries of Jersey and Guernsey are extensively worked and export fine granite for building purposes. There is daily communication by steamer with various English and French ports, and an average of 3000 vessels of 200,000 gross tonnage enter and clear the Channel Islands ports annually.

The geology of the islands is particularly interesting in the primary formation of granite rocks; vegetation is rich and varied, and scientists here find a comprehensive field of study in a small compass. The coasts are rocky and dangerous and the tidal currents treacherous; lighthouses stand on the more important headlands and outlying reefs. The population, April 3, 1911, was 96,900. The chief town is St. Helier, on the island of Jersey. Among the farming population the vernacular is old Norman French, which differs in peculiarities of spelling and pronunciation in each island and even in parishes of the same island. English predominates in the town districts, which contain a large proportion of British and many French residents. The islands are self-governed and afford interesting examples of home rule, forming, as Freeman states, "distinct commonwealths." They include the two bailiwicks of Jersey and Guernsey—the latter including Alderney, Sark, Herm, and adjacent isles—each presided over by a "bailiff" or chief magistrate of native extraction appointed by the British crown, and assisted by a "states" or legislative assembly, composed of "jurats" or magistrates, the rectors of the parishes, all life officers, the "constables" or parochial mayors, and a number of "deputies" or representatives elected for a term. Judicial affairs are managed by a royal court, consisting of the bailiff and jurats, who

thus fill the anomalous dual positions of lawmakers and law dispensers. The British government is represented by lieutenant governors, generally army officers of distinction, who are appointed for five years, command the military forces in the islands, have the right of veto and an equal seat with the bailiff in the States Assembly, but no vote. French is the official language of the legislatures and courts, but after long opposition the optional use of English has been allowed. There are also ecclesiastical courts. Taxation is light, living is inexpensive. Military service at fixed periods is compulsory on all male natives and residents.

The laws of the islands are derived from the *Coutumier de Normandie*, the islands having once formed part of the Duchy of Normandy. They are the sole remains of that duchy, attached to the British crown, whence their independence and the humorous local contention that Great Britain is an appanage of the Channel Islands, legal documents referring to the monarch as Duke of Normandy and King of Great Britain and Ireland. The islands originally were joined to the continent; raised beaches and other traces of disruption exist. Cave dwellings and numerous megalithic cromlechs, tumuli, and menhirs prove the habitation of a prehistoric race; a few old Norman chapels remain; the oldest churches, St. Brelade's, Jersey, and St. Sampson's, Guernsey, date from 1111, and earthworks, fortifications, and castles dating from Roman and subsequent periods exist. The Romans occupied the islands during the third and fourth centuries; Cæsarea (Jersey), Cæsar's Isle, and Sarnia (Guernsey) occur in the *Itinerary* of Antoninus. Christianity was introduced by Irish missionaries about 460 A.D., St. Helier being the apostle of Jersey and St. Sampson of Guernsey. The islands were taken by Rollo previous to his invasion of Normandy; the famous *Roman de Rou*, by Wace (q.v.), a native of Jersey, who wrote in the twelfth century, celebrating his deeds.

After the Conquest the islands alternated between Norman and English rule until 1204, when with the loss of Normandy they remained faithful to England and steadfastly resisted many subsequent attempts on the part of France to capture them. In Henry VI's reign the French held part of Jersey for six years. During the Civil War they were the scene of many notable events, Jersey remaining loyal and Episcopal, and Guernsey republican and Presbyterian. During the Revolutionary War in America a French expedition landed in Jersey in 1781, but was defeated with great loss. During the French and American wars, when shipbuilding was an important local industry, the islanders fitted out many privateers, and, in Burke's words, became "one of the naval powers of the world," capturing many rich prizes. The islands are favorite asylums for political refugees. Their numbers have included Charles II, Earl Clarendon, Victor Hugo, and General Boulanger. Consult: Urquhart, *Channel Islands, Norman Law* (London, 1844); Pegot-Ogier, *Histoire des îles de la Manche* (Paris, 1881); Ansted, *The Channel Islands* (3d ed., London, 1893); De Cléry, *Les îles normandes* (Paris, 1898); Boland, *Les îles de la Manche* (Paris, 1904). See ALDERNEY; JERSEY; GUERNSEY; SARK.

CHANNEL TUNNEL. See TUNNELS.

CHAN'NING, EDWARD (1856–). An American historian, born in Dorchester, Mass., and in 1878 graduated at Harvard, where he was instructor in history in 1883, assistant professor in 1887, and professor in 1897. He wrote: *Town and County Government in the English Colonies of North America* (1884); *The United States of America* (1896), in the "Cambridge (Eng.) Historical Series"; *A Student's History of the United States* (1897; rev. ed., 1908); *A Short History of the United States for School Use* (1900), and *History of the United States*, vols. i–iii (1905, 1908, 1912); *The Jeffersonian System, 1801–1811* (1906), in the "American Nation Series." He collaborated with Justin Winsor in vols. ii, vi, and vii of the *Narrative and Critical History of America* (1886–88), with T. W. Higginson in *English History for Americans* (1893), with A. B. Hart in the *Guide to the Study of American History* (1896), and with A. B. Hart and F. J. Turner in a new edition of this work in 1912.

CHANNING, EDWARD TYRREL (1790–1856). An American scholar, the brother of William Ellery Channing. He was educated at Harvard and began the practice of law in Boston, but devoted his attention chiefly to literature. From 1817 to 1819 he edited the *North American Review* and was a regular contributor to it through a large part of his life. He was professor of rhetoric and oratory in Harvard College from 1819 to 1851. A volume of his lectures was published in 1856 with a memoir by R. H. Dana.

CHANNING, WILLIAM ELLERY (1780–1842). An American Unitarian preacher and author. He was born April 7, 1780, in Newport, R. I., entered Harvard at the age of 15, and took his degree in 1798. He taught for two years in Richmond, Va., and then studied divinity. In 1803 he was ordained minister of Federal Street Church in Boston. During the earlier years of his ministry his theological peculiarities had little prominence in his discourses, and in consequence he stood upon friendly terms with his brethren in more orthodox churches. In 1819, however, he preached a sermon at the ordination of the Rev. Jared Sparks, in which he pointed out the inadequacy of the Calvinistic theology then current, and advocated the Unitarian doctrine with so much zeal and ability that he was termed "the apostle of Unitarianism." This involved him in a controversy, a thing which he naturally loathed. To the end of his life he preserved a devoutly Christian heart, shrinking with the delicate instinct of a refined nature from everything cold, one-sided, and dogmatic, whether Unitarian or Trinitarian. As late as 1841 he wrote, "I am little of a Unitarian, have little sympathy with the system of Priestley and Belsham, and stand aloof from all but those who strive and pray for clearer light." In 1822 he visited Europe and made the acquaintance of several English authors, among them Wordsworth and Coleridge, both of whom were strongly impressed in his favor. Coleridge said of him: "He has the love of wisdom and the wisdom of love." In 1823 he published *Remarks on National Literature;* in 1826, *On the Character and Writings of John Milton;* in 1829, *On the Character and Writings of Fénelon;* in 1835, an essay on *Negro Slavery*, strongly opposing it from the moral point of view; and in 1838 an essay on *Self-Culture*. Besides these he wrote a variety of other essays and treatises, all characterized by vigor, eloquence, pure taste, and a lofty tone of moral earnestness. He died, Oct. 2, 1842, at Bennington, Vt. His complete works

have been several times reprinted (e.g., in 1 vol., Boston, 1903). In an age of mental timidity Channing stood forth conspicuous for his intellectual bravery. But more important than his purely theological speculations was the public exercise of a wide influence on his contemporaries in regard to social and philanthropic questions and the organization of charity, in the interest of peace, of temperance, and of education, the ethics of political life, and the question of slavery. In the last-named matter, while never taking the extreme abolition position, he gave much moral support to the movement; and in concert with Emerson and other great intellectual leaders, was a great factor in the strenuous New England life of the middle of the nineteenth century. An interesting memoir of him was published by his nephew, William Henry Channing (3 vols., London, 1848, and reprinted in Boston, 1880). A bronze statue of him by Herbert Adams was unveiled in the Public Garden of Boston in 1903. Consult Chadwick, *W. E. Channing* (Boston, 1903), and Eliot, *Four American Leaders* (Washington, Franklin, Emerson, and Channing) (Boston, 1906).

CHANNING, William Ellery (1818–1901). An American journalist, poet, and essayist, a nephew of the great Unitarian preacher of the same name. He was born in Boston, was educated at Harvard, and was for many years connected with various newspapers and magazines. He published volumes of poems, and in prose: *Youth of the Poet and Painter; Thoreau, the Poet-Naturalist* (1873); *Conversations in Rome between an Artist, a Catholic, and a Critic* (1847).

CHANNING, William Henry (1810–84). An American Unitarian clergyman and author. He was born in Boston, Mass., May 25, 1810, and was a nephew of William Ellery Channing. He graduated at Harvard in 1829, at Cambridge Divinity School in 1833, and was ordained and installed over the Unitarian church in Cincinnati in 1835. After filling several pastorates in the United States, he succeeded (1857) James Martineau as minister of the Hope Street Unitarian Chapel, Liverpool, England. At the commencement of the Rebellion he returned (1862) and took charge of the Unitarian church in Washington, D. C. He was one of the early supporters of the socialistic movement in this country, was editor of the *Present* and the *Harbinger*, and in 1848 presided over a socialistic association in Boston. He was a prolific writer, contributing to the *North American Review*, the *Dial*, the *Christian Examiner*, and other serials. Among his larger works are a translation of Jouffroy's *Ethics* (1840); *Memoir of* [his uncle] *William Ellery Channing* (3 vols., 1848); *Memoir of* [his cousin] *the Rev. James H. Perkins* (1851); *Memoir of Margaret Fuller Ossoli* (in conjunction with Emerson and J. F. Clarke) (1852). He died in London, Dec. 23, 1884. For his life, consult O. B. Frothingham (Boston, 1886).

CHANSON DE ROLAND, shän'sôn' de rō'läN' (Fr., song of Roland). The best-known and oldest of the extant French *chansons de geste* (q.v.); the type of the class in its best and purest form. It was written demonstrably not later than 1095, possibly as early as 1066. The supposed author's name is given in the text as Turoldus, but he was probably a Norman from Avranches. The poem, which consists of about 4000 lines, deals with the death of Roland at Roncesvalles, and its avenging by Charlemagne. The "Chanson de Roland" lost its vogue in France at an early date, its place being taken by the Breton romances. It never took root in England, but flourished in Germany and in Italy, where Boiardo and Ariosto used its theme. The only ancient manuscript still preserved, dating probably from 1170, is in the Bodleian Library at Oxford. It was first edited in modern times by Michel (Paris, 1837), but more recent scholars have added much to our knowledge. Consult especially the editions by Müller (Göttingen, 1878), Léon Gautier (Tours, 1872 et seq.), and Stengel (Heilbronn, 1878); Seelmann, *Bibliographie des altfranzösischen Rolandsliedes* (Heilbronn, 1888); Gaston Paris, *La poésie du moyen âge* (1885–1906); Gustav Gröber, *Grundriss der römanischen Philologie* (Strassburg, 1904); Léon Gautier, *Les épopées françaises* (1892); P. A. Becker, *Gründriss der altfranzösischen Litteratur* (1907); W. M. Hart, *Ballad and Epic* (1907); C. H. C. Wright, *History of French Literature* (London, 1912); Edmund Stengel, *Das altfranzösische Rolandslied* (1900).

CHANSONS DE GESTE or **GESTES,** zhĕst (Fr., songs of achievement or adventure). The name generally given by scholars to the large and important class of epic poems which sprang into existence in France in the latter part of the tenth century or the beginning of the eleventh. The history of their origin is obscure, and there is no evidence for the existence of preceding ballads out of which they were compiled. The earlier ones are written in decasyllabic iambic lines, arranged in groups (called in French *laisses* or *tirades*) of varying number, connected by assonance or vowel rhyme, the consonants of the final syllables not being the same. This assonance was soon replaced by rhyme, and the 10-syllable line about 1200 by the 12-syllable, or Alexandrine, which is said to take its name from the poem "Alexandre le Grand," by Alexandre de Bernay and Lambert le Tors. Their subject is uniformly French history, treated in a romantic spirit, and generally centring around Charlemagne as the epic hero. As their name implies, they were composed, not to be read, but to be sung or recited. About 110 of them are preserved, averaging 6000 lines apiece. Excepting the oldest and best known, the "Chanson de Roland" (q.v.), and the thirteenth-century "Fierabras," the following, all of the twelfth century, are the best in the judgment of the most competent critics: "Aliscans," "Amis et Amiles," "Antioche," "Berte aux grans Piés," "Garin le Loherain," "Gerard de Roussillon," "Huon de Bordeaux," "Ogier de Danemarche," "Raoul de Cambrai," and the "Voyage de Charlemagne à Constantinople." Consult: Léon Gautier, *Les épopées françaises* (2d ed., 4 vols., Paris, 1878–94); id., in Petit de Julleville, *Histoire de la langue et littérature française* (Paris, 1896–98); Rajna, *Le origini dell' epopea francesca* (Florence, 1884); Saintsbury, *The Flourishing of Romance and the Rise of Allegory* (New York, 1897); G. Paris, *Histoire poétique de Charlemagne* (Paris, 1865). See French Literature; Trouvère; Jongleur.

CHANT (Fr. *chant*, from Lat. *cantus*, from *canere*, to sing). A form of choral music between singing and recitative and especially used for litanies and psalms in the Roman Catholic and Protestant Episcopal services. The chant is the ancient style of church song, certainly as old as Christianity, which seems to have inherited it from the Jewish church. The ancient Persians

chanted or intoned their religious hymns, the Gâthâs (q.v.); St. Paul exhorts believers to sing (to chant) psalms and hymns and spiritual songs; and Pliny the Younger mentions the early morning assembling of Christians to chant hymns to Christ. As rhymed and metrical hymns, now so common, were the product of a later art, so the tunes accompanying them are modern as compared with chants. See AMBROSIAN CHANT; GREGORIAN CHANT; PLAIN CHANT.

CHANT, MRS. LAURA ORMISTON (1848–1923). An English reformer, composer, and writer, born at Chepstow. She was at various times a teacher, nurse, student of medicine, dress reformer, and crusader against London music halls. Subsequently she became known as a speaker on various social and literary themes, and at the time of the Græco-Turkish War (1897) took bands of nurses to Crete and to the Greek frontier. She visited the United States in 1896, and in many public addresses told what she was doing and purposed to do for the betterment of society in general and women in particular. Her publications include: *Sellcuts' Manager* (novel); *Verona and Other Poems;* several short stories; many pamphlets on temperance, politics, purity, and economic reform; some hymns; and the songs: *Ode to a Skylark* (words by Shelley); *Toddlekin's Songs; Thistledown Action Songs; Galloping Horses Action Songs;* and *The Prodigal* (1907).

CHANTAL, shän'tàl', JEANNE FRANÇOISE FRÉMYOT, BARONESS DE (1572–1641). The founder of the Order of the Visitation. She was the daughter of Benigne Frémyot, President of the Parliament of Burgundy, and in her twentieth year married Christophe de Rabutin, Baron de Chantal. While out shooting, he was accidentally killed in 1600. In 1604 his widow met St. Francis de Sales and passed under his spiritual direction. At his suggestion, in 1610, she joined two other pious women in a community, and, when it was confirmed as the Order of the Visitation, made the solemn vows, adding a special one always to choose, in a doubt between two actions, that which tended the more towards perfection. She died at Moulins, was buried at Annecy, and was canonized by Clement XIII in 1767. Her festival is August 21. See VISITATION, SISTERS OF.

CHANT DU DÉPART, shän' dụ dâ'pär', LE (Fr., song of departure). A song of the French Revolution with words by Marie Joseph Blaise Chénier, music by Méhul. It was composed for the fête on the fifth anniversary, July 14, 1794, of the taking of the Bastille. This was the only French national air written during the Reign of Terror, and when sung it created as great an effect as the Marseillaise (q.v.).

CHANTECLER, shän't'-klâr'. A fantastic play by Edmond Rostand, produced in Paris in 1910. Under the guise of a farmyard scene, it is a bitter satire on modern society. Chantecler, the cock who imagines he rouses the sun, typifies man, the earnest idealist, beguiled by the Pheasant, the fascinating woman, and scorned and persecuted by the other animals, who represent the malicious and selfish elements of society. See CHANTICLEER.

CHANTELOUP, COUNT DE. See CHAPTAL, JEAN ANTOINE.

CHANTEPIE DE LA SAUSSAYE, shän't'-pê' de là sô'sâ'. See LA SAUSSAYE.

CHANTERELLE, shän't'-rĕl'. See MUSHROOM.

CHAN'TICLEER (OF. *Chantecler,* name of the cock in the Renart epic, from *chanter,* Lat. *cantare,* to sing + *cler,* Lat. *clarus,* clear). An imaginative name for a cock. It occurs both in Old French and Middle English. The cock in the mediæval version of Æsop, *Reynard the Fox* (q.v.), goes by this name, as does also the barnyard hero of Chaucer's *Nun's Priest's Tale,* who "had in his governance seven hennes," one of which "was cleped faire Damoselle Pertelote."

CHANTILLY, shän'tê'yê'. A town of France in the Department of Oise, about 23 miles north-northeast of Paris (Map: France, N., H 3). Its environs are very picturesque, and the place derives additional interest from its two châteaux surrounded by a magnificent park, both of which belonged to the Condé family from 1632 to 1830. The smaller of the two châteaux is of more recent construction and is regarded as one of the finest specimens of French Renaissance. The older and larger château under Louis II, Prince of Condé, was made famous by the presence of the most brilliant men of its time, La Fontaine, Racine, Molière, La Bruyère, and Boileau, and with its splendid art collections is now, through the gift of the Duc d'Aumale, who built it in 1830, in the possession of the Institut de France. The forest of Chantilly, 5000 acres, is near by. Chantilly lace was once a byword, but the manufactures have fallen off. Chantilly is also a horse-racing centre, with a fine course, and noted for the three annual race meetings held here. Pop. (commune), 1901, 4791; 1911, 5556. Consult "Le Château de Chantilly," in *Revue de l'art ancien et moderne,* vol. iii (Paris, 1898).

CHANTILLY, shăn-tĭl'lĭ. A post village in Fairfax Co., Va., 20 miles west of Washington, where, during a furious thunderstorm on Sept. 1, 1862, after the second battle of Bull Run (q.v.), an indecisive engagement occurred between a part of Pope's army under Generals Hooker, Reno, and Kearny, and two divisions of Lee's army under General Jackson. On the following day the Federal troops were withdrawn to the fortifications about Washington. Each side lost heavily, and among the Federal dead were Generals Isaac I. Stevens and Philip Kearny.

CHANTREY, chăn'trĭ, SIR FRANCIS LEGATT (1781–1842). An English sculptor. He was born at Norton, Derbyshire, April 7, 1781, where he first studied art. He began as a portrait painter, but in 1804 removed to London and, after studying modeling at the Royal Academy, rapidly gained great popularity through his portrait busts. In 1818 he was elected to the Royal Academy for his bust of Benjamin West, and in 1819 to the academies of Florence and Rome. In 1830 he was appointed court sculptor and in 1835 he was knighted. Chantrey was a typical representative of the academic classical school, and was greatly overestimated by his contemporaries. In his portrait busts he seized the most characteristic and pleasing expression of his sitter, and his statues are not without a certain dignity, though somewhat tame. His children are full of grace and tender sentiment. His chief claim to fame, however, is the "Chantrey bequest," a fund of 150,000 pounds which he made to the Royal Academy "for the purchase of British works of art." Among his important works are the

colossal busts of Howe, Duncan, St. Vincent, and Nelson for the Seaman's Hospital, Greenwich; portrait busts of Pitt (Trinity House, London), Scott, Wordsworth, James Watt, and others; the charming tomb of the two children of the Rev. W. Robinson in Lichfield Cathedral; the monuments of Watt, Canning, and Sir John Malcolm in Westminster Abbey; the statues of George III in the London Guildhall and the younger Pitt in Hanover Square; and the equestrian statues of George IV in Trafalgar Square and Wellington before the Royal Exchange. Consult the biographies by Jones (London, 1849) and Raymond (London, 1904).

CHANTRY (OF. *chanterie*, ML. *cantaria*, chantry, from Lat. *cantare*, frequentative of *canere*, to sing). A foundation to provide masses for the repose of the soul of the patron or his friends, or the chapel or altar in a church where such service was performed. Legislation against chantries began under Henry VIII in 1545, when they were dissolved by law and the property given to the King; but, the law being inoperative, another Act was passed under Edward VI in 1547, which had the desired effect, and the King entered into possession of the funds, which amounted to a large sum, as at the time there were 1000 such foundations in England, with certain very carefully ordained exceptions. The text of this important Act is found in Henry Gee's *Documents Illustrative of the History of the English Church*, pp. 328–357 (London, 1896). Private chapels erected with such bequests or gifts are numerous in England, having served, since the Act of 1547, as family chapels for attendance at the regular worship. Some of those of the fifteenth century are highly ornate.

CHANUTE, chā-nōōt′. A city in Neosho Co., Kans., 126 miles south-southwest of Kansas City, Mo., on the Atchison, Topeka, and Santa Fe, and the Missouri, Kansas, and Texas railroads (Map: Kansas, A 4). The extensive repair shops of the former railroad are situated here, and there are a number of manufacturing plants of importance, all operated by natural gas, and including glassworks, brick and cement plants, smelters, drilling-tool works, flour mills, and oil refineries. An extensive oil and gas district surrounds the city, nearly 2000 oil and gas wells having been drilled. The city owns and operates its gas and electric-light plants and water works. Settled in 1872, Chanute was incorporated in 1873, and adopted the commission form of government in 1912. Pop., 1900, 4208; 1910, 9272; 1920, 10,286.

CHANZY, shän′zē′, Antoine Eugène Alfred (1823–83). A French soldier, born at Nouart (Ardennes). He studied at the military school of Saint-Cyr, received a commission in the Zouaves, served in Algeria, and rose to the rank of major. He fought in the Lombardy campaign of 1859 and participated in the Syrian expedition of 1860–61. Commissioned general of brigade, he remained in Algeria until the outbreak of the Franco-Prussian War. Suspecting him of contributing to the press, the government refused his request for a brigade command, but in October he obtained from the Government of National Defense the command of a division, and soon after of the Sixteenth Corps of the Army of the Loire. In December he became commander in chief of the Second Army of the Loire (known also as the Army of the West), and distinguished himself in the stubborn retreat from Beaugency to Laval. Upon the conclusion of the armistice he was elected to the National Assembly, and in 1872 was appointed commander of the Seventh Army Corps. From 1873 to 1879 he was Governor of Algeria, and in 1875 was elected a life senator. In 1879 he received a third of the total vote at the presidential election and in 1880–81 was Ambassador at St. Petersburg. He was probably the most prominent figure in the French resistance to German invasion. He published *La deuxième armée de la Loire* (1871). Consult the biographies by Chuquet (Paris, 1884) and Villefranche (Paris, 1890).

CHAO-CHAU, chou′chou′. A town in the Province of Kwang-tung, China, 15 miles north of the treaty port of Swatow (Map: China, E 7). Pop., 1898 (est.), 200,000.

CHAOS, kā′ŏs (Lat., from Gk. *χάος, chaos*, abyss, from *χαίνειν, chainein*, to yawn, *χάσκειν, chaskein*, to gape). In the ancient cosmogonies, the original infinite space, which was filled with clouds and darkness, from which sprang all things that exist. It gave birth to Erebus and Night, and, as a cosmic form, was the mother of Eros. In the later poets and philosophers the word *chaos* was applied to the confused, shapeless mass out of which the universe was formed into a *cosmos*, or harmonious order. *Chaos* was sometimes used also with reference to the universe as a whole, or to the space between heaven and earth, or to the lower world.

CHAPACU'RAN. An important South American Indian linguistic stock, massed chiefly on the rivers Mamoré, Machupo, Baures, Guaporé, and Blanco in northeast Bolivia, and including the following: Chapacura (or Tapacura; also called Huachi), Quitemoca, Pawumwa, Napeca, and Iten—possibly also, according to De Créqui-Monfort and Rivet, the Rocorona and the Mure. The relationship of the Pawumwa and Iten to Chapacura was simultaneously determined by Rivet and Chamberlain in 1912. Consult Chamberlain, "The Pawumwa Indians," in *American Anthropologist*, N. S., vol. xiv, pp. 632–635 (1914), and De Créqui-Monfort and Rivet, "La famille linguistique Čapacura," in the *Journal de la Société des Amér. de Paris*, N. S., vol. x, pp. 119–171 (1913).

CHAPAIS, shà′pā′, Joseph Amable Thomas (1858–). A Canadian legislator and writer. He was born at St. Denis de la Bouteillerie, P. Q., and was educated at Ste. Anne's College and at Laval University, where he graduated in 1879. In the same year he was called to the bar. In 1879–84 he was private secretary to the Lieutenant Governor of Quebec. He edited *Le Courier du Canada* (city of Quebec) during 1884–1901. In 1892 he was appointed a member of the Legislative Council, of which he became Speaker in 1895. In 1893 he was a member without portfolio of the cabinet of Louis Olivier Taillon (q.v.) and was Minister of Colonization and Mines in 1897, in which year he retired from office and was appointed professor of history in Laval University. In 1902 he was made a chevalier of the Legion of Honor. He published: *Les congregations enseignantes et le brevet de capacité* (1893); *Discours et conférences* (1898); *Le serment du roi* (1901); *Jean Talon, intendant de la Nouvelle France* (1904); *Mélanges de polémique et d'études religieuses, politiques et littéraires* (1905); *Le Marquis de Montcalm, 1712–1759* (1911).

CHAPALA (chà-pä′là) **LAKE.** The largest

lake in Mexico, situated in the State of Jalisco, in lat. 20° 15′ N. and long. 103° W. (Map: Mexico, G 7). It lies at an altitude of about 6000 feet and covers an area of about 1400 square miles. Its chief tributary stream is the Río Lerma, which enters from the east, and its outlet is the Río Santiago, which leaves the lake on the north side, a few miles west of the mouth of the Río Lerma. The lake contains a number of islands. Few towns are found on its shores.

CHAPARRAL, chă′pà-răl′ (Sp. *chaparra,* live oak, probably from Basque *achaparra,* from *aitza,* rock + *abarra,* evergreen oak). A thorny xerophytic (dry-ground) type of thicket, especially characteristic of Texas, Arizona, and the Mexicos. See THICKET.

CHAPARRAL COCK. See ROAD RUNNER.

CHAPBOOKS (Eng. *chap,* AS. *cēap,* bargain, Eng. *cheap,* Ger. *Kauf,* trade, Lat. *caupo,* innkeeper + books). The name given to a variety of old and scarce tracts or small books usually of a homely kind, which at one time formed the only popular literature. In the trade of the bookseller they are distinguishable from the ordinary products of the press by their inferior paper and typography, and are reputed to have been sold by chapmen, or peddlers; hence their designation. The older chapbooks issued in the early part of the seventeenth century are printed in black letter and are in the form of small volumes. Those of a later date are in the type now in use, but are equally plain in appearance. Of either variety, they were mostly printed in London, many being without dates. They were of a miscellaneous kind, including theological tracts, lives of heroes, martyrs, and wonderful personages, interpretations of dreams, fortune telling, prognostications of the weather, stories of giants, ghosts, hobgoblins, and witches, histories in verse, and songs and ballads. An inferior class of tracts succeeded these books for the common people and are best known as *penny chapbooks.* For the most part they consisted of a single sheet, duodecimo, or 24 pages. Besides the title, the first page usually contained a coarse woodcut embellishment. The paper was of the coarsest kind adapted for printing, and the price, as the name imports, was a penny each. The subjects, besides being of a similar nature to the above, included stories of roguery and broad humor. These penny chapbooks were issued by an obscure class of publishers in London and several English provincial towns, particularly Newcastle-on-Tyne. They were also issued from various presses in Edinburgh, Glasgow, Falkirk, and Paisley. After 1800 the chapbooks rapidly declined in popularity, their place being taken by Hannah More's *Repository Tracts,* the *Penny Magazine,* and other cheap publications. Collections of the older chapbooks are now found only in the libraries of bibliophiles, by whom they have been picked up at extravagant prices from dealers in secondhand books. Consult: *Notices of Fugitive Tracts and Chap-Books,* Percy Society, vol. xxix (London, 1851), *Popular English Histories,* Percy Society, vol. xxiii (London, 1848), both edited by Halliwell; Fraser, *Humorous Chap-Books of Scotland* (1873); and Ashton, *A History of the Chap-Books of the Eighteenth Century* (London, 1882). Other countries have their chapbooks. For France, consult Nisard, *Histoire des livres populaires* (Paris, 1854); for Germany, Simrock, *Deutsche Volksbücher* (13 vols., Berlin, 1839–67; new ed., 1887). See also Faxon, "Ephemeral Bibelots," in *Bulletin of Bibliographical Pamphlets* (Boston, 1903); and "Catalogue of English and American Chap-Books," in *Bibliographical Contributions,* No. 56 (Cambridge, 1905).

CHAPEL (OF. *chapele, capele,* from ML. *capella,* chapel, sanctuary for relics, probably referring to the covering of the altar during mass, from *capellus,* dim. of *capa, cappa,* hood, mantle, of uncertain origin, probably not connected either with Lat. *capere,* to take, or *caput,* head). During the Middle Ages the term grew to signify a small building or room for worship, either detached, annexed to, or an integral part of, a larger structure, and not possessing the full privileges and characteristics of a church. Ordinarily mass could be said in chapels only on certain dates, especially on their saints' days; otherwise they were mainly oratories. Baptism could never be administered in them, nor cemeteries attached to them. The extent of their privileges depended on the pleasure of the local bishop. Episcopal palaces had their chapels; one of the earliest was that at Ravenna (fifth century). Civil rulers also had chapels in their palaces (palatine chapels). The Byzantine Duke of Rome had his in the old palace of the Cæsars. That of the doges of Venice was St. Mark's. Charlemagne had his largest one at Aix-la-Chapelle, in the present cathedral; that of the Saxon emperors was at Goslar; the Sainte-Chapelle at Paris was the palatine chapel of St. Louis and his successors; another was built at the Château of St. Germain. (See SAINTE-CHAPELLE.) The feudal nobility regarded a chapel as indispensable in every great castle, as at the Wartburg in Germany, Coucy in France, and later at the châteaux of the dukes of Berry and Burgundy, at Pierrefonds, Urbino, and elsewhere.

In the great communal palaces of mediæval republics there were extremely artistic chapels, as at Nuremberg, Siena, Perugia, and Florence. The great associations, such as the Knights Templars (Tortosa), Knights of St. John (Krak des Chevaliers)—both of these in Syria—the Prussian Knights of the Cross (Schloss Marienburg), had large chapels to hold all the members of the orders. A beautiful modern reproduction of such feudal mediæval chapels is at Neuschwanstein, in the Bavarian highlands, built for King Ludwig II. Other corporations, such as universities and guilds, either had separate structures or chapels in their larger buildings, e.g., that of King's College at Cambridge.

To another class belong chapels connected with churches. Before the eighth century it was rare for chapels or oratories to form an integral part of any church, or for any altar to be erected except in the main apse and later in each of the two side apses. But after this date, with the multiplication of relics and the increased fervor of the worship of saints, altars were multiplied in chapels which were at first excrescences from, but soon became a part of the plan of, the church itself. The richness of the choirs of Romanesque and Gothic churches is due to the symmetrical projection of radiating chapels. Often the central chapel, or Lady Chapel, dedicated to the Virgin Mary, was longer than the rest. (See LADY CHAPEL.) Sometimes a continuous line of chapels opened out of the side aisles, as in Notre Dame in Paris (twelfth century) and a multitude of later churches. The cathedral of Albi has no side

aisles, but a very wide nave flanked by deep chapels on either side. In this way it was possible to pay special separate devotion to each saint whose relics were preserved in any church and to allow wealthy families to build separate chapels for their patron saints. These private chapels were used as private oratories for the donors' families and as burial places for their members and were decorated with paintings and sculptures at their expense. Another class is composed of the numerous small places of prayer and worship scattered over the country and not connected with any church; such as chapels of stations of the cross, votive chapels on the site of some miracle, and wayside shrines.

The term is also applied, at least in the United States, to places of worship, even of large size, erected to serve various subdivisions of a great parish. Thus Trinity Church in New York maintains a number of large churches as its chapels ("chapels of ease"), as St. Paul's, St. John's, and St. Agnes. It was also used to designate places of worship erected by Dissenters in England, the term "church" being restricted by usage to the buildings of the Establishment. Modern universities have their chapels for faculty and students, such as Appleton Chapel at Harvard, the Battell Chapel at Yale, the Marquand Chapel at Princeton, St. Paul's at Columbia University, and many others, in imitation of the magnificent chapels possessed by each college at Oxford and Cambridge. There are also special classes of chantry, domestic, memorial, mortuary, parochial, and proprietary chapels. Consult: Martin, *Manual of Ecclesiastical Architecture* (Cincinnati, 1897); Gilbert Scott, *Mediæval Architecture* (London, 1879); Bond, *Westminster Abbey* (London, 1909); Viollet-le-Duc, *Dictionnaire raisonné de l'architecture française*, article "Chapelle."

CHAPELAIN, shà'plăn', Jean (1595–1674). A French poet and man of letters, born in Paris. He was one of the first and most influential members of the Academy. His scholarly instincts prompted him to pursue classical studies. He was for many years tutor of the sons of Grand Provost de la Trousse. He wrote a preface for Marini's notorious *Adone*, then translated the *Guzman de Alfarache* of Aleman, and by four inferior odes won from Richelieu a pension and a place in the new Academy. Here he helped Richelieu with his dramas, planned the Academy's *Grammar* and *Dictionary*, and edited its observations, made to order, on Corneille's *Cid*. In 1656 he published half of a long-heralded epic on Joan of Arc, *La pucelle d'Orléans*. His literary reputation now collapsed under a shower of epigrams from Boileau, Furetière, and Montdor. The manuscript of the latter half of the epic remains still unpublished in the National Library. Yet when, in 1662, Chapelain was asked by Colbert to draw up a memorial to guide the King in pensioning literary men, he showed himself learned, just, and generous. He continued a favorite of the court; but though in his earlier years an excellent and amiable man, in old age he is said to have become miserly; but the statements of Ménage and Tallemant des Réaux to this effect should perhaps not be accepted as final. His *Lettres*, edited in part by T. de Larroque (2 vols., Paris, 1880–82), are of great interest, as also his *Lettres inédites* (ed. by L. G. Pellissier, 1894). Consult: Julien Duchesne, *Les poèmes épiques du XVII^e siècle* (1780); A. Fabre, *Les ennemis de Chapelain* (1888); E. de Molènes, *La pucelle, par Jean Chapelain* (Paris, 1891); Fabre, *Chapelain et nos deux premières Académies* (Paris, 1890); Mühlan, *Jean Chapelain: Eine biographisch-kritische Studie* (Leipzig, 1893); Searles, *The Library of Jean Chapelain* (Chicago, 1910); George Saintsbury, *History of Criticism*, vol. ii (1911).

CHAP'EL HILL. A town in Orange Co., N. C., 28 miles (direct) west by north of Raleigh; on the Southern Railroad (Map: North Carolina, C 2). It is the seat of the University of North Carolina (q.v.) and has a Carnegie library. The lumber interests are extensive, and there are cotton and knitting mills and a woodworking plant. It was incorporated in 1851 and is governed by a mayor and a council. Pop., 1900, 1099; 1910, 1149.

CHAPELLE, shà-pĕl', Placide Louis (1842–1905). An American prelate, born in the diocese of Mende, France. He studied theology and philosophy at St. Mary's College, Baltimore, Md., was an instructor in St. Charles's College in 1863–65, and was ordained priest in 1865. In 1870 he became assistant pastor of St. John's Church, Baltimore, of which he was later pastor, and in 1882 pastor of St. Matthew's, Washington, D. C. He was in 1891 appointed Coadjutor Bishop to Archbishop Salpointe, of Santa Fe, whom in 1894 he succeeded. In 1897 he was appointed Archbishop of New Orleans, in 1898 apostolic delegate to Cuba and Porto Rico, and in 1899 apostolic delegate also to the Philippine Islands. Upon his return Archbishop Chapelle confined his attention to the affairs of his church in Cuba, Porto Rico, and Louisiana, especially the last. He died at New Orleans of yellow fever.

CHAPELLE ARDENTE, shà'pĕl' är'dănt' (Fr., glowing chapel). A room or mortuary chapel wherein the dead body of a person of high rank, whether ecclesiastical or civil, is laid. The hangings are in black, and burning candles illuminate the scene until the final removal for burial. The custom is of great antiquity in the Catholic church. See Catafalque.

CHAPEL ROYAL (Fr. *chapelle royale*). In the Church of England a chapel royal is composed of two deans (a dean and a subdean), 36 royal chaplains, 10 priests, and a lay choir, styled "gentlemen of the chapel," a clerk and several deputy clerks of the closet, and an organist. The services are performed in London in the small oratory in St. James's Palace. In Scotland the appointments to the chapel royal are purely honorary, involving no services and carrying with them no compensation, though formerly it was attached to the palace at Holyrood and corresponded with the similar establishment in England.

CHAPIN, Anna Alice (1880–1920). An American author, born in New York City. She received a private education and studied music under Harry Roe Shelley. She began writing at an early age; her first book, *A Story of Rhinegold*, was published in 1897, when she was but 17 years old. This was followed by *Wonder Tales from Wagner* (1898); *Wotan, Siegfried, and Brunnhilde* (1898); *Masters of Music* (1901); *Discords* (1905); *The Heart of Music* (1906); *Königskinder* (1911); *The Nowadays Fairy Book* (1911); *The Topsy Turvy Fairy* (1913); *The Eagle's Mate* (1914). She also wrote many short stories for magazines, and with Robert Peyton Carter, whom she married in

1906, wrote a play called *The Deserters*, which was produced in New York in 1910.

CHA'PIN, EDWIN HUBBELL (1814–80). An American Universalist clergyman. He was born in Washington Co., N. Y., and in 1837 began preaching in Richmond, Va., to a congregation of Unitarians and Universalists. In 1846 he went to Massachusetts, and in 1848 to New York, where he became pastor of the Fourth Universalist Church, which later became the church of the Divine Paternity, and remained until his death. Before the Civil War he was a conspicuous opponent of negro slavery. In 1872 he succeeded Dr. Emerson as editor of the *Christian Leader*. Besides his regular sermons, he delivered many lectures and published several volumes, including *Duties of Young Men* (1840; 9th ed., 1856); *Duties of Young Women* (8th ed., 1856); *Characters in the Gospels* (1852); *Discourses on the Lord's Prayer* (1850); *The Crown of Thorns* (1860); *Discourses on the Beatitudes* (1853); *Moral Aspects of City Life* (1853); *True Manliness* (1854); *God's Requirements* (1881). Consult Ellis, *Life of E. H. Chapin* (1883).

CHAPIN, HENRY EDGERTON (1859–). An American biologist, born at Wilbraham, Mass. He was educated at Massachusetts Agricultural College and Boston University. After teaching in secondary schools and engaging in agricultural journalism he was an instructor in the Pennsylvania State Normal School from 1888 to 1890, and professor of biology in Ohio University from 1891 to 1900. In the latter year he became instructor in biology and physiography in a New York high school. Besides his scientific monographs he is joint author of *Chapin's and Rettger's Elementary Zoölogy and Guide* (2d ed., 1896).

CHAPLAIN (AS. *capellane*, OF., Fr. *chapelain*, ML. *capellanus*, chaplain, from *capella*, chapel). Originally the title of the ecclesiastic who accompanied an army and carried the relics of the patron saint. (See CHAPEL.) It has now come to signify a clergyman not having charge of a parish, but employed to officiate at court, in the household of a nobleman, or in an army, garrison, ship, etc. Thirty-six clergymen of the Church of England hold office as chaplains of the sovereign. Six clergymen of the Church of Scotland have a similar title in Scotland; but their only duty is to conduct prayer at the elections of Scotch representative peers. A statute of Henry VIII limits the right of nominating private chaplains in England; thus, an archbishop may have eight, a duke six, a baron three; and chaplains so appointed have certain privileges and may hold two benefices with cure of souls.

CHAPLAIN. A military clergyman, having the rank and status of a noncombatant officer. In the United States army chaplains are appointed by the President and assigned or transferred by the Secretary of War. Usually they are attached to the various army posts of the departments, under the department commander, who is authorized to recommend to the Secretary of War such transfer of the chaplains in his command as may be deemed for the best interests of the service. By Acts of Congress, approved Feb. 2, 1901, April 21, 1904, June 12, 1906, and Jan. 25, 1907, it is provided that the establishment of chaplains shall consist of 67 men, 15 of whom may be majors; those having less than seven years' service, first lieutenants; and the remainder captains; apportioned as follows: one to each regiment of cavalry, infantry, field artillery, to the coast artillery, and one to the Corps of Engineers. They are chosen from all religious denominations and must not have passed the age of 40 on date of appointment. Chaplains are required to render to the adjutant general of the army monthly reports of duties performed, and keep a record of all marriage, baptismal, and funeral services performed by them. In time of war or on active service chaplains are assigned to the various units of command. The instruction of the enlisted men in the common English branches of education is made by law one of the duties of chaplains.

In the United States navy there are 24 chaplains who perform religious duties on board naval vessels; 4 with the rank of captain, 7 with the rank of commander, 5 with rank of lieutenant commander, 1 with rank of lieutenant, 7 with rank of lieutenant (junior grade). In 1913 the Secretary of the Navy recommended that the number be increased, as well as their duties and responsibilities, and that the battleships and shore stations be provided with Y. M. C. A. or welfare secretaries to assist in the religious and educational as well as general welfare work among the enlisted force.

The pay of army chaplains is that pertaining to their grade: $2000 per annum for a first lieutenant, $2400 for a captain, $3000 for a major, with a 10 per cent increase for each 5 years' service, not to exceed 40 per cent in all, or $4000 for a major.

The navy chaplain receives the corresponding pay of his relative army rank, except that, under the Act of May 13, 1908, his pay and allowances shall not exceed those of a lieutenant commander corresponding to the grade of major in the army.

Chaplains are a part of the establishment of all European armies, attendance at the regulation religious services conducted by them being compulsory for all officers and men, except in the French army and navy.

In the British army there are two classes of chaplains, permanent and temporary. In the permanent class are 100 chaplains, all of whom hold permanent commissions as noncombatant officers. The senior, with the rank of major general, is known as the chaplain general. He has charge of the Anglican chaplains only, who form a majority of the corps. The subordinate officers have the rank of colonel, lieutenant colonel, major, or captain. Roman Catholic and Presbyterian chaplains are detailed for duty with regiments in which the majority of the enlisted men profess the corresponding faith. The chaplains' corps is administered by the War Office. Their duties include holding divine service, officiating at funerals, visiting the sick and wounded, and performing the duties and functions of a parish priest at military stations. In war they accompany their regiments. Temporary or special chaplains, known as acting chaplains for temporary service, may be appointed under the Army Chaplain Act of 1868 for special duty wherever needed. The territorial forces were given a chaplains' department in 1909. For India there is provided a special service.

In the British navy the larger ships are each provided with an Anglican chaplain, who must not be over 35 years of age at date of entering

the service and is retired at 60. Pay varies from £129 to £401. Those performing additional duty as instructors receive compensating allowances. The service is administered by its head, the chaplain of the fleet, with the pay of £1000, the same as the chaplain general of the army.

In the French army the office of chaplain was abolished on the separation of church and state. In all other armies the office is officially recognized. The Austrian army, recruited from different nationalities, contains Roman Catholic, Jewish, Greek church, and Mohammedan chaplains. The several states of the German Empire have different systems. In Prussia there are two *Feldprobste* under the War Minister—one Lutheran, one Catholic. The latter is a bishop and has spiritual authority over soldiers. To army corps and divisions chaplains of both faiths are assigned.

CHAPLEAU, shȧ'plō', Sir Joseph Adolphe (1840–98). A Canadian politician. He was born at Ste. Thérèse de Blainville, Quebec, was educated at the colleges of Terrebonne and St. Hyacinthe, and in 1861 was called to the bar. He sat in the Quebec Legislature for Terrebonne, and was at different times Solicitor-General, Provincial Secretary, Provincial Premier, and Minister of Agriculture and Public Works in the government of Quebec. He was also for a time leader of the Conservative Opposition in that province. In 1882 he entered the cabinet of Canada as Secretary of State, under Sir John Macdonald. This office he held until 1892, when he was appointed Minister of Customs and subsequently Lieutenant Governor of Quebec. For some years he occupied the chair of international law in the Montreal section of Laval University. In politics he was a determined Conservative, and as an orator he was perhaps the most brilliant among French Canadians.

CHAPLET (OF. *chapelet,* dim. of *chapel,* Fr. *chapeau,* hat, from ML. *capellus,* hood, dim. of *capa, cappa,* hood, mantle). A garland or headband of leaves and flowers; sometimes also of gold or jewels. In heraldry a chaplet is always composed of four roses, the other parts being leaves.

CHAPLIN, shȧ'plăn', Charles (1825–91). A French painter. He was born of English parents at Les Andelys, France, and studied under Drolling and at the Ecole des Beaux-Arts. He was principally known for his decorations in the Tuileries, the Elysée, and other public and private buildings in Paris. His portraits of women and children, in which he follows the traditions of the great English portrait painters of the eighteenth century, are much praised. Chaplin was a popular teacher. One of his best pictures, "Souvenirs," is in the Luxembourg; another, "Haidee," is in the Metropolitan Museum, New York. He etched after Rubens, Watteau, and some of his own works.

CHAPLIN, Charles Spencer (1888–). Leading comedian on the movie stage. He was born in London, England, made his début as a film performer in the United States in 1914, and soon became the most familiar figure in screen productions. He starred in many pieces of his own creation including *The Kid* (1920–21), which was highly popular with all classes. In 1921 he visited Europe where he received a popular welcome almost without precedent. He established a motion picture plant at Hollywood, Cal.

CHAPMAN, Alvan Wentworth (1809–99). An American botanist. He was born at Southampton, Mass., and graduated at Amherst College in 1830. He was a botanist of exceptional ability, and a genus of plants, *Chapmannia,* was named after him. He published the work entitled *Flora of the Southern United States* (1860; 3d ed., 1897).

CHAPMAN, Carlton T. (1860–). An American marine and battle painter and illustrator. He was born at New London, Ohio, and received his first artistic instruction at the National Academy of Design and the Art Students' League in New York, and afterward at the Académie Julian in Paris. He made a specialty of depicting the naval battles of the United States, from John Paul Jones to the Spanish-American War, and his representations show a remarkable knowledge of the structure and manœuvres of battleships, both past and present. His most recent works include "The Derelict" and "The U. S. S. Gloucester and the Spanish Torpedo Boats" (1904); "A Squally Day—North River," "The Walls of New York," and "Off Ellis Island" (1905); "The Argus and the Pelican," "The Bonhomme Richard and the Serapis," and "The Lighthouse" (1910); "O'er the Dark Sea," "The Pacific Coast," and "October" (1911); "The Mystic Pool" and "Battle of Cape St. Vincent" (1912). He was elected a member of the National Academy of Design and received medals at the Pan-American Exposition at Buffalo in 1901 and at the Charleston Exposition in 1902.

CHAPMAN, Frank Michler (1864–). An American ornithologist, born at Englewood, N. J. He was appointed assistant curator in vertebrate zoölogy in the American Museum of Natural History, New York City, in 1887. In 1897 he was elected to the presidency of the Linnæan Society of New York. He made some excellent close-range photographic studies of bird life, and in addition to many contributions to the *Auk,* of which he became associate editor, and to *Bird Lore,* of which he became editor in chief, he published a *Handbook of Birds of Eastern North America* (1895); *Bird Life, a Guide to the Study of our Common Birds* (1897); *Bird Studies with a Camera* (1900); *A Color Key to North American Birds* (1903); *The Economic Value of Birds to the State* (1903); *The Warblers of North America* (1907); *Camps and Cruises of an Ornithologist* (1908).

CHAPMAN, George (c.1559–1634). An English poet and dramatist, born near Hitchin, Hertfordshire. According to Anthony Wood, he studied at Oxford and Cambridge. In 1598 he was already known as a successful playwright. Among his earliest and best plays are: *The Blind Beggar of Alexandria* (printed 1598); *All Fooles* (printed 1605); *Eastward Hoe!* in collaboration with Jonson and Marston (1605); *The Gentleman Usher* (1606); *Bussy d'Ambois,* a tragedy, the most popular of all (1607); *The Conspiracy and Tragedy of Charles, Duke of Byron* (1608); *May-Day* (1611); *The Widdowe's Teares* (1612); and *Cæsar and Pompey* (1631). Though Chapman's plays are usually weak in plot and in the development of character, they abound in striking passages. Besides plays, Chapman wrote much else: *The Shadow of Night* (1594); *Ovid's Banquet of Sence* (1595); *De Guiana, Carmen Epicum* (1596); a continuation of Marlowe's *Hero and Leander* (1598); *The Tears of Peace* (1609), and several other poems. He is, however, best known as the first translator of Homer into English verse. The *Iliad* appeared in installments (1598–1611); likewise the *Odyssey* (1614–15). Both were pub-

lished together in 1616. For the former, Chapman employed rhymed verse of seven accented syllables; for the latter, rhymed verse of five accented syllables. The translation of the *Iliad* has been criticized for its inaccuracy. On the other hand, it has been praised for its rapid movement, and it is a noble poem. Like Pope's *Iliad*, however, but on different grounds, it is scarcely Homeric. The complete works of Chapman, in 3 vols., were edited by Shepherd, with an elaborate introductory essay by Swinburne (London, 1874–75). A literal reprint of the plays was published by Pearson (London, 1873). Selections from the plays are to be found in the "Mermaid Series," edited by Phelps (London and New York). Consult: Coleridge, *Literary Remains*, vol. i (London, 1836–39); Swinburne, *George Chapman: A Critical Essay*, a reprint of the introduction to the Shepherd edition named above (London, 1875); Matthew Arnold, the essay "On Translating Homer" (1895); Ward, *History of English Dramatic Literature*, vol. ii (1899); Lohff's *George Chapman's Ilias Uebersetzung* (Berlin, 1903); and a facsimile reproduction of a curious play, *Alphonsus*, carefully ed. by H. F. Schwarz (New York and London, 1913).

CHAPMAN, John Jay (1862–). An American author, born in New York City. He was educated at Harvard University, was admitted to the bar in 1888, and practiced law until 1898. Meanwhile he had attracted attention as an essayist of unusual merit. His work is marked by originality and felicity of expression, and in the opinion of many critics has placed him in the front rank of the American essayists of his day. His publications include *Emerson and Other Essays* (1898); *Causes and Consequences* (1898); *Practical Agitation* (1900); *Four Plays for Children* (1908); *The Maid's Forgiveness* (1908); *A Sausage from Bologna* (1909); *Benedict Arnold: A Play for a Greek Theatre* (1911); *Learning and Other Essays* (1911); *William Lloyd Garrison* (1913).

CHAPMAN, J. Wilbur (1859–1918). An American Presbyterian clergyman and writer, born in Richmond, Ind. He graduated from Lake Forest University in 1879 and from Lane Theological Seminary in 1882, and, being ordained to the Presbyterian ministry, was pastor of the First Reformed Church at Albany, N. Y., and of the Bethany Presbyterian Church at Philadelphia. After three years (1893–96) of evangelistic work, in which he was very successful, he was again for a time pastor of Bethany Church; and from 1900 to 1905 he filled the pulpit of the Fourth Church of New York. In 1903 he was appointed executive secretary of the General Assembly's committee of evangelistic work for the Presbyterian church, and later became representative at large for this committee. His writings include *The Lost Crown; The Secret of a Happy Day* (1899); *The Surrendered Life* (1899); *Life and Work of Dwight L. Moody* (1900); *Present-Day Evangelism* (1903); *Present-Day Parables* (1911); *The Problem of the World* (1911); *Chapman's Pocket Sermons* (1911); *Revival Sermons* (1911); *Personal Touch* (1912); *Present-Day Evangelization* (1912).

CHAPMAN, Mrs. Maria (Weston) (1806–85). An American reformer, prominent as an Abolitionist during the antislavery struggle. She was born in Weymouth, Mass., was educated partly there and partly in England, and in 1829–30 was principal of the Young Ladies' High School in Boston, Mass. In 1830 she married Henry G. Chapman, who died 12 years later. After 1834 she was active as an Abolitionist, writing much for the press and speaking occasionally in public. She was treasurer for several years of the Massachusetts Antislavery Society, and was the editor of the *Liberty Bell*, an antislavery annual, which, says Samuel J. May, "year after year rung out the clearest notes of personal, civil, and spiritual liberty." She wrote the pamphlets *Right and Wrong in Massachusetts* (1839) and *Right and Wrong in Boston* (1836), which had a wide circulation, and compiled the official antislavery hymn book, *The Songs of the Free* (1836). From 1848 to 1856 she lived in Paris, France. She was an intimate friend of Harriet Martineau, and published the latter's *Autobiography, with Memorials*, in 1877.

CHAPMAN, William (1850–). A Canadian poet. He was born at St. François de la Beauce, P. Q., and was educated at Levis College. He studied law, afterward engaged in commercial pursuits, and later entered the civil service of the Province of Quebec. He was for some time in journalistic work in Quebec and Montreal; but in 1902 became a French translator for the Dominion Senate and removed to Ottawa. His publications include: *Les Quebecquoise* (1876); *Le laureat* and *Les deux Copains*, two critical works (1894); *Les aspirations* (1904), which received the highest prize of the French Academy; and *Les Royons du Nord* (1910), which also gained the highest prize of the French Academy.

CHAPONE, shȧ-pōn′, Hester (1727–1801). An English essayist, born at Twywell, Northamptonshire. When 10 years old she wrote a romance entitled *The Loves of Amoret and Melissa*, and while still very young became proficient in Italian, Latin, music, and drawing. She wrote for the *Rambler*, *Adventurer*, and *Gentleman's Magazine*, but is best remembered by her *Letters on the Improvement of the Mind* (1772), which went through many editions. In 1760 she married Mr. Chapone, an attorney, who died 10 months afterward. Her *Works, with a Life Drawn up by her own Family*, appeared in 1807, in 4 vols.

CHAPPAUL. See Squawfish.

CHAPPE, shȧp, Claude (1763–1805). A French abbé and inventor, born in Brûlon (Sarthe). In 1792 he contrived the first working ocular telegraph of importance. His "semaphore" consisted of an upright post, on the top of which was fixed a transverse bar, and at the ends of the bar two smaller arms movable on pivots. The position of the bars represented letters or words; and, by means of such machines placed at remote but easily visible points, messages were conveyed 50 leagues in a quarter of an hour. Almost until electric telegraphy was introduced, Chappe's semaphore was used for military purposes, and especially for noting the arrival of ships, in nearly all the countries of Europe. A similar invention had been produced by Hooke as early as 1684, and Chappe was so harassed by charges that he had stolen his ideas from others that he committed suicide. Consult the *Histoire de la télégraphie* (1824) by his brother, Ignace Urbain Jean Chappe (1760–1829).

CHAPPE D'AUTEROCHE, shȧp′ dō′trōsh′, Jean (1722–69). A French astronomer, born at Mauriac, Auvergne, an uncle of the preceding.

He was ordained to the priesthood, but afterward devoted himself to astronomy. In 1761 he observed the transit of Venus at Tobolsk, and he wrote a *Voyage en Sibérie fait en 1761* (2 vols., Paris, 1768). In reply to his criticisms of Russia expressed in this work, Catharine II and Shuvaloff caused the publication of the *Antidote ou examen du mauvais livre superbement imprimé, intitulé: Voyage de l'abbé Chappe d'Auteroche* (1771). Chappe's report on the transit of Venus, observed by him in California (where he died) in 1769, was published in Paris (1772).

CHAPPED HANDS. A form of eczema (*eczema fissum*) produced by undue exposure to extremes of cold and heat, and affecting chiefly the most exposed joints, over which the skin swells and cracks, with itching, pain, and heat. In severe cases there is ulceration, which is difficult to heal in proportion to the length of time the disease has lasted. Chapping may generally be avoided if the hands are washed always with tepid water and a bland soap, and not habitually exposed to great cold or wind, or, when cold, to the heat of a fire. They should not be washed very frequently, and always thoroughly dried. When formed, the lesions may be treated with oxide of zinc ointment; or with dilute solution of borax in glycerin and rose water; or with glycerin alone, diluted with water; the hands in any case being protected by warm gloves in cold weather. See FROSTBITE.

CHAPRA, or **CHUPRA,** chŭp'rà. A town in India, in the Province of Behar, Bengal, on the north bank of the Ganges, at its confluence with the Gogra 35 miles west of Patna (Map: India, D 4). It extends nearly a mile along the river and has several pagodas, mosques, and churches. The government conducts an English school, and there are also private high schools and several Christian missions. There is trade in cotton, sugar, saltpetre, opium, linseed, and shellac. Pop., 1901, 45,901; 1911, 42,473.

CHAPTAL, shàp'tàl', JEAN ANTOINE, COUNT DE CHANTELOUP (1756–1832). A French chemist and statesman. He studied medicine and chemistry at Montpellier, and became professor of chemistry there in 1781. Subsequently he established chemical works near by, and for producing chemicals which had hitherto been imported he was ennobled. The Spanish government offered him a large pension to go to Spain and apparently Washington invited him to come to America. During the Revolution he was imprisoned for a time for a *Dialogue entre un Montagnard et un Girondin.* In 1793 the Committee of Public Safety put him in charge of the saltpetre works of Genelle. After the 18th Brumaire (Nov. 9, 1799) he was made a Councilor of State by Napoleon. As Minister of the Interior, succeeding Lucien Bonaparte, he established chambers of commerce and a school of arts, and in many ways contributed to the material development of the country. In 1804 he lost Napoleon's favor, but he was recalled the following year and made a member of the Senate. Upon the return from Elba, he was made Director General of Commerce and Manufactures and Minister of State. The downfall of the Empire sent him to private life, but in 1816 he became a member of the Academy of Sciences. His most important works were on practical chemistry, especially of agriculture and viticulture and wine making.

CHAPTER. A stated assembly of monks or canons; from this, the canons and other dignitaries of a cathedral or collegiate church, considered as the council of the bishop. The name arose from the practice of reading at daily meeting a chapter of the rule under which the monks or canons lived. It is applied in modern usage to the body of canons, whether in a Roman Catholic or Anglican cathedral. They have special stalls assigned to them in the choir of the cathedral and usually a house in the precincts. The obligations of members of the chapter are substantially the same in both, and include daily participation in divine service, residence during a fixed portion of the year, and assistance in the deliberations of the body. Roman Catholic canons are distinguished by the title "very reverend" and by permission to wear the rochet and mozetta in choir. The bishop in both churches may appoint honorary canons, who are not members of the chapter. It was formerly the custom so to appoint secular princes; thus the Emperor was always an honorary canon of Cologne. Consult Bouix, *De Capitulis* (Paris, 1852).

CHAPTER COFFEEHOUSE. An eighteenth-century resort for wits and literary men. Its site is on the south side of Paternoster Row, London, at the corner of Chapter-House Court, St. Paul's. It is at present a tavern.

CHAPTER HOUSE (Eng. *chapter,* Fr., OF. *chapitre,* from Lat. *capitulum,* chapter, dim. of *caput,* head + *house*). The building in which the monks and canons of monastic establishments, and the dean and chapter of cathedral and collegiate churches, meet for the management of the affairs of their order or society. (See CATHEDRAL; CHAPTER.) Chapter houses frequently exhibit the most elaborate architectural adornment; as, e.g., those at York, Southwell, and Wells. The original stained-glass windows remain at York and are of exquisite beauty. On the walls of that at Westminster the original fresco painting has been discovered. Chapter houses are of various forms: those at York and Westminster are octagonal; those at Oxford, Exeter, Canterbury, Gloucester, etc., are parallelograms; Lichfield is an oblong octagon; Lincoln, a decagon; and Worcester, a circle. They are always contiguous to the church and are generally placed to the west of the transepts. They generally either open into the church or are entered by a passage. Chapter houses were often used as places of sepulture and have sometimes crypts under them, as at Wells and Westminster.

CHAPTERS, THE THREE. The name given to the condemnation issued by the Emperor Justinian in 544 against the three persons or writings —viz., (1) the person and writings of Theodore of Mopsuestia (q.v.); (2) the writings of Theodore against Cyril and for Nestorius; (3) the letter which Ibas of Edessa is said to have written to the Persian Maris. The word "chapter" in this use was understood to mean a form of anathema which threatened with excommunication every one who maintained the deprecated doctrine. The Emperor interfered in the theological disputes of the period in the interest of orthodoxy. Unwittingly he stirred up a great controversy, because he seemed to be condemning the Council of Chalcedon (451). Consult Harnack, *History of Dogma,* vol. iv (New York, 1900).

CHAPU, shà'pu', HENRI MICHEL ANTOINE (1833–91). A French sculptor. He was born at Le Mée, Seine-et-Marne, and studied in Paris

under Pradier and Duret, and in the Ecole des Beaux-Arts, winning the Roman prize in 1855. His art represents academic-classical tendencies, strongly modified by the modern naturalistic influences, which increase in his later work. His numerous works include several monuments, among them those of Henri Regnault (Ecole des Beaux-Arts)—of which the celebrated figure "Youth" forms a part—the novelist Flaubert, and the brothers Galignani. Among his portrait busts are those of Léon Bonnat, Alexandre Dumas (Comédie Française), Carnot, and Alexandra, the Princess of Wales. His ideal and mythological subjects include "Mercury Inventing the Caduceus" (Luxembourg), the "Transformation of the Nymphe Clytie" (Dijon), and "The Cantata," on the façade of the Paris Opéra. His masterpiece is the kneeling statue of "Joan of Arc at Domrémy" (Luxembourg), in which the expression of intense spiritual exaltation is quietly and effectively rendered. Consult his biography by Fidière (Paris, 1894).

CHAPULTEPEC, chà-pōōl'tà-pĕk' (Aztec, hill of the grasshoppers). A small hill, 3 miles southwest of the city of Mexico, rising about 150 feet above the surrounding plain. On it the Aztec monarchs are said to have made their summer home; and here, in 1785, Galvez, then Viceroy of Mexico, began to erect an imposing fortified castle, which, though never fully completed, was subsequently used partly as a military school and partly as a national observatory. In the war between Mexico and the United States the hill was strongly fortified by the Mexicans and was the scene (Sept. 12–13, 1847) of the last serious conflict of the war. After the battle of Molino del Rey (q.v.) Scott planned a movement against Chapultepec and on September 12 opened a heavy bombardment, under cover of which, on the following day, Generals Pillow and Quitman, supported respectively by Generals Worth and Smith, made gallant assaults, the former carrying the fortifications on the west and the latter on the southeast; and the Mexicans, after making a stubborn defense, were driven in confusion back towards the city. On the 14th the Americans entered the city of Mexico, and the war was virtually ended. During the three days (12th, 13th, and 14th) the Americans lost 863 in killed and wounded (General Pillow being among the latter), while the Mexicans are known to have lost a much larger number. On the side of the Americans about 7500 men were engaged; on the side of the Mexicans, about 4000. Consult H. H. Bancroft, *History of Mexico*, vol. v (San Francisco, 1885), and C. M. Wilcox, *History of the Mexican War* (Washington, 1892). See Mexico City.

CHAR (Gael. *ceara*, blood-colored, from Gael., Ir. *cear*, blood). A name given to the numerous varieties of *Salvelinus alpinus*, a fish of the salmon family, and extended to several American "trout." The char has smaller scales than the true trout (*Salmo*), differs in the structure of the vomer, and has red instead of black spots, especially during the breeding season. The color is "grayish or green above, the lower parts red, especially in the male; lower fins anteriorly margined with white. Sides of body with round red spots; back not marbled." This species has a wide distribution, occurring in cold lakes and mountain streams of central and northern Europe, of northeastern America, and probably also in Siberia. It is extremely variable, and has consequently received a host of specific names, such as "saibling," "sälbling," "ombre chevalier," "Greenland trout," etc. The chars "are by far the most active and handsome of the trout, and live in the coldest, clearest, and most secluded waters" (Jordan and Evermann). The best known of the distinctively American chars is the brook trout, or speckled trout; but trout of the Rangeley Lakes, in Maine, is somewhat nearer the European type. See Trout.

CHARACEÆ, kà-rā'sê-ē. See Charales.

CHAR'ACTER (Lat., from Gk. χαρακτήρ, *charaktēr*, feature, graving tool, from χαράσσειν, *charassein*, to engrave). A name given in ethics to the nature of a self-conscious agent. This nature manifests itself in and as the continuity of the various successive voluntary and habitual acts of the agent. Character has popularly been construed as a sort of causal substrate, underlying acts of conduct and giving rise to them. This popular conception has been responsible for the difficulties ordinarily thought to be involved in free will (q.v.). The conception of character not as the substrate, but as the temporal continuity, of a man's voluntary acts and of his habits enables us to escape all these difficulties, and also keeps us in touch with the facts as they actually appear in experience. No one has ever known his own or his neighbor's character as a substrate. But what every one knows is the general way in which he or another acts, and that is what constitutes character. It is upon this experienced character of a man that we pronounce our moral judgments, condemning one character and approving another. A stable character is one in which the successive acts form a continuity according to some recognized or recognizable fixed principle. A strong character is one in which the principle controlling the successive acts maintains itself against temptations which in the average person would be effective. A good character is one whose successive acts are prevailingly directed towards beneficent social ends. Consult Whitby, *The Logic of Human Character* (London, 1905); Eliot, *The Happy Life* (New York, 1905); MacCunn, *The Making of Character* (New York, 1900). See Substance; Ethics; Determinism.

CHAR'ACTERIS'TIC. A term variously employed in mathematics, requiring specific definition in each case. The integral part of a logarithm is called its characteristic; thus, in $\log 125 = 2.0969$, $\log 0.013 = \bar{2}.1139$, $\log 5 = 0.6990$, the characteristics of the three logarithms are respectively, 2, -2, and 0. The characteristic of the common logarithm of a number containing an integral part is one less than the number of integral places; that of a decimal is negative, and is one more, in actual value, than the number of ciphers preceding the first significant figure. On account of this simple relation the characteristic is not ordinarily given in the tables of common logarithms.

In the method of characteristics due to Chasles (q.v.), which appeared in the *Comptes rendus* (1864), may be found the first trace of the "numerative geometry," the object being to determine how many geometric figures of given definition satisfy a certain number of conditions. A number which expresses how many simple singularities may replace a higher singularity of an algebraic curve or surface is called a characteristic number. The elementary right-angled triangle, whose hypotenuse is sensibly equal to the element of the arc of a curve,

was called by Pascal the characteristic triangle. In the application of determinants (q.v.) to the solution of equations the minors of a certain order in the resultant may not all vanish, while all minors of higher order become zero, in which case the equations have a known number of solutions. The number expressing the highest order in which some minor does not vanish is called the characteristic of the determinant. In the theory of functions (q.v.) certain rational integral functions are called characteristic functions. In the theory of certain types of differential equations there are certain algebraic equations every root of which determines an integral of the given differential equations. These are called characteristic equations.

CHARADE, shȧ-rād′ (Fr., Languedoc *charrade,* idle talk, probably from Sp. *charrada,* speech or action of a *charro,* clown). A form of amusement which consists in dividing a word of one or more syllables into its component syllables or into its component letters, something predicated of each; and then, the whole being reunited, and something predicated of that also, the reader or listener is asked to guess the word. As a specimen of the charade depending upon syllables, we adduce the following:

"My *first* is plowed for various reasons, and grain is frequently buried in it to little purpose. My *second* is neither riches nor honors, yet the former would generally be given for it, and the latter are often tasteless without it. My *whole* applies equally to spring, summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. Answer: *Sea-son.*"

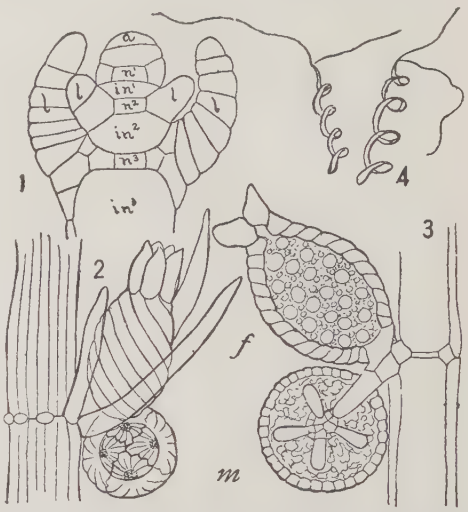
As a specimen of the second class of charades, we take the following example from the French:

"Quatre membres font tout mon bien,
Mon dernier vaut mon tout, et mon tout ne vaut rien."

The word is *zéro.* It is composed of four letters, of which the last (viz., *o*) is equal to *zero;* the whole, zero itself, being equal to nothing.

But, besides charades of this nature, there is another kind, rather popular at evening parties —the *acted* charades—the character of which is entirely dramatic. Half a dozen or so of the company retire to a private apartment, and there agree to select a certain word as the subject of the charade. The next things done are to take the first syllable and arrange a little scene and dialogue, each member taking a certain part. This being accomplished, the amateur actors return to the drawing-room and commence their performance, the rest of the company constituting the spectators. Care is taken to mention conspicuously, and yet not obtrusively, in the course of the dialogue, the syllable which is the subject of the scene. On its conclusion the party again retires to devise a new series of incidents for the next syllable, and so on. Finally, they retire to contrive the final scene, into which the whole word must be dexterously introduced at an odd moment, when the spectators are thought to be off their guard. The company are then asked to guess the word. For the effective performance of a charade of this sort, the actors must possess a good share of inventiveness, self-possession, and ready talk, as the greater portion of the dialogue has to be extemporized.

CHARALES, kȧ-rā′lēz (Neo-Lat. nom. pl., from Gk. χαρά, *chara,* delight, from χαίρειν, *chairein,* to rejoice). Usually classed as the most highly developed order of the Green Algæ, Chlorophyceæ (q.v.). They are often called "stoneworts," because the bodies of certain species, notably those of *Chara,* are incrusted with lime. The body of Charales consists of a



CHARALES: 1, apex, showing apical cell (*a*), the succession of nodal (*n*) and internodal (*in*) cells, and the young leaves (*l*); 2, oögonium (above) and antheridium; 3, the same enlarged and showing connections; 4, sperms.

stem differentiated into nodes and internodes. Each node consists of a plate of cells and gives rise to whorls of branches which were formerly regarded as leaves. Each internode consists of a very much elongated cell, which in *Chara* is invested by small cortical cells, and in *Nitella* remains uncovered. For this reason the internodal cells of *Nitella* are peculiarly favorable for showing the movement of protoplasm. The nodes produce two kinds of branches: those of limited growth, which arise in a whorl; and those of indefinite growth, that resemble the parent axis. It is upon the branches of limited growth that the sex organs occur, arising from the nodes of these branches. The female organ consists of a large cell containing the egg, surrounded by spirally wound filaments, whose tips form a sort of crown at the top of the organ. This whole structure is called the oögonium, and it differs from the ordinary oögonium of Thallophytes in being incased by the spirally wound filaments. The male organ (antheridium) is a spherical, many-celled structure arising near the oögonium. It is the most complex male organ known in the plant kingdom. The wall consists of platelike cells called shields, each of which bears within a stalk, and from the tip of the stalk there arises a variable number of long filaments. When the antheridium is opened, it seems to contain a tangle of these filaments, each of which consists of approximately 200 cells, and each cell produces a sperm. The sperm output of a single antheridium may range between 20,000 and 50,000. Although Charales are included among the Green Algæ, there seems to be no question but that this is an arbitrary association. They differ from Green Algæ (see ALGÆ) in their vegetative body, sex organs, sperms, and life history, and in all of these particulars the resemblances are with the higher plants. The opinion is general that they should either be isolated as

a distinct group of Thallophytes or should constitute a group between Thallophytes and Bryophytes. The North American genera and species of Charales have been described by Allen, *The Characeæ of North America* (New York, 1888); Braun, *Fragmente einer Monographie der Characeen*, ed. by Nordstedt (Berlin, 1882); Filarsky, *Die Characeen* (Budapest, 1893).

CHARBON, shär'bŏn'. See ANTHRAX.

CHARBON ROUGE, shär'bôn' rōōzh' (Fr.), or RED CHARCOAL. A variety of charcoal obtained by subjecting wood to the action of heated air from furnaces, or of steam, which has been raised to a temperature of 572° F. Air-dried wood, by the ordinary process of charring, yields at the best 21 to 26 per cent of black charcoal; but when acted on by heated air or steam, as mentioned above, 36 or 42 per cent of charbon rouge is obtained. It is used in the manufacture of gunpowder. It has a dark-red color and consists of about 75 per cent pure carbon and 25 per cent hydrogen and oxygen.

CHAR'CAS. See CHUQUISACA.

CHAR'COAL (probably from ME. *charken*, to crackle, AS. *cearcian*, to creak, variant of *cracian*, to crack + *cole*, coal; less plausibly from *char*, turn, from AS. *cerr*, Ger. *Kehr*, turn + *cole*, coal). A black, porous substance burning without smoke or flame, and formed by the imperfect combustion of organic matter, either animal or vegetable. *Animal charcoal* is produced by calcining the bones and ivory of animals in closed retorts. In this process the charcoal proper, which consists of the earthy and saline portions of the bone, combined with carbon, is left in the retort, while the volatile matter is allowed to escape into another compartment, where it is distilled. The escaping gas contains, among its other components, an oil which, when burned in closed chambers, deposits a soot which is known as *boneblack* or *ivory-black* pigment. (See LAMPBLACK.) Animal charcoal, or boneblack, is itself a most useful material in the arts, on account of its power of absorbing coloring matter and odors. It is the best material known for filtering saccharine solutions (see SUGAR), and various processes have been invented for recalcining boneblack after it has been used until no longer effective.

Wood charcoal may be produced either in mounds formed by simply covering piles of wood with earth or sand, or in retorts in connection with the manufacture of acetic acid and wood alcohol. If the former method is employed, the wood is fired usually at the top, a central space being left from bottom to top for the progress of the fire. The gases are allowed to escape through holes left in the top. By this method the yield of charcoal is not over 20 per cent, while all the volatile by-products are lost. By the retort method about 30 per cent of charcoal is obtained. A charcoal furnace is usually a dome-shaped structure with openings at the top and side for putting in the wood and a pipe or tube near the top for the escape of the volatile products. The wood rests on grates, and the quantity of air is regulated by a closely fitting ash-pit door. The wood is fired at the bottom, and when the process of combustion has sufficiently advanced, the ash-pit door is closed. The wood is now slowly carbonized, and the gaseous products escape into another chamber, where they are treated as described under LAMPBLACK.

Wood charcoal has many uses. It is employed to some extent as a fuel (q.v.), a polish, and a filter, but its chief use is as an absorbent of gases and aqueous vapors. It is an ingredient in gunpowder and fireworks. See WOOD DISTILLATION.

CHARCOAL, RED. See CHARBON ROUGE.

CHARCOAL BLACKS. Pigments prepared both from animal and vegetable substances, e.g., burnt ivory, bones, vine twigs, peach stones, nut and other shells, the smoke of resin condensed, etc. See CHARCOAL.

CHARCOT, shär'kō', JEAN BAPTISTE ETIENNE AUGUSTE (1867–). A French Antarctic explorer, born at Neuilly-sur-Seine. In 1890–94 he was an interne at the Hospital of Paris and at the same time an investigator in the Pasteur Institute. From 1896 to 1898 he was head of the clinic in the faculty of medicine of the University of Paris. In 1903–05 and in 1908–10 he was leader of Antarctic scientific expeditions, and later he became director of the Marine Laboratory of Higher Studies. His Antarctic expeditions on the *Pourquoi Pas?* took him as far as Adelaide Island, and he saw the inaccessible coast of Alexander I Land. His publications include: *Arthropodes* (1907); *Expédition antarctique française, 1903–1905* (1908); *Deuxième expédition antarctique française, 1908–1910* (1911); *"Pourquoi Pas?" dans l'Antarctique* (1911).

CHARCOT, shär'kō', JEAN MARTIN (1825–93). A French neurologist, born in Paris. He received his degree of M.D. in 1853 and in 1856 was appointed physician to the Central Bureau of Hospitals. In 1873 he was elected a member of the Academy of Medicine, in the section of pathological anatomy, and in the same year became professor of pathological anatomy in the faculty of medicine in Paris, a position which he exchanged in 1882 for the professorship of diseases of the nervous system which was created especially for him and which he occupied until his death. He wrote: *De l'expectation en médecine* (1857); *Leçons cliniques sur les maladies des vieillards* (1868); *Leçons sur les maladies du système nerveux* (4th ed., 1880); *Leçons sur les maladies du foie, des voies biliaires et des reins* (1877); *Localisations dans les maladies du cerveau et de la moelle épinière* (1876–80); *Leçons sur les maladies du système nerveux faites à la Salpêtrière* (1880). Charcot also annotated the French translation of Baring Garrod's *Treatise on Gout*. He was one of the editors of the *Archives de physiologie*. His researches in hypnotic suggestion were notable, but his fame chiefly rests on his original discoveries in nerve pathology.

CHARD, SWISS CHARD, or SEA KALE. A form of the common garden beet (q.v.), in which the edible portion is the enlarged fleshy stalk and midrib of the leaves. Unlike garden beets, the roots are small and woody. Chard is used as a pot vegetable for greens and salad. It is grown in the same manner as garden beets.

CHARDIN, shär'dăn', JEAN (SIR JOHN) (1643–1713). A French-English traveler, born in Paris. In 1664–69 and again in 1671–75 he made extensive journeys to Persia and India, where he had many adventures and acquired much wealth by trade in jewels. Partly because he was a Protestant, in 1681 he settled in London, where he was knighted by Charles II. In 1683 he became representative of the East India Company in the Netherlands and devoted his later years to Oriental studies. In

1686 he published a portion of the *Travels of Sir John Chardin into Persia and the East Indies*, which was completed in a French version in 1711. The best reprint is by Langlès (Paris, 1811).

CHARDIN, Jean Simeon (1699–1779). The principal French still-life and genre painter of the eighteenth century. He was born in Paris and studied principally with Coypel. His celebrated "Skate" (1728, Louvre) and "The Buffet," a kitchen interior, established his reputation and gained him admission to the Academy. After his first marriage, in 1731, he took up genre subjects, excelling especially in the portrayal of children, as in "Boy Blowing Soap-Bubbles" and "Girl with Cherries," and of family life, as in the celebrated "Bénédicité" ('The Blessing'), painted in 1740, the "Diligent Mother," both in the Louvre, and the "Amusements of Private Life" (1746). The best known of his portraits are a pastel of himself, now in the Louvre, and the excellent likeness of Rameau d'Alembert and Sedaine. In 1755 he reverted to still-life subjects. From 1765 to 1767 he painted a series of decorative panels for the castles of Choisy and Bellevue, of which the "Attributes of the Sciences, Arts, and Music" are now in the Louvre. His works, the largest collection of which is in the Louvre, are characterized by naïve and charming realism. His cool and restful color scheme, with its wonderful treatment of light and atmosphere, is a century in advance of his age, and he was not truly appreciated until the middle of the nineteenth century. Consult the monographs by Edmund and Jules de Goncourt (Paris, 1864) and Edmund Pilou (Paris, 1909); Dayot and Vaillat, *L'Œuvre de Chardin et Fragonard* (Paris, 1907).

CHARDON, shär'dŏn. A village and the county seat of Geauga Co., Ohio, about 30 miles (direct) east by north of Cleveland, on the Baltimore and Ohio and the Cleveland and Eastern Suburban railroads (Map: Ohio, H 2). It is the centre of an agricultural region, carries on a trade in creamery and maple products, and has a macaroni factory. The electric-light plant is owned by the village. Pop., 1900, 1360; 1910, 1542.

CHARENTE, shå'rănt' (connected with OIr., Welsh, Corn., Bret. *car*, friend, Gall. *Carentus*, Brit. *Carantinus*, Lat. *carus*, dear). A river in the west of France, rising in the Department of Haute-Vienne, about 14 miles northwest of Châlus (Map: France, S., D 3). It first flows northwest to Civray, where it turns southward into the Department of Charente to Angoulême; thence it flows westward past Châteauneuf, Jarnac, and Cognac, and, entering Charente-Inférieure, runs northwest past Saintes, and falls into the Atlantic below Rochefort, opposite the islands Oléron and Aix. This river gives its name to two departments, remarkable for the productiveness of their vineyards. Length, 224 miles. The tide is felt as high as Saintes, and the river is navigable to Angoulême, 104 miles.

CHARENTE. A department in southwest France, named after the Charente River. The raising of fruit, chestnuts, and potatoes, grazing, quarrying, and the manufacture of flour, paper, naval guns, leather, gunpowder, and brandy are the leading industries. (Map: France, S., E 3.) Pop., 1896, 356,236; 1901, 350,305; 1911, 346,424. Capital, Angoulême. Consult Coquand, *Description physique, géologique, etc., du département de la Charente* (Paris, 1859), and Lièvre, *Exploration archéologique du département de la Charente* (Angoulême, 1881).

CHARENTE-INFÉRIEURE, shå'răn'tăn'-fâ'rē-ēr'. A maritime department in the western part of France, including part of the former Province of Angoumois, with the greater part of Saintonge and a small portion of Poitou (Map: France, S., D 3). Area, 2792 square miles. Pop., 1896, 453,455; 1901, 452,149; 1906, 453,793; 1911, 450,871. It is watered on its boundaries by the Sèvre-Niortaise and the Gironde, and in the centre by the navigable Charente and the coast stream Sendre. The surface is level, and the department is one of the most fertile in France. The soil produces hemp, flax, saffron, oats, wheat, rye, potatoes, and fruit. The industries include the manufacture of salt, brandy, machinery, porcelain and fayence ware, and oyster and pilchard fisheries. The chief harbors are those of Rochefort and La Rochelle; the latter town is the capital of the department.

CHARENTON-LE-PONT, shå'răn'tôn'-le-pôn' (connected with Gall. *Carentus*, Lat. *carus*, dear). A town of France, in the Department of Seine, situated on the right bank of the Marne, where it meets the Seine 1 mile southeast of Paris (Map: Paris and Vicinity). The bridge over the river, which is considered one of the keys of the capital, is defended by two forts, forming a part of the fortifications of Paris. At the other side of the river is the national lunatic asylum, formerly called Charenton Saint-Maurice, now Saint-Maurice. This establishment also contains a hospital for the care of accident victims in Paris, and a hospital for workingmen. The industries of Charenton are boat building, piano making, and the manufacture of porcelain and India-rubber goods. Pop., of commune, 1901, 17,980; 1911, 19,499.

CHARES, kā'rēz (Lat., from Gk. Χάρης) (?–c.324 B.C.). An Athenian general, the son of Theochares. He was appointed general in 367 B.C., and in the same year relieved the Phliasians, who were besieged by the Argives and the Sicyonians. When Oropus was taken, he was recalled from the Peloponnesus; but soon after, the Athenians and Arcadians, having entered into an alliance, returned and made an unsuccessful attempt to seize Corinth. In 361 he was sent to Corcyra, where, through his uncompromising bearing, he destroyed the Athenian influence. In 358 or 357 he was in the Chersonese, whither he had been sent to demand the withdrawal of Cersobleptes. When the Social War broke out and Chios revolted from Athens, Chares and Chabrias (q.v.) led an attack on the island and town—the former at the head of a land force, the latter with a fleet. The attack proved unsuccessful, Chabrias being killed and Chares forced to retire. In 356, being sent, in joint command with Iphicrates, Menestheus, and Timotheus, to relieve Samos, he fought alone at Embatta, against the judgment of the other commanders, and was defeated. At the trial of accountability Chares appeared as the formal accuser of his colleagues, who were convicted and deposed. Chares was now put in sole command, and, in order to secure funds for his troops, in 355 he joined the rebellious satrap Artabazus, and gained a brilliant victory over the King's forces.

Much booty was obtained, and Chares was rewarded by the Athenians with a golden crown. In 353 he recaptured Sestos, which had revolted from Athens during the Social War, and in 349 he was sent to the aid of Olynthus, with what result we do not know. In 338 he fought, as one of the Athenian generals, at Chæronea. After the seizure of Thebes, his surrender being demanded by Alexander, he withdrew from Athens, but appeared again in 332 at Mitylene, at the head of 2000 Persians. At the approach of the Macedonian fleet he surrendered the town on condition that the troops be allowed to depart in safety.

CHARES (Gk. Χάρης). A Grecian worker in bronze, a native of Lindus, and the designer of the Colossus of Rhodes. He lived in the third century B.C. and was a pupil of Lysippus. See COLOSSUS.

CHARETTE DE LA CONTRIE, shâ'rĕt' de lâ kôN'trê', FRANÇOIS ATHANASE (1763–96). A French Royalist, born at Couffé, Loire-Inférieure. In 1793 he became the head of the Royalist bands of Lower Poitou and finally gained control of all of Lower Vendée. He entered into a treaty with the Convention on Feb. 15, 1795, which, however, did not end the war. After several leaders of the Vendeans had been executed by General Hoche, Charette de la Contrie resumed operations. He was defeated at Saint-Cyr and then confined himself to guerilla warfare. He was severely wounded in one of his encounters with the Republican troops, and was captured, March 29, 1796, and shot at Nantes. Consult the biography by Le Bouviers (Nantes, 1823).

CHARGE (from OF., Fr. *charger*, It. *caricare*, to load, from ML. *carricare*, to load a car, from Lat. *carrus*, car, from Gall. *carros*, OIr., Welsh, OBret. *carr*, car). The quantity of gunpowder or other explosive used in loading a gun, torpedo, or projectile. The *full* or *service charge* of gunpowder is the amount with which a gun is designed to give its maximum velocity in service. *Reduced charges* are used for target practice or for high-angle fire when it is desired to fire over an intervening obstacle and have the shell fall behind it. The charge for a projectile is called the *bursting charge*. See BALLISTICS; GUNNERY.

CHARGE, in military tactics. A sudden onset or rush of troops against the enemy. See ATTACK; BATTLE; TACTICS. For heraldic charges, see HERALDRY.

CHARGE AND SPECIFICATION. The formal written statement before a general court-martial of the offense alleged to have been committed by the accused. In the United States service a military charge consists of two parts—the technical *charge*, designating the general character of the offense, and the *specification*, giving the statement of the offense in detail. The article of war under which the offense comes is mentioned in the charge. See COURTS, MILITARY.

CHARGÉ D'AFFAIRES, shär'zhâ' dâ'fâr' (Fr., charged with affairs). A diplomatic agent, ranking fourth, after ambassadors, ministers, and resident ministers. He is accredited not to the sovereign, but to the Minister for Foreign Affairs of a foreign power, and he holds his credentials only from the Minister for Foreign Affairs of his own state. In the absence from his post of a regularly accredited minister or ambassador, some member of the staff, usually the Secretary of the Legation or Embassy, is appointed to serve as chargé d'affaires. When the relations of two governments are strained to such a degree as to preclude formal diplomatic relations, chargés d'affaires are employed to exercise the ordinary diplomatic functions of ministers.

CHARGE OF THE LIGHT BRIGADE, THE. A poem by Alfred, Lord Tennyson, written in commemoration of the famous episode at the battle of Balaklava (Oct. 25, 1854) and published in quarto (London, 1855). An altered version appeared under the title of *In Honorem* (1856, octavo). In the second edition the line "some one had blundered," which had been erased from the original draft, was restored. The metre is that of Drayton's "Battle of Agincourt."

CHARGER. A war horse; a saddle horse suitable for the military uses of commissioned officers; a handsome, showy saddle horse qualified for use on all ceremonial occasions; often used synonymously with *officer's mount*, meaning a horse with a minimum height of 15 hands 2 inches, weighing not less than 975 pounds. See HORSE, for a discussion of the military uses of the horse.

CHARICLEA, kăr'ĭ-klē'ȧ. Daughter of Persina, the Queen of Æthiopia, and heroine of the story, in a fourth-century novel by Heliodorus, entitled *Theagenes and Chariclea.*

CHARING (châr'ĭng) **CROSS.** A district on the northwest bank of the Thames between the Strand and Whitehall, adjacent to a great cross, which is 1¼ miles from St. Paul's and is at present contained within the yards of the Southeastern Railway Company. The district stands upon the old site of the thirteenth-century village of Cherringe, where in 1291 a Gothic cross was erected by Edward I as a token that the bier of his beloved wife, Eleanor, had been set down there during its journey from Grantham, Lincolnshire, to Westminster Abbey. In 1647 the cross was demolished by the parliamentary party as a relic of popish superstition. The present copy was erected near the original site in 1865. The site itself, as near as it can be guessed, is now occupied by Le Sueur's equestrian statue of Charles I, which was cast in 1633 and erected in 1674. See CROSS.

CHARIOT (OF. *chariot*, dim. of *char*, car). In ancient times, a kind of carriage used either for pleasure or in war. Its use in war and peace was general in the East; it is common on Egyptian, Babylonian, and Assyrian monuments. It was early introduced among the Greeks and is represented on Mycenæan works of art. In the Homeric poems the chariot conveys the heroes to the field of battle and on journeys; they usually fight on foot. In historical times the war chariot was not used by Greeks or Romans, though still a part of the Persian armies. Cæsar also found chariots in use among the Britons; they are frequently mentioned in the Irish epics. The ancient chariot was a light two-wheeled car, usually with a closed front and sides, but open behind. It had no springs. It was generally of wood, strengthened by bronze or iron; the wheels had tires of bronze or iron. In the earliest times the chariot was drawn by two horses, yoked to a pole; this type was not uncommon later. (See BIGA.) The racing chariot was the *quadriga* and was drawn by four horses, harnessed abreast. The centre pair were attached to the yoke, the outer were attached, each by a single trace, to the chariot

body. The *quadriga* used in the Roman triumph was often elaborately adorned; it was drawn by white horses. The war chariots used by the Britons, Persians, and other peoples were often armed with scythes attached to the axles. For abundant illustrations of the ancient chariot in its many forms, consult Daremberg and Saglio, *Dictionnaire des antiquités*, s. v. *Currus*. Consult Ginzrot, *Die Wagen und Fahrwerke der Griechen und Römer* (1817); Leaf, *Journal of Hellenic Studies*, vol. v; Helbig, *Das Homerische Epos aus der Denkmälern erläutert* (1884); the article "Currus" in Smith, *Dictionary of Greek and Roman Antiquities* (3d ed., London, 1890). An Etruscan chariot, reconstructed, may be seen in the Metropolitan Museum, New York City. See CARRIAGE; CIRCUS.

CHARIOT RACES. See CHARIOT; CIRCUS.

CHARIS, kā'ris. In Homer's *Iliad*, xviii, 382, the wife of Hephæstus, the personification of the grace which should characterize the works of a divine artificer. For a later development of this conception, see CHARITES.

CHARISIUS, kȧ-rĭsh'ĭ-ŭs, FLAVIUS SOSIPATER. A Roman grammarian, born in Africa, summoned to Constantinople in 358 A.D. to take the place of Euanthius. Only a portion of the five books of his *Ars Grammatica* is preserved. It is largely a compilation, but is valuable for its many quotations from early authors. For the text, consult Keil, *Grammatici Latini* (Leipzig, 1857).

CHARISTICARIES, kăr-ĭs'tĭ-kā'rĭz (ML. *charisticarius*, from Gk. χαριστικός, *charistikos*, generous, from χαρά, *chara*, favor, from χαίρειν, *chairein*, to rejoice). In Greek ecclesiastical history, officers who had full power over the revenues of hospitals and monasteries.

CHARITABLE TRUSTS, or CHARITIES. Property, real or personal, vested in trustees to be administered by them for religious, eleemosynary, educational, or other benevolent purposes of a public nature. The origin and use of the term is due to the difficulty, more apparent than real, experienced by the English Court of Chancery in enforcing trusts created for the benefit of a class of indefinite and unascertainable beneficiaries, as a trust for the benefit of the insane, generally, or for the benefit of the poor of London. Inasmuch as there was no ascertained person having the right to invoke the jurisdiction of the court to compel the trustee to perform the duty imposed on him, such a trust was held to be unenforceable and void. To avoid this consequence when the attempted trust was of a salutary character, an early English statute, known as the Statute of Charitable Uses (43 Eliz., c. 4, 1601), was passed, declaring such trusts valid and enforceable by commissioners appointed by the Court of Chancery. Such trusts have since been known as charitable uses, or charitable trusts. It is probable that the administration of such trusts fell to some extent within the prerogative jurisdiction of the chancellor before the statute, and its principal effect was to enlarge the jurisdiction of the Court of Chancery and to define the uses which were to be recognized as charitable, as distinguished from those which, after the Reformation, were deemed superstitious and void as pertaining to the Catholic church.

The charitable trust is distinguished from the private trust, which includes all other trusts, in that (1) it always exists for charity or public beneficence; (2) its beneficiaries are indefinite and undetermined; and (3) it may create a perpetuity.

I. An enumeration of the charitable objects for which such trusts may be created and upheld is found in the statute of Elizabeth. Those objects may be grouped, as appears by the definition given, under four general heads, as follows: (1) Gifts for *strictly eleemosynary* objects, i.e., for charity in its narrow, popular sense, such as gifts for the poor, for sick, disabled, or demented persons, and for hospitals, homes, and asylums. (2) Gifts for *educational purposes*, as for schools and colleges, to build or equip libraries, and to endow scholarships, fellowships, and the like. (3) Gifts for the purposes of *religion*, such as those for the building or repairing of churches, for missions, and for spreading the gospel. (4) Gifts for *lightening the expenses of government*, such as bequests for the erection of public buildings, docks, wharves, canals, etc.

II. *Indefiniteness in the beneficiaries*, either as to the class to be benefited, or as to the individuals in a determined class who will be the objects of the bounty, is the predominant distinguishing feature of charitable uses or trusts. If the beneficiaries be definitely specified, no matter how charitable the object of the gift, it constitutes a private trust and is valid without the aid of the statute, and must be construed and governed accordingly. Thus, a trust for the support and comfort of designated persons in a certain hospital would be private, while a trust for all those who should be cared for by such an institution would be public, or charitable. This feature of trusts for charity, coupled with the liberal spirit in which courts construe such gifts, has led to the method of executing them, called *cy pres* ('as near as'). By this doctrine is meant that, when such gifts cannot be applied according to the precise intention of the donor, although the general purpose of the trust is proper, they will be employed for the purpose in a manner as near as possible to that which was designated. It assumed two forms in England. In one form it was employed by the chancellor in the exercise of a prerogative, executive power, delegated to him under the sign manual of the crown, and was carried to the extent of applying a trust for charities to *some* charitable purpose, even when the particular objects for which it was intended were illegal and void. In its other form it was exercised by the chancellor in the performance of his *judicial* functions and was applied only to such charitable trusts as were legal and valid in their inception, but which, because of some change in law or circumstances, could not be carried out in exactly the manner indicated by the donor. In this latter form, but not in the former, the *cy-pres* doctrine is recognized and applied in some, though not in all, of the American States, where trusts for charity are allowed. For example, a bequest made before the fall of slavery in the United States, to trustees, to be applied to various methods of creating a sentiment against negro slavery in America, was applied, after the close of the Civil War, by the Massachusetts courts, to the American Freedmen's Union Commission.

III. It is no objection to a trust that it necessarily suspends, during its continuance, the power of free and unrestrained alienation of property. However, when a trust is created to shift at a possibly remote period from one class of beneficiaries to another, it constitutes

what is known as a *perpetuity*. A perpetuity is an estate or interest, legal or equitable, which may vest in the beneficiary at a period more remote than (any number of) lives in being at the time of its creation plus 21 years, and was void by reason of such possible remoteness of vesting. But the beneficial character of charitable trusts led to their being recognized as an exception to this rule, and such a trust will therefore be sustained without reference to the fact that it creates a perpetuity. Similarly a provision for accumulation (q.v.), void under the same rule in case of a private trust, does not impair a charitable trust.

Gifts for charitable uses are of considerable antiquity. They were known and fostered by the Christian emperors of Rome as "pious uses," and it was in this form and under this description that the doctrine passed from the civil law into the law of England, where, as has been said above, pious or charitable uses were enforced to some extent by the chancellor long before the Statutes of 39 and 43 Elizabeth.

In England the system of charitable trusts and the method of administering them is now based upon a series of modern statutes of the most enlightened character, known as the Charitable Trusts Acts, passed in 1853, 1855, 1860, 1869, and 1888, and, lastly, upon the Mortmain and Charitable Uses Act, passed in 1891. In the United States the statutes of Elizabeth have not generally been enacted, but in most of the States the principle embodied in those acts and enforced by the English Court of Chancery has been judicially recognized as a part of the body of legal principles brought over from the mother country, and many trusts not strictly within the English statute are here held to be valid by analogy. New York, long a conspicuous exception, has recently by statute made possible the creation of trusts for charitable purposes, but there are still several States in which no distinction is made between charitable trusts and trusts for private purposes. See MORTMAIN; TRUST; PERPETUITY.

Bibliography. The literature of the subject is extensive. Among the most important works dealing exclusively with it are Shelford, *Treatise on the Law of Mortmain, and Charitable Uses and Trusts* (London, 1836); Tudor, *Law of Charities and Mortmain* (ib., 1890). Consult also the general treatises on trust and equity jurisdiction, as Perry, *Treatise on the Law of Trusts and Trustees* (5th ed., Boston, 1899), and Pomeroy, *Treatise on Equity Jurisprudence, etc.* (3d ed., San Francisco, 1905). See MORTMAIN; TRUST.

CHARITES, kăr'ĭ-tēz (Gk. Χάριτες, *Charites*). In Greek mythology, the goddesses of grace and charm, called Gratiæ by the Romans. (See CHARIS.) They were described usually as three in number, the offspring of Zeus, and were named Euphrosyne ('joy'), Thalia ('bloom'), and Aglaia ('brilliance'). Their home was on Olympus, with the Muses. They were companions also, naturally, of Aphrodite and Peitho ('persuasion'). Their oldest shrine was at Orchomenus in Bœotia, where their festival, the Charitesia, was celebrated. In later days their worship was widespread. In sculpture they usually appear as three beautiful maidens hand in hand.

CHARITIES. The public and private institutions of society whose object is the relief, without compensation and solely from the motive of human sympathy, of those suffering from poverty, sickness, and all forms of human disease.

In ancient times few such institutions existed. The unfortunate individual who was unable to care for himself had to look to the immediate circle of his nearest of kin, or, more frequently, was allowed to perish, or was actually put to death because he was regarded as a burden by the community which had to struggle for existence without being able to accumulate any social surplus of wealth. This is peculiarly the case in a nomadic society. The historical growth of the spirit of charity is briefly and admirably described in Lecky's *History of European Morals*.

The first efforts at institutional relief were those of the early Christian Church. They were carried out in response to the teaching of the Church that it is more blessed to give than to receive, that there is merit in the very act of giving, and that the future welfare of the giver is in a measure dependent on his generosity. Such a doctrine gave little thought to the effect of the gift on the recipient, or, indeed, to the welfare of the recipient after the gift was once bestowed. Naturally a reckless system of charity developed, which in some cases had to be suppressed, and in other cases, where the Church, especially in northern Europe during the Reformation period, lost most of its property and was unable to continue the support of large numbers of undeserving poor, something had to be done as a substitute by public authorities.

In this way a system of public charity grew up in England, though in the beginning it was a part of the criminal law, providing not measures of relief, but regulations and institutions for the repression of "vagabonds" and "sturdy beggars."

The earliest and most popular really charitable institutions were hospitals. Private charities, supported entirely by voluntary contributions, had their beginning, usually, in institutions for the relief of foundlings and abandoned children. By the end of the eighteenth century in Europe many such institutions existed, and the public almshouse or workhouse, supported from public funds, had been established in most countries especially for the relief of the aged poor. At the beginning of the nineteenth century a great movement for the reform and extension of these institutions began. In America the almshouse was then practically the only public institution provided for the needy and helpless. In most parts of the country no attempt was made to segregate the different classes of dependents. The evils of this system were in some degree mitigated by the free employment of outdoor relief for persons who had become destitute through no fault of their own. This plan, however, was in many cases unduly extended, with the inevitable result of pauperization of classes that might otherwise have become self-supporting. The first effort to systematize charitable relief was made in New York in the year 1842, by a committee of philanthropic citizens organized by Robert M. Hartley. As a result of the work of this committee, the New York Association for Improving the Condition of the Poor was founded in 1843. Similar associations were organized in other cities in the next three decades, and in 1876 there were 63 in existence. The object of these associations was to cover all charitable needs save those provided for by public authority.

Modern charities may be classified under the following heads: 1. Institutional care of destitute adults; 2. Care of defectives, insane, feeble-minded, epileptic; 3. The treatment of criminals; 4. Hospitals, dispensaries, nursing; 5. Care of destitute, neglected, and delinquent children; 6. Care and relief of needy families; 7. Supervisory and educational movements; 8. Preventive and constructive philanthropy. The public authorities have in most modern countries assumed responsibility for 1, 2, and 3; 4 and 5 are divided between public and private agencies; 6, 7, and 8 are still largely in private hands.

The line cannot be clearly drawn between public and private charities. Public charities are those supported entirely or in part from funds raised by taxation, while private charities are those supported by voluntary contributions, administered by societies organized for the purpose. Private charitable societies are frequently placed under some public supervision. Public charities should provide for those well-defined and more or less permanent needs of the community for the relief of which experience has been sufficient to enable us to formulate very definite rules and regulations which can be carried out, more or less mechanically, by public officials who must interpret laws more often literally than in the spirit in which they were framed, while private charities should deal with those forms of relief still in the experimental stage, with a view of demonstrating what can be done by the public authorities on a larger scale.

Private philanthropy centres in the home and the family. It views the home as the important element which must be protected and preserved. Public charity has followed private initiative, gradually taking up those institutions shown to be necessary. To protect the home, the tenements are brought under regulation. (See Housing Problem.) To insure the family against loss of income through injury to the breadwinner or through his death, dangerous employments are regulated (see Factory Inspection) and various plans of indemnification are instituted. (See Employer's Liability; Workingmen's Compensation.) The family is relieved of the burden of provision for old age. (See Old Age Pensions.) Sanatoria are built for consumptives. Children are properly cared for. (See Dependent Children; Juvenile Courts; Juvenile Offenders; Cruelty to Children, Prevention of.) Foundling hospitals and children's aid societies rescue the abandoned. It is sought to get at the causes of distress and to remove them rather than to minimize results of bad conditions. (See Pauperism; Charity Organization Society; Social Settlements.) Visiting nurses attend the sick poor, and diet kitchens furnish suitable food. Playgrounds are established for the children. Charity is becoming less sentimental and more methodical and scientific. Its administrators are trained experts. All civilized nations are pursuing similar courses. See also Poor Laws; Social Debtor Classes. Consult: Lowell, *Public Relief and Private Charity* (New York, 1894); Warner, *American Charities* (New York, 1894); Mackay, *Public Relief of the Poor* (London, 1901); Leonard, *Early History of English Poor Relief* (Cambridge, 1900); Loch, *Charity and Social Life* (London, 1910); Devine, *The Spirit of Social Work* (New York, 1912); Gray, *History of English Philanthropy* (London, 1905); Devine, *Principles of Relief* (New York, 1904); Henderson, *Modern Methods of Charity* (New York, 1904); and current numbers of the *Survey* (New York, weekly). See Charitable Trusts.

CHARITIES AND CORRECTION, The National Conference of. An association of some 3000 members in the United States, Canada, and Mexico, who are interested in philanthropic efforts. Many of the members are actively connected with charitable activities in various cities. All shades of thought are represented. The conference has no platform and adopts, usually, only resolutions of thanks. All persons are privileged to participate in the discussions. It is simply an exchange for the comparison of views and experiences, not a body organized to accomplish any undertaking. One result of its deliberations was to arouse public interest leading to the establishment of local or State conferences and in securing needed legislation.

The first session was held in New York City in 1874 at the invitation of the Social Science Association, with which body joint meetings were held till 1878, though the proceedings were published separately after 1876. In 1879 the first separate convention met in Chicago, with delegates from 12 States. The membership and attendance have steadily increased. The State governors frequently appoint representatives, as do the mayors of large cities. Delegates from foreign lands are often present. In 1880 the first report on the organization of charity was read, and thenceforth this topic has had great attention. In 1893 a membership fee was charged, the expense previously having been met by contributions. The membership fee is $2.50, entitling the members to the volume of *Proceedings* and the quarterly *Bulletin*. These volumes contain a vast amount of valuable information on the charitable activities of America. The conference holds annual meetings in the various cities of the country. The evening sessions are devoted to general questions. Section meetings are held during the day. These sections are in charge of special committees on State supervision, needy families, children, defectives, criminals, care of sick, neighborhood improvement, etc.

Consult *Proceedings of the National Conference of Charities and Correction* (published at Boston, New York, and other cities, 1874 et seq.).

CHARITON, shâr'ĭ-ton. A city and the county seat of Lucas Co., Iowa, 56 miles south by east of Des Moines, on the Chicago, Burlington, and Quincy, and the Chicago, Rock Island, and Pacific railroads, and on the Chariton River (Map: Iowa, D 3). It is in a fertile agricultural and stock-raising region, has coal mines, and manufactures carriages and wagons, ice, cement blocks, agricultural implements, flour, windmills, tanks, pumps, pipes, etc. The city contains a public library and owns its water works. Pop., 1890, 3122; 1900, 3989; 1910, 3794.

CHARITON, kăr'ĭ-tŏn (Gk. Χαρίτων). A Greek prose writer, of Aphrodisias in Caria, the author of a romance entitled *Chœreas and Callirrhoë* (q.v.), written about 200 A.D. The views of Rohde, *Der griechische Roman und seine Vorläufer* (2d ed., Leipzig, 1900), concerning Chariton, have been corrected through the finding of a fragment of *Chœreas and Callirrhoë* in a papyrus which must be dated before 225 A.D. Consult J. S. Phillimore, "Greek Ro-

mances," in *English Literature and the Classics* (Oxford, 1912).

CHARITY, Brothers and Sisters of. See Brothers and Sisters of Charity.

CHARITY ORGANIZATION SOCIETY. Associations bearing this name or known as Associated Charities, United Charities, or Bureau of Charities exist in about 150 cities of the United States, with a large number of other societies partially adopting their methods, and in several Canadian cities. In Great Britain nearly 100 societies exist, and they are also found in Australian cities, and organizations more or less closely resembling them exist in Europe. The parent society, known as The Society for Organizing Charitable Relief and Suppressing Mendicity, was started in London in 1869 under the leadership of Mr. Goschen, then President of the Poor Law Board, the Bishop of London, the Earl of Shaftesbury, and Edward Denison. The first Charity Organization Society in America was organized in Buffalo, N. Y., in 1877, through the influence of Rev. S. H. Gurteen. The New York Charity Organization Society was founded in 1882. The primary object of the Charity Organization Society is to bring about such a coöperation between existing charities as to avoid overlapping of fields and duplication of efforts. To many of the earlier charitable societies the reason for existence was almsgiving to those in distress, little, if any, careful investigation being made as to the cause of the trouble and less attention being paid to the work of other agencies. Whenever such a condition obtains, it is always found that "charity tramps" and professional beggars abound. The very existence of these various dissociated agencies is a temptation to those on the border line of self-support to seek assistance. The charity organization societies are of course unable to prevent altogether the practices of unwise almsgiving, but through securing a measure of coöperation and of free discussion of methods they have contributed materially towards the reform of methods of charity.

Coöperation. They act as a clearing house for all philanthropic societies and individuals. Careful records are kept of all cases. These are preserved in envelopes, one for each family. In these envelopes are put all the information regarding the individual and family history, the reports of investigations, all letters and other relevant matter. The record is kept as nearly up to date as possible. These envelopes are so filed that they can be found in a moment. The records are confidential and are given only to persons or societies having a legitimate interest in the family. Their use prevents duplication and fraud. Public officials frequently find them of great assistance. The society undertakes to know just what the other organizations do. As they seek to cure distress, not merely to relieve it, whenever a case comes under their care an investigation is made of the family's condition, sources of income, possible means of assistance, friends, former employers, etc. In cases of emergency assistance is at once given or secured. Then some plan is formed—comprehensive, but subject to constant modification—and this plan is followed until, if possible, the family becomes self-supporting, or, if this is impossible, until some permanent disposition may be made so that the family may have no excuse for asking further assistance. This often involves the calling upon a number of institutions for their services. There is, however, a clearly defined end in view, so that the organizations assisting are rendering a most valuable coöperation. The Charity Organization Society does not duplicate existing agencies, but seeks to supplement them. Some charity organization societies have even had no relief fund, preferring to act wholly as mediators.

Personal Service. The pursuit of a comprehensive plan involves an immense amount of time and labor. Under the old system a sum of money or other necessities was given and the recipient disappeared from sight and notice till trouble brought him back. The Charity Organization Society seeks to show a personal, friendly interest in the family. To further this aim, a corps of "friendly visitors" is developed, who undertake to visit a family regularly, to share sympathetically in its troubles and its pleasures. The influence of this personal interest of a tactful and resourceful person upon the family life is hard to estimate. These friendly visitors are always unpaid, and thus their interest is wholly unselfish. The way is opened for all sorts of suggestions for improvement, for making the home attractive to the children and father. The friendly visitors hold regular conferences.

Social Service. Growing out of the intimate knowledge gained by frequent personal visits comes the opportunity to influence the community regarding the necessity for playgrounds, better sanitary and housing conditions, factory legislation, and the like. Such service is of the highest value, often accomplishing great reforms. The present movement to reform the tenements in New York City is largely the result of the labors of the Charity Organization Society and interested individuals. Here should be noted the possibility of handling special relief funds in times of emergency. The Charity Organization Society, with its trained force and intimate knowledge of local conditions, can act to great advantage. Mention should be made of the influence exerted to cut down unwise appropriations for supposed charitable purposes. Another valuable service is the investigation of charitable organizations for the information of intending donors. By no means the least valuable part of this social work is in getting so many persons directly interested in the work of the society.

Self-Help. The object of the Charity Organization Society is to "help to self-help." It is not sought to give something for nothing. The self-respect and the independence for the individual are always to be preserved. Work rather than alms is given. Laundries, sewing rooms, wood yards, employment bureaus, are maintained according to local needs. In some cities the vacant lots and waste places have been transformed into vegetable gardens, carried on, under expert guidance, by the poor. When necessary, the professional beggars are prosecuted; lists of unworthy alms seekers are published, to compel them to seek honest employment.

Preventive Work. The head of the family is dealt with, whenever possible. The children who ask for assistance on behalf of parents are told that the parents must come in person. The child must not form the begging habit. All workers will testify to the value of preventive efforts on behalf of the children. Summer camps, home libraries, local associations, mother's meetings, penny savings banks, are among the forms this work assumes.

It will be seen from the foregoing that the work of the Charity Organization Society is to an unusual degree administrative—personal. This is the secret of the great work it is able to do, but is frequently a cause of complaint to those who do not grasp the situation. Personal service is considered the highest form of giving. A large part of the income of the Charity Organization Society is therefore spent in salaries. The complexity of the organization naturally increases with the size of the city. There is a board of directors chosen from among those who contribute to the society, and under the directors an executive committee. The administrative officer is the superintendent, who has his necessary assistants. The larger cities are divided into districts, each in charge of a district superintendent, who is responsible for the work in the district. Applicants for help are referred to the district in which they live. The central and district offices are open daily. The central office keeps on file a digest of all cases from each district. In each district a "decisions committee" meets weekly to discuss the various cases and decide upon courses of action. The funds come from private donors.

Expert Service. The work of the Charity Organization Society calls for educated and trained men and women. The mere desire to do good is no qualification, nor is charitable work in general any longer a dumping ground for those who have failed in other professions. The highest abilities are sought, and some societies are conducting special schools for portions of the year for the training of workers.

Publications. The best American periodical devoted to charities is the *Survey* (formerly *Charities and the Commons*), published in New York City. In England this place is filled by the *Charity Organization Review* of the London Society. Consult: Loch, *Charity Organization* (London, 1890); Warner, *American Charities* (New York, 1894); Devine, *The Practice of Charity* (New York, 1901); id., *Principles of Relief* (New York, 1904); Henderson, *Modern Methods of Charity* (New York, 1904); Brandt, *The Charity Organization Society of the City of New York* (New York, 1907); *Reports of Societies* (Boston, New York, Philadelphia, etc.). See PAUPERISM; SOCIAL-DEBTOR CLASSES.

CHARIVARI, shä'rē'vä'rē' (LL. *charivarium*). A French term used to designate a wild tumult and uproar, produced by the beating of pans, kettles, and dishes, mingled with whistling, bawling, groans, and hisses, and got up for the purpose of expressing a general dislike to the person against whom it is directed. The etymology of *charivari* is obscure; the Germans translate it by *Katzenmusik*, the English of which is *caterwauling*. In France, during the Middle Ages, a charivari was generally raised against persons contracting second nuptials, in which case the widow was especially assailed. On these occasions the participators in it, who were masked, accompanied their hubbub by the singing of satirical and indecent verses and would not cease till the wedding couple had purchased their peace by ransom. It was also organized against an unequal match, e.g., where there was great disparity in age. In some of the rural districts of the United States a like custom prevails, the instruments of discord being horns, tin pans, horse fiddles, and whistles. The rustic American corruption of the word "charivari" is "shiveree," for which a synonym is "skimmerton." Similar customs seem to have existed under different names in all parts of Europe, and sometimes they were of such a licentious and violent character as to require military interference to put them down. Even as early as the fourteenth century the Church found itself forced to threaten punishment, and even excommunication, against those who participated in them. In more recent times the charivari has taken a purely political coloring; as, e.g., during the Restoration in France, at which time, however, the popular voice began to seek vent by casting its satirical darts against public men through the press. Among the papers of this sort the most famous is the *Charivari*, established in Paris, Dec. 2, 1832, on which was patterned the English publication *Punch* (q.v.).

CHARKOV, kär'kôv. See KHARKOV.

CHARLEMAGNE, shär'le-mān, *Fr. pron.* shär'l'-mâ'ny'. See CHARLES THE GREAT.

CHARLEMAGNE CYCLE OF ROMANCES. A division of one of the three principal cycles of romances which took form in France in the thirteenth century. These three cycles may roughly be designated as the *gestes royales*, the *gestes de Guillaume*, and the *gestes de Doon de Mayence*. The first of these divisions was composed of all the poems which had been written about the three regal historic figures Pepin, Charles, and Louis, and the *Charlemagne Cycle* was composed exclusively of all those poems which centred about the life and court of the second of these characters. It consisted of a collection and arrangement made by certain itinerant musicians, who were editorially minded, of whatever of the ancient *chansons de geste* pertained particularly to the deeds of this one hero. Many of these chansons were founded on certain heroic ballads which Charlemagne himself had caused to be preserved in writing. These had already formed the basis of two Latin chronicle histories by a monk of St. Gall (890), and by Benedict of St. André (968), entitled *De Gestis Caroli Magni;* and the two latter works were doubtless of great aid to the thirteenth century codifiers of the *gestes*. The cycle is composed of the following individual narrative poems: *Fierabras; Garin de Montglane; Gallien le Rhetoré; Ogier le Danois; Les Quatres Filz Aymon,* and others of varying dates. A prose version of it, in French, was printed at Bagnyon in 1478. Consult G. Paris, *Histoire poétique de Charlemagne* (Paris, 1865).

CHARLEROI, shär'l'rwä' (Fr., Charles king). A Belgian town and railroad centre in the Province of Hainaut, situated on the Sambre and on the Charleroi Canal, between Mons and Namur (Map: Belgium, C 4). It has an archæological museum, with a mineralogical collection and an industrial school, and is altogether dependent upon the activities of the surrounding region. The district is rich in coal and iron, and there are a number of smelting furnaces and nail factories in the neighborhood. The iron works of Couillet, which yield a third of all the cast iron produced in Belgium, are near by. It also produces machinery, glass, and cutlery. Pop., 1890, 21,900; 1900, 24,800; 1910, 27,396. In 1666 the village, originally Charnoi, was fortified by the Spaniards and named, in honor of the King, Charles II, Charleroi.

CHARLEROI, shär'le-roi'. A borough in Washington Co., Pa., 40 miles south of Pittsburgh, on the Monongahela River, and on the Pennsylvania Railroad (Map: Pennsylvania, B 7).

Industries include mining and the manufacturing of various kinds of glass and shovels. Charleroi was settled in 1890 and incorporated in the following year. The government is vested in a burgess, elected every four years, and a borough council, chosen on a general ticket. Pop., 1900, 5930; 1910, 9615; 1920, 11,516. Charleroi is the home of John K. Tener, former Governor of Pennsylvania.

CHARLES THE GREAT, or **CHARLEMAGNE** (from Lat. *Carolus Magnus,* Charles the Great) (742–814). King of the Franks after 768, and Roman Emperor from 800 to 814. He was the son of Pepin the Short, the first Carolingian King, and of Bertha, a daughter of Charibert, Count of Laon, and was born probably on April 2, 742. His birthplace is unknown; but from the fondness which he displayed throughout his life for the cities of Aix-la-Chapelle and Ingelheim, it has been conjectured that he was born in one of these places. Of his early youth and education nothing is known, even from Einhard, his contemporary biographer. He was brought up at the court of his father and received the thorough military training which constituted the education of the time. He took part in his father's expeditions against Aquitaine in 761 and 762. On Pepin's death, in 768, the Frankish Kingdom was divided between his two sons, Charles receiving the eastern part, or Austrasia, which was predominantly Germanic, together with a part of Aquitaine, while his brother Carloman received Neustria, the Romance part of the Frankish domains. Carloman died in 771, and Charles, with the consent of the Frankish nobles, took possession of the entire kingdom, to the exclusion of the young sons of his brother. Their mother fled to Desiderius, King of the Lombards, and the ensuing complications led to the first great war of Charles's reign. Charles had, ere this, in 770, offended Desiderius by repudiating his second wife, Desiderata, who was that monarch's daughter. The latter therefore received Carloman's widow hospitably, and urged Pope Adrian I to crown the sons of Carloman. Upon the Pope's refusal he invaded the papal territory. The Pope thereupon summoned the Frankish King to his aid. Charles endeavored to avert the war; but upon the refusal of Desiderius to restore the papal cities of the Pentapolis, he crossed the Alps, with two armies, from Geneva by the Great St. Bernard and Mont Cenis, in 773, and besieged Desiderius in Pavia, forcing him after a 10 months' siege to surrender and retire to a monastery. In 774 he proclaimed himself King of the Lombards and was acknowledged as such by the Lombard dukes. He secured the Pope's favor by confirming the donation of lands made to the holy see by Pepin. In the winter of 776 he again crossed the Alps and crushed a Lombard revolt, henceforth ruling over northern and central Italy as far south as Spoleto. In 780 he went to Italy, where the Pope crowned his second son, Pepin, King of Italy, and his third son, Louis, an infant, three years old, King of Aquitaine. In 787 he completed the conquest of the Lombards by the subjugation of the Duke of Beneventum.

The severest war undertaken by Charles was his contest with the Saxons. The struggle was of long standing, having been waged by his father and grandfather, and contemplated the incorporation of the Saxons into the Frankish Kingdom and their conversion to Christianity. The obstinate resistance of the Saxons has scarcely been equaled in history. In 772 Charles advanced as far as the Weser and destroyed the famous "Irminsul"—according to heathen belief, the column supporting the earth. There were incessant revolts, but in 775 Charles carried his arms as far as the Elbe. In 777 he could even hold the Frankish National Assembly on Saxon soil, at Paderborn. But in 778, on news of Charles's absence in Spain, the Saxons again arose and advanced almost to Cologne; but Charles again drove them back to the Elbe. They destroyed a Frankish army in the Süntel Highlands in 782; and Charles, after a new victory, avenged this disaster by the massacre, at Verden, of 4500 prisoners in one day. This caused a general rising of the Saxons; but in 783–785 the Frankish monarch at last succeeded in reducing them to subjection. Their great leader, Widukind, submitted to baptism, and their principal chiefs became Charles's vassals. The Saxons north of the Elbe submitted in 804, and 10,000 of them were led into the interior of Germany as hostages. Charles proceeded to extend his arms beyond the boundaries of Saxony. The neighboring Slavs were either his allies or else were made tributary, and even the Bohemians were in part subdued. The Danes were confined to the north of the Eider, which became the northern boundary of Charles's kingdom.

Charles was equally successful in the southeast. His marriage, in 771, with Hildegarde, daughter of Duke Godfrey of Suabia, secured his influence in that duchy. In Bavaria his cousin, Tassilo, ruled practically as an independent sovereign. He had been allied with the Lombards, but in 781 he took the oath of allegiance to Charles. In 787 he rebelled, but was forced to surrender, and was deposed in 788. Tassilo had also been allied with the Avars, a fierce nomadic tribe which occupied the great plain of the middle Danube. The wars which Charles undertook against them in 791–796 resulted in the entire destruction of the nation, the Raab becoming the southeastern boundary of the Frankish Kingdom. In 778, at the invitation of the Emir of Saragossa, who was in revolt against his suzerain, the Caliph of Córdova, Charles invaded northeastern Spain. This campaign against the infidel figures very prominently in mediæval legends, but in reality it was without direct result. Charles was summoned home by the news of a Saxon revolt, and in his return over the Pyrenees, the rear guard of his army was assailed and annihilated, probably in the Pass of Roncesvalles, by the Basques. In this battle Roland, afterward the hero of a vast legendary literature, fell. In 779 Charles sent his son Louis to Spain, and after the fall of Barcelona he established the Spanish "mark," extending from the Pyrenees to the Ebro. It was the policy of Charles to establish such marks on the borders of his dominions as bulwarks against the uncivilized nations by which they were surrounded. Against the Danes he established the Danish mark south of the Eider; against the Sorabians the Thuringian mark; against the Bohemians the Frankish mark; and against the Southern Slavs the marks of Carinthia and Friuli. The land in these districts was parceled out among Frankish vassals, and the margraves who ruled over them had far greater power than the ordinary counts. Charles also made use of the Church to secure his conquests. In the Saxon

wars the Saxons were baptized by the thousands, and the bishoprics of Halberstadt, Paderborn, Minden, Verden, Bremen, Münster, and Osnabrück were erected. He also founded great monasteries, like Corvey and Herford, which were in fact fortresses in the enemy's country.

By the conquest, organization, and rule of such extensive dominions and of peoples so different in race and political tradition, Charles had virtually established an empire. His assumption of the Imperial title and the revival of the Western Roman Empire were but the logical consummation of his great work. This event took place on the occasion of an expedition to Italy, the object of which was to support Pope Leo III against the rebellious Romans. While Charles was worshiping in St. Peter's on Christmas Day, 800, the Pope unexpectedly, as it appeared, set a crown upon his head, and amid the acclamations of the people saluted him as "Carolus Augustus, Emperor of the Romans." Whether or not the Emperor was aware of the intention of the Pope is a matter of conjecture only. In his familiar conversations he was wont to protest his ignorance of the projected coronation. In itself it added nothing directly to Charles's power, yet it greatly confirmed and increased the respect entertained for him, such was the lustre of a title with which were associated recollections of all the greatness of the Roman Empire. There is said to have been a scheme for the union of the newly revived Western Empire with the Empire of the East, by Charles's marriage with Irene, the Byzantine Empress. If so, it failed by reason of Irene's overthrow. Besides the moral weight of Roman tradition, the Imperial title added to Charles's office of King the powerful temporal guardianship of the Church. This was strongly emphasized in the new oath of allegiance to him, as Emperor, which Charles caused all his subjects to swear in 802. He proceeded to organize the Empire with a view to strengthening the Imperial power. The old national dukedoms having been abolished, Charles governed his dominions through counts, whom he himself appointed. Each count presided over an ancient canton (*Gau*), a subdivision of the dukedom. Three times a year the count held a regular court, which all freemen were bound to attend, and in times of war he assembled the military levy of the Gau. To watch over the counts Charles sent his "Missi Dominici," usually a count and a bishop, to the extreme ends of the Empire. Their functions were to look after the administration of the Church, to collect the Emperor's revenues, and hold the superior court. Charles did not attempt to interfere with local Germanic institutions, but caused the ancient laws to be codified and reduced to writing. Although his rule was in fact absolute, he retained the ancient national assemblies, which every freeman might attend. They met twice a year, in spring (*Maifeld;* see CHAMP DE MAI) and in autumn, and decided upon matters of state, particularly on peace and war. Here the "Missi Dominici" made their reports, and the Church councils were held. Besides the "Missi" (q.v.) and his councilors, there were two chief court officials—the Apocrisiarius, who stood at the head of Church affairs, and the Count Palatine (Comes Palatinus), who presided over the secular administration. The income from the royal domains, which Charles skillfully managed, together with the revenues from the administration of justice and so-called free-will offerings, provided for the expenses of the state.

Charles promoted to the fullest extent the interests of the Church. He recognized in it a powerful ally, both in increasing and ruling his dominions. His wars were religious as well as political; he introduced Christianity into the countries which he conquered. He made the system of tithes compulsory throughout the Empire, and richly endowed bishoprics and monasteries. His zealous coöperation with the bishops in bringing about disciplinary reform, his always active interest in doctrinal matters and solicitous participation in the national synods, contributed wonderfully to increase the power and influence of the Church. No sovereign in the history of Christendom contributed more actively and efficaciously than Charles to the propagation and strengthening of religion and the upbuilding of the Church, though the revival of the Western Empire in his person led eventually to the memorable conflict, which filled subsequent centuries, between papacy and the Empire. He also effected a closer Church organization, by subordinating more strictly the bishoprics to the archbishoprics and by strengthening the hold of the Bishop over the churches of his diocese.

No less glorious than his political achievements was the revival of science, literature, and art which Charles brought about—a renaissance all the brighter for the gloom by which it was preceded and followed. He summoned to his court the greatest scholars of the age: Alcuin, the Englishman, who became the head of the Palace School; Paulus Diaconus, the Lombard, who wrote a history of his people; Peter of Pisa, the grammarian; Angilbert and Theodulf, the greatest poets of the day, who wrote in imitation of the ancient authors; finally, Einhard, Charles's secretary and friend. In this circle of scholars Charles moved as a comrade and friend, much as did Lorenzo de' Medici in the Platonic Academy of Florence. He himself possessed an amount of learning unusual in his age, in spite of the fact that he could not write, having begun to learn too late in life. He was very fond of his native tongue—the Frankish—and is said to have drawn up a grammar of the language. He invented Frankish names for the months of the year and for the winds and caused a collection of old German poems and legends, then current, to be made, which his pious son Louis is said to have destroyed because of its heathenism. In his Palace School his own sons and those of the nobility received a liberal education; but he also commanded that each cathedral and monastery should have a school to which laymen, as well as clergy, should be admitted. The school which Alcuin established at Tours, under his patronage, was famous for centuries. He also attempted to establish public schools for all freemen in connection with the monasteries and parishes. He was no less liberal in his patronage of the fine arts. He built palaces, particularly at his favorite residences, Aix-la-Chapelle and Ingelheim—for he had no fixed capital—and many churches, chief among which was the minster of Aix. He endeavored zealously to promote agriculture, manufactures, and commerce. He projected great national works, one of which was a canal to connect the Rhine and the Danube; but he deemed nothing beneath his attention which concerned the interests of his Empire or of his people. He re-

quired his subjects to plant certain kinds of fruit trees, the cultivation of which was thus extended northward in Europe. His own domains were an example of superior cultivation.

Charles the Great was one of the most imposing figures, not only of the Middle Ages, but of all history. His personality impressed itself upon the imagination of the people of the Middle Ages as that of no other man has done. Romances and legends grew up around his name and those of his nobles, or paladins. According to contemporary accounts, he was above the ordinary stature and of a noble and commanding presence. He was fond of manly exercises, particularly of hunting, and his strength was prodigious. His mode of life was simple. In eating and drinking he was very moderate. He wore the simple, ancient costume of his people, except on great state occasions, when he used Roman robes and ceremonial. His death took place on Jan. 28, 814. He was buried in the minster of Aix and was succeeded by his son Louis, known as the Pious.

Bibliography. Besides his capitularies (q.v.), there are extant letters and Latin poems ascribed to Charles the Great. Consult Dümmler, *Poetæ Latini Æri Carolini* (Leipzig, 1881–84). The chief source for his history is the biography, by his secretary, Einhard, *Viti Caroli Magni*, edited by Pertz, in the *Monumenta Germaniæ Historica*, and separately (Hanover), 1863; Eng. trans. by Glaister, London, 1877). Other sources are the letters and poems of Alcuin, Paulus Diaconus, and Angilbert, and the contemporary annals, for a description and editions of which consult Wattenbach, *Deutschlands Geschichtsquellen im Mittelalter*, vol. i (Berlin, 1904). The most detailed modern account of his reign is Abel and Von Simson, *Jahrbücher des fränkischen Reiches unter Karl dem Grossen* (Leipzig, 1883; 1888). Consult also: Vétault, *Charlemagne* (Tours, 1876); Döllinger, *Das Kaisertum Karls des Grossen und seiner Nachfolger* (Munich, 1864); Haureau, *Charlemagne et son cour* (Paris, 1888). The best English works on Charles are: *The Cambridge Medieval History*, vol. ii (New York, 1913); Mombert, *History of Charles the Great* (New York, 1888); Hodgkin, *Charles the Great* (London, 1897); Davis, *Charlemagne*, in "Heroes of the Nations Series" (New York, 1900); and Prutz, *Age of Charlemagne* (Philadelphia, 1905); consult also: Clemen, *Die Porträtdarstellungen Karls des Grossen* (Aachen, 1890).

CHARLES II. Holy Roman Emperor. See Charles I, the Bald, King of France.

CHARLES III. Holy Roman Emperor. See Charles II, the Fat, King of France.

CHARLES IV (1316–78). Holy Roman Emperor from 1355 to 1378. He was born at Prague, May 14, 1316, and was the son and successor of John of Luxemburg, King of Bohemia, who fell in the battle of Crécy in 1346. With the aid of Pope Clement VI, to whom he had previously taken an oath sacrificing several Imperial prerogatives, he was elected King of Germany by five electors on July 11, 1346. This was done because the Emperor Louis IV, who, as such, was also King of Germany, had been placed under the greater excommunication by the Pope. Charles and Louis contended for the prize until the death of the latter in 1347. On Easter Day, 1355, Charles IV was crowned Emperor at Rome. In 1356 he issued the Golden Bull, establishing a new rule for the election of the King of the Romans. On June 4, 1365, he was crowned King of Arles. In 1376 he had his son, Wenceslaus, elected King of the Romans, to succeed him after his death, and secured the Pope's confirmation of the election, in spite of the provisions of the Golden Bull. He died at Prague, Nov. 29, 1378. Charles was an artful politician and directed his efforts mainly to securing power for his own family and for his hereditary Kingdom of Bohemia, which was very flourishing under his reign. He, with the Archbishop of Prague, founded the University of Prague, on the model of that of Paris, in 1348. For his early years, till 1346, we have an autobiography, "Vita Caroli IV ab ipso conscripta," in Boehmer, *Fontes rerum Germanicarum*, vol. i (Leipzig, 1885). Consult Wernusky, *Geschichte Kaiser Karls IV und seiner Zeit* (Innsbruck, 1880–92).

CHARLES V (1500–58). Holy Roman Emperor and, under the title of Charles I, King of Spain. He was born at Ghent, Feb. 24, 1500, and was the eldest son of Philip, Archduke of Austria, and Joanna, the daughter of Ferdinand and Isabella of Spain. Philip's parents were the Emperor Maximilian and Mary, daughter and heiress of Charles the Bold, Duke of Burgundy. On the death of his father in 1506, Charles, at the age of six, inherited the Burgundian realm, consisting in the main of the rich and populous provinces of the Netherlands, then at the height of their prosperity. On the death of his grandfather, Ferdinand, in 1516, he became King of Spain, as his mother, Joanna, was of disordered intellect and incapable of reigning. To the Spanish crown belonged Naples, Sicily, and Sardinia; the Spaniards were just entering upon their great career of conquest in the New World. Charles was not very favorably received by the Spanish nobles, who were doubtful of his rights and jealous of the followers whom he brought from Flanders, where he had been educated. The repression of the liberties of the people, which had already gone far under his grandfather, and which his son was to reduce to a system, continued unchecked under Charles, in spite of the appeals of the Cortes. All the abilities of his famous minister, Cardinal Ximenes, were requisite to prevent an open rupture. In the early part of his reign (1520) the towns of Castile were driven to revolt for the maintenance of their ancient liberties. It was with difficulty that the insurrection was put down (1521). (See Padilla, Juan de.) On the death of his grandfather, Maximilian, in 1519, Charles conjointly with his younger brother, Ferdinand, succeeded to the possession of the hereditary dominions of the house of Hapsburg (house of Austria). On June 28, 1519, he was raised to the Imperial throne of Germany by the choice of the electors, the rival candidates being Francis I of France and Henry VIII of England, and was crowned at Aix-la-Chapelle, Oct. 23, 1520. Owing to the jealousy of his Spanish connections, he was required to sign an election agreement (*Wahlkapitulation*) guaranteeing certain rights to the German nation—a practice followed by his successors in the Imperial office. Charles was now by far the most powerful sovereign in Christendom. In his earlier years he had been frivolous and dissolute, but he now became mindful of the duties and dignity of his high position. He ascended the Imperial throne at a time when Germany was in a state of un-

precedented agitation, because of the movement set on foot by Luther. To restore tranquillity, a great diet was held at Worms in 1521, before which Luther made the memorable defense of his doctrines. Just at this moment the great struggle between France and Spain broke out afresh, Francis I taking up arms against his rival, whose attention was drawn away from the internal affairs of Germany. Thus, instead of vigorously assailing the Protestant movement when it might still have been in his power to quell it, Charles, who was not alive to its significance, permitted it to take deep root.

The war between Charles and Francis, in which the former had Henry VIII of England as an ally, and was strengthened by the defection of the powerful Charles of Bourbon, proved disastrous to France. The French were swept out of Lombardy, and in an attempt to regain possession of it Francis was defeated before the walls of Pavia, Feb. 24, 1525, and taken prisoner. He was forced to sign a humiliating treaty at Madrid, January, 1526; but hardly had he been set at liberty when he prepared to renew the struggle, with Henry VIII now on his side and with the support of Pope Clement VII, of the house of Medici, who, alarmed at the victories of Charles, was anxious to rid Italy of the Imperialists and induced some of the Italian states to join him. The Emperor's forces, under Frundsberg and Charles of Bourbon, took Rome itself by storm (1527), plundered it, and made the Pope a prisoner. Charles pretended great regret, went into mourning with all his court, and caused prayers to be said for the Pope's liberation, while by his own direction the Pope was kept for seven months a captive. The Peace of Cambrai, between Charles and Francis, in 1529, deprived France of Lombardy, for the possession of which she had fought so furiously. In 1530 Clement VII, into whose scheme for the restoration of the Medici in Florence Charles had entered, crowned the victorious monarch at Bologna as King of Lombardy and Emperor of the Romans (the last coronation of a German emperor by the Pope). Simultaneously with these events a great drama was being enacted in the basin of the Danube, which brought a still greater concentration of power in the hands of the Hapsburg dynasty. In 1526 the Ottoman Sultan, Solyman the Magnificent, laid low the power of Hungary in the battle of Mohács. The Hungarian monarch, Louis II, who was also King of Bohemia, did not survive the defeat, and Ferdinand of Hapsburg, his brother-in-law, was chosen his successor in Bohemia, while some of the nobles in Hungary also conferred upon him the royal crown. Thus were laid the foundations of the modern Hapsburg monarchy of Austria-Hungary. Previous to this, in 1521–22, Charles had relinquished to Ferdinand the sole sovereignty over the principal portion of the old hereditary Austrian dominions. Having made peace with his formidable rival, Charles now thought to put an end to the religious differences in Germany and to repel the Turks, who had overrun Hungary and laid siege to Vienna. But the Diet at Augsburg, in 1530, proved how vain was the hope of restoring the former state of things in Germany; and when the Emperor refused to recognize the confession of the Protestants (see AUGSBURG CONFESSION), they refused to help him against the Turks. In 1531 the Protestant princes formed the League of Schmalkald (q.v.) and allied themselves with France and England for their own protection. This, and the continued assaults of the Turks, compelled the Emperor to yield in some measure to the demands of the Protestants and to conclude the Peace of Nuremberg (1532). In 1535 Charles undertook an expedition from Spain against the pirate Barbarossa, who had established himself in Tunis, and whose vessels did great injury to the commerce of Spain and Italy. In this expedition he was completely successful and set free no fewer than 22,000 Christians who had been held as slaves. War again broke out with France. An armistice for 10 years was concluded at Nice in 1538, which left the bulk of the dominions of the despoiled Duke of Savoy in the hands of Francis. Charles visited Paris, where he was magnificently entertained. In 1540 the proud city of Ghent, the birthplace of the Emperor, received a terrible chastisement at his hands for daring to resist his mandates. In 1541 Charles undertook an expedition against Algiers, but returned discomfited. In 1542–44 he was engaged in a fresh war with France, Henry VIII being once more his ally. It was terminated by the Treaty of Crespy, advantageous to the Emperor. The suspension of the struggle with France left the Emperor at liberty to turn his arms against the Protestants of Germany, at whose head were Philip the Magnanimous, Landgrave of Hesse, and John Frederick, Elector of Saxony. Charles received the support of the ambitious Protestant Prince Maurice, Duke of Saxony (of the Albertine line). The victory of Mühlberg, April 24, 1547, placed the Protestants at the mercy of Charles, who deprived John Frederick of his territories. In 1548 the Augsburg Interim was published, fixing the degree of religious toleration to be accorded in Germany pending the decision of the Council of Trent, which had been opened in 1545. In 1551 Magdeburg, a great stronghold of Protestantism, succumbed to the arms of Maurice of Saxony. But this Prince himself now became thoroughly alarmed at the arbitrary manner in which the Emperor was proceeding to carry out his political aims, and suddenly turned his arms against him, allying himself with Henry II of France. Charles was compelled to flee before the arms of the Protestants, and in 1552, through his brother Ferdinand, he concluded with them the Peace of Passau, by which the Lutheran states were allowed the exercise of their religion. A more definite settlement was made, in the Peace of Augsburg, in 1555. In the meanwhile Henry II seized the three bishoprics of Toul, Metz, and Verdun (1552), and an attempt of the Emperor to reconquer Metz failed miserably.

Weary of the constant struggles and heavy responsibilities of his ill-assorted realms, Charles now declared his resolution to seek repose and devote the remainder of his days to God. In 1555–56 he resigned the Netherlands and Spain to his son Philip, and in 1557 abdicated the Imperial crown in favor of his brother Ferdinand and retired to the monastery of Yuste, in Estremadura. At Yuste Charles spent two years, partly in mechanical pursuits, partly in religious exercises, which are said to have assumed a character of the most rigid asceticism, and partly in active participation in politics. He died Sept. 21, 1558. By his wife, Isabella, daughter of King Emmanuel of Portugal, he had one son, his successor, Philip II of Spain,

and two daughters. Charles V was a prince of remarkable executive powers. He showed a shrewd and sometimes statesman-like ability in meeting the difficult problems of his reign; but this gave way more and more to the religious temperament inherited from the Spanish side of his house. While he spared his Protestant subjects in Germany for political reasons, he persecuted heresy unsparingly in Spain, where policy imposed upon him no restraint. As a general he ranks high. In temperament and disposition he was cold, phlegmatic, stoical, and devoid of chivalry.

Consult: W. Robertson, *History of the Reign of Charles V* (London, 1886); Baumgarten, *Geschichte Karls V* (3 vols., Stuttgart, 1885–92); Lanz, *Korrespondenz des Kaisers Karl V* (Leipzig, 1844–46); Sandoval, *Historia de la vida y hechos del Emperador Carlos V* (Valladolid, 1604); Sepulveda, *De Rebus Gestis Caroli V* (Madrid, 1780); Ranke, *Deutsche Geschichte im Zeitalter der Reformation* (Leipzig, 1894); Armstrong, *The Emperor Charles V* (2 vols., London, 1902).

CHARLES VI (1685–1740). Holy Roman Emperor from 1711 to 1740, and the last of the direct male line of the house of Hapsburg. He was the second son of the Emperor Leopold I and was born Oct. 1, 1685. His father wished to secure for him the crown of Spain; but Charles II of Spain assigned it by testament to Philip of Anjou, whereupon arose the great War of the Spanish Succession, Britain and Holland taking part with the Emperor against France, for the maintenance of the balance of power in Europe. (See SUCCESSION WARS.) Charles was acknowledged by the allies as Charles III of Spain, but had not succeeded in obtaining permanent possession of the kingdom when the death of his brother, the Emperor Joseph I, recalled him to Germany in 1711; and as he now became Emperor of Germany, England and Holland concluded the Peace of Utrecht with France in 1713, not wishing to see him also King of Spain. Charles continued the war for some time, but by the Peace of Rastadt (1714) gave up his claim to Spain, being confirmed, however, in possession of the Spanish Netherlands and of the Spanish possessions in Italy. He was successful in a war against the Turks, marked by splendid Austrian victories under Prince Eugene and concluded by the Treaty of Passarowitz (1718), and in a war with Spain, which arose out of the project of the Spanish Minister, Alberoni (q.v.), and in which the Quadruple Alliance was formed—France, England, and Holland joining the Emperor against Spain. Charles had lost his only son and, being anxious to secure the throne to his own descendants, named his daughter, Maria Theresa, as his heiress, by a Pragmatic Sanction, which he began to prepare as early as 1713. For more than 20 years the foreign policy of Charles was dictated by the sole desire of obtaining the ratification of the Pragmatic Sanction from the European Powers. To accomplish this he sacrificed Austrian territories in Italy and Spain, and the commercial prosperity of Flanders to England and Holland. (See OSTEND COMPANY.) He won over Prussia by the concession of extensive privileges and bribed Russia by allowing it a free hand in Poland. He was unsuccessful in the so-called War of the Polish Succession, waged against France and Spain, in the course of which Don Carlos conquered the Two Sicilies in 1734–45. He was also worsted in a second war with the Turks, terminated by the Peace of Belgrade in 1739, in which Austria made some cessions of territory. He died Oct. 20, 1740. He was of a mild and benevolent disposition, but full of superstition and conservative prejudices. Consult Mailáth, *Geschichte des österreichischen Kaiserstaates* (Hamburg, 1834–50), and Coxe, *History of the House of Austria*, vol. iii (3d ed., London, 1873). See HAPSBURG, HOUSE OF.

CHARLES VII (1697–1745). Holy Roman Emperor from 1742 to 1745. He was the son of Maximilian Emanuel, Elector of Bavaria, and for some time Governor of the Spanish Netherlands. After the conquest of the Bavarian territories, and the pronunciation of the ban of the Empire against his father by the Emperor Joseph I (see SUCCESSION WARS), he was for some time a prisoner; but after the death of Joseph, Charles married the latter's youngest daughter and in 1726 succeeded his father as Elector of Bavaria, as such styled Charles Albert. He refused his consent to the Pragmatic Sanction and, on the death of Charles VI, in 1740, advanced a claim to the Austrian dominions in right of his wife and upon the further ground of a testament of Ferdinand I. At first he was successful with the aid of the French forces and caused himself to be proclaimed Archduke of Austria at Linz and King of Bohemia at Prague. In 1742 he was elected Emperor. The Hungarians, however, rose in favor of Maria Theresa, and he was driven from Austria and from Bohemia and for a time even from his Bavarian capital, Munich. Disease and calamities combined to cause his death, Jan. 20, 1745. "Misfortune," he said, "will never leave me till I leave it." Consult Arneth, *Geschichte Maria Theresias* (Vienna, 1863–1879), and Heigel, *Der oesterreichische Erfolgestreit und die Kaiserwahl Karls VII* (Munich, 1877).

CHARLES I (1600–49). King of England, Scotland, and Ireland from 1625 to 1649. The second son of James I of England and VI of Scotland, he was born at Dunfermline, Nov. 19, 1600, and created Duke of Albany at his baptism, December 23. He was a delicate child, tongue-tied, and troubled with weak joints and ankles. In 1605 he was created Duke of York and on the death of his brother Henry, Nov. 6, 1612, became heir apparent, but was not created Prince of Wales until Nov. 3, 1616. He outgrew his physical defects, with the exception of a slight stutter; became a diligent theological student, an accomplished scholar, and skillful in the sports of tilting, tennis, and marksmanship. At 22 years of age he had developed artistic and musical tastes and was distinguished for modesty of conduct and morals. Negotiations for his marriage were made, first with Princess Christian, sister of Louis XIII of France, in 1613, and then with the Infanta Maria of Spain, daughter of Philip III in 1614. In February, 1623, occurred his journey to Spain, at the suggestion of his favorite companion, Buckingham, who accompanied him. Unannounced, he arrived in Madrid, to the consternation of the Spanish statesmen, who had already decided against the marriage. After much duplicity on both sides Charles returned to England in October, being received with popular acclamation. Negotiations were broken off on religious pretexts, although the unwillingness of Philip to help in the restoration of Charles's

brother-in-law, Frederick, to the Palatinate was the real cause. Charles aroused national enthusiasm by advocating war and expressed his readiness to conquer Spain; but his father wished for a military expedition to the Palatinate. On March 27, 1625, James died, and Charles succeeded to the throne. To gain France as an ally, on May 1 he married, by proxy, Princess Henriette Marie, of France (1609–69), receiving his bride at Canterbury on June 13. The national admiration was quenched by this marriage, with its accompanying violations of parliamentary anti-Roman pledges; and before a year had elapsed Charles, finding the Queen's Roman Catholic retinue of 440 persons too troublesome, deported them to France. His marriage subsequently proved particularly happy. His reign, however, was doomed to failure. He was a puppet in the hands of his favorite, Buckingham, whom he had appointed Prime Minister in defiance of public wishes and whose warlike schemes ended ignominiously. Three parliaments, convoked in four years, were dissolved in royal exasperation at their refusal to comply with his arbitrary measures, and public feeling became embittered. The third Parliament presented the *Petition of Right* (q.v.) in 1628. The King temporized and conceded, then—although Buckingham's assassination had removed one cause of the contention—dissolved Parliament and caused some of the leading members to be imprisoned, one of whom, Sir John Eliot, was allowed to sicken and die in the Tower, although he presented several petitions for a temporary release. Influenced by the Queen, and with Laud and Wentworth as chief advisers, Charles governed without a Parliament for 11 years, the despotic Star Chamber and High Commission courts giving semblance of legal sanction to forced loans, poundage, tonnage, ship money, and other extraordinary measures to meet governmental expenses. Republican principles developed and expanded, towards which Charles opposed a policy of severe repression. His attempt to impose episcopacy provoked the Scotch to restore Presbyterianism and to adopt the Solemn League and Covenant, Feb. 28, 1638. In 1639 Charles assembled an army to enforce his will; the Covenanters retaliated and advanced to the border. Unable to proceed without supplies, in 1640 Charles summoned the "Short Parliament," which he dissolved in three weeks, as the members refused to listen to his demands, but drew up a statement of public grievances, demanded an inquiry into Eliot's death, and insisted on peace with Scotland. Obtaining money by irregular means, Charles advanced against the Scots, who crossed the border and defeated his army at Newburn-upon-Tyne, and soon afterward occupied Newcastle and Durham, everywhere receiving popular sympathy and support. His money exhausted, the King was compelled to call the "Long Parliament" which met Nov. 3, 1640. Led by the ripe, sagacious, and dauntless Pym, it proceeded to redress grievances and showed its resolution by impeaching and imprisoning the instigators of royal despotism, Laud, and Wentworth, who had been created Earl of Strafford. The peers, before whom Strafford was tried, refused to condemn him, but a luckless plot, of which Charles probably knew almost nothing, to overcome Parliament by military force sealed the fate of the ministers. A bill of attainder was passed, and Charles, in trepidation for the life of his Queen, which he considered in danger from mob violence, signed Strafford's death warrant and confirmed a bill by which Parliament was not to be dissolved without its own consent. The King was now pledged to constitutional rules, but unhappily was imbued with extreme notions of kingly prerogative. He visited Scotland, hoping by concessions to win favor and armed support; but while there the Irish Rebellion and Ulster Massacre occurred, and, suspecting that Charles had intrigued for the military assistance of the Irish Catholic lords, Parliament enlarged its demands. The Commons accepted a petition against the royally appointed bishops who disputed their authority, and who were mobbed on their way to the House of Lords.

On his return from Scotland the King had yielded to the provisions of "The Grand Remonstrance"; but now, learning of the impending impeachment of his Queen, who had sought assistance from Rome, he appeared in the Commons with an armed force and, accusing Pym, Hampden, Hollis, Haselrig, and Strode of treason, demanded their arrest and delivery to him.

Intense excitement ensued; shouts of "Privilege of Parliament" were raised; the indicted members, forewarned, had taken refuge in the city, and the King retired with undignified threats. The country was aroused, Parliament and the nation were declared in peril, and London prepared to defend itself. Met with his own weapons, the alarmed King fled with his family to Hampton Court. Seven months later he raised the royal standard at Nottingham, Aug. 22, 1642, and civil war commenced and proceeded, although arbitration was vainly attempted from time to time. The Royalists at first were the victors; but after several reverses the parliamentary forces acquired experience and discipline, and Cromwell and Fairfax annihilated the royal army at Naseby, June 14, 1645. Guerrilla warfare continued until Charles gave himself up to the Scottish army at Newark, on May 5, 1646. Negotiations were fruitlessly renewed, and he was delivered to the English Parliament, who assigned him a residence at Holmby House, near Northampton. After four months his qualified reply to a parliamentary proposal resulted in his conveyance by Cornet Joyce to Hampton Court. He continued his intrigues and opposition to all constitutional propositions, and after three months escaped to the Isle of Wight, where he hoped to receive aid from the governor of Carisbrooke Castle, but was imprisoned. Cromwell and the Independents lost patience and compelled Parliament to pass an act of treason against further negotiation with the King, who was removed to Hurst Castle. The Scots and English Presbyterians, deeming the regal person sacred and inviolable, thought to rescue him, but were defeated, and their representatives expelled from Parliament, which appointed a court to judge the King. He was removed from Hurst Castle to Windsor on Dec. 23, 1648, and on Jan. 20, 1649, was taken to Westminster Hall, where the court was opened with great solemnity. Charles repudiated its legality and refused to plead. On the 27th he was sentenced to death as a tyrant, murderer, and enemy of the nation, by 67 out of the original 135 judges. Scotland protested, the royal family entreated, France and the Netherlands interceded, in vain. After a pathetic parting from two of his children he calmly prepared for death and bore

himself with dignity. He was beheaded at Whitehall, Jan. 30, 1649. His last words were: "I must tell you that liberty and freedom consist in having of government those laws by which the lives and the goods of the people may be most their own. It is not having share in the government, sirs; that is nothing pertaining to them," a sentiment that was plagiarized by the opponents of Chartism as late as 1848.

In private character Charles was a man of culture, kind, of irreproachable life, and of great physical courage; but in political affairs he was unscrupulous and blindly obstinate in his belief in the "divine right of kings." In religious affairs he was loyally attached to the national church of England and steadfastly refused to assent to the abrogation of episcopacy, which he held an essential in church government. By Charles II's personal edict at the Restoration, until its cancellation by Parliament in 1859, January 30 received special observances in the Anglican church as "the day of the martyrdom of the Blessed King Charles I." After his death appeared *Eikon Basilike: The Portraiture of his Sacred Majesty in his Solitude and Sufferings*, attributed to the King, but written by Bishop Gauden, who in 1651 published at The Hague *Reliquiæ Sacræ Carolinæ, The Works of that Great Monarch and Glorious Martyr, King Charles I.* The best works on the reign are: Gardiner, *History of England, 1603–42* (10 vols., London and New York, new ed. 1883–84), and his *Civil War* (4 vols., London, New York, and Bombay, 1894–97), containing full citation of the original sources; also his *Puritan Revolution* (London, 1876); Ranke, *History of England* (trans. by C. W. Boase and G. F. Kitchin; 6 vols., Oxford, 1875); Trevelyan, *England under the Stuarts* (London, 1905); Chancellor, *Charles I, 1600–25* (London, 1886); Harris, *Life and Works* (London, 1758); Skelton, *Life of Charles I* (London, 1898); Masson, *Life of Milton* (7 vols., London, 1873–94); Disraeli, *Commentaries on the Life and Reign of Charles I* (5 vols., London, 1828–31). Original materials are contained in: *Letters of Charles I to Henrietta Maria* (London, 1836); Clarendon, *Great Rebellion* (6 vols., Oxford, 1888); Whitelocke, *Memorials* (4 vols., new ed., Oxford, 1853); Gardiner, *Constitutional Documents* (Oxford, 1889); the *Calendars of State Papers*, edited by Hamilton (London, 1890–93).

CHARLES II (1630–85). King of England, Scotland, and Ireland from 1649 (reigned from 1660) to 1685. He was the second, but eldest surviving, son of Charles I, and was Prince of Wales from his birth. He was born at St. James's Palace, London, May 29, 1630, and baptized by Bishop Laud on June 27, Louis XIII of France being one of his sponsors. At eight years of age an establishment was provided for him as heir apparent, with William Cavendish, Earl of Newcastle, as governor, and Dr. Brian Duppa as tutor. The following year he broke his arm, and his life was endangered by a severe illness. He took his seat in the House of Lords in 1641, and his first public act was to carry his father's letter in favor of Strafford to the peers. He held a nominal command in the early campaigns of the Civil War, and was present at Edgehill in 1642, where he narrowly escaped capture. Appointed general of the western forces, he parted from his father at Oxford, March 4, 1645, and remained in safety in Somerset, Devon, and Cornwall; after Naseby, he escaped by way of Scilly and Jersey and joined his mother in Paris, where he remained for two years, to his moral disadvantage. In July, 1648, he sailed from Helvoetsluis with a small fleet for the Thames, where he took several prizes. He issued a proclamation of conciliation to the Londoners and Scots, and returned to The Hague, where during his father's trial he did his utmost to save him, forwarding a blank charter with his signature attached for Parliament to inscribe its own terms of clemency. At his father's death he assumed the title of King and was proclaimed in Scotland, Ireland, the Channel Islands, and one or two places in England. After vacillating between Holland, France, and Jersey, with the intention of invading Ireland, he returned to Holland, and, embarking at Terheyden for Scotland, landed in Cromarty Firth, June 24, 1650, despite an attempt to intercept him. On September 3 a Scottish force fighting for him was defeated at Dunbar, and this hastened his coronation at Scone, Jan. 1, 1651, after an acknowledgment of his father's faults and various declarations and concessions of a feeble character. He suddenly invaded England the following August with 10,000 men and was proclaimed King at Carlisle and other places on his advance. Cromwell hastened to meet and surround him and after two encounters routed his army at Worcester, Sept. 3, 1651. Charles was hunted and a price was put upon his head, but after hiding at Boscobel and other places, through the loyalty of friends and his own courage and address, he safely embarked at Shoreham on October 15 and landed at Fécamp, Normandy, the next day. Eight years of impecunious and profligate exile were variously spent in France and at Cologne and Bruges, until not long after Cromwell's death, when, the country being threatened with military despotism, the popular wish throughout England for the restoration of royalty was consummated by General Monk (q.v.), after Charles's conciliatory Breda declaration, and he was proclaimed King at Westminster, May 8, 1660. He landed at Dover on the 26th, and was welcomed, at Whitehall, by the two Houses of Parliament on May 29, 1660, after an enthusiastic acclamation by thousands on his progress through London. He was crowned on April 23, 1661. His first Parliament, distinguished by abasement and insistence on "royal prerogative," gave him an untrammeled course. Clarendon, his dignified companion in exile, was appointed chief minister. Episcopacy was restored, and English and Scotch Nonconformists and Presbyterians subjected to persecution. He extended an indemnifying Act, dating from Jan. 1, 1637, to June 24, 1660, to all political offenders, excluding the regicides, of whom 13 were executed, while the bodies of Cromwell and Ireton were hung in chains, and the remains of Blake, Bradshaw, and others cast out of Westminster Abbey into potter's fields. Extravagant, and always in want of money, Charles gladly assented to the abolition of the feudal rights of knight service, wardship, and purveyance in consideration of an annuity of £1,200,000, which, however, was never fully paid. On May 20, 1662, he married Catharine of Braganza for her large dowry. The failure of the subsidies to produce the amount agreed on and the chronic mismanagement of the English finances brought the King to a desperate need of money. The choice faced him of secur-

ing this from Parliament or else of selling the control of England's foreign policy to the highest bidder. But to accept the first alternative meant to become the slave of Parliament, and, beneath his easy-going exterior, Charles cherished the desire to recover the absolute power that had been lost by his father and grandfather. On the other hand, a ready purchaser of the foreign policy was found in Louis XIV, who desired to extend French power on the Continent and needed England's aid, or, at least, England's neutrality, for the success of his plans. In return for French subsidies Charles plunged England into a war with Holland in 1672, from which the country as a whole had little to gain. The war, however, was not unpopular; commercial rivalry had already brought about two wars between the two countries, the last one having occurred in the early years of the reign (1665–67). The Dutch War of 1672 did not prove a success, and some knowledge of the negotiations with France, joined with Charles's efforts towards absolutism, brought him into conflicts with his Parliament, which lasted nine years, until Charles, aided by French subsidies, was able to dissolve his last Parliament (1681). The last years of the struggle were especially embittered on account of fear of Roman Catholicism, towards which church the King was suspected to have leanings and to which his brother and heir, the Duke of York, confessedly belonged. This feeling culminated in the Popish Plot (see OATES), which resulted in the execution of many innocent victims. From 1681 to his death Charles ruled as an absolute king. An attempt, the Rye House Plot (q.v.), was made to check this, but failed, and Charles ruthlessly struck down all who opposed him. He never lost, however, the favor which his easy manners had won from the people, and at his death, Feb. 6, 1685, he was sincerely mourned. In his dying hours he received absolution from a Roman Catholic priest, although he had not previously avowed his attachment to that religion. Undoubtedly able, Charles's carelessness and love of ease prevented him from showing the ability he really had. To have maintained absolute rule in England for four years, and that within a half century from the Great Rebellion, is no small feat. Totally lacking in moral fibre and surrounded by men like himself, he made his court one of the most dissolute England has ever known. Yet in his easy way Charles fostered the arts and sciences and did much to bring to England the best results of continental learning.

Bibliography. The best general accounts of the reign are Macaulay, *History of England*, (8th ed., London, 1852), and Ranke, *History of England* (Eng. trans., 6 vols., Oxford, 1875). The best biography is by O. Airy, *Charles II* (London, 1904). For the social side, consult: Sydney, *Social Life in England, 1660–1690* (London, 1892); Pepys, *Diary*, ed. Wheatley (London, 1899); Evelyn, *Diary* (new ed., London, 1854). A good short account is given by Stephen in the *Dictionary of National Biography*, vol. x (New York, 1887), under the heading "Charles II."

CHARLES I, THE BALD (trans. of Fr. *Charles le Chauve*) (823–877). King of France from 843 to 877; as Roman Emperor, Charles II. He was the son of Louis the Pious by his second wife, Judith. The determination of Judith to secure a kingdom for her son led to repeated wars between the sons of Louis, until, by the Treaty of Verdun, in 843, Charles received the western portion of the Empire, which from this time may be called the Kingdom of France, or, more strictly, the West-Frankish Kingdom. The government of Charles was weak; the great nobles were rapidly becoming independent; the Northmen pillaged the country, almost without resistance on the part of Charles, who bribed them to depart. Yet on the death of the Emperor Louis II, in 875, Charles received the Imperial crown through the favor of the Pope. Consult Dümmler, *Geschichte des ostfränkischen Reiches* (3 vols., Leipzig, 1887–88).

CHARLES II, THE FAT (trans. of Fr. *Charles le Gros*, Ger. *Karl der Dicke*) (832–888). King of France after 885; as Roman Emperor, Charles III. He was the third son of Louis the German (q.v.). At his father's death, in 876, he became King of only a portion of Germany; but in 882, after the death of his two brothers, he became King of Germany; within eight years seven kings of the Carolingian line met with untimely deaths, and only one left a legitimate heir. In 885 the only two representatives of the male line were Charles and a boy five years old, afterward Charles the Simple of France. Consequently, Charles was recognized as King, and ruled over almost all the lands which had formed the Empire of Charles the Great. He had been crowned Emperor of the Romans in 881. He was a weak and cowardly ruler. When the Northmen besieged Paris, he made no resistance, but bribed them to leave the capital and allowed them to plunder elsewhere. His subjects revolted. He was deposed in 887 and died in January, 888. Consult Dümmler, *Geschichte des ostfränkischen Reiches*, vol. iii (Leipzig, 1888).

CHARLES III, THE SIMPLE (trans. of Fr. *Charles le Simple*, or *le Sot*) (879–929). King of France from 893 to 929. He was the posthumous son of Louis the Stammerer. At the death of Charles the Fat, Eudes, Count of Paris, was chosen King of France; but many of the Franks were still faithful to the Carolingian dynasty and rallied about Charles. In 893 he assumed the crown and after three years of fighting forced Eudes to promise him the succession to the kingdom. Consequently, on the death of Eudes, in 898, he was generally recognized as King. He has usually been regarded as a weak ruler, but his reign was marked by two events of great importance, for both of which he was responsible. Of these the more important was the cession of the future Normandy to the Northmen. The other event was the conquest of Lorraine, a kingdom which he preferred to France and in which he remained as much as possible. In 922 his subjects revolted. Charles at first defeated them, but by treachery in 923 he was made a prisoner, and died in captivity in 929. Consult Eckel, *Charles le Simple* (Paris, 1899).

CHARLES IV, THE FAIR (trans. of Fr. *Charles le Bel*) (1294–1328). King of France from 1322 to 1328, and the last of the Capetian line. He was the youngest son of Philip IV the Fair and succeeded his brother, Philip V. His policy was to strengthen and consolidate the royal power. This he did by repressing unruly nobles, increasing the royal revenue, and adding cities, such as those of the Agenais, which he took from the English, to the royal domains. He introduced some changes in the coinage,

which still further aggravated the debasement begun under Philip the Fair. Consult Lavisse, *Histoire de France*, vol. iii (Paris, 1901).

CHARLES V, THE WISE (trans. of Fr. *Charles le Sage*) (1337–80). King of France from 1364 to 1380. He was the son of King John II the Good, and on his father's being made prisoner by the English at the battle of Poitiers (Sept. 19, 1356) he assumed the regency. The most significant event of his rule was the vigorous effort of the peasants, aided by a part of the bourgeoisie (see MARCEL, ETIENNE), to deliver themselves from the tyranny of nobles and the court, which resulted in the popular uprising called the Jacquerie. Upon the death of his father, in 1364, Charles ascended the throne. By his cautious policy he succeeded in introducing order in the kingdom and in re-establishing the power of the crown, which had been much shaken. War with England raged for a number of years, but with results highly favorable to Charles, who stripped his enemies of all their conquests in France except a few fortified places. He died Sept. 16, 1380. Charles was a generous patron of literature and the arts. He founded the Bibliothèque Royale and increased the privileges of the university. He rid himself of the so-called "grand companies," bands of mercenaries who were terrorizing many parts of the country, by employing them in wars outside of France. (See DU GUESCLIN.) He built the Bastille to keep the turbulent citizens of Paris in order. See Delacheval, *Histoire de Charles V* (Paris, 1908).

CHARLES VI (1368–1422). King of France from 1380 to 1422. He was the son and successor of Charles V and less than 12 years of age at his father's death. For several years he was under the guardianship of four uncles, one of whom (the Duke of Anjou) acted as regent. Their ambitions led to civil war. In 1388 Charles took the government into his own hands and ruled well for some years, till he became insane. A regent was appointed, and party strife broke out again. The two great parties into which the nation was divided were those of Orléans and Burgundy. Each party at different times called in the English to its aid. Henry V took advantage of the civil conflict and at the battle of Agincourt, in 1415, won a victory which left France almost helpless. Murders, massacres, and all the horrors of civil war devastated France until, in 1420, a peace was made at Troyes, by which Charles VI disinherited his son and accepted Henry V as his successor. He died Oct. 21, 1422, leaving most of France in the hands of the English. See AGINCOURT; ARTEVELDE, PHILIP VAN; FRANCE. Consult Lavisse, *Histoire de France,* vol. iv (Paris, 1902).

CHARLES VII (1403–61). King of France from 1422 to 1461. He was the fifth son and the successor of Charles VI and was born on Feb. 22, 1403. When his father died, Charles had little prospect of ruling France. Paris and almost all the north were in the hands of the English, who proclaimed as King Henry VI of England, who was then 18 months old, and made the Duke of Bedford regent. For the first six years Charles showed little energy and was compelled by the English to evacuate Champagne and Maine. In 1427 the French forces obtained their first success, when the English failed in their siege of Montargis; but in October, 1428, the latter invested Orléans, which was the most important city held by the party of Charles, and on Feb. 12, 1429, the French met with a disastrous defeat at Harengs. At this critical moment Joan of Arc came to the King's aid, and the siege of Orléans was raised on May 8, 1429. Charles was consecrated King at Rheims, July 17, 1429. The English gradually lost their possessions in France, and the Duke of Burgundy, their ally, went over to Charles. The latter entered Paris in 1436, and in the following years the English lost all their French possessions except Calais. The last battle, a disastrous defeat for the English, was at Castillon, July 17, 1453. After he was established on the throne Charles devoted himself to the reorganization of the government, to the reform of the finances, and to the formation of a powerful and well-disciplined army. He strove by every means to increase his own power, but his government was not despotic, and France recovered from the effects of the terrible calamities of the long war. Charles encouraged commerce and literature and had the prosperity of his subjects at heart; but he was timid and irresolute, afraid of plots against himself, and almost continuously under the control of some woman. He made no effort to save the Maid of Orléans from her fate. For many years he yielded in almost everything to the wishes of his mistress, Agnes Sorel, who, however, exercised a beneficent influence over him. See AGNES SOREL. Consult Lavisse, *Histoire de France*, vol. iv (Paris, 1902).

CHARLES VIII (1470–98). King of France from 1483 to 1498. He was born at Amboise and succeeded to the throne on the death of his father, Louis XI, in 1483. For some time the government was carried on under the regency of his sister, Anne of Beaujeu, who displayed fine political statesmanship in defending the rights of the crown against the encroachments of the States-General, in the repression of the feudal princes, and in the annexation to France of Brittany through the marriage of its Duchess, Anne, to the young King. When Charles attained his twenty-first year he took the royal power into his own hands. He was a high-spirited, generous youth and a good king; but his fame rests less on his rule in France than on the part he played in the history of Italy. Solicited in 1494 by Ludovico il Moro, Duke of Milan, to help him against Alfonso of Naples, Charles revived the ancient claims of the house of Anjou to the Kingdom of Naples and achieved its conquest the following year. The Italian princes were alarmed at his success, and the League of Venice was formed against him, by the Pope, the Emperor, Maximilian I, Ferdinand of Aragon, Venice, and Milan. An attempt was made to bar his exit from Italy; but at Fornovo, near Piacenza, Charles broke through a powerful army and safely effected his retreat. It was with difficulty that he was deterred by his councilors from resuming his warlike designs on Italy. Charles's incursion into that country marks an epoch in the history of the peninsula. Left to itself, Italy might have attained national unity, as Spain did, or France. With the incoming of Charles began the intrusion of the northern nations into Italian affairs, and that play of policy which went on for 400 years in the distracted country and did not end till the last foreigner (the French at Rome) departed from Italian soil in 1870. Consult: *Memoirs of Philip de Comines* (trans., London, 1855); Dela-

borde, *Charles VIII en Italie* (Paris, 1884); Ségur, *Histoire de Charles VIII* (Paris, 1884); Lavisse, *Histoire de France*, vol. v, part i (Paris, 1903).

CHARLES IX (1550–74). King of France from 1560 to 1574. He was born at Saint-Germain-en-Laye, June 27, 1550. Charles succeeded his elder brother, Francis II, at the age of 10, under the regency of his mother, Catharine de' Medici. He was declared of age three years later, but his mother continued to rule in his name, though he bore the responsibility for her violent deeds. Intrigues and civil wars marked the whole course of his unhappy reign. The Huguenots were driven to take up arms in 1562. The barbarities and excesses practiced both by the followers of Guise and by the partisans of Condé (outrages in which Catholics and Huguenots were alike involved) would have been sufficient to characterize this reign as one of the most miserable in French history. But the diabolical Massacre of St. Bartholomew, which was deliberately planned and executed by Catharine solely for political purposes, eclipsed all the other brutalities of the epoch. Charles's character is somewhat of an enigma: well-meaning, but passionate and fundamentally weak, he never emancipated himself from the guidance of his mother, who involved him in his worst mistakes. He died at the Château de Vincennes, May 30, 1574. Consult Mérimée, *Chronique du règne de Charles IX* (Paris, 1889).

CHARLES X (1757–1836). King of France from 1824 to 1830, the last sovereign of the elder line of the house of Bourbon. He was born in Versailles, Oct. 9, 1757. He was the younger brother of Louis XVI and Louis XVIII, bore the title of Count of Artois, and in 1773 married the Princess Maria Theresa of Savoy. After the outbreak of the Revolution in 1789 he became the leader of the *émigrés*. In 1795 he sailed with an English expedition to Brittany to arouse the French Royalists against the Revolutionary government. Although the Vendéans were ready to rally around his standard in great force, his courage failed, and he returned to England, abandoning his deluded supporters in France to their fate. With the Restoration he reappeared in France and became the head of the bigoted ultra-Royalist faction. (See CHAMBRE INTROUVABLE.) In the circle of Jesuits, priests, and nobles of the old school that surrounded him originated most of those extreme measures against which the better-minded Louis XVIII ineffectually protested at times. The death of Louis, Sept. 16, 1824, brought Charles to the throne. He took the oath of adherence to the charter, but soon displayed his intention of restoring the absolutism of the old French monarchy. Popular discontent rapidly increased during the succeeding five years. The King sought in vain to allay it by embarking the nation in a military enterprise, the expedition against Algiers, undertaken in 1830. In March, 1830, Charles adjourned the chambers on account of an address of remonstrance in reply to a royal speech. In May the Chamber of Deputies was dissolved and new elections were ordered. The deputies who signed the address were reëlected. On July 25 the celebrated ordinances were signed putting an end to the freedom of the press, already largely curtailed, decreeing a new mode of election, and dissolving the recently elected chamber. The people of Paris took up arms, and the revolution of July 27–29 overthrew the Bourbon monarchs. As a last resource Charles abdicated the throne, Aug. 2, 1830, in favor of his grandson, Henry, Duke of Bordeaux. It was too late, however, as the revolution was accomplished, and Louis Philippe, Duke of Orléans, was chosen King of the French. Charles made his escape to England, resided for some time at Holyrood and afterward at Prague. He took no part in the political intrigues and attempts of the Duchess of Berry. He died of cholera at Görz, Nov. 6, 1836. Charles X was a characteristic example of that type of Bourbons who "never learn anything and never forget anything."

CHARLES III (1345–86). King of Naples from 1381 to 1386, also known as Charles of Durazzo and Charles II of Hungary. His father, Louis of Durazzo, Count of Gravina, died in prison, having rebelled against Joanna I of Naples. The Queen adopted Charles, but afterward abandoned him in favor of Louis I of Anjou. Charles descended into Italy, at the invitation of Pope Urban VI, and seized the crown of Naples (1381), causing Joanna to be strangled in prison (1382). Louis of Anjou contested the throne, and Charles had to wage war with his rival, who died in 1384. He was invited to accept the crown of Hungary by a party dissatisfied with the rule of Queen Elizabeth and her daughter and was crowned at the close of the year 1385; but soon a revolt was incited against the Italians, and Charles was poisoned in prison. Consult Sayous, *Histoire générale des Hongrois* (2d ed., Paris, 1900).

CHARLES II (1332–87). King of Navarre, known as THE BAD. He was the son of Philip of Evreux and Joanna, the daughter of the French King, Louis X. He became King of Navarre in 1349 on the death of his mother and in 1352 married Joanna, the daughter of John II of France. Between the two rulers an implacable hatred prevailed, resulting in great misfortunes to France. In 1354 war broke out, as King John had not given Charles Angoulême, which had been promised as a part of his bride's dowry, and in revenge Charles formed an alliance with the English and made preparations for the invasion of France. The two kings, however, became reconciled; Charles's territories were restored to him, and in 1355 he was ostensibly on terms of friendship with the King, but in reality plotting with the nobles against him. As a result, he was thrown into prison and was not freed until November, 1357. In the same year he was in Paris, at peace with the Dauphin, and enjoying great popularity with the bourgeoisie. As a champion of the people, he sided with Etienne Marcel in the revolt of Paris against the royal authority, and in June, 1358, was made captain general of the city. His perfidiousness and cruelty in repressing the Jacquerie destroyed his popularity, and after playing fast and loose with the Dauphin and the English he formed an alliance with the latter, which lasted until the Treaty of Brétigny in 1360. After 1362 his importance in French politics waned, but he found sufficient scope for the exercise of his talent for duplicity in the complicated politics of the Iberian Peninsula. In 1378 Charles V of France deprived him of his possessions in that country, while a Castilian army invaded Navarre. With the aid of the English, however, he succeeded in warding off the danger. He died on Jan. 1, 1387. Charles was possessed of great political genius and fine

oratorical gifts; but he was mercenary, cruel, and perfectly unscrupulous in the attainment of his ends. He was twice accused of attempting to poison the French King, not without sufficient evidence. Consult Lavisse, *Histoire de France*, vol. iv (Paris, 1902), and Meyer, *Charles II, roi de Navarre* (Paris, 1898).

CHARLES I (1863–1908). King of Portugal after 1889. The son of Luiz I and María Pía, the daughter of Victor Emmanuel II of Italy, he was born Sept. 28, 1863. He succeeded to the throne Oct. 19, 1889. He married, in 1886, Marie Amélie of Orléans, the daughter of the Comte de Paris. Of this union came two sons, Luiz Philippe, Duke of Braganza, born March 21, 1887, and Manoel, born Nov. 15, 1889. His reign has witnessed the rise of a strong radical party in Portugal, traceable in great measure to the financial difficulties under which the country labored during the last decade of the nineteenth century. In international affairs the political status of Portugal has been enhanced by the growth of European colonization in Africa. He and his eldest son were assassinated Feb. 1, 1908.

CHARLES I (1839–1914). King of Rumania. He was born April 20, 1839, the second son of Prince Karl Anton of Hohenzollern-Sigmaringen. He served in the Prussian army and after the dethronement of Alexander John (Cuza) was elected Prince of Rumania, April 20, 1866, and arrived in the capital, Bucharest, in May. The country was in a wretched condition, the prey of rival factions and foreign intrigues. The new Prince showed tact and statesmanship in the work of reorganization. At the outbreak of the Russo-Turkish War, in 1877, the Rumanian army was mobilized, an alliance was concluded with Russia, and Prince Charles took command in person. The army was kept in Rumanian territory for some weeks, after the opening of the campaign, because of Austrian jealousy of military activity on the part of her Balkan neighbors. Prince Charles took the field with his Rumanians, however, when an attack on Plevna had been opened, and rendered valuable assistance in the hardest fighting of the war. A few weeks after the beginning of the war Rumania declared her independence (May 21). In 1881 Rumania assumed the title of Kingdom, and on May 22 Charles was crowned as King at Bucharest. Under him the internal development of the country has gone actively forward, education has advanced, and a safe course has been steered in the difficult politics of southeastern Europe. Charles married Princess Elizabeth von Wied (known by her pen name "Carmen Sylva"), Nov. 15, 1869. Upon the death of the only child of this union the succession was settled upon Prince Ferdinand of Hohenzollern-Sigmaringen, a nephew of the King, in 1889. The Crown Prince has two children. During the recent war of the Balkan states Rumania held aloof and now occupies the position of policeman to keep peace among the petty states. This has enabled King Charles to carry on without interruption the work of making of Rumania a civilized state. He is greatly beloved among the peasantry, but the landowning *Boyards* are opposed to him on account of his agrarian-reform views. Consult Whitman, *Reminiscences of the King of Rumania* (London, 1899).

CHARLES I. King of Spain. See CHARLES V, Holy Roman Emperor.

CHARLES II (1661–1700). King of Spain from 1665 to 1700. He was the son of Philip IV and was but four years old when his father died, the regency being in the hands of the Queen mother, Maria Anna of Austria. During her rule Spain was much weakened by an unsuccessful war with France and by the loss of Sicily. In 1675 Charles assumed the government, taking for his chief adviser that brilliant and popular national hero, the second Don Juan of Austria, an illegitimate son of the late King by his mistress, the renowned actress María Calderón, known as *La Calderona*. By marrying Louise of Orléans, a niece of Louis XIV, Charles maintained harmony with France for several years. After her death Charles married a sister of the Emperor Leopold I, María Ana of Newburg. He joined the Grand Alliance in the war against Louis XIV, which was concluded by the Peace of Ryswick (1697). Charles was childless and was prevailed upon to appoint as his successor Philip of Anjou, grandson of Louis XIV. On his death, Nov. 1, 1700, the claim of Philip of Anjou was contested and the War of the Spanish Succession ensued. See SUCCESSION WARS; CHARLES VI; LOUIS XIV. Consult: Marquis de Villars, *Mémoires de la Cour d'Espagne sous la* [sic] *règne de Charles II, 1678–82* (ed. by William Stirling, London, 1861); Marquis de Villars, *Mémoires de la Cour d'Espagne de 1679 à 1681, publiés et annotés par M. A. Morel-Fatro, et précédés d'une Introduction par M. Le Marquis de Vogüé* (Paris, 1893); the *Letters* of the Marquise de Villars (Paris, 1868); Hume, *The Spanish People* (London, 1901).

CHARLES III (1716–88). King of Spain from 1759 to 1788. He was the first son of the second marriage of Philip V and great-grandson of Louis XIV of France. Parma and Piacenza were obtained for him when he was only 16, to satisfy the ambition of his mother, Elizabeth Farnese. In 1734 he invaded the Two Sicilies, then belonging to Austria, and completed their conquest in 1735, when he was crowned King as Charles III, the Emperor Charles VI being forced to recognize his title in the treaties of Vienna (1735, 1738). On the death of his half brother, Ferdinand VI, in 1759, Charles succeeded to the Spanish throne. He was a man of no great ability (so foreign ministers who had to deal with him agreed), and his foreign policy was disastrous; but he had liberal ideas and effected many reforms, especially in internal affairs and in financial administration. The Jesuits were banished in 1767, and an effort was made to bring the Inquisition under the control of the civil power. This effort was so nearly successful that, although the Inquisition was not abolished, it was rendered nearly innocuous. The power of the church in civil affairs was greatly restricted, and the number of idle clergy, especially the number of monastic orders, was considerably reduced. Charles endeavored to put a stop to brigandage and to Algerine piracy, and interested himself in the development of commerce and the arts and sciences, doing away with much antiquated legislation that was a hindrance thereto. He was an ally of France in the Seven Years' War, and in 1763 was compelled to cede Florida to England, Louisiana being made over to Spain by France. At the close of the American War of Independence Florida was restored to Spain. Unsuccessful

attempts were made in 1781 and 1782 to take Gibraltar from the English. Charles died in Madrid, Dec. 14, 1788. Although he had done much to restrict the power of the church, the Inquisition, and the orders, he was personally a zealous, practicing Roman Catholic and tried earnestly to persuade the Pope to proclaim the dogma of the Immaculate Conception as necessary to salvation. Consult: Colletta, *History of the Kingdom of Naples, 1734–1825*, trans. by Horner (Edinburgh, 1858); Ferrer del Río, *Historia del Reinado de Carlos III en España* (4 vols., Madrid, 1856); Armstrong, *Elizabeth Farnese* (London, 1892); Danvila y Collado, "Reinado de Carlos III," 6 vols., in the *Historia general de España de la Real Academia de la Historia*, published under the direction of Cánovas del Castillo (Madrid, 1892); Conde de Fernan-Núñez, "Vida de Carlos III," annotated ed. in 2 vols. by A. Morel-Fatio and A. Paz y Melia, vols. xiv and xv of the *Libros de Antaño* (Madrid, 1898); F. Rousseau, *Règne de Charles III d'Espagne* (2 vols., Paris, 1907).

CHARLES IV (1748–1819). King of Spain from 1788 to 1808. He was the second son and successor of Charles III and was born in Naples, Nov. 12, 1748. When very young, Charles married his first cousin, Maria Luisa of Parma, who soon acquired great influence over him, despite her coarseness and immorality. In fact, it seems highly probable that he never realized her true character nor the undignified position in which she placed him. The government was conducted chiefly by Godoy (q.v.), a handsome but dissolute guardsman and a favorite of the Queen, who was made Duke of Alcudia and Minister of Foreign Affairs. Peace with the French Republic was concluded in 1795 after a disastrous war, undertaken at the instance of Godoy. Soon after this peace an offensive and defensive alliance was made with France, and Spain speedily became involved in war with Portugal and also with England, the main event of which was the destruction of the Spanish fleet by Nelson at Trafalgar in 1805. In 1807 Charles made a secret treaty with Napoleon according to which Portugal was to be seized by the French and Spanish, and the greater part to be divided between Godoy and the Infanta Maria Luisa, Queen of Etruria, while Charles was to assume the title of Emperor of America; at the same time 16,000 Spanish troops were to be sent to the assistance of the French in Denmark. Meanwhile Napoleon was intriguing with Don Ferdinand, the heir to the throne. On March 19, 1808, Charles, alarmed by disturbances in Madrid, abdicated in Ferdinand's favor. He declared immediately that this act was not voluntary. In a meeting with Napoleon at Bayonne, Charles surrendered the crown on May 5, 1808, to the French Emperor, who gave him a pension of 6,000,000 francs and the castle and grounds of Chambord. He died Jan. 20, 1819, in Rome. See Godoy; Spain. Consult also Gen. Gómez de Arteche, "Historia del Reinado de Carlos IV," 3 vols., in the *Historia General de España de la Real Academia de la Historia* (Madrid, 1892 et seq.).

CHARLES IX (1550–1611). King of Sweden from 1604 to 1611. He was the third son of Gustavus Vasa and in 1560 became Duke of Södermanland. In 1592 he became regent of the kingdom after the death of his brother, John, and as such favored the introduction of the Reformed religion into Sweden. In 1593 he secured the adoption of the Augsburg creed as the basis of the national religion, and he confirmed the position of Protestantism by his victory at Staongebro in 1598 over his nephew, Sigismund of Poland, who was rightful King of Sweden, but who, as a decided partisan of Catholicism, was objectionable to the mass of the people. After many attempts at compromise, Sigismund was formally deposed in 1599 and Charles was offered the royal title. At first he merely accepted the regency, but in 1604 he yielded to the popular demand and was crowned King of Sweden. He engaged in wars with Poland, Russia, and Denmark, but his people did not share his ambitions and denied him the support he desired. Charles founded the University of Gothenburg and made a new code of laws. He wrote a rhymed chronicle of the war with Poland.

CHARLES X GUSTAVUS (1622–60). King of Sweden from 1654 to 1660. He was born at Nyköping, Nov. 8, 1622, the son of Catharine, eldest sister of Gustavus Adolphus, and of John Casimir, Count Palatine of Zweibrücken (Deux Ponts). After studying at the University of Upsala, he traveled through France, Germany, and Switzerland, and joined the army of Torstenson (q.v.) in 1642. He fought at the battles of Jankau and Leipzig, and at the close of the Thirty Years' War was the representative of Queen Christina at the conference held subsequent to the Treaty of Westphalia. On the abdication of Christina he succeeded, June 16, 1654, to the throne of a kingdom in an almost bankrupt condition. In 1655 Charles invaded Poland, whose King, John Casimir, indulged in pretensions to the Swedish crown, compelled the Elector of Brandenburg, Frederick William, to enter into an alliance with him, defeated the Polish army in a great battle at Warsaw (July 28–30, 1656), and overran the country, but retired when Russia and Austria prepared to assist the Poles, while the King of Denmark invaded the Swedish territories in Germany. He attacked Denmark in 1658 and secured for Sweden the provinces of Scania, Halland, and Blekinge by the Treaty of Roeskilde. Renewing the war in the same year, Charles laid siege to Copenhagen. The Dutch came to the assistance of the Danes and defeated the Swedish fleet, and in 1659 Charles had to abandon the siege. At the same time his forces were defeated in Pomerania by the Elector of Brandenburg, who had turned against him. He succeeded in holding his own, however, and at the Peace of Oliva, signed a few months after his death, Sweden retained the conquests she had made from Denmark prior to 1658 and those gained south of the Baltic before 1648. Charles died in Gothenburg, Feb. 13, 1660. As a general, Charles ranks equally with his predecessor Gustavus Adolphus and his successor Charles XII. His most famous exploit was the crossing of the straits separating the Danish mainland from the islands on the ice formed by the dense winter cold in 1657–58. This crossing of the "Belt" crushed out the Danish resistance and forced a favorable treaty for Sweden. Consult: Geijer and Carlson, *Geschichte Schwedens*, vol. iv (Gotha, 1855–75); Bain, *Scandinavia* (Cambridge, 1905); Haumant, *La Guerre du Nord et la paix d'Oliva* (Paris, 1893).

CHARLES XI (1655–97). King of Sweden from 1660 to 1697. He was the son of Charles X and Hedwig Eleonora of Holstein and was born Nov. 24, 1655. During his minority the

government was intrusted to his mother, Hedwig, as regent. By the Peace of Oliva (May 3, 1660) with Poland, Sweden obtained Esthonia, part of Livonia, and Oesel, and the Polish monarch renounced all pretensions to the Swedish crown; that of Copenhagen (June 6, 1660) was generally confirmatory of the Treaty of Roeskilde with Denmark in 1658. (See CHARLES X.) A treaty with Russia on the basis of the status quo followed in 1661; and from this period till 1672 the kingdom was free from foreign wars, but it was misgoverned by the regency and the education of the young King was neglected, willfully, it is charged, in order that he might longer be kept in leading strings. Until he reached manhood he could neither read nor write. In December, 1672, Charles assumed the reins of government. In 1674 he was called upon by Louis XIV, under a treaty made by the regency, to engage in the war of France on the German princes and Holland. The Swedes invaded Brandenburg and met a severe defeat at Fehrbellin in 1675. Charles, however, overthrew the Danes, who were allies of Brandenburg, at Halmstadt, Lund, and Landskrona, but his fleet was defeated by the Dutch near Oeland, and again by the Danes at Blekinge and Kiöge; and many of Sweden's recent acquisitions were wrested from her. These, however, were restored by the Peace of Saint-Germain-en-Laye (Sept. 17, 1679). Charles now entered upon an active period of reform in the administration, aided by his most trusted counselor, John Gyllenstern. In 1680 a struggle commenced between the crown, supported by the burghers and peasants, on the one hand, and the nobles on the other; and a considerable diminution of the power of the nobles was the consequence. The resumption of all the crownlands which had been alienated since 1609 was a fatal blow to the power of the nobles, and by a voluntary declaration of the estates, Dec. 9, 1682, the King was invested with absolute authority. By a judicious administration of the revenues, Charles was enabled to extinguish the public debt, reorganize the fleet and army, and by 1693 to dispense with extraordinary subsidies. Though absolute, he never imposed a tax but with the consent of the estates; and he published every year a detailed account of revenue and expenditure. He established the finances on a sound basis and brought the army and navy of the kingdom to a state of high efficiency. The codification of the laws was commenced, but was unfinished at his death, which took place in Stockholm, April 15, 1697. Consult Geijer and Carlson, *Geschichte Schwedens*, vols. iv, v (Gotha, 1855–75).

CHARLES XII (1682–1718). King of Sweden from 1697 to 1718. He was the eldest son of Charles XI and of Ulrica Eleonora of Denmark and was born in Stockholm, June 27, 1682. He received a careful early training under the eye of his father, and on his accession to the throne in 1697 his abilities were favorably commented on by the foreign ministers. He showed his mettle when Sweden, soon after his accession, was threatened by a coalition of Frederick IV of Denmark, Augustus the Strong, Elector of Saxony and King of Poland, and Peter of Russia, who was yet to win his title of "the Great." Sweden had been for 70 years one of the Great Powers of Europe, as a result of the policy of the kings of the house of Vasa; it possessed territory all about the Baltic, and its troops were reputed the best in Europe. The War of the North that was now brought on by the coalition was at first on Sweden's part a war of defense; then, through the successes of Charles, a war of aggression and conquest, and finally, through his failure, a struggle for existence. Its story is a mingling of brilliant triumph and disheartening defeat, both resulting from the meteoric and ill-balanced genius, reckless ambition, and fatal obstinacy of the Swedish King—qualities that have won for him in history the name of "Madman of the North." He was a born soldier and had taken Alexander the Great for his favorite hero. He was fond of all daring sports, careless of exposure, and unsparing of himself and others. When intelligence of the hostile league that threatened him reached Stockholm, the young King surprised every one around him by the energy and efficiency he displayed. Frederick IV of Denmark had invaded Schleswig-Holstein, whose Duke, a brother-in-law of the Swedish King, had called the latter to his assistance. In a six weeks' campaign Denmark was brought to terms, and Frederick signed the Peace of Travendal on Aug. 8, 1700. Charles now turned promptly to the defense of the Swedish possessions on the Baltic menaced by Russia and Poland. Russia sought to obtain the Swedish provinces of Ingra and Carelia, while Livonia and Esthonia, whose nobility detested the firm and often severe rule of Sweden, wished to put themselves under the weaker Polish monarchy. Hastening towards Riga, Charles compelled the Poles to raise the siege of that place, and then by forced marches brought his army of a little over 8000 men to the relief of Narva in Esthonia, which was beleaguered by 40,000 Russians, while Peter himself had gone to hasten the advance of 20,000 more. The disciplined Swedish troops, although jaded by forced marches, administered a severe defeat to the Russians before the walls of the city (Nov. 30, 1700), and Europe expected to see the whole Russian Empire brought under the sway of the young Swede who seemed to have revived the martial glory of the great Gustavus. Unfortunately for Charles, he seems to have entertained the same mad dream of conquest. Only the astute Peter looked the situation squarely in the face and sought to learn its lesson for Russia. He strengthened his alliance with Augustus of Poland, and at Birsen, in February, 1701, it was agreed that Augustus should occupy the attention of the Swedes in the west and Peter in the east, and that they should divide the Baltic provinces. The war thus opened in Denmark and the Baltic provinces involved the control of the Baltic and lasted for 21 years, ending in the marked diminution of the power of Sweden and the rise of Russia as the great Baltic power. Its first years, however, pointed to no such result. Influenced by the advice of his generals, Charles did not follow up his success against Peter, who was really his dangerous antagonist, but sought the overthrow of the King of Poland, while Peter was left to develop his resources. The conquest of Poland was accomplished, owing to the chronic disagreements among the nobility in that unfortunate country, but five years were necessary for its completion. The country was overrun by the Swedish troops, Augustus was finally driven into Saxony, and Charles, who had determined, against the advice of his principal counselor, Piper, to accomplish his enemy's de-

thronement, secured the election of Stanislas Leszczynski, who was crowned in Warsaw, in October, 1705. Meanwhile the Czar had been engaged in the conquest of the Baltic provinces and had been preparing for the ultimate contest with Charles. The latter now carried the war into Saxony, marching through Silesia and posing as the protector of the Protestants. Seeing his hereditary dominions in danger, Augustus sued for peace. Charles exacted from him in the Treaty of Altranstädt (1706) a renunciation of the Polish crown and of all alliances, the recognition of Stanislas, and the delivery to Charles of Patkul, the head of the Livonian malcontents, who had been instrumental in bringing about the coalition between Augustus and Peter. Patkul was executed as a traitor. Charles was now at the height of his power, with a disciplined army of 40,000 men, stationed near Leipzig, holding Germany in awe. If his military ability had been seconded by moderate and wise statesmanship, he might have made himself the most powerful sovereign of Europe. France hoped that he might attack the Grand Alliance, and the members of the Alliance feared it, but, after exacting humiliating terms from the Emperor Joseph I, Charles turned his face eastward to reconquer the Baltic provinces, and then to conquer Russia and perhaps Asia. He entered upon this daring plan with about 46,000 men. The tactics of the Russians were those afterward employed to defeat Napoleon. Charles was lured on into the interior of Russia, his army harassed on the way, and finally, on July 8, 1709, while besieging Poltava, on the border of the Ukraine, he was attacked by the Russian army in force, and the entire fabric of his military success was shattered in one disastrous engagement. His army was annihilated, and he himself barely escaped into Turkish territory, with 300 of his guard. He prevailed upon the Sultan to take up arms against Russia, and in 1711 Peter the Great found himself in a most precarious position on the banks of the Pruth. He was permitted, however, to escape, and the treaty which he was forced to conclude with the Turks was of no benefit to Charles. The Swedish monarch spent the next three years in semicaptivity among the Turks, engaged in fruitless intrigues to induce the Ottoman government to attack Russia. Had he at once returned to his kingdom and turned his real abilities to good use for the state, the history of Sweden might have been different. Instead, with an obstinacy that was simply madness, he wasted his time in this scheme for revenge. When he found that his plots were of no avail he defied the Turkish power, was made a prisoner, but escaped in 1714, and, dashing on horseback disguised through Hungary and Germany, reached Stralsund, which was at once invested by a combined force of Danes, Prussians, and Saxons, and after a year's siege compelled to surrender. The King was wounded in the siege. After driving the Danes from Scania, he invaded Norway and was killed by a cannon ball while besieging Frederikshald, Dec. 11, 1718. In private life Charles was almost an ascetic. See SWEDEN; PETER I; RUSSIA; POLAND.

Bibliography. The best English biography is by Bain, *Charles XII* (London, 1895). There are valuable Swedish works relating to his reign: Axelson, *Bidragtill kännedomen om Sveriges tillstånd på Karl XIII:s tid* ('Contribution to the Knowledge of the Condition of Sweden in the Time of Charles XII') (Wisby, 1888); E. Carlsen, ed., *Karl XII:s egenhändiga bref* ('Autograph Letters of Charles XII') (Stockholm, 1893); Carlson, *Sveriges historia under konungarne af det pfalziska huset* ('History of Sweden under the Kings of the Palatine House') (Stockholm, 1855–81), also in German abridgment (Gotha, 1887). Consult also Voltaire, *Histoire de Charles XII* (Rouen, 1730), which cites much valuable contemporary evidence. A very full bibliography may be found in Lavisse and Rambaud, *Histoire générale*, vol. vi (Paris, 1896). This work also contains an admirable account of the struggle for the Baltic.

CHARLES XIII (1748–1818). King of Sweden from 1809 to 1818. He was the son of King Adolphus Frederic. As high admiral of Sweden, he distinguished himself by winning a notable victory over the Russians in the Gulf of Finland in 1788. He also rendered important political and diplomatic services to his brother, Gustavus III, who created him Duke of Södermanland. After the assassination of Gustavus III, in 1792, Charles assumed the regency for Gustavus IV Adolphus and held it until 1796. In 1809, when at a critical juncture Gustavus had proved unequal to the situation, Charles was made administrator of the kingdom. A few months later Gustavus was deposed, and Charles accepted the kingship, under a constitution adopted by the Diet. He cultivated friendship with Russia and England. In 1814 the union of Norway and Sweden under one sovereign was effected, and he became its first king. In the latter years of his reign he was the mere vassal of his adopted son Bernadotte, who became Charles XIV upon his death. He died Feb. 5, 1818. See SWEDEN. Consult Bain, *Gustavus III and his Contemporaries* (London, 1895).

CHARLES XIV JOHN (1763–1844). King of Sweden and Norway from 1818 to 1844, and before his elevation to the throne Gen. Jean Baptiste Jules Bernadotte, a celebrated marshal of Napoleon. He was born in Pau, France, Jan. 26, 1763, the son of a French lawyer. He fought in the revolutionary wars (from 1794 as general of division) in Belgium, Germany, and Italy, and in 1799, in the last year of the Directory, was Minister of War. In 1800 he suppressed a rising of the Chouans, and in 1804 Napoleon created him marshal. He bore a distinguished part in the victory of Austerlitz in 1805, for which he was made Prince of Pontecorvo, and won fresh laurels in the campaign against the Prussians in 1806–07 and at Wagram in 1809. He was never one of the personal following of Napoleon, who appears to have been jealous of the general. He was chosen by the Swedish Diet in 1810 Crown Prince and successor of Charles XIII. The only condition of moment was that he should become a Protestant. Bernadotte agreed, changed his name to Charles John, and soon began to exercise many of the royal functions. The Crown Prince resisted the efforts of Napoleon to involve Sweden in his designs against England. The country was soon engaged in war with France, and at the head of the northern troops Prince Charles joined the allies in the final struggle with Napoleon and contributed to the victory of Leipzig (October, 1813). He forced Denmark in the Treaty of Kiel to give up Norway and conducted the campaign for its subjugation (1814). Charles XIII died in 1818 and was succeeded by Prince Charles John as Charles XIV John. The period of his admin-

istration was characterized by progress in all directions, both public and private. Charles was the only one of Napoleon's generals who founded a permanent dynasty. He died March 8, 1844. The present ruling house of Sweden is descended from Marshal Bernadotte, but intermarriage with Germans has made it thoroughly Teutonic. See SWEDEN. Consult: Meredith, *Memorials of Charles John, King of Sweden and Norway* (London, 1829); Sarrans, *Histoire de Bernadotte, Charles XIV Jean* (Paris, 1845); *Recueil des lettres, discours, et proclamations de Charles XIV Jean* (Stockholm, 1858).

CHARLES XV (1826–72). King of Sweden and Norway from 1859 to 1872. He succeeded his father, Oscar I, who was a son of Charles XIV John (q.v.). The rule of Charles was liberal and popular. Of him it is said that his motto was: "Build up the land upon the laws!" His legal reforms in the communal, ecclesiastical, and criminal branches of the law are evidences of his belief in the motto. To the political activity of Minister of Justice, Charles owes much of his reputation as a reformer. The most important event was the change (in 1866) in the constitution of the Parliament, which has since consisted of two chambers, one elected by the provincial representatives and the other by the people. He had a taste for literature and art and published a volume of poems. In 1850 he married Louisa, daughter of the King of the Netherlands, by whom he had one daughter, who became the wife of Prince Frederick of Denmark. He died Sept. 18, 1872. Consult Bååth-Holmberg, *Carl XV, somenskild mau, konung och Roustnär* (Stockholm, 1891).

CHARLES, ELIZABETH, née RUNDLE (1828–96). An English popular novelist, religious in bent and largely in subject matter, whose stories and novels, mildly interesting as narratives and historical pictures, touch almost every century and every country of Christendom. She wrote profusely, beginning with *Tales and Sketches of Christian Life* (1850) and ending with the last of 16 productions published between 1885 and 1896 for the Society for Promoting Christian Knowledge. *The Schönberg-Cotta Family* (1863), a story of the German Reformation, is her noteworthy book.

CHARLES, shärl, JACQUES ALEXANDRE CÉSAR (1746–1823). A French physicist. He made the first balloon using hydrogen gas (called *Charlière,* as distinguished from the *Montgolfière,* or fire balloon), and on Dec. 1, 1783, made a successful ascent to the height of nearly two miles. He invented a thermometric hydrometer and a number of optical instruments. In 1787 he anticipated Gay-Lussac's law of dilatation of gases.

CHARLES, LOUIS JOHN (1771–1847). Archduke of Austria. He was the third son of the Emperor Leopold II and was born in Florence, Sept. 5, 1771. He pursued his military studies with much ardor and, having displayed great ability in inferior commands in the battles of Jemmapes, Neerwinden, and Wattignies, was intrusted, in 1796, with the chief command of the Austrian Army of the Rhine. After inflicting repeated defeats upon Moreau, Jourdan, and Bernadotte, he drove the French across the Rhine and captured the stronghold of Kehl, Jan. 10, 1797. In 1799 he was again at the head of the Army of the Rhine, was several times victorious over Jourdan, protected Suabia, and successfully opposed Masséna, but suffered defeat at Zürich, June 4. In 1800 bad health compelled him to retire from active service, but, being appointed Governor-General of Bohemia, he formed a new army there. After the battle of Hohenlinden (1800) he was again called to the chief command and succeeded in staying the rapid progress of Moreau, but almost immediately entered into an armistice with him, which was followed by the Peace of Lunéville. In 1805 he commanded the army opposed to Masséna in Italy and fought the hard battle of Caldiero, but, upon bad tidings from Germany, retreated from the left bank of the Adige to Croatia. This retreat was one of his greatest military achievements. Made generalissimo of the Austrian forces, he won in 1809 the great battle of Aspern (q.v.), which first showed Europe that Napoleon was not invincible; but he did not promptly enough follow up his victory, and Napoleon, who hastened to reënforce his army, retrieved his fortunes at Wagram. The Archduke was now compelled to give way before the enemy, till he reached Znaim, where an armistice was concluded on July 12. In the campaigns of 1813 and 1814 he had no part. He lived in retirement till his death, which occurred April 30, 1847. He was author of *Grundsätze der Strategie* (1814). Consult Duller, *Erzherzog Karl* (Vienna, 1844–45), and Zeissberg, *Erzherzog Karl* (Vienna, 1895).

CHARLES, ROBERT HENRY (1855–). A British divine and author. He was born in county Tyrone, Ireland, and was educated at Queen's College, Belfast, Trinity College, Dublin, and Queen's University. He was ordained in 1883; was curate of St. Mark's, Whitechapel, in 1883–85, of St. Philip's in 1885–86, and of St. Mark's, Kensington, in 1886–89. In 1898 he became professor of Biblical Greek at Trinity College, Dublin, and from 1905 to 1911 was Grinfield lecturer on the Septuagint, Oxford. In 1898–99 he delivered the Jowett lectures on *The Doctrine of a Future Life in Israel, in Judaism, and in Christianity* (2d ed., 1913). He was made a canon of Westminster Abbey in 1913. His special field was the apocryphal books, and his publications include: *Book of Enoch* (trans. from the Ethiopic, 1893); *Ethiopic Text of the Book of Jubilees* (edited from four manuscripts, 1894); *Book of the Secrets of Enoch* (1895); *Apocalypse of Baruch* (trans. from the Syriac, 1896); *The Assumption of Moses* (1897); articles in the *Encyclopædia Biblica, Hastings Bible Dictionary,* and the *Encyclopædia Britannica; The Ascension of Isaiah* (trans. from Greek, 1900); *Testaments of the XII Patriarchs* (1908); *The Zadakite Fragments* (1912); *Studies in the Apocalypse* (1913).

CHARLES ALBERT (1798–1849). King of Sardinia from 1831 to 1849. He was the son of Prince Charles Emmanuel of Savoy-Carignan and in 1800 succeeded to his father's title and estates in France and Piedmont. In 1817 he married Maria Theresa, daughter of the Archduke Ferdinand of Tuscany. On the outbreak of the revolutionary movement in Piedmont in 1821, he was made regent upon the abdication of Victor Emmanuel I, until Charles Felix, the brother of the late King, should arrive to assume the sovereignty. He displeased, during his short reign of a week, both the Liberal party and its opponents, and Charles Felix disavowed all his acts and for some time forbade his appearance at court, exiling him to Florence. In

1829, however, he was appointed Viceroy of Sardinia. On the death of Charles Felix, April 27, 1831, he ascended the throne and performed several acts of constructive statesmanship by a reorganization of the finances and the creation of an army. Under the impulse of the movements of 1848 Charles Albert granted to Sardinia a constitution, the *Statuto,* which became the constitutional basis of the new Italy (see CAVOUR). The King entered warmly into the project of Italian unity and evidently expected to place himself at the head of the whole movement and of the new Kingdom of Italy. He was not, however, in real sympathy with the democracy of the new liberalism, and he was too visionary and unpractical to lead Sardinia along the difficult road that lay before her. When the Lombards and Venetians rose against the Austrian government, he declared war against Austria, March 23, 1848, and at first was successful; but his army was deficient in organization and leadership, and at Custozza, July 25, 1848, and at Novara, March 23, 1849, his hopes were wrecked by crushing defeats at the hands of the Austrians. On the battlefield of Novara he resigned the crown to his son, Victor Emmanuel. He retired to Portugal and died in Oporto in the same year. Consult: Cappalletti, *Storia di Carlo Alberto* (Rome, 1891); Bianchi, *Storia della diplomazia europea in Italia* (Turin, 1865); Costa de Beauregard, *La Jeunesse du roi Charles Albert* (Paris, 1809). See ITALY; SARDINIA; SAVOY, HOUSE OF.

CHARLES AUGUS'TUS (1757–1828). Grand Duke of Saxe-Weimar. He lost his father in the first year of his life and, together with a posthumous brother, was educated with great care during the regency of his mother, a woman of liberal ideas and great strength of character. Wieland, Knebel, and other prominent men were among the teachers of young Charles Augustus. In December, 1774, he made the acquaintance of Goethe, and they at once became friends. As soon as Charles Augustus assumed the reins of government, on his eighteenth birthday, he called Goethe to Weimar, and their intimacy was interrupted only by death. Owing to his own love of letters and the influence of his mother, Amalie (q.v.), the court of Saxe-Weimar became the shrine of German literature. Schiller, Herder, Wieland, and others lived under Augustus' protection, and the Court Theatre at Weimar witnessed the first production of *Iphigenie* (1786) and *Tasso* (1789). In 1786 Charles Augustus entered the Prussian army, in which he remained until the defeat at Jena in 1806, when he joined the Rhenish Confederacy and aided the French. In 1813 he joined in the coalition against Napoleon and commanded an army of Saxons, Hessians, and Russians. He fought among the allies in 1815, and the Congress of Vienna rewarded his services by enlarging his principality and making it a grand duchy. Goethe's influence was a lasting one in the character of Charles Augustus. His liberality in political opinions was the despair of Europe after the Congress of Vienna, but it made Saxe-Weimar one of the few well-governed and contented principalities of the age. Consult Düntzer, *Goethe und Karl August* (2d ed., Leipzig, 1888).

CHARLES CITY. A city and the county seat of Floyd Co., Iowa, 40 miles northwest of Cedar Falls, on the Illinois Central, and the Chicago, Milwaukee, and St. Paul railroads, and on Cedar River (Map: Iowa, E 1). The city has an opera house, home for the aged, public library, and parks, and is the seat of Charles City College (German Methodist), organized in 1891. It has good water power and manufactures store fixtures, wood furnishings, furniture, sashes and doors, harrows, and gasoline traction and stationary engines. Live stock, dairy products, nursery stock, and poultry are extensively shipped. Settled in 1856, Charles City was incorporated in 1869 and is governed by a mayor, elected biennially, and a council. The water works are owned and operated by the municipality. Pop., 1910, 5892.

CHARLES CITY CROSS ROADS, BATTLE OF. See FRAZIER'S FARM, BATTLE OF.

CHARLES DE BLOIS, shärl de blwä, or **DE CHÂTILLON** (?–1364). A claimant to the Duchy of Brittany. He was a nephew of Philip VI of France and contested the possession of the duchy with Jean de Montfort, who defeated him at the battle of Auray.

CHARLES EDWARD. See STUART, CHARLES EDWARD.

CHARLES EMMAN'UEL I, Duke of Savoy (1580–1630). See SAVOY, HOUSE OF.

CHARLES FRED'ERICK AUGUS'TUS WIL'LIAM (1804–73). Duke of Brunswick, son of Duke Frederick William, who fell at the battle of Quatre-Bras. He was born in the Duchy of Brunswick and after his father's death was put under the care of King George IV of England. He ascended the ducal throne in 1823, but his administration was intolerable, and he was expelled by his subjects in 1830. The remainder of his life he passed chiefly in London, Paris, and Geneva, and at his death he bequeathed his immense fortune to the last-named city.

CHARLES GRAN'DISON, THE HISTORY OF SIR. A novel by Samuel Richardson (1753), depicting the author's ideal of a faultless hero.

CHARLES MARTEL' (Fr., Charles the Hammer) (c.688–741). Mayor of the Palace under the last Merovingian kings, and the illegitimate son of Pepin of Heristal. After his father's death, in 714, he was at first imprisoned by his father's widow, but escaped in 715 and was proclaimed Mayor of the Palace by the Austrasians. A war between Austrasia and Neustria followed, which ended in Charles becoming undisputed ruler of all the Franks, the titular kings being mere puppets in his hands. He was engaged in long wars against the revolted Alemanni, Bavarians, and against the Saxons, but his importance as a historic personage is chiefly due to his wars against the Saracens, who, having conquered Septimania from the Visigoths in 720, advanced into Aquitaine, and in the succeeding years conquered Bordeaux, defeated the Duke of Aquitaine, crossed the Garonne, advanced to the Loire, and threatened Tours. Charles overthrew them near Poitiers, in 732, in a great battle, in which their leader, Abd-er-Rahman, fell, and their progress, which had filled all Christendom with alarm, was checked for a time. He drove them out of the Rhône valley in 739, when they had again advanced into the Burgundian territories as far as Lyons, deprived them of Languedoc, which he added to the Kingdom of the Franks, and left them nothing of their possessions north of the Pyrenees beyond the river Aude. Charles attempted to convert Saxony and Frisia to Christianity and gave aid to St. Boniface in his missions. He died

on Oct. 22, 741, at Quiercy on the Oise, leaving the government of the kingdom divided between his two sons, Carloman and Pepin the Short. Consult Breysig, *Jahrbücher des fränkischen Reiches, 714–741* (Berlin, 1869), and *Cambridge Mediæval History*, vol. ii (New York, 1913).

CHARLES OF ANJOU, ärn'zhōō', Count of Provence and King of Naples and Sicily (1226–85). He was the seventh child of Louis VIII of France and wedded Beatrice, heiress of Provence. In 1248 he went on a crusade in company with his brother, Louis IX, suffered captivity in Egypt with him, and returned to Provence in 1250. Exceedingly ambitious, he sought everywhere for opportunities to increase his possessions. For aid rendered Margaret of Flanders he was promised the Province of Hainaut, but Louis interfered, and Charles was compelled to relinquish Hainaut for a large sum of money. In 1262 Pope Urban IV invited Charles to assume the crown of the Two Sicilies and to assist in the overthrow of the bastard Manfred, the Ghibelline King. In 1263 Charles was made Senator of Rome and in 1266 was crowned King of the Two Sicilies. A crusade was preached against Manfred, who was overwhelmed and slain in the battle of Benevento. In 1268 the young Conradin, the legitimate heir, was defeated at Tagliacozzo, captured, and executed; a like fate was dealt out to many Italian nobles; estates were confiscated to reward the French mercenaries, and Charles established himself firmly in power. In 1270 Charles participated in the disastrous crusade of his brother, Louis IX, and later (1282), when he was preparing for another expedition, news was brought of the rebellion afterward known as the Sicilian Vespers (q.v.). Charles at once sent his fleet against Messina, refusing all offers of capitulation; but the city held out until assistance came from Don Pedro of Aragon, and Charles's fleet was burned. In 1285 the King died at Poggio. Charles of Anjou was one of the most powerful rulers of his time in Christendom. He was all-powerful in the councils of France; ruled over Anjou, Provence, and the Two Sicilies; was Senator of Rome, Imperial Vicar of Tuscany, Governor of Bologna, and lord of several other cities; he had also bought the rights to the Kingdom of Jerusalem. Consult: Sternfeld, *Karl von Anjou* (Berlin, 1888), which treats of Charles's career up to 1265; *Archivio storico Italiano* (3d series, vols. xxii–xxvi, Florence, 1875–77; 4th series, vols. i–vii, Florence, 1878–81); Jordan, *Les origines de la domination angevine en Italie* (Paris, 1909).

CHARLES OF ORLÉANS, ôr'lā'äN' (1391–1465). A French poet and nobleman, the son of Duke Louis of Orléans. He was brought up at the court of Blois, married Isabella, widow of Richard II of England, in 1406, and upon the death of his father (who was murdered, in 1407, by the Burgundians and Valentino of Milan) succeeded to his estates. At the battle of Agincourt (1415) he was joint commander and was taken prisoner. He was never in close imprisonment, but it was nearly 25 years before he was ransomed and returned to Blois. Here he married Mary of Cleves and gathered about him the literary people of the day—Villon, Chastelain, and others. He is best known by his poems, some written in prison and some, of particular interest to the philologist, composed in English. His favorite subjects were Love and Spring, and on these two themes he composed many rondels, one of which is the charming *Le temps a laissié son manteau*, so often introduced into anthologies. His son became Louis XII of France. The best edition of his works is that by D'Héricault (1874), with a memoir. Consult Beaufils, *Etudes sur la vie et les poésies de Charles d'Orléans* (2 vols., Paris, 1875), and R. L. Stevenson, *Familiar Studies of Men and Books* (1882).

CHARLES RIVER. A river of eastern Massachusetts (Map: Massachusetts, E 3). It rises in the western part of Norfolk County in a number of small head streams which connect small lakes and, pursuing a zigzag northeasterly course, empties into Boston harbor. In the middle and lower parts of its 47-mile course the Charles is very attractive for boating excursions. The chief towns on its banks are the Newtons, Waltham, Watertown, Cambridge, Brookline, and Boston. Below Watertown the stream is tidal, and between Cambridge on one side and Boston on the other it widens into an estuary, part of which has been filled in, forming the Back Bay, the Fenway, and an extensive system of parked boulevards.

CHARLES'S WAIN. A common name for the constellation Ursa Major.

CHARLES THE BOLD (trans. of Fr. *Charles le Téméraire*) (1433–77). The last Duke of Burgundy. He was the son of Philip the Good, of the house of Valois, and of Isabella of Portugal, and was born in Dijon, Nov. 10, 1433. During his father's life he bore the title of Count of Charolais. He was of a fiery, ambitious, and violent disposition. From an early period to the end of his life he was a declared enemy of Louis XI of France, the nominal feudal superior of Burgundy, and when Louis caused Philip to deliver up some towns on the Somme, Charles left his father's court and formed an alliance with the Duke of Brittany and some of the great nobles of France for the maintenance of feudal rights against the crown. Their forces ravaged Picardy and Île de France, threatened Paris, and defeated the King at Montlhéry (1465). The result was a treaty by which the Count of Charolais obtained the towns on the Somme and the counties of Boulogne, Guines, and Ponthieu for himself. In 1467 he succeeded his father as Duke of Burgundy. The Burgundian realm comprised Flanders, Brabant, and nearly all the rest of the Netherlands, in addition to Burgundy and Franche-Comté. Richer and more powerful than any other prince of his time, Charles the Bold conceived the design of restoring the old Kingdom of Burgundy, which involved the conquest of Lorraine, Provence, Dauphiny, and part of Switzerland. War raged between him and France afterward with but little intermission till 1475. In September of that year Charles found himself at leisure to attempt the prosecution of his favorite scheme of conquest and soon made himself master of Lorraine. In the following year he invaded Switzerland, stormed Granson, but was soon after terribly defeated by the Swiss near that place and lost his baggage and much treasure. Three months later he appeared again in Switzerland with a new army of 25,000 men and laid siege to Morat, where he sustained in June, 1476, another and still more overwhelming defeat. Nevertheless he refused to listen to terms and laid siege to Nancy in the fall of 1476. His army was small, and, in a battle fought on Jan. 5, 1477, before that town, he was overwhelmed by René of Lorraine and his Swiss mer-

cenaries and lost his life. His daughter and heiress, Mary, married the Emperor Maximilian I. With his life ended the long resistance of the great French vassals to the power of the centralized monarchy. Consult Kirk, *History of Charles the Bold* (3 vols., Philadelphia, 1864–68), and Lavisse, *Histoire de France*, vol. iv (Paris, 1902).

CHARLESTON, chärlz'ton. A city and the county seat of Coles Co., Ill., 46 miles west of Terre Haute, Ind., on the Cleveland, Cincinnati, Chicago, and St. Louis, and the Toledo, St. Louis, and Western railroads (Map: Illinois, D 4). It is the seat of the Eastern Illinois Normal School and possesses a Carnegie library, a fine courthouse, and parks. It is the centre of a region having extensive oil, gas, and coal fields, and manufactures flour, brooms, stoves, and tiles. Charleston was settled in 1830, incorporated in 1855, and at present is governed under a charter of 1870 which provides for a mayor, elected biennially, and a council. The water works are owned by the city. One of the famous Lincoln-Douglas debates was held here in 1858. Pop., 1910, 5884.

CHARLESTON. A city and the county seat of Mississippi Co., Mo., 14 miles west by south of Cairo, Ill., on the St. Louis, Iron Mountain, and Southern Railroad (Map: Missouri, G 5). It is in a highly productive agricultural region and ships grain, flour, fruits, potatoes, and live stock. The industries include flour and saw mills, stave and heading factories, and manufactures of shoe braces, axe handles, etc. The water works are property of the municipality. There are many Indian mounds of historic interest near the city. Pop., 1890, 1381; 1900, 1893; 1910, 3144.

CHARLESTON. A port of entry and an important commercial centre, the largest city in South Carolina and the county seat of Charleston County (Map: South Carolina, D 4). It is 7 miles from the ocean, on a low peninsula formed by the Ashley and Cooper rivers, which unite in a broad bay affording an excellent harbor, 130 miles by rail from the State capital, Columbia, and 82 miles northeast of Savannah, Ga.

Charleston is a city of great historic and scenic interest, with picturesque houses surrounded by pleasant gardens and with some irregular and narrow streets. In the southern part of the city are White Point Garden—a finely wooded park, containing a monument to the Second Regiment, South Carolina Line, Continental Army, which defended Fort Moultrie, June 28, 1776, and a bust of William Gilmore Simms—and the Battery, a popular promenade commanding a view of the harbor. The corner of Broad and Meeting streets is the site of the courthouse, post office, and city hall, the last containing a collection of historic relics and portraits. Other prominent buildings are St. Michael's Church, opened for worship in 1761, the Roman Catholic Cathedral, St. Philip's Church (Protestant Episcopal), the custom-house of white marble, the Memminger Normal School, and the Charleston Museum. The city has a valuable library (subscription) of 40,000 volumes, dating from the year 1748, and a number of charitable institutions, the more notable of which are the Roper Hospital, Charleston Orphan House, Enston Home, and Home for Mothers, Widows, and Daughters of Confederate Soldiers. The Gibbes Memorial Art Gallery, founded through the beneficence of J. S. Gibbes, is well filled with art treasures. As an educational centre, Charleston is the seat of the College of Charleston, founded in 1785; the Medical College of the State of South Carolina; the Citadel, the Military College of South Carolina, which became known for the part its students played in 1861 in the Civil War; Porter Military Academy; and Avery Normal Institute for colored students. The city maintains a well-equipped system of public schools, dating from 1810, and comprising primary and grammar schools, and a girls' high or normal school in which are enrolled over 5000 pupils. About $60,000 is devoted annually to the educational department. Monuments of William Pitt, John C. Calhoun, Wade Hampton, and Gen. G. T. Beauregard, and a bust of Henry Timrod, the poet, are among the objects of interest. Outside of the city are found several resorts attractive on account of popular amusements and for natural beauties: the Charleston Country Club, just north of the city; the Isle of Palms, north of Sullivan's Island and directly on the ocean; Magnolia Gardens, 12 miles distant on the Ashley; and Sullivan's Island, with a fine beach for surf bathing. Magnolia Cemetery, three miles north of the city hall, is a beautiful spot, with fine trees, shrubs, and flowering plants. Hampton Park is a large and attractive public park in the northern part of the city on the Ashley. It is on the site of the Washington Race Course, founded shortly after the Revolution.

The harbor, landlocked and one of the safest on the coast, has been so improved since the construction of jetties as to admit large vessels, the depth of water on the bar at mean high water being over 30 feet. West of the channel is a lighthouse with a fixed light at an elevation of 155 feet. The harbor defenses include Fort Moultrie on Sullivan's Island—where the Federal government, at an expenditure of over $500,000, has made extensive improvements designed to render the artillery post at that point one of the most completely equipped in the United States—and Fort Sumter. The other forts, well known in history, are now abandoned. The United States Navy Yard on the Cooper River, about 7 miles from the city, is large and well equipped. Several millions have been expended in developing and improving it.

The city has about 9 miles of water front, most of the wharves lying on the Cooper River. Good transportation facilities, by rail and water, form a feature of its equipment as a commercial centre. The Clyde Line connects Charleston with New York, Boston, and Jacksonville, and freight steamers go to important foreign and domestic ports; the Atlantic Coast Line, Southern, and Seaboard railways afford railroad communication.

In the early years of the nineteenth century Charleston was the chief cotton port in the United States, and until 1860 it held third place among the cotton-receiving ports. Since the Civil War, however, the Charleston trade has developed but slowly, and some years ago the export trade actually began to decline, but in the past decade has begun to increase again, until now there are but two ports in the South exporting more products. Besides cotton exports there are exports of oil cake (cottonseed), cotton-seed fertilizers, and lumber products. The import trade has been steadily advancing, and there is an important wholesale and jobbing trade

with cities of the interior. Large quantities of fruit, early vegetables, and lumber are shipped to Northern cities, the total income from the truck crops amounting to more than $5,000,000 annually. Charleston, though known rather as a commercial centre, is the seat of considerable industrial interests, the principal of which is the manufacture of fertilizers. Other leading manufactures are clothing, foundry and machine-shop products, lumber and timber products, including sash, doors, blinds, and confections and cigars.

The government is administered, under the charter of 1836, by a mayor, who holds office for four years, and a city council, the members of which are elected one-half by wards and one-half at large. The executive controls appointments to the board of health and, with the consent of the council, nominates commissioners of the city hospital, board of fire masters, commissioners of the Colonial Common, and park commissioners. All other administrative officials are elected by the municipal council. The annual expenditures of the city amount to about $600,000, the main items of expense being $30,000 for street lighting, $50,000 for the fire department, $60,000 for charitable institutions, and $75,000 for the police department.

Pop., 1790, 16,359; 1860, 40,522; 1870, 48,956; 1890, 54,955; 1900, 55,807, including 31,522 persons of negro descent and 2592 of foreign birth; 1910, 58,333; 1920, 67,957.

History. In 1670 an English colony under Gov. William Sayle came to Albemarle Point, on the west bank of the Ashley River, 3 miles from the present city, and founded Charles Town (named in honor of Charles II), the first permanent settlement in Carolina. In 1680 the public offices were removed to the present site of Charleston, where a number of families had previously settled. The population was increased, in 1685–86 by a company of Huguenot refugees, in 1755 by 1200 Acadian exiles, and in 1793 by 500 French refugees from Santo Domingo. In 1775 Charleston was one of the chief cities and the third seaport in importance in America, and it was the first Southern city to join the revolutionary movement. In February, 1776, the Provincial Congress of South Carolina met in Charles Town and on March 26 adopted the first independent State constitution. On June 28, 1776, the garrison on Sullivan's Island, under Colonel Moultrie (see FORT MOULTRIE), repulsed an attack by the British fleet, and in 1779 the city was again successfully defended, this time against General Prévost; but on May 12, 1780, with its garrison of 7000 under General Lincoln, it was captured after a siege of six weeks by a British force of 16,000 under Sir Henry Clinton, its loss being regarded as one of the greatest disasters of the Revolutionary War. On Dec. 14, 1782, the British evacuated the city and the Americans again took possession of it. Charleston was incorporated in 1783 and until 1790 was the capital of the State. In 1784 the first bale of cotton exported from America to Europe was shipped from this port. Charleston was the centre of the nullification movement of 1832, and in 1860 the Democratic convention, being afterward adjourned to Baltimore, met here, as did also the State convention which, on December 20, passed the first ordinance of secession. On April 12–13, 1861, the Civil War was opened by the Confederate bombardment and capture of Fort Sumter (q.v.) in Charleston harbor. In 1863 a Federal fleet under Admiral Dupont unsuccessfully attacked the fortifications of the harbor, and, though closely besieged and frequently bombarded, the city remained in possession of the Confederates until Feb. 17, 1865, when it was evacuated. On the following day the Union forces under General Gillmore took possession. On Aug. 31, 1886, Charleston suffered terribly from an earthquake shock, the severest in the history of the United States. Seven-eighths of the houses were rendered unfit for habitation, many persons were killed, and property valued at over $8,000,000 was destroyed. The damage, however, was quickly repaired. The South Carolina Interstate and West Indian Exposition (q.v.) opened here Dec. 2, 1901.

Consult: McCrady, *South Carolina under the Proprietary Government* (New York, 1897), *South Carolina under the Royal Government* (New York, 1899), and *South Carolina in the Revolution* (New York, 1901); also Powell, *Historic Towns of the Southern States* (New York, 1900), and Ravenel, *Charleston, the Place and the People* (New York, 1905).

CHARLESTON. The capital of West Virginia and the county seat of Kanawha County, about 369 miles west-northwest of Richmond, Va., on the Chesapeake and Ohio, the Kanawha and Michigan, the Kanawha and West Virginia, and the Coal and Coke railroads, and at the confluence of the Kanawha and Elk rivers (Map: West Virginia, C 3). The chief features are the capitol, customhouse, Federal building, public library, monument to Stonewall Jackson, and the county courthouse. The city has regular steamboat communication with the principal river ports, and is an important shipping point for coal, salt, and timber. There are deposits of natural gas, coal, and oil in the neighborhood. The manufactures include axes, glass, engines, boilers, furniture, carriages, fire brick, and lumber. Charleston has also boat-building yards and color and veneer works. The government is vested in a bipartisan board of affairs, consisting of the mayor and three commissioners, and a city council with limited power. A fort was built at Charleston about 1786; the town was incorporated in 1794, and the city in 1870. It has been the capital of West Virginia since 1870, with the exception of the period, 1875–85, when Wheeling was the seat of government. Pop., 1890, 6742; 1900, 11,099; 1910, 22,996; 1920, 39,608.

CHARLESTON EXPOSITION. See SOUTH CAROLINA INTERSTATE AND WEST INDIAN EXPOSITION.

CHARLESTOWN. Formerly a city of Middlesex Co., Mass., now incorporated with Boston (q.v.). Charlestown was settled in 1629 by a small company from Salem and was organized as a town in 1634. The territory originally within its limits has from time to time been divided up to form the towns of Woburn, Malden, Stoneham, Burlington, and Somerville, and parts of Medford, Cambridge, Arlington, and Reading. The battle of Bunker Hill was fought here on June 17, 1775, when the British set fire to the town, destroying 320 buildings, valued at $525,000. The battle is commemorated by the Bunker Hill Monument (q.v.). Charlestown was chartered as a city in 1847. It contains a United States Navy Yard. It was the home of John Harvard, the earliest benefactor of Harvard College, and the birthplace of Samuel F. B. Morse, the inventor of the electric telegraph. In 1874, its population then being 23,373,

Charlestown was annexed to Boston. Consult: Frothingham, *History of Charlestown* (Boston, 1845); Hunnewell, *A Century of Town Life: A History of Charlestown from 1775 to 1887* (Boston, 1888); Sawyer, *Old Charlestown* (1902).

CHARLES TOWN. A city and the county seat of Jefferson Co., W. Va., 55 miles northwest of Washington, D. C., on the Baltimore and Ohio and the Norfolk and Western railroads (Map: West Virginia, G 2). It is the seat of Powhatan College and Stephenson Seminary, both for young women. The city is in a fertile agricultural district, has deposits of limestone and iron ore in the vicinity, and manufactures brass fittings, harness, collars, fly nets, various wooden products, and fertilizers. It is known as a summer resort. Charles Town was settled about 1750 and was first incorporated in 1873. It was here that John Brown, after his raid at Harper's Ferry, was tried, condemned, and hanged on Dec. 2, 1859. On Oct. 18, 1863, a Confederate cavalry division, under General Imboden, captured the place and secured 424 prisoners and large quantities of military stores, but, on the approach of a superior Union force, almost immediately withdrew. Pop., 1890, 2287; 1900, 2392; 1910, 2662.

CHARLES WILLIAM FERDINAND, Duke of Brunswick (1780–1806). See Brunswick, House of.

CHARLET, shär'lâ', Nicolas Toussaint (1792–1845). A French lithographer and painter. He was born in Paris, studied with the painter Gros, and soon became renowned for his lithographed designs of military subjects, like the "Grenadier of Waterloo." He did not confine himself to lithograph subjects, but worked rapidly in water colors and in sepia and oil. Among his pictures in oil are the "Episode in the Retreat from Russia" (Lyons) and "Wounded Soldiers Halting in a Rain" (Valenciennes). He took delight in representing humorously rustic scenes of peasants and children and in attaching to these designs quaint descriptive mottoes. His last important work was his illustration of Napoleon's Diary at St. Helena. By his continual glorification of the First Empire he helped to awaken popular sentiment against the Bourbons, preparing the way for the revolution of 1830. About 1092 of his lithographs survive. Consult his biography by Lacombe (Paris, 1856); Dayot (ib., 1893); id., *Les peintres militaires Charlet et Raffet* (ib.).

CHARLEVILLE, shär'l'-vêl' (Fr., Charles's town). A town of France, on the Meuse, in the Department of Ardennes, opposite Mézières, with which it communicates by a suspension bridge over the Meuse (Map: France, N., K 3). It is a thriving place, well built, with clean spacious streets; it has a teachers' college, a lyceum, and a library. It still adheres to plans for streets and buildings laid down by its founder, Charles III, Duke of Nevers, in 1606. It manufactures hardware, leather, sugar, brushes, and beer, and the Meuse affords facilities for considerable trade in metals, coal, iron, slate, wine, and nails. Pop. (commune), 1901, 18,772; 1911, 22,654. It was the mediæval Arcæ Remorum and Carolopolis, and an important military station until the destruction of its fortifications in 1687.

CHARLEVOIX, shär'le-voi'. A city and the county seat of Charlevoix Co., Mich., 210 miles by rail north by east of Grand Rapids, on the Pere Marquette Railroad, and on the Pine River, which flows into Lake Michigan (Map: Michigan, D 3). It is a popular summer resort and has important fishing and lumbering interests. It manufactures cement, lime, and stone and lumber products. The United States Fish Hatchery has a substation here, and the city contains a Carnegie library and municipal electric light plant and water works. The city was chartered in 1905. Pop., 1900, 2079; 1910, 2420.

CHARLEVOIX, shär l'-vwä', Pierre François Xavier de (1682–1761). A French missionary and traveler, best known as the historian of "New France." He was born in Saint-Quentin, became a member of the Society of Jesus in 1698, and from 1705 to 1709 taught in Quebec, Canada. He then returned to France; but in 1720 was sent to America by the Duke of Orléans to gather information concerning the "Western Sea," then supposed to be only a short distance from the Mississippi River. Arriving at Quebec in September, he ascended the St. Lawrence and the Great Lakes as far as Michilimackinac, and, after questioning the Indians, reported that the Pacific could probably best be reached by way of the Missouri. He proceeded by way of Lake Michigan and the Illinois River to the Mississippi, descended in a small vessel to New Orleans, and, after suffering a shipwreck, went to the island of Santo Domingo, whence, in December, 1722, he returned to France. Subsequently he was sent on various missions by his order, and from 1733 to 1755 collaborated on the *Journal des Trévoux*. He is best known for his *Histoire et description générale de la Nouvelle France avec le journal historique d'un voyage fait dans l'Amérique septentrionale* (1744; Eng. trans. by J. G. Shea, 1865–72), which contains much valuable material. Among his other writings are: *Histoire et description générale du Japon* (1715); *Vie de la mère Marie de l'Incarnation* (1724); *Histoire de l'île espagnole, ou de Saint-Domingue* (1730); and *Histoire du Paraguay* (1756; Eng. trans., 1769).

CHAR'LOCK. See Mustard.

CHARLOTTE, shär-lŏt'. A city and the county seat of Eaton Co., Mich., 18 miles southwest of Lansing, on the Grand Trunk and the Michigan Central railroads (Map: Michigan, E 6). Charlotte contains a Carnegie library. It is of importance as a manufacturing centre, the principal products being furniture, automobiles, scythe swats, ball bats, horse pokes, bridges, and road culverts. There are also grain elevators and grist mills. Settled in 1835, Charlotte was incorporated as a village in 1863 and in 1871 as a city. The government is administered by an annually elected mayor and a council. The city owns and operates the water works. Pop., 1900, 4092; 1910, 4886.

CHARLOTTE, shär'lŏt. A city and the county seat of Mecklenburg Co., N. C., 174 miles by rail west by south of Raleigh, on the Southern, the Piedmont and Northern, the Norfolk Southern, and the Seaboard Air-line railroads, and on Sugar Creek (Map: North Carolina, B 2). It is in the gold region of the State, and a branch mint was established here in 1838. It was closed by the breaking out of the Civil War, reopened in 1869, and was made an assay office. The city has two colleges for women, a military institute, a Carnegie library, a library for the colored population, hospitals for white and colored persons, a United States courthouse, and Vance Park. Biddle University (Presbyterian), for colored students, opened

in 1867, is just outside the city limits. Charlotte is an important commercial and industrial centre. There are more than 300 cotton mills situated within 100 miles of the city. Iron, mill supplies, farm machinery, scales, caskets, show cases, leather belting, and clothing are manufactured also. There are in the city and vicinity several electric plants, which furnish power for manufacturing at a very low cost. The government, under a charter of 1866 and subsequent amendments, is vested in a mayor, biennially elected, and a council. There are municipal water works. Pop., 1890, 11,557; 1900, 18,091; 1910, 34,014; 1920, 46,338.

Settled about 1750, Charlotte was incorporated in 1768 and in 1774 was made the county seat. The so-called Mecklenburg Declaration of Independence (q.v.) was adopted here on May 20, 1775, the signers of which are commemorated by a monument. In September, 1780, Lord Cornwallis entered Charlotte and occupied it for several days. He referred to it as a "hornet's nest," and this has since been adopted as the city's emblem. Later in the year General Gates made his headquarters here. The city was the last meeting place of the full Confederate cabinet. Consult W. H. Foote, *Sketches of North Carolina* (New York, 1846).

CHARLOTTE. 1. The daughter of Sir Jasper in Fielding's farce, *The Mock Doctor*. The character was suggested by Lucinde in Molière's *Médecin malgré lui*. 2. The gay fiancée of Cantwell, who later marries Darnley, in Bickerstaffe's *Hypocrite*, suggested by Marianne in Molière's *Tartufe*. 3. The simple wife of Albert, whom Werther loves, in Goethe's *Sorrows of Werther*. 4. The sweetheart of Wrangle in Cibber's comedy, *The Refusal*.

CHARLOTTE AMALIE, shär-lŏt' ȧ-mä'lê-*e*. The only town of the island of St. Thomas, in the West Indies (Map: West Indies, F 3). It has a spacious harbor, furnished with a floating dock for ships up to 3000 tons, and is an important coaling station. Pop., 1901, 8540.

CHARLOTTE HARBOR. A shallow inlet on the gulf coast of Florida, extending inland about 25 miles (Map: Florida, F 5). The inner harbor is about 10 miles wide at its widest part. The outer harbor is separated from the Gulf of Mexico by a line of keys which reduces the main entrance to the bay to a width of three-fourths of a mile. Pine Island partly divides the inner from the outer harbor. Wild waterfowl and fish are plentiful.

CHARLOTTENBURG, shär-lŏt'ten-bo͝orĸ (Ger., Charlotte's town). A prosperous town and residential suburb of Berlin in the western outskirts of the city (Map: Prussia, E 2). It is connected with Berlin by street railway, by the Stadtbahn and the Hochbahn (an elevated road). It has numerous educational institutions, including a gymnasium, high school, royal academy of music, royal academy of art, artillery and engineering school, technical academy, physical-technical institute, and a military preparatory school. The Technical Academy is a spacious and noteworthy building, containing statues and busts and a valuable architectural museum. A splendid municipal opera house was opened in 1912. The Schiller Theater and an equestrian statue of Emperor Frederick III are also interesting. The manufacturing interests of the city are important; chief among them is the Royal Porcelain Factory, founded in 1761. There are also iron foundries and manufactures of machinery, glass, pottery, electrical apparatus, dyes, wagons, woodworking machinery, asphalt, beer, paper, leather, and chemicals. Horses from the surrounding territory are marketed here. The palace, the main portion of which was finished by 1699, under Schlüter's direction, for Sophia Charlotte, second wife of Frederick I, consists of a group of buildings, with a garden laid out by the French landscape gardener Le Nôtre. The rococo ornamentations and the porcelain chamber are noteworthy. Emperor Frederick III was confined here during a part of his fatal illness. In the garden is the handsome Doric mausoleum, erected in 1810 by Gentze, according to the designs of Schinkel, containing the tombs of Frederick William III and Queen Louisa, and Emperor William I and Empress Augusta. Pop., 1890, 77,000; 1900, 189,305; 1910, 305,181. Consult Schultz, *Story of Charlottenburg* (Charlottenburg, 1888).

CHARLOTTESVILLE, shär'lŏts-vĭl. A city of Virginia, 182 miles by rail, and direct, 97 miles northwest of Richmond, on the Chesapeake and Ohio and the Southern railroads, and on Rivanna River (Map: Virginia, F 3). It is the seat of the University of Virginia (q.v.), founded by Thomas Jefferson, and of St. Anne's School for Girls, Jefferson School, Miller's Manual Training School, and the University Summer School. It contains also two hospitals and two sanitariums. Monticello, Jefferson's home, is but 3 miles distant, to the southeast. The city has woolen, flour, silk, and planing mills, tanbark, locust-pin, and cigar factories, wine presses, etc., and is in a rich agricultural and fruit-growing region. Settled as early as 1744, Charlottesville was chartered as a city in 1888. The government is administered by a city manager elected by the city council. The water works and gas plant are owned and operated by the municipality. Pop., 1890, 5591; 1910, 6765; 1920, 10,688.

CHARLOTTETOWN, shär'lŏt-toun. Capital of Prince Edward Island, Canada, in Queen's County, situated on the south coast, on Hillsboro Bay, and at the confluence of three rivers (Map: New Brunswick). There is steamship connection with various Dominion ports. A railway and carriage bridge, half a mile long, spans the Hillsboro River east of the city. Charlottetown has a fine harbor. It stands on rising ground and is intersected by wide streets at right angles to each other. The Provincial Government and Dominion buildings, courthouse, Young Men's Christian Association building, Roman Catholic cathedral, public library, city hall, insane hospital, normal school, Prince of Wales College, and St. Dunstan's College are noteworthy features. The industrial establishments include iron foundries, railroad workshops, pork-packing, condensed-milk, woolen factories, etc. Agricultural produce and fish are exported. Charlottetown is the seat of a United States consul. Pop., 1901, 12,080; 1911, 11,203. Charlottetown was founded about 1767, the site having been selected in 1764 by Captain Holland, surveyor-general for eastern Canada. In 1775 the town was looted by two American privateers, an act which was condemned by Washington, who liberated the prisoners and restored their property. Canadian confederation originated at a conference held in 1864 in Charlottetown.

CHARLTON, John (1827–1910). A Canadian statesman. He was born near Caledonia, N. Y., and was educated at Springfield Academy.

He went to Ontario in 1849, was engaged for some years as farmer and merchant, and after 1861 acquired a considerable fortune in the lumber business. He was elected a Liberal member of the House of Commons for North Norfolk in 1872 and represented that constituency for 24 years. He commanded attention in the House and gained a high reputation in the country by his mastery of trade and tariff questions; but an exacting conviction that government should promote private and public morality and assure equal rights led him at times to take a legislative course in which he was in notable conflict with his party and a leader of a vigorous and discontented minority. During the agitation in 1885 and later over the execution of Louis Riel (q.v.) he supported the Conservative Premier, Sir John A. Macdonald. When dissatisfaction was aroused among the Protestant element by the Jesuit Estates Act (see MERCIER, HONORÉ), he was one of 13 members who in 1889 voted for a parliamentary resolution against the act; and among those who adhered to the Equal Rights' party, formed at that time, Charlton was a leader. Mainly through his efforts a measure, commonly known as the Charlton Act, was enacted for the protection of women and girls, in the case of the latter raising the age of consent to 16 years. He was a founder of the Dominion Lord's Day Alliance, an organization established in 1888. In the same year he was appointed chairman of the Ontario Mining Commission. He was a stanch advocate of reciprocity with the United States and in 1897 visited Washington in that behalf. He died at Lynedoch.

CHARM. See INCANTATION; MAGIC.

CHARMES, shärm, FRANCIS (1848–1916). A French editor, born at Aurillac. He was educated at the Collège d'Aurillac and the lycées of Clermont-Ferrand and Poitiers. From 1872 to 1880 and from 1889 to 1907 he was editor of the *Journal des Débats* and was also editor of the *Revue des Deux Mondes* from 1893 to 1907, when he became its manager. He held several offices in the Department of Foreign Affairs, was deputy for Contal in 1881–85 and 1889–98, and senator for Contal in 1900. In 1908 he became a member of the Academy. Besides his literary and political articles in the journals mentioned, he published *Etudes historiques et diplomatiques* (1892).

CHARMIDES, kär'mĭ-dēz (Lat., from Gk. Χαρμίδης) (c.450–404 B.C.). A pupil of Socrates, cousin of Critias, and maternal uncle of Plato, who introduces him in one of the *Dialogues*. He was one of the "Thirty Tyrants" at Athens in 404 B.C., but was slain the same year, while fighting against Thrasybulus. Consult Plato, *Charmides*, and Xenophon, *Memorabilia*.

CHARMIDES. One of the dialogues of Plato representing a conversation between Socrates, young Charmides, and two other Athenians on the subject of moderation.

CHARNAY, shär'nā', CLAUDE JOSEPH DÉSIRÉ (1828–). A French traveler, born in Fleurieux, Rhône. In 1857, under the auspices of the French government, he began a long series of expeditions to Mexico and other parts of the world. With the further assistance of Pierre Lorillard, he in 1880 undertook the exploration and excavation of the ancient cities of Mexico. He made many important discoveries, the chief results of which are set forth in the collection at the Museum of the Trocadéro and in his work *Les anciennes villes du nouveau monde* (1884), of which an English translation appeared in 1887 (*The Ancient Cities of the New World*, by Mesdames Gonino and Conant; introduction by Allen T. Rice). He has also published: *Cités et ruines américaines* (1863), with an atlas; *A travers les forêts vierges* (1890); and *Histoire de l'origine des Indiens qui habitent la Neuvella Espanga selon leurs traditions* (1903).

CHARNEL HOUSE (OF. *charnel, carnel*, ML. *carnale*, charnel, from *caro*, flesh + *house*). A chamber situated in a churchyard or other burying place, in which the bones of the dead which were thrown up by the gravediggers were reverently deposited. The charnel house was generally vaulted in the roof, and was often a building complete in itself, having a chapel or chantry attached to it. In such cases the charnel vault was commonly a crypt under the chapel, and even in churches it was not uncommon for the vault or crypt to be employed as a charnel house.

CHARNISÉ, shär'nē'zā', CHARLES DE MENOU, SEIGNEUR D'AULNAY DE (c.1605–1650). A French proprietor in Acadia. In 1632 he accompanied the party under Isaac de Razilly which settled at La Have for the purpose of recovering the Acadian possessions of France. In 1635 Charnisé commanded an expedition to the Penobscot River, where he conquered the fort which had been built there by the Plymouth colonists, telling its defenders that in the following year he would annex the entire region to the fortieth degree, north latitude. After the death of Razilly (1636) Charnisé succeeded to the command and made Port Royal (Annapolis) the chief settlement of Acadia, then a vast territory embracing what is now New Brunswick and Nova Scotia and afterward extending to the Penobscot. He later captured Fort La Tour, and in 1645 went to France, where he was appointed Governor and Lieutenant General of Acadia by the government of Louis XIV (1647). As soon, however, as the charge of treachery reached the court, Charnisé was dismissed from office and superseded by La Tour. His widow married La Tour in 1653.

CHAR'NOCK, STEPHEN (1628–80). An English Puritan theologian, was born in the parish of St. Catherine Cree-Church, London, where his father was a solicitor. He was educated at Cambridge and at Oxford, and became proctor at the latter when Oliver Cromwell was Chancellor. He went to Ireland as chaplain to Henry Cromwell, Lord Deputy. In 1660 he was silenced by the Act of Uniformity and returned to London, where he preached for 15 years, but without a settled congregation. He was a man of great piety and vast learning. After his death his writings were published, the chief being *On the Excellence and Attributes of God* (1681–82). In 1860 Prof. James McCosh published an edition of Charnock's works, with a life of the author.

CHARN'WOOD FOREST. A forest in the northwestern part of Leicestershire, England. It lies on a gradual rise of ground culminating in Bardon Hill, which is 900 feet high.

CHARNY, COMTE DE. See CHABOT, P.

CHARON, kā'ron (Lat., from Gk. Χάρων, Etrusc. *Charun*). In classical mythology, the ferryman of the lower world, who conveys to the realm of Hades the souls of the dead that have been duly buried. He does not appear in

Homer or Hesiod, but was early prominent in popular belief and appeared in one of the lost epics, whence Polygnotus introduced him into his great painting of "Odysseus in the Lower World." From the fifth century B.C. Charon appears frequently in literature. He is also often represented on the Athenian white lecythi, vases buried with the dead, where he is depicted as a bearded old man wearing the short tunic and pointed cap of a seaman, in a skiff with a single oar. To pay the fare a small coin (*obolus*) was placed in the mouth of the dead; bodies with coins in the mouth have been found even in Switzerland and Italy. On Etruscan monuments Charon is represented as a demon of death, with bestial face, huge tusks, and pointed ears, carrying snakes or, more commonly, a large hammer. The bodies of fallen gladiators were dragged from the arena by a man disguised as this Etruscan demon. In modern Greece Charon survives as *Charos* or *Charontas*, who, as a black bird of prey or as a winged horseman, bears victims to the world of the dead. Consult Ambrosch, *De Charonte Etrusco* (Breslau, 1837), and Waser, *Charon, Charun, Charos* (Berlin, 1898).

CHARONDAS, kâ-rŏn′dăs (Lat., from Gk. Χαρώνδας). A Greek of the sixth century B.C., born at Catana, in Sicily, and mentioned, with Lycurgus, Solon, Zaleucus, and others, as a famous lawgiver. To him were ascribed the laws of the Chalcidian colonies in Sicily and Italy, praised by Aristotle as very carefully drawn. Certain citations from his works by Stobæus and Diodorus are to be assigned rather to later modifications of his work.

CHA′RON OF LAMP′SACUS (first half of fifth century B.C.). One of the earlier Greek historical writers, known as logographers (q.v.). He composed a history of Persia, from the point of view of Persia's relation to Greece, which probably included the story of the invasion of Xerxes. He wrote also a work called *Horoi*, dealing primarily with Lampsacus. Consult Kreuzer, *Historicorum Græcorum Antiquissimorum Fragmenta;* Müller, *Fragmenta Historicorum Græcorum* (Paris, 1841); Bury, *The Ancient Greek Historians* (New York, 1909).

CHARON'S (kā′ronz) **STAIRCASE** (trans. of Gk. Χαρώνειος κλῖμαξ, *Charōneios klimax*). A series of steps which led up to the stage (the acting place) in the Greek theatre, by which "the ghost" made his entrance. Consult Haigh, *The Attic Theatre* (3d ed., Oxford, 1907).

CHARPENTIER, shär′päN′tyā′, François Philippe (1734–1817). A French mechanic, engraver, and designer. He was born in Blois and studied engraving in Paris. He invented the aquatint or nitric-acid process in engraving, but sold his secret to Count Caylus. The earliest engravings in aquatint made by him are the following: "Perseus and Andromeda," after Vanloo; "The Decapitation of John the Baptist," after Guercino; and "The Children's Bacchanal," after De Witt. As "royal mechanician" he afterward effected numerous improvements in the construction of lighthouses, war vessels, and firearms.

CHARPENTIER, Gustave (1860–). A French composer, born in Dieuze, Lorraine. He studied at the Paris Conservatory under Massart, Pessard, and Massenet, taking the Grand Prix de Rome in 1887. He wrote numerous songs and orchestral pieces and a symphonic drama, *La vie du poète*, produced at the Grand Opéra in 1892. But the most notable of his works is the opera *Louise*, of which he wrote both words and music, and which was produced in 1898 at the Opéra Comique. The scene is laid in modern Paris (in Montmartre), and the realism and dramatic power of the libretto, as well as the beauty and originality of the music, took Paris by storm and placed Charpentier in the front rank of the French "impressionists." *Louise* found its way into Germany, England, and the United States, meeting with considerable success. *Julien*, produced in 1913 (in the United States in 1914), was a distinct disappointment. Three other operas, *Marie, Orphée, Tête rouge*, have not yet been produced. In 1912 Charpentier was elected to a chair in the Paris Academy of Fine Arts.

CHARPENTIER, Johann Friedrich Wilhelm Toussaint (1738–1805). A German mining engineer. He was born in Dresden, studied law and mathematics at the University of Leipzig, and in 1766 was made instructor in mathematics at the Mining School of Freiberg, where he became interested in mining methods and metallurgy. As the introducer into Germany of the processes of amalgamation employed in Hungary and of various other improvements, Charpentier takes high rank among the German metallurgists of the eighteenth century. His scientific methods of mining as well as his geognostic investigations greatly stimulated the development of these branches in Germany. He wrote: *Mineralogische Geographie der kursächsischen Lande* (1778); *Beodachtungen über die Langerstätten der Erze hauptsächlich aus den sächischen Gebirgen* (1799); *Beitrage zur geognostischen Kenntnis des Reisengebirges schlesischen Anteils* (1804).

CHARPENTIER, Louis Eugène (1811–90). A French historical and genre painter. He was born in Paris and studied there under Gérard and Cogniet. He exhibited first in the Salon of 1831, "Bivouac of Cuirassiers," and afterward became known entirely as a painter of battle pictures in a large panoramic style with great attention to detail. In Versailles, where he became professor of design in 1876, there are several pictures by him—among them "The Battle of Moscow," "An Episode of the Siege of Antwerp," and "The Battle of Tchernaïa."

CHARPENTIER, Marc Antoine (1634–1704). A French composer, born in Paris. He studied under Carissimi in Rome and became chapelmaster to the Dauphin under Louis XIV. At the time of his death he was chapelmaster of the Sainte-Chapelle. He wrote only two operas, *Acis et Galathée* (1678) and *Médée* (1693). His fame rests principally upon his oratorios, of which he wrote 18 in the style of his teacher. One of these, *Le reniement de St. Pierre*, was revived with great success in Paris in 1903. Besides these he wrote 8 masses, 30 Psalms, 6 cantatas, numerous smaller sacred compositions, and some instrumental pieces.

CHARPIE, shär′pē (Fr., from p.p. of OF. *charpir*, to pluck, from Lat. *carpere*, to seize). Ravelings of linen; lint. They were used by surgeons as a dressing for discharging wounds, ulcers, etc., before sterilized gauze came into vogue.

CHARRAS, shà′râs′, Jean Baptiste Adolphe (1810–65). A French military writer, born in Pfalzburg, Lorraine. He entered the artillery and engineering school in Metz, became an officer of artillery, served in Algeria, and in 1848 was appointed a lieutenant colonel and Undersecre-

tary of State in the Ministry of War. In the Assembly of 1848 and of 1849 he vigorously opposed the politics of Louis Napoleon and was banished after the coup d'état, thereafter residing in Belgium, Holland, and Switzerland. He wrote two valuable works, *Histoire de la campagne de 1815: Waterloo* (1858), and an incomplete *Histoire de la guerre de 1813* (1866).

CHARRETTE, shȧ'rĕt', The Knight of the (trans. of Fr. *Chevalier de la Charrette*). A contemptuous nickname earned by Lancelot in a French variation of the Arthurian legends. According to this version the knight, while galloping to the rescue of Guinevere, fell from his horse and was brought home in a cart (*charrette*). A modernized edition of Chrestien de Troyes's *Roman de la Charrette* appeared in Rheims, 1849, under the direction of Tarbe.

CHARRIERE, shȧ'ryâr', Agnès Isabelle Emile de Saint-Hyacinthe de (1740–1805). A Swiss writer. She was born in Utrecht, the daughter of a Dutch nobleman. In 1771 she married M. de Charrière de Penthaz, a Swiss who had been her brother's teacher, and went to live at Colombier near Neuchâtel. As a writer she was entirely French in spirit. Under the pseudonym Abbé de La Tour, she published *Lettres neuchâteloises* (1784); *Caliste, ou lettres écrites de Lausanne* (1788)—her masterpiece—and *Les trois femmes* (1798). She also wrote some plays. She was on terms of close friendship with Madame de Staël and Benjamin Constant and was well known as a brilliant and beautiful woman.

CHARRON, shȧ'rôn', Pierre (1541–1603). A French theologian and philosopher. He was one of the 25 children of a bookseller of Paris. He practiced law for a time in Paris, but, not having immediate success, he studied theology and rose to eminence as a preacher. In Bordeaux he formed a short but important friendship with Montaigne, who, on his death in 1592, requested Charron to bear the arms of the Montaigne family. In 1594 Charron published *Traité des trois vérités*, in which he dogmatically defended the Roman Catholic church. This was followed by a book of sermons, and in 1604 came his most remarkable work, *Traité de la sagesse*, in which he expressed skepticism with regard to science, but asserted the competence of reason to construct an adequate system of morality. Consult Liebscher, *Charron und sein Werk: De la sagesse* (Leipzig, 1890), and Vinet, *Moralistes de 16e et 17e siècles* (1904).

CHARRUA, chär-rōō'ȧ. A savage and warlike tribe formerly roving, without fixed homes, over all of modern Uruguay and somewhat beyond that. They were of dark complexion and heavily built, fought on horseback, and used the bolas. They had the custom of cutting off a finger joint on the death of a relative. They are now practically extinct. Their language, spoken also by the Bohanes, Chanes, Guenoas, Martidanes, Minuanes, and Yaros, constituted a distinct stock. According to Aráujo, "the last of the Charrúas," on exhibition in Paris in 1830, died there some time afterward. The Uruguayan "Gauchos" have a good deal of Charruan blood. Consult the article by Chamberlain on the Charruan stock in *American Anthropologist*, N. S., vol. xiii, pp. 468–471 (1911) and references there cited; also *Rev. de la Univ. de Buenos Aires*, vol. xxiv, pp. 231–237 (1913).

CHART (Fr. *charte*, charter, Lat. *charta*, paper, from Gk. *χάρτη*, *chartē*, paper). A marine or hydrographic map, exhibiting a portion of a sea or other body of water, with the islands, adjacent coasts, soundings, currents, etc. (See Map.) Charts are made of convenient size and scale for the purpose desired and are usually constructed on the principle of Mercator's projection; charts of the oceans on the gnomonic projection are, however, published by the Hydrographic Office of the United States Navy for the convenience of navigators who wish to follow great-circle courses; and the coast and harbor charts of the United States, published by the United States Coast and Geodetic Survey, are on the polyconic projection. Charts are constructed with more accuracy than ordinary maps, and efforts are made to embody in them all the information possible. The meridians and parallels of latitude are drawn at convenient intervals, and on harbor charts the exact geographical position of some datum point is given. One or more compass roses (i.e., plans similar to the face of a compass card) are engraved in the chart where most needed, or where they will not interfere with soundings or other matters, and these show the magnetic variation, while the annual change is recorded in a note. In the case of harbor charts the rise and fall of the tide and lunitidal interval are given; this is important when the tidal range is considerable, for the depths, or soundings, recorded are based upon some particular state of the tide, usually that of mean low water. Shoals and shallow waters are indicated by dotted shading, or stippled tint, in order that their presence may more readily be noticed, and rocks are marked by crosses or other conventional signs. The soundings are expressed in fathoms or in feet, whichever will best serve in the particular locality, and a note under the title states which is used. The character of the bottom is indicated by symbols, giving the kind of material (sand, mud, rock) and its hardness, fineness, color, etc.

Lighthouses, buoys, beacons, and other aids to navigation are carefully shown in their proper position; and, when desirable to do so, the proper courses for entering or leaving a port or channel are indicated by broken lines, alongside which the compass courses are printed. The depths and coast line in nearly all parts of the world are constantly changing, as are the lighthouses, buoys, and aids to navigation. This requires unceasing watchfulness on the part of chart-issuing offices, and the correction of charts constitutes more than half the expense connected with their production and issue. Charts already printed and on the shelves of the issuing office are corrected by hand, several draftsmen being constantly engaged in the work. If, however, the correction in this manner takes more than a few minutes, the copies on the shelves are destroyed and a new edition printed with the correction embodied in the engraving. The sources of information for corrections are the reports from men of war or merchant ships, from lighthouse boards, inspectors of harbors, channels, and waterways, new surveys, and the like. These are embodied in *Notices to Mariners* and published at short intervals, usually once a week. The information is arranged in the most convenient manner possible for the use of navigators, the number of each chart affected by a note being stated. In addition to this, the notices give a list of charts of which new edi-

tions have been published or which have been extensively corrected.

For purposes of navigation the character of the projection (i.e., the plan by which the curved surface of the earth is represented on a plane) is most important. The Mercator projection is most used and decidedly the most popular. The meridians are rectilinear and parallel, and this enables the navigator to lay down the compass course as a straight line; and charts on this projection of the same scale and latitude may be joined at the edges. Neither of these important characteristics is possessed by the polyconic, which is best suited to the delineation of small areas such as harbors of moderate extent or certain types of ocean charts. The line of sight and the great-circle course are nearly straight lines on a polyconic chart, and areas and shapes near the central meridian are undistorted. The saving of distance through following great-circle arcs is very slight except on long voyages, and the conditions of average wind and weather are likely to reduce the value of the saving even then, because the great-circle arc, when it differs from the rhumb line (q.v.), always lies on the polar (and therefore usually the colder and stormier) side of it. Whether it is desirable to follow a great circle or not can readily be determined by comparing the course as laid down on a great-circle chart (gnomonic projection) with a wind, weather, and current chart, such as the pilot chart issued by the Hydrographic Office of the United States Navy. See Pilot Chart.

Charts are now chiefly printed from engraved plates (copper, except in France, where many soft steel plates are used), for various reasons, the principle of which is that it facilitates the introduction of new matter in certain parts without the necessity of reproducing the whole. To effect the correction the plate is turned face downward on a smooth anvil or hard surface, and the area to be reëngraved smoothed out and the metal brought up flush with the general surface of the plate by beating on the back over the predetermined area with a round-faced hammer. Preliminary charts, and others of temporary interest, of which the details do not change, are largely produced by photolithography. With this process tough, flexible paper cannot be satisfactorily used, and if a photolithographic chart is to be much handled it requires backing with cloth.

As already stated, there are in the United States two chart-making offices, the Hydrographic Office of the Navy, and the Coast Survey, the latter publishing charts (about 800) of the United States coast only; and the former, charts (about 2000) of the Great Lakes and of foreign territory and seas. The main office of each of these establishments is in Washington, but for the purpose of gathering and disseminating information of service to navigators, the Hydrographic Office has branches in all the principal seaports of the United States and several on the Great Lakes. It is likely that additional ones will soon be opened at Manila and Honolulu, with observing stations at Guam and Tutuila, when these can be reached by telegraph. In Great Britain the Hydrographic Office is under the Admiralty. Charts are also published by nearly all the European Powers, and by Brazil, Chile, and Japan, and there are several private makers who issue charts of special localities. The price of government charts is very low, barely sufficient to cover the cost of printing and paper.

CHARTA, kär'tȧ, Magna. See Magna Charta.

CHARTE, shärt (Fr., charter, from Lat. *charta*, paper). A French term, used especially to designate the constitution or organic law granted by Louis XVIII on his restoration in 1814. It was formerly written *chartre*. The word is an old one and applied to a large class of legal documents. Among the best known of the older chartes was the *Charte Normande* or *aux Normands*, containing the privileges granted to the Normans (1314–15) by Louis X. The Trésor des Chartes of France is one of the important bureaus of the national archives. The École des Chartes in Paris is the leading school of the world for instruction in the study of historical documents. The charte of 1814 has always been considered the fundamental law of constitutional monarchy when that form of government has existed in France. It was an act of royal grace and not in any sense a popular constitution or even a contract between king and people. This fact eventually led to the revolution of 1830. The charte sworn to on the 29th of August of that year by King Louis Philippe explicitly recognized the sovereignty of the people. This document, with some modifications, remained in force till the revolution of 1848. Consult Floquet, *Charte aux Normands, avec ses confirmations* (Caen, 1788).

CHARTER (OF. *chartre*, from Lat. *chartula*, dim. of *charta* from Gk. χάρτη, *chartē*, paper). A formal writing by which property is granted or rights and privileges are conferred. The term was formerly applied to a written conveyance of land, and property held under such an instrument was, in Anglo-Saxon law, called "charter-land," or "bookland." In this sense the word has given way to "deed."

The term "charter" is used to describe a grant of land, franchises, or other privileges by the state, or a solemn guaranty by the sovereign of popular rights. *Magna Charta*, or the great charter issued by King John in 1215, is one of the chief constitutional documents of Great Britain. It has been the custom of the British government for centuries to grant political charters to some of its colonies.

In American Colonial history grants of franchise, governmental privileges, and estates to companies for the purpose of establishing colonies, to the inhabitants of Colonies in general, or to individual proprietors, were embodied in charters. Of the first sort were the charters of Massachusetts Bay, granted by Charles I (1629), and the charter of Georgia, granted by George II (1732). Of the second sort was the charter of Connecticut granted to the people of the Colony by Charles II (1662). Of the third sort were the original charter of New York, granted to the Duke of York by Charles II (1664), and the charter of Maryland, granted to Lord Baltimore by Charles I (1632). Some of the Colonial municipal charters remain in force to the present day, but the general provisions of charters are of little use in the United States, as corporations are now created by the several legislatures or by Congress. Blackstone describes such charter governments as "civil corporations, with the power of making by-laws for their own interior regulations, not contrary to the laws of England; and with such rights

and authorities as are specially given them in their several charters of incorporation." Judge Story criticizes Blackstone's view, declaring that the charter Colonies of America "were great political establishments, possessing the general powers of government and rights of sovereignty, dependent indeed on the realm of England, but still possessing within their own territorial limits the general powers of legislation and taxation."

None of the British colonies are sovereign, their legislative authority being theoretically subordinate to the Imperial Parliament and government of Great Britain, which latter has a power of disallowance over the colonial legislation, exercisable within a limited period. This power has not been exercised as regards the Dominion of Canada for upward of 40 years. After the expiration of the time within which they are subject to disallowance, acts of the colonial legislatures possessing responsible government become just as much acts of the King as the statutes of the Parliament of Great Britain and Ireland.

In modern municipal law the term "charter" is most frequently used to denote the grant of a *franchise* by the sovereign power to a corporation. According to Blackstone, "the king's consent is absolutely necessary to the erection of any corporation, either expressly or impliedly given."

In the United States corporations are chartered, as a rule, by legislative act—either by a special statute which confers upon a particular corporation the special powers and privileges named therein, or under a general law which provides the method to be pursued by persons who would organize a corporation. In the latter case the articles of association, taken in connection with the provisions of the general statute, constitute the charter. If the corporation is a public one, such as a city, county, or town, its charter may be changed at will by the Legislature. Such a corporation is a mere agency of the State for the exercise of governmental powers within a particular area. It has no vested right to any of its powers or franchises. Its charter "is not a contract, but a law for the public good." On the other hand, the charter of a private corporation is a contract between the State and the corporators. As such, it is protected from repeal or modification by the provision of the Federal Constitution which declares that "no State shall . . . pass any . . . law impairing the obligation of contracts" (Art. I, Sec. 10). The State granting the charter may, however, reserve the right to alter, amend, or repeal it. Consult: MacDonald, *Select Charters of American History, 1606–1775* (New York, 1904); Dicey, *Lectures Introductory to the Study of the Law of the English Constitution* (5th ed., London, 1912); Cooley, *General Principles of Constitutional Law in the United States*. See CORPORATION.

CHAR'TERHOUSE' (a corruption of Fr. *Chartreuse*). The name applied in England to Carthusian monasteries. The first was founded at Witham, on the borders of Selwood Forest, in 1181, by King Henry II in fulfillment of a vow made on the occasion of his memorable penance at the tomb of St. Thomas of Canterbury. The second was at Hinton in Somersetshire (1222); the third at Beauvale, Nottinghamshire (1343); the fourth, and most famous, to which the name is restricted in general usage, was situated in London. It was endowed by the will of Michael de Northburgh, Bishop of London, 1355–61, and the monks took possession of it in 1371. Its history is not of much general interest until the reign of Henry VIII, when in 1535 and the following years a number of the monks suffered death for refusing to acknowledge the royal supremacy in spiritual matters, the prior, John Houghton, being the first martyr for the old faith under the Reformation. The monastery was dissolved in 1538. The house passed through various hands, returning to the crown under Mary by the attainder of the Duke of Northumberland, and under Elizabeth by that of the Duke of Norfolk. The latter's son, the Earl of Suffolk, sold it in 1611 for £13,000 to Sir Thomas Sutton, whose coal lands in Durham had made him one of the richest Englishmen of his day. He richly endowed it as a hospital or almshouse for poor old men and a free grammar school, "to feed, clothe, and educate a certain number of poor boys, who without such assistance would be likely to go untaught." The "poor brethren" were 80 in number, none being admitted under 50 years of age; they must be bachelors and members of the Church of England. Each had a separate apartment, a share of attendance from domestics, and ample though plain diet, and an allowance of about £26 a year for clothes and pocket money. This part of the institution is best known by the famous description of it given in *The Newcomes* by Thackeray, who was himself educated at Charterhouse. The school was not long limited to the 40 foundation scholars, and grew until at the present time it ranks among the great public schools of England. Among the eminent men who have been educated here are Blackstone, Addison, Steele, John Wesley, and George Grote. In 1872, the old location amid crowded streets being thought unhealthful, the school removed to Godalming, in Surrey, 30 miles from London. The old premises were sold to the Merchant Taylors' School, which is now installed here in handsome new school buildings erected in 1875. The quaint old hospital and chapel, the latter containing Sutton's tomb, still remain as the home of aged pensioners. Consult: Hendricks, *The London Charterhouse* (London, 1889); Haig Brown, *Charterhouse, Past and Present* (Godalming, 1879); Eardley-Wilmot and Streatfield, *Charterhouse, Old and New* (London, 1894); Tod, *Charterhouse* (London, 1900); Doreau, *Henri VIII et les martyrs de la Chartreuse de Londres* (Paris, 1891); Wilmot and Streatfield, *Charterhouse Old and New*, with etchings by D. Y. Cameron (Stirling, Scotland, 1910); Taylor, *Charterhouse of London* (New York, 1912); Champney, "Charterhouse," in *Architectural Review*, vol. xi (1902).

CHAR'TERIS, ARCHIBALD HAMILTON (1835–1908). A Scottish clergyman and educator. He was born in Wamphray, educated in Edinburgh, Tübingen, and Bonn, and in 1863 was appointed minister of the Park Parish, Glasgow. He was professor of biblical criticism at Edinburgh from 1868 to 1898, when he became professor emeritus. He was a royal chaplain in 1869, and in 1892 moderator of the General Assembly of the Church of Scotland. In 1901 he was appointed chaplain in ordinary to the King in Scotland. His publications include a *Life of Professor James Robertson* (1863), *Canonicity* (1881), *A Faithful Churchman* (1897), and *The Church of Christ* (1905).

CHARTER OAK. A large tree that stood

in Hartford, Conn., until blown down, August, 1856, when its age was computed to be nearly 1000 years. The tradition relating to it is as follows: When Sir Edmund Andros was appointed Governor-General of New England, he came to Hartford in 1687 to receive the Colonial charter. This the colonists were loath to surrender, but, appearing to submit, carried it to the council chamber, where during the debate the lights were extinguished and in the ensuing confusion the document was carried from the room to its subsequent hiding place in the hollow of the tree. Here it remained until 1689, when the deposition of Andros made further concealment unnecessary.

CHARTER PARTY (Fr. *charte partie*, divided deed, one part being given to each party concerned; cf. *indenture*). In maritime law, a contract under seal by the owner or master of a ship, to carry a complete cargo of goods or to furnish a vessel or part of a vessel for that purpose. It is one form of the contract of *affreightment* (q.v.), the other being the familiar *bill of lading* (q.v.), which is employed when goods are shipped to form only a part of an intended cargo. Such a charter may operate as a lease of the ship itself, which thereupon passes under the control of the charterer; or, more commonly, it confers upon the shipper the right to have his entire cargo conveyed in the chartered vessel, in which case the charterer acquires no property right in the ship, nor any voice in its management. In the latter form of charter party the master or owner of the vessel occupies the position of a common carrier (q.v.); but where the charter transfers the possession and control of the ship, the master is the agent of the charterer, who becomes responsible for his acts and for those of the crew, and who, in the event of the chartered ship's earning salvage, becomes entitled to the salvage award.

The ordinary charter party describes the parties, the ship, and the voyage, stipulates that the ship is seaworthy, and will receive the cargo and perform the voyage promptly, and notes those perils of the sea for which the master and shipowner will not be responsible. On the part of the freighter, it stipulates to load and unload within a given time, with an allowance of so many lay or running days for loading and unloading the cargo, and the rate and time of payment of the freightage, and date of commencement of demurrage. Consult Scrutton, *Contracts of Affreightment as Expressed in Charter Parties and Bills of Lading* (4th ed., London, 1899).

CHARTIER, shär'tyā', ALAIN (c.1390–c. 1440). A French poet and diplomatist of very great literary influence in the fifteenth century, but since then almost forgotten save for the famous kiss bestowed—as legend will have it, in spite of chronology's proofs to the contrary—by Margaret of Scotland, wife of Louis the Dauphin, afterward Louis XI, on the lips of the sleeping poet, who is said to have been the ugliest man of his day. He studied in Paris, served Charles VI in important negotiations, and Charles VII as notary and financial secretary, as well as on a mission to Scotland. That he was Archdeacon of Paris, as asserted in an eighteenth-century epitaph and as generally believed, is, like the story of the kiss, proved false by chronology. Passages of his *Bréviaire des Seigneurs* were set to be learned by heart by court pages; Marot and Saint-Gelais, poets of the second following generation, praise him warmly; the English Lydgate studied and imitated him. His poems are mainly of lovers' controversy, but his *Livre des quatre dames* and *Le quadrilogue invectif* (1422) were evoked by the disasters of Agincourt and show a fine patriotic spirit. His *Lay de la belle dame sans merci* suggested at least a title to Keats. His work shows a boldness and freedom of thought that foreshadow the Renaissance. His works (Paris, 1617) were edited by A. Duchesne. Consult Delaunay, *Etude sur Alain Chartier* (with extracts from his writings, Paris, 1876), and Joret-Desclosières, *Alain Chartier* (1897).

CHARTISM. A Radical reform movement in England which reached its culmination in the period from 1838 to 1848. Its name originated in the *National* or *People's Charter*, which embodied the scheme of reform under six specific titles: (1) the right of voting to every male and every naturalized foreigner resident in the kingdom for more than two years, who should be 21 years of age, of sound mind, and unconvicted of crime; (2) equal electoral districts; (3) vote by ballot; (4) annual parliaments; (5) no property qualification for members; (6) payment of members of Parliament for their services. The Reform Bill of 1832 had failed to satisfy the working classes, and, after a period of terrible commercial depression and want, an unsuccessful attempt was made to institute a more thoroughgoing reform. Upon the failure of this movement six members of Parliament and six workingmen drew up the charter, which was hailed by large numbers of persons with enthusiasm. Immense meetings were held throughout the country, many of them attended by 200,000 or 300,000 people. Fiery orators fanned the excitement, and physical force was spoken of as the only means of obtaining justice. The more moderate were overruled by the fanatics, and the people, aroused by suffering, were easily wrought into frenzy by those who assumed direction. The Chartist propaganda was vigorously carried on by Feargus O'Connor in the *Northern Star*, an organ which attained a circulation of over 50,000. A body calling itself the National Convention, elected by the Chartists throughout the kingdom, commenced sitting in Birmingham in May, 1839. It proposed various means of coercing the legislature into submission, recommending a run on the savings banks for gold, abstinence from excisable articles, exclusive dealing, and, as a last resort, universal cessation from labor. During its sitting a collision took place with the military in Birmingham. Public meetings were forbidden, and alarming excesses were committed by the irritated mob. In June, 1839, a petition in favor of the charter was presented to the House of Commons, ostensibly signed by 1,280,000 persons. The House refused to name a day for its consideration, and the National Convention retaliated by advising the people to cease from work throughout the country. This advice was not followed, but the disturbance increased, and in November an outbreak took place in Newport, which resulted in the death of 10 persons and the wounding of great numbers. In 1842 great riots took place in the northern and midland districts, not directly caused by the Chartists, but encouraged and aided by them after the disturbances began. In the same year an attempt was made by Joseph Sturge to unite all friends of popular enfranchisement in a complete

suffrage union, but he succeeded only in dividing their ranks. In 1848 the turmoil in France created great excitement in England, and much anxiety was felt lest an armed attempt should be made to subvert the institutions of the country. Two hundred thousand special constables were enrolled in London alone, among which number was the subsequent Emperor, Napoleon III.

Adopting the language of Charles I, the opponents of Chartism denied that men *as such* had a right to vote; their right was to be well governed, and universal suffrage was more likely to destroy society than to confer happiness or insure justice. From 1848 Chartism as an organized movement disappeared, owing to the improvement in the circumstances of the people which followed the repeal of the corn laws. The Chartist leaders included Feargus O'Connor, Attwood, Lovett, Stephens, Vincent, Ernest Jones, and Thomas Cooper. Consult: *Life of Thomas Cooper: An Autobiography* (London, 1880); Carlyle, *Chartism* (London, 1839); Kingsley, *Alton Locke* (London, 1856); Gammage, *History of the Chartist Movement* (London, 1894); Dierlamm, *Die Flugschriftenlitteratur der Chartistinbewegung und ihr Widerhall in der öffentlichen Meinung* (Leipzig, 1909); Dolléans, *Le chartisme* (Paris, 1912).

CHARTOPHYLAX. See CHARTULARY.

CHARTRAN, shär'trăn', THÉOBALD (1849–1907). A French portrait and historical painter. He was born in Besançon, studied under Cabanel at the Ecole des Beaux-Arts, winning the Prix de Rome in 1877. Since 1872 he had exhibited at the Salon a series of historical pictures, such as "Joan of Arc" and "Angelica and Roger," which had attracted much attention. While in Rome he painted "The Vision of St. Francis of Assisi" (Museum, Carcasonne) and other religious pictures. After his return to Paris in 1883 he devoted himself almost exclusively to portrait painting, in which line he achieved great celebrity. Towards the end of his life he passed a part of each year in New York, and many members of the social and political world of America were among his sitters. Some of his most celebrated portraits are those of Mounet Sully as Hamlet, Sarah Bernhardt, Leo XIII, President Carnot, President Roosevelt (1903), Mrs. Roosevelt, and Miss Alice Roosevelt, President McKinley, Admiral Dewey, Secretaries Root and Knox, Andrew Carnegie, and Cardinal Gibbons. His "Signing of the Peace Protocol at Washington," an episode of the Spanish-American War, was presented to the United States government by Mr. H. C. Frick of Pittsburgh. His portraits are distinguished by able technique, refined manner, and subtle characterization. He also painted decorations for the Sorbonne, the Hôtel de Ville, and other public buildings in France. Consult Jules Martin, *Nos peintres et sculpteurs* (Paris, 1897).

CHARTRE. See CHARTE.

CHARTRES, shär'tr' (ML. *Carnotum*, Lat. *Carnutum civitas*, Gall. *Autricum*). A city of France, capital of the Department of Eure-et-Loir, and seat of a bishopric, 47 miles southwest of Paris (Map: France, N., G 4). It is built partly at the base and partly on the declivity of a hill overlooking the river Eure, thus consisting of an upper and a lower town connected by streets almost inaccessible to carriages. The upper town has some good streets, but the lower is ill built. Many of the houses are quaintly gabled, timbered buildings. The cathedral of Notre Dame, one of the largest and most imposing cathedrals in Europe, with lofty spires, one of them towering to a height of 413 feet, crowns the top of the hill. It has numerous stained-glass windows, the workmanship of which is unsurpassed, if indeed equaled, elsewhere in France, many of them dating from the thirteenth century. It is also famous for its sculptures. This splendid edifice was the source of inspiration for James Russell Lowell's poem "The Cathedral." The church of Saint-Pierre and the obelisk to the memory of General Marceau are also objects of interest. Chartres has manufactures of woolens, hosiery, and leather, and is the great cattle and grain market of the fertile plain of Beauce and the department. It has a chamber of commerce and a branch of the Bank of France. It has two teachers' colleges, a lyceum, a library of 127,409 printed volumes, a museum, and a botanical garden. Pop. (commune), 1901, 23,431; 1911, 24,103. The city, founded by the Carnutes, is one of the most ancient of France. In mediæval times it was the capital of the Province of Beauce. On several occasions it was besieged by Normans and Burgundians. Francis I conferred upon it the dignity of a duchy, and the title since 1661 has been connected with the Orléans family. Chartres was taken by the English in 1417 and recovered in 1432. It was captured by Henry IV in 1591 and witnessed his coronation in 1594. In 1870 it was occupied by the Germans and formed their base of operations against the army of the Loire. Consult: Doyen, *Histoire de Chartres* (2 vols., Chartres, 1786); Duval, *La cathédrale de Chartres* (Paris, 1867); Joanne, *Chartres* (Paris, 1887); Bulteau, *Monographie de la cathédrale de Chartres* (1887); Plerval, *Chartres, sa cathédrale, ses monuments* (1896); Massé, *Chartres: Its Cathedral and Churches;* Adams, *Mont Saint Michel and Chartres* (Boston, 1913).

CHARTRES, ROBERT PHILIPPE LOUIS EUGÈNE FERDINAND D'ORLÉANS, DUKE OF (1840–1910). A French soldier, the second son of the Duke of Orleans (died 1842), and the grandson of Louis Philippe. He was born in Paris, but when only eight years of age was driven into exile by the Revolution of 1848, and subsequently lived in Germany and England until 1858, when he entered the military school in Turin, Italy. In 1859 he served in the campaign against Austria, and in 1861 went to America with his eldest brother Louis, Count of Paris (q.v.), entered the Federal army, and served on General McClellan's staff during the Peninsular campaign. He returned to England in 1863 and there, in the following year, married his cousin, the eldest daughter of the Prince de Joinville. After the revolution of Sept. 4, 1870, in France, he served for two years in General Chanzy's army under the pseudonym of "Robert le Fort" and before the close of the war had risen successively to the ranks of captain and chief of squadron. He became chief of squadron in the Chasseurs d'Afrique, under his own name, in 1870, served in Algeria, and was appointed colonel of chasseurs in 1878, but in 1883 was suspended from the active service. In 1886 his name was stricken from the army list by a law excluding members of royal families from serving in the army or the navy. He published *Souvenirs de voyages* (1869).

CHARTREUSE, shär'trēz'. A liqueur, named

from the fact that it was made at the Carthusian monastery, La Grande Chartreuse, but when the Carthusian monks were driven out of France in 1903, the secret of its preparation was taken with them to Tarragon, Spain, where it is now prepared. The formula for the preparation is said to be known only to the Father Superior of the order. Three qualities are made—green, yellow, and white. Chartreuse is said to be a most complex product, resulting from the maceration and distillation of balm leaves and tops as a principal ingredient, with orange peel, dried hyssop tops, peppermint, wormwood, angelica seed and root, cinnamon, mace, cloves, Tonquin beans, *Calamus aromaticus,* and cardamoms.

CHARTREUSE, La Grande. A celebrated monastery in France, near Grenoble, in the wild and romantic valley of the Guiers, 3205 feet above the sea. It owed its origin to St. Bruno, the founder of the Carthusian Order, which took its name from a neighboring hamlet. (See Carthusians.) The convent building is a huge structure of no architectural beauty, dating mostly from 1676. The whole neighborhood at one time belonged to the monks, but they were despoiled by the Revolution. At Fourvoire, about 4 miles down the valley, they manufactured the celebrated liqueur which took its name from the monastery. In accordance with the Law of Associations of 1901, dealing with the control of religious congregations, the monks applied to the government for legal authorization. This was refused, and in 1903 the members of the order were expelled from the country and sought refuge in Spain, Italy, and Switzerland.

CHARTREUSE DE PARME, de pärm, La. The title of a French novel (1839), by Stendhal (Henri Beyle), presenting an admirable picture of life at one of the petty courts of Italy after the downfall of Napoleon.

CHARTULARY, kär'tû-lā-rĭ (Lat. *chartularia,* from *charta,* a paper). A collection of charters. So soon as any body, ecclesiastical or secular, came to be possessed of a considerable number of charters, obvious considerations of convenience and safety would suggest the advantage of having them classified and copied into a book or roll. Such book or roll has generally received the name of a chartulary. Mabillon traces chartularies in France as far back as the tenth century, and some antiquarians think that chartularies were compiled even still earlier. But it was not until the twelfth and thirteenth centuries that chartularies became common. They were kept not only by all kinds of religious and civil corporations, but even by private families. Many of them have been printed. For the English reprints, see Grass, *Sources and Literature of English History* (London, 1900). The name "chartulary" was also applied in western Europe to a registrar or keeper of records, who was known as "chartophylax" in the Eastern church and empire.

CHARYBDIS, kâ-rĭb'dĭs. See Scylla and Charybdis.

CHASE, Frederick Lincoln (1865–). An American astronomer, born at Boulder, Colo. He was educated at the University of Colorado and at Yale University. He became assistant astronomer in 1891 and acting director in 1910 of the Yale Observatory. Besides articles in the *Astronomical Journal,* he wrote "Heliometer Triangulation of the Victoria Comparison Stars" in *Annals of the Cape Observatory* (1897); and "Triangulation of the Principal Stars of the Cluster in Coma Berenices" (1896), "Parallax Investigations on 163 Stars mainly of Large Proper Motion" (1906), and "Parallax Investigations on 41 Southern Stars mainly of Large Proper Motion" (1912) in the *Yale University Observatory Series.*

CHASE, George (1849–1924). An American law teacher and writer. He was born in Portland, Me., graduated at Yale in 1870 and at the Columbia Law School in 1873. He became assistant professor of municipal law at Columbia in 1875 and in 1878 professor of criminal law, torts, and procedure. In 1891 he organized and became the first dean of the New York Law School. He edited Chase's *Blackstone's Commentaries* (1876); Stephen's *Digest of the Law of Evidence* (1886); Johnson's *Ready Legal Adviser* (1881); *Leading Cases upon the Law of Torts* (1904); *Chase's Pocket Code* (1911).

CHASE, Philander (1775–1852). A Protestant Episcopal bishop and educator. He was born in Cornish, N. H., graduated at Dartmouth in 1795, and was ordained a deacon of the Protestant Episcopal church in 1798. He labored as a missionary in western New York and in 1811 became rector of Christ's Church, Hartford, Conn. In 1817 he went to Ohio, where two years later he laid the foundation of Kenyon College and Gambier Theological Seminary, of which he was first president. In 1835 he became Bishop of Illinois, where he was instrumental in founding Jubilee College, at Robin's Nest, and in 1843 he became the presiding Bishop of the church. Among his works are: *A Plea for the West* (1826); *The Star in the West, or Kenyon College* (1828); *Defense of Kenyon College* (1831); *A Plea for Jubilee* (1835); *Reminiscences* (1848).

CHASE, Pliny Earle (1820–86). An American scientist. He was born in Worcester, Mass., and educated at Harvard University, graduating in 1839. He engaged in teaching and business in Philadelphia until 1871, when he became professor of logic and philosophy in Haverford College. He investigated many problems in physics and celestial mechanics and was the author of *Elements of Meteorology* (1884). For an investigation on gravity he received the Magellanic gold medal of the American Philosophical Society in 1864 and was a vice president of this organization as well as a member of many scientific societies, both European and American.

CHASE, Salmon Portland (1808–73). An American statesman. He was born in Cornish, N. H., Jan. 13, 1808, and was a nephew of Bishop Chase, who supervised his earlier education in Ohio. He graduated at Dartmouth College in 1826, opened a school for boys in Washington, D. C., where he studied law under William Wirt; was admitted to the bar in 1829, and began to practice in Ohio, where almost his earliest work was the preparation of an edition of the statutes of Ohio with annotations, and a sketch of the history of the State. This work assisted him in gaining practice, and in 1834 he was appointed solicitor in Cincinnati for the Bank of the United States. His first effort in a cause touching slavery was in defense (1837) of a colored woman claimed as a fugitive and of James G. Birney (q.v.) for harboring her. This was the celebrated Matilda case. He

maintained that the Fugitive Slave Law (q.v.) of 1793 was void, because unwarranted by the Federal Constitution, and argued that slavery was a local institution; and that, as the slave had been brought into a free State by her master, she was in fact free. In 1847, in the Van Zandt case, before the United States Supreme Court, he took the ground that under the Ordinance of 1787 (q.v.), no fugitive from service could be reclaimed from Ohio unless he had escaped from one of the original 13 States; that it was the understanding of the framers of the Constitution that slavery was to be left to the disposal of the several States, without sanction or support from the Federal government; and that the clause in the Constitution relating to persons held to service was a compact between the States, conferring no power of legislation on Congress and never intended to confer such power. Chase also took part in many other cases involving the constitutionality of the Fugitive Slave Law and came to be known among the slaveholders of Kentucky as the "attorney-general of fugitive slaves." Being in active correspondence with editors, clergymen, and politicians engaged in the antislavery movement, he soon became a recognized leader of the cause in Ohio. Although favoring the abolition of slavery, he differed radically from Garrison both as to methods of effecting that end and as to the relation of such movements to the existing law of the land. He voted for Harrison in 1840; but after the death of the President, when it became clearly apparent that the Whig party could never be made a party of freedom, he withdrew from it in 1841 and was thereafter prominent as a member of the Liberty party in Ohio, which he helped to organize. He took part in the National Liberty Convention in Buffalo in 1843 and subsequent conventions, until the nomination by the Free-Soilers (in 1848) of Martin Van Buren for President; was a leading member and in most cases directed the proceedings. He was frequently called upon to prepare formal addresses and platforms for his party and in particular was the author of the Liberty Platform of 1843, the Liberty Address of 1845, the resolutions of the People's Convention of 1847, and the Free-Soil Platform of 1848. In February, 1849, he was chosen United States Senator from Ohio, his vote coming from all the Democrats and from a few of the Free-Soil members. In the Senate he was an outspoken opponent of slavery extension, and he refused to accept Clay's compromise measures in 1850. Though under obligations to no one party for his election, he usually acted with the Democrats, until the nomination, in 1852, of Pierce on a strongly proslavery platform, when he withdrew and undertook the formation of an independent Democratic party.

Remaining in the Senate entirely independent of party relations, he became, even at the side of Sumner and Seward, the leader of the opposition to the Kansas-Nebraska Bill (q.v.), and, acting with Giddings and Sumner, he sent out the historic "Appeal of the Independent Democrats in Congress to the People of the United States," which, published in the New York *Times* of Jan. 24, 1854, has been regarded as the earliest draft of the Republican party creed. In 1855 the "anti-Nebraska" elements in Ohio fixed upon him as their candidate for Governor, and after a vigorous and close contest he defeated the candidate of the Old Democrats and brought Ohio into line as a probable Republican State in the campaign of 1856. In that year Chase was put forward as a candidate for the Republican nomination for the presidency, but he withdrew his name. In 1857 he was re-elected Governor of Ohio and became recognized thenceforth as a leader in the new national party. During his service as Governor he was much occupied with matters connected with the slavery problem, and at the expiration of his term he was (in February, 1860) elected again to the Senate for the term beginning March 4, 1861. He was one of the candidates for the Republican nomination for the presidency in 1860, and, failing to secure it, he was later appointed by Lincoln Secretary of the Treasury. In that office, which he held until June, 1864, when he resigned owing to differences between himself and President Lincoln, Chase rendered important public service. The maintenance of national credit and the supply of funds with which to prosecute the war, the provision and regulation of a currency system, the creation of a national banking system, and the administration of a national finance under conditions never before experienced or anticipated, mark these years as the most important in the history of the department and distinguish Chase as one of the great secretaries of the Treasury.

In the autumn of 1864 Chief Justice Taney died, and Chase was appointed as his successor in December of that year, retaining the office through a period in which were handed down a series of decisions second in importance only to those of Marshall. Chase dissented from the court's decision in the Milligan case and in the so-called Slaughterhouse cases; he wrote the decision in Hepburn *v.* Griswold, which held that the Legal-Tender Act, so far as it compelled the acceptance of paper money in payment of debts antedating the statute which provided for such money, was unconstitutional. The effect of this was naturally to disprove an important part of Chase's work as Secretary of the Treasury; and this decision against his own work was soon afterward, in the Legal-Tender cases, reversed by a slightly reorganized court. He also wrote the opinion in the case of Texas *v.* White, in which the nature of the Union and the effect thereon of the Civil War were clearly expounded, the nation being characterized as "an indestructible Union composed of indestructible States." As Chief Justice, Chase presided over the impeachment trial of President Andrew Johnson. He became separated from the Republican party and was in 1868 a candidate for the Democratic nomination for the presidency, while his willingness to secure the same nomination in 1872 emphasized the weakness of his position. There is no doubt that as early as 1864 he set his heart upon a presidential nomination and that he had to some extent intrigued against Lincoln, even while sitting in his cabinet. In 1870 he was stricken with paralysis, from the effects of which he died, May 7, 1873, in New York. For his biography, consult: Warden (Cincinnati, 1874), a work undertaken at Chase's own request; Schuckers (New York, 1874); and for a recent and authoritative *Life*, Hart (Boston, 1899), in the "American Statesmen Series"; also, "Diary and Correspondence," in the *American Historical Association Annual Report for 1902*, vol. ii (Washington, 1903).

CHASE, SAMUEL (1741–1811). An American

jurist, one of the signers of the Declaration of Independence. He was born in Somerset Co., Md., studied law in Annapolis, was admitted to the bar in 1761, soon attained a considerable practice, and became prominent in Colonial politics. He served for more than 20 years in the General Assembly of Maryland; was prominent as one of the "Sons of Liberty" during the Stamp Act excitement; was one of the framers of the "Declaration of Rights of Maryland"; and from 1774 to 1778 and from 1784 to 1785 was a member of the Continental Congress. In 1776 he was associated with Franklin and Carroll in an unsuccessful mission to secure the good will of Canada and soon after his return advocated and signed the Declaration of Independence. As agent for the State of Maryland, he went to England in 1783 to recover the value of stock held by it in the Bank of England before the outbreak of the war and after remaining a year succeeded in obtaining about $650,000. In 1788 he was a member of the convention which ratified the Federal Constitution for Maryland, but was himself, along with Luther Martin, opposed to that document. He was appointed judge of the General Court of Maryland in 1791 and judge of the Criminal Court for Baltimore County in 1793 and in 1796 became an associate justice of the United States Supreme Court. As a judge, though frequently presiding with firmness and ability, he was unable to suppress or conceal his decided political predilections and on various occasions delivered what his political opponents regarded as partisan harangues to the grand jury. A harangue in Baltimore attracted the notice of prominent Democrats, who were then engaged in a general movement to diminish the influence of the judiciary, and, on John Randolph's motion, the House of Representatives passed a resolution of impeachment in 1804. In the following year the trial was conducted with much ceremony before the Senate, Chase being represented by Luther Martin, R. G. Harper, Charles Lee, P. B. Key, and Joseph Hopkinson, and the prosecution by John Randolph, G. W. Campbell, Joseph Nicholson, C. A. Rodney, John Boyle, Peter Early, and Christopher Clark. By the latter, eight articles were exhibited, two setting forth Chase's oppressive treatment of Fries, two more charging similar treatment of Callender, two others charging an infringement of the laws of Virginia in the Callender case, one relating to alleged unbecoming and unfair conduct before a Delaware grand jury, and the last calling Chase to account for his harangue before the Baltimore grand jury. Chase was finally acquitted on all but two charges—partisanship in the Callender trial and "electioneering" before the Baltimore grand jury—and no article received the two-thirds vote requisite for impeachment. This decision has been regarded as of considerable significance in the history of the American judiciary, inasmuch as it served to discountenance impeachment trials unless based on really serious grounds, and at the same time warned judges to suppress all manifestations of partisanship on the bench. "The case," says Henry Adams, "proved impeachment to be an impracticable thing for partisan purposes, and it decided the permanence of those lines of constitutional development which were a reflection of the common law." After the trial Chase continued to serve as a member of the Supreme Court until his death, June 19, 1811. Consult: an article "The Impeachment Trial of Judge Samuel Chase" in the *American Law Review*, vol. xxxiii (St. Louis, 1899); Smith and Lloyd (reporters), *The Trial of Samuel Chase* (Washington, 1805); Adams, *History of the United States* (New York, 1889).

CHASE, Thomas (1827–92). An American educator, born in Worcester, Mass. He graduated in 1848 at Harvard University, studied at the University of Berlin and the Collège de France, and was professor of Greek and Latin at Haverford College in 1855–75. From 1875 to 1886 he was president of Haverford. He was a member of the American committee for the revision of the New Testament and a delegate to the Stockholm Philological Congress of 1889. He published: *Hellas: Her Monuments and Scenery* (1863); a *Latin Grammar* (1882); editions of *Cicero on Immortality* (1881); *The Æneid* (1868); *Horace* (1869); *Four Books of Livy* (1872); *Juvenal* and *Persius* (1876).

CHASE, William Merritt (1849–1916). An American landscape, portrait, genre, and still-life painter. He was born in Franklin, Ind., Nov. 1, 1849. After studying under B. F. Hays, in Indianapolis, and in the schools of the National Academy of Design, he painted with Piloty and Wagner at Munich (1872), acquiring a thoroughly German method. On his return to New York (1878) he began to change his style of painting, gradually clarifying his color and showing an appreciation for the work of the French school. One of the most facile and brilliant technicians of the American school, Chase succeeds equally well with figure, portrait, and still life. Examples of his still life—particularly his fish, which are especially celebrated—are in the Pennsylvania Academy of Fine Arts, Metropolitan Museum, New York, and Brooklyn Institute Museum. Other well-known works are "A Broken Jug," "Ready for a Ride" (1878, Union League Club, New York), "Alice" (Art Institute, Chicago), a "Lady in Black" (Metropolitan Museum, New York), and a number of portraits (including one of his wife) and genre subjects, which he exhibited at the World's Fair, St. Louis, 1904. His more recent works include "American Fish" (1905); "Flying Clouds" and "Portrait of an Artist" (1906); "Portrait of Mrs. J." (1910); "Studio Interior" and "The Orangery" (1911); the "Portrait of Mrs. H.," awarded the Proctor prize in 1912. He became especially successful as a teacher, received many medals, is a National Academician and a member of the American Academy of Arts and Letters, and was at one time president of the Society of American Artists.

CHASIDIM, kă-sē'dĭm (Heb., saints). A name employed at different periods of history to designate some class of especially pious persons among the Jews. 1. From passages in the Psalter, the books of Maccabees, and the Talmud, it seems evident that the term was used as a designation of those who distinguished themselves by their loyalty to the law and the ancestral customs. They do not appear to have formed a sect or society or party, but were only the congregation of the pious in distinction from the apostates. They firmly opposed all Hellenizing tendencies and clung closer and closer to the ceremonies of Judaism. The members even suffered death in preference to transgressing the rites of their religion. They carried out to the letter the Sabbath laws and incurred loss and personal danger rather than extinguish a fire

on that day; but they were no less stringent in carrying out the purely ethical features of the law and were noted for their kindness and charity. Under Mattathias, the Hasmonean, they took part in the Jewish wars for independence and were keen patriots (1 Macc. ii. 42 ff., cf. also Ps. cxix). According to 2 Macc. xiv. 6, "Those of the Jews that are called Asideans, whose captain is Judas Maccabæus, nourish war and are seditious and will not let the realm be in peace." It is probable, however, that when they perceived the ambitious designs of the Hasmonean family, they made peace with Alcimus (1 Macc. vii. 12 ff.). Some scholars have maintained that they afterward formed the Essene party (see ESSENES); others that they developed into the Pharisaic party. Neither theory can be proved. The term is used as an honorary title of many distinguished rabbis. Consult Hamburger, *Realencyklopädie für Bibel und Talmud*, vol. ii (Leipzig, 1896); Moritz Friedländer, *Geschichte der jüdischen Apologetik*, pp. 43 (1903); Schürer, *Geschichte des jüdischen Volkes*, vol. ii, pp. 472 f. (4th ed., 1907); Schloessinger, in *The Jewish Encyclopædia*, art. "Hasidæans" (1904); Oesterley, in Charles, *The Apocrypha and Pseudepigrapha of the Old Testament*, vol. i, p. 73 (1913).

2. In modern times the name "Chasidim" is applied to a sect which originated in Poland under the leadership of Israel of Miedziboz (died 1759), and after his death of Beer of Mizricz (died 1772). Israel was called "Baal Shem," 'master of the name,' because he professed to perform miracles by using the name of God, and the sect that followed him was characterized by a belief in miracles and in the approach of the coming of the Messiah. They opposed Talmudic learning. Their worship became characterized by its noisiness and the almost frenzied gyrations of its devotees, but also by the intensity of their pious sentiment. Their leader Beer was dignified with the title "Zaddik" ('righteous'). The members of the sect formed a kind of fraternity, and it spread rapidly, numbering about 50,000 in 1770. The new division provoked great opposition on the part of the Talmudists, and in 1781, in Vilna, the Chasidim were declared to be heretics, but the sect continued to flourish, and to-day has a large number of adherents. With their mystical tendencies and their simple fervent faith the Chasidim came into conflict on the one hand with the orthodox party and on the other with the rationalists, and only in recent years have they been made the object of an impartial scientific investigation. Consult Schechter, *Studies in Judaism* (New York, 1896), and especially the instructive and discriminating article by Dubnow in *The Jewish Encyclopædia* (1904).

CHASING (short form of *enchase;* Fr. *enchâsser*, from *en* + *châsse*, frame, OF. *casse*, It. *cassa*, Cat., Lat. *capsa*, case, from *capere*, to hold). The art of working in metals by indenting. This is an art of very early times and was practiced largely by the Greeks in ornamenting the draperies and costumes of religious figures for the temples. It is produced by punching from behind the general character of the design, which is afterward perfected by chiseling the details. This results in a kind of embossed engraving, often of great richness. The favorite metal used for this purpose was silver, although gold, and in very early times even iron, was thus ornamented. That the art was known at a very early period may be inferred from the shield of Achilles, the ark of Cypselus, and other productions of the kind. Such portions of the colossal statues made by Phidias and Polyclitus as were not of ivory were produced by this art. The statue of Athena by the former was richly adorned in this manner. Myron, Mys, and Mentor were also celebrated toreutic artists in antiquity, and among many moderns the most famous is Benvenuto Cellini.

CHAS'KA. A city and the county seat of Carver Co., Minn., 22 miles southwest of Minneapolis, on the Minneapolis and St. Louis and the Chicago, Milwaukee, and St. Paul railroads, and on Minnesota River (Map: Minnesota, D 6). It is the seat of an extensive brickmaking industry, and has a flour mill, sugar-beet, canning, and pickle factories, foundry and machine shops. The electric light plant is owned by the city. Pop., 1900, 2165; 1910, 2050.

CHASLES, shâl, MICHEL (1793–1880). A French mathematician. He was born at Epernon, entered the Ecole Polytechnique, of Paris, in 1812, took part in the defense of Paris in 1814, and reëntered the school in the following year. At graduation he secured the much-coveted promotion to a commission in the engineer corps, but resigned it, with rare generosity, to allow one of his fellow classmates to take the place, retiring to Chartres for the purpose of studying geometry. For a quarter of a century Chasles devoted the leisure which his wealth afforded to a profound study of this science. After a perusal of the works of Lagrange or Laplace, he read Apollonius and Archimedes and sought to clarify the obscure passages of Pappus. Chasles's classical work, *Aperçu historique sur l'origine et le développement des méthodes en géométrie* (1837, 2d ed., 1875), while modest in title, is powerful in exposition, clear in style, and rich in ingenious comparisons. In 1841 he was made professor of geodesy and mechanics at the Ecole Polytechnique, and in 1846 professor of geometry at the Sorbonne, which chair he occupied for 21 years. The appendix to the *Aperçu historique* contains the general theory of homography and reciprocity. Synthetic or projective geometry was elaborated by him, as was also the "method of characteristics" (see CHARACTERISTIC), the basis of enumerative geometry afterward extended by Schubert to *n*-dimensional space. Chasles contributed also some valuable propositions to the integral calculus; his discussions of the displacement of solid bodies and of static electricity have become classics in the field of science, and his solution (1845) by projective geometry of the difficult problem of the attraction of an ellipsoid on an external point is noteworthy. The words of an illustrious Englishman, "M. Chasles is the emperor of geometry," rightly suggest his title to fame.

It is not an uninteresting fact that Chasles was duped by the notorious forger, Vrain Lucas. In 1867 Chasles announced that he was in possession of 27,000 letters and documents of great value; among them were papers believed to have been written by Dante, Petrarch, Rabelais, Julius Cæsar, and Shakespeare, as well as some by Pascal, which were intended to prove that Pascal had anticipated some of the greatest discoveries of Newton. Scarcely 100 of them proving genuine, Chasles suffered not only the embarrassment of being deceived, but also the loss of his expenditure of 200,000 francs.

Bibliography. Among the chief works of Chasles are, besides the *Aperçu historique* mentioned above, the following: *Traité de géométrie supérieure* (1852; 2d ed., 1880); *Traité des sections coniques* (1868–76); *Rapport sur les progrès de la géométrie* (1871); and *Trois livres de porismes d'Euclide* (1863). His various memoirs on perspective and projective figures, duality, tortuous curves, and the principle of correspondence were published in the *Journal de l'Ecole Polytechnique* (1837–65).

CHASLES, Victor Euphémien Philarète (1798–1873). A French literary critic, born at Mainvillers (Eure-et-Loir). He studied at the Lycée Imperial, was a printer's apprentice, and in 1815 went to England, where he assisted Valpy in an edition of Greek and Latin authors. In 1837 he was appointed curator of the Mazarin Library, and in 1841 professor of continental languages and literatures at the Collège de France. He wrote for periodicals, chiefly the *Journal des Débats* and the *Revue des Deux Mondes*, a large number of articles collected under the title *Esquisses*, dealing particularly with contemporary foreign literature. His other works include *Dix-huitième siècle en Angleterre* (1846); *Oliver Cromwell* (1847); *Galileo Galilei* (1862); *Etudes contemporaines* (1866); and *L'Arêtin, sa vie et ses écrits* (1873). Two volumes of his *Mémoires* were posthumously published (1876–77).

CHASMOGAMY, kăz-mŏg'ă-mĭ (Gk. *χάσμα, chasma*, opening + *γάμος, gamos*, marriage). Flowers which open are said to exhibit chasmogamy, as opposed to cleistogamy, in which case the flowers never open. See Pollination.

CHASMOPHYTES, kăz'mō-fīts. Crevice plants. See Rock Plant.

CHASSAIGNAC, shà'sà'nyàk', Charles Marie Edouard (1805–79). A French physician. He was born in Nantes and in 1835 became prosector and professor at the university and physician at the central bureau of the hospitals of Paris. He originated the surgical operation known as *écrasement*, by means of which tumors, piles, polypi, and other growths may be removed without the effusion of blood. The general introduction of drainage in surgery is also due to his initiative. He wrote: *Traité de l'écrasement linéaire* (1856); *Leçons sur la trachéométrie* (1855); *Clinique chirurgicale* (1854–58); *Traité pratique de la suppuration et du drainage chirurgical* (2 vols., 1859).

CHASSÉ, shà-sā', David Hendrik, Baron (1765–1849). A Dutch soldier, born at Tiel, Gelderland. He entered the army at an early age, and when the anti-Orange party was crushed by a Prussian army, in 1787, Chassé joined the French ranks and served for a term under Pichegru. He afterward fought with distinction in the French wars of the Revolution and the Empire, and, for the frequency with which he ordered bayonet charges, was nicknamed "Général Baïonette." He was made lieutenant general for his services in the passes of the Pyrenees. After the conclusion of peace he entered the Dutch army and served with great gallantry on the field of Waterloo. During the Belgian Revolution Chassé commanded the citadel of Antwerp and bravely defended it against an overwhelming force of Belgians and French, from Nov. 29 to Dec. 23, 1832, when he was forced to surrender. He was held by the French as a prisoner of war until May 12, 1833, when he was released and retired to private life.

CHASSELOUP-LAUBAT, shàs'lōō'lô'bà', François, Marquis de (1754–1833). A French military engineer, born at St. Sernin (Charente-Inférieure). He defended Montmédy in 1792, conducted the engineering operations at Maestricht in 1794, and in 1796 was chief of engineers at Mainz and in the army of Italy under Bonaparte, who promoted him to brigadier general of engineers. Until 1812 he served as head of the engineer corps of the Napoleonic armies. In 1815 he declared for Louis XVIII, who made him a peer. His great work was the fortress of Alessandria in Piedmont, in which he attempted to improve the orthodox bastioned system. His more important writings have never been printed.

CHASSELOUP-LAUBAT, Justin Napoléon Samuel Prosper, Marquis de (1805–73). A French politician, son of the preceding. He entered the Chamber of Deputies in 1837 and afterward became Councilor of State. In the Legislative Assembly of 1849 he supported Louis Napoleon, who in 1851 made him Minister of Marine. After the coup d'état he was elected to the Corps Législatif. In 1859 he became Minister of Algeria and the Colonies and gave a marked impulse to French colonization. In 1869 he was President of the Council of State from July to December.

CHASSEPÔT, shàs'pô'. A kind of breech-loading rifle. The chassepôt derived its name from its inventor, Antoine Alphonse Chassepôt, and was used by the French during the Franco-Prussian War of 1870, but it has since been superseded by the modern Lebel magazine rifle. It was, however, a great improvement on the rifles or guns previously in use, and marked the real commencement of the epoch of needle, breech, and magazine loading firearms generally. The chassepôt had four grooves and could be fired 12 times a minute. Its range was 1200 yards, and its cartridge had a calibre of .433 inch. See Small Arms.

CHASSÉRIAU, shà'sā'rē'ô', Théodore (1819–56). A French painter and etcher. He was born on the island of Samaná, near San Domingo. At the age of 13 he entered the atelier of Ingres, and at 16 he received a medal in the Salon. Although his early works show the influence of Ingres and his later of Delaroche, yet Chassériau also possessed undoubted originality. Among his best-known paintings are "Tepidarium at Pompeii," "Susanna," and "Venus Anadyomene," all in the Louvre. Of his mural paintings the "Descent from the Cross" in St. Philippe du Roule, Paris, is the only one in a good state of preservation. His greatest achievement was the decoration of the Palais d'Orsay, which was destroyed by the Communists; a few figures which were rescued have found place in the Louvre. The best of his fine etchings are a series of 15 plates illustrating "Othello."

CHASSEURS, shà'sēr' (Fr., from *chasser*, to hunt, chase). A branch of the military forces of France. Before the era of railroads, long-range and rapid-fire artillery and rifles, light cavalry and light infantry were much used, and were very necessary, for service in advance or on the flanks of the army. They were designed and equipped for greater mobility than was possible for the army as a whole and were very generally adopted throughout Europe at large, under various titles. The English Rifles and Light Infantry, Prussian and Austrian Jäger, and later the Italian Bersaglieri, were all of this

type, and while they still retain their former titles, the characteristics that once distinguished them have, in the evolution of the science of warfare, of necessity become general.

Every modern soldier must be a good shot, a marksman or sharpshooter if possible, and in every branch and detail mobility itself. The chasseurs, who derive their name (Fr., hunter) from the same source as the Russian Jäger, are divided into two branches: the mounted chasseurs (*chasseurs-à-cheval*), or light cavalry, and the dismounted chasseurs (*chasseurs-à-pied*), or light infantry. After the reorganization of the French army in 1873 there were 20 regiments of *chasseurs-à-cheval*, besides 4 regiments of *chasseurs d'Afrique* (regiments raised and equipped for special service in Africa), and 30 battalions of *chasseurs-à-pied*. In 1913 there were 23 regiments of chasseurs in the cavalry and 31 battalions of *chasseurs-à-pied*, as well as 4 regiments of *chasseurs d'Afrique*.

CHASTELARD, shȧ'tlär', PIERRE DE BOSCOSEL (1540–63). A French poet at the court of Francis II and his young wife, Mary, whom he afterward accompanied as page of Damville (1561) to Scotland, where his indiscreet love invited, and at last almost compelled, his execution. He it was who carried to Mary the famous *Regrets* of his poetic master Ronsard. Chastelard and the Queen exchanged also amorous verses of their own composition. His last words are said to have been a profession of undying love. Consult Swinburne, *Chastelard: A Tragedy* (London and New York, 1865; 1906). The story of Chastelard is recounted in an imaginative way by Maurice Hewlitt in his historical novel, *The Queen's Quhair* (New York, 1904).

CHASTELER, shȧ'tlȧ', JEAN GABRIEL JOSEPH ALBERT, MARQUIS DE (1763–1825). An Austrian general. He was born in Belgium, received his military education in Vienna, and entered the Austrian service. He took a prominent part in the campaigns against the Turks in 1789 and those against France during the Revolution and especially distinguished himself at Wattignies in 1793. He fought in the Tirol against Napoleon, but was beaten by Lefebvre, at Wörgl in 1809, and was compelled to fly to Hungary. When the Lombardo-Venetian Kingdom was established, he was made Governor of Venice.

CHASTELLAIN, shȧ'tlăn', GEORGES (c.1415–75). A French chronicler and poet, born in Flanders. He became attached to the courts of Philip the Good, Duke of Burgundy, and Charles the Bold as chronicler. His *Chronique des choses de ce temps* is more valuable than most such writings, for its veracity and character drawing. He wrote a *Temple de Bocace* for Margaret of Anjou, but probably had no part in the *Book of Deeds* of Jacques de Lalain. Consult De Lettenhove's edition of the works (8 vols., Brussels, 1863–66).

CHASTELLUX, shȧ'tlụks', FRANÇOIS JEAN, MARQUIS DE (1734–88). A French soldier and writer. He was born in Paris, entered the French army in 1749, distinguished himself in the Seven Years' War, and from 1780 to 1782 served as a major general in the French army, under Rochambeau, in the American Revolutionary War. After his return to France until his death he held the position of inspector of infantry, and in 1786 he became a marquis by the death of an elder brother. His reputation rests chiefly upon his *Voyages dans l'Amérique septentrionale, dans les années 1780, 1781, et 1782* (1786; Eng. trans. by Kent, or more probably George Greive, 2 vols., 1787; reprinted, New York, 1828), in which he gives an interesting account of many persons and places connected with the American Revolution and of many localities visited by him in a tour through the Middle States and the northern part of Virginia. For the most part the book has been considered a reasonably accurate picture of the United States at that time, but certain portions of it met with severe criticism, especially at the hands of Brissot de Warville, who wrote an *Examen critique des "Voyages dans l'Amérique septentrionale" dans lequel on réfute principalement ses opinions sur les Quakers, sur les nègres, sur le peuple et sur l'homme* (London, 1786). Chastellux also wrote: *De la félicité publique, ou considérations sur le sort des hommes dans les différentes époques de l'histoire* (1772; Eng. trans., 1774), which was highly praised by Voltaire (who is said to have ranked it above Montesquieu's *Esprit des lois*), which gave considerable offense to many by its strictures upon Christianity, and which won him a place in the Academy; *De l'union de la poésie et de la musique* (1775); and *Discours sur les avantages et les désavantages qui résultent pour l'Europe de la découverte de l'Amerique* (1787), in which, answering the famous question proposed by Raynal, he asserts that the advantages have greatly outweighed the disadvantages. Consult Chastellux, *Notice sur le marquis de Chastellux* (Paris, 1822), and Pascallet, *Notice historique sur la maison de Chastellux* (Paris, 1844).

CHASTE MAID IN CHEAPSIDE, A. A comedy by Thomas Middleton, printed in quarto (1630) and acted about 1612 at the Swan Theatre, London.

CHASTE TREE. See VITEX.

CHASUBLE, chăz'ụ-b'l. See COSTUME, ECCLESIASTICAL.

CHAT (from *chat*, so called on account of its note). Originally one of the Old World ground-keeping warblers or small thrushes of the large subfamily Saxicolinæ, elsewhere described under WHEATEAR, WHINCHAT, ETC. In America, one of a group of large warblers (Icteriinæ), of which the best known is the yellow-breasted chat (*Icteria virens*), a bird some 7 or 8 inches long, common in the eastern United States, at least southward. The tail is considerably longer than the wing. The color is olive green above, bright yellow beneath, fading into white posteriorly. The song is a most extraordinary jumble of whistles, chucks, and caws, and is chiefly uttered when the male is in the air, carrying on aërial evolutions little less remarkable than his song. The chats are insectivorous and are inhabitants of thickets and copses, where they can conceal themselves readily when too closely approached. The nest is built of coarse grass, leaves, and strips of bark, in a bush near the ground, and the eggs, five in number, are white evenly spotted with brown. Consult Chapman, *The Warblers of North America* (New York, 1907).

CHÂTEAU, shȧ'tō', **CHÂTEL,** shȧ'tĕl', or **CASTEL,** kȧ'stĕl' (Fr., castle, from Lat. *castellum*, dim. of *castrum*, camp). Names applied in France and other parts of the Continent to the residences of the feudal lords of the soil. The name *château-fort* is now applied to the fortified castles erected before the fifteenth century. The term "château" is also applied to the

modern French country house, when the proprietor is also the owner of extensive adjoining landed property. Royal residences, like the Louvre, were also called châteaux, although they were in reality palaces (*palais*). The valley of the Loire contains an unusually large number of châteaux, both royal, as Amboise, Blois, and Chambord, and private, as Chenonceaux, Longeais, Châteaudun, Chaumont, and Azai-le-Rideau. The word is also a component part of many names of places in France. See the bibliography of CASTILE; consult also Petit, *Les châteaux de la Loire* (Paris, 1861).

CHATEAUBRIAND, shà'tō'brē-äN', FRANÇOIS AUGUST RENÉ, VICOMTE DE (1768–1848). A French author and statesman. He was born in St. Malo, the most Catholic of French provinces, and the warm piety of his mother and the distant reserve of his father combined with the strange Breton legends and the mysterious vastness of the neighboring ocean to nurse in the child religious sentiment and poetic mysticism. To these elements direction and intensity were given by his education at Dôle and Rennes. At 20 he entered the army, thinking to try his fortune in India, but the Revolution diverted him from this, and in 1790 he obtained a government commission to seek the Northwest Passage, a quest that took him, according to his own possibly inaccurate account, on wide journeys on the Great Lakes and prairies of America and even to semitropical Florida and brought him much association with Rousseau-like Indian "children of nature" and self-communion in primeval forests. These influences first revealed Chateaubriand to himself and were revealed in all his future work, but most brilliantly in *Les Natchez*, planned about this time, though unpublished for 30 years, and in the stories that originally were connected with it—the epoch-making *Atala* (1801) and *René* (1802). The excesses of the Revolution modified Chateaubriand's zeal for political reform, and on his return to Europe (1792) after a hasty and unhappy marriage, of his parents' making, he cast in his lot with the army of the *émigrés*. He was wounded at the siege of Thionville (September, 1792), and suffering and in want he went in 1793 to England, where he supported himself for several years by literary work, and wrote the pessimistic and skeptical *Essai sur les révolutions* (1797). Here, too, he elaborated *Atala*, *René*, and *Les Natchez*, inspired partly by Rousseau's *Emile*, partly by St. Pierre's *Paul et Virginie*. These show a marked change in Chateaubriand's religious attitude, which had been free and unorthodox. This change was attributed by him to the grief caused his mother by his free thought and to his mother's death in 1798.

That France was ready for a Christian and idealistic reaction the Concordat (July 15, 1801) was about to prove. Returning to France in 1800, he struck a note that set all hearts vibrating. *Atala* was immediately and universally popular. It roused a dormant spirit of romantic idealism and, in the mental state that it disclosed, anticipated much in Lamartine and Hugo. The eloquent descriptions of nature showed rare powers of minute observation. Chateaubriand immediately took the leading place in French letters and retained it unquestioned till the appearance of Lamartine's *Méditations* (1820). *Le génie du Christianisme* (1802), a brilliant piece of special pleading, suggests that æsthetic rather than moral interests drew Chateaubriand to the Church. At bottom he was still a pessimist and a skeptic, though perhaps as sincere as he could be, for neither rational nor logical consistency was a dominant characteristic in him. The author of the *Génie*, and its readers also, were less interested to find that Christianity was true than that it was sentimentally poetic, pathetic, and æsthetic.

Chateaubriand, whose apotheosis of Christianity fell in with Napoleon's plans at this time, received a diplomatic post in Rome (1803). He was involved in intrigues, was transferred to Switzerland, and on the execution of the Duc d'Enghien (1804) resigned and began a campaign of criticism against Napoleon, who, he said, "made the world tremble, but me—never." In 1806 he started on an extensive tour in the East, visiting Greece, Turkey, Asia Minor, Palestine, Tunis, and Spain. He embodied his impressions in *Les martyrs* (1809), a prose epic of rising Christianity and sinking paganism; in *Les aventures du dernier des Abencérages* (1826), a Moorish story, and in *Itinéraire de Paris à Jérusalem* (1811), all showing "opulence of imagination and poverty of heart." The fall of Napoleon evoked *De Buonaparte et des Bourbons* (1814), which, according to Louis XVIII, was worth 100,000 men to the Legitimist cause. The work brought its author several diplomatic appointments, which he resigned in order to be free to oppose ministries that displeased him, until towards 1830 he seemed tending to liberalism. The Orléanist triumph brought him back promptly to the lost cause. Chateaubriand now sank into a discouraged silence. He translated *Paradise Lost* (1836), wrote a *Vie de Rancé*, the ascetic (1844), and revised and completed his *Mémoires d'outre-tombe*, published a little prematurely, just before his death (1848), and translated into English (1902). This is a work of some historic interest, great eloquence, remarkable prejudices, and unique self-conceit—"*René* with documentary evidence," as it has been wittily called. For Chateaubriand is his own René and in *René* lies his literary significance.

René and *Atala* mark the beginning of the Romantic school. They are to France what Goethe's *Werther* is to Germany and "Childe Harold" to England, the germ of the so-called *maladie du siècle*, a dilettant, morbid, introspective pessimism that was to infect Senancour, Lamartine, Vigny, Musset, and the youthful work of Sainte-Beuve, Dumas, and George Sand. It can be traced also, masked by stronger powers, in Hugo and in Byron. This moral influence, the helpfulness of which has been questioned, was accompanied by very great services to art. Chateaubriand was the first in France to draw attention to the literary resources of the Middle Ages and Christian antiquity. He was a renovator in imagination, criticism, history, and the founder of the new descriptive school of idealization and personification of nature, and thus as much the father of Loti as of Thierry and Michelet. He made literature national in aspiration, Christian in spirit; he persuaded his generation to break with the imitation of imitation that had sapped the literary life of the eighteenth century. His style left its mark on poetry, history, fiction—on the very language. His effect on morals and religion has been considered morbid and transitory. In literary art he marks an era.

Bibliography. Chateaubriand's works were edited in 20 vols. by Sainte-Beuve, with an intro-

ductory study of his own (1859–60). Consult also: Sainte-Beuve, *Chateaubriand et son groupe littéraire* (Paris, 1860), and other essays in *Portraits contemporains*, and *Causerie de lundis, Nouveaux lundis, Premiers lundis;* Vinet, *Madame de Staël et Chateaubriand* (Paris, 1857); Villemain, *Chateaubriand, sa vie, ses écrits et son influence* (Paris, 1859); France, *Lucile de Chateaubriand* (Paris, 1879); Bardoux, *Chateaubriand* (Paris, 1893); Lescure, *Chateaubriand* (Paris, 1892); Pailhès, *Chateaubriand, sa femme et ses amis* (Bordeaux, 1896); Maurel, *Essai sur Chateaubriand* (Paris, 1899); Bertrin, *La sincérité réligieuse de Chateaubriand* (1901); *Mémoires d'outre-tombe*, trans. by Teixeira de Mattos (6 vols., New York and London, 1902). For the reality and fiction in Chateaubriand's American and other journeys, see J. Bédier, *Etudes critiques* (Paris, 1903); V. Giraud, *Chateaubriand: Etudes litt.* (Paris, 1904); Stathers, *Chateaubriand et l'Amérique* (Grenoble, 1905); E. Champion, *L'itinéraire de Paris à Jérusalem par Julien, domestique de Chateaubriand* (Paris, 1904). Other notable books are: Gribble, *Chateaubriand and his Court of Women* (New York, 1909); Lemaître, *Chateaubriand* (1912); *Correspondance général de Chateaubriand*, ed., with introduction, etc., by L. Thomas (3 vols., Paris, 1912–13).

CHÂTEAUDUN, shä'tō'dĕN' (Fr. *château*, castle + Gall. *dun*, OIr. *dún*, stronghold). The capital of an arrondissement in the Department of Eure-et-Loir, France, situated on the Loir, about 28 miles northwest of Orléans (Map: France, N., C 4). The town contains an old castle, with an enormous tower, a number of houses dating from the fourteenth, fifteenth, and sixteenth centuries, a college, and a library. The manufactures are of machinery and blankets; trade also flourishes in cattle, grain, wool, and hemp. Pop. (commune), 1901, 7146; 1911, 7296. During the Middle Ages Châteaudun was the residence of the counts of Dunois; it was burned by the Germans in 1870. Consult *Un coin de l'ancien Dunois* (Châteaudun, 1869).

CHÂTEAUGAY, shät'ō-gā', Battle of. An engagement on Oct. 26, 1813, at the junction of the Châteaugay and Outarde rivers in New York State, between 1000 English, strongly intrenched, and about 4000 Americans, the latter being defeated, owing to the incapacity of their leader, General Hampton, who brought less than half of his troops into action. The loss of the Americans was 38; that of the British, 25.

CHÂTEAUNEUF DE RANDON, shä'tō'nĕf' de räN'dôN' (Fr., castle of Randon, the hill on which it is situated). A village of France, in the Department of Lozère, 12 miles northeast of Mende, celebrated in connection with an incident of the Hundred Years' War. In 1830 the fortress, then held by French brigands, was besieged by the troops of Charles V, under the command of the gallant Du Guesclin. The garrison finally had to yield. Du Guesclin was on his deathbed when the keys of the fortress were brought, and he received them "in the name of his sovereign liege the King of France." According to another version he was already dead when the keys were brought, so that the chronicler wrote, "He never besieged a place which did not surrender to him, either alive or dead." A monument commemorating the death of Du Guesclin was erected in 1820. Consult Lavisse, *Histoire de France*, vol. iv (Paris, 1902).

CHÂTEAU-RENAULT, shä'tō're-nō', or **CHÂTEAU-REGNAUD**, -re-nyō', François Louis Rousselet, Marquis de (1637–1716). A French admiral. In 1673, in command of five ships, he dispersed a fleet of eight vessels under Admiral de Ruyter in the North Sea, and in 1677 with six vessels he defeated a Dutch fleet of 25 under Admiral Evertzen off the coast of Spain. He was commander in chief of the fleet sent to Ireland by Louis XIV to support the cause of James II. He became vice admiral in 1701 and marshal of France in 1703. In 1702 when guarding Spanish treasure ships in Vigo he was attacked and defeated by a fleet commanded by Sir George Rooke.

CHÂTEAUROUX, shä'tō'rōō' (named in honor of Prince Raoul of Déols, who founded it in the tenth century). A town of France, capital of the Department of Indre, situated on the left bank of the river Indre, 166 miles south of Paris by railway (Map: France, N., G 6). The town, which was formerly dirty and ill built, has been greatly improved. Across the Indre lie its beautiful suburbs, Christophe and Déols. Its gloomy castle on a hill above the river was the prison of Cardinal Richelieu's niece, the Princesse de Condé, during 23 years. The Château Raoul, built in the fourteenth century, still stands. The church of St. André (modern), the hôtel de ville with its Flemish paintings and souvenirs of Napoleon I, the statue of Gen. Henri Bertrand, a native, are other points of interest. The town has extensive factories of woolen and cotton goods, hosiery, yarn, hats, paper, parchment, hardware, tobacco, and leather. Pop. (commune), 1901, 24,957; 1911, 26,095. Consult Falconneaux Dufresne, *Histoire de Déols et de Chateauroux* (Chateauroux, 1873).

CHÂTEAUROUX, Marie Anne, Duchesse de (1717–44). A daughter of Marquis de Nesle and favorite of Louis XV. She was born in Paris, and after the death (1740) of her husband, Marquis de la Tournelle, succeeded her three sisters as the mistress of Louis XV of France, who made her the Duchess of Châteauroux (1743). During the war of 1744 she accompanied the King as far as Metz, where he was taken ill and was prevailed upon by the Bishop of Soissons to dismiss her. Upon his return to Paris, however, she consented to a reconciliation on condition that her principal enemies at court should be banished. She died soon afterward. Consult E. and J. de Goncourt, *La duchesse de Châteauroux et ses sœurs* (Paris, 1879).

CHÂTEAU-THIERRY, shä'tō'tyâr'rē' (named in honor of Theuderich or Thierry IV, for whom it was founded by Charles Martel in the eighth century). The capital of an arrondissement in the Department of Aisne, France, situated on the right bank of the Marne, 59 miles northeast of Paris. Towering above it on the heights are the ruins of the castle from which the town takes its name. Its chief buildings are a commercial college, a public library, and an old cathedral (Map: France, N., J 3). Pop. (commune), 1901, 7083; 1911, 7771. The Champagne district begins here, and, besides its wine trade, it is famous for the manufacture of musical and scientific instruments and woolen yarn; stone is quarried near by. The position of Château-Thierry has subjected it to many disasters. It was captured by the English in 1421, by Charles V in 1545, by the Spanish in

1591; was pillaged in the Fronde wars in 1652 and suffered severely in the Napoleonic campaign of 1814. Château-Thierry was the birthplace of La Fontaine. Consult Poquet, *Histoire de Château-Thierry* (2 vols., Château-Thierry, 1839–40).

CHÂTEAUX EN ESPAGNE, ăn nȧ'spȧ'ny' (Fr., castles in Spain). Romance castles; castles in the air; daydreams.

CHATEL. See CHÂTEAU.

CHÂTELAIN, shȧ'tlăn'. See CASTELLAN.

CHÂTELAIN DE COUCY ET DE LA DAME DE FAYEL, shȧ'tlăn' de kōō'sē' ȧ de lȧ dȧm de fȧ'yĕl', HISTOIRE DU (Fr., history of the Châtelain of Coucy and the Lady of Fayel). A French romance founded on the quasi-historical loves of Renaud, Châtelain de Coucy, and belonging to the thirteenth century. An edition by M. Crapelet appeared in Paris in 1829. See COUCY, THE CHÂTELAIN DE.

CHÂTELET, shȧ'tlȧ'. A town of Belgium in the Province of Hainaut, situated a few miles east of Charleroi on the Sambre opposite Châtelineau. It contains a number of smelting works and iron foundries. Its chief industries are coal mining and the manufacture of cutlery and ironware. It has numerous technical training schools. Pop., 1900, 10,932; 1910, 11,573.

CHÂTELET (Fr., a little castle). A fortification placed at the entrance to towns or at the mouth of rivers. The most noted châtelets were the large and small châtelets of Paris. That either one was built by Julius Cæsar is purely mythical; but it would seem that Charles the Bald spoke of them in his capitulary of 877 as a defense against the Normans. The great châtelet situated on the present Place du Châtelet was remodeled in the years 1506 and 1684, became the seat of royal justice for Paris, and continued such until the Revolution of 1789. Officials were added gradually until just previous to the Revolution the list numbered over 700. The first morgue was established under the châtelet as early as 1363. It was also a noted prison, and although Louis XVI endeavored to abolish it in 1780, it still contained many prisoners at the opening of the Revolution. In 1802 the large châtelet was demolished to open the way for the Boulevard Sébastopol. The small châtelet situated near the present Hôtel-Dieu was rebuilt in the twelfth and thirteenth centuries and used as a prison in the eighteenth century. It was demolished in 1782.

CHÂTELET-LOMONT, shȧ'tlȧ'lô'môn', GABRIELLE EMILIE, MARQUISE DU (1706–49). A French author, born in Paris. She was distinguished for her wit, talent, and learning, especially in mathematics and physics, but chiefly for her intimacy with Voltaire, who was for several years her guest at Cirey, her complacent husband's countryseat on the Lorraine frontier. In 1747 she exchanged Voltaire's cooling affections for those of Captain Saint-Lambert, but the philosopher remained her devoted and indulgent friend till her death in childbirth two years later. She translated Newton's *Principia*, with annotations, and wrote on the philosophy of Leibnitz, but her *Correspondance* with Voltaire is the most instructive and interesting of her productions. Consult De Graffigny, *Vie privée de Voltaire et de Mme. de C.* (1820), and Capefigue, *La marquise du Châtelet* (Paris, 1868); and see also bibliography under VOLTAIRE.

CHÂTELLERAULT, shȧ'tĕl'rō' (ML. *Castrum Heraldi, Castellum Airaldi*, herald's castle). A town of France, capital of an arrondissement in the Department of Vienne, situated on the river of that name, 18 miles northnortheast of Poitiers (Map: France, S., F 6). A handsome stone bridge, with a massive castellated gateway built by Sully, connects it with Châteauneuf, a suburb on the other side of the river. Châtellerault, which is an illbuilt, mean-looking town, is one of the chief seats of the manufacture of cutlery in France, and since 1820 has had a national manufactory of swords and bayonets, employing nearly 2000 workmen. There are also extensive manufactures of millstones, watches, leather, candles, and lace, which employ 4000 more. Its river port makes it the entrepôt for the produce of wine, brandy, and prunes of an extensive district. Pop. (commune), 1901, 20,801; 1911, 18,260. Consult Lalanne, *Histoire de Châtellerault* (Châtellerault, 1859).

CHATFIELD-TAYLOR, HOBART C. (1865–). An American author, born in Chicago, and educated at Cornell University. He served as editor of *America* for two years, was Consul of Spain at Chicago in 1892–94, and became a member of honorary societies in France, Spain, Italy, and Portugal. Besides his contributions to the *North American Review*, the *Bookman*, and the *Dial*, he published *With Edge Tools* (1891); *An American Peeress* (1893); *Two Women and a Fool* (1895); *The Idle Born* (1900); *The Crimson Wing* (1902); *Molière: A Biography* (1906); *Fame's Pathway* (1909); *Goldoni: A Biography* (1913).

CHATHAM, chăt'ăm (AS. *Coteham*, village of huts, from *cot*, hut + *ham*, inclosure). A parliamentary borough, river port, fortified town, and naval arsenal, in the County of Kent, England, on the estuary of the Medway, 34 miles east-southeast of London (Map: England, G 5). It lies a little to the east of Rochester, with which it is politically united, as it is also with Gillingham, on the east. The streets are generally irregular and narrow, but much has been done to improve this since the incorporation of the town in 1890. It sends one member to Parliament. Its gas and water supply is furnished by private companies, but the municipality has built a pier, established a public park and recreation grounds, constructed a fine town hall and municipal offices, and expends a considerable sum on technical education. Chatham owes its importance to its naval and military establishments, situated at New Brompton (a suburb on a height half a mile north of Chatham). The so-called lines or fortifications which inclose these works are the frequent scenes of field operations, sham fights, and reviews. From a military point of view, the lines of detached forts connected with Chatham, which have superseded for defensive purposes the old "lines," constitute a fortification of great strength, and, together with the strong forts erected on the Medway, form an excellent protection to London from invasion from the southeast. Chatham is an important military post with large infantry, artillery, and engineer barracks, a school of military engineering, and a large military hospital. As a naval base, it is one of the most important in the kingdom. The royal dockyard, which was first established by Queen

Elizabeth, embraces an area of about 500 acres and contains building slips and floating docks in which the largest ships of the navy may be built or repaired. One basin, famous for its size, has a frontage of 6000 feet and a width of 800 feet. At times 7000 workmen are employed. In connection with the yard is a metal mill which supplies it with copper plates and bolts. Melville Hospital is a large establishment for sailors and marines. There are also extensive barracks for marines. Pop., 1891, 31,700; 1901, 37,057; 1911, 42,250. Consult "Chatham," in *Municipal Journal* (London, 1900).

CHATHAM. A town in Northumberland Co., New Brunswick, on the Miramichi River, 25 miles above its entrance into Miramichi Bay, 5 miles east of Newcastle, and on the Intercolonial Railway (Map: New Brunswick, D 2). It has a Roman Catholic cathedral, hospital, and a fine city building. It is a port of entry, with a fine harbor, pulp factories, foundries, mills, and a large export trade in fish, lumber, etc. Many hunting parties set out from here. Pop., 1901, 4868; 1911, 4666.

CHATHAM. A city and the county seat of Kent Co., Ontario, Canada, on the Thames River, 45 miles east of Detroit, Mich., reached by the Grand Trunk, the Wabash, the Père Marquette, and the Canadian Pacific railroads, and by steamboats from lakes Erie and Huron and the Detroit River (Map: Ontario, B 9). It is in an agricultural district, has a large trade in grain and lumber, and manufactures lumber products, carriages, flour, boilers and engines, iron goods, woolens, etc. The United States is represented by a consul. Pop., 1901, 9068; 1911, 10,770.

CHATHAM. A borough in Morris Co., N. J., 15 miles west of Newark, on the Lackawanna Railroad, and on the Passaic River (Map: New Jersey, D 2). With a picturesque situation and good roads, it has become a residential suburb of New York and Newark. It is the centre of an extensive rose-growing industry. Chatham owns and operates its water works and electric light plant. It was incorporated as a village in 1892 and as a borough in 1897. The mayor and members of the council are elected annually. Pop., 1890, 780; 1900, 1361; 1910, 1874.

CHATHAM, Earl of. See Pitt, William.

CHATHAM ENGINEERING SCHOOL. See Military Education.

CHATHAM ISLANDS. A small group in the Pacific Ocean, 536 miles east of Lyttelton in lat. 43° 38′ to 44° 40′ S., long. 177° to 179° W. (Map: Australia, L 7). Area, 321 square miles. The group was discovered in 1791 by Lieutenant Broughton, and the name of his brig was given to both the cluster and its chief member. A salt or brackish lake, 72 miles in area, occupies the interior of Chatham Island. The soil and climate of the archipelago, in general, are good. Wheat yields abundantly, and horses, cattle, sheep, and pigs thrive well. Considerable trade is carried on in supplies for whalers and passing ships. The greater portion of the two principal islands is used for sheep grazing. The native canoe, instead of being cut out of a single tree, is merely wickerwork bound together by cordage of native flax. The aboriginal Morioris, who in 1831 were 1200, have been supplanted by a mixed population of Maoris and whites, a few only surviving. Pop., 1911, 453 (234 Europeans and 219 Maoris and Morioris). The Chatham Islands are politically attached to New Zealand.

CHATI, shä′tē′. See Wild Cat.

CHATILLON, Charles de. See Charles de Blois.

CHÂTILLON-SUR-SEINE, shä′tē′yôn′ sur-sān′ (Fr., castle; cf. Sp. *castillo*, castle). The capital of an arrondissement in the Department of Côte-d'Or, France, on the Seine, about 45 miles north-northwest of Dijon (Map: France, N., K 5). The town is divided into two parts by the river. Of the château which gave the town its name nothing now remains save several ruined walls. The ground on which it stood has been converted into a cemetery, but the Château Marmont, built by Marshal Marmont, who was born in Châtillon, still stands. The church of the ancient château, Sainte-Vorle, has an interesting Holy Sepulchre done in stone. There are important manufactures of woolens, cottons, hats, and leather, and ironworks. Pop. (commune), 1901, 4807; 1911, 4698. Châtillon was an important fortified town in the twelfth century and the seat of the dukes of Burgundy. It was the capital of the Pays de la Montagne, part of Burgundy. From Feb. 5 to March 19, 1814, a congress of the Allied Powers assembled at Châtillon vainly endeavored to come to terms with Napoleon. The failure of negotiations was followed by the resumption of hostilities. Here a German detachment suffered a severe repulse, on Nov. 19, 1870, at the hands of Ricciotti Garibaldi, and was driven back upon Château-Villain.

CHAT'MOSS. A bog in Lancashire, England, about 12 miles square, which reaches at some places a depth of 30 feet. It is celebrated as the scene of successful efforts for the reclaiming of bogs in the end of the eighteenth and beginning of the nineteenth century, and of one of the great engineering triumphs of George Stephenson in the construction of the Liverpool and Manchester Railway.

CHATOYANT, shä-toi′ant, *Fr. pron.* shä′twä′yäN′ (Fr., from *chat*, cat). A mineral is chatoyant when it exhibits a changeable internal band of light. The phenomenon is said to be due to minute internal parallel striations or inclusions. It is especially noticeable when the mineral is cut with a convex face (*en cabochon*). See Cat's-Eye.

CHATRIAN, shä′trē-äN′, Alexandre. See Erckmann-Chatrian.

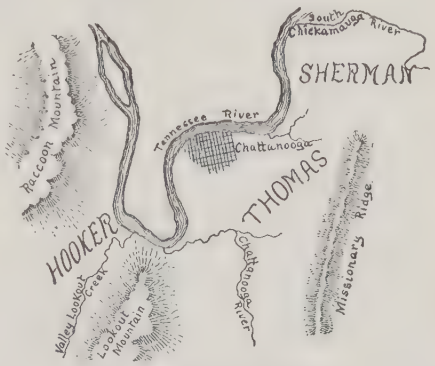
CHATS'WORTH. The mansion of the dukes of Devonshire and one of the most splendid private seats in England. It is situated in Derbyshire, on the Derwent. Sir William Cavendish in 1570 began the old mansion, which was finished by his widow, afterward Countess of Shrewsbury. In this building Mary, Queen of Scots, was imprisoned for 13 years. The present edifice includes the Ionic pile, 183 by 172 feet, built 1687–1706, by the first Duke of Devonshire, after designs by Talman and Wren. The façade is 720 feet long or, with the terraces, 1200 feet. The grounds around are 9 miles in circuit and are surpassed only by those at Versailles.

CHAT'TAHOO'CHEE (Creek *châtu*, rock; *hutchas*, mark; pictured rocks). A river rising on the south slope of the Blue Ridge, in northern Georgia. It traverses the State in a southwesterly direction to its west edge, where, turning south, it becomes the boundary between Georgia and Alabama, and finally, after receiving the Flint from the east, crosses Florida under the name "Appalachicola." It empties

into the Gulf of Mexico (Map: Alabama, D 4). The Chattahoochee is over 500 miles long, is navigable to Columbus, 200 miles, and drains an area of about 17,000 square miles.

CHAT'TANOO'GA. A city and important railroad centre and the county seat of Hamilton Co., Tenn., 150 miles by rail southeast of Nashville, on the Alabama Great Southern, the Central of Georgia, the Cincinnati, New Orleans, and Texas, the Nashville, Chattanooga, and St. Louis, the Southern, the Tennessee, Alabama, and Georgia, and the Western and Atlantic railroads; and on the Tennessee River, which is navigable as far as this place eight months of the year (Map: Tennessee, F 5). To the south is Lookout Mountain, from which seven States can be seen. Chattanooga has a fine marble customhouse, the Baroness Erlanger Hospital, a Carnegie library, a museum, two opera houses, University of Chattanooga (Methodist Episcopal), the Chattanooga College of Law, Baylor School, McCallie School, and Girls' Preparatory School. The Chickamauga National Military Park, laid out by the Federal government on the site of the battle of Chickamauga, is south by east of the city. Other features of interest are Fort Oglethorpe, a brigade post, and the National Cemetery, containing 13,322 graves. A large trade is carried on in grain, iron, coal, and lumber, and there are extensive manufactures of iron and steel, machinery, cotton goods, furniture, bricks and tiles, wagons, stoves, textiles, leather goods, etc. In November, 1913, a $9,000,000 lock and dam and power plant was completed at Hale's Bar, on the Tennessee River, near this city. Chattanooga adopted the commission form of government in 1911. The annual income and expenditures balance at nearly $800,000. The main items of expense are: $94,000 for the fire department; $73,000 for police; $152,000 for schools; $10,000 for health department; $110,000 for streets and sewers; $69,000 for parks and buildings. Originally called Ross's Landing, Chattanooga was settled in 1836 and was incorporated in 1839. It became of great military importance in the Civil War, and the vicinity was the scene of several hotly contested battles, notably those of Chickamauga, Missionary Ridge, Lookout Mountain, and Chattanooga (q.v.). It was from here that Sherman began his famous march to the sea. In 1863 it was occupied by the Union forces. The city was almost destroyed during the Civil War. Chattanooga has been chosen as the southern headquarters of the Interstate Commerce Commission. Pop., 1870, 6093; 1900, 30,154; 1910, 44,604; 1920, 57,895.

CHATTANOOGA, Battle of. One of the most important battles of the Civil War, fought in the vicinity of Chattanooga, Tenn., Nov. 23–25, 1863, between a Federal army of 60,000, under General Grant, and a Confederate army of about 40,000, under General Bragg. After the battle of Chickamauga (q.v.) Bragg had held the Federal troops closely besieged in Chattanooga and, by seizing nearly all of their lines of supply, threatened them with starvation. In October Thomas superseded Rosecrans, who had commanded at Chickamauga, and on the 23d Grant, recently placed in command of the military operations in the West, arrived in person. Grant immediately reopened his communications with the Federal base of supplies at Nashville (October 26, 27, and 28), by advancing Hooker's troops from Bridgeport and sending a small force from Chattanooga to seize the points in Lookout valley which controlled Brown's Ferry. After awaiting reënforcements under Sherman, he took the aggressive on November 23, when Thomas, in an engagement lasting two



BATTLEFIELD OF CHATTANOOGA.

hours, drove back Bragg's advanced guards and established a new Federal line a mile in advance of the old one. On the 24th Sherman, on the left, carried a detached point of Missionary Ridge, and Hooker, on the right, in the famous "Battle above the Clouds," carried Lookout Mountain, the Confederates retreating from his front during the night. At daylight on the 25th Sherman renewed his attack on the Confederate right, but, owing to the unavoidable delay of Hooker in coming to his assistance, was placed in a precarious position, and as a diversion Grant ordered an assault by Thomas's troops, under Sheridan and Wood, against the Confederate centre. These troops quickly drove the enemy from his rifle trenches, and then, without orders from Grant or Thomas, rushed impetuously up the steep hill (Missionary Ridge) and, in one of the most remarkable charges known in military history, carried the fortifications under a terrific fire, gained possession of the crest of the ridge, and drove the Confederates, panic-stricken, from the field. The Confederate retreat now became general, and during the night Bragg, hotly pursued by Sheridan, withdrew rapidly up the Chickamauga valley. The losses in killed, wounded, and missing were for the Federals 5815; for the Confederates, 6687. The victory not only relieved Chattanooga, but also forced Longstreet, then besieging Burnside at Knoxville, to retreat into Virginia. Consult: the *Official Records*, vol. xxxi (Washington, 1890); Cist, *The Army of the Cumberland* (New York, 1897); Nicolay and Hay, *Abraham Lincoln: A History*, vol. viii (10 vols., New York, 1897); and Grant, *Personal Memoirs* (2 vols., new ed., New York, 1895).

CHATTANOOGA, University of. A coeducational college under the auspices of the Methodist Episcopal church, founded at Chattanooga, Tenn., in 1867. The university has a preparatory department at Athens, Tenn., with a college department at Chattanooga. They are under the same management, but the instructors are different. At the college department there were, in 1913, 119 students and 12 members of the faculty. In the preparatory department there were 285 students and 12 instructors. The value of the buildings and grounds of the university in 1913 was $416,750. The endowment was $375,739. About $350,000 was

recently subscribed for endowment and buildings to be paid in installments. This increased endowment was made possible by a subscription of $150,000 by the general education board on condition that $350,000 additional be raised in Nov. 1, 1912. The library of the college department contains about 8000 volumes and the preparatory department about 3000. The president is John H. Race, D.D.

CHAT'TEL (OF. *chatel, catel,* ML. *captate, capitale,* property, from Lat. *caput,* head). A term nearly, though not quite, coextensive with the term "personal property" (q.v.), i.e., property which passes to the executor or administrator, as distinguished from real property, which is inheritable and passes to the heir. By chattel is meant that species of personal property which is capable of physical delivery and possession. Thus, *choses* (things) in possession are chattels, but *choses* in action (i.e., legal claims for moneys due), although personal property, are not chattels in the technical sense.

Chattels are classified as *chattels real* and *chattels personal.* A *chattel real* is any interest or property in land less than a freehold. As opposed to freeholds, *chattels real* are regarded as personal property; but, as being interests in real property, they are called *chattels real,* to distinguish them from other chattels, which are called *chattels personal.*

Certain objects which are a part of the real estate may become chattels upon being severed from the real estate—as, e.g., timber which has been cut, or ore which has been mined and removed from the land; and certain other objects which are still attached to and form a part of real property—as, e.g., growing annual crops or emblements (q.v.)—are for some purposes regarded as chattels. On the other hand, in general, chattels which become attached to the land or are used as a part of the real estate lose their character as chattels and become real estate. Thus, the materials used in constructing a house or other structure forming a part of the real estate are real estate. Certain chattels, however, affixed to the real estate, but capable of removal—as, e.g., machinery, articles of furniture, etc.—retain their character as chattels for some purposes, while for others they are deemed to be real estate. Chattels of the Church are known as fixtures.

At common law, titles to *chattels personal* in existence are transferable by mere agreement, except in case of gift, when delivery of the chattel is required in order to confer a title upon the grantee. The various branches of the law of chattels are specifically treated under the several titles relating to them, such as GIFT, SALE, PERSONAL PROPERTY, FIXTURES, and the authorities mentioned under those titles may be consulted for a fuller statement of the law. For the early law as to ownership of chattels in England, consult Pollock and Maitland, *History of English Law* (Boston, 1899).

CHATTEL MORTGAGE. The transfer of personal property as security for a debt or obligation in such manner as to pass title to the transferee or mortgagee which may be revested in the transferor or mortgagor upon payment of the debt or performance of the obligation; but upon his failure to pay or perform, the title becomes absolute in the mortgagee. Courts of equity, however, will allow the mortgagor to redeem the mortgaged chattel after the debt or obligation becomes due. (See MORTGAGE; PLEDGE.) The mortgagor of chattels is generally held to have title even in jurisdictions where the mortgagee of real estate is deemed to acquire only an equitable lien, as distinguished from a legal title. At common law, a chattel mortgage might be made without writing or other formality, provided the chattel was delivered to the mortgagee; but under modern statutes, particularly those relating to registration (q.v.) of mortgages, a chattel mortgage is required to be in writing and recorded in order to give it validity against third parties, and in some jurisdictions, by statute, chattel mortgages become void unless refiled or otherwise renewed, as by statute required, from year to year. Consult Cobbey, *A Practical Treatise on the Law of Chattel Mortgage* (St. Paul, 1893).

CHATTERER. A term formerly applied to the waxwings and some related birds with little applicability. It is now, with more or less propriety, restricted by ornithologists to the South American passerine family Cotingidæ, which may be better called cotingas. See BELL BIRD; COTINGA; WAXWING.

CHAT'TERTON, EDWARD KEBLE (1878–). An English author and journalist, born at Sheffield. After graduating from Oxford University he entered journalism in London, writing especially art and dramatic criticisms. He was at various times subeditor of the *Art-Record,* subeditor of the *Daily Mail,* editor of the *Lady's Realm,* and that journal's dramatic critic. His publications include: *T. Sidney Cooper: His Life and Art* (1903); *The Marriages of Mayfair* (1909); *Modern Journalism* (1909); *Down Channel in the Vivette* (1909); *The Boy's Book* (1910); *The Story of the British Navy* (1911); *Royal Love Letters* (1911); *Through Holland in the Vivette* (1912); *King's Cutters and Smugglers* (1912); *Ships and Ways of Other Days* (1913).

CHAT'TERTON, THOMAS (1752–70). An English poet, born in Bristol, Nov. 20, 1752. His father, who had once been a sexton of St. Mary Redcliffe, Bristol, and also master of a charity school, died about two months before the poet's birth. Chatterton was educated at the school of which his father had been master and was thought a dull child; but, making acquaintance with a black-letter Bible which his mother often used, the dormant spirit flashed up. From this book he learned to read. From early years he was fond of all kinds of antiquities; he clung around old walls like the ivy and haunted twilight ruins like the bat. At the age of 14 he was apprenticed to John Lambert, an attorney. His situation here was uncomfortable; he took his meals in the kitchen with the footboy and, when refractory, was chastised with a ruler. In October, 1768, the new bridge at Bristol was opened, and Chatterton sent to a newspaper an account, in antique phraseology and spelling, of the ceremonies attending the opening of the old one in 1248, the whole purporting to be taken from an ancient manuscript. In the preceding year he presented himself to a certain Bristol pewterer, Burgum by name, and astonished the craftsman by the sight of a parchment in which his pedigree was traced back to the Norman Conquest. He also exhibited to his friends copies of old poems, which, he said, were composed by one Thomas

Rowley, a mythical monk of the fifteenth century. These manuscripts made some stir in his native city, but not enough to satisfy Chatterton. Accordingly Horace Walpole, at that time collecting additional materials for his *Anecdotes of Painting in England*, received from Chatterton several pages of antique writing, accompanied by a short note (1769). The pretended manuscript gave biographical sketches of celebrated painters who had flourished in England several centuries before, and of whose existence Walpole had never dreamed. Walpole, put off his guard, answered his unknown correspondent at once, expressed his delight at receiving the manuscript, and desired, as a personal favor, that all the other antique writings, poems included, mentioned in the note should be forwarded. Chatterton immediately sent accounts of a great many more painters and poets and also gave some slight sketch of his personal history. On receipt of this second communication Walpole suspected a trick. The poems he showed to Mason and Gray, who at once pronounced them forgeries. He then wrote Chatterton, administering a great deal of excellent advice. Chatterton replied, desiring that the manuscript should be returned at once; but by the time the letter reached London Walpole was about to start for Paris, and it was allowed to remain unanswered. It was returned three months later. From his earliest youth Chatterton had a ghastly familiarity with the idea of suicide. Among his papers preserved in the British Museum is a last will and testament, "executed in the presence of Omniscience, the 14th of April, 1770," full of the wildest wit and profanity. This, and similar documents falling into the hands of his friends, led to his dismissal from Lambert's office. Released from the slavery of law, Chatterton left for London, April 24, 1770, taking with him the Rowley manuscripts. He found shelter in the house of one Walmsley, a plasterer, in Shoreditch. No sooner had he settled there than he began to work as with a hundred hands. During the last few months of his life he poured forth squibs, satiric poems, political essays, burlettas, letters in the style of Junius, and meditated writing a history of England, to appear in parts. For a time his prospects seemed very bright. He obtained an introduction to Lord Mayor Beckford; he sent glowing letters home, accompanied by presents to his mother and sisters. Ultimately he left the plasterer's in Shoreditch and took lodgings in Brooke Street, adjoining Holborn. Unhappily for him, editors of opposition papers were willing enough to insert and praise his articles, but were disinclined to render an equivalent in cash. The means of life were now fast failing. On Aug. 25, 1770, his landlady, alarmed that her lodger did not make his appearance, had the door of his room broken open; saw the floor littered with small pieces of paper, and Chatterton "lying on the bed with his legs hanging over, quite dead." He had taken arsenic, in anticipation of a slower death from starvation.

Chatterton, dying before he was 18 years old, was certainly a "marvelous boy." While a peculiar interest is attached to all that he wrote, he is best remembered as the author of the so-called "Rowley Poems." Of them only one—"Elinour and Juga"—appeared during his life. The rest were collected and published by T. Tyrwhitt in 1777. Some of them possess that rare beauty of imagination which we associate with Coleridge and Keats. Indeed, these latter poets owed much to Chatterton. So, too, did Dante Rossetti and William Morris. We may cite especially "The Ballade of Charity," the first and third "Eclogues," the "Tragedy of Ælla," the "Tragedy of Godwin," "The Tournament," and the "Parliament of Sprites." Perhaps the best edition of Chatterton is *The Poetical Works of Chatterton* (1871, introductory essay by W. W. Skeat in vol. ii) in the "Aldine Edition of the British Poets." It also contains a memoir of the poet by Edward Bell. Consult: Masson, *Chatterton: A Biography* (New York, 1899); Watts-Dunton's essay in Ward, *English Poets*, iii (London and New York, 1880); Beers, *English Romanticism* (New York, 1898); Russell, *Thomas Chatterton, the Marvelous Boy* (New York, 1909); and Ingram, *The True Chatterton* (London, 1910).

CHATTI. See CATTI.

CHAUCER, chą'sẽr, GEOFFREY (c.1340–1400). The first great English poet. The son of John Chaucer, a London vintner, he was born in London about 1340, or possibly a few years earlier. Of the poet's life few trustworthy details have come down to us. The usual biography is a fabrication. But certain facts are contained in the official documents of the time, and, besides this, Chaucer sometimes speaks of himself. In 1357 he was in the service of the Countess of Ulster, wife of Lionel, the son of Edward III. His position was most likely that of a page. He was in the army of his King, who invaded France in 1359–60. He was taken prisoner, but was ransomed on March 1 of the latter year. Chaucer is not mentioned again until 1367, when he received from the King a pension of 20 marks under the title of "valet." From this time on Chaucer may be followed more closely, his name occurring frequently in public documents. From valet he rose to the rank of squire in the King's household. Chaucer was soon sent on several important foreign missions to Flanders, France, and Italy. His first Italian journey was in 1372–73, when he went to Genoa and Florence, and, as many believe, to Padua, where he learned from Petrarch the story of the Patient Griselda, the tale told by the Clerk of Oxford, one of the Canterbury pilgrims. In 1378 he again went to Italy, returning early the next year. In 1374 he was appointed comptroller of the customs for wool, skins, etc., at the port of London, and in 1382 comptroller of petty customs—of wine, candles, and other small articles. Both these positions he lost in 1386, but in that year he was elected to Parliament from Kent. Three years later he was appointed clerk of the King's works at Westminster, the Tower of London, and various royal manors, and in 1390 clerk of the works for St. George's Chapel, Windsor. During 1391 he lost these positions, probably because the repairs were completed. At about this time he became forester of North Petherton Park, Somersetshire. This appointment he held until his death. After 1386 Chaucer was at various times in financial trouble. It is not to be supposed that he was inefficient as an executive officer; he was rather a sufferer from the ups and downs of politics. During the reign of Richard II (1377–99) there were two parties, one led by John of Gaunt and the other by the Duke of Gloucester. Chaucer belonged to the first and shared in its reverses. When Henry Bolingbroke gained the throne as Henry

IV (1399), Chaucer was placed in better circumstances, but he did not live to enjoy his good fortune. He died on Oct. 25, 1400, and was buried in Westminster Abbey. Chaucer was married some time before 1374, probably as early as 1366. The surname of his wife is uncertain, but her Christian name was Philippa. She seems to have died in 1387. The fifth centenary of Chaucer's death was observed on Oct. 25, 1900, when the Poet Laureate unveiled a memorial window to him in St. Saviour's Cathedral, Southwark.

Chaucer was thus a man of affairs as well as a poet. The exact date of composition cannot be fixed for his various poems. In grouping them it has been customary to assign those that show a knowledge of Italian literature to a period following the first visit to Italy. But this procedure is not quite convincing. In the prologue to the "Legende of Good Women," written about 1385, Chaucer mentions his most important poems down to that date—"Troylus and Cryseyde," "The House of Fame," "Boke of the Duchesse," the "Assembly of Foules," "Palamon and Arcite," "Life of St. Cecile" (the last two were incorporated into the *Canterbury Tales*), and many ballades, roundels, and virelays. All these poems just mentioned by name are very beautiful. Of them, "Troylus and Cryseyde," founded on the mediæval Troy legend, is by far the longest. It was a favorite with Dante Rossetti; and Chaucer is indeed most subtle here in his psychology. In much of the work cited above, Chaucer was to some extent a translator. He did not, however, follow Boccaccio and his other originals slavishly, but rather made use of them in a broad and free way. His greatest work is the *Canterbury Tales*. Here Chaucer brings together at the Tabard Inn men and women of every degree, from the knight to the cook, and plans to have each tell stories on the way to Canterbury and on the return. Of this vast scheme he lived to carry out only a part. The stories were intended to represent the literary types current in his day, such as the romance of chivalry, the legend, and the *fabliau*, or poetic fable, and they were to be in harmony with the characters sketched so delightfully in the prologue. Of this prologue Dryden wrote the famous passage: "'Tis sufficient to say, according to the proverb, that here is God's plenty. We have our forefathers and great-grandames all before us, as they were in Chaucer's day; their general characters are still remaining in mankind, and even in England, though they are called by other names than those of monks, and friars, and canons, and lady abbesses, and nuns; for mankind is ever the same, and nothing lost out of nature, though everything is altered."

Chaucer wrote several minor poems, among which are the "Complaint to Pity" and the "Complaint to his Purse." While it is agreed that Chaucer translated "The Romance of the Rose," there is disagreement as to whether the extant version is wholly his. Indeed, it has been argued, though not very successfully, that it is throughout the work of another hand. "The Court of Love," "The Flower and the Leaf," and certain other poems that have been attributed to him critics no longer accept as his. Chaucer also translated the work of Boëthius entitled *De Consolatione Philosophiæ*, a favorite book of the Middle Ages, and one of which we have a version by King Alfred. No better than his contemporaries in prose, Chaucer rises far above them all in verse. At a time when English poetry was dull and without art, he wrought as a craftsman of the very first rank. He invented the seven-line stanza and the heroic couplet employed by Dryden, Pope, and a host of other poets. He was indeed the father of English poetry.

Bibliography. The first competent editor of Chaucer was Thomas Tyrwhitt, whose edition of the *Canterbury Tales* appeared in 1775, a glossary being added three years later. An admirable edition of the *Complete Works*, by Skeat, in 7 vols., was published at Oxford in 1894–97. A convenient edition in 1 vol. is the Globe (London and New York, 1898). The most exhaustive work on Chaucer is by T. R. Lounsbury: *Studies in Chaucer* (3 vols., New York, 1892). Indispensable to the Chaucer student are the publications of the Chaucer Society, founded in 1867 by F. J. Furnivall. Consult also: Ten Brink, *Chaucer: Studien zur Geschichte seiner Schriften* (Münster, 1870); *Chaucer: Sprache und Verskunst* (Leipzig, 1884); Skeat, *The Chaucer Canon* (Oxford, 1900). For a summary of all known facts and dates of Chaucer's life, see Kirk, *Life-Records of Chaucer* (London, 1900), part iv, published by the Chaucer Society. A most useful work, also, is Hammond, *Chaucer: A Bibliographical Manual* (London, 1909). MacKaye, *Complete Poetical Works of Chaucer: Now first Put into Modern English* (New York, 1912), is helpful to beginners in Chaucer; and John Koch, *A Detailed Comparison of the Eight Manuscripts of Chaucer's Canterbury Tales*, etc. (Heidelberg, 1913), a careful textual study.

CHAUCER'S DREAM. A title originally prefixed to that poem of Chaucer which is now known as *The Boke of the Duchesse*, or *The Deth of Blanche*. In all editions of Chaucer subsequent to that of Speght in 1597, however, it is given to a poem which had been hitherto unrecognized. Although little is known as to the origin or history of the latter piece, there is no reason to doubt the authenticity of the authorship. The earliest manuscript of it which has come down belongs to the year 1550.

CHAUCER SOCIETY, The. A society founded in 1867 in London, by F. J. Furnivall, for the purpose of facilitating Chaucerian research and opening a knowledge of the great poet's works to the public.

CHAUCHARD, shō'shär', Hippolyte François Alfred (1821–1909). A French merchant and art collector, born in Paris. He was first employed as a clerk, but in 1854 founded the Magasins du Louvre and through the introduction of methods now universal in modern department stores built up a great fortune, with which he retired in 1885. His art treasures, including "The Angelus" and six other Millets, 40 Corots, several Rousseaus and Meissoniers, bronze statues, and tapestries, were left as a gift to the French nation.

CHAUCI, kạ'sī. An ancient German tribe which dwelt along the North Sea, between the Amisia (Ems) and the Albis (Elbe). The Romans often came into conflict with them, notably during the reign of Claudius (41–54). Tacitus (*Germ.* 35) records that they were conspicuous for their love of peace and justice, powerful but not ambitious, ready to resist aggression, but never provoking war. After the fifth century they disappear from history.

GEOFFREY CHAUCER

FROM AN ENGRAVING BY GEORGE VERTUE

AFTER THE MINIATURE IN A MANUSCRIPT OF THE WORKS OF THOMAS OCCLEVE

CHAUDESAIGUES, shō'dzāg' (Fr. trans. of Lat. *Calentes Aquæ*, hot springs). A watering place of France, in the Department of Cantal, about 12 miles south-southwest of Saint-Flour (Map: France, S., G 4). It is widely known for its five hot mineral springs with a maximum temperature of 177°, the waters of which are considered very efficacious in cases of rheumatism and are also used for domestic purposes, washing fleeces, etc. There are also three cold springs near by. Pop. (commune), 1901, 1645; 1911, 1675.

CHAUDET, shō'dā', Antoine Denis (1763–1810). A French sculptor, painter, and draftsman. He was born in Paris, studied with J. B. Stouf and E. Gois, and won the Prix de Rome in 1784. He was the favorite sculptor of Napoleon I, of whom he modeled many busts and statues. The most imposing of these, a colossal statue for the Vendôme Column, was destroyed in 1814. Other well-known works are the stone relief "Devotion to the Fatherland" (Panthéon), "Sensibility," "(Edipus" (Louvre), a silver statue of "Peace" (Musée des Arts Decoratifs, Paris), "General Dugommier" (Versailles). His best painting is "Æneas Fleeing with his Family," in imitation of the style of David. He also furnished good illustrations for editions de luxe of the day, such as Didot's *Paul and Virginia* and Racine's dramas. Chaudet's art united classic severity of form with a certain pathos which at times becomes sentimentality. He was an imitator of Canova, to whom some of his works have been ascribed.

CHAUDIÈRE (shō'dyâr') **LAKE** (Fr., caldron). An expansion of Ottawa River in Canada, just above the city of Ottawa, at which place the Chaudière Falls occur (Map: Ontario, J 2).

CHAUDIÈRE RIVER. A river of Canada which rises near the northwest border of Maine, in small head streams which flow into Lake Megantic, from which the Chaudière River issues. It flows generally north-northwest to join the St. Lawrence, about 7 miles above Quebec. It is about 120 miles long. The falls of the same name are 2½ miles above its mouth. See Chaudière Lake.

CHAUFFEUR, shō'fẽr' (Fr., burner), or Garrotteur. A member of the bands of outlaws during the Reign of Terror in France who roamed over the northeastern part of the country, under the lead of John the Skinner, or Schinderhannes. They garroted men and women and roasted their feet to compel them to disclose hidden treasure. In 1803 vigorous measures were taken which resulted in their suppression. (See Brigandage.) With the increasing use of the automobile as a means of recreation and transportation, the term "chauffeur" was applied to the driver who operated the carriage and the mechanic who was carried to look after the machinery and fuel. The origin of this use of the term is found in France, where automobiling first won favor as a sport, the word "chauffeur" being there employed to designate a fireman or stoker. To-day the word has come to be used to signify a professional licensed driver of a self-propelled motor vehicle. See Motor Vehicle.

CHAULIAC, shō'lyȧk', Guy de (c.1300–c.80). A French surgeon. He first practiced in Lyons and was physician to three of the popes of Avignon. He was far in advance of the time, and his *Chirurgia Magna* (1363), written in the vernacular *langue d'oc*, was for three centuries an indispensable manual.

CHAULIEU, shō'lyẽ', Guillaume Amfrye (1639–1720). A French poet, born at Fontenay (le-Comte). He was one of the dissolute abbés of the period and was called "L'Anacréon du Temple." His verses have a grace and facility that makes them still read. His poems were not published during his life. They have usually been printed with those of his intimate companion, the Marquis de la Fare (1644–1712). The best edition is that by Fouquet (1774). Consult Sainte-Beuve, *Causeries du lundi*, vol. i, and Berenger's introduction to Chaulieu's *Lettres inédites* (1850).

CHAUMETTE, shō'mĕt', Pierre-Gaspard (1763–94). A notorious character of the French Revolution, born at Nevers. Through Camille Desmoulins he was made a member of the Club of Cordeliers, and he soon became connected with one of the revolutionary journals. He preached the downfall of property and religion and stood for the policy of anarchy, pillage, and atheism. He became the real dominating spirit of the Commune. After the events of August 10 he became procureur-syndic of Paris. He was guillotined, April 13, 1794, at the instance of Robespierre. Chaumette was one of the most extravagant revolutionists in an age that had gone mad on revolution. At one time, according to tradition, he proposed that the French people should be made to wear wooden shoes and to subsist on potatoes. With all this, he is entitled to a certain amount of commendation for his hospital reforms, public burial for the poor, the suppression of lotteries, houses of ill fame, and obscene literature. Perhaps his most important reform was the abolition of corporal punishment in the schools.

CHAUMIÈRE INDIENNE, shō'myâr' ăn'dē-ĕn', La. See Saint-Pierre, Jacques Henri Bernardin de.

CHAUMONOT, shō'mō'nō', Pierre Marie Joseph (1611–93). A French Jesuit missionary in North America. He was the son of a vine-dresser, but was brought up by his uncle, a priest, who lived at Châtillon, on the Seine. At the age of 10 he ran off, with a companion, to study music at Beaune, Burgundy, under the Fathers of the Oratory; but, having stolen 100 sols (about a dollar) from his uncle, and dreading to be disgraced therefor at his home, he made a pilgrimage to Rome, where he fell under the influence of the Jesuits, and in 1639 went to Canada as a missionary to the Indians. Soon after arriving at Quebec, he left for work among the Hurons and for a year was stationed at Ossossane. For some time he busied himself gathering information for a dictionary of the Huron language and dialects and in 1640 accompanied Brébeuf (q.v.) on a mission to the Neutral Nation, a tribe which then lived west of the Iroquois, between Lake Ontario and Lake Erie. This mission proving unsuccessful, he went to St. Michael, where he remained until 1648, when the Iroquois destroyed this settlement, together with nearly all the others in this vicinity, and almost exterminated the Hurons. Chaumonot accompanied the survivors first to St. Joseph's Island, in Lake Huron, and afterward to the Island of Orleans, where he was able to complete the work on his dictionary and prepare a grammar besides. From 1655 to 1658 he worked among the Iroquois at Onondaga and then

spent some time in Montreal, where in 1663 he founded the Society of the Holy Family. He finally returned to the Hurons, among whom he remained until his death. His life was full of hardship, persecution, and suffering, and, like that of the other Jesuit missionaries of the time, was remarkable for its self-abnegation and unobtrusive heroism. Chaumonot left a curious autobiography, *Vie de P. M. J. Chaumonot, écrite par lui-même* (1688), the original of which is in the Hôtel-Dieu, Quebec. It was published by J. G. Shea in New York in 1858. A continuation (to 1693), *Suite de la vie de P. M. J. Chaumonot par un père de la compagnie* (probably Rale), was also published in New York in the same year. For his missionary work and writings, consult Thwaites, *The Jesuit Relations* (72 vols., Cleveland, 1897–1901). The Index volume should be consulted, as accounts of him are found in many volumes.

CHAUMONT-EN-BASSIGNY, shō'môn'-ông-ba'sē'nē (Fr., bald hill). The capital of the Department of the Haute-Marne, France, situated on an elevation between the rivers Marne and Suize, about 140 miles southeast of Paris (Map: France, N., L 4). The railway viaduct across the Suize is a remarkable structure, 1960 feet long with 50 arches. The city is well built, with clean, spacious streets, and fine promenades around the upper part of the town. The church of St. Jean Baptiste exhibits fine examples of Flamboyant Gothic, of Renaissance, and transitional architecture of the thirteenth, fifteenth, and sixteenth centuries, and contains some good paintings and sculptures. Among the town's monuments is a bronze statue of Philippe Lebon, a native and the pioneer of gaslighting in France. There are many manufactures, including wax candles, hosiery, cotton, yarn, leather, kid gloves, etc. There is also a brisk trade in grain, ironware, and coal. The town traces its origin to a baronial castle erected in 940. At Chaumont, on March 1, 1814, the Allied Powers formulated a plan for the reconstruction of western Europe and bound themselves by treaty not to lay down arms till France had been reduced to its ancient boundaries. Pop. (commune), 1901, 14,622; 1911, 14,870. Consult E. Jolibois, *Histoire de la ville de Chaumont* (Chaumont, 1856).

CHAUNA, chou'nȧ. A bird. See SCREAMER.

CHAUNCEY, chän'sĭ *or* chąn'sĭ, ISAAC (1772–1840). An American naval officer. He was born at Black Rock, Conn., and at an early age began a seafaring life in the mercantile service, in which he was conspicuous for enterprise and energy. In 1799 he entered the newly organized navy as a lieutenant, and in 1802 he was made acting captain, commanding the *Chesapeake*, the flagship of the squadron sent against Tripoli. Throughout the War of 1812 he had command on the Great Lakes. In 1813 he participated in the capture of York (now Toronto) and of Fort George, thus helping to drive the enemy from the whole of the Niagara region, and on October 5 he captured five British vessels and a regiment of troops. At the close of the war he was placed in command of the Brooklyn Navy Yard and in 1816 commanded the Mediterranean squadron and, with William Shaler, Consul, negotiated the treaty of peace with Algiers.

CHAUNCY, or **CHAUNCEY,** CHARLES (1592–1672). An American clergyman and educator, the second president of Harvard College. He was born at Yardleybury, England; graduated in 1613 at Trinity College, Cambridge, of which he was for some time a fellow and where for several years he was professor of Greek. He was vicar of Ware from 1627 to 1633 and of Marston St. Lawrence, Northamptonshire, from 1633 to 1637, and in both pastorates came into frequent conflict with the ecclesiastical authorities. He was first called to account for his opposition to the *Book of Sports* and for his presumption in substituting catechetical exercises for the prohibited afternoon sermon, and in 1629 was brought before the Court of High Commission for having said that "idolatry was admitted into the Church," and that "there is much atheism, popery, Arminianism, and heresy crept into the Church." In 1635 he was again brought before the court, this time for objecting to a rail around the communion table, and to the act of kneeling at the communion service, and after trial publicly recanted. In 1638 he emigrated to America and for three years preached in Plymouth; but in 1641 he became the pastor at Scituate, where, says Mather, "he remained for three and three times three years, cultivating the vineyard of the Lord." In 1654 he planned to return to his old pastorate at Ware; but the overseers of Harvard had meantime chosen him to succeed President Dunster and "by their vehement importunity" induced him to remain. From this time until his death he was president of the college. He is the reputed ancestor of all those bearing the name of Chauncy or Chauncey in the United States. Besides a number of sermons he published: *The Doctrine of the Sacrament, with the Right Use Thereof* (1642); *The Plain Doctrine of the Justification of a Sinner in the Sight of God* (1659), a collection of 26 sermons; *Antisynodalia Scripta Americana* (1662). Consult the interesting sketch in Cotton Mather, *Magnalia* (London, 1702), and Fowler, *Memorials of the Chaunceys* (Boston, 1858).

CHAUNTER, chänt'ẽr (OF. *chantur*, It. *cantatore*, Lat. *cantator*, singer, from *cantare*, frequentative of *canere*, to sing). The highest pipe of the bagpipe (q.v.) on which the chaunt, or melody, is played.

CHAUS, kā'ŭs (Neo-Lat., from the native name). The Indian jungle cat (q.v.).

CHAUSSARD, shō'sär', PIERRE JEAN BAPTISTE (1766–1823). A French author. He was born in Paris and was educated at the Collège Saint-Jean de Beauvais. In 1792 he was sent as commissioner to Belgium to effect a union with that country and upon his return was appointed Secretary General of Public Instruction. His *Mémoires historiques et politiques sur la révolution de Belgique et du pays de Liége* (1793) is an important contribution to the history of that period. He wrote on the art of poetry, supplementing Boileau.

CHAUSSES, shŏs (Fr., stockings). In the Middle Ages, defensive armor for the legs. Some were made of padded and quilted cloth, with metal studs; some of chain mail, some of riveted plates, and some of banded mail. It was not unusual to fasten them by lacing behind the leg.

CHAUSSON, shō'sôn', ERNEST (1855–99). A French composer, born at Paris. He studied under Massenet and César Franck at the Paris Conservatory. For several years he was secretary of the Société National de Musique. He died as the result of an accident with which he met

while wheeling. His works attracted more than ordinary attention because of their strong individuality and excellent workmanship. He wrote two operas, *Hélène* and *Le Roi Arthur*, which was produced in Brussels in 1903; a symphony in B flat; two symphonic poems, *Viviane* and *Les caprices de Marianne*, and several smaller pieces for orchestra; incidental music to Shakespeare's *Tempest* and Bouchor's *Légende de Ste. Cécile;* the vocal works with orchestra *Hymne Védique, Le poème de l'amour et de la mer, Chanson perpétuelle;* a concerto for piano and orchestra; a concerto for violin and piano with string quartet; a piano quartet; a string quartet, and a string trio.

CHAUTAUQUA, shâ-tą'kwâ. A town in Chautauqua Co., N. Y., popular as a summer resort, and noted for its educational facilities and its picturesque situation 1427 feet above sea level, 68 miles by rail from Buffalo, on the Chautauqua Traction and the Jamestown, Chautauqua, and Lake Erie railroads, and on the western shore of Chautauqua Lake (Map: New York, A 6). Steamboats ply on the lake, which is reached by several railroads. The town has a hotel and numerous cottages, and among features connected with the educational work of the Chautauqua Institution are an amphitheatre with a seating capacity of 5000, the "Hall in the Grove," three gymnasiums, and an athletic club, administration building, and buildings for lectures, recitations, etc. The New York State Summer Institute also is situated here. Pop., 1900, 3590; 1910, 3515.

CHAUTAUQUA INSTITUTION. A name adopted from a lake and a county in southwestern New York, which has during the past third of a century become associated with a system of popular education now generally known, but by many only vaguely understood. The fundamental principle of this system is that the higher education may and should be extended to all alike, and that education, best begun in academy, college, and university, is not confined to youth, but continues through the whole of life. Broadly speaking, the influence of the institution is twofold—it is exerted through the summer assembly and summer schools directly upon those in attendance; and, by means of reading circles upon self-educating readers and students in their own homes. Correspondence instruction, formerly undertaken by the institution, has been abandoned. These two plans may be successfully combined, for, by supplementing home study during the year with six weeks' residence at Chautauqua in the summer, a conscientious and persevering student may do work of a high grade and acquire valuable and broadening information. The function of the institution in the educational system of the United States is, therefore, compensatory and supplementary. While its methods cannot be by any means an adequate substitute for college training, they may stimulate personal development among ambitious persons denied college opportunities and among all classes may encourage habits of systematic reading and study.

The Summer Assembly. The first Chautauqua Assembly (known as the "Sunday-school Assembly") was in session Aug. 4–18, 1874, as the result of a plan formed by Lewis Miller, of Akron, Ohio, and the Rev. John H. Vincent, of New York. Both men were interested in the improvement and development of Sunday schools. To this end they devised a meeting which should be more than a mere conference of two or three days, and which should include courses of study in pedagogical principles, biblical analysis, and practical questions of Sunday-school organization and management, extending over a period of 10 days or two weeks. The plan also recognized the importance of recreative exercises and of certain lectures of a general character not strictly related to the main subject of Sunday schools. It was decided to hold this "assembly" in camp, to adopt the unquestionably good features of the so-called camp meeting, but to give prominence to the calm, earnest, careful study of important principles and methods. Although the plan originated with members of the Methodist Episcopal church, there was no thought of making the assembly denominational. At the first session all the leading Protestant bodies were represented, and there has never since been any attempt to make distinctions. The attendance in 1874 was gratifyingly large. In spite of primitive lodgings and many discomforts, there was a spirit of enthusiasm which promised well for the success of the experiment. The Sunday-school Normal Department provided means for daily study under experienced instructors; prominent speakers gave lectures of a popular character on biblical themes. A large model of Palestine (300 feet long) was laid out near the lake (which served as the Mediterranean), and students were conducted through this miniature land by Oriental travelers.

The assembly plans widened rapidly in successive years. The system which had succeeded in the case of Bible study was quickly extended to include science, language (the teaching of Hebrew began in 1875), and literature. Music of a better grade was introduced, and a large chorus was drilled daily. This expansion has continued, until now the staff of lecturers and instructors numbers more than 200 men and women prominent in all departments of educational life. Every year at least one well-known British scholar is invited to cross the Atlantic especially to lecture at Chautauqua. Gradually, progressive courses on some one topic have been substituted for miscellaneous addresses on a great variety of subjects. In 1876 the session was lengthened to three weeks and now covers 60 days of each year. Thus began the Chautauqua Assembly, based on the theory that change of occupation, not idleness, is true recreation, and that the summer vacation may be made a means of development and stimulus to those engaged during the year in the ordinary pursuits of life.

Summer Schools. In 1879 a school for teachers in secular subjects, called "The Teachers' Retreat," was opened, with a faculty of efficient instructors. This department has grown steadily in numbers and importance and is a leading summer school of methods. It is now the School of Pedagogy. In the same year (1879) the School of Languages (now the College of Liberal Arts) began, with courses in German, French, Latin, Greek, Hebrew, and Sanskrit. The development of this school has been marked by important changes, largely due to Dr. William R. Harper, late president of the University of Chicago, who became instructor in Hebrew in 1882 and principal from 1884 to 1898. In 1888 the School of the English Bible (now the School of Religious Teaching) was organized, also under the principalship of Dr. Harper. This department, designed to promote the study of the Bible as a great literary masterpiece as well as an inspired

volume, was received with immediate favor and has grown rapidly. In addition to these three schools many other subjects of study have been added, until there are now 14 distinct departments under the presidency of George E. Vincent, son of the founder of the institution. These various schools are as follows: (1) School of English Language and Literature; (2) School of Modern Languages; (3) School of Classical Languages; (4) School of Mathematics and Sciences; (5) School of Pedagogy; (6) School of Religious Teaching; (7) School of Library Training; (8) School of Domestic Science; (9) School of Music; (10) School of Arts and Crafts; (11) School of Expression; (12) School of Physical Education; (13) School of Practical Arts; (14) School of Agriculture, added in 1912 in coöperation with Cornell University. Many of these schools are under the direction, or command the services, of professors from the leading universities and colleges of the country. About 3000 students avail themselves each year of these facilities.

In addition to the instruction given in these schools, the public programme includes: (1) a variety of lecture courses on the university-extension model, in which a number of lectures are given by one professor and at which the attendance is large; (2) public lectures and addresses by men and women prominent in various departments of life; (3) recreative and æsthetic entertainments, such as concerts, dramatic recitals, stereopticon lectures, etc. The public programmes are divided into series, each extending over a week and many emphasizing in the discussions some great movement of the time. No additional fee is charged for these lectures and entertainments, and they form a most popular and most successful part of the assembly work.

The Chautauqua Literary and Scientific Circle. Probably Chautauqua is best known in connection with the plan of systematic home reading. In 1878 at Chautauqua this plan was proposed and explained. The announcement went out to the press, and the first year 7000 persons were enrolled. From that time, every autumn and winter, readers varying in number from 8000 to 25,000 have joined the circle. During this period more than 300,000 persons have taken this work. About 50 per cent of these have done continuous work for two years, and about 60,000 have completed the four years' course.

The system was founded in the belief that thousands of ambitious men and women were only waiting for definite suggestion and aid in reading. The plan consists of: 1. A four years' course of reading, including selections in English from the ancient classics, history, economics, literature, and art. Each year of the four is devoted especially to a great nation and is known as "The Modern European Year," "The Classical Year," "The English Year," or "The American Year." No attempt is made to study language or mathematics. The course is general and follows in a measure the subjects taught in the average college; it gives what has been called the "college outlook." 2. Certain books, many of them specially prepared by well-known authors, are designated each year by a council of six prominent men. 3. A weekly (monthly up to 1913) magazine, the *Chautauquan*, containing supplementary articles on the subjects of the course by the leading writers of the day; general miscellaneous matter on current affairs; several departments designed to aid the reader, such as apportionment of the course by the week or month, notes on the books, outlines of reading, word studies, etc. 4. A membership book, sent to each reader, including analyses of the required books, and question papers (memoranda), to be filled out and returned to the office. These papers are intended to aid the reader in reviewing and systematically arranging the facts and principles he has learned. They are not examinations, nor are they regarded as such. 5. Local circles, which may be formed in any community where three or more readers desire the benefit of comradeship. More than 10,000 such circles have been formed. 6. A certificate, granted at the end of the course to all who state in writing that they have faithfully read all the required literature. Such certificate has no significance beyond the fact stated, and, of course, has not the significance of a degree.

The readers enrolling each year are known as a "class" and assume the numeral of the year during which their course is completed, after the plan of American colleges. This device, with the thought that so many people in this country and in foreign lands are reading the same books at the same time, creates a certain spirit of fraternity and enthusiasm that contributes to the success of the plan. For those who have completed the four years' course, or for others, there are many special courses in history, literature, science, and art, which enable a reader who has found a congenial subject in the general course to pursue a specialty. There is also a plan by which these special courses may be directed by correspondence with one or another college professor. More than 75 such specialized courses are offered. The importance of continued reading is always emphasized.

In 1902 a new charter was granted to Chautauqua Institution in the nature of an amendment. It states that the purpose and object of the institution shall be to promote the intellectual, social, physical, moral, and religious welfare of the people. To this end it may hold meetings and provide for recreation, instruction, health, and comfort on its grounds at Chautauqua; conduct schools and classes; maintain libraries, museums, reading and study clubs, and other agencies for home education; publish books and serials, and do such other things as may further its general purpose.

Present Status. Architecturally the summer city of Chautauqua has kept pace with the progress of the plan. All the schools and classes are provided with suitable buildings; there are public lecture halls of capacity varying from 200 to 5000, and for other than collegiate purposes there are four clubhouses, three gymnasiums, an imposing colonial market place, and various other community buildings. A large organ and a chime of eight bells are among the possessions of the institution. The revenue is collected, like the customs dues of a foreign city, at the gates. No public "collections" are ever taken. A tax is levied upon all who enter and become members of the community. The institution carries the municipal idea beyond mere material matters to include public instruction and entertainment. All exercises, except class instruction in the college, are free to any one within the town limits, and a ticket giving all the educational privileges of the assembly may be had at a nominal price.

Local Assemblages. There are now throughout the United States and Canada over 550 local assemblies modeled after the original Chautauqua Institution. Most of these are local in their influence; but a few, such as the Champlain Assembly at Plattsburg, N. Y. (see CATHOLIC SUMMER SCHOOL), and the Jewish Chautauqua at Atlantic City, N. J. (see JEWISH CHAUTAUQUA SOCIETY), are doing work quite similar in character to that at Chautauqua. There is no organic relation between these local assemblies and the original, but most of them adopt as a part of their regular work the home reading courses of the mother institution.

Bibliography. Vincent, *The Chautauqua Movement*, with introduction by Miller (Boston, 1886); *The Chautauquan Magazine* (Chautauqua, N. Y., 1880–); *The Chautauqua Assembly Daily Herald; The United States Bureau of Education, Report* (Washington, 1891–92, 1894–95, 1899–1900); Martin, *Social Circles and how to Form them* (Boston, 1888); *Chautauqua Reading Circle Literature* (Meadville, Pa., 1896–97); Raymond, *About Chautauqua: As an Idea, as a Power, and as a Place* (Toledo, 1886); Bray, *A Reading Journey through Chautauqua* (Chautauqua, 1905).

CHAUTAUQUA LAKE (Seneca *t'kenchiata'kwen*, one has taken out fish there). In Chautauqua Co., western New York, 730 feet above the level of Lake Erie, and about 1300 feet above sea level (Map: New York, A 6). It is 18 miles long and about 2 miles wide, with an outlet into Conewango Creek and thence into Allegheny River. It drains only a small area, having no large feeding streams. The lake is in a country famed for its scenery, and on its banks is the celebrated Chautauqua Summer School. Mayville is at the head of the lake and Jamestown at the foot, on the outlet.

CHAUVEAU, shō'vō', PIERRE JOSEPH OLIVIER (1820–90). A Canadian statesman and writer, born and educated in Quebec. He was elected to the Provincial Legislature in 1844 and became Solicitor-General in 1851 and Provincial Secretary in 1853. In 1855 he was appointed superintendent of education for Lower Canada. On the organization of Confederation in 1867 he became Premier of the Province of Quebec and in 1873 was chosen Speaker of the Dominion Senate. He was appointed professor of Roman law in Laval University in 1878 and at one time was president of the Royal Society of Canada. Besides poems, he published: *Charles Guérin, roman de mœurs canadiennes* (1852); *L'Instruction publique au Canada* (1876); *François-Xavier Garneau, sa vie et ses œuvres* (1883); *Bertrand de la Tour* (1898).

CHAUVEAU-LAGARDE, shō'vō' là'gärd', CLAUDE FRANÇOIS (1756–1841). A French advocate, born at Chartres. He defended Marie Antoinette, the Princess Elizabeth, General Miranda, Brissot, and Charlotte Corday before the revolutionary tribunal. Apprehended and imprisoned, he escaped death through the fall of Robespierre. In 1828 he became a counselor of the Court of Cassation. He wrote a *Note historique sur le procès de Marie-Antoinette et de Madame Elisabeth* (1816).

CHAUVENET, shō've-nā', WILLIAM (1820–70). An American mathematician, one of the charter members of the National Academy of Sciences. He was born in Milford, Pa., graduated at Yale in 1840, was professor of mathematics in the navy from 1841 to 1859, and assisted in the establishment of the Naval Academy at Annapolis and of its observatory, of which he was made director. He became professor of mathematics and astronomy in 1859, and chancellor in 1861, in Washington University, at St. Louis, Mo. In 1870 he was president of the American Association for the Advancement of Science. Among his works are an excellent *Treatise on Plane and Spherical Trigonometry* (1850) and a *Manual of Spherical and Practical Astronomy* (1863). Consult "Memoir of William Chauvenet," in the *Biographical Memoirs of the National Academy of Sciences* (Washington, 1877).

CHAUVINISM, shō'vĭn-ĭz'm. The name given in France to a policy of excessive national self-glorification, accompanied by an attitude of aggressive hostility to everything foreign. Chauvin was the name of an old battle-scarred veteran of the Empire who adored the memory of Napoleon and who was continually talking of his achievements at Austerlitz and Jena, and his determination to take a brilliant revenge for Waterloo. The vaudevillists of the day—Scribe, Cognard, Bayard, and Dumanoir—seized upon him as a subject for the comic stage, and since then a *Chauvinist* has come to mean a man who has extravagant and narrow-minded notions of patriotism and enmity towards foreign people, equivalent to the English word "Jingo."

CHAUX-DE-FONDS, shō de-fôN', LA (Fr., deep line). A town in the Canton of Neuchâtel, Switzerland, 9 miles northwest of Neuchâtel (Map: Switzerland, A 1). It is situated in a dry, barren valley of the Jura, at an elevation of 3070 feet above sea level, and is regularly built, with broad, straight streets, and stone houses. The most notable structures are the aqueduct, 13 miles long; the Protestant church, with a fine, vaulted roof; the hospital; the college, which contains the municipal picture gallery; the historical museum; and the library. Among the educational institutions is a watchmaking and art-engraving school. Chaux-de-Fonds is the second largest watch and clock making centre in Switzerland and also manufactures articles in gold, silver, bronze, and enamels, lenses and scientific instruments. Watch and clock making was begun here in 1705 by Jean Richard. Pop., 1900, 36,015; 1910, 39,597.

CHAVANNES. See PUVIS DE CHAVANNES.

CHAVANTÉAN, chä'vän-tā'ăn. A South American tribe, whose language forms a distinct stock, situated in the region of the upper Paraná and lower Paranapanéma, about 20° S. lat., in the State of São Paulo, Brazil. These "Chavantés" are to be distinguished from the "Chavantés" (also known as Akua) of Goyaz and Matto Grosso, who belong to the Tapuyan stock. The independent character of their language was recognized by Von Ihering in 1905. Consult H. von Ihering, *The Anthropology of the State of S. Paulo, Brazil* (2d ed., S. Paulo, 1906), and Chamberlain, in *Journ. de la Soc. des Amér. de Paris*, N.S., vol. vii, p. 185 (1910), and in *Science*, N.S., vol. xxxvii, p. 344 (1913).

CHAVES, shä'vĕsh (Portug., key). A town and fortress of the second class in Portugal, in Tras-os-Montes, near the Spanish frontier, situated on a plain on the right bank of the Tamega, which is here crossed by an old Roman bridge of 12 arches (Map: Portugal, B 2). In the neighborhood are saline springs, which are much

frequented, and the remains of a Roman bath-house. Because of its position near the Spanish frontier it was long maintained as a strongly fortified place, and its name "Chaves" is due to its being one of the "keys" of the North. Its industries consist of silk and linen weaving. Pop., 1900, 6463.

CHAY (chā) **ROOT** (Tamil, *chaya*), CHOYA, or SAYAN (*Oldenlandia umbellata*). A perennial herbaceous plant of the family Rubiaceæ, said to be a native of India. It is cultivated on the coast of Coromandel for the sake of its long, orange-colored roots, the bark of which affords a beautiful red dye. The quality of the bark is said to be improved by keeping it for some years. It is the coloring matter obtained from chay root which is used to paint the red figures on chintz. Chay root is the Indian madder, and with it some tribes in Ceylon formerly paid their tribute.

CHEAP'SIDE (ME. *chepe*, AS. *cēap*, bargain, ultimately connected with Lat. *caupo*, innkeeper + *side*). A street in London extending from St. Paul's Churchyard east to the Mansion House. It is famous for its fine stores, especially of jewelers and mercers, and for its historical reminiscences. It was originally an open square crossed by Watling Street (q.v.), where fairs, markets, and the like were held during the Middle Ages. It is from its mediæval use that it received its name. The square was narrowed down into a street after the "Great Fire."

CHEAT (abbreviation of *escheat;* OF. *eschet*, ML. *excadere*, from Lat. *ex*, out + *cadere*, to fall). As a term of English criminal law, cheat has a narrower signification than in popular usage. For example, a man may be induced to sell goods on credit to another by the false representation of the latter concerning his financial responsibility and thus be defrauded; but such fraud by the purchaser does not amount to a common-law cheat. To constitute that offense, false weights and measures, or a false token, coin, or sign must be used, or there must be a *conspiracy* (q.v.) to defraud. It was punishable as an offense against public trade rather than against an individual. By statute, both in England and in the United States, many fraudulent acts are indictable which did not amount to common-law cheats. See FALSE PRETENSES.

CHEAT. See BROME GRASS.

CHEAT RIVER. A river of West Virginia, formed of four confluents, rising in the eastern part of the State in the Alleghany Mountains, and uniting in Tucker County (Map: West Virginia, E 2). It flows through a region rich in iron and coal and joins the Monongahela River in Pennsylvania, 4 miles from the State line. It is about 125 miles long, but drains a rather narrow area, owing to the conformation of its watershed. It furnishes abundant water power and in portions of its course flows through narrow gorges amid magnificent scenery.

CHEATS, THE. A comedy by John Wilson written in 1662, published in London, in quarto, in 1664, and performed by Killegrew's company at Vere Street, Clare Market, in 1663. It is a satirical farce in mockery of the Nonconformists and excited so much disapprobation that it was soon withdrawn.

CHEATS OF SCAPIN, skȧ'păn', THE. A farce by Otway, performed in February, 1677, and published in the same year, bound up with the author's *Titus and Berenice*, which had been first produced at the same performance. A second edition appeared in 1701. It is a close adaptation of Molière's *Les fourberies de Scapin* and was played as far down as the end of the eighteenth century. The first edition was dedicated to Lord Rochester.

CHEBEC'. The least flycatcher (*Empidonax minimus*), a small, olive-green garden bird, common in the eastern United States, so named from its sharply accented call note. See PEWEE, and Plate of EGGS.

CHEBOYGAN, shĕ-boi'gan. A city and the county seat of Cheboygan Co., Mich., 166 miles north by west of Bay City, on the Michigan Central and the Detroit and Mackinac railroads, and on Lake Huron, at the mouth of the Cheboygan River (Map: Michigan, E 3). It has a good harbor, connected with lake ports by regular steamship lines, and has some reputation as a summer resort. The lumber interests are important, and there are large tanneries, canning factories, shipyards, and saw and paper mills. Settled in 1849, Cheboygan was incorporated in 1877. It is governed by a mayor and a city council. The water works are owned by the city. Pop., 1900, 6489; 1910, 6859.

CHECHEN. See TCHETCHEN.

CHECK, or **CHEQUE.** A bill of exchange (q.v.) drawn on a banker payable on demand. Such is the definition given in the English Bills of Exchange Act, 1882 (45 and 46 Vict., c. 61, § 73), and in the Negotiable Instruments Law, which has been adopted by a number of the United States. (See Laws of New York, 1897, c. 612, § 321.) In a few States it has been held that an instrument drawn upon a printed blank-check form, and differing from an ordinary check only in that it was payable on a day subsequent to its date, is a check, as distinguished from a bill of exchange. Such was not the prevailing view, however, even before the statutes above referred to. It is not necessary that a check be drawn by a customer on his banker, nor that it be drawn against funds, although ordinarily it is so drawn; and a person who obtains money on a check which he knows is drawn by one not entitled to draw for the amount specified therein commits a fraud and may be liable to criminal punishment. A check is intended for prompt presentment, and not for use as a continuing security; and when presented it is to be paid by the banker and canceled, not accepted and returned to the holder. In the United States the usage of certifying checks prevails. The liability of a bank which certifies a check drawn upon it is the same as that of a drawee who accepts a bill. The effect of certification upon the drawer's liability depends upon whether it was procured by the holder or by the drawer. If the drawer procures it, he remains liable on the check as the drawer of an accepted bill of exchange, payable on demand. If the holder procures it, the drawer and indorsers are discharged from liability. In other words, the holder in the latter case chooses to substitute for payment by the bank its promise to pay. Mere delay in presenting a check does not discharge the drawer, unless loss is caused to him thereby. At common law, if the delay did result in loss, as where the bank failed during the period of delay, the drawer was discharged in toto. By the English Bills of Exchange Act and the American Negotiable Instruments Law this has been modified, and he is discharged only to the extent of the loss caused by the delay.

Crossing checks is an English usage which does not prevail in this country. It consists (1) in writing across the face of the check the words "and Company" between two parallel lines, or in simply drawing two parallel transverse lines across the face; or (2) in writing across the face the name of the banker. The first is called a general crossing, the latter a special crossing. A crossed check is payable only when presented through a bank, and one crossed specially is payable only through the bank specified. The usage was introduced as a protection and safeguard to the owner of the check, but it did not restrain the negotiability of the instrument. The Bills of Exchange Act provides that if the crossing is accompanied with the words "not negotiable," a person taking the check shall not have, and shall not be capable of giving, a better title than that of the person from whom he took it.

In most respects other than those mentioned above, checks are governed by the rules which apply to bills of exchange. Consult the authorities referred to under NEGOTIABLE INSTRUMENTS.

CHECK'ERBER'RY. See GAULTHERIA; PARTRIDGE BERRY.

CHECK'ERED BEETLE. A beetle of the serricorn pentamerous family Cleridæ, so named because of its variegated markings. Some of them are antlike in form and coloration. The adults are found on flowers, such as *Spiræa*, and on trunks of trees, where they subsist on nectar and sweet sap. The larvæ live under bark and feed on wood-boring larvæ, even penetrating into the burrows in search of them. Some infest the hives of bees, where they devour the young bees, burrowing their way from cell to cell, and still others feed on dead animal matter. A synopsis of the North American species, by J. L. Le Conte, will be found in the *Annals* of the Lyceum of Natural History of New York, vol. v (New York, 1849).

A CHECKERED BEETLE.

CHECK'ERS (OF. *eschequier*, from ML. *scacarium*, chessboard, from *scacci*, chess, from Pers. *shāh*, king), or DRAUGHTS (Dutch *dragt*, Ger. *Tracht*, burden, from AS. dragan, to draw, Ger. *tragen*, to carry). A game played with "men" on a checkered board, made square, divided into 64 equal square spaces, colored alternately black and white, or any two strongly contrasted colors. The draughts, or checkers, are circular and flat. There are many varieties of checkers—Chinese, English, Polish, Spanish, Italian, and Turkish. A similar game was played by the Egyptians as early as 1600 B.C., and a form of it was popular in ancient Greece. The game is also found among the native tribes of the interior of New Zealand. In France it is called *les dames*, from its having been a favorite game with ladies; in Scotland the draughtboard is called the *dambrod*.

Two persons play this game, each having a set of 12 men—one set black, the other white. The men may be placed either on the black or white squares, but they must all be placed on one color only. In England it is usual to play upon the white squares, with a black square to the lower right, and in Scotland upon the black, with a white square to the lower right, The men may be moved diagonally only, and by one square at a time. If an enemy's man stands in the way, no move may take place unless there be a vacant square beyond into which the piece can be lifted. The man leaped over is then taken and removed from the board. The object of the game is to clear the board of the enemy's men, or to hem them in so that they cannot be moved, and whichever party does so first wins the game. As no piece can move more than one step diagonally at a time, there can be no taking till the antagonists come to close quarters, and the advancing of them cautiously into each other's neighborhood is the chief art of the game. When a man on either side has made his way, either by taking or by a clear open path, to the opposite side of the board, he is entitled to be "crowned," which is done by placing another man on the top of his man. Crowned men may move either backward or forward, but always diagonally and by one square at a time, as before, and this additional power gives a great advantage to the player who owns the greatest number of "kings," and usually decides the game in his favor. Joshua Sturges's work, entitled *The Guide to the Game of Draughts*, first printed in 1800, edited by Kean and last published in 1892, is the standard authority. The rules and many diagrams will be found in *Spalding's Home Library* (New York). Consult also *Foster's Complete Hoyle* (New York, 1909) for different forms of the game, openings, etc.

CHECK'ING. In arithmetic, one of the oldest and best methods of checking the results of operations in decimal arithmetic is known as *casting out nines*. It originated at an early date among the Hindus, and from them it passed to the Arabs. Proofs for this rule appear in the works of Avicenna in the tenth century. Luca Pacioli (1494) adds this check to his work on division, pointing out cases in which it fails. Its use in elementary schools has been neglected more on the continent of Europe than in England, and not until recently has the method been seriously urged by American teachers. The process may be best explained by an example.

Required to check the multiplication, $35 \times 34 = 1190$:

(1) Dividing 35 by 9, the remainder is 8;

(2) Dividing 34 by 9, the remainder is 7;

(3) Dividing 56 (the product of 7 and 8) by 9, the remainder is 2;

(4) Dividing 1190 by 9, the remainder is likewise 2.

Therefore the product, 1190, is probably correct.

According to a proposition in the theory of numbers, the remainder (called the *excess*) arising from dividing a number by 9 is the same as that arising from dividing the sum of its digits by 9. Hence the above remainders may be obtained thus: (1) $3 + 5 = 8$; (2) $3 + 4 = 7$; (3) $5 + 6 = 11 = 9 + 2$; (4) $1 + 1 + 9 + 0 = 9 + 2$ as before.

In the case of addition the excess in the sum is equal to the excess in the sum of the excesses of the addends. Thus, in $635 + 234 = 869$, $6 + 3 + 5 = 9 + 5$, $2 + 3 + 4 = 9 + 0$, $8 + 6 + 9 = 2 \times 9 + 5$, but $5 + 0 = 5$; therefore the sum 869 is correct.

From the identity of division, dividend = divisor $\times$ quotient + remainder, it appears that the excess in the first member must equal that in the second. Hence the check for division is made to depend upon that for addition and

multiplication. Thus, in $8765 = 42 \times 208 + 29$, $8 + 7 + 6 + 5 = 2 \times 9 + 8$; $4 + 2 = 6$, $2 + 0 + 8 = 9 + 1$, $2 + 9 = 9 + 2$; $6 \times 1 + 2 = 8$; but $8 = 8$, therefore the division is correct.

In practice the sum of the digits is rarely found. As soon as the addition produces 9, this is rejected, and so on. Thus, in 180136, $6 + 3 = 9$, $1 + 0 + 8 = 9$; hence 1 is the excess.

If the result obtained from any operation differs from the true result by a multiple of 9, the check evidently fails, as is also the case if the result differs from the true result by having certain digits interchanged. These cases, however, rarely occur. Any number could be chosen for the purpose of checking, but the excess for 9 is easier found than that for any other number not having more exceptions to its efficiency.

The method of casting out nines is only one of several important checks used in mathematical operations. In algebra one of the principal checks is that of arbitrary values. Thus, in the multiplication of $a^2 + 2ab + b^2$ by $a + b$, the product is $a^3 + 3a^2b + 3ab^2 + b^3$. This may be checked by substituting any arbitrary values for a and b, as $a = 2$, $b = 3$, giving $5 \times 25 = 125$. There is also the check of homogeneity, likewise illustrated by the above multiplication, where the product of two homogeneous functions of degrees 1 and 2 respectivcly is also homogeneous of degree $1 + 2$. Functions which are, as in the above case, symmetric with respect to certain letters, also give rise in general to functions symmetric with respect to those letters when one is operated upon by the other, thus suggesting a simple check. The use of checks characterizes the work of all who have to perform operations of various kinds in any of the branches of mathematics, and the importance of the subject can hardly be overestimated. Consult Beman and Smith, *Higher Arithmetic* (Boston, 1895).

CHECKY, chĕk'ĭ, or **CHEQUEE,** chĕk'ê (OF. *escheque,* from *eschequer,* to check). The name given in heraldry to a field or charge composed of small squares of different tinctures, generally metal and color. See Plate of HERALDRY.

CHEDDAR (chĕd'dar) **CHEESE.** See CHEESE; CHEESE MAKING.

CHEDORLAOMER, kĕd'ôr-lā-ō'mēr. A king of Elam, who, according to Gen. xiv, conquered Palestine, but 13 years later was forced to make an invasion in order to establish his authority. He was accompanied by Amraphel (q.v.) of Shinar, Arioch (q.v.) of Ellasar, and Tidal of Goyim. Having conquered the Rephaim, the Zuzim, the Emim, and the Horites, and proceeding as far as El Paran, he returned by way of En Mishpat, slew the Amalekites and the Amorites in Hazezon Tamar, and defeated in a pitched battle the five kings of Sodom, Gomorrah, Admah, Zeboiim, and Zoar, but was smitten near Dan by Abram, who rescued his nephew, Lot. Concerning the historical character of this narrative as a whole many scholars entertain grave doubts. Chedorlaomer is indeed a possible Elamitish name, as Kudur occurs in Kudur Nanchundi and Kudur Mabuk, and Lagamar is the name of an Elamitish goddess. Three cuneiform tablets have been found dating probably from the Achæmenian and the early Seleucid periods, in which some scholars have seen a reference to King *Kudur Lagamar,* but the name in the first is only *Kudur* KU KU *mal,* in the second *Kudur nuch* (?) *gu mal,* and in the third, *Kudur nuch* (?) *gu;* the first also has the names *Erim aku* and *Tudchula,* and the second *Eriekua.* When these men lived is not indicated in the inscriptions. Tudchul may be identical with Tidal, as the guttural *ch* may represent the letter *ayin,* and it has been suggested that Goyim is a textual error for Gutim. Eri Aku may be the same as Rim Sin, a son of Kudur Mabuk, who actually reigned in Larsa, Aku being the Elamitish equivalent of Sin, the name of the moon god. There can be little doubt that Amraphel represents Hammurapi (2124–2081 B.C.). An invasion of Palestine by an Elamitish king is not improbable. But there is as yet no direct evidence from the monuments of any of these kings. While it is thought by some scholars that the names were found by a Babylonian Jew and put into connection with the story of Abram, others regard it more probable that a Palestinian cuneiform source was used. The names of the kings of the submerged cities (see SODOM) are regarded by some as symbolical and fictitious, while others maintain that they are of a type that may be expected in Palestine at the time, and are drawn from the same document. This difference of opinion also applies to Melchizedek (q.v.). We have no means at present of determining whether Abram was mentioned in the original source. The whole chapter is supposed by some students to be a *midrash* written as late as in the fourth century B.C., and some late touches are generally admitted even by those who prefer in so delicate a matter to suspend judgment until more archæological evidence can be obtained. Consult, especially, King, *Letters and Inscriptions of Hammurabi I* (London, 1898); Clay, *Light on the Old Testament from Babel* (Philadelphia, 1906); Meinhold, *I Mose 14, Eine historisch-kritische Untersuchung* (Giessen, 1911); Dhorme, in *Revue Biblique Internationale* (1908); Pilter, "Some Amorite Personal Names in Gen. xiv," in *Proceedings of the Society for Biblical Archæology* (1913).

CHEDUBA, chĕ-dōō'bà, or **MANAUNG.** An island off Arakan, Burma, in the Bay of Bengal, stretching from lat. 18° 40′ to 18° 56′ N., and from long. 93° 28′ to 93° 46′ E. Area, 308 square miles. Pop., 1901, 26,899; 1911, 30,197 (Map: Burma, B 3). The soil is fertile, yielding rice, tobacco, sugar, indigo, cotton, hemp, and large quantities of a vegetable oil, equally fitted for burning and for varnishing. The principal mineral is petroleum. The island is of volcanic origin and still contains an active volcano in the northwestern corner. The coast has earthy cones, which emit mud and gas. The town of Cheduba, or Manaung, in the northeast, has a population of 1540.

CHEE'CHA (native name). A gecko (*Hemidactylas frænatus*) of Ceylon, India, and the Orient, 4 or 5 inches long, which is semidomesticated. "It makes its appearance soon after sunset, about the walls of the Indian dwellings, in search of flies and other small insects. If some attention be shown it, however, it will present itself every evening at the accustomed place, . . . soon becoming very tame." See GECKO.

CHEE'LA, or **CHILA.** See SERPENT EAGLE.

CHEER PHEASANT, chēr fĕz'ant. A crested pheasant (*Catreus wallichi*), of the middle ranges of the Himalayas, which varies from the true pheasants in lacking the bright metallic plumage and in other details. It ranges from

Chamba on the west to Khatmandu in Nepal, being found between 4000 and 10,000 feet elevation according to the season. Flocks of 5 to 15 are found in the vicinity of steep mountain sides, where it scratches vigorously for edible roots and feeds also on berries, seeds, and insects. It breeds in May and lays 8 to 10 eggs. It is the only member of its genus.

CHEERYBLE (chēr'ĭ-b'l) **BROTHERS, THE.** Twin brothers, Charles and Edwin by name, who are benevolent friends to Nicholas and Kate in Dickens's *Nicholas Nickleby*. They are said to be drawn from the Grant brothers who were Manchester cotton spinners in Dickens's day.

CHEESE (AS. *cēse*, from Lat. *caseus*, cheese). A food product made from milk by separating the curd or casein and portions of the fat and other constituents from the whey, shaping the mass into different forms, and usually ripening or curing it. The product has been known since earliest times, the oldest mention of it dating back to about 1400 B.C. It was a common food material long before butter was known, the references to butter in the Bible being more correctly translated 'curdled milk.' The Greeks were familiar with cheese making at the time of Homer, and Aristotle refers to the renneting of milk with the sap of the fig. Hippocrates mentions cheese made from mare's milk and from goat's milk. Sheep's milk was employed for this purpose by the early Egyptians. The Romans used cheese as food quite extensively and were familiar with several kinds, one similar to Limburger, others flavored with spices and herbs, and some which were smoked in the process of making. Columella gives a very good description of the methods employed in cheese making, and Pliny describes the foreign cheeses to be had in Rome, some of which were quite celebrated.

At the present day more than 150 different kinds of cheese made in Europe and America have been described. These depend for their characteristics upon the kind and condition of the milk used, the process of making, the seasoning, and especially upon the conditions incident to the ripening or curing. (See CHEESE MAKING.) Cow's milk is, of course, mainly used, but in some parts of Europe the milk of goats and sheep is also employed. The milk may be sweet or sour; it may contain different amounts of fat, depending upon whether whole milk, skim milk, or milk to which cream is added is used, and the cheese may be hard or soft, according to the amount of water left in it and the character of the curing. The principal hard cheeses are the common Cheddar cheese, the English Cheshire and Stilton, the Dutch Edam and Gouda, the Schweitzer (Swiss) or Emmenthaler (French product, known also as Gruyère), and the Italian Parmesan and Gorgonzola. Among the soft cheeses are Brie (*Fromage de Brie*), Camembert, Neuchâtel, Limburger, "brick," Philadelphia cream, and cottage cheese, or "smierkäse." The famous Roquefort is a semisoft cheese. In addition to these there are many fancy brands of cheese made in the United States and Canada by mixing ground cheese with cream, or butter, or oils, and sometimes adding a flavoring material, such as Meadow-Sweet, Club-House, Canadian Club, etc. Pineapple cheese is ordinary cheese made very firm and pressed into the shape suggested by its name. In composition cheeses of the same general variety vary quite widely, owing to differences in the richness of the milk used, the amount of water left in the curd, and the age of the product. As cheese ripens and ages, it dries out considerably, losing from 8 to 15 per cent of its water. The water in ordinary factory cheese varies all the way from 15 to over 50 per cent, although in well-cured cheese it usually constitutes about one-third, or 35 per cent. The remainder is solid matter, composed mainly of fat, casein (protein), and a little sugar and ash (mostly salt). Fully one-half of the solids in a whole-milk cheese should be fat; in skim-milk cheese the proportion is considerably less. Van Slyke found the average composition of whole-milk cheese made in New York factories to be: water, 31.5; fat, 37; protein, 26.25; ash, sugar, etc., 5.25 per cent. The average of a large number of American analyses differs but little from this, and is as follows: water, 34.2; fat, 33.7; protein, 25.9; ash, sugar, etc., 6.2 per cent. The average percentage composition of a number of the more common kinds of cheese is shown by the accompanying table.

KIND	Water	Fat	Protein	Sugar, ash, etc.
Cheddar (American)	34.2	33.7	25.9	6.2
" made from partly skimmed milk	38.2	29.5	25.4	6.9
" made from skim milk	45.7	16.4	31.5	6.4
Pineapple	23.0	38.9	29.9	8.2
Schweitzer	32.7	32.6	29.5	5.2
Edam	34.0	27.4	30.9	7.7
Parmesan	32.7	25.1	36.8	5.4
Stilton (made from milk and cream)	29.1	35.6	27.4	7.9
Cheshire	34.8	29.5	28.6	7.1
Roquefort	38.8	31.5	23.4	6.3
Limburger	42.1	29.4	23.0	5.5
Neuchâtel	43.4	32.3	17.1	7.2
Fromage de Brie	51.4	25.7	17.9	5.0

Many of the foreign cheeses, such as Emmenthaler (Schweitzer), Edam, Neuchâtel, brick, and Limburger, are now successfully made in the United States; but more than nine-tenths of all the cheese made in this country is the familiar standard variety known as Cheddar. The grades of this cheese commonly recognized are: "full cream," made from whole (unskimmed) milk; "skims," made from skimmed or partly skimmed milk; and "filled" cheese, in which foreign fat is substituted for the natural fat of the milk. The latter is the most serious form of adulteration of cheese, and as the product is palmed off as "full-cream cheese," it is to be regarded and should be treated as a fraud. Its base is skim milk, which is very abundant and cheap in creamery districts. The fat added is usually oleo oil or neutral lard, and from these cheap materials it is said that filled cheese can be made for four or five cents a pound. It is not easily detected by ordinary sampling when fresh; but it has little flavor or aroma, and its quality is short-lived. The exportation of considerable quantities of this cheese under fraudulent names has unfavorably affected the export cheese trade of the United States. Several of the dairy States have prohibited its manufacture, and others have enacted laws requiring its proper labeling.

The general reputation of American cheese at home and abroad has also suffered from the extent of the manufacture of skim cheese, or half-skims. While these are regarded as legitimate products, and, if well made, are highly

nutritious, they should always be plainly marked and sold for exactly what they are. Unlike the ripe and finely flavored Parmesan cheese, which is made from skim milk, the American skims are generally flat in flavor, hard, and horny. Several of the dairy States, notably New York and Wisconsin, have passed laws authorizing the use of State brands on cheese made from whole milk, guaranteeing the quality of the cheese so branded. Canada has prohibited by law the manufacture of either skim-milk or filled cheese. It is one of the largest cheese-producing countries, exporting about 200,000,000 pounds a year.

The cheese production of the United States in the middle of the last century was about 100,000,000 pounds a year and at its close about 300,000,000 pounds, from 30,000,000 to 50,000,000 pounds being exported. The total production in 1910 was 320,530,000 pounds. New York and Wisconsin are the two principal cheese-making States, the former making about 50 per cent more than the latter, and both together producing three-fourths of the entire output of the country. Farm-made cheese has been almost entirely superseded by factory cheese. (See CHEESE FACTORY.) From 30,000,000 to 40,000,000 pounds of cheese are annually imported into the United States, nearly one-half coming from Italy (Parmesan and Gorgonzola), and 30 per cent from Switzerland (Schweitzer).

Food Value. In proportion to its bulk, cheese is a highly nutritive food, both as regards tissue-forming material (protein) and as a source of energy (fuel value). The few digestion experiments which have been made with cheese indicate that the protein and fat in it are quite thoroughly digested. Well-ripened cheese is more thoroughly digested than green cheese. As regards ease of digestion, it appears that fat cheese, thoroughly ripe cheese, or that which is porous, is more quickly digested than other sorts. The distress which some persons experience after eating cheese may be due to a variety of causes, such as overindulgence, especially at the end of a hearty meal, eating a concentrated food without proper dilution with other foods, or insufficient mastication. There are undoubtedly some persons who cannot eat cheese, owing to some personal idiosyncrasy not easily explained, just as there are those who cannot eat strawberries or some other food. In general, it may be said that cheese thoroughly deserves the reputation of being a nutritious and wholesome food which it has had for centuries. Cheese is eaten alone, or combined with other food materials. The more highly flavored kinds are most commonly served at dessert and eaten in small quantities, while the mild sorts often replace to a considerable extent meat or other animal food and constitute an important part of the meal. Occasionally cheese causes a severe, or even fatal, illness. This is due to the growth of peculiar microörganisms and the consequent production of poisonous substances called "ptomaines." But these are by no means confined to cheese and are likely to occur in many other highly nitrogenous foods.

For bean cheese, or bean curd, see SOY BEAN.

CHEESE CEMENT. See CEMENT.

CHEESE FACTORY. A place where cheese is made on a commercial scale. The first cheese factory in the United States was established at Rome, N. Y., in 1851, by Mr. Jesse Williams, a farmer and skillful cheese maker. The idea of bringing together the milk from several neighboring farms, to be made into cheese by a skillful operator, has spread extensively throughout the dairy States and has been adopted abroad. In 1869 the number of cheese factories in the United States had reached over 1000, and since that time this coöperative, or factory, system has practically superseded the making of cheese on farms. There are now said to be over 3500 factories in the United States. The advantages of the system are diminished cost of production, a more uniform and superior quality of cheese, a higher and more regular price, and a great reduction of labor at the farm. Cheese factories are operated on two plans—viz., the stock company or coöperative system, under which the farmers own and manage the factory, through proper officers; and the proprietary plan, in which an individual owns and operates the factory, making cheese for the patrons for a certain price, which in New York State is usually one dollar per hundredweight. The milk is hauled to the factory daily by the patrons, the distance being in many instances several miles. Payment for the milk is usually made on the basis of the weight, account being taken of the amount of milk required to make a pound of cheese. The demonstration that the fat content is a reliable index to the cheese-producing value of milk has led some progressive factories to adopt this basis, which is carried out as at creameries (q.v.). There is a wide difference in the size of cheese factories. Some make only 5 or 6 cheeses a day, while others make over 20 in the height of the season. An average-sized factory produces from 8 to 10 cheeses a day, requiring the milk of about 300 cows. The kind made is almost exclusively Cheddar cheese.

CHEESE INSECTS. Insects affecting cheese are as follows: *Cheese hopper*, or *cheese skipper*, the larva of *Piophila casei*, a small, black, shining, two-winged fly, which lays its eggs on cheese, smoked ham, and chipped beef. The white, slender eggs hatch in 24 to 36 hours, and the cylindrical, white, tapering larva feeds voraciously upon the cheese, ham, or beef, completing its growth in from seven to eight days, and remaining in the pupal condition 10 days longer. The name is derived from the fact that the larva will bring the two ends of the body together and suddenly release them, like a spring, jumping in this way for 3 or 4 inches. In the United States this insect plays a more important rôle as an enemy of smoked ham than of cheese. It seems to prefer the outer, fatty portions. The substances attacked should be kept in scrupulously clean, well-aired rooms; the windows should be screened through the summer, and all shelf cracks should be occasionally washed out with a kerosene emulsion. *Cheesemite*, a minute, whitish, gregarious mite (*Tyroglyphus siro*) of a genus destructive to flour, sugar, etc., which feeds upon cheese, leaving a brown, powdery mass of shed skins where it has worked. Cleanliness in the place where cheese is kept is the best preventive.

CHEESE MAKING. The making of Cheddar cheese, which is the common cheese made in the United States and Canada, and also extensively in England, may be taken as illustrating the general principles upon which the process depends. The milk used should be free from taint or smell, and of good quality as regards composition. While the casein of the milk is

the part which is curdled and gives the body to the cheese, the fat is an important constituent of the finished product, and it has been conclusively shown that the cheese-producing power of milk is measured by its percentage of fat. Hence the fat content of milk indicates its value for both cheese and butter making. The casein in milk exists in a state of semisolution, from which it is separated or curdled by acids, as in the case of sour milk, or by rennet extract prepared from the stomachs of young mammals. The latter is most commonly used in making Cheddar cheese. Pepsin, which is the active agent of rennet, may be used equally well. The fresh milk is first ripened to the proper degree—i.e., a certain amount of lactic acid is developed in it by keeping it for a short time at about 85° F. The acidity accelerates the action of the rennet. When the milk is sufficiently ripe, the rennet is added in diluted form and stirred in, the milk being held at from 82° to 86° F. Ten or fifteen minutes are required to carry the curdling to the proper stage, after which the curd is cut into small pieces with gangs of steel knives, in order to facilitate the contraction of the curd and the expulsion of the whey. The mass is then stirred gently for about five minutes, and subsequently heated to about 98° or 100°, the result being the formation of more acid and a further shrinkage of the curd. The object in these operations is to separate the whey from the curd with the least possible loss of fat. Most of the fat is inclosed in the curd mechanically, but some little goes into the whey, the amount depending upon the skill of the operator. When the curd has assumed the proper consistency (usually judged by its stringing out in little threads when touched with a hot iron), the whey is drawn off and the curd is allowed to mat together into a solid mass. This is cut up into blocks, which are turned so as to maintain a uniform heat throughout. The development of acid, which continues, changes the character of the curd, and when the hot-iron test shows threads 2 or 3 inches long, the curd is ground, or, more properly speaking, cut, and salted, the salt hardening the curd and checking the further development of acid. It is then pressed to bring it into suitable form and remove any surplus whey. After this it is ripened in cool rooms or cellars. This is an important part of the process and has much to do with determining the general quality and character of the cheese. In it the casein is peptonized and changed to forms which are digestible, and the characteristic flavors are developed. If the temperature of the curing room is too high, the cheese ripens rapidly, but gets off flavor and even spoils; and if the air is too moist, the cheese molds. Low temperature and slow curing are much the safest methods, from 45° to 50° F. being recommended, and even a freezing temperature is employed with success. Cold-cured cheese is smooth and mild, and there is less shrinkage in curing due to water evaporation. To avoid the latter, cheeses are often coated with paraffin.

The losses in cheese making occur in the whey and in drippings from the cheese press. The albumin, a milk constituent similar to casein, is not coagulated by the rennet and passes into the whey. This is true also of the milk sugar, only a little being carried into the curd. The fat of the milk is quite largely (all but 5 or 10 per cent) recovered in the cheese in careful making. The amount of cheese that can be made from 100 pounds of milk depends upon (1) the skill of the maker, (2) the amount of water left in the cheese, and (3) the composition of the milk. As mentioned above, the richer the milk is in fat, the greater the amount of cheese that can be made from it under skillful handling. In recent years successful experiments have been made in making Cheddar cheese from pasteurized milk to which hydrochloric acid is added. This gives a more uniform product, removes the difficulty from tainted milk, and places the process under better control.

In the manufacture of other kinds of cheese than Cheddar the details of the process are modified somewhat, or different kinds of milk are used, or the ripening process is different. In the case of a number of kinds special ferments are introduced into the curd to bring about desired characteristics and flavors. This is true of Roquefort cheese, which was originally made from sheep's milk, but in which some cow's milk is now often used. A mold cultivated upon bread is mixed with the curd, and this gradually permeates the whole mass, giving it a mottled bluish color and imparting a characteristic flavor. The characteristics of Limburger are also due to specific fermentations induced during ripening, which result in a putrefactive odor. This cheese is made from sweet milk, the curd being formed into cakes about 5 inches square and 2 inches thick, and not pressed. The main cause of the putrefactive fermentation during ripening is the extremely moist condition in which it is kept. Successful experiments in making Camembert cheese have been conducted at the Connecticut Experiment Station, which have shown the nature of the peculiar fermentation. Schweitzer cheese is made from perfectly fresh, sweet milk—i.e., without ripening—and is of waxy texture, with large "eyes" or holes distributed evenly through it. The curing covers two stages and is carried on in two cellars to secure the proper conditions. It requires a number of months, a fine Swiss cheese being at least 8 or 10 months old before it is eaten.

The spherical dark-red Edam cheese is made quite similarly to Cheddar cheese, the curd being placed in molds to give it its form. It is sometimes made of partly skimmed milk. The curing process is practically the same as for Cheddar cheese, being continued for at least 8 or 10 months. The color is due to the application of an alcoholic solution of carmine when the cheese is ready for market.

The rich Stilton cheese of England, which is very highly esteemed, is made of milk to which cream is added, and is ripened for two years. This ripening is sometimes assisted by mixing some old grated cheese with the curd. The Italian Parmesan cheese is made from skimmed or partly skimmed milk, much like Cheddar cheese, but is ripened for a much longer time. It is very hard and keeps almost indefinitely. Brie is a rennet cheese made in France for several centuries, using cow's milk to which a coloring matter is added. The familiar cottage cheese, Dutch cheese, or smierkäse, is made of sour milk, no rennet being used, and is eaten while fresh. Part skim milk is often used, or a little cream or butter may be added to the curd. The American Neuchâtel, which comes in little cakes wrapped in tinfoil, is likewise a soft, unripened cheese, to be eaten while fresh, but is made from sweet milk with the addition of

rennet. Buttermilk cheese, a new product devised by the Wisconsin Experiment Station, is made by heating slightly acid buttermilk at 130°–140°, when the curd separates out. It is a soft cheese and keeps only a few days. See also CHEESE; CHEESE FACTORY.

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CHEESE RENNET. See BEDSTRAW.

CHEETA, chē'tȧ, **CHITA** (Hind. *cīta,* from Skt. *citra,* spotted), or HUNTING LEOPARD. A large tropical cat (*Cynœlurus jubatus*). It forms an aberrant genus of the Felidæ, differing from *Felis* prominently by its greater comparative length and slenderness of limb, which enables it to run for a short distance with the greatest speed, probably, of any of the larger mammals, and also by the fact that its claws are short, blunt, and almost nonretractile. It therefore pursues its prey by chase rather than by stealth, and to these doglike characteristics adds a docility unusual among cats. It is about the length of the leopard, but stands much higher; in color it varies from tawny to bright rufous, lighter underneath, marked everywhere except on the throat with small, solid spots of black, which are neither rosettes nor arranged in lines; the length of the crisp, erectile hair ("hackles") on the neck and shoulders is another feature. See Plate of WILD CATS, under CAT.

The cheeta is distributed over nearly all Africa, but commonly only in the equatorial jungles and thence sparingly eastward to India. It is in southern India that it is best known, because there it is kept tame and trained by many wealthy natives for the chase of black buck, etc. The methods of training are described by J. L. Kipling (*Beast and Man in India,* London, 1891) and result often in producing a harmless household pet. When taken hunting, it is driven in a cart, leashed and hooded, so that the sport resembles falconry. As soon as the game is sighted, the attendant removes the hood, the cheeta, quivering with excitement, understanding perfectly the meaning of the movement; and then the freed animal, after a glance to find its prey, rushes forward, overtakes and drags it down; it will, however, use catlike stealth should circumstances suggest. The game is never brought back, but held by the cheeta, which must be found quickly and captured—an operation requiring skill, for its native ferocity has been aroused. Having been rewarded with a draft of blood, it is rehooded and confined. The sport (to which the caracal has occasionally been trained for the chase of birds) is of very ancient date, as appears from its depiction on early Assyrian and Egyptian monuments. It was introduced into Europe by returning Crusaders in the fourteenth century and flourished for two centuries in Italy and France. For particulars, consult article by J. E. Harting in the *Field* (London, Dec. 26, 1885). For general description, see *Royal Natural History,* vol. i (London, 1894); for wild habits in Africa, Drummond, *Large Game . . . of Southern Africa* (London, 1875); for habits and sport in India, Blanford, *Fauna of British India* [mammals] (London, 1888–91); Baker, *Wild Beasts and their Ways* (New York, 1890); Sanderson, *Wild Beasts of India* (London, 1893). Facts and illustrations relating to its use in sport in the Middle Ages may be found in La Croix, *Mœurs et usages des moyen âges* (6th ed., Paris, 1878).

CHEETAL, chē'tŭl, or **CHITAL** (Hind. *cītal,* from Skt. *citra* spotted). The axis deer.

CHEETHAM, chēt'am, HENRY (1827–99). An English clergyman and religious author. He was born at Nottingham, studied at Christ's College, Cambridge, and in 1856 was settled as curate of Saffron Walden, Essex. He held the vicarage of Quarndon, Derbyshire, from 1858 to 1870 and was consecrated Bishop of Sierra Leone in the latter year. In 1882 he resigned to become vicar of Rotherham, Yorkshire. His most important publications are *One Hundred Texts of Irish Church Missions* and a volume of *Sermons.*

CHEETHAM, SAMUEL (1827–1908). An English divine and theologian of the Established church, archdeacon and canon of Rochester. He was born at Hambleton, educated at Christ's College, Cambridge, and was fellow there in 1850 and assistant tutor in 1853–58. From 1863 to 1882 he was professor of pastoral theology at King's College, and from 1879 to 1882 archdeacon of Southwark. He was an editor of the *Dictionary of Christian Antiquities* (1875–80) and published: *A History of the Christian Church during the First Six Centuries* (1894); *The Mysteries, Pagan and Christian* (1897); *Mediæval Church History* (1899); *History of the Christian Church since the Reformation* (London, 1908).

CHEE'VER, EZEKIEL (1615–1708). An American educator. He was born in London, but came to New England in 1637 and assisted (1638) in founding New Haven, where he became prominent as a deacon, a minister, and especially as a teacher. He also taught in Ipswich (1650–60) and in Charlestown and was at the head of the Boston Latin School for 38 years. He prepared the *Accidence, a Short Introduction to the Latin Tongue,* which was used as a textbook for a hundred years. Consult Gould, *Ezekiel Cheever, Schoolmaster* (Boston, 1905).

CHEEVER, GEORGE BARRELL (1807–90). An American Congregational clergyman. He was born in Hallowell, Me., and graduated at Bowdoin College in 1825 and at the Andover Theological Seminary in 1830. Two years later he was installed as pastor of a Congregational church in Salem, Mass. The Unitarian controversy attracted his attention, and he was an earnest defender of the orthodox system. Temperance also became a leading idea, and in 1835 he published in a Salem newspaper "Deacon Giles's Distillery," a bitterly satirical allegory which had a wonderful popularity. The author

was prosecuted and imprisoned a month for libel. He then traveled for some time in Europe and, on his return in 1839, became pastor of the Allen Street Presbyterian Church in New York. He resigned in 1844, and from 1846 until his retirement in 1867 was pastor of the church of the Puritans, New York. During the fierce debate that preceded the Civil War he was an active and uncompromising antislavery advocate. At an early age he began to contribute to the *North American Review* and later wrote much for the *Independent* and the *Bibliotheca Sacra*. Among his published works are: *Studies in Poetry* (1830); *Lectures on the Pilgrim's Progress* (1843); *The True History of Deacon Giles's Distillery* (1844); *Wanderings of a Pilgrim* (1846); *Journal of the Pilgrims at Plymouth in 1620* (1848); *God Against Slavery* (1857); *Faith, Doubt, and Evidence* (1881).

CHEFOO. See CHIFU.

CHEHALIS, chē-hā'lĭs. A city and the county seat of Lewis Co., Wash., 33 miles south of Olympia, on the Great Northern, the Northern Pacific, and the Union Pacific railroads (Map: Washington, C 4). There are saw and shingle mills, and factories of furniture, building materials, etc. Pop., 1910, 4507.

CHEIRANTHUS, kī-răn'thŭs. See WALLFLOWER.

CHEIROLEPIS, kī-rŏl'ê-pĭs (Neo-Lat., from Gk. *χείρ, cheir,* hand + λεπίς, *lepis,* scale). The earliest-known ray-finned fish, found in the Devonian rocks of Europe and North America. The body was slender, about 20 inches in length, and was covered by the regular rhomboidal ganoid scales, which in this genus were very small and reënforced on their inner surfaces by vertical ridges. The skull had almost the normal development of external bones, and the jaws were strong and well provided with teeth. The fins, which had very finely divided rays, consisted of a pair of pectoral, a pair of pelvic, and an anal and dorsal fin, and the tail was heterocercal. *Cheirolepis* is a member of a heterogeneous family of fishes, the Palæoniscidæ. See STURGEON; PALÆONISCUS.

CHEIROMANCY. See CHIROMANCY.

CHEIROTHERIUM, kī'rō-thē'rī-ŭm (Neo-Lat., from Gk. *χείρ, cheir,* hand + *θηρίον, thērion,* dim. of *θήρ, thēr,* beast). The name given by Dr. Kaup to the animal which produced the peculiar handlike impressions on the Triassic rocks of this country and Germany. The remains of the animal having been found and its structure made out, this name has given place to the more characteristic one of *Labyrinthodon*. See STEGOCEPHALIA.

CHEKE, chēk, SIR JOHN (1514–57). An English scholar, one of the revivers of classical learning in England during the sixteenth century. He was born at Cambridge, and became a fellow of St. John's College in 1529. He devoted himself assiduously to Latin and Greek, particularly the latter language, then much neglected in England. When the regius professorship of Greek was founded in Cambridge by King Henry VIII, Cheke was appointed to the chair. In 1544 he became tutor to Prince Edward (afterward Edward VI). He became a member of Parliament in 1547, and again in 1552–53, provost of King's College in 1548, and was knighted in 1551.

When Mary came to the throne, Cheke, who was a Protestant and had been Secretary of State for Lady Jane Grey, was stripped of all his possessions and imprisoned. Later he was released and went to the Continent. In 1556 he was seized in Belgium by the agents of Philip II of Spain and brought back to England. Being now compelled to choose between the stake and the Catholic religion, he accepted the latter. Of his numerous writings the most remarkable is his translation of the *Gospel of St. Matthew*, ed. by Goodwin (1843). He lectured on Demosthenes and wrote *De Pronuntiatione Graecæ Linguæ* (1555); through this work he introduced into England a new method of pronouncing Greek. Consult Strype, *Life of Cheke* (Oxford, 1821).

CHEKH (chĕk) **LANGUAGE AND LITERATURE.** See CZECH LANGUAGE; CZECH LITERATURE.

CHEKHOV, chĕ'kōf, ANTON PAVLOVITCH (1860–1904). A famous Russian writer of the younger school, which includes Gorky, Andreev, and Artsybashev. He was born at Taganrog (southern Russia), and although his parents were uneducated themselves—they were both liberated serfs—he himself received a good education. In 1884 he completed the medical course at Moscow University, but soon he decided to follow a literary career. His early work, dating from 1879, consisted chiefly of humorous sketches appearing in the more popular periodicals under the pseudonym "Chekhonte." Encouraged by the suggestion that he was capable of worthier things, Chekhov approached his work more seriously, and soon he was hailed by literary critics as the greatest figure in Russian literature since the days of Turgenev—a distinction which in a measure is still his. Chekhov died of tuberculosis at 44, but into his short life he crowded the writing of over 150 short stories, a number of plays, and at least one full novel. So popular did he become in Russia that it was no uncommon thing for a collection of his works to sell from 10 to 14 editions in a comparatively short time.

Most of his writings have been translated into German or French. In English only the following are available: "Philosophy at Home" (*Short Stories*, October, 1891); "Sorrow" and "The Biter Bit" (*Temple Bar*, May, 1897); "In Exile" (*Fortnightly Review*, September, 1903); "Street Scene in Russia" (*Canadian Magazine*, April, 1905); "Sleepy-Eye" (*Cosmopolitan Magazine*, June, 1906); "Darling" (*Fortnightly Review*, September, 1906); "Terrible Night" (*Current Literature*, January, 1907); and "Bad Conduct" (*New England Magazine*, January, 1909). There are also in English two collections of Chekhov's tales —*The Black Monk and Other Stories* (1903) and *The Kiss and Other Stories* (1908). His plays accessible in English are: *The Sea Gull* (1905); "The Cherry Garden" (*Yale Courant*, 1908); *The Swan Song* (1912); and "Uncle Vanya" and "Ivanhoff" (in *Plays by Anton Tchekhoff*, 1912).

Chekhov's distinguishing characteristics are extreme compression, strict realism and objectivism, complete aloofness, an unusual mastery of words, and a delicate sense of humor. He has been sometimes called a pessimist; but in view of his charming comedies, especially *The Cherry Garden* (his last and most inspiring play), this charge can hardly be sustained. He represents petty and aimless characters with the same intent that he depicts hypocrites and frauds. As a true realist, he could not avoid them.

CHE-KIANG, chĕ′kē-äng′ (Chinese, crooked river). A maritime and eastern province of China, bounded by the Province of Kiang-su on the north, the Pacific on the east, Fu-kien on the south, and Kiang-si and An-hwei on the west. The Chusan Archipelago is also a part of the province. It is the smallest of the provinces and one of the oldest and most fertile parts of the Empire, 36,680 square miles in area. Drained by 14 large rivers (and the Yang-tze-kiang once had a mouth here) and many smaller streams, it produces abundantly tea, rice, cotton, silk, wheat, indigo, and other crops, while the forest and fruit trees comprise every species known in eastern China, so that the people have little need to import materials for food or clothing. Its capital is Hangchow, the centre of the silk district, and on the line of China's partly completed railway system. Ningpo is the chief seaport. Other important cities are Wenchow, a treaty port in the south, and Huchou, on the south shore of T'ai-hu Lake, in the north. In 1899 Italy attempted to gain part of this province, but failed. Pop. (est. in 1910), 17,000,000. Next to Shantung it is the most densely populated province of the Republic.

CHELAN, shĕ-lăn′, Lake. A serpentine sheet of water in Chelan Co., Washington, situated amid picturesque mountain and glacier scenery (Map: Washington, E 1). It is over 40 miles long and from 2 to 3 miles wide. It is fed by the Stehekin or Pierce River, on which are the famous Rainbow Falls, 300 feet high, 3 miles above the entrance to the lake. The lake drains at Chelan Falls into the Columbia River. Stehekin, Moore, Lucerne, Lakeside, and Chelan on its banks are summer resorts. Steamers ply on its waters, and there are fine angling and shooting in the district.

CHELARD, she-lär′, Hippolyte André Jean Baptiste (1789–1861). A French musician, born in Paris. He studied under Fétis and at the Paris Conservatory under Gossec and Dourlen. In 1811 he won the Grand Prix de Rome and became in Italy a pupil of Baini, Zingarelli, and Paisiello. His first opera, *La casa a vendere* (1815), was produced in Naples; but his second, *Macbeth* (book by Rouget de Lisle), was not brought out till 1827. Its failure discouraged Chelard, who retired to Munich and rewrote the entire work. In revised form it met with considerable success, and its composer was appointed court kapellmeister at Munich. In 1829 he returned to Paris and opened a music store, but upon its destruction in the revolution of 1830 he returned to Munich. He conducted German opera in London (1832–33), and in 1836 was called to Weimar as kapellmeister of the Grand Duke. His successful operas, *Der Student* (1831); *Mitternacht* (1831); *Die Hermannsschlacht* (1835), his best work; *Der Scheibentoni* (1842), and *Der Seekadett* (1844), were all produced in Germany. He died in Weimar. A posthumous opera, *L'Aquila romana*, was produced in 1864 in Milan.

CHELIDONIUS, kĕl′ĭ-dō′nĭ-ŭs, Benedictus (?–1521). A Benedictine monk. His true name was Schwalbe ('a swallow'), of which the name by which he is better known is a Græco-Latin punning translation. While in the abbey of St. Egidius, in Nuremberg, built by the Emperor Conrad III in 1140 for the Scotch Benedictines, he wrote, in 1511, the Latin verses to Albert Dürer's cartoons on "The Apocalypse," the "Passion of Christ," and the "Life of the Virgin Mary," besides poems on his monastery and its abbots. His love of learning earned him the nickname "Musophilus." In 1515 he became abbot of the Scotch Benedictine monastery of the Virgin Mary in Vienna, and there he died, Sept. 8, 1521.

CHELIUS, kā′lĭ-o͞os, Maximilian Joseph von (1794–1876). A German physician, born in Mannheim and educated at the University of Heidelberg. He was professor of surgery in Heidelberg from 1817 to 1864, where he contributed greatly to the advancement of the science. His works include: *Ueber die Amputation im Fussgelenk* (1846); *Ueber das Staphyolm der Hornhaut* (1847); *Handbuch der Chirurgie* (8th ed., 1858); *Ueber die Heilung der Blasen-Scheidenfisteln durch Kauterisation* (1845); *Zur Lehre von den Staphylomen des Auges* (1858).

CHELLEAN, shĕl′ē-an. The designation applied by French archæologists to one of the oldest epochs of man in Europe, named from Chelles, in the Department of Seine-et-Marne. The climate of the Chellean epoch was warm and humid, and the flora of the Seine valley was that of the Mediterranean basin, and the fauna characterized by the hippopotamus, rhinoceros, and *Elephas antiquus*. The fact of man's existence there rests on the occurrence in vast numbers of the leaf-shaped, chipped flint implement called by the French Chelléan. Consult Mortillet, *Le préhistorique* (Paris, 1900). See Paleolithic Period.

CHELLES, shĕl, Jean de (?–c.1270). A French architect and sculptor, famous for having built and decorated the beautiful portal of the south transept of Notre Dame in Paris (begun in 1257), with its sculptured portal and rose window. The contemporary chapels of the nave are also probably by him, and he may have had a hand in the building of the original Louvre.

CHELMINSKI, chĕl-mĭn′skē, Jan (1851–). A Polish genre and battle painter. He was born at Brzostov, Russian Poland, and studied in Warsaw under Kossaks and at the Munich Academy under Wagners, Brandt, and Franz Adam. The years 1884–87 he spent in the United States. After that he passed much time in London and in Paris, where he took up his residence. His early works are principally military and hunting subjects. Attractive and lively in execution, they met with great success. Among them are: "Stag Hunt in the Time of Louis XV" (1876); "Morning in the Ukraine"; "Empress of Russia on a Fox Hunt" (1888). These were followed by a series of battle pictures from the wars of Napoleon, particularly the deeds of the Polish legion. More recent works are "The Outskirts of Soissons, 1814" (1907), "Reconnaissance in the Mountains" (1910), "Pursuit of a Courier, 1812" (1911).

CHELMSFORD, chĕmz′fĕrd. The county town of Essex, England, at the confluence of the Chelmer and the Cann, 30 miles east-northeast of London (Map: England, G 5). The town contains factories for making agricultural implements and electric appliances, iron foundries, breweries, and grain mills. Its chief trade is in agricultural produce. It has large and important corn and cattle markets. Pop., 1901, 15,572; 1911, 18,008. Chelmsford belonged to the Bishop of London from Anglo-Saxon times to 1545. It was a prosperous town under the Edwards.

CHELMSFORD. A town in Middlesex Co., Mass., 4 miles southwest of Lowell, on the New York, New Haven, and Hartford and the Boston and Maine railroads, and on the Merrimack River (Map: Massachusetts, E 2). It is the seat of the Middlesex County Training School and contains Adams Library, Silver Lake, and a number of old houses of historic interest. The town is in an agricultural and fruit-growing region and has woolen and worsted mills, machine shops, and cotton-scouring plants. It is governed by a board of three selectmen. Pop., 1900, 3984; 1910, 5010.

CHELONIA, kĕ-lō′nĭ-ȧ (Neo-Lat. nom. pl., from Gk. χελώνη, *chelōnē*, tortoise), or TESTUDINATA (Neo-Lat. nom. pl., from *testudo*, tortoise). An order of reptiles, having the body protected above and below by bony expansions forming shields usually covered with horny plates. It is the least variable of the reptilian group and comprises the turtles, tortoises, terrapins, carets, etc. See TORTOISE and TURTLE, under which heads a description of fossil forms will also be found.

CHELSEA, chĕl′sê (AS. *Celchyp*, Chalkport, from *celc*, chalk + *hyp*, port). Formerly a suburban village of London, England, on the north bank of the Thames, 4½ miles southwest of St. Paul's, and now a metropolitan and parliamentary borough of Greater London (q.v.) (Map: London and Vicinity, E 6). From the sixteenth to the eighteenth century it was a place of aristocratic habitation and is now the chief literary and artistic residential section of London. During the nineteenth century George Eliot, Rossetti, Whistler, and Carlyle, "the Sage of Chelsea" (whose house in Cheyne Row is preserved as a public memorial to him), were residents. The celebrated Ranelagh and Cremorne Gardens were situated here. Bridges connect Chelsea with Battersea, on the south bank of the river. Its features of note are the Chelsea Hospital (q.v.); the Royal Asylum for Soldiers' Children; military barracks; the old church of St. Luke's, built in 1307–27, one of the most interesting of metropolitan parish churches; the Sloane Botanic Gardens; the London Water Works of 1772, and the "Embankment," a favorite riverside promenade. Chelsea porcelain has been famous since the eighteenth century. Pop., of borough, 1891, 72,954; 1901, 73,856; 1911, 66,385. Consult: Martin, *Old Chelsea* (London, 1888); Beaver, *Memorials of Old Chelsea* (London, 1890); Davies, *Chelsea Old Church* (London, 1904).

CHELSEA. A city in Suffolk Co., Mass., and a suburb of Boston, from which it is 3 miles distant, on the Boston and Maine Railroad (Map: Massachusetts, E 3). It is connected with Charlestown by a bridge across the Mystic River, and with Boston by ferry and steam and electric railroads. The principal public buildings are the courthouse, city hall, United States naval and marine hospitals, Frost Hospital, soldiers' home, public library, State armory, and Ye Olde Pratt House. The city contains also Union Park and public playgrounds, and a soldiers' monument. Though Chelsea is principally a residential place, it has manufactures of rubber goods, woolens, foundry and machine-shop products, shoes, brass goods, wireless apparatus, boxes, lithographs, stoves and furnaces, tiles, pottery, etc. The city owns and operates its water works. The government is vested in a mayor, elected annually, and a board of aldermen, one elected from each of the five wards, and four at large. The board elects the city clerk, treasurer, solicitor, auditor, assessors, messenger, clerk of committees, and commissioners of sinking fund, and, upon nomination of the executive, all other municipal officials. The mayor's clerk alone is appointed by the mayor. The annual income of the city for 1913 was $274,637. The principal items of expenditure were: police department, $60,736; fire department, $73,534; schools, $199,230. Pop., 1890, 27,909; 1900, 34,072; 1910, 32,452; 1920, 43,184.

First settled in 1626 as Winnisimmet, Chelsea was part of Boston from 1634 to 1638, when it was incorporated as a town under its present name. Here, in May, 1775, occurred a sharp skirmish between a body of British troops and 1000 Americans under Stark and Putnam, the latter being victorious. Chelsea was incorporated as a city in 1857. Out of parts of Chelsea the present towns of Winthrop and Revere were created. In 1908 a great fire occurred in Chelsea, causing the destruction of 17,000,000 dollars' worth of property. The city recovered from this loss rapidly, however. Consult Winsor, *Memorial History of Boston* (4 vols., Boston, 1880–81).

CHELSEA. A town and the county seat of Orange Co., Vt., 22 miles south by east of the State capital, Montpelier (Map: Vermont, E 5). It has manufactures of lumber, bobbins, and dairy products. Pop., 1890, 1230; 1900, 1070; 1910, 1074.

CHELSEA CHINA. Chinaware made in Chelsea, London, between 1745 and 1784. Its leading marks are an anchor and triangle.

CHELSEA HOSPITAL. An asylum in Chelsea, London, for disabled and superannuated soldiers. It was founded by Charles II, who built the present building in 1682–92, on the site of the College for Religious Controversy (Protestant) founded by James I in 1609. Originally one day's pay per year and two in leap year were deducted from the pay of soldiers in service in order to defray the hospital expenses. This deduction, however, has long since ceased, and the asylum is maintained by parliamentary grant and governed by a board of commissioners appointed by the crown, who are charged also with the duty of awarding all pensions granted by the British government. The initial plan of giving all pensioners accommodation in the asylum has been necessarily abandoned. The inpensioners in 1913 numbered 558, and the outpensioners 84,393.

CHELSEA VILLAGE. A former village, now a part of New York City. In the early part of the nineteenth century it formed the farm of Clement C. Moore, author of "'Twas the Night before Christmas," who, when on the point of abandoning it on the ground of its distance from the city, was persuaded to sell it in building lots. The name is still in use by old residents and is preserved in Chelsea Square, between Twentieth and Twenty-first streets and Ninth and Tenth avenues, the site of the General Theological Seminary.

CHELTENHAM, chĕl′t'n-*am* (village on the Chelt). A municipal and parliamentary borough and fashionable watering place in Gloucestershire, England, 8 miles northeast of the city of Gloucester (Map: England, D 5). It lies in a picturesque valley, on the Chelt, a small stream which rises in the adjacent hills and flows into the Severn. It is sheltered on the east and

southeast by a semicircle of the Cotswood Hills. The town is regularly laid out and well built and has fine public promenades, gardens, terraces, and squares. Among its numerous churches, the parish church of St. Mary's, dating from the fourteenth century, is a fine example of Gothic architecture. The town was incorporated in 1876. It returns one member to Parliament. Modern improvements include electric lighting, an excellent water supply, and a system of sewerage in connection with three large sewage farms. A public library, an art school, baths, a cattle market, and slaughter-houses are also maintained. Cheltenham has become famous for its colleges and schools, among which are the grammar school (founded in 1574), Cheltenham College, training colleges for school-teachers, and many private schools. Its popularity, however, is chiefly due to its mineral springs, considered to be especially efficacious in cases of dyspepsia and affections of the liver. In consequence, such a large proportion of the resident population consists of Anglo-Indians that the town has been nicknamed "Asia Minor." The Cotswold Hunt holds its meets here and draws many visitors during the hunting season. Roman remains have been discovered on the site of the town. It is mentioned in *Domesday Book*, but it was not until the discovery of its mineral springs, in 1716, that it began to rise into importance. The visit of George III in 1788 set upon it the seal of fashion. Its growth in the nineteenth century was very rapid. Pop., 1901, 49,439; 1911, 50,035.

CHELYUSKIN, Cape. See Severo.

CHEMICAL FIRE ENGINE. See Fire Engine.

CHEMICAL HARMONICON. See Harmonicon, Chemical.

CHEMICAL NOTATION. See Chemistry, *Chemical Formulas.*

CHEMICAL SENSE IN ANIMALS. The capacity of an animal for particular mental processes conditioned upon the chemical constitution of the stimuli acting upon it. The criterion of the chemical sense is to be found, as are, indeed, the criteria of all the senses, in the specialized mode of behavior with which the animal responds to the particular class of objects concerned. Many of the lowest forms of animals (e.g., amœba) respond to the presence of chemicals in their environment in the same way that they respond to mechanical contact with a solid object; they cannot, however, be said to give evidence of a chemical sense, since the identity of response to mechanical and chemical stimuli shows no indication of a special experience concomitant with the one kind of stimulation and not with the other. A very little higher in the biological scale the specialized response is found; while still higher there seems to be a difference in the reaction of the animal to substances in solution and to those diffused in air—a difference which has led to the discrimination of two senses, taste and smell.

Among the cœlenterates we first find evidence of a separate chemical sense. Hydra responds to food by seizing it with its tentacles, a performance never elicited by mechanical stimulation. Sea anemones exhibit at least two responses to chemical substances. In the one, the positive reaction, a particle of food is seized by the outer tentacles and passed on by means of the inner tentacles to the mouth. In the other, the negative reaction, the tentacles withdraw in the presence of certain chemicals, such as quinine. In both of these animals the difference in the character of response to chemical and mechanical stimulation indicates an independent chemical sense. In other members of the group, however, the response to both sorts of excitation is the same, although the chemical stimulus seems to be more readily effective, or, as is the case in jellyfish, effective only in certain parts of the creature. In neither of these cases are we justified in assuming the existence of a separate chemical sense. (For form of behavior as sole index of mental processes, see Animal Psychology.)

As we progress higher in the evolutionary scale, the evidences of the chemical sense become more abundant and more striking. The flatworms show a fairly complex feeding reaction. One form of earthworm will burrow only in the presence of the juices from manure, which constitutes its usual environment. There is some evidence for both taste and smell in snails. Starfish perceive food at a distance, and may even be made to follow a bit of meat about an aquarium. Most of the Crustacea (crabs, crayfish, etc.) show a general restlessness when in the presence of food, and it is thought that in some forms chemical stimulation is effective in guiding the male to the female. Spiders give evidence of smell, in that they will move away from glass rods, dipped in certain oils, which are held behind them.

In insects there is a remarkable development in the sense of smell, both in respect to sensitivity and in respect to the number of discriminable smell qualities. Evidence of extreme olfactory sensitivity is seen in the mating of moths. A male moth, when liberated over a mile away, has been known to find the only female in the region within a very short time. A female of another species, hatched in a region where the species was practically unknown, was visited, within a few hours after she became mature, by 60 males. When the female was placed in a tightly sealed box, however, no males came.

Ants appear to be sensitive to a considerable number of different smell qualities, which play an important part in determining their complex behavior. Ants apparently distinguish the smell of food and of their larvæ and discriminate between nest mates and foreigners also in terms of smell. They are guided in the paths to and from the nest very largely, although not entirely, by smell, and it has been suggested that the ability of certain forms to recognize, upon coming at random across a path, the direction to the nest as distinct from the direction from it, is in some way due to an olfactory perception. The fact that the antennæ, which bear the organs of smell, are movable, makes it possible that ants may have an olfactory space perception not unlike tactual space perception in man.

Bees are, perhaps, no less well endowed for olfactory discrimination, although vision plays a more important rôle in their habits than it does with ants. One investigator finds evidence of a large number of specifically different smell qualities—the smell of the individual workers, of the queen, of the drones, of the larvæ, of food, of wax, and of honey.

There is no conclusive evidence for a chemical sense in fishes, amphibia, or reptiles, although

it is suspected in fishes. Most birds are probably without the power of smell.

In spite of the lack of experimental work upon mammals, there is no doubt that in general they possess the capacity for both taste and smell, aquatic animals, such as whales, porpoises, and seals, forming a probable exception as regards smell. In most other members of the group olfactory sensitivity is very great and the power of discrimination remarkable. Not only can they sense very faint odors, but those animals, like the dog, which are primarily dependent upon smell in their daily life, appear to be able to isolate a single smell component within a highly complex mixture.

For details of behavior of particular forms, see articles under those animals. For method of interpretation of observed data and for bibliography, see ANIMAL PSYCHOLOGY. See also CHEMOTAXIS; TROPISM, *Chemotropism*.

CHEMICAL SOCIETY, AMERICAN. A society founded in 1876 for the discussion of subjects connected with and allied to chemistry. The society holds annual meetings, frequently in conjunction with other scientific societies. The membership in 1913 was 6673, including 14 honorary members, 13 life members, and 64 corporation members. Two journals are published, the *Journal of the American Chemical Society* and the *Journal of Industrial and Engineering Chemistry*. The first is edited by W. A. Noyes, and the second by M. C. Whitaker. There is also published a series of *Chemical Abstracts* edited by A. M. Paterson.

CHEMICAL WARFARE. The organized use of chemical materials to do injury to the personnel or matèriel of an enemy, or to wreak destruction of crops, and permanent and temporary structures, or otherwise to render uninhabitable certain regions. The chief field of such effort has been in the use of asphyxiating or poisonous gases, but as shown in the World War the activity of the military chemist was by no means confined to such limits. The earliest recorded use of suffocating gases in military operations was at the siege of the cities of Platæa and Belium in the war between the Athenians and the Spartans about 431 B.C. Here sulphur was burnt and the fumes were employed to harass the enemy. In modern times the first serious proposal to use toxic gases was in August, 1855, when the British Admiral, Lord Dundonald, familiar with the deadly effects of sulphur fumes in Sicily, proposed to the British Government a detailed plan for the reduction of the fortress of Sebastopol by such a method. This proposal was officially disapproved on the ground that "the effects were so terrible that no honorable combatant could use the means required to produce them." From that time the discussion of poisonous gases in warfare was academic and with little thought of the actual use of such materials. However, it was in the minds of military men, as evinced in the introduction of the subject at the Hague Conference of 1899 (see PEACE MOVEMENT), when among the declarations adopted was one providing for the prohibition of the use of projectiles diffusing asphyxiating or deleterious gases. Several European and Asiatic nations acquiesced in this declaration at the time, but many did not sign the articles until later. Thus provision was signed and ratified by Germany on September 4, 1900, but the United States never signed the declaration, which furthermore was not to be binding in case of a war in which a non-signatory was or became a belligerent.

Again at the second Hague Peace Conference in 1907 rules for land warfare were adopted, and Article 23 of these rules stated that "It is expressly forbidden to employ poisons or poisonous weapons," while at the Washington Peace Conference of 1922 a treaty was signed by the powers there represented relative to abolishing the use of poisonous gases. See VOLUME XXIV.

The active beginning of the use of toxic gas in the World War dated from April 22, 1915, when chlorine was released by the Germans in an attack against the French and British lines in the northeastern portion of the upper Ypres salient (see VOLUME XXIV). This was indeed a momentous step for the Germans, as it introduced into civilized warfare a new weapon which led to new tactics of offense and defense.

The importance of the use of toxic gas in modern warfare is shown by the fact that during the year 1918, from 20 to 30 per cent of all the American battle casualties were due to it, but there was the compensating feature that where armies were supplied with masks and other defensive equipment only about 3 or 4 per cent of the gas casualties were fatal as compared with 20 to 25 per cent for those wounded by high explosive shell, shrapnel, bullets, etc. By far the greater part of the gas casualties resulted from the gas projectiles fired by field artillery, which in the British Army reached the great total of 170,000. In fact it was estimated that 90 per cent of the total gas casualties could be thus accounted for, notwithstanding the heavy losses at the first attacks in 1915 among troops quite unprepared when cloud gas was released from cylinders. But trusting to air currents to carry the gas was not satisfactory, and it was charged into projectiles which could be fired from guns, howitzers or mortars.

The use of lethal shells began in 1916 and these projectiles charged with deadly gases were used in addition to the lachrymatory gases. The three main killing gases used in chemical warfare were phosgene, diphosgene, and chlorpicrin. Their use made improved masks or respirators essential, and it was a constant contest between developing new toxic gases and finding adequate protection against them.

Chlorine (q.v.) was the first gas to be used and after it had been allowed to escape from cylinders, it was found that in its liquid form it could be filled into shells, which discharged from regular field pieces, would be detonated in the usual way by a fuse and booster charge and small bursting charge of high explosive. Chlorine is a greenish yellow gas of strong suffocating odor which commercially is used for bleaching and purification of water supplies. By cold and pressure it is liquefied for storage and transport. At Ypres the Germans permitted this gas to float out but they were insufficiently supplied with it, and also with means of protecting themselves so that they were afraid to advance through it.

Phosgene, a gas formed by the combination of chlorine and carbon monoxide in the presence of a catalyzer, is a colorless gas that liquefies at 8° C. It was one of the deadliest gases used during the war and was employed not merely to annoy or to compel the wearing of masks but to kill as many as possible. It was often used in an attack as it did not persist long in the air or on the ground after the explosion of the shell,

and as a result it would clear away by the time that the oncoming troops reached the place of gas concentration.

Chlorpicrin, a gas that is an active poison and in addition a lachrymator or tear producer, is made by the reaction between picric acid or calcium picrate and chlorine. It is a colorless liquid that boils at a temperature of approximately 112° C, and the gas while not so poisonous as some of the toxic gases nevertheless was quite efficient. This after chlorine was the first war gas to be made on a large scale in the United States.

Mustard Gas, Dichlorethyl Sulphide, was introduced by the Germans in July, 1917, at Ypres and immediately became a most effective agent in gas warfare. It also proved a boomerang for the Germans, as they never were able to improve their original facilities for manufacture which could not produce more than 6 tons per day at the end of the war. At that time France and England had improved methods and quantity production, while the United States had 10 times the German capacity at the time of the Armistice. This gas, it is interesting to note, was prepared by the Germans by the method originally described by Victor Meyer and later developed in Emil Fischer's laboratory. Mustard gas is a colorless, slightly oily liquid boiling at 220° C. with some decomposition and freezing at 14° C. or below, the former temperature applying to the pure liquid. Mustard Gas was not necessarily fatal except in sufficient amounts and it acted on the skin like a deep burn. It attacked the lungs, the eyes, the skin and even the intestines. It blistered the skin and produced nausea thus requiring the removal of the mask. It had a delayed action and often a man might be gassed even fatally before he was aware of it, and then he was beyond the reach of treatment. Ground soaked with mustard gas remains impregnated for days continually giving off the vapor.

Diphosgene, or Superpalite, Perchlormethyl formate, was extensively employed by the Germans as was *Diphenylchlorarsine*, their blue cross gas, which produced sneezing and a disagreeable temporary sickness. The latter gas was not considered by the Allies very efficient though made by the Germans in large amounts. *Diphenycyanarsine* and *Ethyl Dichlorarsine* were also employed by the Germans.

Lachrymatory or tear gases were extensively used during the World War by both sides in order to annoy and cut down the efficiency of the enemy and most of all to compel him to keep masked continually. This form of gassing was cheaper than the use of poison gas and even a trace of tear gas in the air would blind a man temporarily. In fact a single tear gas shell could distribute its charge so widely as to require the wearing of masks over an area so wide that from 500 to 1000 phosgene shells would be needed for the same effect. The tear gas was irritating to the membranes of the eye, and so far as it alone was concerned goggles might suffice for protection, but the usual practice was to mix it with deadlier gases. Most tear gases had bromine as a base, the bromine being derived from subterranean brines, and the gas could be used alone, but such combinations as brombenzyl cyanide were made, the one specified being extensively produced in the United States.

In addition to the gases mentioned others were employed and new toxic materials were developed during the war by organic and physiological chemists. Much was accomplished that was never revealed, and had the war continued another year the annihilation of the Central Powers by the discharge from aircraft of deadly gases produced in the United States and elsewhere was predicted.

Gas Masks. Naturally the use of gas immediately resulted in defensive measures. After the first attack by the German in 1915, extemporized masks and impregnated fabric helmets were rapidly developed in England and hurried to the Continent consisting merely of gauze pads soaked with neutralizing chemicals. Then came masks or helmets of the box respirator type first introduced by the British in August, 1916, where absorbing and neutralizing chemicals purified the air before it was inhaled by the wearer. An essential element of these respirators was the charcoal which had to be prepared with great care. Gradually the British and the Americans developed double protection masks which were efficient under all conditions. There were also protective suits and gloves to resist mustard gas.

Tactical Use of Gas. By 1917 the extensive and effective use of gas led to the development of special tactics both for attack and defence. Shells filled with gas and appropriately painted or striped to indicate the charge were issued along with shrapnel and high explosive. The kind of gas selected was determined by the nature of the plan or the military objective, all carefully considered especially with regard to the target and terrain. For example, in case of an advance, a gas that would disperse readily would be employed, or it might be that lanes would be left for the troops going up to seize or contest an objective. It must be remembered that while ordinary high explosive or shrapnel shell exerts its effect immediately after the burst, that of a chemical shell has just begun and may even persist in the case of some of the chemical charges for a week or ten days. Furthermore, a bomb-proof shelter, safe against flying fragments, is no protection against chemical shell whose fumes can pass around corners or sink into the ground.

The artillery during the war made a distinction between "lethal" and "neutralizing" projectiles and fire and this was the basis of the marking of the shell. The lethal shell is used to produce casualties and was employed against occupied positions for surprise effect, the object being to concentrate the greatest possible number of shell on the target in the smallest time, which should not exceed two or three minutes, as in that time gas masks can be adjusted and no further casualties should develop. In attacks of this kind phosgene is employed. With neutralizing shell or those filled with chemicals which are persistent and vaporize slowly, a slow searching fire is maintained scattered over the area to be neutralized. In other words the aim is to develop an atmosphere intolerable for unprotected troops, so that the artillerist seeks to find lines of communication, camps, rest billets, trench systems, cross roads, battery positions, and in short any point where troop are likely to be concentrated. The aim is to make them wear respirators, thus cutting down their efficiency in using field or machine guns, construction or supply work or the bringing up of transport.

Just as the Germans introduced the various types of chemical shell in the World War, so they also developed tactics for its effective use. Their first shell was fired over a considerable area with low concentration, but the results while not always considerable were encouraging so that when they had Mustard Gas and other lethal gases available they began to use a high explosive charge and greater concentration. When it was proposed to advance infantry they began by using mustard gas on the areas where the attack was contemplated, and then a shelling of the front areas was made with Green Cross (Phosgene) shell. The Germans developed detailed tactics using the various shell — "Yellow Cross," "Blue Cross," "Yellow Cross 1," "Green Lorraine Cross," and others as they fitted into the general plan. At the end of the World War, it was stated that 40 per cent of all shell issued to the artillery should be chemical shell divided as follows:

	Per Cent
Mustard Gas	24
Lethal Gas	10
Lachrymatory Gas	6

Incendiary projectiles, short and long range, hand grenades and drop bombs all found their place in the bitter warfare that was waged, and no substance capable of causing injury or destruction was overlooked. The incendiary projectiles usually contained a charge of phosphorous or thermit or a mixture of thermit and oil. For trench fighting flame projectors were developed but were never extensively employed.

CHEMISTRY. The science of the various material substances that are capable of existence, of their relations to one another, and of the laws governing their various transformations.

The Name. The origin of the word "chemistry" is uncertain. *Chemia* (or *Chemi*) is the old name of Egypt, and as the art of making gold and silver was first practiced in that country, the *science of chemeia* (χημεία) may have meant originally 'the science of Egypt.' Later, however, at the time of the Alexandrian alchemists, the word was used to denote some substance; and as, on the one hand, the word *chemi* means 'black,' and, on the other hand, the first step in the transmutation of metals is known to have been a process of blackening, we conclude that *chemeia* may at that time have denoted the 'philosopher's stone,' i.e., the substance employed in the process of blackening the metals. Similarly, in the form *al-kimiyâ*, the term is used also by the early Arabic writers to denote, not their art, but a substance employed in that art. With them, however, the term was used in much the same sense as the word *al-iksîr*, and this suggests another possible derivation. The word *iksîr* is derived from the Greek *xēros* (ξηρός), which means 'dry.' Possibly, then, the word *kîmiyâ* may have been derived from the Greek *chymos* (χυμός), which means 'liquid'; and while at one time both *iksîr* and *kîmiyâ* were used to denote a substance, the words *chymeia* (χυμεία) and *alchymy* gradually came to denote the art in which that substance was employed, the substance itself (the philosopher's stone) retaining only the name *al-iksîr*.

The Branches of Chemistry. The facts of chemistry have been grouped in a variety of ways, either in the interests of research or according to their usefulness in connection with kindred sciences or with the arts. Hence such titles as Animal, Vegetable, Medical, Astronomical, Metallurgical Chemistry, etc., which in a general way explain themselves. Chemistry proper may be considered as comprising the following four branches: analytical, descriptive, general, and applied. *Analytical chemistry* may be defined as the art of determining the composition of substances; under the names of technical analysis, physiological analysis, etc., many of its methods form an important part of applied chemistry. *Descriptive chemistry* deals with the chemical and physical characteristics of substances; it forms a record of the properties of substances, which are arranged, for convenience of reference or for didactic purposes, in accordance with the principles of general chemistry. The two great subdivisions of descriptive chemistry are *inorganic* and *organic* chemistry, the latter dealing with the compounds of carbon, the former with those of all the other elements. *General chemistry* includes theoretical and physical chemistry, which are usually treated together; theoretical chemistry comprises the laws of the composition and chemical behavior of compounds; physical chemistry treats of the physical properties of compounds, of homogeneous mixtures, and of the physical phenomena (thermal, electrical, etc.) accompanying the transformations of substances in general. *Applied chemistry* comprises all the facts and methods of chemistry that find practical employment. The most important subdivisions of this branch are: (1) biological chemistry, including the chemical facts connected with physiological and pathological phenomena in animals and plants; (2) agricultural chemistry, which deals with problems of rural economy; and (3) industrial, technological, or practical chemistry, which deals with the uses of chemistry in the arts and manufactures.

The Methods of Chemical Philosophy. Like any other science, chemistry may use two different ways in discovering and demonstrating its general principles. On the one hand—and this is the surest way—a principle may be induced from a large number of experimental observations; it is then nothing but the statement of a general fact, and is termed an *empirical law*. Thus, the principle of the conservation of matter is an empirical law. Perhaps this law may suggest itself a priori; but as a law of science it has been induced from facts established by the balance. On the other hand, there are problems which cannot be attacked by experiment. Thus, the problem of the ultimate structure of matter lies far beyond our power of direct observation; yet it is intimately connected with the correlation of substances, and therefore chemistry is compelled to consider it for purely practical reasons. In cases of this nature chemistry, like any other science and like speculative philosophy, makes some plausible assumption, termed a *hypothesis*. Like speculative philosophy, it develops the hypothesis, combines it, if necessary, with other assumptions, and thus builds up a *theory*. But at this point, where speculative research reaches its ne plus ultra, the work of the scientist really begins. The general principles forming part of the theory are busily applied to phenomena capable of direct observation, and then, if their correctness is indicated by actual experiment, they become *theoretical laws*. A scientific theory has for its object, first, to correlate seemingly different facts, and, secondly, to throw light on the road of in-

vestigation and lead to the establishment of new facts. Thus, the atomic theory of chemistry has correlated the various chemical substances with regard to their composition and constitution, and it has revealed the possible existence of innumerable compounds many of which have since been actually prepared—an achievement not unlike the discovery of Neptune by theoretical astronomy.

SUBSTANCES

The Chemical Elements. Some 80-odd among the many thousand substances known to chemists have been classed together as the chemical "elements." They include the pure metals (gold, silver, iron, tin, zinc, etc., but not the alloys, like brass) and, on the other hand, a set of substances (carbon, sulphur, phosphorus, oxygen, nitrogen, hydrogen, etc.) called "the metalloids." A list of elements may be found in the article ATOMIC WEIGHTS.

A priori the mind almost refuses to accept the belief that the universe is built up of a number, like 80, of substances, each of which is ultimately simple and unrelated to the others. At all periods in the history of scientific thought men have rather inclined to the belief in the qualitative unity of matter, to the idea that the substances and materials found in nature or prepared artificially consist essentially and ultimately of one and the same thing, a *single* primordial matter. Towards the very end of the nineteenth century we find so keen a chemical thinker as Van't Hoff expressing the opinion that the elements may yet be decomposed when we have learned to produce high enough temperatures.

However, in spite of such philosophic views held by chemists as well as by scientists in general, the metals and metalloids continued to be regarded as elements and to be classed apart from other substances. For a positive science like chemistry is more securely founded on results of experience, even if such results are not philosophically plausible, than on attractive aprioristic speculation. And experiment had failed to establish any relationship between the substances in question. Thus, centuries of effort directed towards transmuting the baser metals into gold had yielded only negative results. Then, through the various innumerable processes, analytical and preparative, to which all sorts of substances were subjected by chemists in the course of the nineteenth century, the elements remained unchanged and undiminished in amount. Moreover, the spectroscope has shown that the heavenly bodies are made up of the same elements as the earth, which indicates that the highest temperatures prevailing anywhere in nature are still incapable of decomposing our terrestrial elements. While, therefore, the elements were defined, with formal scientific caution and for obvious philosophic reasons, as substances that have *not yet* been decomposed into something simpler and that are *not known* to be related or transmutable into one another, they were really assumed to be as good as absolutely undecomposable, and the name "elements" was retained notwithstanding the prevalent belief that they were ultimately derived from some one substance.

In 1869 Mendeléeff and Lothar Meyer made a discovery (see PERIODIC LAW) which indicated that the elements had very correctly been distinguished as a class of substances different from all others. When, viz., the elements are arranged in the order of their atomic weights, the group exhibits a periodicity of physical and chemical properties which could not possibly occur among a heterogeneous lot of compound substances that simply had not yet happened to be decomposed. But, on the other hand, this same discovery, this very periodicity of properties, also pointed to the existence of an essential family relationship between the elements themselves, and hence, possibly, to their common derivation from one and the same ultimate substance. However, the underlying cause of this periodicity is still not definitely known to-day.

The first decade of the twentieth century brought an even more important discovery: Sir William Ramsay found that the element radium was continually changing into the element helium, and shortly afterward Debierne discovered that the element actinium was likewise changing into helium! This was strong evidence—almost proof—of the essential sameness of the elements. True, the phenomenon was observed only in the exceptional cases of the newly discovered radio-active elements; but the view gained ground that radio-activity was by no means an exceptional property, that in some measure or other it is common to *all* the elements, and hence that *all* the elements are undergoing gradual decomposition—perhaps into electricity, the ultimate primordial material of the universe.

Radio-activity may thus appear to have introduced a profound revolution in chemical science: to have degraded the elements to the rank of decomposable substances and even to have brought back in its wake the ancient alchemist hope of transmuting base metals into gold. This is not the case. That the alchemical hope is not yet more justifiable now than in the past is clear if we consider that radio-active changes are as far beyond human control as the movements of the heavenly bodies: we can observe them as passive spectators; influence them we cannot. Granting even that some base metal might be turned into gold by a radio-active change, we can neither bring about nor control such a change. Nor has radio-activity (notwithstanding its great importance and still greater possibilities) in any sense revolutionized chemical science: the elements of 25 years ago are still listed as elements to-day and are still recognized as substances of an immeasurably high order of stability. The radio-active decomposition of an element is so exceedingly slow that its occurrence has no more significance for the activities of the chemist than the attraction of a distant fixed star has in computations of the orbit of a planet by the astronomer: it is a negligibly small quantity. This is why radium itself, in spite of its continually changing into helium, is unhesitatingly classed with the "elements."

Chemical Compounds. The conception of the almost absolute simplicity and stability of a chemical element defines clearly the distinction between elementary substances on the one hand and compounds and mixtures on the other. The distinction between a chemical compound and a mixture is not easy to define precisely and generally. But before we proceed to formulate this latter distinction, it may be well to consider two simple cases illustrating the formation of true chemical compounds.

First, when hydrogen and oxygen are mixed in certain proportions at ordinary temperatures, a gas is obtained which still exhibits the properties of the two constituents, each of which behaves just as if the other were not present. If the walls of the vessel containing them are porous, both diffuse out, but the hydrogen diffuses out more rapidly; and so it would be if the two gases were confined in porous vessels separately. Now, if we should apply to our mixture sufficient heat, a remarkable change would suddenly set in—an explosion would take place, the hydrogen as well as the oxygen would cease to exist as such, and a new substance (water) would be found in their place. By suitable methods (e.g., by the use of a galvanic current) water may be decomposed into hydrogen and oxygen; but while it exists as water, it has a set of properties all its own and does not exhibit any of the properties of either hydrogen or oxygen.

Secondly, if finely divided iron and finely divided sulphur should be carefully mixed in certain proportions and left at ordinary temperatures for any length of time, the two would continue alongside each other, iron as iron, sulphur as sulphur. A microscope would show two different kinds of particles. A magnet would separate out the iron and leave the sulphur. But again, if we should heat the mixture, a change would take place, accompanied by an evolution of heat and light, and, as a result, we would find a substance (sulphide of iron) which has none of the properties of either sulphur or iron, although these substances may be obtained from it by suitable methods of decomposition.

It is therefore clear that a chemical compound is an "individual" with properties peculiar to itself and different from those of its components; in a mixture each constituent retains its own individuality and may be recognized by its own properties. A compound is invariably found to be homogeneous, even if examined with a powerful microscope; a mixture may be homogeneous, as in the case of hydrogen and oxygen, or it may be heterogeneous, as in the case of iron and sulphur. In separating the constituents of a mixture advantage is taken of the differences in their properties—in the case of hydrogen and oxygen, the difference in diffusibility; in the case of iron and sulphur, the fact that iron possesses magnetic properties while sulphur does not. The properties oftenest taken advantage of for separating substances without destroying their individuality are *volatility* and *solubility;* and on these are based, respectively, the processes of distillation and crystallization.

When a sufficiently stable chemical compound is subjected to one of these processes and is thus gradually divided into two or more portions, the latter are qualitatively identical with one another and with the whole. Thus, when pure water is subjected to distillation, its composition remains unchanged while any portion of it is being removed. The successive portions of the escaping vapor, too, must have the same composition, viz., that of pure water. Similarly, in the case of pure alcohol, when part of a given amount is removed by distillation, the portion remaining undistilled, as well as the distillate, cannot be anything but pure alcohol, and hence cannot but have the same composition as the liquid before the distillation. Quite different is the case of mixtures. Let, e.g., a liquid made up of alcohol and water be subjected to distillation, and let the process be discontinued when a portion of the liquid has passed over. The liquor remaining behind undistilled will then be found to be much weaker, i.e., to contain a greater proportion of water, than the original liquor before the distillation. On the contrary, the escaping vapor will be found to contain a smaller proportion of water than the original liquor before the distillation. The reason is mainly in the fact that water and alcohol are not equally volatile in the mixture; and, of course, the more volatile constituent, viz., alcohol, distills over more rapidly than water, the less volatile constituent. The process of distillation is very often actually employed by chemists when it is required to ascertain whether a given liquid represents a single compound or a mixture. During crystallization, too, a single substance must obviously remain unchanged. Let, e.g., a given amount of magnesium sulphate (Epsom salt) be dissolved in water and allowed to crystallize; any portion of the crystalline matter separating out must obviously have the same composition as the given salt. On the contrary, if every crystal of a given substance contains two or more different compounds—say, magnesium sulphate and zinc sulphate—then any portion crystallizing out from the solution will be found to have a composition quite different from that of the given substance. The reason is mostly in the fact that the constituent substances of a mixture are not equally soluble in water; and, of course, the less soluble constituent will tend to crystallize out more rapidly than the constituent whose solubility is greater.

It must, however, be remembered that certain mixtures, too, retain their chemical composition unchanged when divided into two or more fractions by distillation or crystallization. Thus, alcohol containing about 2 per cent of water will remain absolutely unchanged if divided into fractions by distillation; each fraction will still contain the same percentage of water. A certain mixture of water and nitric acid, and mixtures of certain other substances, are known to behave in the same way. At one time these mixtures were actually taken to be chemical compounds. This view, however, was discarded as soon as it was shown that the composition of such mixtures can be readily changed by changing the conditions under which the distillation or crystallization takes place. If such a mixture is, viz., distilled in an apparatus connected with an air pump, the temperature at which the distillation takes place can be lowered by lowering the pressure, and then the composition will be found to have changed considerably if the liquid is examined after a part of it has passed over. No such thing can be observed in the case of a single chemical compound. Water, e.g., may, by varying the pressure with the aid of an air pump, be distilled at any ordinary temperature, yet its composition will of course remain unchanged. See DISTILLATION.

In accordance with the above considerations, a chemical compound may be defined as *a homogeneous substance which can, by suitable methods, be broken up into elements, but whose composition is not changed by fractional distillation or crystallization carried out under variable conditions of temperature.* This definition is sufficient for most purposes of theoretical and practical chemistry.

The Atomic Theory. Once we have made certain that we shall not, by insufficient definition

of our concepts, confound mixtures of substances with isolated chemical compounds, we are ready to undertake the investigation of compounds, their physical and physiological properties, their composition, and their constitution and reactions, i.e., their chemical properties. The physical properties, such as color, crystalline form, solubility in various solvents, the boiling or melting point, etc., serve the purpose of readily identifying known compounds. A knowledge of the physiological properties of compounds is desirable, because compounds are often capable of therapeutic action and may therefore be used in medicine. The theoretical chemist, however, is interested in all such properties only inasmuch as they are manifestations of the intimate nature of the compounds characterized by them, and his principal aim is to find a precise expression for the dependence of properties on chemical composition and constitution.

The composition of a compound is revealed by chemical analysis, which shows (1) what the constituent elements are (qualitative analysis) and (2) in what relative quantities those elements are contained in the compound (quantitative analysis). A remarkable law that governs the quantitative composition of compounds became known about the beginning of the nineteenth century. This law, called "the law of multiple proportions," may be enunciated in the following form: There is for every chemical element a characteristic number that represents its combining weight; and the composition of any chemical compound may be represented either by the combining weights of its elements or by simple multiples of those weights. Thus, using the combining weights as we know them at present, we may state the composition of a few compounds as follows: carbonic oxide is composed of 12 parts of carbon and 16 parts of oxygen; carbonic acid of 12 parts of carbon and 32 parts of oxygen; water of 2 parts of hydrogen and 16 parts of oxygen; marsh gas of 12 parts of carbon and 4 parts of hydrogen; olefiant gas (ethylene) of 24 parts of carbon and 4 parts of hydrogen, etc. The combining weights of the three elements mentioned are, approximately: carbon, 12; hydrogen, 1; oxygen, 16; and it is easy to see that in stating the composition of our compounds we have been able to use either these numbers or simple multiples of them. Dalton was led to the discovery of this law by the hypothesis according to which all matter is made up of "atoms," i.e., of minute particles incapable of further subdivision. The atomic theory, based on this hypothesis, comprises the following assumptions: The atoms of any given element are identical; the atoms of different elements are different and have different weights; by the force of chemical affinity several atoms may be held in combination, forming a particle, or "molecule," of a compound, and very large numbers of molecules are necessary to make up even the smallest amounts of compounds which we are actually capable of handling. In accordance with these assumptions, let M stand for the number of molecules making up a certain amount of some compound containing two elements; and let the amount of the first element in it be a, the amount of the second element, b. Let, further, A stand for the weight of a single atom of one of the elements, and n stand for the number of such atoms contained in a single molecule of the compound. Then, evidently, the weight a of the first element in the compound equals $M \times n \times A$. Similarly, if A' stand for the weight of a single atom of the second element, and n' for the number of its atoms contained in a single molecule of the compound, then, evidently, the total weight b of the second element in M molecules equals $M \times n' \times A'$. We therefore have

$$a : b : : MnA : Mn'A'$$

or,

$$a : b : : nA : n'A'.$$

In case a molecule of the compound should contain equal numbers of atoms of the two elements, then $n = n'$, and hence

$$a : b : : A : A'.$$

But these proportions tell us that the weights (a and b) of the elements in a compound are proportional either to the weights of single atoms (A and A'), or to multiples (nA and $n'A'$) of those weights. Thus the fundamental law of chemical composition follows as a direct consequence from, and is, hence, completely explained by, the atomic hypothesis, without which it would be a mystery. The "combining weights" mentioned above in connection with our statement of the law are seen, in the light of the hypothesis, to represent the relative weights of the atoms themselves and are therefore termed *atomic weights.*

But while the fundamental assumptions of the atomic theory thus establish a general relation between the quantitative composition of substances and the relative weights of atoms, they do not furnish a sufficient basis for determining these relative weights in an unequivocal manner. When we apply the above proportions to some given substance—say, water—for the purpose of determining the atomic weights of its elements, we find ourselves compelled to make some additional assumption. Indeed, chemical analysis shows that water contains 11.1 per cent of hydrogen and 88.9 per cent of oxygen. We therefore have

$$a : b = 11.1 : 88.9 = 1 : 8 \text{ (nearly)}$$

and hence

$$nA : n'A' : : 1 : 8,$$

where A and A' are, respectively, the weights of single atoms of hydrogen and oxygen, while n and n' are, respectively, the numbers of atoms of these elements in a molecule of water. What we are after is the ratio $A : A'$, i.e., the relative weights of single atoms; but this we evidently cannot find unless we assign some numerical value to the ratio $n : n'$. Dalton assumed that a molecule of water is made up of one atom of hydrogen and one of oxygen, i.e., $n = n' = 1$, and therefore he found

$$A : A' : : 1 : 8,$$

i.e., an atom of oxygen is 8 times as heavy as an atom of hydrogen. (In reality, Dalton thus obtained, for the atomic weight of oxygen, the figure 6; but this was due to his imperfect knowledge of the proportion of hydrogen and oxygen in water.)

Dalton's assumption was quite arbitrary. But in subsequent years, as the substances known grew numerous and complex, chemists began to feel the want of some general theoretical principle which would render arbitrary, and hence confusing, assumptions unnecessary. Then Gerhardt and Cannizzaro enriched Dalton's atomic theory by adding to it a principle which had

been enunciated by Avogadro as early as 1811, but which had remained unemployed as long as it was not urgently needed. According to Avogadro, equal volumes of different gases contain equal numbers of molecules if the temperatures and pressures of the gases are the same. This theoretical principle and its use in determining the atomic weights of the elements have been explained at some length under ATOMIC WEIGHTS and AVOGADRO'S RULE (qq.v.) and require no further discussion here. Suffice it to state that it forms part of the very foundation of the present atomic and molecular theory, and that it is involved in the discussion of most, if not all, problems of modern chemistry.

A still further addition was made to the fundamental hypothesis of the atomic theory before it attained its maximum of possibilities. This last addition, gradually incorporated during the second half of the nineteenth century, consists of certain assumptions concerning the combining forces of atoms, the number of such forces peculiar to the atom of each element, and the directions in which those forces act. (See below, under *Chemical Formulas;* and see the articles VALENCY; CARBON COMPOUNDS; STEREO-CHEMISTRY.) These assumptions, forming the so-called "doctrine of valency," were adopted mainly because of the necessity of explaining the isomerism of organic compounds, i.e., the fact that quite different compounds may have exactly the same composition. And it was mainly when fortified by these assumptions that the atomic theory enabled us to know compounds before they have actually been found in nature or in a chemical laboratory.

Chemical Formulas. In the notation based on the atomic theory, the atoms of the several elements and their relative weights are represented by symbols, such as H for hydrogen, O for oxygen, C for carbon, etc.; H standing for 1, O for 16, C for 12, etc. (A list of elements, with their symbols and atomic weights, may be found in the article ATOMIC WEIGHTS.) When two or more elements combine chemically, their atoms are assumed to become associated in groups (molecules) without being in any way changed. The assumption is based on the fact that the elements of a compound can be reobtained from it in the free state, though we do not know, of course, what really becomes of an element when it combines with other elements; for, as we have seen above, chemical combination usually causes the properties of the elements to disappear more or less completely. In accordance with the assumption, the formula of a compound is made up from the symbols of its elements. For example, the formula of carbonic oxide is CO; that of carbonic acid is CO_2, etc.; C denoting one atom of carbon, O_2 two atoms of oxygen, etc. The formulas at present used by chemists are of three different kinds, viz., empirical, molecular, and graphic.

An *empirical formula*, as the name suggests, may be considered as involving no hypothesis whatever; it is merely the simplest form in which the composition of a compound may be expressed in terms of the atomic weights of its elements. For example, analysis shows that acetic acid contains 6 parts of carbon, 1 part of hydrogen, and 8 parts of oxygen; or—what is the same—12 parts of carbon, 2 of hydrogen, and 16 of oxygen. Using the symbol C to represent 12 parts of carbon, the symbol H 1 part of hydrogen, and the symbol O 16 parts of oxygen, we may denote the composition of acetic acid by the empirical formula CH_2O, which is nothing but a symbolic expression of the results of analysis.

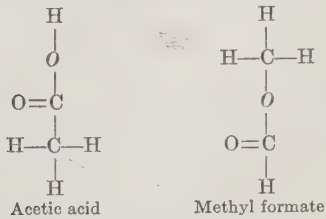
But analysis also shows that certain other substances have the same composition as acetic acid, e.g., the well-known formaldehyde. It is therefore clear that, in order to denote their compounds in a definite manner, chemists must employ formulas which express something else besides composition. Now, Avogadro's hypothesis leads to a knowledge of the relative weight of the molecule of a compound, that weight being, viz., twice as great as the vapor density of the compound referred to hydrogen. (See MOLECULES—MOLECULAR WEIGHTS.) So, to compare acetic acid and formaldehyde, we determine their vapor densities, and as the vapor of acetic acid is found, under proper conditions, to be 30 times as heavy as hydrogen, and formaldehyde vapor is found to be 15 times as heavy as hydrogen, we assign to the acid the "molecular weight" 60, and to the aldehyde the "molecular weight" 30. On the basis of this difference we represent the two compounds, respectively, by the formulas $C_2H_4O_2$ and CH_2O, which have the total weights 60 and 30, while the relative weights of the constituent elements are obviously the same in both. Formulas like these, which denote not only the relative composition of substances, but also their molecular weights, are termed *molecular formulas.* In the case of formaldehyde the molecular formula, CH_2O, happens to be identical with the empirical formula, CH_2O; in many other instances, however, this is not so. A thing exceedingly important to remember is, that *molecular formulas represent practically equal volumes of substances in the gaseous* (or dissolved) *state, under the same conditions of pressure and temperature.* See AVOGADRO'S RULE.

But even molecular formulas do not, in very many cases, suffice to characterize fully the compounds represented by them, for different compounds may have not only the same composition, but also the same molecular weight. Consider, e.g., the "ester" formed by the action of formic acid on wood alcohol. This compound, called methyl formate or methylformic ester, has precisely the same composition as formaldehyde and acetic acid, and precisely the same vapor density as the latter. It must therefore be represented by the same molecular formula as acetic acid:

$C_2H_4O_2$	$C_2H_4O_2$
Acetic acid	Methyl formate

To differentiate compounds like these, chemists use *graphic* or *structural formulas.* Such formulas represent compounds as different because the atoms are differently combined within their molecules, though the kind and number of atoms are the same. To exhibit these differences of combination, chemists employ the assumptions of the doctrine of valency. They assume an atom of hydrogen to be always "uni-valent" because as a rule it is incapable of holding in combination more than a single atom of another element; they assume an atom of carbon to be "quadri-valent" because in marsh gas, CH_4, they find it combined with *four* atoms of hydrogen, and for other reasons of the same nature; and they assume an atom of oxygen to be "di-valent" because in water, H_2O, they find it combined with *two* atoms of hydrogen. With the aid of these assumptions, symbolized by dashes

("bonds") linking together the atoms, they represent acetic acid and methyl formate, respectively, by the following graphic formulas:



Acetic acid Methyl formate

The differences between the two formulas are obvious; thus, the formula of methyl formate shows one of its oxygen atoms as linking together two carbon atoms, while in the formula of acetic acid the corresponding oxygen atom links a carbon atom to an atom of hydrogen. An explanation of the principles used in determining which of all graphic formulas possible in a given case should be assigned to the compound under consideration may be found in the article CARBON COMPOUNDS. To determine the "chemical constitution" of a compound means to determine its graphic formula; for the latter corresponds with, and is therefore a simple expression of, its most important chemical properties.

Graphic formulas often have an abbreviated form; the dashes are omitted, the atoms are combined into groups, and these are written so that their relative arrangement in the molecule may be evident. Such abbreviated expressions are usually employed, for convenience' sake, in preference to the full graphic formulas. Thus, acetic acid is represented by the formula $CH_3.CO.OH$ (or simply CH_3COOH, or CH_3CO_2H); methyl formate is represented by the formula $H.CO.OCH_3$; etc. Remembering the valencies peculiar to the constituent elements, the chemist has no difficulty in reconstructing the graphic formulas from abbreviations of this kind. There is, however, another kind of constitutional formulas, which may be described as incomplete, or imperfect, because they are made up of atomic groups which can be represented, not by only one, but by two or more different graphical schemes. Such formulas are assigned to compounds when we do not know enough about their chemical nature.

Mixtures. We have seen in a preceding paragraph that while the properties of a chemical compound are quite different from those of its constituent elements, the properties of a mixture are made up by the alligation of those of the components. This is very nearly true in the case of all gaseous mixtures, particularly under low pressures, and one of the general laws of gases is that the pressure in a vessel containing several gases is equal to the sum of the pressures that would be exerted by them if each were isolated in a similar vessel (Dalton's law). But in the case of homogeneous ("physical") mixtures in the solid or liquid state, or even of gaseous mixtures in a highly compressed state, the principle of the "additivity of properties" is only a rough approximation, for in such mixtures the properties of each component are often considerably affected by the presence of the other components. A class of mixtures whose theory forms one of the most important chapters of physical chemistry will be discussed in the article SOLUTION.

TRANSFORMATIONS

We have seen above that when heat is applied to a mixture of hydrogen and oxygen, or to a mixture of powdered iron and sulphur, changes set in which result in the formation of entirely new substances—water and sulphide of iron respectively. Changes of this kind are termed *chemical reactions*. On the other hand, there are changes of matter that are much less profound in their character and involve neither the disappearance of the given nor the formation of new chemical substances. Such changes (mostly changes of state) are termed physical transformations. Thus, e.g., the mere evaporation of water may be spoken of as a physical transformation, because liquid water and water vapor are chemically identical. The science of chemistry deals with physical as well as with chemical transformations, mainly because the former often influence and accompany the latter. Following are the laws governing the various transformations of matter:

1. **Conservation of Mass.** No transformation is known to involve gain or loss of the mass of matter. When, e.g., a candle burns up in the air, its material is not lost; it merely combines with the oxygen of the air to form two invisible products—water vapor and carbonic acid; but these, too, are matter, for they have weight, and their mass is precisely equal to the original mass of the candle, *plus* the mass of oxygen consumed. Hence the inductive principle known as the law of the indestructibility or conservation of mass. A strong argument in favor of this law is found in the fact that in spite of the violent processes undoubtedly taking place in the sun, its weight has not in the least changed within historical times; for an appreciable change in the mass of the sun would have involved a change in the length of the day, and such a change is positively known not to have taken place. Of course, the main evidence in favor of the principle of conservation is presented by the innumerable quantitative processes actually employed by chemists. Besides, accurate investigations have been instituted for the special purpose of testing the precision of the principle and have invariably failed to prove it incorrect. True, radio-active change may possibly, or even probably, involve loss of ponderable mass by the partial dissolution of matter into the imponderable substance of electricity. But radio-active change, as already observed (see above, under the side head *The Chemical Elements*), is too exceedingly slow to require consideration in connection with the processes forming the subject matter of chemical science proper.

2. **Conservation of the Elements.** No transformation, except those of radio-activity, is known to involve the transmutation of one chemical element into another. Combining this with the preceding principle, we get what is known as the law of conservation of the elements. According to this, no ordinary transformation involves gain or loss of the mass of each of the chemical elements, and hence, while an element may exist either free or in a state of chemical combination with other elements, its total mass in the universe may, for all purposes of chemical science, be considered as unchangeable.

3. **Combining Quantities.** While we can mix substances in any desired proportion, chemical combination can only take place between

certain definite relative quantities, which depend on the nature of the reacting substances. Thus, hydrogen and oxygen combine in the proportion of 1 part by weight of the former to 8 parts by weight of the latter; or, what is the same, they combine entirely when the volume of hydrogen is twice as great as the volume of oxygen (oxygen is 16 times as heavy as hydrogen). If, instead of these relative quantities, we should mix, say, 1 part by weight of hydrogen with 9 parts of oxygen, we should still find that only 8 parts of the latter have combined with all of the hydrogen into water, and that 1 part of oxygen has remained uncombined; the case would be analogous if, instead of an excess of oxygen, we employed an excess of hydrogen. Hence the conception of "combining quantities." Early in the nineteenth century Gay-Lussac discovered a remarkable fact, viz., that the relative combining volumes of gases can in all cases be expressed in the form of simple arithmetical ratios. We have just seen that hydrogen and oxygen combine in the ratio of 2 volumes of the former to 1 of the latter (the product is 2 volumes of water). In the case of the reacting pair, hydrogen and chlorine, the ratio is still simpler, 1 volume of hydrogen combining with 1 volume of chlorine (the product is 2 volumes of hydrochloric acid). It was this general fact that suggested to Avogadro his celebrated hypothesis, in accordance with which we explain the fact that 2 volumes of hydrogen react with 1 of oxygen, by saying that every 2 *molecules* of the former react with every 1 *molecule* of the latter.

Chemical Equations. The three principles just stated are expressed symbolically in those equations which chemists use to represent the various reactions of substances. Take, e.g., the equation representing the combustion of marsh gas, i.e., its combination with oxygen, viz.:

$$CH_4 + 2O_2 = CO_2 + 2H_2O.$$

The symbols CH_4, $2O_2$, CO_2, and $2H_2O$ represent, respectively, certain relative weights of marsh gas, oxygen, carbonic acid, and water; and the sign of equality denotes that the total mass of the carbonic acid and water yielded is precisely the same as the total mass of the marsh gas and oxygen that have disappeared as such. Similarly, the fact that the total number of C's, H's, and O's is respectively equal in the two members of the equation reminds us of the principle of conservation of the elements. Further, CH_4, O_2, CO_2, and H_2O represent equal volumes of the four substances, and hence the equation expresses that 2 volumes of oxygen are required to burn completely 1 volume of marsh gas, and that the products of the combustion are a volume of carbonic acid equal to that of the marsh gas burned and twice that volume of water vapor.

Reversible Reactions. In mathematics, the members of an equation can be transposed at pleasure, and $a = b$ may as well be written $b = a$. Not so in chemistry. A chemical equation represents not merely an equality of quantities, but an actual reaction of substances. And if, e.g., marsh gas and oxygen react to form carbonic acid and water, it does not by any means follow that carbonic acid and water will with equal readiness form marsh gas and oxygen, which would be expressed by the above equation if written in the form

$$CO_2 + 2H_2O = CH_4 + 2O_2.$$

There are, however, reactions that can actually be reversed. For instance, ordinary ethyl alcohol and acetic acid react to form ethyl-acetic ester and water. But ethyl-acetic ester and water also react to form ethyl alcohol and acetic acid. In this case we are, of course, justified in writing the equation in either of the following forms:

$$\underset{\text{Alcohol}}{C_2H_5OH} + \underset{\text{Acetic acid}}{CH_3CO_2H} = \underset{\text{Ester}}{CH_3CO_2C_2H_5} + \underset{\text{Water}}{H_2O}$$

$$\underset{\text{Ester}}{CH_3CO_2C_2H_5} + \underset{\text{Water}}{H_2O} = \underset{\text{Alcohol}}{C_2H_5OH} + \underset{\text{Acetic acid}}{CH_3CO_2H}$$

Reactions of this nature are termed *reversible reactions* and are now denoted by expressions in which the sign of equality is replaced by two arrows pointing in opposite directions. Thus, the reactions just mentioned would be represented as follows:

$$\underset{\text{Alcohol}}{C_2H_5OH} + \underset{\text{Acetic acid}}{CH_3CO_2H} \rightleftarrows \underset{\text{Ester}}{CH_3CO_2C_2H_5} + \underset{\text{Water}}{H_2O}$$

The investigation of reversible reactions has resulted in the establishment of the so-called law of mass action, which is at the basis of modern chemical statics and dynamics. In return the methods of chemical statics and dynamics have furnished positive proof that *all reactions are reversible*, i.e., that any reaction whatever may be set going backward, if only the proper physico-chemical conditions are established. In this manner, e.g., the decomposition of ammonia has been reversed, i.e., nitrogen and hydrogen gases have been caused to *form* ammonia, and thus a great new industry has been created under the guidance of the chemico-dynamic theory. See AMMONIA; REACTION.

Thermochemical Equations. Every given quantity of matter carries with it a certain quantity of energy. Heat being a form of energy, it is clear that the hotter the body the greater its energy. To cool it, we must abstract some of its heat by bringing it into contact with some cooler body; and then, by determining the rise of temperature in the latter, we can learn how much energy the hot body has lost. But while we can thus readily find out how much more energy a body contains at one temperature than at another, we have no way of telling how much energy it contains altogether, for we have no way of abstracting its energy entirely. Nevertheless, we know that different substances generally contain different amounts of energy, even if their temperatures are precisely the same. This is plainly shown by the fact that different substances have different "specific heats," i.e., that different amounts of heat are required to cause an equal rise of temperature in equal masses of them.

Now, since during chemical reactions the given substances disappear as such and new ones arise in their place, it is evident that chemical reactions must be accompanied by either evolution or absorption of heat. For, like the mass of matter, a quantity of energy can be neither destroyed nor created out of nothing, by a chemical or any other transformation. If the original reacting substances contain more energy than the products of the reaction, the reaction will cause some energy to be given off; thus, hydrogen gas and oxygen gas contain much more energy than the water vapor that may be formed from them, and hence their combination (the "burning") sets free much energy in the form of sensible heat. Precisely the same amount of energy would, on the contrary, be taken up if water were decomposed into its elements, hydrogen and oxygen. Reactions in which energy is

given off are called *exothermal reactions;* those in which energy is taken up are called *endothermal reactions.* It must not be thought, however, that transfers of energy are involved in chemical reactions alone. Thus, the evaporation of water is a purely physical transformation, and yet it involves the absorption of much heat. For this reason, if a chemist wishes to ascertain how much energy has been given off or taken up in a given chemical reaction, he must make a thorough study of the physical changes accompanying the reaction and of the transfers of energy caused by those changes. In this respect the most important form of physical change is the dissolution of solids in liquids, especially in water, because many important reactions take place in aqueous solutions.

The above considerations make it evident that the chemical equations discussed in preceding paragraphs are really incomplete; for they represent transformations of matter without stating what changes of energy accompany them. Whenever, therefore, questions of energy are of moment, whether in theoretical discussions or in problems dealing with foods, fuels, etc., chemists use a more complete form of equations, viz., "thermochemical equations." In writing these, Ostwald has adopted the following notation: Gases are denoted by their chemical formulas inclosed in parentheses; solids by their formulas inclosed in brackets; liquids simply by their formulas; substances dissolved in a great deal of water by the symbol Aq (i.e., *aqua*, water) affixed to their chemical formulas. Thus, (H_2O) denotes water vapor; $[H_2O]$ denotes ice; H_2O denotes liquid water; KClAq denotes potassium chloride in very dilute aqueous solution. Ostwald also proposes to denote the energy taken up or given off during reactions in terms of *kilojoules,* denoted by the symbol J. One kilojoule (= 10,000,000,000 ergs) is the same as 239.1 calories, a calorie being here the amount of heat required to raise by 1° C. the temperature of one gram of water of 18° C. For example, the neutralization of hydrochloric acid by potash in dilute solution, which is ordinarily represented by the equation

$$HCl + KOH = KCl + H_2O,$$

would be denoted thermochemically in the following form:

$$HClAq + KOHAq = KClAq + 57.3J.$$

The number of kilojoules represents the total amount of energy given off or taken up in the reaction. It is, however, important to observe that even the thermochemical equation does not give complete expression to all the important facts connected with the given reaction. Even leaving out of view questions concerning the atomic mechanism of the reaction and the catalytic influences involved in it (see CATALYSIS), the thermochemical equation fails to tell us how much *mechanical work* the reaction is capable of furnishing. The practical importance of knowing this need not be emphasized. But it should be remembered that this work is by no means equivalent to the heat given off. In fact, work can be furnished by a reaction even if, instead of cooling, it *absorbs* heat. See REACTION.

HISTORY

Ancient History. The history of ancient philosophy records certain theories of matter which have had a directing influence on chemical thought during later centuries. The most important ideas date from the fifth century B.C. Empedocles (c.490–430 B.C.), who may have derived his views from the ancient philosophers of the East, held that air, water, earth, and fire are four elements unrelated to one another and forming the basis of the universe. Aristotle (384–322 B.C.) added a fifth element, *ousia* (*οὐσία*), a purely spiritual substance pervading the infinity of space. During the Middle Ages not a little energy was lost in researches after this "fifth essence," which, by confusion of ideas, came to be regarded as a fifth elementary form of matter. To Aristotle the material elements were not altogether different from one another, but were forms of a primary substance differentiated by properties—as dry, moist, hot, cold—that were not essential to its nature. Hence, later, the alchemists' attempts to turn metals into one another, crowned by the belief that such transmutations cannot be effected by any known means. The atomic conception dates from Democritus (c.460–370 B.C.), who held that all bodies are made up of the atoms of one and the same substance, and that the differences exhibited by the various forms of matter are due entirely to differences in the size and shape of their atoms. It is hardly necessary to state that if this undeveloped idea of Democritus had not furnished a suggestion that led to the building up of a useful chemical doctrine, it would deserve no mention in the history of science. It is thus clear that the ancients did nothing directly towards the building up of a science of chemistry. Indeed, how much chemical knowledge can we expect to find in an age when a man like Aristotle did not hesitate to assert that a vessel will hold as much water if filled with ashes as when empty?

But while the intellectuals of the epoch were devoted to speculation concerning broad general questions of the philosophy of nature—with little result—artisans and craftsmen, priests and healers, gradually accumulated an empirical store of knowledge that was destined to serve as a crude foundation for a rational science of chemistry to be built up by experimenting philosophers in a remote future. Most of that empirical chemical knowledge was gained by the Egyptians and was by them communicated to the Jews and Phœnicians and later to the Greeks and Romans. The metallurgy of gold, silver, copper, iron, lead, tin, mercury, and perhaps zinc, and the preparation of certain alloys, were known at quite an early date. The Egyptians had highly developed the art of making glass and of coloring it by means of certain metallic oxides, and many extant specimens of Egyptian pottery are beautifully enameled in various colors. The art of dyeing fabrics with the aid of mordants had likewise been developed at an early date, and many mineral and organic coloring matters were known to the Egyptians, Phœnicians, and Jews. The Egyptians were also probably the first to employ substances for medicinal purposes.

Alchemy. Egypt was the birthplace of alchemy, the pretended art of making gold from base metals. Based on superficial observation and the erroneous interpretation of phenomena, this pseudo-art subsequently absorbed the attention of men for many centuries (see ALCHEMY) and rendered scientific progress, and hence the development of the useful arts,

impossible. Thus, the arts of metallurgy and of dyeing remained through the Middle Ages practically what they had been in Egypt long before the beginning of our era. Nevertheless, in their fantastic search after the philosopher's stone, the alchemists discovered methods of preparing many new substances, perfected many processes of manipulation, and thus slowly paved the way for the future investigator. Bismuth and antimony, sulphuric, hydrochloric, and nitric acids, the chloride and the carbonate of ammonium, the nitrates of potassium and silver, compounds of mercury, antimony, and arsenic—these and many other important substances were first prepared and their properties were first studied by the alchemists. Of course, the interpretation of known facts was absurd, based as it often was on the most groundless assumptions, e.g., the assumption that most substances and certainly all metals contain sulphur. As to the compounds of carbon, the alchemists did hardly anything towards laying a foundation for future organic chemistry, although they learned to concentrate aqueous acetic acid by distillation and to prepare a few metallic acetates and were familiar with certain reactions, such as the transformation of ordinary alcohol under the influence of sulphuric acid, the formation of certain esters, etc. A number of substances derived from the organic world were also used for medicinal purposes; but it was not until the beginning of the "iatrochemical" period that the art of preparing substances began to be looked upon as a handmaid of medicine. Alchemy proper had only one great object in view—to ennoble the base metals and to prolong life indefinitely—and this remained the principal aim of some of the best men even to the close of the era of iatrochemistry. The history of chemistry teaches here a remarkable lesson. Even in our own day the practical man is given to jeering at the uselessness of pure science; his attitude towards the activities of a scientific investigator is not unlike that of a busy adult towards a child's play. But the history of chemistry tells that while sixteen centuries of utilitarian search for gold and perpetual youth —the most utilitarian search imaginable— yielded nothing useful, the birth and activities in our own time of a pure, non-utilitarian science of chemistry have brought mankind incalculable wealth.

Iatrochemistry (Gk. *ἰατρός, iatros*, physician). The first great iatrochemist was Paracelsus (1493–1541), who taught that the aim of chemistry was the preparation, not of gold, but of therapeutic agents. Adopting a view current among alchemists prior to his time, he held that, everything being composed of sulphur, mercury, and salt, if the amount of any of these happens to rise above or fall below the normal in the animal body, the result is a condition of disease. Hence disease must be combated by chemical means. Paracelsus therefore devoted himself to pharmacy and medical chemistry and soon became famous through the many happy cures that he actually succeeded in effecting. Unfortunately the adventurous life that he led, and his gross lack of modesty, aroused suspicion in many, and the bitterest opposition among the more conservative members of the medical profession, obscured his fame, and greatly diminished the sphere of his influence. Nevertheless, his great work was accomplished; pure alchemy had received at his hands the first powerful blow, pharmacy had been firmly linked to chemical science, and medicine had been aroused from the torpor of many centuries.

Following in the steps of Paracelsus came Turquet de Mayerne (1573–1655), Andreas Libavius (?–1616), Oswald Croll, Adrian van Mynsicht, and the great Van Helmont (1577–1644). Van Helmont not only realized that the processes of life, in health and disease, are largely dependent upon chemical changes, but he abandoned the arbitrary assumptions of Paracelsus concerning the chemical basis of the animal body, and his keen experimental researches imparted a powerful impulse to the development of scientific medicine. Equally, if not more, important was his recognition of the fact that there may be other gases than air, and that atmospheric air, carbonic acid, hydrogen, marsh gas, and sulphurous acid may be quite different from one another. In certain special cases he also succeeded in showing that substances are not lost, either qualitatively or quantitatively, when they enter into chemical combination, and that they may be reobtained entirely from the resulting compounds. Yet he believed in the possibility of making gold, and among the absurdities found in his writings is the assertion—strange to relate—that mice may be spontaneously produced in buckets filled with soiled linen and wheat flour! But if the spirit of the time permitted such beliefs, so much more wonderful must appear the scientific penetration of his genius, so much more deserved is his place among the best names of both chemistry and medicine. Other important names in connection with iatrochemistry are those of Sylvius (1614–72) and Tachenius. Sylvius was the first to grasp the similarity between the processes of respiration and combustion, and, recognizing the distinction between arterial and venous blood, he understood that the bright color of the former was due to the action of air. Digestion, too, he considered as a purely chemical process. His pupil, Tachenius, was the first clearly to recognize that salts are substances formed by the union of acids and bases; he studied the composition and properties of many substances, invented a number of interesting qualitative tests, and even subjected a few reactions to quantitative investigation, determining, e.g., the gain of weight involved in the oxidation of lead.

The age of iatrochemistry marks a great period in chemical history. During this period, for the first time, we find many thoughtful men making an endeavor to free themselves from the preconceived ideas of the past and to approach nature in a critical spirit and with a curiosity purely scientific. With iatrochemistry was thus born the possibility of chemical progress. But this is not the only thing for which mankind is indebted to that period. For, while the iatrochemists were preparing the first material for the very foundation of future chemistry, others were busy developing industries which have since become affiliated to our science. Foremost among these men were Agricola, Palissy, and Glauber. Georg Agricola (1490–1555) rendered great services to mining and metallurgy, introducing rational scientific methods into the former and perfecting many of the processes of the latter. His splendid treatise on metallurgy, in which these processes were described for the first time, long remained the standard work on its subject. Besides, he introduced a

practical system for the classification of minerals, based on their physical properties, such as color, hardness, etc. Bernard Palissy (c.1510–89), considering worthless and ridiculous the efforts of alchemy, devoted himself to experimental research in ceramic art and invented a number of valuable methods of coloring and enameling articles of pottery. Johann Rudolf Glauber (1604–68) improved many processes of dyeing and prepared a number of useful salts, including sodium sulphate ("Glauber's salt"), the chlorides of zinc, tin, arsenic, copper, lead, and iron, the nitrate of ammonium, tartar emetic, etc. He even succeeded in gaining some insight into the rationale of certain processes; but this did not prevent him from adhering to the most fantastic absurdities of alchemy to the very end of his life. In connection with the iatrochemical period reference must finally be made to the wonderful development of the art of making articles of glass, and to the rapid progress of the liquor industry, which had only been founded towards the end of the fifteenth century, i.e., a short time before the commencement of the period. As to scientific pharmacy, we have already stated that its beginning coincides with that of iatrochemistry, and it is hardly necessary to add that the latter enriched it with many new preparations and with a knowledge of the medicinal properties of substances already known.

About the middle of the seventeenth century iatrochemistry came to a sudden decline. That this had to happen sooner or later is clear, if we consider that a true medical chemistry could not possibly flourish before, on the one hand, chemistry itself was placed on a sound basis, and before, on the other hand, anatomy and physiology had attained a stage of serious development. The iatrochemists were still too utilitarian to accomplish much of really permanent practical value; even they had misdirected their efforts, and if we should in our present structure of chemistry mark the parts established by them, we would find that their lasting contributions were very few. The historical importance of the period is chiefly in the fact that with it came a revolution against traditional errors and a change in the direction of research.

The Forerunners of Chemistry. In the seventeenth century we find the Englishman Robert Boyle (1627–91) grasping truth with an insight unprecedented and in many respects not yet surpassed. Boyle understood that chemistry must be treated as an independent science, i.e., primarily without reference to applications of any sort, and that only in this manner could the relationships between chemical phenomena proper be discovered. He maintained that chemists should consider as an element only a substance which, in spite of exhaustive actual efforts, they have not succeeded in decomposing. And even this method, though necessary and sufficient for the purposes of science, he did not regard as proving the elementary nature of a substance absolutely beyond doubt. Still, he was inclined to consider the metals as elements, and, proving experimentally that the products of the destructive distillation of wood are compound, he refuted the opinion—then generally prevalent—that dry distillation breaks up substances into their elements. He further defined the distinction between a chemical compound and a mixture; the properties of a chemical compound, he maintained, are quite different from those of its components, while in a mixture each constituent retains its characteristic properties practically unaffected. Above all, he earnestly warned chemists against adopting hypotheses and general theories a priori. Theories are necessary; but unless they are generalizations cautiously made from observed facts, they may be dangerously misleading.

Boyle's views are now accepted universally. Had he grasped and succeeded in spreading abroad one more idea—viz., the absolute necessity of quantitative investigation—he would have doubtless become the founder of the science of chemistry—that is to say, with him would have commenced the epoch enlightened by truth and free from fundamental errors. This he did not accomplish; nor was it possible to accomplish it before the characteristics of gaseous matter came to be known better than they were in his day. And so it came about that chemists failed to appreciate his great warning against hypotheses that are not rigidly correlated with facts, adopted a belief in a fiery "phlogiston," and thus created a new period of darkness that lasted a century. It must be remembered that the important phenomena of what we now call oxidation engaged the attention of chemists towards the end of the seventeenth century and through the entire eighteenth century. These phenomena were explained by the supposed existence of phlogiston, a substance which may have been originally produced in the erring mind of some alchemist, but the first clear reference to which, under the name of *terra pinguis*, we find in the works of Becher (1635–82). Stahl (1660–1734) named it phlogiston, endowed it with certain imaginary properties, and used it as the basis of a doctrine which was soon accepted throughout the civilized world.

To give a clear and precise account of this, as of any other erroneous doctrine, is a matter of considerable difficulty. For when ingenious men are dominated by error, they will mold it into a variety of forms in their efforts to give it the appearance of truth and render it consistent with itself. The phlogistians handled their hypothesis with much dexterity. Yet their thought, lacking the character of quantitative precision, was weak; for quantitative conceptions, while already mastered by the physicist, were still in a state of confusion in the mind of the chemist. Distinguishing clearly between the absolute weight of bodies and their specific gravity, we have no difficulty in understanding that although water vapor is lighter than air, its addition to a given body must increase the weight of the latter, because water, whether liquid or vaporized, has weight. Stahl believed that the conversion of a "calx," i.e., a metallic oxide, into metal was caused by the addition of phlogiston. He *knew* that the conversion was accompanied by a diminution of weight; but from this fact he only deduced that phlogiston must be "lighter than air," failing to grasp that such an addition may make a body *lighter* in the sense of producing a system of lower specific gravity, but must necessarily make it *heavier* in the sense of increasing its absolute weight. It is more probable, however, that Stahl understood this in a general way, but thought that the metals had a lower specific gravity than their calces. At least Juncker, a pupil of Stahl's, asserts this about metals and calces as a matter of fact, although Boyle

had long before shown experimentally that the specific gravity of metals is really higher than that of their calces. Much more extraordinary is the conception that we find in the writings of Guyton de Morveau, Macquer, and others, who taught that phlogiston had *less than no weight!* Stahl conceived of phlogiston as a fiery principle, "*materia aut principium ignis, non ipse ignis.*" Seeing that charcoal burns up completely and is capable of producing metals by adding itself, as he thought, to their calces, he considered charcoal as made up almost entirely of phlogiston. Cavendish, knowing that "inflammable air" is given off when metals are dissolved in acids, adopted the view that that inflammable air (hydrogen) was phlogiston, with which metals part on coming into contact with acids. An inconvenient fact in connection with the phlogistic theory was that combustion, including the transformation of metals into calces, could only take place in the air. Stahl and his followers referred to this fact as if it were quite natural that if phlogiston was to be absorbed from metals there must be a medium capable of absorbing it. There were thoughtful men, however, who would not be satisfied with explanations of this kind. Boerhaave, whose *Elementa Chemiæ* (1732) served for many years as the standard textbook of chemistry, taught distinctly that the conversion of metals into calces involved the absorption of something from the air. This he deduced by combining the fact that the presence of air was necessary with the fact that the conversion involved increase in weight. The latter fact he even freed from an erroneous explanation attached to it by Boyle, who had thought that the increase in weight was due to absorption of heat during calcination; by the use of the balance Boerhaave showed that metals have precisely the same weight when glowing hot as when cold, and thus proved that heat has no weight. So near the truth were some. Yet none rose to combat the phlogistic theory, and all, even Boerhaave, were dominated by it more or less.

Two things were necessary to make away with phlogiston: first, a clear knowledge of some of the ordinary gases; secondly, a clear quantitative knowledge of some of the ordinary chemical transformations. The gases in question are carbonic acid, oxygen, and air. As to quantitative chemical knowledge, it can, of course, be acquired only by the use of the balance. Carbonic acid was known since the time of Van Helmont; yet chemists were not sure but that it might be impure air, until Joseph Black isolated it and demonstrated its properties in 1755. Bergman completed the study of this gas in 1774. The presence and properties of oxygen were suspected by Boyle, Mayow (1669), Boerhaave, and others; but it was first actually isolated by Priestley and Scheele in 1774. The nitrogen of the air was isolated by Rutherford in 1772. It must be remarked here that the apparatus and manipulations of "pneumatic chemistry" were gradually perfected by Boyle, Hales, Moitrel d'Element, Black, and Priestley, the latter having invented the method of collecting gases over mercury, which rendered possible the isolation of gases that are soluble in water. But the precise demonstration of the composition of gases, the introduction of the systematic use of the balance, are due to the founder of quantitative chemistry—the French physicist and chemist Lavoisier.

But before we proceed to narrate the further progress of chemical philosophy, it remains to enumerate briefly the most important achievements of chemical technology during the reign of phlogiston. In spite of its fundamental error, chemistry was making fairly rapid progress, and this naturally told on the industries. Boyle and Kunkel improved many metallurgical processes and the manufacture of glass. The manufacture of iron and steel owed valuable improvements to the researches of Bergman, Gahn, Rinman, and Réaumur. Stahl, Scheele, Hellot, Macquer, and others introduced new dyestuffs and improved many processes of dyeing. The preparation of zinc was improved by Marggraff, and its manufacture on a large scale was commenced at Bristol in 1743. The manufacture of sulphuric acid was commenced by Ward at Richmond; and in 1746 lead chambers were first introduced by Roebuck. In 1747 Marggraff discovered sugar in beets; however, the sugar industry was not born until the beginning of the nineteenth century. Early in the eighteenth century (1703) Böttger was accidentally led to the invention of porcelain, and its manufacture commenced at Meissen in 1710; but the processes were kept secret, and the manufacture was confined to Meissen until Réaumur rediscovered them by systematic research, and finally, in 1769, great porcelain works were established also at Sèvres, near Paris. In the course of the period many substances were introduced as therapeutic agents, and Scheele discovered a number of important compounds of carbon.

Modern Chemistry. If, after we have become accustomed to think of modern chemistry as founded in the latter part of the eighteenth century, we take up the writings of phlogistic chemists prior to that time, we may be greatly surprised to find that our general principles were not at all unknown to them. They certainly believed in the indestructibility of matter, and some of them described molecules and atoms in much the same way as we describe them at the present day. And yet their knowledge cannot be rightly considered as constituting a science. Their abstract speculations were very keen; their knowledge of chemical facts was quite extensive; but that mathematical correspondence between abstract principles and concrete phenomena which alone constitutes science did not exist. And so, even when the properties of gases were no longer unknown, all chemical knowledge remained in a state of confusion, and elements continued to be considered as compounds, compounds as elements, combinations as decompositions, and decompositions as combinations, until the work of establishing the scientific correspondence was begun by Lavoisier.

Endowed by nature with a keenly critical mind, Lavoisier acquired the habit of quantitative thinking by early training in mathematics and physics, and by subsequent association with some of the most brilliant mathematicians and physicists of his time. As early as 1770 we find him solving a problem of chemistry by a purely quantitative method. It was known, viz., that when water is kept boiling for some time in a glass vessel, there is formed in it an earthy deposit; it was therefore believed that water could be converted into "earth." Lavoisier heated water in a glass vessel, weighed the vessel before and after the operation, and found that the vessel *plus* the deposit after the opera-

tion weighed exactly as much as the vessel alone weighed before. He thus proved that the earthy deposit came, not from the water, but from the glass of the vessel. In 1772 he turned the same quantitative method of experimenting and reasoning to the conversion of metals into calces, and in 1774 published the following observation: When metallic tin is heated in a sealed retort full of air, it becomes transformed into its calx; the weight of the sealed retort with its contents is exactly the same after the reaction as before; if the retort is now opened, air rushes into it and the weight is increased; the increase is equal to the difference in weight between the calx formed and the mass of metallic tin employed. From this Lavoisier concluded that the transformation of tin into its calx involved the absorption of air, and that phlogiston had nothing to do with the phenomenon. It also became evident to him that the balance of precision could serve the chemist no less than the telescope served the astronomer, and that the principle of indestructibility, which could and should be established experimentally, ought to be at the basis of all chemical reasoning. When Priestley and Scheele discovered oxygen, they thought that it was this constituent of air that was capable of absorbing phlogiston from metals; Lavoisier demonstrated that it was this constituent of air that combined with metals to form calces. He recognized that the same gas combined with sulphur, phosphorus, charcoal, and other combustible substances, and as he regarded the resulting compounds as acids, he gave to the gas the name *oxygen* (from the Greek *ὀξύς, oxys,* acid, and *γενής, genēs,* producing), and adopted the view that it was an indispensable constituent of all acids (this view was discarded half a century later). Carbonic acid he recognized as a compound of carbon and oxygen, and when Cavendish found that the sole product of the combustion of hydrogen in oxygen was water, Lavoisier understood that water was not an element, but a compound of hydrogen and oxygen, and had no difficulty in determining its quantitative composition. Carbonic acid and water he also showed to be the products of the combustion of organic substances, and soon he recognized that respiration, too, was a process of organic combustion.

Logical and consistent as Lavoisier's method appears to the unprejudiced mind, it failed to appeal to some of the most eminent men of his time. Thoroughly accustomed to the inverted principles of the phlogistic doctrine, those men adhered to them as firmly as fanatics will adhere to an absurd creed, and some of them, including Priestley, himself the discoverer of oxygen, died believers in phlogiston. Nevertheless, Lavoisier lived to see the light of his system spread over the entire scientific world and turn chaos into order. He had established a rigid correspondence between the law of indestructibility and chemical transformations and had thus built the first bridge between an abstract principle and the world of chemical phenomena. The concept *element* was now correctly applied to oxygen, hydrogen, carbon, sulphur, phosphorus, and the metals then known in the free state; the concept *compound* was correctly applied to water and the oxides of the metals. True enough, in his list of elements (1787) Lavoisier included also light and heat and the compounds potash, soda, and lime; on the other hand, he considered the element chlorine as a compound containing oxygen. But this did not interfere with further progress. The first bridge of chemistry was firmly established, and the lingering errors were rectified (mainly by Sir Humphry Davy) early in the nineteenth century. The development of another correspondence—viz., that between the hypothesis of the atomic constitution of matter and the quantitative composition of substances—was already noted in a preceding section of this article. Here it may be observed that the law of multiple proportions was first discovered by Richter (1762–1807), and that Proust (1754–1826) continued Richter's researches and clearly demonstrated the law in course of a controversy with Berthollet. Dalton (1804) rediscovered the law deductively and then proved it experimentally; he was thus the first to establish a rational connection between the old atomic hypothesis and the facts of chemical composition.

After the relation between the known metals and their oxides was established, Lavoisier himself, and others, began to suspect the true nature even of oxides whose metals were not yet known in the free state, and attempts began to be made to decompose these oxides so as to isolate their metallic elements. About the beginning of the nineteenth century Sir Humphry Davy (1778–1829) undertook to investigate the effect of the galvanic current on chemical compounds. In 1807–08 he succeeded in decomposing caustic potash and caustic soda, obtaining from them the metals potassium and sodium. About the same time Seebeck similarly decomposed the oxides of calcium, barium, strontium, and magnesium, obtaining these metals in the form of their amalgams, i.e., combinations with mercury. From these amalgams Davy isolated the metals themselves and gave them their present names. From the metals Davy turned his genius to the nonmetallic elements. Chlorine, known since 1774, remained unrecognized as an element and was generally considered as the oxide of hydrochloric acid. In 1811 Davy clearly demonstrated its elementary nature; and when, soon afterward, Courtois discovered iodine, Davy showed that this substance, too, so similar to chlorine, must be considered as an element. Davy also was the first to demonstrate clearly the elementary nature of nitrogen and even of fluorine (from the similarity of hydrofluoric to hydrochloric acid, and of the fluorides to the chlorides), although the latter element was not yet known in the free state and remained unknown until 1887. The value of Davy's contributions can be readily appreciated if we remember that the substances he was dealing with are among the commonest in the entire range of chemistry, and if we imagine how much confusion would suddenly ensue in all departments of the science if we were to forget their existence or their true nature.

Dualism. On the basis of his electrolytic investigations, Davy also constructed an electrochemical theory which was subsequently modified and extended by Berzelius. According to Davy (1807), when the atoms of different elements come into contact, they become charged with the opposite forms of electricity, by whose attractive force they are held together, constituting chemical compounds. Berzelius' theory was as follows: The atom of each element does not *become* charged with electricity on coming in contact with other atoms, but *is* charged, whether combined with other atoms or not

With respect to the electrical charges of their atoms, the elements form an "electro-chemical order," oxygen being the most electro-negative, potassium the most electro-positive, and hydrogen dividing the electro-negative from the electro-positive elements. All bases are produced by the combination of oxygen with electro-positive, all acids by the combination of oxygen with electro-negative elements. Yet bases and acids are not altogether neutral; in the former positive electricity, in the latter negative electricity, predominates. This is why bases and acids show no mutual chemical indifference, but combine to form salts. When the terminals of a sufficiently powerful galvanic battery are immersed in the solution of a salt, the base of the latter is attracted more strongly by the negative terminal than by the acid, and the acid is attracted more strongly by the positive terminal than by the base; hence electrolysis ensues, the base being deposited on the negative, the acid on the positive, terminal. In brief, Berzelius maintained (1) that oxygen is an indispensable constituent of bases, acids, and salts; (2) that bases, acids, and salts have a dual constitution, each being made up of an electro-positive and an electro-negative part; (3) that chemical affinity is nothing but the mutual attraction of opposite forms of electricity. In the first of these principles Berzelius followed Lavoisier, for years refusing to accept Davy's view that chlorine and nitrogen were elements, and that their compounds with hydrogen, viz., hydrochloric acid and ammonia, although respectively an acid and a base, contained no oxygen. The structure of the entire theory became somewhat shaky when the correctness of Davy's views was finally recognized by all, including Berzelius himself (1820). Nevertheless, Berzelius, and with him the entire chemical world, continued to adhere to the electro-chemical theory, and thus a strictly dualistic conception of compounds continued to reign in the science. The thirties, however, brought much new evidence against Berzelius' principles. First of all it was recognized that electrolysis breaks up a salt, primarily not into two oxides, but into a free metal and an acid radicle. For example, potassium sulphate is broken up, primarily not into K_2O and SO_3, but into K_2 and the radicle SO_4. This made it evident that sulphuric acid was not SO_3, but H_2SO_4 (i.e., SO_3 chemically combined with H_2O), because the SO_4 radicle was seen to be the true acidic component of potassium sulphate. Two important conclusions thus thrust themselves upon chemists: (1) an acid is not a binary compound of *oxygen* with an electro-negative element, but a combination of *hydrogen* with an electro-negative radicle; (2) a salt is not a compound of two oxides (e.g., $K_2O.SO_3$), but a combination of a metallic element with the electro-negative radicle (e.g., SO_4) of an acid. The first of these conclusions, together with Davy's discovery that hydrochloric acid contained hydrogen but no oxygen, indicated that not oxygen, but hydrogen, is an indispensable component of acids, and this view was further strengthened by Graham's and Liebig's classical studies of the so-called polybasic acids. But so profound was Berzelius' belief in dualism, and so great was his authority, that the electro-chemical theory still continued to stand, and the conclusions just pointed out were not generally accepted for some years. The final blow to dualism came from the young organic chemistry, in which the electric theory had been applied as generally as in the inorganic branch of the science. About the middle of the thirties Laurent and Dumas made a series of important discoveries showing that chlorine and other elements could be substituted for the hydrogen of organic compounds, and that the nature of the latter was thereby affected very little. But if part of the molecule of a compound can combine with either of such electrically different atoms as those of hydrogen and of chlorine, then there is no reason for believing that that part is essentially either electro-positive or electro-negative, and hence there is no reason for believing that every compound is made up of two electrically opposite parts. The more evidence to this effect was brought forward, the more bitterly old Berzelius adhered to the electro-chemical theory. But finally it became evident to all that, as Liebig wrote, "the wheel of time cannot stand still," and "Berzelius is fighting for a lost cause"; and thus, towards the end of the thirties, electro-chemical dualism was overthrown. As a result of their struggle against dualism, chemists then fell into the opposite extreme and adopted a purely unitary view of chemical combination. The molecule of a compound was conceived to be a composite unit somewhat like the solar system, in which the planets are held together by mutual attraction, but which does not by any means consist of two essentially different parts, endowed with two opposite forms of energy. Such unitary views of combination are still prevalent in chemistry to-day. But "the wheel of time cannot stand still," and recent years have forced upon us theories which make us feel that extreme unitarism is just as inadequate as extreme dualism. The elements certainly differ in their electrical properties, and chemists have even succeeded now in expressing those differences mathematically. Electricity, while not identical with the energy that causes the mutual attraction of atoms, is yet certainly one of the factors determining that attraction. At present, however, it is impossible to tell what compromise between chemical unitarism and electro-chemical dualism will ultimately be adopted.

Organic Chemistry. When the general principles of chemistry were established, and the atomic hypothesis had lent to the science a keen power of penetration, it became possible to approach the world of organic matter with the hope of shedding some light upon its mystery. Since then organic research occupied chemists almost exclusively during a greater part of the nineteenth century, and the result of that inquiry has been not only a vast store of empirical knowledge of organic compounds, but also a set of general principles that have strengthened the theoretical basis of the science and have led to some of the great industrial achievements of modern times.

Early in the nineteenth century it was universally believed that organic substances could not be produced without the agency of the "force of life." Whether there is such a distinct "force," and what its relations may be to the measurable forms of energy, we do not know as yet. But we do know that organic compounds can also be produced by chemical agencies alone, without the intervention of anything else. For chemists have actually succeeded in building up from their elements many

thousands of compounds that occur ready formed only in the organisms of animals and plants. The first of such compounds reproduced in the laboratory was urea, which Wöhler made artificially in 1828. The old belief, however, lingered, some chemists contending that urea could not be looked upon as a true organic compound. Gradually, however, less doubtful organic compounds were reproduced synthetically. Writing in 1839 of the synthesis of formic acid, Ure says: "The artificial formation of this animal secretion is one of the most remarkable triumphs of modern chemistry." When Kolbe synthesized acetic acid in 1845, and when other indisputably organic compounds were made from their elements, then all agreed that there was no essential difference between organic and inorganic compounds, and that the former were nothing but the compounds of carbon. At present many dyestuffs, drugs, and perfumes, which could once be obtained only from plants, are made artificially on a large scale, and so are many valuable carbon compounds that are not known to occur ready formed at all.

While the belief in an indispensable force of life thus delayed for a time the progress of synthesis, chemists early directed their attention to the problem of molecular constitution. Berzelius was led to this problem by his electrochemical theory. But in the twenties facts became known which made its study an imperative necessity also from a purely practical standpoint. Not small was the surprise of chemists when Gay-Lussac and Liebig found, in 1823, that silver fulminate had precisely the same composition as silver cyanate. Two years later, Faraday discovered a volatile liquid hydrocarbon that had precisely the same composition as ethylene gas. Berzelius first thought it unwise to abolish, on the evidence of a few facts, what had seemed an axiom, viz., that two different compounds cannot possibly have the same composition. But when he discovered that racemic and tartaric acids, too, had the same composition, he realized that the character of a substance must depend not only on its *composition*, but also on its *constitution*, i.e., not only on the kind and number, but also on the arrangement of the atoms in its molecule. Thus was born that great problem of modern chemistry—to determine the constitution of substances from the standpoint of the atomic hypothesis.

In 1832 Liebig and Wöhler made an important discovery: A series of compounds allied to benzoic acid were transformed by them into one another, and through all the transformations a group of atoms (made up of carbon, hydrogen, and oxygen), which they named "the benzoyl radicle," remained unchanged; the molecules of benzoic acid, benzaldehyde, benzamide, and benzoyl chloride contained that radicle in common, as if it were a single atom of some element. The discovery of benzoyl was followed by Liebig's discovery of ethyl, a radicle common to ordinary alcohol and ether, and by Bunsen's discovery of cacodyl, which is possessed in common by several compounds of arsenic. The discovery of radicles was obviously the first step towards a knowledge of the constitution of compounds. But almost from the beginning the idea of radicles became associated with certain other ideas that could not be maintained in the light of more knowledge. Berzelius subdivided organic radicles, like the elements, into electro-positive and electro-negative. On the other hand, it was generally expected that radicles would eventually be isolated and thus constitute a series of simple compounds whose molecules would bear the same relation to the substances of organic chemistry as the atoms of the elements bear to the compounds of inorganic chemistry. But when the electro-chemical theory was overthrown, while attempts to isolate radicles remained fruitless, the opinion began to spread that the theory of radicles had made of organic chemistry a science of imaginary substances, and, hence, the sooner the theory was abolished the better for the young science. But how, then, were organic compounds to be correlated? A solution of this problem was suggested by Dumas in 1839. Continuing his researches on the substitution of different elements for one another in organic compounds, Dumas found that in acetic acid hydrogen could be exchanged for chlorine, and that the resulting compound (trichlor-acetic acid) was very much like acetic acid itself. Similar facts had already been observed, since 1834, by himself as well as by Laurent. It now occurred to Dumas that in correlating their substances chemists could be guided solely by the phenomena of substitution. Acetic acid and its chlorine-substitution product obviously belong to the same "type," and similar relations exist between other substances as well. If, therefore, the phenomena of substitution were investigated in connection with organic compounds in general, the result would be a grouping of compounds free from all hypothesis, but based on and exhibiting clearly their natural relationship. Such were, *in nuce*, Dumas's views, on the basis of which the celebrated "theory of types" was gradually built up in course of the fourth and fifth decades. The most important contributions to the theory were made by Gerhardt, Wurtz, Hofmann, and Williamson. Gerhardt realized that Dumas's ideas were worthy of being developed, but he also realized that this could not be done without the aid of the idea of radicles. No objection could be raised against the latter idea, once it were freed from all unnecessary associations, especially from the belief that radicles were unalterable substances capable of independent existence. To say that benzoyl chloride, C_7H_5OCl; benzoic acid, $C_7H_6O_2$; and benzamide, C_7H_7ON, contain in common the benzoyl radicle, i.e., the group of atoms C_7H_5O, was only to express what was evident from their formulas. On the other hand, the recognition of radicles must obviously lead to the discovery of the relationship of compounds, and thus, together with the phenomena of substitution, guide in grouping compounds in accordance with the idea of types. In 1849 Wurtz and Hofmann discovered a series of compounds that bore an unmistakable resemblance to ordinary ammonia, and could be considered as ammonia in which one or more hydrogen atoms were replaced by radicles. They proposed to group them together as belonging to the "ammonia type." In 1850 Williamson showed that alcohols, ethers, and acids could be referred to the "water type." Ordinary alcohol, e.g., whose formula is C_2H_6O, could be considered as water, H_2O, in which one hydrogen atom has been replaced by the ethyl radicle, C_2H_5. Ordinary ether, $C_4H_{10}O$, could be considered as water, H_2O, in which two hydrogen atoms have been replaced by two ethyl radicles, ether being thus $(C_2H_5)_2O$. Acetic acid,

$C_2H_4O_2$, could be considered as water, H_2O, in which one hydrogen atom has been replaced by the radicle C_2H_3O. Now, ether, $(C_2H_5)_2O$, was obtained from alcohol, C_2H_5HO, by the use of dehydrating agents. Williamson therefore held, by analogy, that it ought to be possible to transform acetic acid, $C_2H_3O.HO$, into a compound, $(C_2H_3O)_2O$. When, in 1852, Frankland actually succeeded in effecting this transformation by the use of dehydrating agents, the usefulness of the type theory was demonstrated. For nothing is more striking proof of the value of a theory than its capacity for revealing unknown facts. To the types *ammonia* and *water* Gerhardt added the types *hydrogen* and *hydrochloric acid*, and for a time it seemed that all organic compounds could be grouped under these four simple types. It was soon found necessary, however, to introduce the ideas of "condensed types," like the condensed water type, $(H_2O)_2$, "mixed types," and the type *marsh gas*, CH_4. In course of the fifties the type theory thus gradually became less and less simple, and hence less and less valuable for the purpose of correlating organic compounds.

Meanwhile an idea of inestimable value had thrust itself upon chemists. Inspecting the typical formulas of compounds, they could not help noticing that certain radicles (e.g., methyl, CH_3, or ethyl, C_2H_5) were capable of replacing each a single atom of hydrogen; others were capable of replacing each two atoms of hydrogen, etc. In other words, some radicles were seen to be equivalent to an atom of hydrogen; others had double its combining capacity, etc. Hence the idea of the *valency* of radicles and atoms. Like most other general ideas, that of valency was not new. In a vague and more or less specialized form it may be found in the researches of Berzelius, Graham, Liebig, and others; and Frankland, who first clearly enunciated it, in 1852, justly points out that it was probably a vague recognition of the valency of radicles, as exhibited by the facts of substitution, that gave birth to the theory of types. Frankland's statements, however, attracted no attention. In 1858 Kekulé and Couper independently developed the same idea, the latter proposing to symbolize the combining capacity of different atoms by the dashes now generally employed in graphic formulas. Kekulé called attention to the quadrivalence of the carbon atom, as shown directly by compounds like the following: CH_4, CH_3Cl, CH_2Cl_2, $ChCl_3$, CCl_4; or indirectly by such compounds as CO_2, $COCl_2$. In the former compounds a single atom of carbon is seen to be equivalent to four atoms of hydrogen, and a single chlorine atom to a single atom of hydrogen, which is also shown by the formula of hydrochloric acid, HCl. In a compound like $COCl_2$, the oxygen atom must therefore be assumed to be divalent, and so it is directly shown to be by the formula H_2O. Kekulé soon came to the conclusion that in practically all organic compounds one carbon atom is combined with a quantity of other elements which is equivalent to four atoms of hydrogen. This gave rise to a lively controversy, the critic Kolbe especially maintaining that the valency of an element may not be the same in all of its compounds. Kekulé's view, however, was finally accepted by all, and in 1860 chemists the world over were busy determining the "structure" of organic compounds—a problem which has since occupied the attention of a majority of them almost exclusively. The theory of types, the mother of the structural theory, exhibited the radicles of compounds, and thus explained those cases of isomerism in which compounds are different because they contain different radicles. Those further cases in which the radicles themselves are differently constituted, it could not explain. The doctrine of valency, showing the different ways in which the atoms can be linked in the radicles, has furnished a satisfactory solution of the problem of molecular constitution and has completely explained the fact that the molecules of different compounds may be made up of the same atoms. At first Kekulé scarcely appreciated the full value of his own ideas. In the very memoir in which he states the doctrine of valency, he advances the view that this doctrine cannot by any means solve the problem of the constitution of compounds; the old problem, he thought, might possibly be solved some day by physical chemistry. Perhaps he was not altogether wrong. For now, after half a century of experience, organic chemists are beginning to complain of the inadequacy of the structural theory, even with its more recent development—stereochemistry (q.v.)—and to look forward to some broader idea, that would correlate a larger number of known phenomena and permit of foreseeing a larger number of as yet unknown facts. What that idea will be, no one can tell as yet. Chemists are energetically trying to attain it by way of inquiries into the *nature* of valency, and an increasing number of such inquiries are now published every year. The conception of valency has lost much of its original rigidity, and the idea that carbon, e.g., is not necessarily quadrivalent, but may in certain compounds act as a trivalent or even as a bivalent element, is no longer astonishing to anybody. Thus, in fulminic acid carbon is very generally considered to be bivalent, and in triphenyl-methyl it is also generally admitted to be trivalent. Further, the existence of "additional valencies," "partial valencies," etc., is not infrequently assumed, for very practical purposes, by contemporary chemical investigators. See VALENCY.

General Chemistry. The doctrine of valency could not have come into existence if not for the fact that towards the end of the fifties chemists had learned the true atomic weights of the elements. Without a knowledge of the true relative weights of atoms, it would have been impossible to know their true number in molecules and, hence, impossible to know their true valencies. Atomic weights were determined, calculated, and recalculated ever since Dalton first established the atomic theory. Dalton himself, as stated in a previous section of this article, determined atomic weights on the basis of certain simple assumptions. Soon afterward Berzelius devoted himself to the problem with great assiduity. From the law of combining volumes, discovered by Gay-Lussac in 1808, Berzelius inferred that equal volumes of gaseous elements must contain equal numbers of particles. In 1819 Mitscherlich discovered the principle of isomorphism. (See ATOMIC WEIGHTS.) Berzelius had carried out about 2000 analyses, determining the relative quantities of the elements contained in a great variety of compounds. By combining the principle of isomorphism with that of equal gaseous volumes, he was now able to calculate the atomic weights of the elements. Now, his principle of equal volumes was not quite correct. To him the par-

ticles of a gaseous element in the uncombined state were isolated atoms. While he distinguished between the particles of compounds and the atoms of elements, he failed to distinguish between the free particles of elements and their atoms. That the particle of an element might be made up of two or more single atoms, it would have been impossible for him to admit; for, according to his electro-chemical theory, only unlike atoms could exist in combination with one another. Avogadro's memoir of 1811, in which more correct views on the subject had been advanced, therefore remained unnoticed, and Berzelius' atomic weights were for years employed by all. Nor were most of those figures wrong; for in many cases Berzelius' error eliminated itself, owing to the fact that the molecules of the ordinary gaseous elements are made up of equal numbers of atoms. Knowing the true atomic weights of the ordinary gaseous elements, Berzelius was able to obtain correct figures for many other elements, with the aid of the principle of isomorphism and certain other principles that need not be explained here. Thus, his figure for mercury was 200, that for phosphorus 31, that for sulphur 32—figures practically identical with those accepted at present. In 1827, however, Dumas invented his celebrated method of determining vapor densities and undertook to apply Berzelius' principle of equal volumes to elements which are not ordinarily gaseous. Finding that the vapor of mercury is 101 times as heavy as an equal volume of hydrogen, the vapor of phosphorus 62.8 times, and the vapor of sulphur 96 times, as heavy as hydrogen, Dumas concluded that the relative weights of their atoms must be, respectively, 101, 62.8, and 96, and not 200, 31, and 32, as Berzelius thought. The error of Berzelius' principle thus emerged in the results of Dumas. But instead of rectifying the error of his principle by introducing the concept of the *molecules* of elements, Berzelius only concluded that the principle was unreliable. The result was that chemists began to disagree as to the true values of the atomic weights, and many even abandoned the hope of ever knowing atomic weights altogether, and decided to use nothing but *equivalents*. These represented the weights of elements that were capable of combining with, or of being replaced by, unit weight of hydrogen. For example, Berzelius' view that an atom of oxygen was 16 times as heavy as an atom of hydrogen was abandoned, and as hydrogen combined with 8 times its weight of oxygen, the latter was represented by its equivalent 8. But the use of equivalents was not universal, many chemists using systems in which the figures were partly equivalents, partly atomic weights, and thus for years great confusion reigned in chemical notation, the true purpose of which is to avoid confusion by exhibiting the composition of substances in the simplest and clearest possible manner. In the forties Laurent and Gerhardt became convinced that the progress of knowledge in organic chemistry was seriously impeded by the lack of a consistent system of atomic weights. Their researches soon led them to distinguish clearly between the atoms and molecules of elements, and to grasp the full value of Avogadro's principle for determining the relative weights of molecules. With the aid of this principle Gerhardt found the true atomic weights of the elements; and in the latter part of the fifties his pupil Cannizzaro demonstrated clearly the consistency of the principle with all known facts. Thus was paved the way for the doctrine of valency. A few years later (in 1869) Mendeléeff and Lothar Meyer established a remarkable connection between the properties of the elements and their atomic weights (see PERIODIC LAW), and thus the correctness of the latter was confirmed in a very striking manner.

The further progress of general chemistry has been mainly in connection with the various subdivisions of physical chemistry, brief historical accounts of which may be found under REACTION; SOLUTION; DISSOCIATION; THERMOCHEMISTRY; ELECTROCHEMISTRY; CATALYSIS. (See also the article LABORATORY.) The epoch-making discovery of radium has resulted in the birth of what is really a new science—the science of radio-activity (q.v.), which has even already a history of its own.

LITERATURE

In a science whose progress is so phenomenally rapid as that of chemistry, even the best books are likely, within a few years of publication, to lose more or less of their original value. Nevertheless, it is safe to say that most of the following works will, in the ordinary course of events, retain their interest for a number of years to come. The list includes some of the best-known modern works on descriptive, theoretical, and technical chemistry. More specialized works are noted in the articles on various chemical topics.

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CHEMISTRY, Agricultural. The branch of chemical science which deals with the problems of the soil, the nutrition of plants and animals, the composition of their products, and their value as food for man and animals. Its field borders on those of vegetable and animal physiology on the one hand, and of physics and geology on the other; and in working out problems in agriculture, the agricultural chemist has frequently been led into these adjoining branches of science. His work has, however, been essentially chemical, and thus a quite distinct and well-defined branch of chemical science has been built up.

History. The first attempt to bring together in a systematic manner the teachings of chemistry as applied to agriculture was made by Sir Humphry Davy, in a series of lectures before the British Board of Agriculture, early in the nineteenth century (*Elements of Agricultural Chemistry*, 1814). Davy regarded the soil as the source of all nourishment of plants, and he announced the general principle that plant food must be practically dissolved before it can enter the organism of the plant. But while he and his predecessors knew the value of certain materials for plant food, they did not know the constituents which gave them this value. Oil, e.g., was long supposed to be one of the most valuable fertilizing constituents, and Davy supposed sugar to be also. One of the reasons for this error was undoubtedly the belief that the carbon of plants was derived through the roots from the humus—i.e., the partially decomposed organic matter of the soil. The errors of this "humus theory" were pointed out, about 1840, by Justus von Liebig, who in his generalizations drew heavily upon the works of De Saussure and Boussingault. Liebig showed the carbonic acid of the air to be the source from which plants

derive their carbon, and the leaves to be the medium through which this assimilation takes place. He thus laid down a fundamental principle of physiological botany. He established the interdependence of plants and animals with relation to carbonic acid, which is a vitalizing principle of the one and an excretory product of the other. In place of the "humus theory" he advanced his famous "mineral theory," according to which the soil furnishes to plants their ash or mineral constituents; and this led him to suggest the employment of artificial fertilizers for keeping up the supply of the mineral constituents of the soil and thus maintaining its fertility. Liebig's views, with some modifications, form the basis of our present theories; but, on the other hand, we have learned much regarding the true value of humus and its functions in the soil. See MANURES.

In the field of animal nutrition, or the utilization of plants and their products in feeding animals, agricultural chemistry has likewise led to the establishment of the underlying principles and the methods of research. The earlier ideas regarding the valuable food constituents of plants were equally as crude as those regarding the fertilizing constituents. There was a prevalent belief in a subtle, undefined property of forage plants, upon which their nutritive properties largely depended, and it was a long time before the connection between nutritive value and chemical composition was traced. Boussingault, in France, attempted to classify feeding stuffs on the basis of their nitrogenous constituents; and Thaer, in Germany, compared them with hay and prepared his tables of "hay values." At length Henneberg worked out a classification of the nutritive constituents of feeding stuffs, and a method of analysis known as the Weende method. His classification and method have been extensively employed, having served as the basis in most of the investigations since. These studies in animal nutrition have led the agricultural chemist into a field of inquiry intimately connected with physiology proper; and in the development of the theories, as well as in their application in practice, agricultural chemistry has until recently contributed much more than physiology itself and has usually been the leader. See FEEDING FARM ANIMALS.

Agricultural chemistry laid the foundation for a science of agriculture, and one of the most important and far-reaching influences of the early agricultural chemists was that which led to the establishment of the agricultural experiment station. The teaching of agriculture in agricultural schools and colleges preceded it in most countries, but the investigation and experimentation was for the most part in the hands of the agricultural chemists. Their work led them into agricultural experiments of various kinds, as a matter of necessity, and Liebig, Boussingault, Lawes and Gilbert, and others, laid out experimental fields for carrying on their studies and testing their theories. As the practice of fertilizing the soil became introduced in the Old World, farmers found themselves confronted by a variety of problems relating to their soils and fertilizing materials which they were unable to answer, and they quite naturally turned for advice and guidance to the agricultural chemists who had developed these theories. Thus experiment stations came to be established, first by agricultural societies of private individuals and later with government aid. (See AGRICULTURAL EXPERIMENT STATIONS.) In the United States the researches and writings of S. W. Johnson (*How Crops Grow*, 1869; *How Crops Feed*, 1870), C. A. Goessmann, E. W. Hilgard, G. C. Caldwell, W. O. Atwater, and other chemists, prepared the way for the establishment of experiment stations as State institutions; and out of these has grown a system of stations under government aid and supervision, embracing every State and Territory in the Union, and providing incidentally the most munificent endowment for agricultural-chemical research to be found in any country.

Agricultural Analysis. The chemical substances with which agricultural chemistry is primarily concerned are those comprising the ash, or mineral constituents, and the food constituents of plants. As the soil is the source of the mineral constituents of plants, and usually of the nitrogen also, those elements of the soil which serve as food for plants—i.e., which enter into their composition—are embraced in the field of agricultural chemistry; and, on the other hand, as farm animals derive their nourishment from plants, agricultural chemistry is naturally concerned with the food constituents of these plants. The plant is thus a link between the soil and the animal, as regards the mineral elements; but the plant gets its carbon from the air and develops from it a series of carbon-containing compounds, which in turn are the source of carbon to the animal.

In the analysis of the plant we find first that the tissue contains a very large percentage of water—up to 90 per cent—which is indispensable to its growth and circulatory system. This water is expelled by heating the plant in a drying oven at about 212° F. for several hours. The residue, or *dry matter*, consists of organic constituents and a relatively small proportion of ash. The former are combustible, and hence the ash is determined by burning the sample. The ash consists chiefly of lime, magnesia, potash, soda, iron, silica, chlorine, and carbonic, sulphuric, and phosphoric acids. In plant analysis determinations are made of all these constituents. In analyzing fertilizers, only the potash, phosphoric acid, and nitrogen are commonly considered, these three being often spoken of as the fertilizing constituents. Latterly lime and sulphur are often included, and in special cases the other ash constituents, soda, magnesia, iron, etc. In fertilizer analysis it is customary to carry out separate determinations of the phosphoric acid soluble in water (mono-calcium phosphate), of "reverted" phosphoric acid—i.e., that soluble in a standard solution of ammonium citrate (di-calcium phosphate), and of the insoluble form (tri-calcium phosphate). The soluble and reverted forms are more readily available to plants than the insoluble form and are valued at a higher price. In complete analysis of soils other mineral ingredients besides the potash and phosphoric acid are determined, such as magnesium, calcium, sodium, manganese, iron, alumina, and silica, and also the humus. The latter is a very important constituent of soil in determining its fertility, ability to retain moisture, and to support biological changes which render the soil constituents available to plants. Mechanical analysis of the soil is also made, in which the sample is separated into particles of different sizes by means of water, and the percentage of each grade ascertained. The value of an agricultural soil depends to a considerable

extent upon its mechanical condition, as shown by this analysis, since this largely governs its capacity for moisture, capillarity, suitability for certain crops, and other qualities. In the examination of soils there have been many attempts to estimate the amount of the fertilizing ingredients present in forms available to plants. This is done by extracting the soil with weak acids and analyzing the extract, or by growing plants in pots of the soil and analyzing the crop. Important as this matter is in determining the fertilizers needed by soils, no method has yet been devised which is entirely reliable and satisfactory.

Of the organic constituents of plants those of most concern to the agricultural chemist are the so-called food constituents, which determine the value of the plant as food for animals or man. These may be divided into the nitrogenous, or those containing nitrogen, and the non-nitrogenous substances. The nitrogenous are grouped under the name of protein and include albuminoids, containing about 15 to 18 per cent of nitrogen, the amides, and a variety of other bodies. Of the non-nitrogenous constituents, the most important are (1) the fats and oils and (2) the carbohydrates, including starch, sugars, pentoses, cellulose, fibre, etc. The protein of plants is estimated by determining the nitrogen and multiplying the result by 6¼, on the assumption that the protein constituents average about 16 per cent of nitrogen. As this does not always hold true, the result is subject to slight error. In determining the fats the material is extracted with ether, in a special extraction apparatus, the ether expelled, and the residue weighed. This is not pure fat, but contains also the waxes, chlorophyll, lecithin, and some other bodies in small quantities. The fibre or cellulose is usually determined separately from the other carbohydrates. This is done by dissolving out the other constituents of the plant with dilute alkali and acid and weighing the residue, a correction being often made for the remaining traces of nitrogen and ash. As a large variety of other carbohydrates are usually present, which are of similar feeding value, they are not determined individually, except for special purposes, but are grouped with the organic acids and some other substances about which little is known, under the general head of nitrogen-free extract. This is done on the supposition that everything else has been accounted for in the water, ash, fat, protein, and fibre determined separately; and hence the difference between the sum of the percentage amounts of these and 100 represents the nitrogen-free extract. Accurate methods have been worked out for determining the sugars, starches, pentoses, galactose, etc., separately, and these are used for special analysis. For example, in studying sugar-producing plants, the sugar is determined very exactly. The principal organic acids in plants are oxalic, malic, citric, and tartaric, and these are determined on occasion, as in analysis of fruits, beverages, and some vegetables.

In the analysis of dairy products, which comes within the scope of the agricultural chemist, the principal subjects are milk, butter, and cheese. In milk analysis the specific gravity (by lactometer), water, total solids (dry matter), fat, casein, sugar, and ash are determined, the fat being the constituent considered especially, as showing the richness of the milk and its value for butter and cheese making. (See MILK; BUTTER MAKING; CHEESE MAKING.) Butter is analyzed mainly with a view to detecting adulteration with oleomargarine, renovated butter, excess of water, etc. Cheese is examined for water, fat, nitrogen, and ash, the principal objects being to determine its food value and to detect adulteration. There is a long list of other substances which come within the scope of the agricultural chemist for analysis, such as fungicides and insecticides, human foods and beverages, tanning materials, etc., which can only be referred to here.

In dairying the investigations of agricultural chemistry have been far-reaching in their results, largely modifying dairy practice in a number of respects. For example, Babcock has worked out a rapid, simple, and accurate method of testing milk and cream as to their fat content. This test has come into very general use and has not only changed the method of paying for milk at creameries and cheese factories, but led to the selection of cows giving richer milk. The same chemist, with Russell, a bacteriologist, has made elaborate studies of the ripening of cheese, which, supplemented by those of Van Slyke and Hart, have shown the causes and nature of the chemical changes during ripening.

The inspection or control work, which is now carried on in nearly every country, has afforded agriculturists needed protection in the purchase of fertilizers, feeding stuffs, and the like, and reduced the traffic to a business basis. The percentages of essential constituents in these materials is now guaranteed by the sellers, and the goods inspected to see that they meet the guarantee. Dairy products of various kinds have been subjected to systematic inspection, and of late this has been extended to materials used for insecticides and fungicides, the consumption of which is assuming large proportions.

The earliest treatise on methods of agricultural analysis in the United States was published by Prof. G. C. Caldwell in 1869. Since 1884 the Association of Official Agricultural Chemists has been a potent factor in testing and developing methods of analysis. It holds an annual meeting and publishes a volume of proceedings and papers. Similar associations exist in Germany, Holland, and Belgium, and a number of other European countries.

Feeding and Metabolism Experiments. The analysis of plants as above shows the total amount of the constituents present; but as these are not all in form to be digested by the animal, digestion experiments are made by the chemist on live subjects. In these experiments the amount and composition of the feed consumed by the animal, and of the corresponding excreta voided, are definitely determined for a short period, and by calculation the percentages of protein, fat, fibre, and nitrogen-free extract actually digested are ascertained. These percentages are called the *coefficients of digestibility* and have to be determined for each feeding stuff separately. A method of artificial digestion has been worked out, in which the feed is treated with pepsin and hydrochloric acid and with pancreas solution, but it is not generally considered to be as reliable as the natural method. In recent years the bomb calorimeter has come into quite extensive use in the study of feeding stuffs, for measuring the fuel value, or the capacity of the feed for furnishing heat and energy for work. In this apparatus a sample of the material is ignited with oxygen in a platinum-lined bomb,

and the heat evolved is measured by means of very accurate thermometers, suspended in a water jacket surrounding the bomb. For further details regarding fuel value and the subject of animal nutrition in general, see FEEDING STUFFS; FEEDING FARM ANIMALS.

Very refined and delicate methods and apparatus have also been elaborated for studying the functions of the different nutrients in animal feeding, and the way in which they are used in the animal body in producing animal heat and energy for work, repairing the waste of the body, and making growth or meat or milk. In the ordinary feeding experiment with cattle, or sheep, or pigs, the herd is divided into equal lots and fed in periods varying from a few weeks' to several months' duration, account being kept of the amounts of food of known composition which each lot or individual eats and of the changes in weight. At the conclusion the animals are often slaughtered and the composition of the carcass determined. In this way the feeding value of nearly every available feeding stuff, and of a great variety of compound rations, has been studied, and the specific effect of nutrients from different sources on the quality of the beef, pork, butter, etc. Much of this feeding work has also been directed towards the relation of live stock to the problem of maintenance of soil fertility and the development of a rational system of agriculture. It has been shown that by feeding the crops largely on the farm where they are produced, and applying the manure to the soil, the fertility of the latter can be conserved, the supply of humus kept up, and the expense for commercial fertilizers reduced to a minimum. The reason of this is that when crops are fed to growing stock or milch cows, from 60 to 90 per cent of their fertilizing ingredients, voided in the solid and liquid manure, are retained upon the farm.

In studying the fundamental principles of nutrition, and the function of the different nutrients, the total income and outgo of the body during the experimental period must be determined. This includes the carbonic acid and other gases given off, as well as the excreta. For measuring these gases a respiration apparatus is employed, which usually consists of a closed chamber in which the animal or person is placed, with means for measuring and sampling automatically the air as it enters and leaves the chamber. With such a respiration apparatus Henneberg, Kühn, Kellner, and others have worked out the functions and relative values of the different nutrients and many of the underlying principles of nutrition. Atwater and Rosa have combined a calorimeter with the respiration apparatus and made many improvements in the accuracy of the latter. In their apparatus the chamber in which the subject is placed is a calorimeter, with very delicate arrangements for registering the heat given off by the subject. With the aid of this highly sensitive respiration calorimeter, it has been possible to demonstrate the absolute conservation of matter and energy in the body. A similar apparatus for use with animals has been constructed by Armsby.

Fertilizer Experiments. The investigations of the agricultural chemist in studying the fertilizer requirements of different crops, the value of different forms of plant food and their effect on the quality of the crop, and a wide range of similar problems, are conducted either in pots or cylinders, or in plats in the field. The preliminary studies are often made in pots or boxes, filled with sterile sand, to which definite amounts of humus and fertilizers have been added. The conditions are under complete control, and every part of the plants can be saved for analysis. These pots are usually mounted on trucks, so that they can be placed under cover at night or during a rain. The plat work is especially for testing theories under field conditions, studying fertilizer requirements, the draft of different kinds of crops, the changes in humus content and fertility of the soil under various systems of treatment, and the like. The plats are most commonly about one-tenth of an acre in area, selected with much attention to uniformity of the soil, and often underdrained and provided with basins for collecting the drainage water from each plat. Great care is exercised in preparing the land, applying the fertilizers, cultivating the crops, and harvesting them, so as to have the treatment of all uniform except as regards the special experimental feature. For studying soils in the field, samples are taken at intervals with a tube specially made for the purpose, which is driven into the ground to the depth required, removing a core of the soil. These samples are taken to the laboratory and tested or analyzed. These studies of plant production and soil fertility have been accompanied by a gradual refinement of methods, and a great deal of investigation has had purely that aim. The field covered has been very broad and has not always been strictly chemical. For example, the discovery of the ability of leguminous plants (clovers, peas, and the like) to appropriate to their use the free nitrogen of the atmosphere, and thus, under certain conditions, to enrich the soil with nitrogen from the air, was made by a German agricultural chemist, who also demonstrated the agency of bacteria in bringing about this assimilation. See GREEN MANURING; ROTATION OF CROPS.

Of late years the biological relations of soils, nitrification and denitrification, the water requirements of plants, poisonous principles of feeds and plants, the nature of the protein and other constituents of plant and animal products, the ripening of fruits, and allied topics have received the attention of agricultural chemists. The development of biological and physiological chemistry has differentiated the field of agricultural chemistry to some extent, and the more detailed classification of agriculture has tended to split up the subject among numerous departments.

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CHEMISTRY, ANALYTICAL. (See ANALYSIS, CHEMICAL.) Many special processes of analytical chemistry may be found described under the

names of the substances in connection with which they are usually employed.

CHEMISTRY, INDUSTRIAL. In no department of manufacture has the progress been so great in recent years as in Industrial Chemistry.

Chemistry is naturally divided into two great divisions, known respectively as inorganic and organic chemistry. The former may also be termed mineral chemistry, and that branch of chemistry which treats of the extraction of metals from their ores is called metallurgy; therefore the industrial processes used in metallurgy will find proper treatment under that title or perhaps under the special metal concerning which information is sought, such as gold, iron, silver, tin, etc. In addition it may be said that many of the processes used for the manufacture of special products will be found under the name of the product, as cement, lime, potash, soda, etc.

The most prolific development in industrial chemistry is perhaps that which pertains to organic chemistry. So long ago as 1828 the great German chemist Wöhler by his synthesis of urea established the fact that it was possible to produce from inorganic substances, such as coal tar, compounds previously supposed to derive their origin from organic or natural sources. Since that time many artificial products have been manufactured, such as alizarin, indigo, and camphor, which have in some cases entirely removed the industry from a natural local environment to a chemical center. This was the case with artificial alizarin, which was synthesized in Germany and there manufactured at a cheaper rate than it was possible to grow the natural madder in Turkey and elsewhere. Thus have the conditions in recent years entirely changed owing to the manufacture of many substances from coal tar. Also must be mentioned the fact that the fuel question has had much to do with the development of industrial chemistry, especially where those products that are of organic origin are concerned. Formerly coal was the common fuel used, but again with the rapid development of the uses of electricity, that force generated in regions where water power was cheaply available has led to the establishment of chemical industries in localities, such as Niagara Falls in the United States. The cheaper the fuel, it naturally follows that the power is cheaper with a corresponding possibility of making the product at a reduced price.

The World War has had a remarkable influence upon chemical manufactures. With rare skill and great ability, large chemical plants had been developed in Germany until these concerns controlled many branches of chemical industry. The whole world seemed, therefore, dependent upon Germany for many of their essential chemicals. The methods followed were quite simple. Control was obtained of raw products and these were then manufactured into useful products which were sold more reasonably than by other concerns in other countries. Typical of this situation was the potash industry, leading up to the manufacture of commercial fertilizers, which was completely under German domination. The coal tar products, including the aniline dyes (originally an English invention), the synthetic medicines, and many artificial products could be purchased in Germany of better quality and at cheaper prices than elsewhere in the world. The stopping of all exports from Central Europe made it impossible for the Allied countries to obtain these products, and accordingly at once Great Britain, the United States, and Japan began to manufacture their own chemicals. In Great Britain under government subsidies, the manufacture of dyestuffs, certain chemicals, and certain varieties of glass was undertaken. In Japan large plants were established and the natural camphor industry renewed, as was also the indigo industry in India. The conditions in the United States were in many respects most favorable. Large industrial corporations, some of which were manufacturing high explosives, saw their opportunity and found it possible to undertake the manufacture of artificial dyes and succeeded. (See DYESTUFFS below.) The production of potash so essential for the farmer was undertaken and also succeeded. In 1922 the newer chemical industries in England had somewhat lapsed, and those in Japan had failed to realize expectations, but in the United States the results had been most successful, until this country was not only practically independent in the dyestuff industry but was succeeding in the making of potash, a success which promised to continue if proper tariff legislation were enacted. One other chemical deserves a word. It is the manufacture of nitrogen compounds from the air and this will be discussed under *Nitrogen*. Had not Germany been able to manufacture nitrates from the air during the World War she would have been obliged to succumb much sooner, owing to the impossibility of procuring nitrates from Chile.

Metals. In recent years the conditions regarding these important substances have changed materially. Ever since the perfection of the valuable reduction process announced by Castner, followed by the electrolytic production of *aluminum*, resulting in a great reduction in the price of that metal, there has been a growing demand for it as a substitute for tin, notably in the production of household utensils and in the manufacture of alloys. Aluminum has also found extensive use in the manufacture of white metallic paints and is used to take oxygen from iron oxides in the manufacture of steel. Important improvements have been made in the processes used for its reduction and in the methods of soldering it. During the World War its production in the United States greatly increased. Uses for the rare metal *cerium* have been found, and both it and *magnesium* are now manufactured in this country. The former is a by-product of the gas mantle industry. *Molybdenum* deposits in Canada and Southern China have been worked advantageously especially since Germany ceased to be the source for that metal. It finds its chief use in connection with steel. *Radium*, formerly extracted from ores mined in Colorado, is now largely manufactured near Pittsburgh in the United States, and the production of this valuable remedial agent is increasing with a corresponding reduction of the cost. The great source of supply for *Platinum* has always been the Ural Mountains but as these deposits are no longer available, the world has been searched for that precious metal. Small quantities have been found in Spain and in Western United States and Alaska. It is largely used as a catalizer. *Thorium* and *Mezothorium* are growing in importance, especially for use in mantles for artificial lighting. *Tin* is growing scarce, although new

deposits have been found in Bolivia and improved processes for its extraction are reported. *Titanium*, formerly entirely disregarded, is now coming into use as a valuable constituent of steel rails. *Tungsten*, until lately an exclusive German product, is now obtained in California, Chile, Burma, and China, and was largely derived from these sources during recent years. *Uranium* ores as a source for radium have been in demand and *Vanadium*, once a curiosity almost, is now a valuable constituent of certain steels. *Zirconium* is also being studied as an alloying element in steel.

Alloys. Improved alloys showing lightness and increased strength are of frequent invention. Concerning aluminum alloys it has been found by adding aluminum to copper an immediate increase, both in the strength and ductility is obtained. The ductility attains a maximum with 7.35 per cent of aluminum. Beyond that it falls and when 11 per cent is reached the alloy becomes too brittle to be of any commercial value. Heat treatment has little effect upon alloys containing less than 7.35 per cent of aluminum. Beyond that they are stiffened by heat treatment at 800° C. Alloys containing less than 7.5 per cent aluminum are not amenable to cold working, though they are improved by hot rolling, while higher alloys are much improved by either hot or cold rolling. Of the recent aluminum alloys "Liege metal" and "Vanalium" are compounds that are useful for machine parts where lightness and strength are desired. When the scarcity of platinum became conspicuously evident a series of substitute alloys were prepared for commercial use. Among these was "palau," a gold palladium alloy which consists of 80° gold and 20° palladium. In resistance to most chemical reagents to the action of which such ware is ordinarily exposed, palau compares favorably with ordinary platinum ware. "Rhotanium" is an alloy with a gold content of 60 to 90 per cent, which is said to be superior to pure platinum for use in jewelry. It is harder and stronger and takes a better finish. Jewelry made from it passes the common jewellers' and platinum buyers' test. An alloy of chromium, cobalt, and iron is a Canadian invention, which is recommended for the finest forms of cutlery.

Gases. Two very important gases have in recent years come into conspicuous notice. Of these *Helium*, discovered in the middle of the nineties of the last century by Sir William Ramsay, was until 1917, without any practical value. It is not inflammable, and next to hydrogen is the lightest substance known, and in consequence, owing also to the fact that in a balloon it is capable of exerting an ascensional power of 92.6 as compared with hydrogen, helium has become of the utmost value for aëronautical purposes. It is a constituent of natural gas from which it is separated by fractional distillation through compression which induces heat and subsequent expansion which promotes refrigeration, the gases that liquify at higher temperatures precipitating from the mixture sooner than those that require lower temperature to bring about this action. The progressive cooling causes liquifaction of all the gases in natural gas except helium, the one having the lowest boiling point. The helium content, therefore, of the natural gas retains its gaseous condition, and in this state can be readily separated from its liquified associates. The richest sources of helium are in Texas, Oklahoma, and Kansas, while others of less importance are in California, Montana, and Ohio. In 1917, the cost of its production was from $700 to $2,000 a cubic foot while today it may be produced at $56 a 1,000 cubic feet and even $20 a 1,000 cubic feet is believed possible. The U. S. Navy has established a plant at Fort Worth, Texas, for the production of helium for its dirigible balloons.

Nitrogen. When Sir William Crookes made his celebrated presidential address before the British Association for the Advancement of Science, in which he predicted the exhaustion of the soil with consequent diminution of food supplies unless means were found for an increased supply of nitrogen compounds, he little thought of the thousands of British lives that would be sacrificed because Germany, recognizing the value of his predictions, was able at the beginning of the World War to successfully extract nitrogen from the air and convert it into nitrates. As early as 1915 the commercial production in the United States of nitric acid from the air was announced with its application to the manufacture of artificial fertilizers, but when the World War came it was more and more obvious that no adequate plants existed in this country for the manufacture of nitrates in sufficient quantities to furnish the needed supply of explosives. In response to a resolution of the Naval Consulting Board Congress appropriated $20,000,000 in 1915, for the erection of a plant somewhere between the Alleghany Mountains and the Sierra Nevadas so as to be situated at a safe distance from either sea coast. In 1916 the matter having been thoroughly considered, Congress appropriated a very large sum of money and plants were built at Muscle Shoals, Ala., and near Toledo and near Cincinnati, Ohio. It was believed with this equipment that the United States would be independent of all foreign sources for its supply of nitrates for use in the manufacture of explosives, while in times of peace these plants could be used for the manufacture of fertilizers. At the close of the war after an expenditure of over $60,000,000 by the United States work at these plants ceased and has not as yet been resumed. It is pertinent to add that at the close of the war an announcement was made of an organization of a syndicate of all the German nitrogen plants under the direction of the Minister of Finance.

Potassium. Closely allied to the production of nitrogen is the question of potassium salts. The natural deposits of these salts in Central Europe were, until the return of the deposits in Alsace to France, under the control of the German Potash Syndicate and careful search was made throughout the world for other sources. In the United States the Geological Survey reported that "every clew that might yield valuable results has been followed up in a country-wide investigation extending from New York to California." Nevertheless, it resulted in the development of deposits at Searles Lake in California, where a plant was erected in 1915, and also of deposits of alunite, a mineral containing potassium salts, in Utah, which was developed, but the output from both of these deposits was relatively small. Other sources were therefore considered, and among them are several which are of practical value. The most important, perhaps, is the large quantities of seaweed and rockweed found in the shallow

waters of the Pacific Coast. This kelp is dried and then distilled, yielding a charred residue from which potash salts can be extracted by leaching and evaporation. The great masses of seaweed known as the Sargossa Sea were considered, but these were not so rich in either nitrogen or potash as the California kelp. Other sources were the gases from cement works and blast furnaces. It was found that by adding a small proportion of sodium chloride to the charge of a blast furnace, the potash in the ore is released and volatilized with the outpouring gases as potassium chloride, when it may easily be recovered as a by-product. A similar process was announced of recovering potash by decomposing feldspar, resulting in the salvage of potassium carbonate and aluminum. This process was successfully carried on in Durham, Ontario, where it was said the cost of production was less than the freight charges paid on a ton of the imported German product before the war. In 1915, only 1,000 tons of potash were produced in the United States, while three years later the estimated production was over 60,000 tons.

Fuel. The enormous consumption of coal with the prophesied disappearance of natural gas and petroleum would seem to indicate that within a comparatively short time these valuable natural sources of heat will be exhausted, and therefore chemical engineers are studying the sources of power that will in the future be available for heat and light. Electricity derived from water power seems to be the coming agent, but it is hoped that some means will be found to utilize the heat of the sun and perhaps collect the power generated by the action of the waves.

In the United States the use of natural oil and also of electricity has been largely substituted for coal in motors and engines and also in locomotives and steamers. Under the auspices of the Geological Survey the peat and other deposits of inferior coals have been made the subject of careful and exhaustive reports. In Europe in recent years the trend has been in favor of natural products such as peat and refuse carbonaceous materials, and even before the war a gas made from peat was recommended and wood made from straw, especially for such uses as match stems, was favorably considered. The distillation of peat was actually undertaken in Great Britain and the oil thus obtained was used in the British Navy in place of foreign oils. In Sweden, where again the subject was thoroughly investigated, condensed peat was used in the form of briquettes, while in Holland an illuminating gas was made from peat, that had the merit of having no by-products, the peat being entirely consumed in the process of manufacture. In Sweden experiments with peat powder as a fuel for locomotives were made and the product was found to compare with coal as 2 to 3. Its use for this purpose has extended to Norway, Denmark, and even to Switzerland until during the war its cost was one-sixth that of coal. In England, household refuse, such as ashes, cinders, paper, straw, and vegetable fibers, has been converted into briquettes so as to conserve the supply of coal. It is safe to say that in Ireland and northern Europe an industry has been created for the manufacture of fuel from peat deposits, and in Germany the great shale deposit, bog and peat fields have been carefully examined by experts for the same purpose. In England the very latest reports mentions a so-called "colloidal fuel" composed of pulverized coal and oil which is said to give ships a wider cruising radius with increased boiler efficiency.

Dyestuffs. The story of the coal tar colors is the romance of chemistry. At the inspired touch in 1856 of Sir William H. Perkin, the beautiful aniline violet came out of the discarded refuse of gas works and a new industry was created. For a time it grew and flourished in England, where color after color were released from their prison of darkness by the magic of chemistry. Then it went to Germany where great corporations with every facility that science could afford were established and the industry became practically a monopoly of Central Europe. This condition continued until the blockading of the seaports of the Central Powers of Europe made further exports impossible and with the exhaustion of existing stocks in other countries prices naturally rose. Great Britain, France, Italy, Russia, and the United States at once undertook to manufacture their own dyestuffs and to bring again into use such natural dyes as were available. In Great Britain the conditions were met by the organization of "British Dyes (Ltd.)" with a capital of £2,000,000 which the government increased by £1,500,000 at 4 per cent to be paid in 25 years. The largest existing plant in England for the manufacture of aniline dyes in Huddersfield was secured and actual manufacturing begun in May, 1915. In France, Italy, and Russia schemes were considered and attempts made to establish new plants but with uncertain success. In Switzerland the conditions were peculiar. Factories there had long depended upon Germany for their crude materials, but that country declined to continue that practice unless the Swiss factories would refuse to sell the finished dyestuffs to countries not at war with the Central Powers. This they declined to do, and arrangements were made with the United States manufacturers to supply the crude materials and accept in payment the finished products. In the United States the outlook was most favorable. The annual consumption of dyestuffs had a value in 1914 of over $15,000,000, of which $12,000,000 represented importations. The textile industries, the paint, varnish, and ink trades, the paper industry, the feather and leather trades, and other minor industries were threatened with disaster unless means were found to furnish them with the needed coloring materials. Congress promptly directed the Bureau of Foreign and Domestic Commerce to prepare a report on the subject, which was promptly done, so that with the facts carefully presented by the well-known chemist, Dr. Thomas H. Norton, the conditions required for the establishment of the industry were well known. The most important element was to obtain sufficient crude materials from which to manufacture aniline oil, the source of the aniline colors, and to meet this demand many coke ovens were equipped with appliances for the recovery of coal tar bases, from which the dyes were manufactured. This was accomplished so quickly that within a year the supply of aniline oil was sufficient to meet the demands of the dyestuff makers in the United States. New and improved processes were invented and it was not very long before the domestic product exceeded in value that previously imported and even large exportations were made. In 1917,

the 7 establishments had increased to 46, from which the annual production was over 60,000,000 pounds. In that year the statement was made that "American colors are made from practically the same chemical formulas as those of Europe and are practically the same product in every way." In a summary of the condition of the dyestuff industry in the United States published in 1921, it was said that the exports of aniline dyes had increased to a value of $17,130,397 in 1920, and the comment was made "that with the return of peace it is evident that whatever the demand for dyes made in Germany may be, that country will never regain its lost supremacy n the world trade in dyestuffs." In England the production is constantly increasing and it is estimated that the domestic output is about 80 per cent of the dyes actually consumed in the United Kingdom. France, Italy, and Japan are producing some dyestuffs, but due to lack of raw materials and to other difficulties, these countries cannot yet supply their own textile factories with the quantity and variety of colors required. Switzerland is the only country other than the United States now making aniline colors sufficient to meet its own requirements and to export on a large scale, but the Swiss are dependent on other countries for the raw materials.

Paper. The persistent demand by man for wood for many purposes has largely reduced in recent years the supply of wood pulp for paper, and the attention of the industrial chemist has been directed to other sources for substitutes. During the war there was an actual scarcity of stock for newspaper and in Australia the condition was so acute that many newspapers were forced to suspend publication when the price of paper stock went from $45 to $185 a ton. Many varieties of grass have been experimented with, such as the tall millet of Manchuria, the sparto grass of Spain and northern Africa, the papyrus of Egypt and borders of the Nile, while in the United States studies have been made with corn stalks, pineapple leaves and pulp, and with various fibrous plants and grasses, both without and in combination with ranges. These experiments have resulted in the production of excellent qualities of wrapping paper and strawboard, and there has been reported a paper made from hemp which has been described as "of good body, clear white cream texture, and very satisfactory calendered finish"; also the Bureau of Standards announced the possibility of making a high grade white paper from cotton linters although the question of cost might have to be considered. It was announced that in England a successful filter paper had been made to take the place of the Swedish and German filter papers. During the war Germany made extensive use of paper for clothing, especially in connection with fibrous materials. It was such that prisoner's uniforms were found to consist of a union of cotton, shoddy, and paper.

Artificial Silk. The artificial production of a natural fiber seems at first blush an impossibility, but chemistry can accomplish wonders, and so by the skilful treatment of cotton with the addition of certain chemical preparations to make it brilliant or incombustible, a compound is obtained that can only be distinguished from silk by the most expert. Certain varieties of artificial silk consist of spun glass, the filaments of which are one-eighteenth of a hair's diameter, and these are said to be stronger and more solid than any other variety. The process for manufacturing artificial silk has been extended to the production of artificial velvets which are said to present all the brilliancy and softness of silk velvet. In recent years the scarcity and high prices of silk and other textiles has resulted in a greater development in the manufacture of chemically produced textile materials and at present it is possible to procure any one of the following five varieties of artificial silk, namely, nitrated silks, collodion silks, viscose siks, acetate silks, and gelatin silks. The great center of the industry was in France but it has now extended both to England and Italy, and even to Poland, where a large factory was established prior to the World War.

Rubber. At a meeting of the Eighth International Congress of Chemistry, held in New York City in 1912, specimens of artificial rubber were exhibited that were fully equal to the original product, but more convincing, perhaps, was the statement made by Chancellor Bethmann-Hollweg before the Reichstag in 1915 that "German inventors had discovered a method of producing synthetic rubber." There is no reasonable doubt but the production of artificial rubber has been accomplished; but for the present the cost of the production of the artificial compound is too great to allow of its manufacture in competition with the natural product. Meanwhile many plants, such as the guayule of Mexico and the bulia of the Fiji Islands, have been proposed as desirable sources of juices that possess qualities similar to those of the rubber plant. In 1916 a Russian chemist announced that an artificial rubber had been produced by him from certain vegetable oils, such as hempseed oil and rapeseed oil, with alcohol. An experimental plant was erected for the continuation of his experiments. Among the interesting war products was "sonjatin," a substitute for rubber tubing, made out of masses of solidified glue. That many chemists are devoting their energies to the solution of the interesting proposition of how to produce a synthetic rubber is shown by the extensive list of references to the subject found in the journals on chemistry.

Motor Fuels. The increased and increasing price of gasoline has naturally received much attention from the chemist, whose researches for a cheaper motor fuel have very largely led him to a study of original sources, although mixtures of gasoline have been considered. In England, where the subject has been very thoroughly investigated, a mixture of benzol and alcohol was successfully employed in motor busses. It was also in England that the recommendation was made that steps be taken to increase the production of power alcohol by the extended use of the vegetable matter from which it may be obtained, such as: (1) Sugar-containing products, as molasses, makua flours, sugar beets, and mangolds; (2) Starch or inulin-containing products, as maize and other cereals, potatoes, and artichokes; and (3) Cellulose-containing products, as peat, sulphite wood-pulp lyes, and wood. In Sweden alcohol is now made from white moss, of which large quantities are available, and in the United States straw was found to yield satisfactory results. In South Africa a compound called "natalite" has been found useful. It is a by-product of the Natal sugar industry and is said to be a mixture of

alcohol and ether. "Acetol" is a similar mixture that is made in Africa and may be manufactured at a much lower price than gasoline can be bought. Coal gas in large bulky containers has been used in England with much success, but the general trend seems to be in favor of cheaper alcohol or mixtures of alcohol obtained from some local source as in the case of natalite, noted above as a by-product of a sugar industry, and gasoline or other derivative of petroleum. Both in Cuba and Brazil such preparations have been found very useful and are largely employed.

Petroleum Products. In connection with the foregoing paragraph mention must be made of the introduction of the so-called "cracking" principle applied to petroleum for an increased yield of the lower products of distillation. It was found that by treating the vapor of petroleum instead of the liquid itself greater pressure could be applied than by the use of a still. In a still pressures of 100 pounds are high and an undue increase of heat after that pressure is reached is usually dangerous. Gas on the other hand is compressible to a much greater degree than 100 pounds without danger of explosion and it was found possible to work with a pressure greater than 500 pounds. With such pressures and with a degree of heat perfectly controllable by the means used, it becomes possible to deliver gasoline to the amount of from 50 to 75 per cent and also to obtain benzene and toluene, both valuable by-products useful in the manufacture of aniline oil. By this method 200 per cent more gasoline can be obtained from a given quantity of petroleum than was formerly possible. This process is called "cracking" and methods for its application were invented by W. F. Rittman, W. O. Snelling, W. A. Hall, C. S. Palmer, and others. The first named was connected with the U. S. Bureau of Mines and his patent was assigned to the Government from which it may be leased with the understanding that those who use it agree if they discover any improvements to it will give them to the United States instead of patenting them for themselves. Of the great value of this process it was said of it that: "By its aid vast quantities of petroleum waste, hitherto available for little beyond fuel purposes, can be transformed at will either into gasoline for use in motor engines or into benzene and toluene, also susceptible of the same utilization, but constituting likewise the crude material for the manufacture of the two coal tar high explosives— picric acid and trinitrotoluene — and forming also the starting point for the synthesis of an almost endless variety of dyestuffs, medicinals, photographic chemicals, artificial flavors, and perfumes."

Artificial Gems. Synthetic gems have been sought for during many years and the successful production of such gems has been found possible, largely through the high temperatures resulting from experiments made in France. The successful production of diamonds would solve the problem for other gems and while satisfactory results have been obtained, the processes have thus far been found to be too expensive to yield gems that are economically satisfactory. With the return of peace comes a report from Germany that the firm of Alfred Nobel, formerly makers of dynamite and other high explosives, have succeeded in manufacturing synthetic diamonds. Not only have many diamonds of good size been produced, but it is also claimed that it will be possible to make them profitably. In quality the artificial stones are said to be equal to those which come from natural sources.

Glassware. Formerly the best qualities of optical glass were made in Germany and from that source the world was supplied. The Bureau of Standards after long and persistent investigation of this subject achieved results that were so satisfactory that in May, 1917, Secretary Redfield announced concerning optical glass "that henceforth the United States would be independent of any foreign supply of this important element of warfare." In Great Britain similar successes were reported and the British Government in 1918 entered into contracts with recognized firms to furnish crown glass that was equal in quality "to the well-known German Jena glass that formerly was universally used." The condition was similar in connection with glassware used in laboratory work for the chief sources of this glass were formerly factories in Germany and Austria. In July, 1919, the American Chemical Society began a campaign against importing scientific apparatus from Germany, especially glassware, and within a year it was possible to announce that American glassware was being made that would compare favorably with that from abroad. A similar experience was had in England. A department of glass technology was inaugurated in Sheffield University with the support of the British Government and soon it was reported that chemical glassware was being made to "equal anything Germany ever produced." The manufacture of lenses, especially designed for photography from the air, was started in England during the war and the products obtained satisfied the most searching tests and the claim was made that the "lenses were superior to those hitherto made in Germany." Thus again the expert chemist showed himself capable in difficult situations to meet the emergency and produce technical products considered impossible to duplicate.

Sugar. The removal of the tariff placed on sugar caused the sugar planters in the United States to discontinue their raising of that important food product. This condition was naturally followed by increased importation, but with the advent of the World War all exports, as of beet sugar, ceased from the Central Powers of Europe; and as supplies soon greatly diminished, the price rose and for a time only a limited amount could be purchased by any one person. Under these circumstances, sugar-producing countries, such as Cuba and the Philippines, greatly increased their production, which was sold at very high prices. Whether the sugar planters in Louisiana and the beet-sugar growers in the west will be protected by a new tariff sufficiently high to permit them to resume operations and make the United States independent of foreign sources remains to be seen. Meanwhile other varieties of sugar are being continuously sought and exploited, notably the nipa palm of the Orient, from which the Bureau of Science in Manila reports that there would be at least 12 per cent of recoverable sugar in the sap, and the average annual yield of 4,000 gallons of sap an acre would yield about 4,000 pounds of sugar. A recent improvement in the manufacture of sugar consists in the use of dry or superheated steam for water in the final process of washing sugar in

the drums in which the sugar is dried. By this means over 99 per cent of the avid molds and bacteria are destroyed and it is estimated that fully 1 per cent of the Cuban crop, or about 70,000,000 pounds of sugar a year, worth at least $1,500,000, can be saved by the employment of this improved process invented by an American.

War Products. Two very interesting series of products have grown out of the World War and were the results of the demands made upon the chemist by the extraordinary conditions that prevailed during that period.

Substitutes. Among these are the following which are of passing interest. A *beer* substitute consisting of beet root, hops, yeast, and water which was patented in Germany, but its use was forbidden, as it was essentially a beer, being produced by the fermentation of sugar contained in the beet root. Beet roots were extensively used in the dilution of jam supplies and in the manufacture of coffee substitutes. A *butter* substitute was made in Norway from fish oils and it was accepted as being as good as any of the best kinds of margarines. A substitute for absorbent *cotton* was made in Sweden from wood pulp. After sterilization it found extensive use as a surgical dressing. Seaweeds have been found in Japan to yield a practical substitute for *cotton* and this substitute is found to be in every respect superior to vegetable *cotton.* Numerous *fiber* substitutes such as "cellulon," which is a cellulose yarn made from wood and "textilite," the result of a paper thread and a fiber thread being twisted together, were exhibited in Dresden in 1918, where also were shown fabrics made from various fiber plants, such as the cat-tail, the cotton grass, and the broom, and of certain animals, particularly the hair of the Angora rabbit. Heather ground to form a sort of flour and mixed with blood from slaughter houses was used as a substitute for *fodder.* Sawdust, strawdust, and nutshell dust were sold in Germany at incredible prices as *food* adulterants. Carpenter's glue was used in the manufacture of pudding powder, and flour sweepings in the baking of bread. Foreign substitutes found in the bread included flax fabrics, cotton, wood pulp, straw, and sand. Raw bones were made into a substitute for *glue* by treatment with sulphur dioxide, the fat being removed by benzene and the mass boiled in water under pressure. The juices from the stems of certain creeping plants and from certain kinds of bulbs, if properly evaporated and treated, yielded a very suitable *gum* substitute for certain purposes. As a substitute for *jute* "cellulon" was extensively used in Germany, and in Italy the stray fibers from barley, wheat, or rice were used for a similar purpose, according to the strength of the material wanted. A product from cellulose yarn without any dressing was used as a *leather* substitute, and shoes were made from it in Germany. As a substitute for *opium* benzyle benzolate was announced. It was taken internally as benzyle acetate and relaxed the muscles, giving the patient the same beneficial effects as opium without its ill effects. The *oils* from mustard seeds and from sunflower seeds as well as other plants found extensive use in northern Europe during the days of scarcity as substitutes for illuminating and lubricating oils. *Wool* was largely replaced in Sweden and Denmark by the fiber obtained from the peat bogs that occur in northern Europe, and when mixed with 10 per cent of animal hair served as a substitute for felt soles in footwear.

Asphyxiating Gases. The world was startled and horrified when in May, 1915, a gas of a greenish color with a strong odor and great density came from the German lines towards the Allies. Its properties were those of chlorine and the symptoms of the soldiers who inhaled this poison gas tended to confirm this opinion. Later it was claimed that not only chlorine but also bromine, and nitrogen peroxide had been added to this new and cruel method of modern warfare. Measures were at once taken to meet this terrible weapon of offense and these assumed the form of gas masks, at first quite primitive, but as the war progressed they became more elaborate and were provided with materials impregnated with counteracting chemicals that neutralized the effect of the poison gas. (See Chemical Warfare.) Finally in 1918 it was asserted by high authority that "there was not a single case on record of an American soldier falling victim to a gas attack when protected by the gas mask" adopted by the United States. Equally to the credit of the United States may it be said that the American poisonous gases were stronger and more effective than those used by the Germans. With the coming of peace and the turning of swords into ploughshares the poisonous chlorine gas has been directed into almost universal use for purifying the water supply of cities, and the other and more deadly gases in the destruction of rodents, as rats around wharves, breakwaters, etc., and insect pests, such as those that infest the citrus groves of California or the cotton fields of the South, while the frightful phosgene yields a violet scent more delicate and lasting than that of the woodland flower.

Organizations. Besides many special organizations, such as the American Ceramic Society and the American Petroleum Institute in the United States and the Institute of Petroleum Technologists and the Society of Dyers and Colourists in Great Britain, there is the American Chemical Society with a membership of over 15,000, which publishes "Chemical Abstracts" and the "Journal of Industrial and Engineering Chemistry," both of which periodicals contain abstracts of important papers and digests of current information on industrial chemistry. In Great Britain there is the London Chemical Society with a membership of over 3800 and the Society of Chemical Industry with a membership of over 5600. The last named publishes fortnightly a "Journal" and annually an "Annual Report," giving the progress of the science during the year. In the United States there is also the American Electrochemical Society and the American Institute of Chemical Engineers, both of which publish proceedings.

Bibliography. The literature of chemistry is enormous. In fact not only does every special branch of chemistry possess its own text books and treatises, but every important product has now many volumes devoted to its history and treatment. Therefore, in order to acquire a knowledge of any particular subject such works must be examined and studied. The great reference book in the English language on chemistry is Watts' *Dictionary of Chemistry,* revised and entirely rewritten in recent years by M. M. Pattison Muir and H. Foster Morley. Added to this is *A Dictionary of Applied Chem-*

istry by Sir Edward Thorpe, also in four volumes, which is now in its third revised edition.

CHEMISTRY, ORGANIC. See CHEMISTRY; VALENCY; CARBON COMPOUNDS; STEREO-CHEMISTRY; HYDROCARBONS; ALCOHOLS; ALDEHYDES; KETONES; ETHERS; ESTERS; AMINES; AMIDES; PHENOLS; DIAZO-COMPOUNDS; CARBOHYDRATES; SUGARS; ALKALOIDS; ETC. All the more important organic compounds may be found described under their special names.

CHEMISTRY, PHYSICAL. See AVOGADRO'S RULE; MOLECULES—MOLECULAR WEIGHTS; REACTION; CATALYSIS; SOLUTION; DISSOCIATION; THERMO-CHEMISTRY; ELECTRO-CHEMISTRY; PHOTO-CHEMISTRY; EVAPORATION; DISTILLATION; BOILING POINT; MELTING POINT; CRITICAL POINT; ACIDS; ETC.

CHEMISTRY, PHYSIOLOGICAL. One of the biological sciences, having for its object the study and investigation of the manifold chemical processes taking place in living organisms, both animal and vegetable. Physical, or mechanical, physiology deals with those functions of living organisms explainable by physical laws and studied by physical methods. Chemical physiology, or physiological chemistry, deals with those functions explainable by chemical laws and studied by chemical methods. In the study of physiological chemistry, therefore, the facts to be collected and the methods pursued are almost wholly chemical, while the application is purely physiological.

In the early days of physiological chemistry, energy was devoted mainly to the simple study of chemical composition. The various tissues and organs, especially of the higher animals, were analyzed, their chemical composition examined, and the chemical nature of the various proximate principles occurring in these tissues ascertained. It was found that 12 chemical elements enter into the composition of all living organisms—viz., carbon, nitrogen, hydrogen, oxygen, sulphur, phosphorus, chlorine, sodium, potassium, calcium, magnesium, and iron—while more recently iodine has been found widely distributed in organic combination. The first six of the above elements enter mainly into the make-up of the organic substances of the living body, while the last six occur chiefly as inorganic or mineral compounds. Sulphur and phosphorus, however, are especially characterized by the fact that they are widely distributed in organic combination—i.e., as an integral part of complex organic compounds, as proteids, nucleo-proteids, and various crystalline substances—while at the same time in oxidized form as sulphates and phosphates of the alkalies and alkali earths, they are ever present as part of the inorganic salts, or mineral matter, so abundant in animal and vegetable tissues. Iron likewise occurs both in organic combination, as in ferruginous nucleo-proteids and in the pigment of the red blood corpuscles, and in the form of simple iron salts. The ideas of physiologists were revolutionized, and physiological chemistry took on new dignity, when it was seen that the various chemical substances—both simple and complex—formed in the tissues of living organisms could be constructed in the laboratory by comparatively simple methods. (See CHEMISTRY.) As a result, there rapidly developed great activity in the study of the chemical nature and chemical relationship of the organic compounds occurring in the body; methods were devised for producing them artificially; their genetic relationships were traced out; and much light was thrown upon the conditions attending their formation in the body. To-day the study of the chemical constitution of the various end products of catabolism formed in and excreted from the body has given most useful information regarding a host of chemical processes occurring in the organism, and has enabled the physiologist to trace out many of the individual steps in the breaking down of complex organic material. In other words, chemical methods and simple chemical principles are quite sufficient to explain the nature of the many processes going on in living organisms by which the life and activity of the organism are maintained.

The various chemical processes characteristic of living organisms may be divided into two main groups, viz., synthetic and analytic; i.e., building up and breaking down. Synthetical processes are most prominent in the vegetable kingdom. The plant cell alone has the power of building up complex organic compounds out of simple elementary substances. The most striking illustration of this constructive power is seen in the formation of proteid or albuminous material. This important constituent of every living cell, in part the chemical basis of protoplasm, is formed in the plant cell from simple inorganic substances. The carbonic acid of the atmosphere furnishes the carbon, hydrogen is drawn from the moisture, nitrogen from ammonia or nitrates in the air and water, oxygen from the air, sulphur and phosphorus from the sulphates and phosphates of the soil. From these elements proteid, the most complex organic substance known in nature, is constructed. As indicative of its chemical composition, we ascribe to it various formulas according to its exact nature, for there are many different proteids in both the animal and vegetable kingdoms. Egg albumin is represented by the formula $C_{204}H_{322}N_{52}O_{66}S_2$; vegetable globulin, by the formula $C_{292}H_{481}N_{90}O_{83}S_2$. Investigations in recent years have shown that there exist very subtle, though quite distinct, differences between proteids, which as yet cannot be detected by purely chemical methods. By means of a biological test (the precipitin test) it was demonstrated that proteids of the tissues of an animal of one species differ from those of another, and on the other hand that all proteids of one animal or of animals of the same species possess a certain degree of similiarity. This necessitates a change in our view of the difference between the function of animal and of plant cells. According to the older view the animal cell does not possess the power to synthesize proteid. At present it is evident that proteids of the foodstuffs are totally reconstructed before they are assimilated and transformed into body proteid. It is nevertheless true that in the animal kingdom synthetical processes are limited. An example of the most frequent type of synthetic reactions in the animal is presented by the formation of hippuric acid. Glycocoll and any benzoyl-containing compound, on passing through the kidney, are, under the influence of the epithelial cells of the kidney and the ever-present blood, made to combine, and hippuric acid results. This reaction may be formulated as follows:

$$\underset{\text{Glycocoll}}{CH_2(NH_2)COOH} + \underset{\text{Benzoic acid}}{C_6H_5COOH} =$$

$$\underset{\text{Hippuric acid}}{C_6H_5CO.NH.CH_2COOH} + \underset{\text{Water}}{H_2O}$$

In the animal body, however, analytical processes are most conspicuous. These analytical or destructive changes are of various kinds, such as *hydrolysis, oxidation, reduction,* etc. Examples of hydrolytic decomposition or change are perhaps best observed in connection with the digestive processes. Here the various classes of foodstuffs, under the influence of the digestive juices, are gradually transformed into more or less soluble and diffusible products well fitted for absorption. Proteid, e.g., is converted into a series of soluble proteoses and peptones —a transformation brought about by certain enzymes or ferments, such as pepsin and trypsin. The change, little understood, is termed "catalytic," since it is assumed to occur through mere contact of the enzyme; but what really happens is the taking on by the proteid of one or more molecules of water (hydrolysis) with subsequent splitting or cleavage of the molecule, and formation of a number of simpler products. Hence the products are frequently termed "hydrolytic cleavage products." A like transformation occurs in the digestion of starch with saliva or pancreatic juice, whereby soluble dextrins and sugars result, under the influence of the enzymes contained in the above secretions. Further, cane sugar, under the influence of the invert ferment secreted by the intestinal cells, is split into two molecules of a simpler sugar during digestion, as a result of simple hydration. The reaction which takes place may be represented as follows:

$$\underset{\text{Cane sugar}}{C_{12}H_{22}O_{11}} + H_2O = \underset{\text{Dextrose}}{C_6H_{12}O_6} + \underset{\text{Levulose}}{C_6H_{12}O_6}$$

Oxidation, another analytical process, serves a different purpose. Oxidation is the principal method by which the organic material of the tissues is broken down. Naturally this oxidation is brought about in some measure by the oxygen coming to the tissues in the arterial blood; but oxygen itself does not possess the power of oxidizing tissue constituents, and as yet the exact process by which the oxygen of the blood is caused to act on tissue components remains a subject of speculation. There are present in tissues of the animal body, as well as in vegetable tissues, peculiar ferments such as the oxidases which are capable of inciting oxidation. Many of the oxidation processes going on in the animal body seem to be connected with the life of the cell of the tissue or organ involved, but it is quite probable that in most, if not in all, such cases there are really oxidizing enzymes present, generated no doubt by the activity of the cell. The process of oxidation is the means by which the organism is furnished with that energy which is required to maintain its vital functions. The potential energy of the foodstuffs, the fuel of the animal body, is derived from the sun. As Bunge has stated it, "all the potential energy of vegetable substances is converted sunlight." The foodstuffs, whether animal or vegetable, are rendered capable of absorption by the several digestive processes. After passing into the blood or lymph, they are carried to the various organs and tissues of the body, where they are assimilated, and, by processes of anabolism, are built up, in part, into the tissues of the body, in part directly burned with liberation of their energy. This energy shows itself either in the form of heat or as work—i.e., muscular movements, or organized movements by which we perform work. The sum of the work performed by an animal, and of the heat which it gives out, is the exact equivalent of the potential energy contained in the food taken in, or in the material of the tissues burned up. This energy is liberated as the result of oxidation, and the energy is essentially the same in amount, whether the oxidation is carried on in the body or by combustion outside of the body. In other words, the amount of energy liberated is the same whether the foodstuff or its equivalent is burned directly to carbonic acid and water, or whether it is broken down gradually, step by step, until the final stage in the oxidation is reached. A man of average body weight, doing an average amount of work, must consume food material sufficient to yield 3000 kilogram-degree units of heat, or 3000 large calories, if he is to keep himself in equilibrium. The amount of heat required to keep the body continuously at 38° C., no matter what the temperature of the surrounding air, is by no means small, and, in addition, it is to be remembered that all the involuntary muscular movements, such as the beating of the heart, the muscular movements involved in respiration, and the constant movements of the intestinal walls, involve a large expenditure of energy which is quite independent of the energy required for muscular contraction when some task is to be performed. Consequently, in the case of an active man, the amount of chemical activity involved in the various processes incidental to the liberation of the required energy is large. The rôle of the process of reduction in furnishing the organism with the required heat and energy is as yet not known, but that the process does occur in the animal body is evidenced by the formation of the pigments of the urine and of the fæces from that of the bile.

The efficient and economical liberation of this energy in the body is dependent not only upon the completeness of digestion, the readiness of absorption and assimilation, and the efficiency of the circulation, but much depends also upon the proper working of the excretory apparatus. Waste products formed in oxidation must be removed, otherwise the physiological rhythm is interfered with. The ashes and clinkers must be taken from the human furnace if the fires are to be kept burning freely. For this purpose the skin, lungs, and kidneys are efficient channels, and the study of the excretions poured out through these several emunctories throws much light upon the extent and character of the oxidation going on in the body. It is a truism that the chemical study of the urine throws light especially upon the extent and character of the proteid metabolism going on in the body. The nitrogenous waste products—those which come from the breaking down of proteid material—find their outlet through the urine, and abnormalities in this excretion have a significance easy of interpretation.

It must not be overlooked, in considering the domain of physiological chemistry, that its scope is a broad one. The chemical processes going on in the animal body, e.g., are multitudinous. There are few functions in which physiological chemistry does not play some part, and the light which its study throws upon physiology as a whole can hardly be estimated. The phenomenon of muscular contraction is in great part chemical. Until the discovery of muscle plasma and the contained myosinogen by Kühne,

physiologists were in the dark regarding what took place inside the muscle fibre during contraction and after the death of the fibre. The discovery of glycogen in the liver by Claude Bernard, and the relationship of glycogen to the sugar of the blood, opened up the whole subject of the glycogenic function of the liver and thereby paved the way for a clearer understanding of the function of carbohydrate material in the body. The subject of secretion and the mode of formation of the digestive enzymes from their precursors, the zymogens, inside the cells of the secreting glands, was unraveled in great part through the application of chemical methods by such eminent physiologists as Corvisart, Kühne, Heidenhain, and Langley.

The study of lymph formation was rendered possible through the use of chemical methods, and the same methods of study have taught physiologists all that is known regarding the chemical nature of the blood, its various chemical constituents, and the various parts played by the serum, plasma, and corpuscles in the coagulation of the blood and in many normal and abnormal processes.

Metabolism in the liver—aside from glycogen formation—has had much light thrown upon it by chemical methods of study, and the whole broad subject of internal secretion and the ductless glands has been helped forward at a rapid pace by the work of physiological chemists, who have unraveled in part the chemical nature of the specific substances responsible for the physiological action of the various secretions.

Lastly, mention may be made of the part which physiological chemistry is now playing in the development of our knowledge concerning bacteriology and the infectious diseases. The microörganisms which are responsible for the various infectious diseases now preying on mankind owe their action in great part to specific chemical poisons which they produce. The chemical nature and physiological action of these poisons is being carefully studied, and, with fuller knowledge of their properties, ready methods for combating these diseases will be available. Even to-day our knowledge of these toxins is considerable, and more than one antitoxin has been discovered by which immunity can be secured or a logical method of treatment devised. Here is a large and practical field for the application of the principles and methods of physiological chemistry, and we may hope in the near future for such an extension of our knowledge of bacterial poisons as will enable us to cope successfully with these destroyers of health and life. A study of physiological chemistry promises expansion of knowledge concerning the normal changes occurring in the organism, and also affords a means of recognizing the approach of abnormal conditions, the forerunners of disease and death.

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CHEMISTS AND DRUGGISTS, Laws Relating to. In the United States the terms "apothecaries," "druggists," "pharmacists," and sometimes "chemists," are used with little or no distinction as names of those licensed to compound and sell drugs and medicines upon prescriptions of physicians or otherwise; in Great Britain, however, a legal distinction exists between the three classes—apothecaries, chemists and druggists, and pharmaceutical chemists.

The Law of 1868, designed especially to restrict the sale of poisons, made the classification just referred to for the sake of public convenience. Under this law apothecaries are from practically a lower branch of the medical profession, having the right to practice in certain classes of cases; chemists and druggists are those who have passed an examination at the pharmacy college and have received a license to sell and compound drugs and poisons; pharmaceutical chemists are those who have passed a second, "major," examination, and who constitute a higher branch of the profession. Laws relating to the business of selling and compounding drugs and medicines, under whatever name the business is carried on and whether in the United States or in England, are either laws limiting and defining the qualifications of those who may carry on the business, or restricting the sale of poisons or intoxicating liquors, or defining the liability for injuries caused by carelessness or ignorance. Generally speaking, the statutes of the States in the United States require a person wishing to adopt the profession of druggist either to pass an examination before a board appointed for that purpose, or to produce a diploma from a college of pharmacy recognized as having authority and weight. Either State or city ordinances prescribe the conditions under which poisons may be sold, directing, e.g., that certain kinds of labels be used on bottles containing the poisons, and that the names of persons purchasing be entered in a book open for public inspection. Druggists are sometimes also forbidden to sell certain drugs or liquors except on physicians' certificates. Gross carelessness on the part of a druggist in compounding a prescription, if it leads to death or serious injury, is a penal offense; if death ensue, the offense usually amounts to manslaughter.

CHEM'ITYPE. A process invented by C. Pül, of Copenhagen, in 1843, for producing on a metal plate an engraving in relief. A design is etched or engraved on a polished plate of zinc, and the depressions filled with a melted metal, the composition of which is secret, which is then reduced to the exact level of the zinc, so that the design appears as if inlaid. An acid is then applied to the surface, which dissolves the zinc, leaving the inlaid metal in relief, and from which an electrotype may be made, or the orig-

inal may be used directly on the printing press. The process was formerly employed for printing maps, but is now seldom used. The term "chemitype" has also been applied to several processes for obtaining drawings or impressions from an engraved plate in relief, suitable for printing on an ordinary press.

CHEMNITIUS, MARTIN. See CHEMNITZ, MARTIN.

CHEMNITZ, kĕm'nĭts (from OCh. Slav. *kamenĭ*, Lith. *akmu*, stone, Gk. *ἄκμων, akmōn*, anvil, Skt. *aśman*, stone). One of the foremost manufacturing towns in Germany, and the third in population, in the Kingdom of Saxony, situated in a fertile valley at the base of the Erzgebirge, on the river Chemnitz, about 38 miles west-southwest of Dresden (Map: Germany, E 3). The city consists of an older inner town, almost circular in form, intersected by narrow streets, completely surrounded by modern suburbs. Among its numerous squares and public places are the Hauptmarkt, which contains the Old Rathaus, a handsome late Gothic structure; the Neumarkt; the Königs-Platz, with the church of St. Peter and the Royal Technical Schools; the Stadtpark, and the gardens surrounding the castle pond. Its notable public buildings include the church of St. James, of the fifteenth century, restored in 1880; the New Rathaus, post office, Imperial bank, law courts, Central Railway station, the city theatre, King Albert Museum, the large cattle market, and the castle. The city owns its water, gas, and electric works, maintains a municipal pawnshop, and is the seat of government of the district. Its educational institutions include a gymnasium, numerous schools for the technical branches, including schools of agriculture, commerce, engineering, and the various crafts, in addition to several elementary schools. There is also a municipal library of over 35,000 volumes. Chemnitz has grown from a small city to be called "the Saxon Manchester." Its locomotive and machinery construction shops employ over 20,000 men; ranking with them is the manufacture of textiles which are largely exported to the United States. It also has large manufactories of carpets, dyestuffs, chemicals, leather, vehicles, and beer. Its growth during the past 20 years has been phenomenal. Pop., 1900, 207,000; 1910, 287,340.

Chemnitz was originally a settlement of the Wends; but the present town grew up around a Benedictine monastery which Emperor Lothair founded in 1125. By 1300 it had a fully organized communal government and in 1414 it received municipal rights. It possesses, as do few other German cities, an unbroken history as an industrial city from the thirteenth century, when bleacheries were first established, to the present. In the Thirty Years' War Chemnitz was laid waste; but later in the century the introduction of cotton manufacturing revived its prosperity. Consult Zöllner, *History of the Manufacturing and Commercial City of Chemnitz* (Chemnitz, 1891).

CHEMNITZ, kĕm'nĭts, **KEMNITZ, CHEMNITIUS,** MARTIN (1522–86). Next to Luther and Melanchthon the most distinguished German Protestant theologian of the sixteenth century. He was born at Treuenbrietzen, in Brandenburg, Nov. 9, 1522; studied at Frankfort-on-the-Oder and Wittenberg; and in 1548 became rector of the cathedral school of Königsberg. About 1550 he began to devote himself seriously to theology, and in 1553 went back to Wittenberg, where he became familiar with Melanchthon and delivered prelections on *Loci Communes*, whence sprang his own *Loci Theologici*, which for method and learning excels all similar books of the same age. In 1554 he was made a preacher in Brunswick, where he wrote his *Repetitio Sanæ Doctrinæ de Vera Præsentia Corporis et Sanguinis Domini in Cœna Sacra* (1561), in which he defended Luther's view of the Lord's Supper against that of the Swiss reformers; the *Theologiæ Jesuitorum Præcipua Capita* (1562); and the *Examen Concilii Tridentini* (4 vols., 1565–73), a work in which he argued with remarkable acuteness and learning against the dogmas of the Church of Rome. His *Corpus Doctrinæ Prutenicum* (1567), written in conjunction with Joachim Mörlin, became a standard work of divinity among the Prussian Protestants. But his greatest ecclesiastical achievement was inducing the Saxon and Swabian churches to adopt as their confession of faith the *Concordienformel*, and thus extending and consolidating the creed of Luther. He died in Brunswick, April 8, 1586. For his life, consult C. G. H. Lentz (Gotha, 1866). Consult also R. Mumm, *Die Polemik des M. Chemnitz gegen das Konzil von Trent* (Leipzig, 1905).

CHEMNITZ, MATTHÄUS FRIEDRICH (1815–70). A German poet, born in Barmstedt, Holstein. For a number of years he was editor of the *Hamburger Nachrichten*. He is best known as the author of *Schleswig-Holstein meerumschlungen*, which, as set to music by Bellmann, was extremely popular throughout Germany, particularly in 1848–49 and 1863–64.

CHEMNITZER, or **KHEMNITZER,** kĕm'nĭt-sĕr, IVAN IVANOVITCH (1745–84). A Russian fabulist, born at Yenotayevsk, Astrakhan, the son of a German physician of Chemnitz, who had served in the Russian army under Peter the Great. He participated in the campaigns of the Seven Years' War and afterward devoted himself to mining engineering and subsequently visited Germany, Holland, and France. Upon his return he accepted a position as Consul to Smyrna, where an attack of melancholia hastened his death. In contradistinction to Sumarokov and others among the earliest fabulists of Russia, whose works are essentially satires, Chemnitzer was the first to introduce the genuine fable into Russian literature. He was thus one of the predecessors of Krylov (q.v.), having brought the Russian fable to its greatest perfection. Although to some extent translations or imitations of La Fontaine and Gellert, his works show considerable originality. Their good humor, vivacity of dialogue, simplicity, and distinctively national character have greatly endeared them to the Russian people. Among his best original fables are *The Metaphysician*, *The Tree*, *The Peasant and his Load*, and *The Rich Man and the Poor Man*. The latest and best edition of his works is that of Grot (St. Petersburg, 1873).

CHEMOSH, kē'mŏsh. The national god of the Moabites, mentioned as such in the Bible (Num. xxi. 29; Jer. xlviii. 46) and on the Moabite Stone. He bears the same relation to the Moabites as the national deity Yahwe does to the Hebrews. Little is known of the worship of Chemosh; the Moabite Stone tells that Mesha, King of Moab, built a high place for the worship of his god; and when Solomon, as a political symbol of his control over surrounding na-

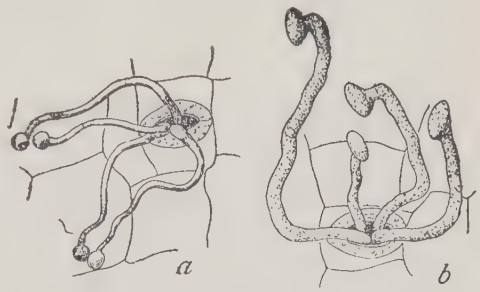
tions, introduced the official cults of other deities by the side of the national Yahwe, he also built a high place in Chemosh's honor. From the fact that the King of the Moabites offered up his son to the god (2 Kings iii. 27), it has been conjectured that human sacrifices formed part of the worship of Chemosh. The Ammonites are apparently said to have worshiped Chemosh (Judg. xi. 24), but the passage (Judg. xi. 12–28) in which this statement occurs is probably an interpolation and should refer to Moab. Chemosh was formerly variously identified with Saturn or Mars, but these identifications have no value. The etymology of the name is not known. Consult E. Renan, *Mission de Phénicie* (Paris, 1864); G. A. Barton, *A Sketch of Semitic Origins* (New York, 1902).

CHEM'OSYN'THESIS. See PHOTOSYNTHESIS.

CHEM'OTAX'IS (Neo-Lat., from Gk. χημεία, *chēmeia*, alchemy + τάξις, *taxis*, arrangement, from τάσσειν, *tassein*, to arrange). The sensitiveness of free-swimming organisms to certain chemical substances, by virtue of which they approach or recede from the source of the substance. Chemotaxis seems to be fundamentally the same as chemotropism (q.v.), though the reaction is unlike. It has been held that in many organisms the unequal stimulation of different parts of the creature by the diffusing chemical substance causes the motor organs on one side to act more strongly than those on the other. Thus the body is swung around in the medium until it is so placed that all sides are equally stimulated. This condition occurs only when the axis of the organism coincides with some of the lines of diffusion of the stimulating chemical compound. Since the motor organs still act, but now equally on all sides, swimming must take place either towards or away from the source of diffusion. More recent study, however, has shown that with certain substances the organisms, swimming in all directions, accidentally pass into the constantly increasing sphere of influence of the diffusing substance; but as they swim through it, reach the limit, and are about to pass out into the pure solvent again, a reaction occurs which reverses the movement of the motor organs. The creatures thus seem to rebound from the invisible limit whenever they reach it. The region occupied by the diffusing substance therefore acts as a trap into which they may pass but from which they cannot escape. Other substances repel a given organism. In this case the reversal of motion occurs as soon as they reach the boundary of the region occupied by the diffusing particles.

Chemotactic sensitiveness is observed, among plants, in zoöspores of various algæ and fungi, in sperms of mosses and ferns, and in many bacteria. Fern sperms are attracted by malic acid and its salts, as well as by many salts of the common mineral acids. Sperms of mosses are attracted by cane sugar. Such reactions may be demonstrated as follows: Very fine capillary glass tubes are prepared, of such diameter that the sperms can swim easily into them. These are cut into lengths of about 1 centimeter, and one end of each is sealed in the flame. These tubes are submerged in the solution to be tested, and the whole is exhausted of air under an air pump. Air is then allowed to reënter the receiver, and the fluid is forced into the tubes, leaving only a small bubble of air at the closed end. A drop of water containing the sperms is now mounted on a microscopic slide in the ordinary way. The tubes just described are placed under the edges of the cover glass, their open ends inside. After a short time the sperms may be observed swimming towards and into the tubes or away from them. The mode of response of an organism is profoundly influenced by the concentration of the substance. See TROPISM.

CHEMOT'ROPISM (from Gk. χημεία, *chēmeia*, alchemy + τροπή, *tropē*, a turning, from τρέπειν, *trepein*, to turn). The sensitiveness of certain plant organs by virtue of which they change the direction of their growth when acted upon by chemical substances. If an organ bends so as to grow towards the source of a substance, it is said to be positively chemotropic



CHEMOTROPISM.

Positive chemotropism. *a*, hyphæ of a fungus, *Mucor*, entering stoma of leaf of *Tradescantia* which has been injected with ammonium chloride; *b*, pollen tubes of *Digitalis* entering stoma of same, injected with 4 per cent solution of cane sugar. (After Miyoshi.)

to that substance; if it turns away from it, it is negatively chemotropic. The organ tends to place itself so that it shall be equally stimulated on all sides by the diffusing chemical substance. In elongating organs, such as roots, fungous filaments, etc., the reaction is one of growth; the curvature is brought about either by the retardation of growth on one side or by its acceleration on the other, or by both together. Of course the side on which retardation occurs becomes concave; the opposite side convex. If a root is positively chemotropic towards a substance, that side which comes in contact with the most of the substance—as the latter diffuses through the medium in which the root is growing—will be retarded in growth and become concave. If the root is negatively chemotropic, acceleration of growth will take the place of this retardation, and that side will become convex. Thus the root tip is turned either towards or away from the source of the diffusing compound, and the bending continues until all sides are equally stimulated. The reaction is seen in case of many gases, liquids, and solids when dissolved in water. The term "aërotropism" (q.v.) has been applied to the power of responding to gases in this way. An example of chemotropism is the following: If fungi be grown in a plate of moist gelatin, and an excess of sugar be added to a certain part of the gelatin plate, the filaments will bend and grow from all parts of the medium towards the part which is richer in sugar. The diffusion of the sugar from this region into the surrounding material is the occasion of the response. For chemotropism in animals, see TROPISM, *Chemotropism*.

CHEMULPO, chĕ-mŭl'pō. The most important treaty port of Korea, situated on the west coast, at the mouth of the Han River, about 25

miles southwest of Seoul, whose port it is (Map: Korea, G 4). There are native, Chinese, Japanese, and European quarters. The port was opened to Japanese commerce in 1881 and to that of the world in 1883. In 1911 the imports amounted to over $7,227,000, consisting chiefly of textiles, silk, metals, railroad material, and petroleum; the exports amounted to over $1,948,000, consisting mostly of rice, beans, ginseng, hides, wheat, and paper. In 1900 a railroad connection was established with Seoul. Improvements by the Japanese have made the river navigable. Pop., 1900, about 27,000 (4200 Japanese, 1260 Chinese, and 86 Europeans and Americans); 1909, 25,167. In October, 1906, there were 13,603 Japanese. At the outbreak of the Russo-Japanese War a Japanese force landed in Chemulpo, Feb. 8, 1904. On the following day a Japanese squadron under Admiral Uriu destroyed a Russian cruiser and gunboat outside the harbor.

CHEMUNG (shĕ-mŭng′) **FORMATION.** A series of sandstones and shales of marine origin, constituting the uppermost member of the Devonian system in southern and western New York and eastern Pennsylvania, and deriving its name from the Chemung Narrows, near Elmira, N. Y., where the formation was first described. The Chemung strata formed the top of the "New York system" of the early New York State Geological Survey. It succeeds the Portage formation, which it conformably overlies, and which it resembles in the shallow-water character of most of its deposits. The rocks are mostly shales, though sandstones are frequent. In the vicinity of its original locality, near Elmira, the Chemung formation has a thickness of about 1500 feet; it thins westward towards the Pennsylvania-Ohio line, where it disappears. Towards the east it changes its character, the marine deposits giving way to the estuarine and brackish-water deposits of its littoral facies, the Catskill formation (q.v.). Southward, through eastern Pennsylvania, the thickness of the marine deposits increases, and along the northern Appalachian Mountains the formation is from 3500 to 5000 feet thick.

The Chemung rocks, as a rule, abound in fossil contents. Brachiopods are most abundant, in places forming whole layers of rock, where the shells were washed together by currents and strewn over the shallow bottoms. They include forms belonging to the genera *Spirifer, Rhynconella, Atrypa,* and *Productella.* Land plants, prophetic of the forms seen in the later coal measures, are common in the more easterly portions of the formation, especially in the estuarine beds of the Catskill series, where a large fern, *Archæopteris* (q.v.), is often found. At several localities in western New York have been found large numbers of Dictyospongidæ (q.v.), allies of, and probably when alive just as beautiful as, the modern glass sponge (*Euplectella*). Some phyllocarid crustacea have been found, and in a few localities "fish beds" have yielded good examples of *Holoptychius, Bothriolepis,* etc. The economic products of the Chemung consist of building stone, and oil and gas in the western counties of New York.

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CHENA, chē′nȧ (Hind.). The Hindu name of the most common and widespread species (*Ophiocephalus striatus*) of the "walking" or serpent-headed fishes. See Walking Fishes.

CHENAB, chē-näb′ (Pers., gathering of waters). The largest of the five rivers which give name to the Punjab (q.v.), British India (Map: India, B 2). It rises at an altitude of 14,000 feet above sea level in the western Himalayas, flows through the Ritanka Pass, and after a southwest direction enters the plains of the Panjab at Riasi. It receives from the right the Jhelam, and from the left the Ravi and the Ghara, with its affluents, the Sutlej and the Beas. After its junction with the Ghara, near Uchh, it is called the Panjnad ('five rivers') and flows into the Indus near Mithankot. Its length is about 750 miles. It is navigable by rafts 50 miles below Riasi.

CHENAVARD, shȧ′nȧ′vär′, Paul Joseph (1807–95). A French painter. He was born in Lyons, studied at the Ecole des Beaux-Arts, Paris, under Hersent, Ingres, and Delacroix, and passed two years in Italy copying the old masters. A student also of philosophy and æsthetics, he dreamed of reforming painting and making it play a political and social rôle. He was called the "orator in painting," and by his witty and learned conversation exercised a great influence over his contemporaries. After the revolution of 1848 he began a series of mural decorations in grisaille representing the history of humanity, but, owing to political conditions, he was forced to abandon this long-cherished project at the end of three years. Some of the cartoons for this work have been preserved in the museum at Lyons, which also possesses a number of his paintings, such as "Hell," "Purgatory," "Paradise," "The Deluge," and the "Death of Socrates." Another important work is the "Divina Tragedia," or "End of all Religions," in the French Senate. His drawing is excellent, but his contempt for color often makes his work appear cold and heavy. Consult Germain, *Les artistes lyonnais* (Lyons, 1910).

CHE′NERY, Thomas (1826–84). An English journalist and Arabic scholar. He was born in Barbados, was educated at Eton College and Caius College, Cambridge, and became correspondent for the London *Times* in the Crimean War. Afterward he became a writer of editorials and in 1877 succeeded John T. Delane as editor of the *Times.* He was an excellent Arabic and Hebrew scholar, was professor of Arabic at Oxford from 1866 to 1877, and was a member of the company of the Old Testament revisers. He served for several years as secretary to the Royal Asiatic Society and published a translation of the *Six Assemblies* of Hariri (1867) and an edition of the *Machberoth Ithiel* of Harizi (1872).

CHE'NEY, Charles Edward (1836–1916). A bishop of the Reformed Episcopal church in America. He was born in Canandaigua, N. Y., and graduated at Hobart College in 1857 and two years later at the Theological Seminary of Virginia. He was ordained to the Protestant Episcopal priesthood and in 1860 became rector of Christ Church, Chicago. For refusing to use the word "regenerate" in the baptismal offices, he was tried and suspended by an ecclesiastical court, and when he refused to yield was deposed from the priesthood. Soon afterward (in December, 1873) he was chosen Assistant Bishop, and afterward Bishop, of the Reformed Episcopal church, then newly organized, and became again rector of Christ Church, Chicago, the parish following its pastor into the new communion. His published works include: *Twenty-eight Sermons* (Chicago, 1880); *A Word to Old-Fashioned Episcopalians* (Philadelphia, 1884); *What do Reformed Episcopalians Believe?* (1888); *A King of France Unnamed in History* (1903); *The Enlistment of the Christian Soldier* (Chicago, 1893); and *The Second Norman Conquest of England* (1907).

CHENEY, Edna Dow. See Cheney, Seth W.

CHENEY, John. See Cheney, Seth W.

CHENEY, John Vance (1848–1922). An American librarian, poet, and essayist, born in Groveland, N. Y. After practicing law for a year in New York, he removed to San Francisco (1876), and became librarian of the Free Public Library from 1887 to 1894. From 1894 to 1899 he was librarian of the Newberry Library in Chicago. His publications comprise several volumes of poems, including: *Thistle Drift* (1887); *Queen Helen and Other Poems* (1895); *Out of the Silence* (1897); *For Thinking Hearts* (1901); and two volumes of essays: *The Golden Guess* (1893), *That Dome in Air* (1895); *At the Silver Gate* (1911). He edited the *Caxton Club Scrap-Book* (1904).

CHENEY, Seth Wells (1810–56). An American draftsman and engraver. He was born in South Manchester, Conn., and, together with his brother John, studied painting under Isabey and Delaroche in Paris. They both practiced engraving also in Paris, and Seth Cheney's work, though not extensive, is noted for its charm of expression. In 1841 he opened a studio in Boston and soon obtained prominence through his portraits in crayon, being the first to practice this art on a large scale in the United States. He excelled especially in his ability to express character in individual heads. Among his best-known sitters are James Russell Lowell, Theodore Parker, and William Cullen Bryant. His widow, Ednah Dow Cheney (1824–1904), was a well-known author. She took an active part in the Freedmen's Aid movement, and was later a prominent advocate of woman suffrage.—John Cheney (1801–85) was probably the best American engraver of his day for illustrated holiday books. His heads of young girls, especially, are finely executed and very charming.

CHENG-TU, cheng-to͞o'. A Chinese city, capital of the Province of Sze-chuan, situated on the river Min, in the midst of a fertile plain (one of the largest in the Empire) and a rich mining region (Map: China, B 5). Famous in Marco Polo's time, it is still one of the richest cities in China, with clean streets and canals, carrying on a flourishing trade with the cities of the Yang-tze River valley. It has telegraphic and postal connection with many other places in the province, and railways to K'ui-chou-fu and farther east are under construction. Better-class overland roads connect the city with Ichang and the Yang-tze ports. In the arsenal, which has machinery of German and British make, rifles and cartridges of the Mauser pattern are turned out. It has a population estimated by some as nearly 1,000,000.

CHÉNIER, shā'nyā', André Marie de (1762–94). A French poet. He was born in Constantinople, where his father, Louis de Chénier, a historian of some note, was Consul General. André was sent in infancy to France and studied in Paris. His mother was Greek, and he had a strong predilection for Greek poets, from whom he adapted verses as early as 1779. In 1782 he entered the army, but resigned that year and gave himself up to study and poetry, writing idyls and planning longer works. His health failed from overstudy, and he passed 1785–86 in travel. On his return he conceived a passion for Madame de Bonneuil that inspired many of his elegies, remarkable for their classic purity of language and their restrained vigor of thought, and showing him an apt, probably the aptest, pupil of the Greek anthologists. He wrote also at this time, in imitation of Ovid, a poem on the "Art of Love"; a poetic theory of æsthetics, "L'Invention"; and a Lucretian philosophic poem, "Hermes," which remains a noble fragment; but "Susanne," a Miltonic treatment of the biblical legend, is little more than a preliminary sketch. None of this work was then published. In 1787 Chénier went as Secretary of Legation to London. This uncongenial post he resigned in 1790, and entered with patriotic zeal into the revolutionary movement, joining the moderate party as a lover of liberty and a hater of anarchy. He wrote a manifesto in this spirit for the Society of '89, which brought him a medal from Stanislas Poniatowski of Poland and fierce denunciation from Camille Desmoulins, in *Les révolutions de France et de Brabant.* In 1791 he wrote the *Jeu de Paume,* a superb Pindaric ode on the meeting of the Third Estate. The same year he was defeated in the election for the National Assembly. In 1792 his anti-Jacobin attitude involved him in sharp controversy, and the fall of the monarchy made him resolve to retire from politics and devote himself to study and art.

But the trial of the King brought him again to the front. He offered to share in the preparation of the King's defense and in the responsibility for it. Then, broken in spirit, he withdrew to Rouen and Versailles, whence he wrote the striking poems, "A Versailles" and "A Fanny." He could not resign himself to be a passive spectator of the Terror. On March 7, 1794, seized by agents of the Committee of Public Safety at the house of M. Piscatory, at Passy, he remained in Saint-Lazare prison till his execution, July 25. Here he wrote his most famous poems, an iambic denunciation of the Convention, and the exquisite "Jeune Captive," dedicated to his fellow prisoner, Mademoiselle de Coigny (later Duchess of Fleury). It is said that on his way to execution he recited to his fellow condemned, the poet Roucher, the opening lines of Racine's *Andromaque.* His last words are reported as: "I have done nothing for posterity, and yet I had something in me." He had indeed published only the "Jeu de Paume" and "Ode à Charlotte Corday," the

self-appointed executioner of Marat. His other poems were first edited in 1819 by Latouche. He became at once a restraining and chastening force in the new romantic poetry. He still stands among French poets as an envied model of formal purity, stately yet vigorous diction, and a lyric style that is warmly passionate, yet never obtrusively personal. The best edition —2 vols., *Poésies* and *Œuvres en prose*—of Chénier is that of 1872, ed. by Becq de Fouquières, not the earlier of 1862 of the same editor. Becq de Fouquières also edited *Documents nouveaux sur André Chénier* (1875). There is also a later edition of Chénier's *Prose* (1879) and *Poésie* (1889) by L. Moland. In 1899 appeared the two-volume edition, ed. by R. Guillard, and in 1908 the *Œuvres complètes* (2 vols.), ed. by Paul Dimoff. Consult: Becq de Fouquières, *Lettres critiques sur Chénier* (Paris, 1881); Valée, *Chénier et les Jacobins* (Paris, 1881); Rouquet, *Les Chénier, portraits, lettres, et fragments inédits* (Paris, 1891); Bertheleroy, *Eloge de Chénier* (1901); Haraszti, *La poésie d'André Chénier* (Paris, 1892); Morillot, *André Chénier* (Paris, 1894); Heller, *André Chénier* (New York, 1895); Faguet, *André Chénier* (Paris, 1902).

CHÉNIER, Marie Joseph Blaise de (1764–1811). A French poet and dramatist, the younger brother of André Marie de Chénier. He was born in Constantinople, was educated in France, and entered the army at 17, but soon left it, and at 20 produced *Azémire* (1784), a rather feeble tragedy. His *Charles IX*, however, excited in 1789 intense enthusiasm, its intrinsic merit being supplemented both by the occasion of the eve of the Revolution and by the genius of the great actor Talma, who achieved in it his first renown. This play is still acted. Other dramas, now forgotten, followed—*Henri VIII* and *Jean Calas* in 1791, *Caius Gracchus* in 1792. This last was proscribed for its anti-Jacobin phrase, "Laws and not blood," as was his *Timoléon* in the following year. He now became, as member of the Jacobin Club, a literary politician and political poet. He was successively member of the Convention, the Council of Five Hundred, the Tribunate, and of the Committees of Public Instruction, General Security, and Public Safety. Under Napoleon he was member of the Educational Jury of the Seine, and member of the Committee of Public Instruction (1803–06). He lectured on literature under Imperial patronage, and wrote, at Napoleon's command, a good *Tableau historique des progrès de la littérature française* (1808) that has been often reprinted. His most noteworthy poems are the national song, the *Chant du départ; Sur la mort de Mirabeau;* and *Sur l'oligarchie de Robespierre.* His best satires are the *Lettre à Voltaire* (1806) and the well-named *Epitre sur la calomnie* (1797), which may seem to illustrate the vice it denounces. Chénier also deserves remembrance for his work as translator, not only from the Latin and Greek poets, but from the German Lessing and the English Gray. Chénier's *Works* (*Œuvres complètes*) were collected in 8 vols. (1823–26). This edition contains notices of the author by Arnault and Daunou. Consult: C. Labitte, *Etudes littéraires* (1846); H. Welschinger, *Théâtre Révolutionnaire* (1881); A. Lieby, *Etude sur le Théâtre de Marie-Joseph Chénier* (1902); Ernst Peters, *Marie-Joseph Chénier als Kritiker und satirischer Dichter* (Leipzig, 1911).

CHENILLE, shê-nēl′ (Fr., caterpillar). A thick, velvety, tufted cord of silk, wool, or worsted, having short fibres or threads standing out at right angles from a central core of thread or wire and so bearing some resemblance to a woolly caterpillar. It is made by weaving four warp threads, or crossing three warp threads about filling threads that are afterward cut, and is used in trimming and bordering dresses, in ornamental sewing, and in manufactured trimmings, hangings, curtains, etc. In certain carpets chenille is used instead of yarn to form the filling. In embroidery also chenille is employed, being either laid on the surface of the stuff or drawn through with a needle. Chenille is used also in combination with wool or cotton in the manufacture of a cloth known as *chenille cloth.*

CHEN KIANG FU. See Chinkiang.

CHENNEVIÈRES-POINTEL, shâ-nĕv′yâr′ pwăn′tĕl′, Philippe, Marquis de (1820–99). A French administrator and art critic, born at Falaise. In 1851 he received the title of inspector of museums of the provinces, and in 1855 was chosen inspector general of exhibitions of art and was further given charge of the organization of the Salon at the Palais des Champs Elysée. He was also made manager of the Luxembourg Museum and in 1873 director of fine arts. His official capacity gave him the choice of artists and subjects for the decoration of the Panthéon. In 1874 he instituted a *prix du Salon,* whose recipient was given the opportunity to spend three years in study in Rome. He caused to be compiled a general inventory of the artistic treasures of France and made the teaching of drawing obligatory in the common schools. Among his numerous works on art and kindred subjects are: *Lettres sur l'art français* (1851); *Portraits inédits d'artistes français* (1853); *Les derniers contes de Jean de Falaise,* his own nom de plume (1860); *Essais sur l'histoire de la peinture française* (1894); *Les dessins du Louvre* (4 vols., 1882–84).

CHENONCEAUX, shê-nôn′sō′. A celebrated castle in the Department of Indre-et-Loire, France, built on piles in the river Cher, 4 miles east of Bléré. Its foundations were laid in 1515. It became crown property in 1535 and was a favorite occasional residence of Francis I. Henry II presented it to the celebrated Diana of Poitiers, who lavished much money on its embellishment, as did also Catharine de' Medici, after she had dispossessed Diana. Among the curiosities shown to the visitor is the mirror used by Mary Stuart, Queen of Scots, during her honeymoon spent at Chenonceaux with Francis II in 1559. The castle became private property in the eighteenth century and was long an attractive resort for the distinguished literary and scientific men of that period, including Montesquieu, Voltaire, Fontenelle, Buffon, Bolingbroke, and Rousseau. It escaped the ravages of the revolutionary period and is in a fine state of preservation.

CHENOPODIACEÆ, kē′nō-pō′di-ā′sê-ē (Neo-Lat. nom. pl., from Gk. χήν, *chēn,* goose + πούς, *pous,* foot). A family of dicotyledonous plants, consisting of herbs and half shrubs, with entire or divided leaves that are destitute of stipules. The flowers are inconspicuous, bisporangiate or monosporangiate; the perianth deeply divided, persistent; the stamens inserted into its base, opposite to its segments, and equal to them in number, or fewer; the ovary single,

free, or occasionally adhering to the tube of the perianth, with a single ovule attached to the base of the cavity; the style generally with two to four divisions. The fruit is membranous, inclosed in the perianth, which sometimes becomes fleshy. The seed has a curved or spiral embryo. There are about 75 genera and 550 known species, most of which have a weedlike appearance and grow in waste places. They are widely diffused over the world, but are particularly abundant in the northern parts of Europe and Asia. Beet and spinach are among the best-known and most useful plants of the family. Many are occasionally used as potherbs, as some species of *Chenopodium* and of *Orache*. See CHENOPODIUM.

As most of the species of this family frequent situations where the soil abounds in salt, necessitating a reduction of transpiration by the plant, many curious devices to prevent too abundant giving off of water are shown. In *Salicornia* the leaves are wholly suppressed, and the stem is curiously jointed. In many others the leaves are covered with peculiar scales or hairs, giving to the plant a mealy appearance, and structural differences are also present by which water is kept within the plant, so that there is not such a draining of the soil and consequent absorption of salt as would be expected in plants growing in salt marshes, etc. Two great groups are formed of the genera —the *Cyclolobeæ*, in which the embryo is ring-shaped or horseshoe-shaped, and *Spirolobeæ*, in which the embryo is spirally coiled. *Beta*, *Chenopodium*, *Spinacia*, *Atriplex*, *Kochia*, *Corispermum*, and *Salicornia* belong to the first group, and *Sarcobatus*, *Suæda*, and *Salsola* to the last.

CHENOPODIUM, kē'nō-pō'dĭ-ŭm (Neo-Lat., from Gk. *χήν*, *chēn*, goose + *πούς*, *pous*, foot). A genus of plants, comprising about 50 species, of the family Chenopodiaceæ, some species of which are well known by the name of goosefoot, as weeds in gardens, on heaps of rubbish, and in waste places. The species are mostly annuals, with entire or toothed leaves, which in some cases have a sort of mealy hoariness. They are mostly natives of Europe and of the temperate parts of Asia; but some are natives of America, into which, however, some of the common European species have found their way and are naturalized as weeds. The genus has perfect flowers with perianth of five small green scales, five stamens, and solitary flat seeds. The leaves of many species are used as a substitute for spinach, particularly those of the good-Henry, wild spinach, or English mercury (*Chenopodium bonus-henricus*), a perennial plant, native of Great Britain and other parts of Europe, often found growing by waysides, with stem more than a foot high, powdered with minute, transparent globules, and large, alternate, triangular, arrow-shaped, entire leaves. It is cultivated in some places, particularly in Lincolnshire, chiefly for the leaves, but the young shoots are also used as asparagus. *Chenopodium urbicum*, *Chenopodium album*, etc., annuals common in waste places, are also excellent substitutes for spinach. *Chenopodium olidum* and *Chenopodium vulvaria* (stinking goosefoot), annuals with an extremely nauseous odor, growing in waste places in Great Britain and elsewhere, especially near the sea, are popular medicines, in much repute as antispasmodics and emmenagogues. *Chenopodium botrys*, a native of the south of Europe, with pinnatifid leaves resembling those of the oak, and hence called Jerusalem oak, is in use as an expectorant and anthelmintic. It is not fetid like the species last named, but agreeably fragrant. *Chenopodium ambrosioides* has a strong aromatic odor, is used in Mexico instead of tea, and is much cultivated in France, an infusion of it being deemed useful in nervous disorders. A variety, known in the United States as wormseed, has a strong and somewhat aromatic odor, and enjoys a high reputation as a vermifuge. Its seeds are chiefly used, or the essential oil extracted from them, called oil of wormseed. More important than any of these species, as affording an important article of food in the countries of South America, of which it is a native, is quinoa (*Chenopodium quinoa*) (q.v.), the seeds of which are large and abundant and are extensively used. The coast blite (*Chenopodium rubrum*) and the strawberry blite (*Chenopodium capitatum*) are indigenous species along the seacoast, about the Great Lakes and westward. See QUINOA.

CHEN'OWETH, ALEXANDER CRAWFORD (1849–1922). An American engineer, born at Baltimore. He was educated at Dickinson College (A.B., 1868; LL.D., 1908) and Rensselaer Polytechnic Institute. He engaged in engineering in connection with the public works of Brooklyn and Washington and also for various railroads. In 1884 he prepared the foundation for the Bartholdi Statue of Liberty, Bedloe's Island, N. Y. In the following year he became assistant engineer to the Croton Aqueduct Commission, New York, and he was resident engineer in charge of Croton Aqueduct from 1885 until he was called (1895) to take charge of construction work for the United States Government at Sandy Hook. He invented the Chenoweth steel-concrete pile and the Chenoweth reënforced concrete revetment. He came to be regarded as an authority on foundation work and was awarded several medals and prizes.

CHENSTOCHOW, chĕn'stō-kôv'. A town of Russian Poland in the Government of Piotrkow, situated near the left bank of the Warthe, on the Warsaw-Vienna Railway, 135 miles southwest of Warsaw (Map: Russia, A 4). It consists of the old and the new town and is of considerable industrial importance. There are a number of large cotton mills, iron foundries, paper mills, breweries, flour mills, etc. Chenstochow owes its fame to the adjacent monastery of the Order of St. Paul the Hermit, situated on the Warthe and visited annually by over 400,000 pilgrims. The chief attraction is the picture of the Virgin, made of dark wood and known among the Catholics of Poland and Russia as the Black Virgin. It is supposed to be by St. Luke the Evangelist and to have been brought to the monastery at the end of the fourteenth century. The monastery was formerly fortified and in 1655 withstood a siege of 38 days by the Swedish troops. Pop., 1900, 53,650; 1910 (est.), 69,525. Its manufactures are of cotton and woolen goods, and paper. Trade is carried on in lithographs, printing, and religious emblems. It is also a cattle market.

CHENTUNG, LIANG-CHENG, SIR. A Chinese diplomat. He graduated at Phillips Academy, Andover, Mass., served as attaché of the Chinese Legation to the United States from 1886 to 1889, and was secretary to the Chinese special mission to Japan in 1895. In 1897 he was secretary of the embassy to the Diamond Jubilee in London,

and afterward served as secretary of embassies to Berlin (1901) and to London (1902). From 1903 to 1908 he was Chinese Envoy and Minister to the United States, Peru, Cuba, and Mexico.

CHENU, she-nȳ′, JEAN CHARLES (1808–79). A French naturalist and army physician. He was born in Metz and was educated in Paris. In 1829 he entered the sanitary corps of the army, and was in the Crimean War. During the Franco-Prussian War he was at the head of the ambulance corps. He published several valuable works on the medico-surgical statistics of modern French campaigns, edited the *Encyclopédie d'histoire naturelle* (31 vols., 1850–61), and wrote on shells.

CHEOPS, kē′ŏps. The name under which the second King of the fourth Egyptian dynasty, who probably lived about 2900 B.C. (Meyers' dating), and who built the greatest of the pyramids, is generally known. In that form the name is given by Herodotus. He is called Chembes by Diodorus, Saophis by Eratosthenes, and Souphis by Manetho; the hieroglyphic form is Khufu. He carried on successful wars against the Bedouins of the Sinai Peninsula. Herodotus' account, in which Cheops was made out to be an oppressive ruler and one who even sacrificed the honor of his daughter to obtain funds to complete his pyramid, is probably without foundation. So far as can be made out the Egyptians considered him a wise and powerful ruler, and to him the foundation of many temples was ascribed. In later times, in the twenty-sixth dynasty, together with Chephren, he was honored by a funerary cult. Various monuments bearing his name have survived; outside of Egypt there have been discovered only the inscriptions at Wady Magharah, near Sinai, where the old copper mines were worked under him. See EGYPT; PYRAMID.

CHEPHREN, or **KHEFREN,** kĕf′rĕn. A king of Egypt, the builder of the pyramid near Ghizeh, second in size of the great pyramids. The usual form of his name is taken from Herodotus; other Greek writers call him Chabyras (Diodorus). In Egyptian his name is Kha'-f-re'. The Greeks, misled by the similarity of the two names, commonly call him the brother of Cheops; but, according to Egyptian tradition, he was his son. The famous Sphinx near the pyramids was attributed to Chephren as early as about 1450 B.C., but whether correctly is much disputed.

CHEP'STER. A name used in England to designate the starling (q.v.).

CHEPSTOW, chĕp′stō. A market town and river port of Monmouthshire, England, on the Wye, about 15 miles east-northeast of Newport (Map: England, D 5). It lies between bold cliffs on a slope rising from the river. Its castle, dating from the eleventh century, but almost entirely rebuilt in the thirteenth, is well preserved. The river is notable for its high tides, which reach at times the height of 50 feet. In the neighborhood are the fine ruins of Tintern Abbey and Caldicot Castle. Pop., 1901, 3000; 1911, 2953. Consult Wakeman, "The Town and Castle of Chepstow," in *British Archæological Journal*, vol. x (London, 1855); Marsh, *Annals of Chepstow Castle* (Exeter, 1883).

CHEQUE, chĕk. See CHECK.

CHER, shâr (Gall. *Carus*, connected with Bret. *quer*, Lat. *carus*, dear). A tributary of the Loire, rising near Crocq, in the Department of Creuse, France (Map: France, S., G 2). It flows in a tortuous course for 200 miles, in a general northwest direction, until it joins the Loire below Tours. It is navigable to Vierzon, 47 miles from its mouth.

CHER. A central department of France, to which the river Cher gives its name (Map: France, N., H 6). Over 500 square miles is forest land; the rest, being mainly agricultural, furnishes abundant harvests of wheat, oats, hemp, vegetables, fruit, and pasturage for horses and cattle. It has many iron mines, saw mills, manufactories of porcelain, glass, linen, and faïence. The surface is mostly level. Climate is mild and pleasant. Area, 2819 square miles. Pop., 1896, 347,725; 1901, 345,543; 1906, 343,484; 1911, 337,810. Capital, Bourges. Consult Frémont, *Le département du Cher* (Bourges, 1862); Ménault, *Monographie agricole du Cher* (Paris, 1891).

CHERASCO, kâ-räs′kō. A city in the Province of Cuneo, north Italy, 36 miles south of Turin, near the confluence of the Stura and the Tanaro (Map: Italy, B 3). It has a domed church, two triumphal arches, a gymnasium, and a technical school; markets grain, wine, and truffles, and manufactures silk. The Peace of Cherasco in 1631 ended the Franco-Austrian War, and in 1796 the armistice of Cherasco was followed by the treaty in which the King of Sardinia ceded Savoy and Nice to France. Pop., 1901, 9054; 1911, 9312.

CHERASKOV, kâ-räs′kŏv, MIKHAÏL MATVEYEVITCH. See KHERASKOFF.

CHERAW, chĕ-rą′. A town in Chesterfield Co., S. C., 88 miles northeast of Columbia, on the Seaboard Air Line, the Atlantic Coast Line, and the Chesterfield and Lancaster railroads, and on the Pee Dee River (Map: South Carolina, E 2). The most important industries are planing and veneering mills, lumber plants, novelty works, cottonseed-oil mills, box factories, and sash and door factory. The water works and sewage system are owned by the town. During the Civil War Cheraw was for a time a depot of supplies for the Confederates. General Sherman captured it on March 3, 1865, and destroyed an immense amount of stores, including 3600 barrels of gunpowder. Pop., 1900, 1151; 1910, 2873.

CHERBOURG, shâr′bo͝or′. A fortified seaport town and arsenal of France, in the Department of Manche, at the mouth of the Divette River and at the head of a deep bay at the north extremity of the peninsula of Cotentin, on the English Channel (Map: France, N., D 3). Among its prominent buildings are the church of La Sainte Trinité (fifteenth century), lately restored, in front of which is a bronze statue of Napoleon I; that of St. Clement; the hôtel de ville; the marine library, containing 25,000 volumes; the museum and theatre. It owes its importance to its naval and commercial harbors. Napoleon I began to build the great defenses of this northern stronghold of France. His nephew, Napoleon III, developed his plans, but not with the original view of an invasion of England. Occupying a prominent position on the French coast, only some 60 miles removed from the southern shore of England, the harbor works have been extended, strengthened, fortified, and provided with cannon, the dockyards improved, and facilities for embarkation afforded. The vast breakwater of Cherbourg incloses a space of 3700 acres. In connection with its fortifications this breakwater assumes an importance that attaches to no other work of the kind in existence. At the apex of the angle formed by

the meeting of the two branches of the breakwater, or *digue*, there is a central fort or battery, measuring 509 feet on the inner line of the parapet, which forms a flat semiellipse. The circular forts at the extremities of the breakwater are remarkably well placed for purposes of defense. Behind the centre battery there is an elliptical tower, measuring 225 feet on the major and 123 feet on the minor axis. The entrances to the harbor are around the end of the mole; and the passages are further defended by the fortifications of the Île Pélée and by the batteries of La Roche Chavaignac and Fort Querqueville. A series of coast redoubts, and the two large fortifications of Les Roches des Flamands and du Homet, are situated behind this outer zone of defense. Besides batteries on the mole, Cherbourg is defended by many regular forts and redoubts. The town itself is commanded by the towering fort and mountain of La Roule and Fort d'Octeville, on the heights behind. The military port of Cherbourg comprises a small outer harbor, the entrance to which is 206 feet wide at its narrowest point. This harbor communicates by means of a lock with a floating basin, 957 feet long by 712 feet wide. The outer harbor has four building slips for first-class ships, besides some smaller slips and a fine graving dock. In August, 1858, an inner floating harbor was opened. This harbor, entirely cut out of solid rock, has a length of about 930 yards and a breadth of 437 yards and is surrounded by building slips and capacious graving docks. Cherbourg has a safe and commodious commercial port quite distinct from the other, situated on the southeast. Among its numerous industries are shipbuilding, sugar refining, lace making, tanning, and dyeing. The United States is represented by a consular agent. Communal pop. (census of March 5, 1911), 43,731.

Cherbourg is a town of Gallic origin, and is identified with the Roman Coriallum. In the Hundred Years' War it was captured by the English (1418) after a siege of four months, but was regained by Charles VII in 1450, after which it remained in the hands of the French. Louis XIV attempted to make it a military fort, but the works were dismantled in 1689. In 1758 the English inflicted severe damage upon the fortifications. On June 19, 1864, the Confederate cruiser *Alabama* steamed out of Cherbourg harbor to meet the Federal warship *Kearsarge*, and during the historic fight that ensued was destroyed about 9 miles from the harbor.

CHERBULIEZ, shâr'bụ'lyâ', Antoine Elisée (1797–1869). A Swiss political economist and jurist, professor of economics in Geneva and afterward in the National Polytechnic School in Zurich. He was a contributor to cyclopædias and periodicals, and the author of *L'Utilitaire* (1828–30); *Théorie des garanties constitutionnelles* (1838); *Riche ou pauvre* (1840); *De la démocratie en Suisse* (1843); *Le socialisme c'est la barbarie* (1848); *Précis de la science économique* (1862).

CHERBULIEZ, shâr'bụ'lyâ', Charles Victor (1829–99). A cosmopolitan French novelist and miscellanist, son of a professor in Geneva, where he was born and where he studied history and philosophy, as well as in Paris, Bonn, and Berlin. He taught, and then traveled widely, gathering material that he afterward used in social and political essays and also in his novels. Of his writings the first, *Apropos d'un cheval* (1860), was archæological; others were scientific. He first caught popular favor by *Le comte Kostia* (1863). The best of a multitude that followed in quick succession are: *Prosper Randoce* (1868); *L'Aventure de Ladislas Bolski* (1869); *Miss Rovel* (1870); *Meta Holdenis* (1873); *Samuel Brohl et Cie* (1877); *Noirs et rouges* (1881); *Jacquine Vanesse* (1898). He is best in cosmopolitan characterizations of Russians, Poles, English, Germans, or Jews—persons of exaggerated independence, incoherent and improbable as the plots in which they figure. Cherbuliez's descriptions are varied and clever, but superficial; his psychology is weak and conventional; the story may be interesting, but the ending is apt to be trivial. He grazes burning questions of sociology or science, deftly adapting his treatment to currents of popular interest, and with a sharp, cynical, and rather narrow irony. Cherbuliez became an Academician in 1881. Several of his novels have been popular in English translations. His essays, under the assumed name of G. Valbert, are in part collected under various titles and deal with politics, literature, and art. Consult the *Eloge*, by E. Faguet, on his succession to Cherbuliez's seat in the French Academy (1900).

CHÉRET, shâ'râ', Jules (1836–). A French lithographer and mural painter. He was born in Paris, was early apprenticed to a lithographer, but as a draftsman was self-taught. He was the first to convert poster designing into a real art, opening up an entirely new field with his posters in color. His work is original and charming, his drawing skillful, his color pleasing and harmonious. Among his best posters are "Bal de Valentino," "Le petit Faust," "Pan," "Scaramouche," "Loie Fuller," "Vin Mariani," "Jardin de Paris." Cheret shows extraordinary talent as a mural painter in such decorations as the dance scenes entitled "Life's Joys," in the Hôtel de Ville, Paris, in which the grace of the rococo is combined with modern French elegance. Consult Alexandre, *Jules Cheret, Catalogue de ses œuvres, etc.* (Paris); Kahn, in *Art et decoration* (ib., 1902).

CHERETHITES AND PELETHITES, kĕr'ê-thīts, pĕl'ê-thīts. Two peoples settled in the south of Palestine and furnishing a bodyguard for David. They are mentioned together in 2 Sam. viii. 18; xv. 18; xx. 7, 23; 1 Kings i. 38, 44; 1 Chron. xviii. 17. In all these passages the troops are referred to. The Cherethites alone are mentioned in 1 Sam. xxx. 14; Zeph. ii. 5; Ezek. xxv. 16; and probably Ezek. xxx. 5. The Greek and Syriac versions translate Cherethim as "Cretans," and they are evidently regarded as belonging to the Philistines. The Pelethites are probably only a dialectical pronunciation of Philistines. There is nothing improbable in David's having a bodyguard made up of Philistines. Consult R. Kittel, *History of the Hebrews* (London, 1896); S. R. Driver, *Notes on the Hebrew Text of Samuel* (London, 1890).

CHERIBON, shĕr'ĭ-bŏn. The capital of the residency of that name, situated on the northern coast of Java, at the mouth of the Cheribon River, about 125 miles southeast of Batavia (Map: East India Islands, C 6). It has a good harbor, and, although it has lost to a great extent its commercial importance, it still has a considerable trade in coffee, indigo, and teakwood. It is the seat of one of the sultans. Pop., 1896, 20,792.

CHERIMOYER, chĕr'ĭ-moi'ĕr (Fr. *chérimolier,* corruption of Peruv. *cherimoles*), or CHIRIMOYA (*Anona cherimolia*). One of the most esteemed fruits of Brazil and Peru, now common and even naturalized in some parts of the East Indies and generally throughout tropical countries and cultivated upon the Keys of Florida and in California. The tree is from 15 to 30 feet in height, with drooping branches and oblong leaves which are velvety beneath. The fruit is of most delicious flavor, is sometimes described as the finest of all fruits, and sometimes as inferior only to the mangosteen. It belongs to the same genus with the custard apple (q.v.). Both flowers and fruit emit a pleasant fragrance, but when the tree is covered with bloom the odor is so strong as to be almost overpowering. The fruit varies from the size of an orange to 16 pounds or upward in weight. It is roundish or heart-shaped. Externally it is nearly smooth, greenish or brownish yellow when ripe, and often with a reddish cheek. The skin is rather thick and tough and marked off into pentagonal or hexagonal areas. Internally the fruit is snow-white and juicy and contains a number of small brown seeds.

CHERKES'SIANS. See CIRCASSIANS.

CHER'NIGOV. See TCHERNIGOV.

CHERNOZEM, chĕr'nō-zĕm (Russ. *chernozemŭ,* from *chernuiĭ,* black + *zemlya,* earth). The Russian name for a very fertile black or dark-colored soil covering almost the entire southern half of European Russia and extending beyond the Ural Mountains into Asiatic Russia, where it occupies isolated areas of varying extent. Soils similar to chernozem are found in Galicia, Hungary, Rumania, northern Bulgaria, and Germany (in the region of Magdeburg and Hildesheim), as well as on the prairies of the western United States and the pampas of Argentina. Typical chernozem is formed by the admixture of humus with loess (qq.v.). It is characterized by high contents of fine particles and humus and high water capacity. The proportion of humus usually varies from 6 to 10 per cent, but is sometimes less than 4 per cent or higher than 20 per cent. The humus usually contains somewhat less than 5 per cent of nitrogen, the latter varying from .2 to .5 per cent in the soil. The soil also contains from .12 to .25 per cent of phosphoric acid and from .4 to 1 per cent of potash. Chernozem is therefore rich in plant food, and it is of great depth, so that it bears continuous culture with the same crops without deterioration; but its physical properties, due to its very fine particles, are such that under unfavorable weather conditions it loses its normal granular structure, dries out, and becomes so compact as to result in crop failures. Consult P. Kossowitsch, *Die Schwarzerde* (Vienna, Berlin, and London, 1912).

CHERNYSHEV, chĕr'ni-shĕf', ALEXANDER IVANOVITCH, PRINCE (1786–1857). A Russian general. He served against the French at Austerlitz and Friedland and on the side of Napoleon at Aspern and Wagram. He bore an important part in the campaigns of 1813–14; was made a count in 1825 and Minister of War in 1828. Nicholas I created him a prince in 1841. In 1848 he was made chairman of the Imperial Council.

CHERNYSHEVSKY, chĕr'nĭ-shĕf'skĕ, NIKOLAI GAVRILOVITCH (1828–89). A famous Russian author and publicist. He was born at Saratov (southern Russia) and received his early education at home under the supervision of his father, a distinguished priest. Later, at St. Petersburg University, his unusual ability soon attracted attention. Within three years after his graduation (having done teaching in the meantime) he had decided to devote himself entirely to literary work. In 1855 he appeared at the university for his master's degree with a dissertation entitled "The Æsthetic Relation of Art to Reality"; although this was well received and ably defended, the degree was denied —and the thesis confiscated. Such sensational procedure, however, served only to bring into greater prominence Chernyshevsky's brilliant work, with the result that the columns of the *Sovreménik* (the 'Contemporary'), a most influential Russian periodical at the time, were placed at his disposal. In two years (1855–57) the *Sovreménik,* with its leading essays and reviews by Chernyshevsky and Dobrolúbov (another famous publicist), became the greatest literary and intellectual force of progressive Russia.

Chernyshevsky's articles were rapidly transforming the views of thousands, when the Russian government, becoming alarmed at his influence, suppressed the epoch-making periodical and imprisoned its guiding spirit. This was in 1862. A year later, while still awaiting his fate at the Fortress of Paul and Peter, Chernyshevsky wrote *What's to be Done?,* a problem novel and the only work by which its author is known to non-Russian readers. Thereafter, on one pretext or another, he was kept in exile in Siberia for nearly 20 years, and when at last he was allowed to return to Russia health and courage were no longer equal to the task of resuming all his former activity. In 1889, within a few months of receiving leave again to live in his native town, he died.

Save the important but not very literary novel already mentioned, which exercised a tremendous influence in Russia, Chernyshevsky's creative work was all journalistic. He did, however, considerable translating and editing, of which the most important specimen is his scholarly translation, with illuminating notes and practical illustrations, of Mill's *Political Economy.* In a similar way he treated Schlosser's *Universal History* and Weber's voluminous *History of the World.* His original writings were gathered in 4 vols.—*Studies in Russian Literature in the Days of Gogol* (1890), *Æsthetics and Poetry* (1893), *Notes on Contemporary Literature* (1894), and *Critical Essays* (1895). A fuller collection of his articles appeared in 1906 in 10 vols. As a realist and materialist, Chernyshevsky helped to rid Russian thought of metaphysical speculation and to popularize science; as an exponent of the "Art for Life's Sake" principle, he gave æsthetics a utilitarian basis which won for it new favor in his generation; and as an exponent of French Socialism —especially that of Fourier—he did much to rouse the social conscience of Russia and to furnish truly scientific grounds for the unrest that characterized that country in the latter half of the nineteenth century.

CHER'OKEE. A city and the county seat of Cherokee Co., Iowa, 59 miles by rail northeast of Sioux City, on the Illinois Central Railroad and on the Little Sioux River (Map: Iowa, B 2). It is the seat of a State hospital for the insane and has a Carnegie library. Farming is the principal industry of the surrounding region.

Butter, mill machinery, and novelties are manufactured in the city, and there are railroad repair shops. Cherokee was settled in 1850 and was incorporated in 1872. The government is administered by a mayor, elected biennially, and a unicameral council. The water works are the property of the city. Pop., 1900, 3865; 1910, 4884.

CHER'OKEE (N. Amer. Indian, upland field). The largest and most important native tribe of the eastern United States. They are of remote Iroquoian affinity and formerly occupied the mountain region of the Carolinas, Tennessee, Georgia, and Alabama, in numerous permanent villages of substantially built log houses. They depended chiefly upon agriculture and raised large crops of corn, pumpkins, and beans. De Soto passed through their country in 1540, and for three centuries later they were prominent in the history of the South. They espoused the British cause during the Revolution, but in 1785 made a treaty of peace with the United States and at once took up the road to civilization, attaining in a very short time a high degree of prosperity and advancement. This was largely due to the work of devoted missionaries and to the presence of a respectable mixed-blood element, the descendants of former British traders. In 1820 they adopted the regular civilized form of government and seven years later formulated a constitution under the style of the "Cherokee nation." In the interval Sequoya (q.v.), known also as George Guess, had devised for the language an alphabet, which was officially adopted by the Cherokee government.

Meanwhile, however, gold had been discovered in the Cherokee country, and at once strong pressure was brought to bear to compel the removal of the Indians. Notwithstanding a decision of the Supreme Court upholding the autonomy of the Cherokee nation, the State of Georgia extended her laws over their country, and President Andrew Jackson refused to interfere in their behalf. Despite the repeated and energetic protests of more than nine-tenths of the Cherokee nation, a treaty was negotiated with a small faction which bound the tribe to remove within three years beyond the Mississippi, whither a small portion of them had removed some years before. The Cherokees repudiated the instrument, and in 1838 they were removed by military force, several thousands dying on the march or from hardships incident to the removal. Throughout this crisis the great leader of the patriot party was the chief John Ross (q.v.), who served as principal chief of the Cherokee nation from his first election in 1828 to his death in 1866. On their arrival in the Indian Territory they reëstablished their government, with Tahlequah as the capital. The outbreak of the Civil War in 1861 brought division to their councils, calamity and misery to their people, the tribe being about equally divided in sentiment and furnishing large contingents to both the Federal and Confederate forces. At the close of the war they entered into a new treaty with the United States, by which they agreed to free their negro slaves and admit them to full Cherokee citizenship. In 1892 they sold their western territorial extension, known as the "Cherokee Outlet." Under their former national government they had an elective principal chief, a Senate, a House of Representatives, and a complete system of public schools, but in 1906 they disbanded as a tribe and became citizens of the United States. The Cherokees of pure and mixed blood may number perhaps 20,000, besides whom some 1400 more, known as the Eastern Band, reside on or adjoining a reservation in western North Carolina, being descendants of those who escaped and fled to the mountains at the time of the removal. Consult Royce, "Cherokee Nation," in *Fifth Report of Bureau of American Ethnology* (1887); Mooney, "Myths of the Cherokee," in *Nineteenth Report of Bureau of American Ethnology* (Washington, 1887).

CHÉRON, shâ'rôn', Elisabeth Sophie (1648–1711). A French painter, engraver, and poet. She was born in Paris, studied first with her father, and at the age of 20 became a member of the Royal Academy of Painting and Sculpture, then presided over by Le Brun. In 1692 she married the engineer Jacques Le Hay. Her principal works are miniature portraits in pastel and water color. Some genre and biblical oil paintings also survive. Among her engravings a series of antique reliefs and gems are worthy of mention. She was the author of a book on the *Principles of Drawing* (1706), and her reputation as a poet was such that she was made a member of the Academia dei Ricovrati.

CHEROOT. See Tobacco.

CHERRIE, George Kruck (1865–). An American field naturalist, born at Knoxville, Iowa. He was educated at Iowa State Agricultural College. In 1889 he became taxidermist and curator of birds, mammals, and reptiles in the National Museum of Costa Rica, and in 1894–97 he was assistant curator of ornithology in the Field Museum of Natural History, Chicago. He spent the following two years in explorations of the valley of the Orinoco for Lord Rothschild. From 1899 to 1911 he was curator of ornithology and mammalogy in the Brooklyn Institute of Arts and Sciences. Besides his articles in the *Auk*, his writings include "The Ornithology of Santo Domingo," in *Publications of the Field Museum of Natural History, Chicago* (1896), and *New Birds of the Orinoco Region and of Trinidad* (1909).

CHER'RY (AS. *ciris*, Ger. *Kirsche*, from Lat. *cerasus*, Gk. κερασός, *kerasos*, cherry tree, from κέρας, *keras*, horn). Cultivated cherries have sprung almost entirely from two parent species —*Prunus cerasus* and *Prunus avium*—both of European origin. (For illustration, see Plate of Drupes.) Besides these species, the cherry is represented in Europe, America, Japan, and China by indigenous species, none of which have attained economic importance save the Japanese ornamental forms (*Prunus pseudocerasus*), in honor of which the famous Cherry Festival is given every year, and the Japanese weeping rose-flowered cherry (*Prunus pendula*). In America the chokecherry (*Prunus virginiana*) has sometimes been cultivated. The bird cherry (*Prunus pennsylvanica*) is grown for ornament, while *Prunus besseyi* and *Prunus pumila*, two dwarf forms native to the prairie region of the Northwest, have lately come into notice because of their fruit. The garden cherries are varieties of either *Prunus cerasus* or *Prunus avium*. To *Prunus cerasus* belong the Morellos and Amarelles—two of the three groups of *sour cherries*, in which the tree characteristics are spreading habit and willowy, drooping branches; to *Prunus avium* belong the Hearts, Bigarreaux, and Mazzards, the *sweet cherries*, and the Dukes, the third group of sour cherries, characterized by tall, robust, upright trees. The cherry is usually

propagated by budding the desired variety on Mazzard or Mahaleb stocks. Mazzard stocks are now counted best for both the sweet and sour cherries; but, because buds take more readily on the Mahaleb, this is extensively used as a stock for the sour cherries. Cherries prefer a well-drained gravelly loam, well enriched with plant food. Sour cherries require more moisture and will grow on heavier land than sweet cherries, but they will not tolerate a wet location. The fruit is grown commercially in Europe and the United States. In the eastern United States the sour cherries form an important item in the canning business, while on the Pacific coast the sweet-cherry industry reaches its highest development. The fruit of the cherry is much valued as an article of food. It is extensively used for dessert, pies, puddings, wines, etc. In 1909 the yield of cherries in the United States was 4,126,099 bushels, valued at $7,231,160. It ripens in Norway as far north as lat. 63°. In some parts of Germany the public roads are lined for many miles together with avenues of cherry trees. The wild black cherry (*Prunus serotina*) is a splendid timber tree, the wood being highly prized for finishing and furniture, while the bark is used in medicine and the fruit is used for making brandy.

Cherry Diseases. The cherry is subject to a number of fungus diseases, most of which are also common to other fruits, as brown rot (see PEACH), leaf spot (see PLUM), and black knot (see PLUM). A common disease of the cherry, known as mildew, is caused by the fungus *Podosphæra oxyacanthæ*, which is found upon the apple also, especially upon nursery stock. The affected leaves are gray with the fungus, and they soon dry and fall from the tree. Ammoniacal copper carbonate has been found a very efficient fungicide for preventing it. Leaf curl, due to the fungus *Exoascus cerasi*, and scab (*Cladosporium carpophilum*), are rather common diseases, but they usually yield to spraying. There is a very common leaf scorch in Europe, due to *Gnomonia erythrostoma*, that has not yet appeared in America. When attacked by this disease, the leaves wither suddenly, but remain on the trees all winter. The fruit ripens unevenly, cracks, and rots. In Germany relief was secured by collecting and burning all the leaves for two seasons. To be successful, this would have to be practiced over a considerable area, as the winds can spread the disease to quite a distance.

CHERRY BIRD, or **CEDAR BIRD.** See WAXWING.

CHERRY LAUREL, or LAUREL CHERRY. A popular name for certain evergreen species of the genus *Prunus*. They bear racemes of small, usually white, flowers and small nauseous fruits, the kernels of which somewhat resemble in flavor the kernels of almonds. The kernels and leaves of the cherry laurel are poisonous, although they are used to some extent for flavoring purposes. The leaves particularly are rich in the oil of bitter almonds, which is obtained by aqueous maceration and distillation. The product is known as cherry-laurel water and was formerly used in medicine. The common or English cherry laurel (*Prunus laurocerasus*), to which the foregoing remarks chiefly apply, is a native of southeastern Europe and adjacent Asia. It is a shrub which sometimes attains a height of 10 feet and which bears ovate-lanceolate, convex, smooth, shining, yellowish-green leaves and rather short terminal racemes. In Europe it is one of the most popular ornamental shrubs. It is rarely met with in the northern United States except in greenhouses; but in California and in the States south of Virginia it is becoming fairly common. Another European species is the Portugal cherry laurel (*Prunus lusitanica*), which often reaches a height of 20 feet. It does not grow so well in the shade as the other species. The wild orange (*Prunus caroliniana*), termed in the South the mock orange, is the best-known American representative of the cherry laurels. It is prized for ornamental planting because of its shining, dark-green leaves and short racemes of cream-colored flowers which appear in March.

CHER'RYVALE. A city in Montgomery Co., Kans., 156 miles south-southwest of Kansas City, on the Atchison, Topeka, and Santa Fe, and the St. Louis and San Francisco railroads (Map: Kansas, G 8). It contains a Carnegie library and a park. The principal industries are zinc smelting, brickmaking, oil refining, and the manufacture of glass. There are also ironworks and deposits of oil and gas. Cherryvale was settled in 1870 and was incorporated in 1879. The city has adopted the commission form of government. It owns its water works. Pop., 1900, 3472; 1910, 4304.

CHERRY VALLEY. A village in Otsego Co., N. Y., 68 miles west of Albany, on the Delaware and Hudson Railroad (Map: New York, F 3). Pop., in 1900, 772; in 1905, 746; in 1910, 792. It was the scene of a massacre during the Revolutionary War, 600 Indians under Joseph Brant and 200 Tories and English under Walter Butler attacking it on Nov. 11, 1778, killing 16 of the small garrison stationed here and 30 of the inhabitants, including women and children, burning nearly all the buildings, and carrying off 71 prisoners, whom they treated with great cruelty. Consult Halsey, *The Old New York Frontier* (New York, 1901).

CHERSIPHRON, kĕr'sĭ-frŏn (Lat., from Gk. Χερσίφρων). A famous Cretan architect, born at Cnossus. He planned, and in part constructed, the older temple of Artemis at Ephesus, being assisted in the work by his son Matagenes. He died, apparently, before the completion of the sculpture of the columns—i.e., before 546 B.C.

CHERSO, kĕr'sō. A long, narrow island of Austria, in the Adriatic, 12 miles south-southwest of Fiume (Map: Austria, D 4). It has an area of about 105 square miles. Its surface is generally hilly and rugged, with forests in the north. The vine and olive are cultivated to some extent. Vrana Lake, in the centre of the island, 40 feet above sea level, has no visible inlet or outlet, but is fed with water from the mainland by subterranean and submarine channels. Administratively it belongs to the District of Lussin, Istria. Its inhabitants are chiefly engaged in maritime industries. Its population, principally Serbo-Croat, was 8803 in 1900, including over 3000 Italians, and 10,200 in 1910. The chief town, Cherso, on the west coast, had in 1900 a population of about 5000.

CHERSON, kĕr-sōn'. See KHERSON.

CHERSONESUS, kĕr'sō-nē'sŭs (Lat., from Gk. Χερσόνησος, from χέρσος, *chersos*, dry land + νῆσος, *nēsos*, *island*, land island, i.e., peninsula). A name applied by the ancient Greeks to several peninsulas and promontories. Three of the most frequently mentioned are: (1) the Thracian Chersonese, northwest of the Hellespont (see THRACE; GALLIPOLI, PENINSULA OF); (2) the

Tauric Chersonese, in the Black Sea, the modern Crimea; and (3) the Cimbrian Chersonese, the modern Jutland.

CHERT, chĕrt (akin to Ir. *ceart,* pebble, Welsh *careg,* stone, Gael. *carr,* shelf of rock). An amorphous mineral substance, composed of a mixture of hydrated and anhydrous silica, which has the hardness of quartz and a splintery or conchoidal fracture. The color varies from white to black, but is commonly a neutral gray or brown. Chert is commonly associated with carbonate rocks, particularly limestone, where it forms nodules and irregular masses within the rock matrix, and is believed to be due partly to chemical deposition from water at the time of the deposition of the carbonate rocks, and perhaps in part to a concentration or segregation of the siliceous impurities subsequent to the formation of such rocks. Chert was formerly called "hornstone." See QUARTZ; SILICEOUS ROCKS.

CHERTKOV, VLADIMIR. See TCHERTKOV.

CHERTSY, chĕrt'sĭ, *colloq.,* chĕs'ĭ (AS. *Ceortes ēg,* Ceort's island). A market town of Surrey, England, on the Thames, 22 miles west-southwest of London (Map: England, F 5). It is irregularly built and is surrounded by villas. The chief trade is in malt and flour. Many vegetables are raised for the London market. Pop., 1901, 12,760; 1911, 13,816. Chertsey arose from a Benedictine monastery founded in 666 and rebuilt in 964 by Edgar. Charles James Fox lived on St. Anne's Hill, about a mile from the town, and the poet Cowley lived and died here.

CHER'UB (LL., Heb. *Kerub,* pl. *Kerubim,* Eng. pl. cherubim, or cherubs). The Hebrew name for a winged creature which is represented as in attendance upon Yahwe, and as belonging to the court of heavenly beings around his throne. In Babylonian inscriptions found at Susa the colossal winged bulls are called *karibati* (Zimmern, in Gesenius, *Hebräisches Wörterbuch,* 14th ed.), and the Semitic root *karab,* 'to plow' (Neo-Heb., Aram., Ar.), suggests that *karib,* or *karub,* may be an early name for "ox," attaching itself as a technical term to the figure of a bull symbolizing the protecting genius of a shrine or palace. It is probable that already in Babylonian and Assyrian thought the hurrying storm cloud in the sky corresponded to this representation on earth of the swift messenger and carrier of a celestial divinity. Whether the term applied to other winged monsters, combining features of man, beast, and bird, cannot yet be determined. Cherubim are spoken of in Gen. iii. 24 as guarding the way to the tree of life. In addition to the cherubs "the flame of the turning sword" is mentioned, probably suggesting the presence of a seraph. Some scholars hold that two classes of heavenly beings, cherubim and seraphim, are referred to; others think of clouds and lightnings. The author may have had the natural phenomena in mind as manifestations of the presence of the protecting spirits. According to Ex. xxv. 18–22; xxxvi. 7–9, there were two cherubs made of gold on top of the covering of the ark (see ARK OF THE COVENANT), and pictures of cherubs were woven into the veil and elsewhere (Ex. xxvi. 31; xxxvi. 35). There is no intimation as to the form or size of these cherubs. We do not even know whether they were winged bulls, as is perhaps most probable, or winged men. In the innermost sanctuary of Solomon's temple there were also two cherubs, but they were each 10 cubits high, with wings 5 cubits in length, and were made of olive wood overlaid with gold; and there were carved cherubs, palm trees, and open flowers on all the walls of the house (1 Kings vi. 23–30). Again we have no information concerning the body of the cherubs, and cannot be sure, therefore, that they were winged bulls, though the prominence of the ox symbol, e.g., under the brazen sea, renders this very probable. In Ps. xviii. 11, it is said of Yahwe, "he rode on the cherub and did fly." Here the storm cloud seems to be represented as Yahwe's celestial carrier, his animal on which he rides, probably the bull. In Ezek. i, four cherubs, represented as animals with the legs and feet of oxen, two pairs of wings, and different faces—one that of a man, another that of a lion, another that of an ox, and another that of an eagle—carry the vault of heaven on which rests the throne of Yahwe. It is generally recognized that the text has suffered much in transmission; a later hand seems to have given four heads to each of the cherubs. (Consult Winckler, *Altorientalische Forschungen,* 1896, vol. iv, pp. 347 ff.) In Ezek. x. 14, the original text also appears to have assigned only one face to each cherub, but, characteristically enough, substitutes for "the face of an ox" "the face of the cherub"; in xxviii. 14, Yahwe says to the Prince of Tyre, "Thou wast with the cherub, I set thee in the holy mountain of the gods," and verse 16: "The cherub cast thee out of the midst of the stones of fire." The author of Ezek. xl.–xlviii. has no ark in his temple and therefore no free standing figures of cherubs; but alternate cherubs and palm trees are carved on the walls (xli. 18–20, 25), the former with two faces—one of a man and one of a lion. As a reason for this alternation of cherubs and palm trees, it has been suggested that the cherubs were perhaps thought of as winds carrying pollen; the relation of guardian to a sacred tree is also obvious. Not essentially different from Ezekiel's view is that found in Rev. iv. 6 ff. Four cherubs covered with eyes surround the throne of God; the first has the face of a lion, the second that of an ox, the third that of a man, and the fourth that of an eagle; but they have six wings, and not four. This gave rise at an early period of the Church to the symbolical figures of the four evangelists—the human countenance being associated with Matthew, that of the lion with Mark, that of the ox with Luke, and that of the eagle with John. In the developed system of Hebrew angelology the cherubs form one of the 10 highest classes of angels. They are mentioned in Eth. Enoch, xiv. 11, 18; in xx. 7, Gabriel is said to be "over paradise, the serpents, and the cherubim." Cherubim, seraphim, and ophannîm (wheels) are mentioned in the Parables of Enoch (Eth. Enoch lxi. 10). Slavonic Enoch represents the cherubs as living in the sixth and seventh heavens (xix. 6; xx. 1). Their function becomes more and more that of offering praise to the Most High. Dwelling so near to the source of all knowledge, they also become examples of most perfect knowledge. This is emphasized already by Philo and then by many Christian teachers. In the hierarchical gradations established by these theologians the cherubim rank next to the seraphim as the second order of angels. Consult Barton, *Semitic Origins,* pp. 90* ff. (1903); Zimmern, in the 3d ed. of Schrader, *Die Keilinschriften und das Alte Testament,* pp. 631 ff. (1902); Bousset, *Die Religion des Judentums,* pp. 320 f.

(1903); Driver, *Genesis*, pp. 60 f. (1904); Dibelius, *Die Lade Jahves* (1906); Benzinger, *Hebräische Archäologie*, pp. 221 al. (1907); Pinches, *The Old Testament in the Light of the Historical Records of Assyrians and Babylonians*, pp. 80–82, 533 (1908); Gunkel, *Genesis*, pp. 24 f. (3d ed., 1910); Moss, "Cherubim," in Hastings, *Encyclopædia of Religion and Ethics*, iii (1911).

CHÉRUBIN. An opera by Massenet (q.v.), first produced in Monte Carlo, Feb. 14, 1905.

CHERUBINI, kā'rōō-bē'nē, Maria Luigi Carlo Zenobio Salvatore (1760–1842). An Italian composer. He was born in Florence and began to study music at the age of six, under his father, a musician in the Pergola Theatre, and composition when nine years of age, under the brothers Felici and Bizarri and Castrucci. His earliest work was a Mass and Credo in D, and by 1776 his list included a Te Deum and an oratorio. Granted an allowance by the Grand Duke, he went to Bologna in 1778, spending there and in Milan four years under Sarti, from whom he acquired his remarkable knowledge of counterpoint and fugue. In 1780 his first opera, *Quinto Fabio*, was produced and was followed quickly by other dramatic works. In 1784 he went to London and held the post of composer to the King for one year. Here two operas, *La finta principessa* and *Giulio Sabino*, were brought out. In 1785 he visited Paris, and later Turin, and produced *Ifigenia in Aulide* (1787), returning in 1788 to make Paris his home. *Démophon* (1788) indicated that he was adopting a new style, and *Lodoïska* (1791) proved that he had abandoned the light Neapolitan style of his earlier works. Among later operas were: *Elisa* (1794); *Médée* (1797); *L'Hôtellerie portugaise* (1798); *Les deux journées*, in German called *Der Wasserträger*, and considered his operatic masterpiece (1800); and *Anacréon* (1803).

In 1795 Cherubini was appointed one of the *inspecteurs des études* in the new Conservatory of Music. In 1805 he went to Vienna to write an opera for the Imperial Opera House. Here he made the acquaintance of Haydn and Beethoven, both of whom considered the opera *Faniska* (1806) a masterpiece. He returned to France, but finding little favor with Napoleon went to the estate of the Prince de Chimay to recuperate. At the latter's request he wrote a church composition, the famous Mass in F (1809), and after that date wrote almost exclusively sacred music. In 1814 he was made a knight of the Legion of Honor by Louis XVIII. In 1815 Cherubini visited London, where he composed a symphony and overtures for the Philharmonic Society. In 1816 he was appointed, with Lesueur, musician and superintendent of the King's chapel, and in 1821–41 he was director of the Paris Conservatory, which he advanced to the high standard it still preserves. Cherubini has been called "the link between classic idealism and modern romanticism." "His sacred compositions, notably the requiems in C and D (1817 and 1836), are distinguished by a severe grandeur, and his dramatic work by brilliant and original instrumental effects." His work on counterpoint (1835) is still a standard. It was revised in 1896 by G. Jensen. For his life, consult: Berlioz, *Mémoires* (Paris, 1878); E. Bellasis, *Memorials of Cherubini* (London, 1905), with catalogue of compositions; Crowest, *Cherubini* (London and New York, 1890); M. E. Wittmann, *Cherubini* (Leipzig, 1895).

CHÉRUEL, shâ'rụ'ĕl', Pierre Adolphe (1809–91). A French historian. He was born in Rouen, was educated at the Ecole Normale of Paris, became an instructor there in 1849, and in 1866 was appointed inspector general of public education and rector of the Academy of Strassburg. From 1870 to 1874 he was rector of the Poitiers Academy. He wrote a number of accurate, thorough, and readable works, including the *Dictionnaire historique des institutions, mœurs et coutumes de la France* (2 vols., 1855; 6th ed., 1884), the *Histoire de France sous le ministère de Mazarin* (3 vols., 1882–83), and a masterly edition of Saint-Simon (1856–58; 2d ed., 1878–81) and two studies of the Duc de Saint-Simon (1865, 1876). His earliest work was on the history of Rouen.

CHERUSCI, kĕ-rŭs'sī. A German tribe, first mentioned by Cæsar. They dwelt in the region of the Weser, their country lying to the northeast of that of the Chatti (q.v.). They are chiefly memorable in connection with their great leader, Arminius. After the death of Arminius internal strifes broke out among the Cherusci, and Tacitus says that they were subjugated by the Chatti. Notwithstanding this, they again appear as the chief tribe in the military league of the Saxons about the end of the third century. In the beginning of the fourth century they are included among the peoples who had leagued against Constantine and towards the close of the same century are still mentioned distinctively by Claudian.

CHER'VIL (AS. *cerfille*, Ger. *Kerbel*, from Lat. *cærefolium*, from Gk. χαιρέφυλλον, *chairephyllon*, from χαίρειν, *chairein*, to rejoice + φύλλον, *phyllon*, leaf) (*Anthriscus cerefolium*). An umbelliferous plant which has long been cultivated as a potherb, used in soups and for a garnish, in the same manner as parsley. It is much more used in some parts of the continent of Europe than in Great Britain or in the United States. It is a native of Europe, naturalized in some parts of England and in a few localities in the United States. The leaves have a peculiar, somewhat sweetish, pleasantly aromatic smell and taste, by which the plant may be known from its congener *Anthriscus vulgaris*, a weed whose leaves have a disagreeable smell and which is also distinguished by its hispid fruit. The umbelliferous plant called Venus's comb, or shepherd's-needle (*Scandix pecten-veneris*), a native of Europe, often found in grainfields and remarkable for the appearance and large size of its fruit, and another species, *Scandix australis*, which grows in the south of Europe, have a taste and smell resembling chervil and are used in the same way on the Continent. Sweet chervil, or sweet cicely (*Myrrhis odorata*, the *Scandix odorata* of the older botanists), a native of the south of Europe and of some parts of Asia, common in the neighborhood of houses in Great Britain, although probably not a true native, is frequently cultivated in Germany under the name of Spanish chervil, or anise chervil. In Scotland the plant is commonly called myrrh by the peasantry. Its smell is peculiarly attractive to bees, and the insides of empty hives are sometimes rubbed with its leaves, to induce swarms to enter. *Chærophyllum bulbosum*, of southern Europe, sometimes called "turnip-rooted chervil," is cultivated for the sake of its carrot-shaped roots, which are used in the same manner as carrots. The seed is said to lose its vitality quickly and

should be stratified or sown in the fall soon after ripening. The quality of the root is said to be improved by keeping.

CHERVILLE, shĕr'vēl', Gaspard Georges Pescow, Marquis de (1821–98). A French author. He was born in Chartres and for some time collaborated with the elder Dumas. Subsequently he became known as a writer on the chase, angling, and animal life, his works including: *Les aventures d'un chien-de-chasse* (1862; 2d ed., 1882); *Histoire d'un trop bon chien* (1867; an illustrated ed., 1884); *Les éléphants* (1895).

CHERWELL, chär'wĕl. A stream which falls into the Isis, or Thames, near Oxford, England. It rises in the southwest of Northamptonshire and forms the western boundary of Oxfordshire for a considerable distance (Map: England, E 5).

CHESAPEAKE, chĕs'ä-pēk, The. A 38-gun vessel famous in the history of the American navy. Early in 1807, after undergoing partial repairs in the Washington Navy Yard, she proceeded to Hampton Roads, where Commodore James Barron (q.v.) assumed command. On June 22, poorly equipped, insufficiently manned by an untrained crew, and wholly unfit for immediate action, she started across the Atlantic on a training cruise; but when well out to sea was overtaken and stopped by the British frigate *Leopard,* 50 guns, whose commander demanded the restitution of British deserters alleged to form a part of the *Chesapeake's* crew. On Barron's refusal to return the sailors demanded, or to permit search for them the British attacked with vigor, soon killing 3 and wounding 18 of the Americans and seriously crippling their vessel. From the *Chesapeake* only one gun was fired, and that with great difficulty and without effect. Barron finally struck his colors, and the British reclaimed four deserters, three of whom, though they had been formerly impressed into the British service, were native-born Americans. The affair caused intense excitement throughout the United States, anti-British feeling ran high, and the people everywhere demanded "reparation or war." President Jefferson immediately (July 2) issued a proclamation, which proved futile, ordering British cruisers to depart from American ports and forbidding all aid and intercourse with them; and, through Monroe, indignantly demanded redress, but without avail, from the British government. The incident was one of the chief occurrences that led up to the War of 1812 and is famous in American history as "The *Chesapeake* Affair," or "The *Chesapeake* Outrage." On June 1, 1813, the *Chesapeake,* then commanded by Captain Lawrence and carrying 50 guns, fought a battle in Massachusetts Bay with the British 38-gun vessel the *Shannon,* Captain Broke, then carrying 52 guns. The two vessels were almost evenly matched, except that the *Chesapeake* had an untrained crew and had only recently changed captains. After an engagement lasting fifteen minutes the *Chesapeake,* rendered unmanageable by the terrible fire of the *Shannon,* was forced to surrender after Captain Lawrence had received a mortal wound. This gallant commander exhorted his men to the end with the words, "Don't give up the ship!" Out of a crew of 379, the *Chesapeake* lost 61 killed or mortally wounded and 85 severely and slightly wounded; while out of a crew of 330, the *Shannon* lost 33 killed and 50 wounded. The *Chesapeake* was taken as a prize to Halifax, was afterward used as a British war vessel, and in 1820 was sold as old timber. Consult: Henry Adams, *History of the United States,* vol. iv (9 vols., New York, 1889–91); McMaster, *History of the People of the United States,* vols. iii and iv (New York, 1883–1900); Cooper, *History of the Navy of the United States* (2 vols., London, 1839); Roosevelt, *The Naval War of 1812* (New York, 1882); Barnes, *Naval Actions of the War of 1812* (New York, 1896).

CHES'APEAKE BAY (Algonquian *K'chesepi-ack,* country on a great river). The largest inlet on the Atlantic coast of the United States (Map: United States, L 3; Maryland, M 5). It penetrates Virginia and Maryland and is 200 miles long, having a maximum width of nearly 40 miles, but an average width of less than 20 miles. Its entrance, 12 miles wide, has on the north Cape Charles (q.v.) and on the south Cape Henry (q.v.). This bay has numerous arms, many of which are the estuaries of navigable rivers, such as the Susquehanna, Gunpowder, Patapsco, Patuxent, Potomac, Rappahannock, York, and James rivers on the west shore, and the Elk, Chester, Choptank, Nanticoke, and Pocomoke rivers on the east shore. Unlike the shallow sounds in North and South Carolina, this network of gulfs and estuaries, with an average depth of from 30 to 60 feet, affords navigation for the largest vessels. In consequence, Baltimore and Norfolk are extensive shipping ports, the latter being a naval base. Chesapeake Bay is noted for its extensive oyster beds, and the vast numbers of waterfowl which frequent its waters. The shore lands of the bay produce a great amount of garden stuff, which is sent to Baltimore and the Northern markets. Chesapeake Bay is connected with Delaware Bay by canal.

CHESAPEAKE BAY DOG. See Field Dog.

CHESAPEAKE FORMATION. The geological designation for an assemblage of sands, clays, and marls that outcrops within the Atlantic coastal plain of the United States and that comprises the entire Miocene series of that region. It is exposed as a broad continuous belt from northern New Jersey to North Carolina, but farther south appears in disconnected areas which continue as far as northern Florida. The famous Gay Head cliffs of Martha's Vineyard represent a northern outlier of the main belt. The formation has a thickness of 700 feet in New Jersey and 400 feet in Maryland. In the latter State, as well as in Virginia, it contains deposits of diatomaceous earth which have considerable economic importance. See Tertiary System.

CHESELDEN, chĕs'el-den, William (1688–1752). An English surgeon and anatomist, born at Somerby, Leicestershire. He commenced his medical studies in 1703, established himself as a lecturer on anatomy in 1711, and in the following year was elected a fellow of the Royal Society. In 1718 he was appointed surgeon to St. Thomas's, St. George's, and Westminster hospitals, where he acquired a great reputation for his "lateral operation for the stone." His principal works are: *Anatomy of the Human Body* (1713), long a textbook on the subject in England; a *Treatise on the High Operation for the Stone* (1723); and *Osteology, or Anatomy of the Bones* (1733).

CHESHIRE, chĕsh'ēr (for *Chestershire,* from *Chester,* the capital of the county + *shire*). A

maritime county in the west of England, bounded north by the river Mersey and partly by the Irish Sea (Map: England, D 3). Its area is 1027 square miles. The surface forms an extensive, nearly level plain between the Derbyshire and Welsh mountains, chiefly occupied by grazing and dairy tracts, which are among the most important in England. Dairy farming and cheese making are the principal agricultural industries. Cheshire is also an important manufacturing county. The chief mineral products are rock salt and coal. The chief towns are Chester (the county town), Macclesfield, Stockport, Congleton, Knutsford, and Birkenhead. Pop., 1901, 593,885; 1911, 676,356.

CHESHIRE, Joseph Blount (1850–). An American Protestant Episcopal clergyman, Bishop of North Carolina. He was born at Tarboro, N. C., graduated at Trinity College (Hartford, Conn.) in 1869, and practiced law from 1872 to 1878. He was ordained priest in 1880, was consecrated Bishop Coadjutor in 1893, and Bishop in the same year. His publications include *The Early Conventions of the Episcopal Church in North Carolina* (1882) and various pamphlets and addresses. He has edited *Sketches of Church History in North Carolina* (1892) and wrote a *History of the Protestant Episcopal Church in the Confederate States* (1911).

CHESHIRE CHEESE. See Cheese; Cheese Making.

CHESHUNT, chĕs″nt. A town of Hertfordshire, England, on the Lea, about 7 miles south of Hertford and 14 miles north of London (Map: England, F 5). The Cheshunt (theological) College, established here in 1792, was removed to Cambridge in 1905. Pop., 1901, 12,300; 1911, 12,954. Consult *Cheshunt College* (London, 1868).

CHESLEY, Mary Russell (1847–). A Canadian social reformer, born and educated at Dartmouth, Nova Scotia. She early became interested in matters of social reform, especially the legal prohibition of the liquor traffic; and was elected president of the Women's Christian Temperance Union. That body about 1891 petitioned the Nova Scotia Legislature for the political enfranchisement of women, and the refusal of the petition caused Miss Chesley to become an active supporter of the movement. To the address of James Wilberforce Longley (q.v.), then Attorney-General of Nova Scotia, against a bill for woman suffrage which had been introduced in the Legislature, she made a notable reply. Her publications include *The Mission of Women* (1895), *The Delusion of Militarism* (1909), and papers on the subject of woman suffrage.

CHESNEY, chĕs′nĭ, Charles Cornwallis (1826–76). A British military engineer and writer. He was a brevet colonel in the British Royal Engineers, and for many years was professor of military history at the Staff College at Sandhurst. He first attracted general attention by *A Military View of Recent Campaigns in Virginia and Maryland* (1863) and in 1868 published his *Waterloo Lectures*, perhaps his ablest work. He also published *The Military Resources of Prussia and France* (1870) and *Essays in Modern Military Biography* (1874). The latter contains valuable critical estimates of the military careers of Generals U. S. Grant and R. E. Lee and of "Chinese" Gordon.

CHESNEY, Francis Rawdon (1789–1872). A British soldier and explorer, was born at Annalong, County of Down, Ireland. In 1829 he inspected the route of the Suez Canal and proved the undertaking to be feasible, so that De Lesseps 40 years afterward styled him the "Father of the Suez Canal." He is especially known, however, as the explorer of the Euphrates, and the founder of the overland route to India by way of that river. He wrote *Expedition for the Survey of the Euphrates and Tigris* (1850) and *Narrative of the Euphrates Expedition* (1868). Consult his *Life*, by his wife and daughter, ed. by Stanley Lane-Poole (London, 1885).

CHESNIUS. See Duchesne.

CHESNUT, Victor King (1867–). An American chemist and botanist, born at Nevada City, Cal. He was educated at the University of California, where in 1890–93 he was assistant in chemistry. From 1894 to 1904 he served as assistant botanist, having charge of poisonous-plant investigations, in the Bureau of Plant Industry, United States Department of Agriculture. For the following three years he was chemist of the Montana Experiment Station. In 1907 he became assistant chemist in the Division of Drugs, Bureau of Chemistry, United States Department of Agriculture. His publications include: *Principal Poisonous Plants of the United States* (1898); *Preliminary Catalogue of Plants Poisonous to Stock* (1898); *Plants Used by the Indians of Mendocino County, California* (1902).

CHESS (OF. *esches*, Fr. pl. *échecs*, from It. *scacchi*, ML. *scacci*, from Pers. *shāh*, king). The origin of this, the most intellectual of all games of skill, has been much disputed; but it is safe to say that under the Sanskrit name of *chaturanga*, consisting of four members, a game essentially the same as modern chess was played in Hindustan in very remote ages. Marked traces of its early Asiatic origin may still be discerned in its nomenclature and other characteristics. From Hindustan chess spread into Persia and thence into Arabia. The Arabs, it would appear, introduced it into Spain in the eighth century, though it may have been imported still earlier into Constantinople and probably some other cities of eastern Europe. An interesting reference to it occurs in the French poem of "Huon de Bordeaux" (c.1450), which supplied Shakespeare with some of the *dramatis personæ* of his *Midsummer Night's Dream*. This connection is especially noteworthy because of the probability that it also suggested to him the introduction of Ferdinand and Miranda playing at chess in the *Tempest*, although it is likely that he was acquainted with the fact that during his own lifetime Naples, the country of Ferdinand, was the centre of European chess playing, and skill in the game temporarily reached a height which it never attained again until the middle of the eighteenth century, when Philidor (F. A. Danican) became famous all over Europe.

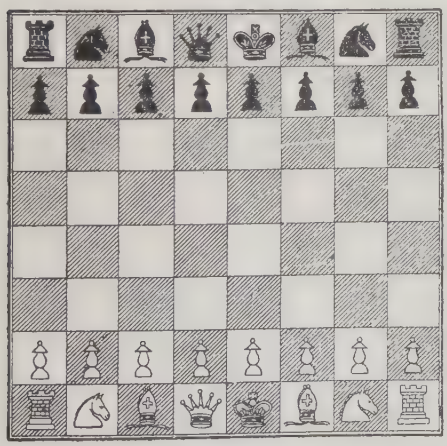
Benjamin Franklin was the first American to bring the game into prominence, both as a player and a writer; but its practice was confined to a few until the early part of the nineteenth century. By 1857 there were sufficient chess clubs to justify a national congress, at which Paul Morphy of New Orleans won the championship. He was such a phenomenal player that next year he was sent to Europe, and there he carried off all the honors. From that time chess has had a settled place among our pas-

times, and Americans, in all the phases of the game, in international contests have held a high place.

The original Hindu game was played on a board of 64 squares, as now, but by *four persons*, two being allied against two, as in whist. Hence the name *chaturanga*, from *chatur*, 'four,' and *anga*, 'a member,' or 'component part.' The name *shatranj*, used by the Persians and Arabs, is a corruption of the Sanskrit. The English, French, and other European names are derived from the Persian term *shah*, 'king.' *Check*, the warning when the king is in danger, is but another form of *shah;* in fact, "king" is sometimes used for "check," and in German *schach* is both the name of the game and the term of warning. The term *rook* is from the Sanskrit *roka*, Persian *rukh*, meaning a 'ship' or 'chariot'; *pawn* is said to be from *peon*, an 'attendant' or 'foot soldier.'

The chessboard is marked out into 64 square divisions, which are colored alternately black and white, in order the more clearly to determine and denote the respective movements of the several pieces. In placing the 32 pieces with which the game is played upon the board, each player must always have a *white* corner square at his right hand. There are two sets of pieces, of opposite colors, of 16 men each, and of various powers according to their rank. These sets of men are arrayed opposite to each other and attack, defend, and capture, like hostile armies. The accompanying diagram will best explain the name, form, and place of each man at the commencement of the game.

BLACK.



Rook. Knight. Bishop. Queen. King. Bishop. Knight. Rook.

WHITE.

The superior officers occupying the first row on each side are called *pieces;* the inferior men, all alike, standing on the row immediately in front of the pieces, are called *pawns*. Their moves and powers, along with the peculiar terms used in chess, may be briefly described as follows:

A *pawn*, at his *first* move, may advance either one or two squares straight forward; but after having once moved, he can advance only a single square at a time. In capturing an adverse piece, however, a pawn moves one square diagonally, either right or left; but the pawn never moves backward. On arriving at an eighth square, or the extreme line of the board, a pawn may be exchanged for any piece his owner chooses to call for, except a king, so that a player may have several queens on the board at once. If, on moving two squares, a pawn pass by an adverse pawn which has arrived at the fifth line, the advanced adverse pawn may take the other *in passing* in exactly the same manner as if the latter had moved but one square.

A bishop moves any number of squares diagonally, but diagonally only; therefore a bishop can never change the color of his square.

A knight moves two squares, so as always to change color—i.e., one square forward, backward, or sidewise, and one diagonally. On account of this crooked movement he can leap over or between any surrounding pieces; and therefore a knight's check, unless he can be taken, always compels the king to move.

The rook, or castle, moves any number of squares forward, backward, or sidewise, but not diagonally.

The queen is by far the most powerful of the pieces and moves over any number of squares, either in straight lines or diagonals, forward, backward, or sidewise; so that her action is a union of that of the rook and bishop. At starting the queen always stands on a square of her own color.

The king is the most important piece on the board, as the game depends upon his safety. He moves only one square at once, in any direction, except when he *castles*—a term to be explained presently. The king cannot be taken; but when any other piece attacks him, he is said to be in *check* and must either move out of check or interpose some one of his subjects, unless the checking piece can be captured. When there is no means of rescuing the king from check, he is said to be checkmated, and the game is over. Of course, the two kings can never meet, as they would be in check to each other. *Double check* is when a piece, by being moved, not only gives check itself, but also discovers a previously masked attack from another.

Castling is a privilege allowed to the king once in a game. The move is performed either with the king's rook or queen's rook; in the former case the king is moved to the king's knight's square, and the king's rook is placed on the king's bishop's square; in the latter case the king is played to the queen's bishop's square, and the queen's rook played to the queen's square. But the king cannot castle after having once moved, nor at a moment when he is actually in check, nor with a rook that has moved, nor when he passes over a square attacked or checked by an adverse piece, nor when any piece stands between him and the rook with which he would castle, nor when in the act of castling either the king or rook would have to capture an adverse piece.

A *drawn* game results from neither player being able to checkmate the other; thus, a king left alone on each side must of course produce a draw, as does also a king with a bishop, or a knight, against a king.

Stalemate, or the not being able to move either the king or any other piece, also constitutes a drawn game.

Odds is a term applied to the advantage which a stronger player should give to a weaker; thus, the removal of a rook or knight from the better player's forces may be fair odds; or, if the

players are more nearly matched, the one may give a pawn. When the odds of a pawn are given, it is always understood to be the king's bishop's pawn.

Gambit is a technical word implying the sacrifice of a pawn early in the game, for the purpose of taking up an attacking position with the pieces.

Supposing the worth of a pawn to be represented by unity, the following is a tolerable average estimate of the comparative value of the pieces: pawn, 1; bishop, 3; knight, 3; rook, 5; queen, 9.

The rows of squares running straight up and down the board are called *files*, those running from side to side are called *lines*, and those running obliquely across are termed *diagonals*.

The playing over the following short game will serve the learner as a little initiatory practice:

WHITE.	BLACK.
1. Pawn to K 4.	1. Pawn to K 4.
2. King's bishop to queen's bishop 4th.	2. King's Bishop to queen's bishop's 4th.
3. Queen to king's rook's 5th.	3. King's knight to king's bishop's 3d.
4. Queen takes [1] king's bishop's pawn, giving black checkmate.	

[1] Taking is always performed by lifting the captured man from the board and placing the captor on his square. The pawn is the only man whose mode of taking differs from his ordinary move.

The foregoing brief mode of giving a checkmate is called the *scholar's mate* and is often practiced upon young and unwary players. Any contractions used, such as "K" for king, "B" for bishop, etc., will readily be understood by the use of the diagrams.

In the conduct of the game and in the practice of chess the following rules, precepts, and hints will be found very generally useful: Play forth your minor pieces early, and castle your king in good time. You may sometimes delay castling with advantage, but not often. Do not expect to be able to establish an enduring attack with half your forces at home. Seek to let your style of play be attacking, and remember the gaining or losing of time in your measures is the element of winning or losing the game. Never touch a piece without moving it, nor suffer yourself or your opponent to infringe any other of the laws of the game.

You will find, when first player, that the opening, springing from your playing first king's pawn two, and then your king's knight to the bishop's third, is one of the best that you can adopt; but do not adhere to any one opening only. If you wish to adopt a purely defensive opening, you may play Pawn to K 3, and follow up with Pawn to Q 4, and Pawn to Q B 4. Next to playing with good players, nothing will conduce to improvement more than looking on at two expert players while they play. Wanting these advantages, it is best to play over openings and actual games from books or journals. To prevent blunders and oversights, always endeavor to perceive the motive of your adversary's move before you play; and look often round the board to see that you are not losing sight of any better move than the one you intended, or that you are not suffering yourself to be tempted by a bait.

The most elaborate and complete code of rules is to be found in Staunton, *Chess Praxis* (London, 1860). In that code every law of the game is fully explained, filling 66 pages of the book. For the antiquities of the subject, consult Forbes, *History of Chess* (London, 1860). Modern practical works are: Morphy, *Games at Chess*, ed. by Lowenthal (New York, 1860); Staunton, *Chess: Theory and Practice* (London, 1876); Gossip, *Chess Player's Manual* (London, 1875); Morgan, *Chess Digest* (4 vols., Philadelphia, 1905).

CHESS, or **CHEAT.** A common name of the *Bromus secalinus*. See BROME GRASS.

CHEST (palatalization of AS. *cist, cest*, from Lat. *cista*, Gk. *κίστη, kistē*, chest, box), or THORAX. In anatomy, the part of the body between the neck and abdomen, constituting the uppermost of the two divisions of the trunk. It contains the heart and lungs and is bounded externally by the ribs. The chest is somewhat conical in form, the broad or lower end of the cone being closed by the diaphragm, a large muscular partition which projects upward from the lower ribs, being convex towards the chest and concave towards the abdomen. In respiration the diaphragm descends by its own muscular contraction, while at the same time the ribs are drawn upward and outward by the accessory muscles of inspiration. The cavity of the chest is thus enlarged, the lungs are expanded, and air is drawn into them through the trachea, or windpipe, and the bronchial tubes. The combination of bone, cartilage, muscle, and tendon entering into the composition of the chest is such as to permit of expansile movement to the extent required and yet to guard against overexpansion, which would be fatal to the delicate structures within. The bones of the chest are at the same time a powerful protection against external injury.

The structures forming the walls of the chest are: 1. The backbone, or spinal column, divided into 24 true vertebræ, 12 of which, called the "dorsal vertebræ," form the thoracic portion. 2. Twelve ribs on either side, attached behind to the dorsal vertebræ, and ending in front in the costal cartilages. 3. The sternum, or breastbone, which occupies the middle line in front, and to which the costal cartilages are attached on either side. 4. The diaphragm (q.v.). See also SKELETON.

The contents of the chest are the heart, the great arteries and veins, the lungs, the trachea, or windpipe, the bronchi, or branches of the trachea, leading to the lungs, the œsophagus, or gullet, certain important nerve trunks, and the thoracic duct, or general terminus of the lymphatic system of vessels, by which the chyle and lymph are discharged into the blood. The importance of these parts to life, and their great liability to deranged action, render the chest the seat of a large proportion of the diseases which afflict humanity, and especially of those which end in death. Of the three organs which Bichat called the "tripod of life" —viz., the brain, heart, and lungs—the chest contains two; hence its condition in almost all diseases, and especially in fatal diseases, is an object of the utmost solicitude to the physician.

The diseases of the chest depend in some cases on alterations in its form, as by rickets (q.v.) and other conditions affecting the bones in early childhood or in youth, or by too tight lacing in girls. The lungs are subject to a great variety of diseases, among which the principal are consumption, or pulmonary tuberculosis (q.v.), pneumonia (q.v.), pleurisy (q.v.), and bronchitis (q.v.). The heart is subject to pericarditis, endocarditis, enlargement (hyper-

trophy), dilatation, and degeneration of its muscular texture. The aorta is often affected with degeneration of its walls and occasionally with aneurism. The great veins are liable to overdistension and to obstruction by tumors or by coagulation of the contained blood. The thoracic duct is sometimes obstructed by external pressure, and the œsophagus has a number of diseases usually described in connection with the alimentary canal. Most of the diseases here referred to are described either in special articles or under HEART, DISEASES OF. See also AUSCULTATION; PERCUSSION.

CHEST, NAVAL. The name "chest" has been given to certain funds maintained for the benefit of seamen belonging to the English navy. A fund, called the *Chest at Chatham,* was suggested so long ago as the days of Drake and Hawkins for the relief of superannuated and wounded seamen. In 1590 all seafaring men in Queen Elizabeth's service consented to a stoppage out of their pay of two shillings to six shillings per month to support this fund. The money was not in those days, as it would be now, put out to interest; it was kept in a chest, and hence the name given to the fund itself. During the eighteenth century the system became organized in a better manner; but still the fund retained the name "chest," insomuch that when the office was removed from Chatham to Greenwich in 1803, it became the *Chest at Greenwich.* The chest is managed ex officio, and the accounts are annually laid before Parliament. Handsome gifts are occasionally made to the fund by individuals. Disabled sailors receive a present sum of money, if not deprived of the power of earning a living; but if their injuries are more permanent, they receive a pension from the Chest for one year or for several years or for life, paid half-yearly.

CHES'TER (AS. *ceaster,* from Lat. *castra,* camp). An ancient episcopal city, municipal and parliamentary borough, and river port, the capital of Cheshire, England, on the right bank of the Dee, 22 miles from its estuary, and 16 miles southeast of Liverpool (Map: England, D 3). It stands on a rocky sandstone height, the greater part being inclosed by ancient walls 7 or 8 feet thick, nearly 2 miles in circuit, pierced by four gates, and now forming a promenade from which excellent views of the city and vicinity are obtained. It is the only city in England that still has its walls intact. The two main streets cross at right angles and were cut out of the rock by the Romans 4 to 10 feet below the level of the houses. The houses in these streets are curiously arranged; the front parts of their second stories, as far back as 16 feet, form a continuous paved promenade or covered gallery, open in front, and reached by flights of steps from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. These arcades, called the "Rows," together with the walls and the half-timbered construction of many of the houses, with ornamental gables of the sixteenth century, render Chester perhaps the most picturesque city in England. The cathedral is a massive structure of sandstone, with a tower of 127 feet. It was formerly the church of the Benedictine Abbey of St. Werburgh, which for 650 years was one of the richest in England. Charles Kingsley held his canonry in the cathedral of Chester. The cathedral grammar school was founded by Henry VIII. St. John's Church, long in ruins, but partially restored since 1868, is supposed to have been of early Saxon origin. Among other noted buildings are Cæsar's Tower, a remnant of the castle built by William the Conqueror, now used as barracks, the town hall, linen hall, and music hall. There are also many quaint private houses, such as God's Providence House, so called from the inscription on it; Bishop Lloyd's House, and Stanley House. The Dee is crossed by three bridges—an old stone one of seven arches, a suspension bridge, and Grosvenor Bridge, consisting of one superb stone arch of 200 feet span. Chester sends one member to Parliament. Many modern improvements have been made in the city, but with due regard to the quaint architectural features. Electric lighting has been installed; a modern sewerage system, including precipitation works, has been introduced; public baths, markets, a free library, a museum, and a hospital are maintained by the municipality. There are two public parks, and on the Roodee, outside the walls, there is a large race track. Chester has manufactures of lead, iron foundries, chemical works, and a shipbuilding yard. It manufactures boots and shoes for export. Its principal trade, however, is in cheese, for which it is a famous market. The improvement of the Dee is bringing back to Chester some of its former position as a port; there is an increasing importation of ores and timber and an export of manufactured iron. Chester is the terminus of several railway lines, and the union railway station is one of the finest in Great Britain. About 3½ miles from the city is Eaton Hall, the magnificent seat of the Duke of Westminster. Pop., 1891, 37,105; 1901, 38,309; 1911, 39,028.

Chester was the Deva of the Romans, the British Caer Lleonvawr, and the Saxon Legancester or Laegeceaster. It was devastated by Ethelfrid, King of Northumbria, early in the seventh century, after the massacre of 1200 monks of Bangor Yscoed, who had assembled to pray for the success of their compatriots. In 828 it was taken by the Saxons and in 894 by the Danes. Ethelred retook it in 904 and rebuilt the walls. From the Norman Conquest to the time of Henry III the earls of Chester had their own courts and parliaments at Chester, with eight subfeudatories and the superiors of the great religious houses, Chester being then a county palatine. Henry III made his eldest son Earl of Chester, a title held since by the Prince of Wales. In 1128 the town received its first charter. After a long siege (1643–46) the parliamentary forces took the city.

Bibliography. Howson, "Chester Cathedral," in *Cathedrals of England* (Philadelphia, 1895); Freeman, "Early History of Chester," in *Archæological Journal,* vol. xliii (London, 1886); Lach-Szyrma, "The Rows of Chester," Picton, "The Walls of Chester," Smith, "The Walls of Chester," in *Archæological Journal,* vol. xliv (ib., 1888).

CHESTER. A town and port of entry on Mahone Bay, Lunenburg Co., Nova Scotia, Canada, 34 miles (direct) south by west of Halifax, and on the Halifax and Southwestern Railroad (Map: Nova Scotia, E 4). The town was founded by New Englanders in 1760 and has manufacturing and fishing industries. Pop., 1910, 1096. The village of Chester Basin, 5 miles distant, is a popular summer resort.

CHESTER. A city and the county seat of Randolph Co., Ill., on the Mississippi River, 69

miles by rail south of St. Louis, and on the St. Louis, Iron Mountain, and Southern, the Illinois Southern, the Cape Girardeau and Northern, the St. Louis Southwestern, and the Wabash, Chester, and Western railroads (Map: Illinois, C 6). It has a public library, and contains the Southern Illinois Penitentiary and the Illinois Asylum for the Criminal Insane. The city carries on a considerable trade and has manufactures of flour, furniture, hose, shoes, knit goods, foundry products, wagons, etc. Pop., 1900, 2832; 1910, 2747.

CHESTER. A city in Delaware Co., Pa., 13 miles southwest of Philadelphia, on the Delaware River, and on the Baltimore and Ohio, the Pennsylvania, the Philadelphia and Reading, and the Southern Pennsylvania Traction Co. railroads (Map: Pennsylvania, K 8). It has two free libraries, two hospitals, a high school building, and three parks, and the Deshong Memorial grounds and art buildings; and is the seat of the Pennsylvania Military College. The Crozier Theological Seminary (Baptist) is at Upland, a part of Chester. Of historic interest are the city hall, built in 1724, and the house of William Penn. Chester has large manufactories of silk, cotton, and woolen goods, dyestuffs, steel castings, locomotives, boilers and engines, lumber, fire bricks, paper, cigars, plaster, boards, ice, etc.; and is noted for its former shipbuilding. Chester adopted the commission form of government in 1913. Pop., 1890, 20,226; 1900, 33,988; 1910, 38,537; 1920, 58,030.

Chester, the oldest town in Pennsylvania, settled by Swedes in 1644, was called Upland until 1682, when Penn arrived and gave it its present name. It was laid out in 1700, was incorporated as a borough in 1701, and was chartered as a city in 1866. The first Pennsylvania Assembly convened here in 1682. During the Revolution it was alternately occupied by the British and the Americans, and after the battle of Brandywine, in 1777, Washington reassembled his troops here. Consult Ashmead, *Historical Sketch of Chester* (Chester, 1883).

CHESTER. A city and the county seat of Chester Co., S. C., 65 miles north by west of Columbia, on the Southern, the Seaboard Air Line, the Carolina and Northwestern, and the Lancaster and Chester railroads (Map: South Carolina, C 2). It is in a cotton-growing and agricultural country, and has cotton mills, cotton gins, a cottonseed-oil mill, flour and lumber mills, iron works, an ice plant, overall, fertilizer, and canning factories, and railway shops. The city contains also a public library, courthouse, and hospital, and owns its water works. Pop., 1900, 4075; 1910, 4754.

CHESTER, Colby Mitchell (1844–). An American naval officer. He was born in New London, Conn., graduated at the United States Naval Academy in 1863, and in 1864 participated in the operations against Mobile. Having held several important commands and risen in rank, he was commandant at Annapolis in 1891–94 and commander in chief of the South Atlantic squadron in 1897–98; commanded the *Cincinnati*, the flagship of the North Atlantic squadron, during the Spanish-American war; took command of the battleship *Kentucky* in 1900; became superintendent of the Naval Observatory in 1902, and was advanced to rear admiral in 1903. He was retired on Feb. 28, 1906.

CHESTER, George Randolph (1869–1924). An American writer, born in Ohio. He left home at an early age and after engaging in various occupations began newspaper work as a reporter on the Detroit *News*. He was later connected with the Cincinnati *Enquirer*, of which he became Sunday editor. He began writing for newspaper syndicates and later for magazines, especially for the *Saturday Evening Post*, and became known as an author of popular appeal. Several of his stories have been dramatized and produced with success. His writings include: *Get-Rich-Quick Wallingford* (1908); *A Cash Intrigue* (1909); *The Making of Bobby Burnit* (1909); *The Art of Short-Story Writing* (1910); *The Jingo: A Tale of Red Roses* (1912); *Wallingford in his Prime* (1913).

CHESTER, Joseph Lemuel (1821–82). An American antiquary. He was born in Norwich, Conn., and until 1852 was a merchant's clerk in Philadelphia. He was afterward clerk in the House of Representatives and aid-de-camp to the Governor of Pennsylvania. After 1858 he resided in London, where he spent 10 years in the compilation of an annotated abstract of the registers of Westminster Abbey (1876). This work was published by the Harleian Society, of which in 1869 he had been a founder. At the time of his death he was regarded as perhaps the most learned genealogist in England or America. He also published: *Greenwood Cemetery and Other Poems* (1843); *Educational Laws of Virginia* (1854); *John Rodgers, the Compiler of the First Authorized English Bible* (1861); *The Reiester Booke of Saynte De'nis Backchurch* (1878).

CHES'TERFIELD. A municipal borough and market town in Derbyshire, England, at the confluence of the Hipper and Rother, about 12 miles south of Sheffield (Map: England, E 3). There are manufactures of cotton, silk, earthenware, and machinery; the metals and minerals in the neighborhood include coal, iron, potters' and brick clay, slate, and lead. Trade is facilitated by a canal connecting Chesterfield with the Trent and by the main line of the Midland Railway. Owing to the rapid growth of its manufactures and the increase of its population, it has become a flourishing municipality. The electricity, gas, and water supplies are managed by a special board; tramways, parks, public baths, a cemetery, markets, and slaughterhouses are maintained by the municipality. It also operates its street railways. The town has an excellent system of sewerage and in connection therewith maintains a sewage farm. Its educational institutions include an ancient grammar school and technical school, and a public library maintained by the town. The town is of great antiquity. Its first charter was received in the reign of King John. George Stephenson is buried in Trinity Church. Pop., 1901, 27,200; 1911, 39,038. Consult Yeatman, *The Records of Chesterfield* (Chesterfield, 1884).

CHESTERFIELD, Philip Dormer Stanhope, Earl of (1694–1773). An English statesman and author, eldest son of the third Earl of Chesterfield. He was born in London, Sept. 22, 1694. He studied for about a year at Trinity Hall, Cambridge, and then left to travel in Flanders (1714). The next year he was appointed a gentleman of the bedchamber to the Prince of Wales and entered the House of Commons as a Whig. On the death of his father (1726) he succeeded to the earldom and

took his seat in the House of Lords. Two years later, he was appointed Ambassador to The Hague; in 1730 he was made a knight of the Garter and Lord Steward of the Household. Dismissed from office (1733), he became a bitter opponent of Walpole. Particularly brilliant was his speech against the Licensing Act (1737). In 1744 he joined the Pelham ministry, and in the next year was appointed Lord Lieutenant of Ireland, a post for which he was admirably qualified. In 1746 he became Secretary of State and was offered a dukedom. In 1748 he resigned office and passed the rest of his life in leisure. Distinguished for wit and graceful manners, he was for a time on terms of intimacy with Pope, Swift, Bolingbroke, and other eminent contemporaries. At an inopportune time he thrust himself forward as a patron of Dr. Johnson and was repudiated in a celebrated letter (Feb. 7, 1735). (See JOHNSON, SAMUEL.) Chesterfield's literary fame rests upon his *Letters* (published 1744) to his natural son, Philip Dormer, written for the improvement of his manners and inculcating the general standards of a man of the world rather than those of a moralist. Consult: *Letters of Chesterfield*, ed. by Lord Mahon (London, 1845–53) and by J. Bradshaw (London, 1892); also Browning, *Wit and Wisdom of Lord Chesterfield* (London, 1875); Hill, *Worldly Wisdom of Lord Chesterfield* (New York, 1891); Ernst's biography, including many letters not before published (London, 1893); Collins, *Essays and Studies* (London, 1895); Birrell, *Lord Chesterfield* (New York, 1905), and the *Life* by Craig (London, 1907). In 1912 there were published in London some hitherto uncollected letters of Lord Chesterfield's ed. by R. M. Louden and appearing as "Some Unpublished Letters of Lord C." in *Nineteenth Century and After*.

CHESTERFIELD INLET. An inlet of Hudson Bay, which extends westward for a distance of over 200 miles from the northwest corner of the bay (Map: Canada, M 4). It has a variable width, which does not exceed 25 miles, and is in water connection, near its head, with the string of large lakes lying to the southwest. It contains a number of islands, and at its western extremity it widens into Baker Lake.

CHESTER PLAYS, THE. A group of mystery plays on scriptural subjects, 24 in all, played by the guilds of Chester during three days at Whitsuntide. A sixteenth-century proclamation concerning them ascribes them, in obscure phrase, to either Sir Henry Francis, a monk, or to Sir John Arnway, mayor of Chester in 1327–28. The only complete edition of them was made by Mr. Thomas Wright, for the Shakespeare Society, London (2 vols., London, 1843–47).

CHES'TERTON, GILBERT KEITH (1874–). An English author, born in London and educated at St. Paul's School. After studying art for a while, he began at an early age to write for various periodicals and newspapers in London, attracting prompt attention by his brilliant and vigorous prose style and by the originality of his opinions (or of his way of expressing his opinions) on every sort of subject. A certain unexpectedness gave piquancy to his writing and especially to his criticism. If not always taken seriously, at least he came to be widely read, and his books, which represent poetry, fiction, miscellaneous essays, biography, and criticism, firmly established him as one of the most attractive of the English writers of his day. So nimble is he that in some of his essays the reader's mind, though fascinated, wearies in following his intellectual pyrotechnics. Mr. Chesterton has published two books of verse, *The Wild Knight* and *Greybeards at Play* (both in 1900); a collection of miscellaneous writings, *The Defendant* (1901); and two somewhat erratic stories, *The Napoleon of Notting Hill* (1904) and *The Club of Queer Trades* (1905). Of his biographies, the following deserve especial mention: *Robert Browning* (1903); *G. F. Watts* (1904); *Charles Dickens* (1906); *George Bernard Shaw* (1909). Other and even more characteristic works by Chesterton are *Heretics* (1905); *Orthodoxy* (1908); *Tremendous Trifles* (1909); *The Ball and The Cross* (1910); *What is Wrong with the World?* (1910); *Alarms and Discursions* (1911); *Man Alive* (1912); *The Victorian Age in Literature* (1913); *Magic* (1913); *The Flying Inn* (1914). Consult the anonymous *G. K. Chesterton: A Criticism* (London, 1908).

CHES'TERTOWN. A town and the county seat of Kent Co., Md., 30 miles (direct) east of Baltimore, on the Chester River, and on the Pennsylvania Railroad (Map: Maryland, N 4). It has planing and strawboard mills and phosphate and basket factories. Washington College, organized in 1773, is situated here. Pop., 1900, 3008; 1910, 2735.

CHESTNUT, chĕs'nŭt (formerly *chesten-nut*, a contamination of AS. *cisten*, OHG. *chestinna*, *kestinna*, Ger. *Kastanie*, chestnut, and OF. *chastaine*, It. *castagna*, Lat. *castanea*, chestnut, from Gk. καστανέα, *kastanea*, Arm. *kask*, chestnut; connected with Gk. Κάστανα, *Kastana*, or Καστανaία, *Kastanaia*, a city of Pontus noted for chestnuts). (*Castanea.*) A genus of plants of the family Fagaceæ, closely allied to the beech (*Fagus*), but botanically distinguished from it by long male catkins, set with groups of flowers, a five to eight celled ovary (bur), and one to three compressed, rounded nuts. Three species are of horticultural and commercial importance for their nuts and wood—the European of Spanish chestnut (*Castanea vulgaris*), the Japanese (*Castanea japonica*, or *Castanea crenata*), and the American (*Castanea dentata*). The European chestnut grows wild in extensive forests in the south of Europe, west of Asia, and north of Africa, and is a large, stately tree. The nuts are usually two in each bur, very large, and of a dark mahogany color. The American chestnut is taller and more spreading. In forests it reaches a height of 100 feet, with a trunk 3 to 4 feet in diameter. It is native from Maine to Michigan and southward to Louisiana and is generally found on high, sandy land, gravel ridges, or mountain slopes comparatively free from limestone. The Japanese chestnut is a smaller tree than either the Europeon or American and has a compact, symmetrical habit. Its large nuts, early and heavy bearing propensities, comparative freedom from blights, and complete union on either its own American-grown or on native American seedlings have brought it into extended use in the United States within recent years as an orchard tree and in grafting over native chestnut forests. Chestnuts are usually propagated from seed, and the seedlings are later grafted or budded with improved varieties. Chestnut timber is coarse-grained, light, and durable, and it finds

extensive use in furniture making and for posts and fence timbers.

In addition to the three species noted above, there are a number of dwarf forms known as chinquapins. The common, or tree, chinquapin (*Castanea pumila*) and the bush chinquapin (*Castanea nana*) are natives of the States south and west of Pennsylvania as far as Texas. The former is a shrub 4 to 5 feet high, though occasionally reaching a height of 30 or 40 feet; the latter rarely exceeds 3 feet. The nuts are smaller than chestnuts, but ripen earlier, are edible, and to some extent marketed. A number of other species are native to the East. *Castanea argentea* and *Castanea tungurrut* of Java are large trees with edible nuts. *Castanopsis chrysophylla* is a California evergreen, the small fruit or nuts of which are eaten. The horse-chestnut (q.v.) is entirely different from the true chestnut.

Chestnut trees in the eastern part of the United States are suffering from a very serious blight. First noticed in a park in Brooklyn, N. Y., in 1904, it has spread until in 10 years it was known to occur from New Hampshire to Virginia and westward to western New York and West Virginia. In parts of the country practically all the native chestnut trees have been destroyed. The cause of the disease is the fungus *Endothia parasitica*, and what is believed to be the same species occurs in China, indicating that the disease was introduced from the Orient. No remedy is known for the trouble. Japanese chestnuts seem less subject to injury than the American species.

Food Value.—Chestnuts when fresh contain 84 per cent of edible portion and 16 per cent of refuse (shell). The edible portion has the following percentage composition: water, 45.0; protein, 6.2; fat, 5.4; total carbohydrates, 42.1; and ash, 1.3. The fuel value is 1125 calories per pound. Unlike most nuts, the chestnut is rich in carbohydrates (largely starch) rather than fat or protein. In Europe steamed chestnuts are eaten with either salt or milk. They are also boiled and roasted, or are used combined with other food materials, and in the manufacture of confectionery. In the form of cakes, called in Italy *necci*, they are a common food. In the United States they are eaten raw or roasted, and are also used for making desert, for stuffing poultry, and in other ways. The candied chestnuts, or *marrons glacés*, are also well known. According to recent investigation, cooked chestnuts are quite thoroughly digested. Chestnuts are dried, and are sometimes ground to a flour used for making a bread or cake.

CHESUN'COOK LAKES (N. Amer. Indian, great discharge place). A group of lakes in Piscataquis Co., Me., the chief being Chesuncook Lake, 18 miles long and from 1 to 2 miles wide, and Ripogenus Lake, 2 miles long and 1 mile wide, which are but expansions of the Penobscot River (Map: Maine, C 3). Lake Chesuncook has the following feeding lakes or ponds: Longeley Pond, Umbazooksus Lake, Cuxabexis, Duck and Moose ponds, Mud Pond, Ragged Lake, and Caribou Lake, 7 miles long and 1½ miles wide. Lake Ripogenus has as a feeder Harrington Lake, 3 miles long and 1 mile wide. Lobster Pond, 5 miles long and 1½ miles wide, between Ragged Lake and North Bay of Moosehead Lake, may also be included in the Chesuncook system. Lying to the northwest of this section and directly connected with it by the Cauquomgomoc River, 12 miles long, are Lake Cauquomgomoc, about 7 miles long and nearly 2 miles wide, and its feeding lakes—Lone Lake, Poland Pond, Round Pond, and Shallow Lake.

CHETIMACHES, shĕt'ĭ-mâsh', LAKE. See GRAND LAKE.

CHET'TLE, HENRY (?–c.1607). An English dramatist. Of the 13 or more plays of which he was the sole author, only one has survived, the lurid *Tragedy of Hoffman, or a Revenge for a Father* (performed 1602, printed 1631; ed. by H. B. Leonard, 1851). Of 36 plays on which he collaborated, only four were printed. Very attractive is *The Pleasant Comedie of Patient Grissil* (printed, 1603; ed. by J. P. Collier, 1841). Chettle's name is forever linked with Shakespeare's. He edited Greene's *Groatesworth of Wit* (1592), in which Shakespeare was attacked; apologized in a memorable passage in a pamphlet entitled *Kind Heart's Dream* (1592 or 1593; reprinted by C. H. Ingleby in *Shakespeare Allusion Books*, 1874); and apparently alluded to Shakespeare in "Silver-tongued Melicert," in *England's Mourning Garment* (1603; reprinted with *Kind Heart's Dream*, as above). There are two careful editions of Hoffman—one by H. B. L[ennard] (London, 1852); the other by Richard Ackermann (Bamberg, 1894). Consult also Ward, *History of English Dramatic Literature* (London and New York, 1899), and *Cambridge History of English Literature* (Cambridge and New York, 1907–13).

CHEVALIER, shĕv'ă-lēr' (Fr., variant of *cavalier*, It. *cavaliere*, from ML. *caballarius*, horseman, from Lat. *caballus*, horse). In heraldry, a horseman armed at all points. In the more general acceptation it signifies a knight (q.v.). See BANNERET; CHIVALRY.

CHEVALIER, THE YOUNG. The popular title of the grandson of James II of England, otherwise known as the Young Pretender (q.v.). See STUART, CHARLES EDWARD.

CHEVALIER, shə-vă'lyā', ALBERT (1861–1923). An English music-hall singer, and composer of "coster" songs. He made his first public appearance in 1877, at the Prince of Wales's Theatre, during the Bancroft management, in *An Unequal Match*. For some years he continued as a regular actor at the Court Theatre, with John Hare, and elsewhere, till in February, 1891, he made a great hit at the Pavilion Music Hall, developing his special gift of mimicking the traits of the London costermonger, as in the song *My Old Dutch*. His talents as composer and singer have brought him great popularity. In 1896 he spent some time in the United States, repeating his favorite performance. In 1911 he played at the Savoy Theatre, London. He is also the author of dramatic pieces, notably *Tommy Dodd*, which he produced at the Globe Theatre, London, in 1898, and of a volume of reminiscences called *Before I Forget*.

CHEVALIER, MICHEL (1806–79). A French economist. He was born in Limoges, Jan. 13, 1806, and was at the age of 18 admitted as a pupil of the Polytechnic School. Thence he went to the School of Mines, and some days before the revolution of July he was appointed engineer to the Département du Nord. In early life he accepted the doctrines of Saint-Simon and collaborated with the latter in the publication of the *Organisateur* and the *Globe*. In 1834 he was commissioned by the government

CHESTNUT TREE AND FLOWER SPRAY (Castanea Americana)

to visit North America and to prepare a report on the canals, roads, and railways of that continent. He traveled for two years in the United States, Mexico, and Cuba, and published the results of his experiences in a series of letters in the *Journal des Débats*. In 1840 he was appointed professor of economics in the Collège de France, and in 1845 he was elected a deputy, but served only till next year, his championship of free trade preventing his re-election. He lost his professorship during the provisional government, but later won the favor of Louis Napoleon and was reinstated. In 1860 he became senator. He died in Montpellier in 1879. The most important work with which Chevalier's name is associated was the commercial treaty of 1860 between France and England, negotiated by Chevalier and Richard Cobden. This treaty inaugurated a new era in the commercial policy of western Europe. Of his works, that most frequently quoted is his *Probable Fall in the Price of Gold* (1854). Other works are: *Letters from North America* (1836); *Material Interests in France: Public Works, Roads, Canals, Railways* (1838); *Letters on the Organization of Labor and the Question of the Laborers* (1848).

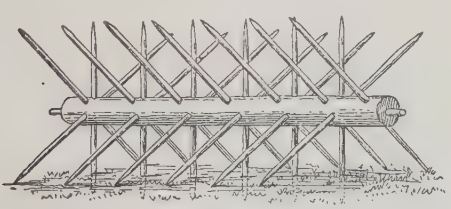
CHEVALIER AU CYGNE, ō sē'ny' (Fr., knight of the swan). A character also known as Helias, occurring in the Icelandic sagas, the legends of Germany and Flanders, and the early French romances. In the latter he is made grandfather to Godfrey de Bouillon. His name is more especially familiar as the title of a set of *chansons* composed shortly after the Crusades, among the individual titles of which are *Antioche, Les Chétifs,* and *Les Enfances de Godefroy.*

CHEVALIER DE SAINT GEORGE, de săN zhôrzh (Fr., knight of St. George). A title assumed by the "Old Pretender," James Stuart.

CHEVALIER D'INDUSTRIE, dăN'dụ'strē' (Fr., knight of industry). A man who lives by expedients and trickery. The term is derived from Alexandre Duval's five-act comedy in verse of that name, which was presented at the Théâtre Français on April 3, 1809. The hero, Saint-Remi, is a *chevalier d'industrie,* who palms himself off as a gentleman of quality. The scene is laid in the home of a rich merchant, where, after a number of diverting escapades, Saint-Remi's roguery is finally exposed. It is one of the weakest of Duval's plays.

CHEVALIER SANS PEUR ET SANS REPROCHE, săN pēr å săN re-prôsh'. See Bayard, Pierre du Terrail.

CHEVAUX-DE-FRISE, she-vō'de-frēz' (Fr., horses of Friesland). An array of sharp or ragged points placed in a position towards the



CHEVAUX-DE-FRISE.

enemy and designed to stay his advance. They are usually made of wood or iron and are, as a rule, a substitute for regular abatis. See Abatis; Fortification.

CHEVECHE, she-vēsh', or **CIVETTA,** chē-vĕt'tà. The common names in France and Italy, respectively, of the "little owl" (*Carine noctua*) —the bird of Pallas Athene and hence the emblem of Athens and associated with Minerva and the idea of Wisdom. See Owl, and Plate of Owls.

CHEVERNY, she-vâr'nē', Philippe Huralt, Count de (1528–99). A French statesman and author. He was born at Cheverny, in Brittany, and was appointed Chancellor to the Duke of Anjou, in 1562, through the influence of Catharine de' Medici. Under her son, Henry III, he became Guard of the Seals (1578) and Chancellor of France (1581), but fell into disgrace by supporting the League and was deprived of his post in 1588. In 1590 he was restored to favor by Henry IV, whom he served until his death. Count de Cheverny was the author of *Mémoires d'estat* (1636).

CHEVERT, she-vâr', François de (1695–1769). A French general. He was born at Verdun and took part in nearly all of the important campaigns fought during the reign of Louis XV. Marshal Saxe placed him in command of the grenadiers at the battle of Prague, and Chevert and his sergeant, Pascal, were the first to mount the walls of the city. In December, 1742, he heroically defended the same city with a handful of men. His skillful manœuvre decided the battle of Hastenbeck. He became lieutenant general in 1748.

CHEVES, chēvz, Langdon (1776–1857). An American lawyer and statesman, sometimes called "the Hercules of the United States Bank." He was born in Abbeville Co., S. C.; was self-educated; was admitted to the Charleston bar in 1797 and rapidly rose to eminence as a lawyer. In 1808 he became Attorney-General of his State, and, after serving three terms in the South Carolina Legislature, was elected to Congress by the Young Republican party in 1811. In Congress he was closely associated with William Lowndes, Henry Clay, and John C. Calhoun, and formed with them the celebrated "War Mess." He served as Speaker in 1814, and by his casting vote defeated the Dallas Bill for rechartering the United States Bank. In 1815 he resumed the practice of law in South Carolina, and from 1816 to 1819 was one of the associate justices of the State. In January, 1819, he was elected one of the directors of the United States Bank and in the following March was chosen to succeed Jones as president of that institution. The bank was then in a deplorable condition, and insolvency seemed almost inevitable; but Cheves set about restoring its credit, and, by continuing a previous policy of curtailing the note issues, by enforcing a rigid collection of all balances due from local banks, and by securing a loan of $2,000,000 in Europe, he fully accomplished his purpose within three years. In December, 1822, he resigned, and was succeeded by Nicholas Biddle (q.v.). Subsequently, until his death, he lived in retirement, first in Philadelphia, then in Lancaster, Pa., and finally in Charleston, S. C.; but in 1850 he went as a delegate to the celebrated Nashville Conference, where he expressed himself in favor of a Southern Confederacy, but strongly deprecated any independent action by separate Southern States. A brief account of his services to the United States Bank is given in the *Annual Report of the American Historical Association for 1896* (Washington, 1897).

CHEVILLARD, shĕ-vē′yȧr′, CAMILLE (1859–1923). A French composer and conductor. He was born in Paris, Oct. 14, 1859, a son of the famous 'cellist Pierre Chevillard. He studied piano under G. Mathias, while in composition he was almost entirely self-taught. For several years he acted as assistant conductor to his father-in-law Lamoureux, whom, on the latter's death in 1899, he succeeded. Under Chevillard the *Concerts Lamoureux* have maintained their high standard of excellence and progressiveness. In 1903 he received the Prix Chartier for chamber music, and was in 1913 president of the Société Française de Musique de Chambre. His compositions comprise a symphonic ballad, a symphonic fantasy, a string quartet, a piano quintet, a piano trio, a sonata for violin and piano, and a sonata for 'cello and piano.

CHEVIOT HILLS, chĕv′ĭ-ŭt *or* chē′vĭ-ŭt. A mountain range in the counties of Northumberland and Roxburgh, on the English and Scotch borders, extending 35 miles, from near the junction of the Till and Tweed in the northeast, to the sources of the Liddel in the southwest (Map: England, D 1). The highest point is Cheviot Peak, 2658 feet high. The hills are noted for a valuable breed of sheep and for their connection with the border warfare of earlier history.

CHEVREAU, shĕ-vrō′, HENRI (1823–1903). A French legislator. He was born in Belleville, Seine. He was one of the strongest supporters of the coup d'état of 1851. In 1870 he superseded Baron Haussmann as Prefect of the Seine and, after the first defeat sustained by the French army in that year, was appointed Minister of the Interior. In this capacity he energetically promoted the organization of the Garde Mobile throughout the country, encouraging the formation of bodies of *francs-tireurs* (sharpshooters), and completing in Paris the equipment of 60 new battalions of the Garde Nationale. After the disaster at Sedan and the revolution of September 4, he fled to Brussels and subsequently rejoined the Empress Eugénie in England. He was elected a member of the Chamber of Deputies in 1885.

CHEVREUL, shĕ-vrēl′, MICHEL EUGÈNE (1786–1889). A French chemist, born at Angers, in the Department of Maine-et-Loire. He studied chemistry in Paris, became assistant to Vauquelin, and in 1813 was appointed professor of the physical sciences at the Lycée Charlemagne. In 1820 he was made examiner in the Ecole Polytechnique and in 1824 director of the dyeing department in the Gobelin manufactory. In 1830 he became professor of applied chemistry in the Museum of Natural History and in 1879 retired from active service. In recognition of his important services to science many honors were conferred upon him; he was made a member of the Institute, a fellow of the Royal Society of London, a commander of the Legion of Honor, etc. In 1886 the centenary of his birth was celebrated with great enthusiasm; and in the same year Harvard University, on the two hundred and fiftieth anniversary of its foundation, conferred upon him the degree of LL.D. A monument to his memory was erected at Angers in 1893. Another statue of Chevreul may be seen in the Museum of Natural History in Paris. Among his researches may be mentioned his successful investigation of the chemical nature of fats, which has led to the achievement of industrial results of the greatest importance. He was the first to demonstrate that the various fats are mixtures of glycerides, or compounds of glycerin with oleic, stearic, and palmitic acids. (See FATS.) He recognized that the stearic acid (or usually rather a mixture of stearic and palmitic acids) that may be obtained from solid fats would make an excellent material for candles. He was, however, unable to "break the grain" of the stearic acid (i.e., to prevent it from solidifying in the form of large crystals), and this was at least one of the reasons of the failure of his attempt to found the "stearin-candle" (or, as it should be called, the "stearic-acid candle") industry. Nevertheless it was on the basis of the discoveries of Chevreul that this important industry was subsequently established in 1851. He wrote: *Recherches chimiques sur les corps gras d'origine animale* (1823); *Considérations générales sur l'analyse organique et sur ses applications* (1824); *Leçons de chimie appliquée à la teinture* (2 vols., 1831); *De la loi du contraste simultané des couleurs et de l'assortiment des objets coloriés* (1839); *Théorie des effets optiques que présentent les étoffes de soie* (1846); *Des couleurs et de leur application aux arts industriels* (1864); *Résumé d'une histoire de la matière* (1878); etc. Consult Malloizel, *Œuvres scientifiques de Chevreul* (1887); also Hofmann, "Nekrolog auf Chevreul," in the *Berichte der deutschen chemischen Gesellschaft*, for 1887.

CHEVREUSE, shĕ-vrēz′, MARIE DE ROHAN, DUCHESSE DE (1600–79). One of the foremost opponents at the court of France to Richelieu, who banished her to England. After the death of Louis XIII she returned and participated in the Fronde (q.v.), defending Condé. She was a patron of La Rochefoucauld (q.v.). She was the widow of the first Duke of Luynes when she married Claude of Lorraine, Duc de Chevreuse. Consult the biography by Cousin (7th ed., Paris, 1886).

CHEVRON, shĕv′rŭn (Fr., ML. *capro*, rafter, from Lat. *caper*, goat). Any ornament in the form of a V, whether isolated, arranged in rows with the points in the same straight line, or in rows, side by side. In the latter case the ornament is more generally called a zigzag. Chevrons

CHEVRONS.

play an important part in Assyrian ornament; and, in the form of molded zigzags, in the French Norman and Anglo-Norman architecture of the eleventh and twelfth centuries, especially in the decoration of arch moldings. In heraldry (q.v.), one of the charges known as ordinaries.

CHEVRONS, shĕv′rŭnz (Fr. *chèvre*, a goat). Badges or insignia of rank consisting of stripes meeting at an angle and worn on both sleeves of the coat by noncommissioned officers. *Sleeve insignia* for rated enlisted men, not noncommissioned officers, are sometimes called *chevrons*. In the United States army such badges of rank are worn by all noncommissioned

officers and are of cloth corresponding in colors and pipings to the patterns laid down for stripes on trousers. (See UNIFORMS, MILITARY.) The chevrons are worn with the points up and midway between the elbow and top of sleeve. They are worn on the sleeves of the overcoat and all coats; also on the sleeves of the sweater in the field and on the sleeves of the olive-drab shirt when worn without the coat or sweater. The word *chevrons* is often improperly used to designate the *service stripes* worn by all enlisted men who have served faithfully for a period of three years. A *stripe* is added for each such period. They are worn diagonally on both sleeves of the dress coat below the elbow, and are of the color of the facings of the arm in which the service was rendered. To indicate *service in war* half chevrons, or stripes of white, were *formerly* worn on the sleeve. These have been replaced by *campaign badges* worn on the left breast. Previous to 1902 chevrons were worn with the points down, except by the cadet officers of the United States Military Academy and the noncommissioned officers of the United States Marine Corps.

Chevrons worn by noncommissioned officers of the line, according to their rank, are as follows: *regimental sergeant major*, three bars and an arc of three bars; *regimental quartermaster sergeant*, three bars and a tie of three bars; *regimental commissary sergeant*, three bars and a tie of three bars, having a crescent (points rear); *squadron* or *battalion sergeant major*, three bars and an arc of two bars; *chief musician*, three bars and an arc of two bars, with a bugle in the centre; *chief trumpeter*, three bars and an arc of one bar, with a bugle in the centre; *principal musician*, three bars and a bugle; *drum major*, three bars and two embroidered cross batons; *first sergeant*, three bars and a lozenge; *troop, battery*, or *company quartermaster sergeants*, three bars and a tie of one bar; *sergeant*, three bars; *color sergeant*, three bars and a star; *corporal*, two bars; *lance corporal*, one bar; *stable sergeant, field artillery*, three bars and a horse's head. Post permanent staff, engineer, hospital, ordnance, and signal corps noncommissioned officers wear chevrons in which the stripes are accompanied usually by a cloth device designating the corps or department of the service to which they belong. (See MILITARY INSIGNIA; for conditions under which campaign badges are worn, see UNIFORMS, MILITARY.) The service stripes to indicate enlistment periods, if more than one, are worn one above the other, in the order in which they were earned, one-quarter of an inch distance between them.

Chevrons of varying number and design are worn for the same reason and purpose in practically every civilized army, the English and French systems more closely approaching the United States than do the other nations of continental Europe. Chevrons as badges of distinction were first introduced in the Prussian cavalry in 1889 and are worn by expert swordsmen. In France veterans and noncommissioned officers promoted for long service are called *chevronnés*. In England warrant and noncommissioned officers wear the badges similarly to the French, on the left sleeve of the coat, between the elbow and the shoulder. Four chevrons denote the rank of quartermaster sergeant, three a sergeant, two a corporal, and one a lance corporal of infantry, a bombardier of artillery, and a second corporal of engineers. They are worn point downward. Warrant officers (i.e., regimental sergeant major or bandmaster) are distinguished, the former by a gold crown worn over the left cuff, and the latter by a gold lyre similarly worn. Chevrons for long service are worn by private soldiers on the right forearm, points upward. Chevrons for long service in the case of enlisted men or for rank in the case of noncommissioned officers below the rank of full sergeant are of cotton braid, the color of which is determined by the arm of the service to which the wearer belongs. Noncommissioned officers of sergeant's rank and upward wear gold chevrons.

CHEVROTAIN, shĕv'rō-tān' (Fr., from OF. *chevrot*, dim. of *chevre*, from Lat. *caper*, goat). A group (Tragulina) of diminutive, hornless, deerlike animals, the smallest-known ungulates, which are intermediate in structure between pigs, camels, and deer, but resemble agoutis in form, standing only about 12 inches high. Several species inhabit southern India, Ceylon, and the Malayan region, and one inhabits the Philippines. These belong to the genus *Tragulus*, and the best known are the kanchil (*Tragulus kanchil*) of the Malayan Islands and the Indian chevrotain, or mouse deer (*Tragulus meminna*), which differs from the others in being spotted with white. Usually the fur has some soft and beautiful hue of rufous, tawny, or mouse gray. In West Africa is a related species, the "biche cochon," or "water deer" (*Dorcatherium aquaticum*), which is rich brown, with the back and sides spotted and striped. All are shy little creatures, walking with a queer, stiff-legged, tiptoeing gait and hiding in thickets and rocky jungles, but capable of becoming gentle pets. These constitute the family Tragulidæ, which seems to be a scant survival of a group of forms widely distributed throughout all the temperate zone in Middle Tertiary times, and traceable to the same ancestry as the deer. See Plate of FALLOW DEER, MUSK, ETC., with DEER.

CHEVY (chĕv'ī) **CHASE** (probably a corruption of Fr. *chevauchée*, raid; scarcely connected with Eng. *chevy, chivy*, to drive, from Gypsy *chiv*, goad). The name of perhaps the most famous of British ballads. It has been preserved in two forms, known severally as the Scotch version and the English version, of which the former is the older and the more imaginative. To the Scotch ballad there is a reference in *The Complaynt of Scotland* (1549), and apparently in Sidney's *Apologie for Poetrie* (1595). The English poem, best known in England, was praised by Addison for its naturalness and simplicity (*Spectator*, Nos. 70, 74, 85) and continues to be a favorite poem. It is impossible to reconcile its incidents with history, but the event which is meant to be commemorated appears to have been the battle of Otterburn, in August, 1388—a fight which Froissart declares to have been the bravest and most chivalrous which was fought in his day. According to the ballad, Percy, surnamed Hotspur, vowed that he would enter Scotland and take his pleasure for three days in the woods of his rival and slay the deer therein at will. Douglas sent back word that he would prevent the sport. Accordingly, at the time of the hay harvest, Percy, with staghounds and archers, passed into the domains of his foe and slew 100 fat bucks. After the English had hastily cooked their game, Douglas, clad in armor and heading his Scot-

tish spears, came on the scene. Haughty challenge and defiance passed between the captains, and the battle joined. In the centre of the fray the two leaders met, and during the fierce combat an English arrow struck Douglas to the heart. "Fight on, my merry men all!" cried he, and died. Percy, with all the chivalrous feeling of his race, took the dead man by the hand and vowed that he would have given all his lands to save him, for a braver knight never fell by such a chance. Sir Hugh Montgomery, having seen the fall of Douglas, clapped spurs to his horse, dashed on Percy, and struck his spear through his body a long cloth yard and more. When the battle ended, representatives of every noble family on either side of the border lay on the bloody greensward. Consult "The Hunting of the Cheviot," in Child, *English and Scottish Ballads*, vol. iii (Boston, 1878; last ed., with memoir by Kittredge, 1898); Gummere, *The Popular Ballad* (New York, 1907); and see BALLAD.

CHEW, BENJAMIN (1722–1810). An American jurist, born at West River, Md. He studied law in the office of Andrew Hamilton (q.v.) in Philadelphia, Pa., and afterward in London; returned to Philadelphia in 1754 and was successively Register of Wills, Attorney-General, and Chief Justice of Pennsylvania. After the adoption of the Declaration of Independence he joined the ranks of the Loyalists, or Tories, resigned the chief-justiceship, and retired to private life. Stubbornly refusing to sign a parole, he was imprisoned at Fredericksburg, Va., in 1777. In the same year his elegant mansion (still known as the "Chew House") in Germantown was badly damaged by the cannonading to which it was subjected during the battle of Germantown, its occupation early in the engagement by the British, and the unwise attempt of the Americans to capture it, probably turning the fortunes of the day. (See GERMANTOWN.) Chew was President of the High Court of Errors and Appeals from 1790 until the abolition of this court in 1806.

CHEW, NG POON (1866–). A Chinese-American editor, born at Sun Ning, China. He was educated in the Occident School, San Francisco, and in the San Francisco Theological Seminary. His Chinese parents intended him for the Taoist priesthood, but he became converted to Christianity and entered the Christian ministry. He resigned his ministerial work in 1899 and began the publication of the first Chinese illustrated weekly and of *Chung Sai Yat Po*, the first Chinese daily newspaper in the United States. He became adviser to the Chinese consulate general in 1906. Chew came to be regarded as an authority on matters of Chinese exclusion and of American-Chinese relations. He published *Non-Exclusion* (1905) and *Treatment of Exempt Classes of Chinese in America* (1908).

CHEW'ING GUM. A preparation of some form of gum resin, to which a flavoring matter is often added. The gum resin of black spruce (*Abies nigra*), in its original state, was probably first used for this purpose; but the demand is now supplied by various manufactured preparations, and spruce gum occurs less frequently than formerly. The gum resins of sweet gum (*Liquid-ambar styraciflua*), tamarack (*Larix americana*), and certain other forest trees are also used. The substance most extensively employed in the manufacture of chewing gum is chicle gum (13,758,592 pounds, valued at $5,282,722, having been imported into the United States in 1913), an elastic gum from the naseberry (*Achras sapota*), a tree found in Central and tropical South America, somewhat similar to the India-rubber tree. Balsam of tolu, also found in South America, is a constituent of certain kinds of gum, while paraffin has also been employed. The gum of the white sap of the South and Central American trees is usually first allowed to oxidize and then melted in a crude oven and the resulting product flavored with brown sugar and colored with appropriate stains and flavoring matters. This may be done before export, but in the United States the product is carefully worked up in large factories. The practice of chewing gum is probably harmless, and in mild cases of indigestion it may even be somewhat beneficial, by mechanically stimulating the flow of saliva. Pepsin and similar substances are often mixed in with the gum; but it is safe to say that the success of any particular brand depends more upon its sweetness and flavor than upon any beneficial properties.

CHEWINK, chē-wĭnk′ (imitation of its cry), or TOWHEE. A large terrestrial finch of the genus *Pipilo*, represented by several species in North America, of which the common Eastern species, the red-eyed towhee (*Pipilo erythrophthalmus*), is best known. It is about 8 inches in length, of which the tail is nearly half. The male is black, with a white belly and chestnut sides and with prominent white markings on the tail. The female is grayish brown where the male is black. It is a migratory bird, wintering in the Southern States and breeding from Georgia northward. The nest is built on or near the ground, of bark and leaves, lined with grass, and usually most cleverly hidden by an apparently accidental roof of twigs, leaves, etc. Eggs, four or five, white, spotted with rufous. The chewink is an active bird, spending its time mostly on the ground in woods and thickets, scratching about in the leaves in search of its insect prey, and now and then flying to some low branch or convenient fence rail to utter his melodious "chewink," or, in the spring, to pour forth a short but most musical song. The various names "chewink, towhee, joree," etc., are in imitation of its sharp call note, while "ground robin" refers to its colors, suggesting those of the American robin. See Plate of SPARROWS, and Plate of EGGS OF SONG BIRDS.

CHEYENNE, shī-ĕn′, *local pron.*, shī-ăn′. The capital of Wyoming and the county seat of Laramie County, 105 miles by rail north of Denver, Colo., on the Union Pacific, the Burlington and Missouri River, and the Colorado and Southern railroads (Map: Wyoming, G 4). Among the prominent buildings are the State Capitol and Governor's mansion, the High School, Carnegie Library, Federal Building, Elks' Home, County Hospital, Catholic Convent, Opera House, and the stone depot of the Union Pacific Railroad. There are three attractive parts. Fort D. A. Russell, a well-equipped military post, is 3 miles distant from the city. The annual celebration of Frontier Days at Cheyenne attracts thousands of visitors. The city is an important stock-raising centre, with large stock-feeding yards and an independent packing establishment, and has railway shops of the Union Pacific, pressed-brick works, and an ice plant. Iron is mined in the vicinity. The place was first settled in 1867,

when the Union Pacific Railroad reached that point, and in 1869 was chosen as the territorial capital of Wyoming. In the same year a large portion of the town was destroyed by fire. Cheyenne has adopted the commission form of government. Its water works are owned by the municipality. Pop., 1900, 14,087; 1905, 13,656; 1910, 11,320; 1920, 13,829.

CHEYENNE, shē-ĕn′. A brave and warlike Plains tribe of Algonquin stock. They lived at one time on the Cheyenne River, a tributary of the Red River of the North, and according to tradition were friends of the Ojibway and the Dakota while these two powerful tribes were at war with each other. At last the Ojibway became suspicious, set upon the Cheyenne, and drove them down into the Dakota country. After this they roamed about the headwaters of the Platte, finally dividing into two bands, one of which became affiliated with the Kiowa of the South and the other with the Dakota of the North. These groups are, respectively, the Southern and Northern Cheyenne. They number 3055 and are confined to reservations in Montana and Oklahoma. In culture they are typical Plains Indians, living in tepee, observing the Sun Dance, and maintaining a complex social organization. Their ceremonies have been described by Dorsey, *Field Columbian Museum Publications* (Chicago, 1905).

CHEYNE, chā′nē, George (1671–1743). An English physician. He was born in Methlick, Aberdeenshire, studied in Edinburgh, and in 1702 went to London, where he was elected fellow of the Royal Society. He became enormously corpulent and, having secured relief by a milk and vegetable diet, recommended this treatment in all his subsequent treatises. His works, eminently argumentative in tone, were widely popular and were translated into foreign languages. They include: *Essay on Health and Long Life* (1724; 7th ed., 1726); *The English Malady* (1733; 6th ed., 1739); and *Essay on Regimen* (1740). His correspondence with Richardson, the novelist, appeared in 1817, as *Original Letters, edited by Rebecca Warner.*

CHEYNE, Thomas Kelly (1841–1915). An English biblical critic. He was born in London, Sept. 18, 1841; took the degree of B.A. at Oxford, 1862; was fellow of Balliol College there, 1868–82; became Oriel professor of the interpretation of Holy Scripture, 1885; and canon of Rochester, 1885. He was rector of Tendring, Essex, 1880–85; a member of the Old Testament Revision Company, and Bampton lecturer, 1889. His publications include: *Commentaries* on Isaiah (1880–81; 3d ed., 1884), Jeremiah (1883–84), Hosea (1884), Micah (1882); a new translation of the Psalms (1884); and critical works, such as *Job and Solomon* (1887); *Jeremiah: His Life and Times* (1888); *The Hallowing of Criticism* (1888); *The Origin and Religious Contents of the Psalter* (Bampton lectures, 1891); *Aids to the Devout Study of Criticism* (1892); *Founders of Old Testament Criticism* (1894); *Introduction to the Book of Isaiah* (1895); *The Christian Use of the Psalms* (1899); *Jewish Religious Life after the Exile* (1898); *Critica Biblica* (1904); *Bible Problems and the New Material for their Solution* (1904); *Traditions and Beliefs of Ancient Israel* (1907); *Decline and Fall of the Kingdom of Judah* (1908); *The Two Religions of Israel* (1910); *Mines of Israel Re-explored* (1912); and *The Veil of Hebrew History* (1913). With J. S. Black he edited the *Encyclopædia Biblica* (1899 et seq.).

CHEYNE-STOKES RESPIRATION. A type of breathing occurring in severe cases of disease of the brain, heart, kidneys, or severe general infections, and usually presaging death. The respirations occur in a regular cycle or rhythm; they gradually become accelerated and deeper up to a certain point, when they grow progressively shallower until breathing has apparently ceased; then, after a long pause, another cycle begins.

CHEYNEY, chā′nĭ, Edward Potts (1861–). An American historical and economic writer, born at Wallingford, Pa. The University of Pennsylvania, from which he graduated in 1883, and where he later became professor of history, conferred the degree of LL.D. upon him in 1911. He spent the years 1884, 1894, and 1904–05 in foreign travel, visiting German universities and studying at the British Museum. His writings, of widely recognized value as college textbooks, include: *Social Changes in England in the Sixteenth Century* (1896); *Social and Industrial History of England* (1901); *Short History of England* (1904); *European Background of American History* (1904); *Readings in English History* (1908); *A History of England, from the Defeat of the Armada to the Death of Elizabeth* (2 vols.; vol. i, 1914). He contributed to the first edition of the New International Encyclopædia.

CHÉZY, shâ′zē′, Antoine Léonard de (1773–1832). A French Orientalist, born at Neuilly. He was the son of Antoine de Chézy (1718–98), a well-known engineer. After studying engineering, in 1799 he entered the Bibliothèque Nationale as librarian in the department of manuscripts, and published *Les amours de Medjnoun et Leïla* (1806), a translation from the Persian of Jami. He devoted himself to Sanskrit also, and a chair of that language was created for him at the Collège de France (1814). Among his works are an analysis of the *Meghaduta* of Kalidasa (1817); *La mort de Yadjnadatta* (1826); *La reconnaissance de Sacountala* (1830, trans. and text); and *L'anthologie érotique d'Amarou* (1831).

CHHATISGARH, chŭt′ēs-gär′. A division of the Central Provinces, British India (q.v.), comprising formerly the districts of Raipur, Bilaspur, and Sambalpur, and several small feudatory states. In 1906 Sambalpur was given to Bengal, and the district of Drug constituted out of parts of Raipur and Bilaspur. These three districts now form the division. The name "Chhatisgarh" means the 'Thirty-six forts.' Area, 21,240 square miles. Pop., 1901, 2,642,983; 1911, 3,246,767.

CHHINDWARA. See Chindwara.

CHIABRERA, kyâ-brā′râ, Gabriello (1552–1638). An Italian poet, sometimes called the Italian Pindar. He was born at Savona, June 8, 1552. A posthumous child, he was educated under his uncle's care in Rome, where he afterward lived many years; but having taken vengeance for an injury done him by an Italian nobleman, he retired to his birthplace, where he married at the age of 50, and where, supported by the patronage of the leading princes of Italy, he spent the rest of his life in independence and the tranquil enjoyment of literary pursuits. Among Chiabrera's *canzonette* are several gems that have entered the *Golden Treasury* of Ital-

ian poetry to stay. His work in general has a great historical importance. His rigid adherence to imitation of the classics left little room for originality of thought; but the sculptural effect of his metrical studies widened the outlook of his contemporaries in matters of form, where his methods influenced moderns like Parini and Carducci. The so-called imitations of Pindar and Anacreon were really inspired by Ronsard and the French *Pleiade*, something of whose spirit Chiabrera caught and indicated to later Italian poets. Consult: bibliography by Varaldo (in *Giornale storico della lett. ital.*, xiii, xiv); autobiography in works (Milan, 1807–08, and Florence, 1863); selected works (Florence, 1865) and in *Oxford Book of Italian Verse* (Oxford, 1910).

CHIAJA, kyä′yȧ, La (dialectic form of It. *piazza*, place, park). A fashionable boulevard in modern Naples, extending along the coast for about a mile from the Largo Vittoria. Upon it is the Villa Nazionale.

CHIANA, kyä′nȧ. A river, the ancient Clanis, in central Italy, which once belonged entirely to the Tiber system. In ancient days it often flooded the valley of Clusium (modern Chiusi) and even caused a dangerous rise of the Tiber at Rome; hence in 15 A.D., according to Tacitus (*Annales*, i. 79), it was proposed to change the channel so as to divert its waters into the Arno, but the people of Florence objected, being unwilling to face the added danger of floods themselves. In the Middle Ages silt from the mountain streams converted the level, fertile valley from Arezzo to Chiusi into a swamp (which Dante spoke of as an accursed sink). Now, as the result of the drainage system carried out at the beginning of the last century by Count Fossombroni (q.v.), the valley is one of the most fruitful districts in Italy. A watershed was formed which sends the Chiana Toscana, or Maestro Canal, north into the Arno, and the Chiana Romana south into a branch of the Tiber at Orvieto. Among the lakes of the Chiana valley are Montepulciano and Chiusi.

CHIANTI, kyän′tē. A name applied to the mountain district of Siena in Tuscany, central Italy, about 30 miles southeast of Florence, which produces the red wine known by the name of the district.

CHIAPA, chē-ä′pȧ, Bishop of. A title often applied to Bartolomé de las Casas, the famous Spanish Dominican, who held that office between 1544 and 1547, and made every effort to ameliorate the condition of the Indians in Mexico and elsewhere. See Las Casas.

CHIAPAS, chē-ä′pȧs (from the Aztec tribe of *Chiapanecs, Chapanecs,* or *Chapas,* who derived their name from Aztec *chapa*, red macaw). A Pacific state of Mexico, situated at the southeastern end of the country, and bounded by the State of Tabasco on the north, Guatemala on the east, the Pacific on the south, and the states of Oaxaca and Vera Cruz on the west (Map: Mexico, N 9). It covers an area of 27,222 square miles. In the southern part are a number of volcanoes, ranging in altitude from about 1500 to over 7000 feet, while the centre consists of a fertile plateau, the most cultivated portion of the state. The climate is moderate and healthful. The state produces corn, coffee, cocoa, sugar, tobacco, and indigo in small quantities, as agriculture is still in a backward condition; gold, silver, copper, and petroleum are mined. Near Palenque, one of the towns in the northeast of Chiapas, are some of the most extensive and magnificent ruins in this portion of America. Pop., 1900, 360,799; 1910, 438,843, chiefly aborigines. Capital, Tuxtla Gutiérrez, pop., 1910, 10,217. Consult: Stephens, *Incidents of Travel in Central America, Chiapas and Yucatan* (2 vols., New York, 1841; 12th ed., New York, 1867); *The State of Chiapas* (Mexico, 1895).

CHIARAMONTE GULFI, kyä′rȧ-mōn′tȧ go͞ol′fē. A town in the Sicilian Province of Syracuse, situated on a high hill, about 8 miles north of Ragusa. The chief occupation is the cultivation of the vine. Pop., 1901, 10,548; 1911, 13,200.

CHIARAMONTI, kyä′rȧ-mōn′tē, Museo. A division of the Vatican Museum (q.v.), arranged in a corridor 900 feet long, containing some 300 marble sculptures.

CHIARI, kyä′rē (It., clear). A city in the Province of Brescia, north Italy, 36 miles east of Milan (Map: Italy, D 2). It has silk factories and tanneries. On Sept. 1, 1701, the Austrians, under Prince Eugene, here defeated the French and Spanish, under Villeroi. Pop., 1901, 10,810; 1911, 12,489.

CHIARINI, kyȧ-rē′nē, Giuseppe (1833–1908). Italian scholar and poet. Beginning life as an official in the Department of Public Education, Chiarini was in 1866 president of the Liceo of Livorno; in 1882, of the Liceo Umberto I, Rome, and in 1892 general superintendent of secondary education. Remembered especially as the friend and interpreter of Carducci, Chiarini lives in his own right as author of nearly 200 critical studies on Italian literature of the nineteenth century, as a translator of Heine, and as the author of a volume of poems, *Lacrymæ*. Consult D'Ancona, in *Rassegna bibliografica* (1908).

CHIAROSCURO (CHIARO-OSCURO), kyä′rō-skō͞o′rō (It., light and dark, from Lat. *clarus*, clear + *obscurus*, obscure). Arrangement of light and shade in a work of art—a most important matter, for without light and shade the sense of projection, rotundity, and corporeity cannot exist. But chiaroscuro is more than that element which gives volume to an object or group of objects; it is at its best that pervading sense of light which merges into shadow still carrying the qualities of light and color with it, so that the whole object may be homogeneous in color. Painters often fail to produce this effect, and the color of an object, after merging into shadow, loses in some hands, in the shadowed portion, the quality that rightly belongs to it. The first great master of chiaroscuro in Italian painting was Leonardo da Vinci, and it was the chief characteristic of the art of his pupils. It was developed to the highest extent by Correggio, the chief effect of whose paintings depends upon this quality, which he mastered with consummate skill. Among the Germans it was practiced especially by Grünewald. Chiaroscuro was the most salient technical characteristic of Dutch painting, and its greatest master of all times was Rembrandt, into whose very depths of shadow we may look and still feel a sense of light reaching thither. Consult the bibliography of Color.

CHIASMA, kī-ăz′mȧ, or **CHIASM.** An X-shaped decussation of nerve trunks. The term refers especially to the *optic chiasm*, where the optic nerves meet and cross at the base of the brain. See Decussation.

CHIASMUS, kī-ăz′mŭs. See SYNTAX, FIGURES OF.

CHIASTOLITE, kī-ăs′tō-līt (from Gk. χιαστός, *chiastos*, diagonal, from χιάζειν, *chiazein*, to yawn, from χι, *chi*, name of the twenty-second letter of the Greek alphabet + λίθος, *lithos*, stone). A dark-colored variety of andalusite, consisting of stout crystals which, owing to a regular arrangement of carbonaceous impurities through the interior, show in cross section a colored cross, square, or tesselated figure. This mineral is found in Andalusia, Spain, in Tirol, in Saxony, in Austria, and elsewhere in Europe, where it is frequently sold as a gem and, owing to the crosslike appearance, is prized, especially among the lower classes. In the United States the best chiastolites are found in Lancaster and Westford, Mass., and especially in Mariposa Co., Cal.

CHIAVARI, kyä′vȧ-rē. A maritime city in the Province of Genoa, Italy, 24 miles east-southeast of Genoa (Map: Italy, D 3). Numerous old towers, one of them of considerable size, are scattered through the town, which has a city hall, statues of Garibaldi and Mazzini, by Rivalta, attractive public gardens, good bathing, a technical and nautical school, and a gymnasium. It is a market for wine, oil, cheese, and fish, and manufactures lace, silk, and furniture, particularly the slender chairs called *sedi di Chiavari*. Chiavari is a starting point for the ascent of Mount Penna; altitude, 5690 feet. Pop., 1901, 12,500; 1911, 13,700.

CHIAVENNA, kyä-vĕn′nȧ (Lat. *Clavenna*, probably from *clavis*, key). A town in the Province of Sondrio, north Italy, picturesquely situated north of Lake Como, on the Mera, at the mouth of the Bregaglia valley, through which passes the road to the Engadine (Map: Italy, D 1). The beautiful church of San Lorenzo has a campanile rising from an arcaded inclosure. Interesting, also, are the ruins of an unfinished castle, and the Giants' Kettles (*marmitte dei giganti*), in the Capiola valley. The chief trade is in fruit and wine, and the manufactures include silk, cotton, beer, and a coarse ware cut out of a soft stone found in the neighborhood. The situation made the ancient Clavenna one of the most important keys to the Alps. Pop., 1901, 4788; 1911, 4547.

CHIBA, chē′bä. A prefectural town of Japan, situated on the coast, about 17 miles by rail from Tokio (Map: Japan, G 6). It yields large quantities of marine products. Pop., 1898, 26,223.

CHIB′CHA, or MUYSCA. An important nation or confederacy centring, at the time of the Spanish Conquest, on the upper Magdalena River, about Bogotá, Colombia, their language being the general trade language throughout the whole mountain region of that country. Detached tribes of the same stock were found along the isthmus, and in Costa Rica. The chief tribes of the Chibchan stock were: in Colombia, the Chibchas or Muycas of the region of Bogotá, the Aruacs of Santa Marta, the Tunebos, east of Bogotá; in the Isthmian region and Costa Rica, the Guaymis, Doraskeans, Talamancans, Guetares, and Guatusos. To these Rivet would add the tongues hitherto classed in three other separate stocks, viz., Barbacoan, Paniquitan, Coconucan. In culture the Chibchas ranked close to the Quichuas, practicing agriculture by the aid of an extensive system of irrigation, weaving cotton cloth, and working gold with a high degree of skill, although ignorant of the use of copper and bronze. They offered heroic resistance to the Spaniards, but were finally subdued and well-nigh exterminated, only a few remnants still surviving in their native mountains. Consult: Restrepo, *Las Chibchas antes de la conquista española* (Bogotá, 1896); Benchat and Rivet, *Affinitiés des langues du sud de la Colombie et du nord de l'équateur* (Louvain, 1910), and works therein cited. Consult also Thomas and Swanton, *Indian Languages of Mexico and Central America* (Washington, 1911), and Rivet, *Antiquités de l'équateur* (Paris, 1913).

CHIBOUQUE, or **CHIBOUK**, chĭ-bo͞ok′ (Turk. *chibuq*, small stick, tube of the pipe). A tobacco pipe used in Turkey and Egypt, having a long wooden stem, often of valuable material, a mouthpiece of glass or amber, and a bowl of baked clay.

CHIC, shĕk (Fr., familiar abbreviation of Fr. *chicane*. In the expression *de chic à chic*, 'little by little,' used in France in the sixteenth century; *chic* is the Sp. *chico*). A colloquial term used in painting to express the art of giving efficiency in the most dexterous manner possible, with ability and adroitness closely united. The word is also employed in connection with fashion; and, in this sense, means style, manner, grace, and 'go.' See PSCHUTT.

CHICA, chē′kȧ (So. Amer.). A dyestuff, which gives an orange-red color to cotton. It is obtained by boiling the leaves of a species of *Bignonia* (*Bignonia chica*, Humb.), a native of the banks of the Cassiquiare and the Orinoco. The Indians use it for painting their bodies.

CHICA, chē′kȧ (So. Amer. Indian), PITO, POSO, or MAIZE BEER. A fermented liquor made from maize or Indian corn. It is much used in some parts of South America. See BEER.

CHICA (Sp., fem. of *chico*, small, from Lat. *ciccus*, trifle). A lively dance, popular in Spain and in South America as well; possibly of Moorish origin.

CHICAGO, shĭ-kȧ′gō. The county seat of Cook Co., Ill., the second city in population and importance of the United States, and the railroad centre and commercial metropolis of the West (Map: Illinois, E 2). It is situated on the southwest shore of Lake Michigan, at the mouths of the Chicago and Calumet rivers, in lat. 41° 53′ 6″ N., long. 87° 38′ 1″ W.; distant 2274 miles from San Francisco, 911 from New York, 790 from Washington, and 915 from New Orleans.

Description. The city, one of the few great metropolises of the world built directly on a lake front, extends along Lake Michigan for 24 miles, occupying, on a remarkably level site, an area of 191.3 square miles, at an average elevation over the larger part of about 15 feet above the level of the lake, which is 582 feet above sea level. Within the municipal limits are several bodies of water—Calumet, Hyde, and Wolf lakes. The largest of these is Calumet Lake, Wolf Lake lying partly in the State of Indiana, the boundary of which adjoins the city limits for some 4½ miles. Chicago was originally built on a flat prairie, which was but slightly elevated above the level of the lake, and which was characterized by sand and swamp; but the grade of a large portion was raised about 10 feet in the years from 1855 to 1860. Many buildings were lifted to the newly established grade during this period, an entire

business block on one occasion in a single operation. Foundations of buildings in earlier days rested on the blue clay underlying the surface layers of soil and gravel, but in the later era of tall and heavy structures it has become necessary to sink shafts filled with concrete down to bed rock, 75 to 110 feet below the surface. Upon the columns thus prepared a firm footing is provided for the superstructure.

Nature made of the lake shore a broad beach of sand and gravel, back of which there was formerly a line of sand dunes. These sand dunes, which are characteristic of the shores of Lake Michigan, extend for hundreds of miles towards the south and east, but have long since disappeared within the city limits in the course of the city's building. The city's lake front is protected south from Twelfth Street by the Illinois Central Railroad, and north from Twelfth Street to Chicago Avenue by the Government Pier, which protects the harbor. North from Chicago Avenue the Lake Shore Drive and Lincoln Park are secured by a massive sea wall. Chicago is situated upon both sides of the Chicago River (q.v.), which, at a point little more than one mile from its mouth, is formed by the junction of two streams or branches, one flowing from the northwest and the other from the southwest. The river and branches divide the city into three natural parts, legally known as the South, West, and North divisions. The South Division includes all the territory south of the main river, and the North Division the area north of the river; while the West Division comprises all that part of the city west of the two branches. These sections are connected by 66 bridges, 47 of which are movable. Of the latter, 24 are of the bascule type, i.e., having one or two leaves opening upward; one a vertical lift bridge, i.e., lifted bodily upward; and 22 are swing bridges. The bridges of all the various types are mostly operated by electricity, though some of the older swinging bridges are operated by hand power.

Notwithstanding the fact that Chicago stands on a plain of nearly 200 square miles in extent, it is remarkable that the earth beneath it and below the adjoining waters of the lake and river is honeycombed with a vast network of tunnels. These tunnels are designed for various purposes—some to convey drinking water from the lake, some to afford passage for freight between depots and large establishments, and some for street-car traffic under the river connecting the different divisions of the city. There are also minor tunnels and conduits for the use of the telegraph and telephone companies. The people of Chicago have become the greatest tunnel builders, perhaps, of any community on the face of the earth, and the completion of a new tunnel for any purpose occurs so often that it awakens scarcely a passing comment. There are seven tunnels connecting with cribs, 2 to 4 miles in the lake, delivering about 550,000,000 gallons of water per day to the inhabitants of the city, besides land tunnels connecting these to distant sections many miles to the west, north, and south. Far below the surface, low lying as it is, there are flowing rivers of water conducted through these tunnels, the volume of which is almost beyond comprehension, rivaling, indeed, if not surpassing, in their extent and capacity the aqueducts and conduits of ancient Rome. Three tunnels for the use of street cars pass under the river—one under the main river and two under the south branch; and an intricate system of tunnels, 30 feet below the surface, is in use by the Illinois Tunnel Company, devoted mainly to the carrying of heavy merchandise, thus relieving the streets from congestion to a large extent. These tunnels, with an aggregate length of some 60 miles, are also used largely for the conveyance of wires and cables.

Grade crossings of the steam railroads are obviated by numerous bridges, viaducts, and by track elevation—the city containing more than twice as many miles of elevated tracks as are to be found in the combined mileage of all other cities in the United States. There are about 150 miles of the roadbeds of the different railroads entering the city which have been elevated to an average height of 13½ feet above the level of the streets, at an expense to the railroad companies of upward of $70,000,000. The street-railroad system, comprising electric and elevated roads, operates over 1300 miles of track. There are four elevated roads, having six terminal stations. There is a loop in the business centre, with stations two or three blocks apart, around which trains may pass, although in recent practice they follow a continuous route between the outlying terminals of their respective systems. Thus, for a single fare of five cents, it is possible to travel approximately 25 miles on these lines. The street-car systems, both surface and elevated, have paid the city 55 per cent of their net profits since 1907, when the new franchise was adopted, resulting in the addition to the municipal treasury, up to the end of the year 1913, of upward of $10,000,000. These lines connect all parts of the city and suburbs and are extremely efficient, the system probably being the best in the country. The various steam railroads, which have over 1500 miles of track within the city limits, offer additional transportation facilities; and a belt line, encircling the city on three sides, affords intercommunication between the many lines and serves to unify the entire system.

The business centre is found largely in the South Division and extends from the river south to Twelfth Street. It contains the passenger stations of several railroads, administration buildings, hotels, banks, commercial houses, Board of Trade, theatres, the newspapers, and the "skyscrapers," which have made of the Chicago office buildings an architectural type. State, Clark, Dearborn, La Salle, Market, and Madison streets and Fifth and Wabash avenues are typical business streets, Adams and Market streets being prominent centres of the wholesale dry-goods interests and State Street the centre of the retail trade. In Chicago there has been a noteworthy development of the department store, establishments here ranking among the largest and most complete in the United States. Manufacturing establishments are found in various parts of the city, while the great live-stock and packing industry centres in the famous Union Stock Yards, 475 acres in extent, some 5 miles southwest of the City Hall. On the waterways, among the objects of particular interest are the great grain elevators, of which there are 30 or more. The produce markets, South Water Street throughout its whole length of a mile, and Haymarket Square on the west side, present scenes of great animation in the early hours of the day.

The streets, with few exceptions, cross at right angles and are generally wide, some of the boulevards being 120 feet in width. Some of the long thoroughfares, notably Western Avenue and Halsted Street, nearly equal the length of the city. There are over 4000 miles of streets and alleys, over 1400 of which are paved, principally with wooden blocks, macadam, and asphalt, the mileage of the last-named material having increased rapidly in the last few years. Most of the main avenues are parallel with the lake. Of these, the Lake Shore Drive, Michigan, Drexel, and Grand boulevards, Prairie and Calumet avenues, Lincoln Parkway, Rush and Cass streets, and La Salle Avenue, with Washington and Jackson boulevards running east and west, are conspicuous representatives of Chicago's more attractive residence avenues.

Detached houses mark the purely residence districts, which, together with the more recently acquired suburban areas where rural conditions to some extent still prevail, and the magnificent parks and boulevards of the public-park system, are noticeable in contrast with the congested business area, with its noise, dust, and smoke, and numerous tall office buildings. Of these varying mammoth structures, the tallest reaches 22 stories in height, and the largest has a capacity of 6000 tenants. They are constructed of a structural steel frame with an exterior shell of masonry, generally of granite, limestone, or terra cotta. For some time a municipal ordinance limited the height of buildings to 150 feet, but this restriction was removed in 1902. Under a building ordinance, passed in February, 1911, the limit of height is established at 200 feet.

Buildings. In the centre of the business quarter, and covering an entire square, is the Courthouse and City Hall—a magnificent twin building of limestone, with fine granite columns, in a free rendering of French Renaissance, erected at a cost of $10,000,000, i.e., $5,000,000 for each of the structures. The east half is used for county purposes and the west half by the city. On La Salle Street, running south from the City Hall, are some of the finest office buildings. The Chamber of Commerce building, one of the finest commercial structures in the city, costing more than $1,000,000, is 14 stories high, with a great central court roofed by an immense skylight and a richly furnished interior. The Temple, of French-Gothic architecture, 13 stories high, consists of two great wings united by a narrow vinculum, forming interior courts which admit light and air. The first two stories are faced with red granite, the rest with red brick; and near the Monroe Street entrance is the "Willard Fountain," adorned with a bronze figure. The Rookery, a Romanesque building of granite, brick, and terra cotta, contains 600 offices. The Board of Trade, at the foot of La Salle Street, is a massive granite building. Other large structures on La Salle Street are the Tacoma, the Association, New York Life, the Northern Trust, the Otis, the Corn Exchange Bank, the Continental and Commercial Bank, the Borland, the Home Insurance buildings, and the Illinois Trust and Savings Bank, the latter one of the finest edifices in the city.

The Federal Building, 16 stories high, covers an entire block, 321 by 396 feet, bounded by Adams, Jackson, Dearborn, and Clark streets. The structure is of granite and steel and is surmounted by a great dome, 297 feet in height, the interior of which rises 139 feet from the floor to the "eye." The original appropriation for the building was $4,000,000, and, in 1903, $750,000 additional was voted by Congress to finish the interior.

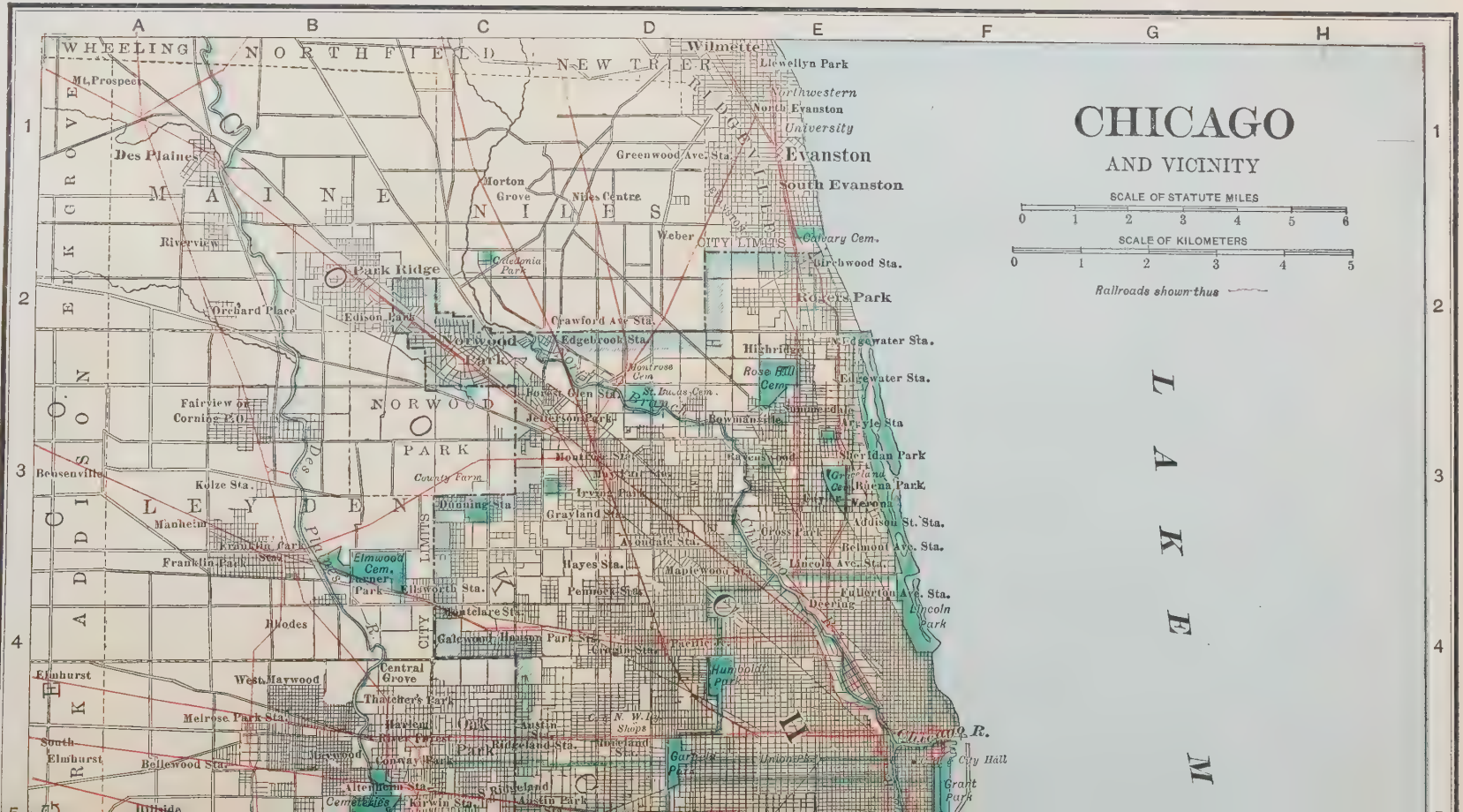
In this vicinity are four great buildings, 16 stories high: the Great Northern Hotel and Theatre, the Monon, the Manhattan, and the Monadnock, costing $3,000,000, constructed of steel and finished in granite and marble. Next to the last is the Union League Club, one of the most handsomely appointed clubhouses in Chicago. West of the Federal Building, on Adams Street, is the wholesale establishment of Marshall Field and Company, designed by the eminent Boston architect, Henry H. Richardson—of note as a more attractive type of the commercial building wherein purely commercial utility is not preëminent. At the corner of Monroe and Dearborn streets is the First National Bank, containing one of the largest banking rooms in the world. Dearborn Street is the site of many tall structures, among which the Unity, Hartford, Marquette, Old Colony, Fisher, and Transportation buildings are prominent. Situated on one of the most busy corners in the heart of Chicago is the 17-story building of the Chicago *Tribune*, one of the best examples of the growth of the æsthetic in Chicago. It is in the Italian style, being attractively built of Bedford stone, gray pressed brick, and terra-cotta trimmings. The corridors are floored in mosaics with marble wainscoting. The woodwork is in mahogany throughout, and the floors of the office portions of the building are of polished oak. On State Street is the Spanish Renaissance Columbus Building, completed in 1893, at a cost of $800,000. It is 14 stories high, with a tower 240 feet high, tipped with a globe of opalescent glass, lighted by a powerful electric light. Over the entrance is a bronze statue of Columbus, and in the interior are two glass mosaics depicting scenes in his life. The retail house of Marshall Field and Company, on State, Washington, and Randolph streets and Wabash Avenue, represents the climax of Chicago's great commercial buildings. The entire block, situated as above described, is occupied with this structure, besides a 20-story building on the south side of Washington Street opposite the main building and connected with it by a subway. This gives a total floor space for store purposes of about 44 acres, an area far in excess of any other store building in the world. The buildings are supported by foundations of concrete columns resting on bed rock 110 feet below the surface. On one corner of Randolph Street is the Masonic Temple, the highest building in the city except the tower of the Montgomery Ward Building, mentioned below. Other structures of interest are the Fair, a building 190 by 350 feet and 180 feet high, with a floor space of 677,500 square feet; the building of Siegel, Cooper, and Company, which affords 542,700 square feet floor space; the Title and Trust Company Building, 16 stories high, which contains offices occupied mainly by lawyers; the Venetian and Reliance buildings, the latter occupied almost entirely by physicians, the Merchants' Loan and Trust Company Building, a 12-story structure of granite, finished in mahogany and marble; the publishing house of A. C. McClurg and Company; the Kimball Hall Building, a musical centre with 200 studios, a music hall, and two recital halls;

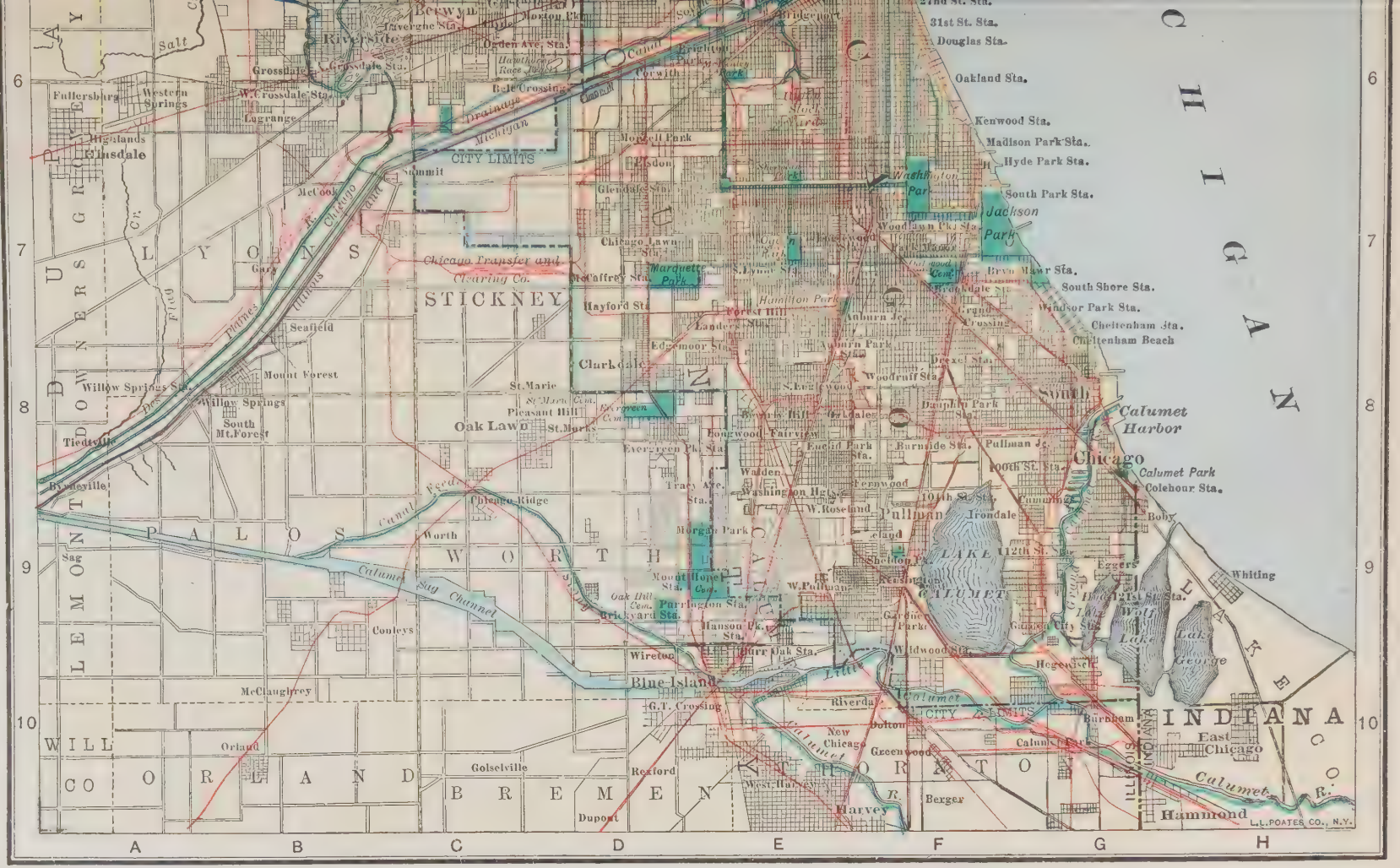
the Schiller Building, containing the Garrick Theatre and halls, clubrooms, and offices; the Ashland Block; the Insurance Exchange; the Harris Trust Building; and the building of the Central Trust Company, four stories in height, at the front of which are placed four huge Corinthian columns, rising 50 feet from sidewalk to architrave.

On Michigan Avenue and Congress Street is the Auditorium, built at a cost of $3,500,000, of granite and brick, 10 stories high, and extending, on the longest front, 360 feet. It contains a large hotel facing the lake, and a beautiful theatre. The tower commands a magnificent view from its height of 270 feet. The main entrance, on Congress Street, leads through a beautiful court, splendidly decorated and with an elaborate mosaic floor, to the grand staircase of marble and bronze. The theatre, which seats 3700 persons, is luxuriously furnished and decorated with attractive mural paintings. The Fine Arts Building, Michigan Boulevard, is a centre of artistic, literary, and educational interests. It contains three auditoriums—Studebaker Hall, with a seating capacity of 1330; University Hall, with 703 seats; and an assembly room. North of it is the splendid Romanesque Chicago Club House, and farther north the building erected, and for many years owned and occupied for business purposes, by the late A. Montgomery Ward, with a tower which rises above its roof to a height of 394 feet, the highest point in the city. Upon its summit is the bronze figure of a goddess, 22½ feet high and weighing 2500 pounds, made to revolve freely on a ball-bearing shaft and serving the purpose of a weather vane. Opposite the end of Adams Street, fronting on Michigan Boulevard, is the Art Institute, the only structure that is permitted to occupy space in Grant Park. It has a frontage of 320 feet, is built of Bedford limestone, and is fireproof. The style is Italian Renaissance, the details classic. The institution, dating from 1866, was known previous to 1882 as the Chicago Academy of Design. It contains a library and lecture hall and collections of great value, some of which are loaned, including paintings, sculptures (both originals and reproductions), textiles, and antiquities. Adjoining the institute, overlooking the park towards the south, is the "Great Lakes Fountain" by Lorado Taft, completed in 1913. It consists of five figures, each representing one of the Great Lakes and holding a vase from which descends a stream of water into the basin below. Connected with the institute is a school of art instruction. The average annual attendance of visitors for some years has been upward of 700,000. On the opposite side of the avenue, to the north, is the magnificent structure of the Chicago Public Library, built in 1893–97. It is a successful rendering of the classic type of architecture and cost $2,125,000. The interior is enriched with Siena and Carrara marble, with 10,000 square feet of glass mosaic, and with beautiful frescoes and inscriptions. The library contained in May, 1913, 514,000 volumes, though it can provide for a much greater number. There are 17 branches located in different parts of the city, two of which are housed in splendid buildings. One is the Blackstone Library, the other the Hiram Kelly Library, both being gifts to the city. The delivery room of the main library is 134 by 48 feet in size. In 1912 the library circulated 2,250,000 volumes. The annual expense of maintenance is about $850,000. The building contains also a large G. A. R. Memorial Hall.

On the North Side, fronting on Washington Square, is the Newberry Library, an imposing structure of steel and granite, completed in 1893. In it are contained 350,000 volumes, none of which are taken from the building. It has a priceless collection of ancient manuscripts, of music and musical literature, and its department of genealogy is the most extensive in the West. Other institutions of allied character, which have noteworthy buildings, are the Chicago Historical Society, in a stone edifice at Ontario and North Dearborn streets—the repository of a fine collection of paintings and interesting historical relics and of a valuable library; and the Chicago Academy of Sciences in Lincoln Park. The University of Chicago (see CHICAGO, UNIVERSITY OF) occupies 95 acres, bordering the Midway Plaisance between Jackson and Washington parks. The Harper Library, connected with this institution, contains about 600,000 volumes and pamphlets. The structures of the university are English Gothic in style, uniformly built of dark limestone. Other notable buildings are the Union, the Chicago and Northwestern, Dearborn, and the Grand Central Railroad stations; and among ecclesiastical edifices are the cathedral of the Holy Name (Roman Catholic), the cathedral of St. Peter and St. Paul (Protestant Episcopal), First Church of Christ (Christian Science), and the Second Presbyterian Church.

Parks. Chicago has a splendid system of public parks, covering over 4600 acres and connected by wide, level boulevards which have aided materially in making the greater Chicago an organic whole. There are about 40 parks, of which seven are of considerable extent. There are, in addition, numerous attractive playgrounds to meet the needs of great masses of children who were without convenient access to the parks. The principal parks are maintained by State funds, and are controlled by a Board of Commissioners for each division of the city, appointed by the Governor; the smaller areas are under municipal control. In the city there is a system of boulevards, aggregating in length a total of 70 miles. These include the well-known Lake Shore Drive, Sheridan Road, Diversey Avenue, and Ridge Avenue boulevards in the North Division; Humboldt, Washington, and Jackson boulevards in the West Division; Michigan Avenue, Grand, Drexel, and Garfield boulevards in the South Division. The North Side park system centres in Lincoln Park (320 acres), one of the most beautiful in the city, with attractions in the way of a zoölogical collection, conservatories, and gardens. It has also statues of Lincoln and Grant (among the most notable of the city), of Linnæus, Schiller, and La Salle, and the Ottawa Indian monuments. Of the South Side parks, Grant Park (210 acres), adjoining the business section on the east, is noteworthy, being on ground mostly reclaimed from the lake. It contains the Art Institute, the spirited equestrian statue of Logan by Saint-Gaudens, and the Rosenberg Fountain. Jackson Park (542 acres) has a world-wide reputation, having been the spacious site of the World's Columbian Exposition (q.v.), of which a few features remain, the most important being the Field Museum of Natural History. It was the Fine Arts Building of the


CHICAGO
AND VICINITY
SCALE OF STATUTE MILES
0 1 2 3 4 5 6
SCALE OF KILOMETERS
0 1 2 3 4 5
Railroads shown thus
LAKE MICHIGAN
WHEELING
NORTHFIELD
NEW TRIER
MAINE
NILES
EVANSTON
NORWOOD PARK
LEYDEN
RIVERSIDE
CICERO
Wilmette
Llewellyn Park
Northwestern University
North Evanston
Evanston
South Evanston
Greenwood Ave. Sta.
Morton Grove
Niles Centre
Weber
CITY LIMITS
Calvary Cem.
Birchwood Sta.
Rogers Park
Mt. Prospect
Des Plaines
Riverview
Park Ridge
Caledonia Park
Orchard Place
Edison Park
Crawford Ave. Sta.
Norwood Park
Edgebrook Sta.
Highrid...
N. Edgewater Sta.
Rose Hill Cem.
Edgewater Sta.
Montrose Cem.
St. Lukes Cem.
Bowmanville
Argyle Sta.
Fairview or Corning P.O.
Jefferson Park
Sheridan Park
Berwyn Ave.
Ravenswood
Ravenswood Park
Irving Park
Verona
Addison St. Sta.
Bensenville
Kolze Sta.
County Farm
Manheim
Dunning Sta.
Grayland Sta.
Avondale Sta.
Gross Park
Belmont Ave. Sta.
Franklin Park
Franklin Park Sta.
Elmwood Cem.
Elmwood Park
Ellsworth Sta.
Hayes Sta.
Maplewood
Lincoln Ave. Sta.
Pennock Sta.
Fullerton Ave. Sta.
Deering
Lincoln Park
Rhodes
Galewood Heaton Park Sta.
Pacific R.
Elmhurst
Central Grove
West Maywood
Humboldt Park
Thatcher's Park
Melrose Park Sta.
Austin
C. & N. W. Ry. Shops
Ridgeland Sta.
South Elmhurst
Bellwood Sta.
Garfield Park
Union Park
Chicago R.
City Hall
Grant Park
Altenheim Sta.
Ridgeland
Austin Park
Cemeteries
Kirwin Sta.
Hillside


Berwyn
Riverside
Grossdale Sta.
Fullersburg
Western Springs
Highlands
Elmhurst
CITY LIMITS
Summit
Chicago Transfer and Clearing Co.
STICKNEY
Seafield
Mount Forest
Willow Springs Sta.
Willow Springs
South Mt. Forest
Tiedtville
Bryceville
Oak Lawn
St. Marie
Pleasant Hill
St. Marks
Clarkdale
Hayford Sta.
Chicago Ridge
Worth
W O R T H
Calumet Sag Channel
Conleys
McClaughrey
Orland
Golselville
Rexford
Dupont
Wireton
Blue Island
Riverdale
New Chicago
Dolton
Greenwood
West Harvey
Harvey
Berger
Hammond
Whiting
East Chicago
Calumet Harbor
Calumet Park
Colehour Sta.
Chicago
South Chicago
Pullman
Kenwood Sta.
Madison Park Sta.
Hyde Park Sta.
South Park Sta.
Jackson Park
Oakland Sta.
31st St. Sta.
Douglas Sta.
Irvington Sta.
South Shore Sta.
Windsor Park Sta.
Cheltenham Sta.
Cheltenham Beach
Woodruff Sta.
Drexel Sta.
Burnside Sta.
Pullman Jc.
Roseland
Morgan Park
Mount Hope Sta.
Oak Hill Cem.
Brickyard Sta.
Manson Park Sta.
Blue Island Sta.
Wildwood Sta.
Hegewisch
Burnham
Calumet City
LAKE CALUMET
LAKE MICHIGAN
INDIANA
ILLINOIS
Calumet R.
Little Calumet R.
LL. POATES CO., N.Y.
A B C D E F G H
6 7 8 9 10

Exposition, has a library and scientific collections, and is endowed with $4,000,000. The famous Midway Plaisance, a mile long and 660 feet wide, leads from Jackson Park past the buildings of the University of Chicago to Washington Park (371 acres), noteworthy for its trees and flowers. Other parks on the South Side are Marquette Park (322 acres), McKinley Park (75 acres), in which is placed a statue of William McKinley, and a number of smaller parks and playgrounds. The total area of the South Park system is 2495 acres. The West Side Division has a total park area of 1218 acres, including Douglas Park (179 acres), Garfield Park (185 acres), and Humboldt Park (200 acres), all of which contain lakes and special features. In the last-named park is located a fine monument to Humboldt. The distribution of smaller parks and squares throughout the city adds to the effectiveness of the system.

Other notable monuments of the city are the mausoleum and statue of Stephen A. Douglas in Douglas Monument Square; the Police Monument in Union Square, commemorating the victims of the Haymarket riot of 1886; and the Confederate Monument in Oakwoods Cemetery. At the end of Michigan Avenue a tablet marks the site of Fort Dearborn. Through a bequest of $1,000,000 made by Benjamin F. Ferguson in 1905, provision was made for the "erection and maintenance of enduring statuary and monuments" in the city of Chicago. The income only of this fund is to be used; it is administered by the trustees of the Art Institute. There are several cemeteries within the city limits. Of these, Graceland and Rosehill, in the North Division, are worthy of particular mention for beauty of situation.

Educational Institutions. The Chicago Board of Education consists of 21 members, appointed by the mayor for a term of three years, seven being appointed each year. They are free from municipal control, except that matters relating to purchase of buildings and sites and erection of buildings, etc., require the approval of the City Council.

In 1847 there were four schoolhouses in Chicago, built at a cost of $5000 each. In 1913 there were 21 public high schools and 264 elementary schools, besides a normal school, a school for juvenile printers in the House of Correction, a parental school for truants, a school for apprentices, and special classes for the deaf, blind, crippled, and mentally dull children. Manual training is taught in a majority of the graded schools. Evening schools are conducted for five months during the year and day schools for 10 months. The course of elementary instruction includes instruction in nature study and household arts, manual training, music, drawing, and physical culture. The enrollment of pupils in the public day schools for 1913 was 315,737, with 7013 teachers in charge. The enrollment in the evening schools was 26,000, and in private schools over 100,000. There are about 300 school buildings in use. The total expenditure for annual maintenance is approximately $8,000,000.

The higher educational institutions are the University of Chicago (q.v.); St. Ignatius College, Loyola University (Roman Catholic); the Northwestern University (Methodist Episcopal), at Evanston, whose professional schools, excepting the Garrett Biblical Institute, are in Chicago. The schools of theology in the city include: Chicago Theological Seminary (Cong.); McCormick Theological Seminary (Presb.); Theological Seminary of the Evangelical Lutheran Church; Western Theological Seminary (P. E.). There are several medical schools, the most prominent of which are the College of Physicians and Surgeons, the Rush, the Hahnemann, and the Bennett; several schools of law; also dental colleges, colleges of pharmacy, training schools for nurses, and a veterinary college, art schools, and schools of music. In the educational work of the city a prominent place is occupied by the Art Institute, the numerous classes of which are as free as practicable and are attended by 2500 or more students. Its Art School, which is self-supporting, offers one of the most complete courses in America; besides the usual branches of art, perspective and mechanical drawing, ceramics, and the modeling of ornament are taught by a large staff of professors. There are a year's traveling scholarship in the department of drawing and painting, and two annual scholarships for women. The library and gallery of the museum, as well as the lectures, are open to all students. The fee is from $5 to $25 for a term of 12 weeks. The Armour Institute of Technology, similar in scope to the Pratt and Drexel institutes, has been enlarged since its inception in 1893 to include, besides manual and technical training, various courses in engineering, architecture, and science, leading to the degree of B.S. The Lewis Institute, opened in 1896, is an institution for the practical training of young men and women. The Chicago Athenæum is a private philanthropic institution, maintaining daily and nightly sessions for a considerable part of the year, to which students are admitted at any time on payment of a nominal tuition fee. It has also a library and reading room.

Libraries. Chicago has three great libraries, besides that of the University of Chicago. The Public Library, founded in 1872, contains 514,000 volumes and maintains over 100 delivery stations at various points in the city, including the 17 branch libraries previously mentioned. The Newberry Library is a reference library, containing notably fine collections on music, genealogy, and religion. The John Crerar Library, which occupies temporary quarters until its permanent home shall be erected in the South Division, is endowed with $2,500,000 and has valuable works on natural, physical, and social science. It contains about 350,000 volumes and is solely a reference library. Accessions to these libraries are made with reference to the other book collections in the city, thus affording opportunity for a wide range of study. The library of the Chicago Law Institute is large and valuable, and the Chicago Historical Society has a fine collection of Americana. There are also the libraries of the several educational institutions and of the Chicago Academy of Sciences and the Field Museum of Natural History.

Charitable Institutions. The city contains a great number of hospitals—the largest being the Cook County Hospital; the Presbyterian; the United States Marine Hospital; St. Luke's; St. Joseph's; the Michael Reese; Mercy; Iroquois Emergency (erected in memory of the great theatre disaster Dec. 30, 1903); the Augustana Hospitals; and the Hospital of the Alexian Brothers. There are many dispensaries, asy-

lums, and homes, day nurseries, reformatories, and relief societies. One of the most interesting institutions is the Armour Mission (nonsectarian), the object of which is industrial, mental, and religious training. It is maintained as a memorial to Mr. Joseph Armour. The oldest and most influential of the social settlements of the city is Hull House, modeled after Toynbee Hall, London, and situated in the slum and Ghetto district on the West Side. Next in order of importance are Chicago Commons, also on the West Side; Northwestern University settlement, in the northwestern section of the city; and the University of Chicago settlement, in the stockyards district. These settlements are contiguous to or are surrounded by foreign colonies. The Chicago Bureau of Justice employs legal talent in aiding the poor to recover just wage claims. The Bureau of Associated Charities carries on a worthy work by means of its summer camps and outings; and the Chicago Charity Organization Society, made up of representatives from the various allied organizations, exercises to some extent a centralized power by virtue of its general supervision.

Theatres, Clubs, Hotels. There are numerous first-class theatres and places of amusement in Chicago. Among the leading playhouses are the Blackstone, Illinois, McVicker's, Majestic, Powers', Colonial, Garrick, Cort, Studebaker, Grand Opera House, and Palace.

Among the leading clubs the following may be mentioned: the Chicago, Chicago Athletic, Illinois, Illinois Athletic, City, Hamilton, Chicago Yacht, Commercial, University, Cliff Dwellers, Iroquois, Standard, Union League, the Chicago Woman's Club, and the Woman's Athletic Club. The Chicago, Chicago Athletic, Illinois Athletic, Union League, Hamilton, City, and University clubs have handsome and well-appointed clubhouses.

Chicago is known as a great convention city. Its hotel accommodations, which were increased considerably for the World's Fair, are very extensive. Among the most prominent hotels are the Auditorium, the Great Northern, Metropole, Palmer House, Grand Pacific, Wellington, Lexington, Victoria, Virginia, La Salle, Blackstone, Morrison, Transit, Chicago Beach, Windermere, Briggs, Majestic, New Brevoort, Stratford, Congress, and the Sherman House.

Newspapers and Periodicals. The newspaper and periodical press of Chicago occupies a high position in the publishing interests of the country, both in the number of its issues and the widespread influence exercised by its conductors. There were upwards of 700 newspapers and periodicals published in Chicago in 1914. More than a quarter of the whole number are devoted to the interests of trades and industries; altogether they cover a broad field of news and knowledge. A large proportion of the weeklies and monthlies, and about half of the dailies, are printed in foreign languages. There were in 1914 about 40 dailies, the leading ones being as follows: the *Tribune*, with a daily circulation of 261,000 and a Sunday circulation of 406,000; the *American*, daily 409,000; the *Daily News*, daily 346,000; the *Examiner*, daily 204,000, Sunday 503,000; the *Record-Herald* (later the Chicago *Herald* after consolidation with the *Inter-Ocean*), daily 173,000, Sunday 218,000; the *Evening Journal*, daily 137,000; the *Evening Post*, daily 65,000; the *Socialist*, daily 61,000; the *Farmers' and Drovers' Journal*, daily 50,000; and the *Jewish Courier*, daily (except Saturday) 30,000, Sunday 33,000. The leading dailies printed in foreign languages are: the *Staats Zeitung*, daily 40,000, weekly 30,000; the *Abendpost*, daily 47,000; the *Freie Presse*, daily 42,000; the *Skandinaven*, daily 25,000, Sunday and semi-weekly 70,000; the *Abend Presse*, daily 22,000; and the *Polish News*, daily 15,000. The journal enjoying the largest circulation was the *Woman's World*, a monthly, with 2,095,000 subscribers.

Commerce and Industry. The secret of Chicago's rapid development is found in its commanding position relative to an extensive and phenomenally productive region. Situated near the south end of Lake Michigan, the city enjoys the navigable facilities of the Great Lakes, while the railways crossing the country from the East to the Northwest and the West generally and naturally touch here. The Southern lines, connecting with the Great Lakes, also find it a natural terminal point. Chicago, the greatest railway centre of the United States, is therefore of first importance as a collecting and distributing centre. Of the 1400 trains entering the city not one passes through it; Chicago is the absolute terminal of every railroad train that enters it. The numerous railways converging in and tributary to the city operate 120,000 miles of line, one-half of the total mileage of the United States. These connections reach every State of the Union, also Canada and Mexico. The railways are supplemented, too, by lake navigation. Lines of steamers for the conveyance of passengers and freight connect with all the ports of the five Great Lakes. The number of vessels arriving at Chicago in 1912 was 5751, carrying about 8,500,000 tons of freight, of which about 55 per cent was iron ore from Lake Superior for the great steel mills in the southern part of the city. The clearances represented about the same amount of tonnage, consisting for the most part of wheat, corn, oats, and oil. The number of vessels arriving and clearing from the port of Chicago has greatly diminished in the period which has elapsed since 1890, though the tonnage has greatly increased. This is owing to the larger size of the lake craft employed in the carrying trade at the present day, many of the great "freighters" exceeding 600 feet in length. As long ago as 1870 nearly 13,000 lake vessels arrived and about the same number cleared in that year, but the tonnage, both coming and going, was only about one-third of the tonnage for 1912. The wharves along the banks of the Chicago River present a deserted appearance as compared with their aspect when throngs of smaller craft frequented the port a generation ago. In former years the shipping interests at Chicago greatly desired to engage in direct foreign commerce. A steamer with a cargo of wheat was dispatched to Liverpool in 1856, but the venture did not prove profitable, and no attempts have since been made to continue the practice. In the course of the few years following the voyage above referred to, three sailing vessels arrived from European ports at different times, but while great enthusiasm was aroused when they came, in no case were their visits repeated, and the dream of the people, that an ocean and lake commerce in unbroken shipments would be established, has entirely faded away.

The port of Chicago owes much to the presence of rivers. The mouth of the Chicago River, formerly a sluggish bayou, has been deepened by piers that extend into the lake, leaving an

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THE ART INSTITUTE (UPPER)
THE PUBLIC LIBRARY (LOWER)

entrance way about 500 feet wide; while long breakwaters on the east and far to the north and south, constructed by the United States government, form an outer harbor with an average depth of 21 feet and an area which is constantly varying as the extensive filling operations proceed along the city front. Additional protection to vessels is given by an exterior breakwater, which extends in a northeasterly direction about a mile from the river's mouth. In South Chicago, at the northern mouth of Calumet River, is another harbor, 300 feet wide between piers. The Illinois and Michigan Canal, constructed in 1836–48, connecting the Chicago River with the Mississippi and its affluents, extends to La Salle, the head of navigation on the Illinois. It is 96 miles in length, and its cost was $6,469,000, while its total earnings during the period of its usefulness were slightly in excess of that sum. The canal has now been practically abandoned, but during its construction period and for many years thereafter it was a large factor in the development of the city's commercial prosperity.

The largest part of the foreign exports consists of grain (wheat, corn, and oats) and packing-house products, though it is all transshipped at the seaboard for ocean passage. The largest lake import is lumber. For over 40 years the annual imports of lumber have exceeded 1,000,000,000 feet, and in the year 1913 they reached a total of 2,700,000,000 feet. About two-fifths of this import has been, in turn, shipped to other points. The imports of grain in 1912 amounted to 322,000,000 bushels (including 8,100,000 barrels of flour reduced to wheat bushels), while the exports reached a total of 244,000,000. Imports and exports of barley have fluctuated widely in recent years, the receipts in 1912 being 20,000,000 bushels (they were 29,000,000 in 1909), and the shipments only 3,500,000, thus showing a large local consumption. For the decade ending with 1912 the annual importation of hogs averaged over 7,500,000 head, and of cattle over 3,000,000. There has been recently a large increase in the importation of butter and dairy products—the imports of butter for 1912 being about 288,000,000 pounds.

According to the census of 1910 the manufactured products in the previous year reached a total value of $1,281,171,000, and there were 293,977 wage earners employed, an increase of about 33 per cent during the decade. A large percentage of the live stock received in Chicago is slaughtered and packed there, the total value of cattle, hogs, and sheep received in 1909 amounting to $358,493,000. For two decades the average number of hogs packed annually has been about 6,000,000 head. This is about one-fifth of the total number packed in the West during that period. Over 32,000 men are employed in the industry. Every part of the slaughtered animal is utilized, the value of the more important by-products, such as soap and tallow, alone amounting to $25,000,000. Leather tanning reaches a total of over $13,000,000.

The convenient location of Chicago with respect to the coal fields of Illinois and the iron-ore regions of Lake Superior is naturally utilized. The iron and steel products in 1909 reached a value of $46,000,000, while the foundry products amounted to $90,000,000. Chicago is a centre for the manufacture of harvesting machines. The capital employed in the agricultural-implement industry in 1909 was $140,000,000, under the control of one corporation, the International Harvester Company. There are extensive manufactures of lumber, the value of the manufactures of furniture being placed at $20,512,000, and the lumber and planing mills products at $32,709,000. The railway products, principally cars for steam and electric railways, amounted in value to $39,000,000. Chicago is the leading clothing manufacturing centre of the West, the total product in 1909 exceeding $85,000,000 for men's clothing and $15,600,000 for women's. A like position is held in the printing and publishing business, this output in 1909 being given at over $74,000,000. There is also a long list of other important manufactures, among which may be mentioned bakery products, value $27,000,000; electrical machinery, $20,600,000; coffees and spices, $19,600,000; paints, $19,000,000; sheet iron and copper, $12,200,000; pianos and organs, $11,500,000; confectionery, $11,000,000; and patent medicines, $10,000,000.

Government. Chicago is governed by a general Act of the Legislature passed in 1875, and by such subsequent acts as have in some measure modified the original act. The council is unicameral, with 70 elected members, there being two from each of the 35 wards. An elected mayor presides at the meetings of the council, and has a vote in case of a tie. Some of the powers vested in the council have been delegated by it to special departments, e.g., the police department. These departments are in the hands of single commissioners, who are appointed by the mayor, and whose terms of office expire with the term of the mayor (four years). The mayor is further fortified with the power to remove these commissioners, but such act may be disapproved by a two-thirds vote of the council. The legislative function of the school department is intrusted to a board of education of 21 members, appointed by the mayor and confirmed by the council. The members are appointed for two years and serve without pay. Civil-service methods prevail in the administration of city affairs, the regulations being made by the State Civil-Service Commission. Owing to prohibitive legislation, the township and county governments still exist. Township officers are elected in town meetings, and the county elects a board of commissioners. These organizations are an important factor in the financial affairs of the city.

The city owns and operates a vast and very complete water-works system. The water supply is obtained from Lake Michigan, cribs having been located at a distance of from 2 to 4 miles from the shore, in order to secure uncontaminated water. It is conveyed to the city by means of underground tunnels. Further to preserve the purity of the water supply the municipality constructed the greatest sanitary engineering work of the country, the Chicago Drainage Canal (q.v.).

Finance. The per-capita receipts and expenditures of Chicago are low when compared with those of other large cities, and it suffers from inadequate funds, as the State constitution places a limit upon tax rates. In 1898 a new revenue law was passed, creating a board of assessors which levies assessments for the entire County of Cook. Subsequent legislation abolished the numerous offices of town collectors and made the county treasurer ex-officio collec-

tor for all the towns. The municipality is compelled to resort in an unusual degree to indirect taxes—such as licenses, fees, fines, etc. Property, real and personal, was assessed on the basis of 20 per cent of its full value from 1898 to 1909, but after the latter date the rate was fixed at one-third. On this basis the total valuation of real and personal property in Chicago for 1913 was $981,788,078. The budgets are determined by committees of the council. The public debt in 1912 was $25,784,586. The following are the principal items of the receipts and expenditures, according to the report of the city comptroller for 1912: the receipts aggregated $54,248,546, of which $22,137,527 was from property tax; $6,828,600 from liquor licenses; $6,530,057 from the water works; and $1,616,955 from franchise compensations. The total expenditures were $56,339,734, of which those for schools were $15,318,088; for water works, $6,888,763; special assessment fund, $5,925,979; sinking funds, $2,743,771; and the balance, $25,463,133, for general corporate purposes. There are certain items of county and township government not herein included, e.g., the county maintains the charitable institutions, certain courts, jails, various public boards, the offices of the sheriff, recorder, coroner, and election commissioners, at a total annual cost for 1913 of $11,728,919.

Population. With but 4479 inhabitants in 1840, the city had increased in 1870 to 298,977, ranking fifth among American cities; in 1880, to 503,185, ranking fourth; in 1890, to 1,099,850, standing second; in 1900, to 1,698,575, and in 1910, to 2,185,283, still holding second place. The city *Directory* estimate for 1913 is 2,388,500; 1920, 2,701,705. Greater New York alone had as great an absolute growth during the last decade. Chicago's phenomenal growth seems quite natural, however, when compared with the development of the "Great West," of which it is a part. Chicago has a remarkably high per cent (36) of foreign-born population, and of the native-born 54 per cent are of foreign parentage. Of the foreign nationalities the Germans are most numerous, aggregating more than twice the number of Irish, the latter having shown an inclination to remain in the Eastern towns. The numbers of those who are of foreign birth or parentage are given in the following list after the names of the countries from whence they were derived: Germany, 501,832; Austria, 227,958; Ireland, 204,821; England and Scotland, 85,894; Canada, 66,453; Russia, 184,757; Scandinavian countries, 184,747; and various other countries of Europe, 303,909; making a total under this classification (exclusive of Canadians) of 1,693,918, i.e., about 77½ per cent of the entire population of the city. The negro population is given at 44,103. Chicago possesses a climate subject to sudden changes of temperature, though seldom remaining long at either extreme, the extreme heat of summer and the cold of winter being tempered by the waters bordering the city. The average annual temperature for the decade ending in 1913 ranged from 48° to 50°. The death rate per 1000 for 1913 was 15.3, a ratio which has held fairly constant for 15 years, placing the city about midway in the death rates of 50 leading American cities.

History. The name "Chicago" is probably derived from an Indian word meaning "wild onion," a plant which grows abundantly in this locality. Before the coming of the whites the place was a rendezvous for various Indian tribes and a favorite meeting place for voyageurs and traders. In 1673 Joliet and Marquette on a voyage of discovery visited this spot, and the latter spent most of the winter of 1674–75 here. Later the locality was visited by La Salle, Hennepin, Tonty, and others; and on a map published by Franquelin at Quebec in 1684, the name "Chekagou" was applied to a river placed some distance west of the real location of the Chicago River. Later maps show the name in proper position. The name "Chicago" came to be applied to the region lying contiguous to the river, and for over a century and a half after its discovery Chicago was an important outpost on the frontier where traders and savages met. During that period Chicago existed under three flags—first, under the domination of the French, when after the fall of Quebec it passed into the possession of the English. As British territory it remained until the close of the Revolutionary War, when the Western territories were ceded by the English to the United States. It has been said that "Chicago is the oldest Indian town in the West of which the original name is retained."

Jean Baptiste Point de Saible, a native of San Domingo, who came about 1779, built a house which was later known as the Kinzie house and which remained in existence over half a century. In 1796 he sold his cabin to Le Mai, a French fur trader, who in turn sold out early in 1804 to John Kinzie, the first white man to make his home here. The military importance of the place was quickly recognized by the government, which in 1795 forced the Indians to cede a tract of land "six miles square at the mouth of the Chicago River," and late in 1803 erected Fort Dearborn (q.v.) on the south bank of the river, near its mouth. On Aug. 15, 1812, in accordance with orders, Captain Heald and the garrison evacuated this fort, but were ambushed by their Potawatomi escorts and other Indians, and 38 soldiers, two women, and 12 children were killed, and many others captured. On the following day the fort was burned, but it was rebuilt in 1816. In 1830 the town was laid out, and the first map, dated August 4, gives its area as three-eighths of a square mile. There were then 12 families here, besides the garrison. Three years later Chicago was incorporated as a town, its population being 550, and its area 560 acres; and on March 4, 1837, then having 4479 inhabitants, it was chartered as a city. In 1833, 5000 Indians assembled here and sold a large tract of land in this vicinity, agreeing to move across the Mississippi.

The Illinois and Michigan Canal, begun in 1836, was finished in 1848; and in the same year the first railroad, the Galena and Chicago Union, was completed a few miles towards the west. Four years later the Michigan Southern and the Michigan Central, the first roads leading to the East, entered the city, which from this time grew with unprecedented rapidity. In 1860 the Republican National Convention, by which Lincoln was nominated, was held in Chicago. In October, 1871, one of the most destructive fires in the history of the country occurred here. Breaking out in a barn in De Koven Street and fanned by a gale, it spread with the greatest rapidity and raged uncontrolled for two days and nights, sweeping over 2100 acres, destroying 17,450 buildings, and causing 200 deaths, besides the greatest destitution and suffering. Out of

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CHICAGO AND NORTH WESTERN RAILWAY STATION (UPPER)
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a population of 324,000, more than 70,000 were rendered homeless, and almost one-third of the property in the city ($190,000,000 out of $575,000,000) was destroyed. Relief poured in from all sides, and within a year the city was largely rebuilt.

In July, 1877, the railroad riots, caused by discontented laborers, necessitated the calling out of militia and United States troops, and in May, 1886, occurred the celebrated "Haymarket riots" (q.v.), consequent upon the labor troubles of 1885–86. On May 4, while the police were attempting to break up an anarchist meeting, a bomb was thrown among them, and 27 of their number were wounded, of whom seven subsequently died. In 1893 the Great World's Fair (see World's Columbian Exposition) was held here. In 1894 a large number of laborers went on a strike, destroying property valued at $1,000,000 and again making it necessary to call out the militia and Federal soldiery. In 1904 and 1905 street traffic was seriously affected by a strike of the city teamsters.

The Mueller law, enabling the city to acquire, own, lease, construct, and operate street railways, provided that the electorate should decide by referendum vote upon questions of this nature, was passed in 1903, as a result of popular discontent with prevailing conditions. For municipal operation a two-thirds majority was made a prerequisite; a simple majority was made sufficient to authorize municipal ownership. In 1905 both mayoralty candidates were pledged to municipal ownership—the Democratic candidate, Edward F. Dunne (q.v.), promising immediate municipalization; the Republican candidate favoring a temporary agreement with the private companies which should safeguard the interests of the city and make possible municipalization under more favorable conditions than could then be secured. Mr. Dunne was elected by a substantial majority, but opposition in the council prevented him from making material progress towards the consummation of his policy. All efforts in this direction were eventually abandoned. Meantime the street-railway service degenerated, betterments were neglected, and public discontent was rife. While the companies were clamoring for extensions of their expiring franchises, the public demanded in return a new agreement, which at length was entered into, and ratified by both parties, in April, 1907. The agreement provided that thereafter the city was to receive 55 per cent of the net receipts and be given the right to purchase the existing systems at an agreed valuation at any time upon giving six months' notice. The result was that in the years following the inauguration of this plan the city received from "franchise compensations" the sum of $10,334,199, down to the end of the year 1913. The various systems greatly enlarged their facilities and improved the roadbeds in accordance with the terms of their agreement, but they are still seriously embarrassed with the constantly swelling volume of street-passenger travel. It can now be said that Chicago possesses in many respects the most modern and complete system of street railways of any city in the world.

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CHICAGO, University of. A leading American university, situated in Chicago, Ill. The university was established at the instance of prominent Baptists throughout the country, and through gifts made chiefly by Mr. John D. Rockefeller, to replace the former University of Chicago—a Baptist institution opened in 1857, which had been obliged through lack of funds to close its doors in 1886. In recognition of the funds given by Baptists to start the new university, it was provided in the charter that while no religious tests should ever be exacted from the university professors or students, yet at all times two-thirds of the trustees, and also the president of the university, should be members of regular Baptist churches.

The university includes four divisions: first, schools, colleges, and academies; second, university extension; third, the university libraries, laboratories, and museums; fourth, the university press. The first division includes the graduate schools, of which the divinity school, the graduate school of arts and literature, the Ogden Graduate School of Science, and the law school have already been organized, while schools of medicine, technology, fine arts, and music are yet to be established. Of the schools established, the Ogden School of Science was founded under the will of William B. Ogden, his executors alloting to Chicago 70 per cent of the moneys he devised to charities. The divinity school was established under an agreement of the university made in 1891 with the Baptist Theological Union of Chicago, by which its seminary became the divinity school of the university. The colleges of the university include the colleges of arts, literature, science, commerce and administration, the university college, and the college of education. There were, in 1913, 404 secondary schools in coöperation with the university, these schools being allowed to send their graduates upon certificate and without examination. In the department of university extension the attempt is made to bring the university to those who cannot come to it. Lecture and study courses are given, and work done in them is on certain conditions recognized and credited by the university. The correspondence courses are definitely arranged in majors and minors, according to the regular university schedule, and on them credits are allowed, on certain conditions, towards the university degrees. The university libraries in July, 1913, contained 402,000 volumes, bound and catalogued, besides about 130,000 volumes uncatalogued and about 200,000 pamphlets. Of the total number about 217,000 volumes were in the general library and the remainder in the various departmental libraries. The acquisitions by purchase, gift, and exchange, in 1912–13, numbered about 52,000 volumes. The laboratories and museums include: The Kent Chemical Laboratory, Ryerson Physical Laboratory, Psychological Laboratory, the Yerkes Astronomical Observatory, the Walker Museum, Haskell Oriental Museum (including biblical, comparative religion, Syrian, and Egyptian collections), and the Hull biological laboratories (including the zoölogical, physiological, anatomical, and botan-

ical laboratories). The university press publishes both separate books and pamphlets and departmental journals. The departmental journals are as follows: *The Journal of Political Economy; The American Journal of Sociology; American Journal of Semitic Languages and Literatures; Biblical World; The Astrophysical Journal; Journal of Geology; School Review; Botanical Gazette; American Journal of Theology; The Elementary School Teacher; Modern Philology;* and *The University of Chicago Magazine; Weekly Calendar and Classical Philology.* Under the head of separate publications the university press issues many important pamphlets and books written by professors or postgraduate students in the course of specialized university work, and others.

The arrangement of courses at the University of Chicago is unique among American universities. The academic year consists of four quarters, and these four quarters, equally divided, complete the calendar as well as the scholastic year. Instruction is arranged with a single quarter of 12 weeks as the unit, instead of taking for the unit the scholastic year. Students are permitted to drop or take up university work at the beginning of any quarter, and a degree is given whenever the requisite amount of courses, computed by units, has been completed. The courses are arranged by majors and minors, according to the group system, and the student is required to take courses in definite groups. This system has the advantage of eradicating such artificial barriers to obtaining an education as are likely to follow from continuous courses of nine months each and from arbitrarily required studies. The degrees conferred by the university are: A.B., Ph.B., B.S., LL.B., A.M., Ph.M., M.S., J.D., Ph.D., B.D., D.D., LL.D. Bachelors' degrees are given upon completion of work in the senior colleges of the university. Chicago, however, has also junior colleges, and graduation from these entitles the students to the title of associate in arts, philosophy, or science. The work of the junior colleges is roughly equivalent to the work ordinarily done in the best American colleges in the freshman and sophomore years. The title is given on the completion of this work, mainly to give recognition to such students as are for any reason unable to complete the course.

The University of Chicago has grown with extraordinary rapidity since it was first opened to students in 1892. This growth has been made possible by many large gifts. Of the benefactors of the college should be especially mentioned: John D. Rockefeller, whose gifts have amounted to about $35,000,000; Marshall Field, who gave the original site for the university; S. A. Kent, Silas B. Cobb, Martin A. Ryerson, Charles T. Yerkes, Miss Helen Culver, Mrs. Annie Hitchcock, Mrs. Elizabeth G. Kelly, Julius Rosenwald, La Verne Noyes, and Mrs. Anita McCormick Blaine. The present buildings of the university, which have been erected almost entirely from private donations, include Cobb Lecture Hall, Kent Chemical Laboratory, Walker Museum, Ryerson Physical Laboratory, Haskell Oriental Museum, Law School, Bartlett Gymnasium, Mandel Hall, Reynolds Club (for men), Hutchinson Dining Hall (for men), School of Education, a group of graduate and divinity dormitories, Snell Hall and Hitchcock Hall (for men), Beecher, Kelly, and Nancy Foster halls for women, four biological laboratories (comprising the Charles J. Hull group), 1896–97; Yerkes Observatory, Lake Geneva, 1897; Green Hall (for women), 1898, and the Harper Memorial Library (1911–12). As shown by the president's report, the general assets of the university on June 30, 1913, amounted to $31,055,420.10, of which $18,690,563.66 represented investments, and the remainder buildings, grounds, and equipments. The current expenditures for the year previous had amounted to $1,738,610.57. In 1912–13 the total number of students, excluding duplicates, entered was 6802. These students were distributed as follows: divinity school, 359; graduate schools, 1737; the colleges, 3822; medical school, 219; school of education, 1018; law school, 286.

The president of the university from its foundation in 1891 until 1906 was William Rainey Harper (q.v.), Ph.D., D.D., LL.D., who, previous to his succession to the presidency of the University of Chicago, was professor of Semitic and biblical literature in Yale University and principal of the Chautauqua system. Harry Pratt Judson, LL.D., was made acting president in 1906 and president in 1907. The administrative and scholastic methods of the university were largely molded by Dr. Harper, and a large measure of the university's immediate success is ascribed to his influence and to his efforts in its upbuilding. Under President Judson's administration the financial resources have doubled, and the increase in the attendance of students has been very pronounced.

CHICAGO DRAINAGE CANAL. A canal constructed under an Act of the Illinois Legislature, dated May 29, 1889. The object of the canal is to reverse the flow of the Chicago River. After being in use for several years it was deemed necessary, with the growing population of southern Chicago and the near-by city of Gary in Indiana, to make similar provision for the flow of the Calumet River. Accordingly a smaller (the Calumet-Sag) canal, about 16 miles in length and 20 feet in depth, capable of carrying 2000 cubic feet per second and connecting this stream with the main Chicago Drainage Canal near Sag Bridge, was put under construction in 1912 at an estimated cost of $11,000,000 for excavation and connected works. The aim of the original canal was to divert the sewage-laden contents from the city's water supply, Lake Michigan, to the Mississippi, by way of the Des Plaines River, and also, if possible, to furnish a waterway from the Great Lakes to the Gulf of Mexico. Construction was begun Sept. 3, 1892, and the canal formally opened Jan. 2, 1900. Cost, $33,000,000; length, 40 miles. The work consisted of four parts: (1) deepening and widening the Chicago River from its mouth to Robey Street, 5.3 miles; (2) constructing the canal proper from Robey Street to Lockport on the Des Plaines River, 28.05 miles; (3) diverting this river into a new channel; (4) constructing a tail race and a new channel between Lockport and Joliet, 7.1 miles; size of canal, 160 feet bottom width in rock and 110 to 202 in earth; top width, 162 feet in rock and 200 to 300 feet in soil; minimum depth, 22 feet; capacity, 20,000 cubic feet per minute per 100,000 of population, or about 360,000 cubic feet per minute. The controlling works are located at Lockport and consist of a bear-trap dam 160 feet wide, and 7 sluice gates, 30 feet wide. In September, 1903, it was decided to utilize the 35,000 horse power being

wasted at the controlling works, by means of turbines, and to this end construction estimated at $3,000,000 was begun. At first it was feared that the turning of Chicago's sewage into the Mississippi from which St. Louis is supplied would result in an increase of typhoid and other water-borne diseases there, but chemical and bacteriological examinations failed to verify this. That Chicago benefited from a sanitary standpoint was shown by the report of the commissioner of health for August, 1904, which gave a comparison of water-borne diseases for a period of four years previous to and after the opening of the canal. Acute intestinal diseases, 1896–1900, 16.41 per 1000 of population; 1900–04, 12.44 per 1000. Typhoid fever, 1896–1900, 3.68 per 1000; 1900–04, 3.10 per 1000.

The question whether the taking of water from Lake Michigan affected navigation and the interests of States and cities on the Great Lakes was one that was seriously discussed and involved much litigation and investigation. The Chicago Sanitary Canal had never received the direct sanction of Congress. The authority to derive water from Lake Michigan was granted by Secretary of War Alger on May 8, 1899, and he permitted a flowage of 5000 cubic feet per second under certain restrictions and subject to any future action by Congress. Secretary of War Root, on Dec. 5, 1901, fixed the amount at 4167 cubic feet per second, and on March 14, 1907, Secretary of War Taft denied the application for an additional 4000 cubic feet per second for the purpose of reversing the current of the Calumet River and flowing that river also through the canal to drain the southern portion of Chicago. Subsequently the proposals to take as much as 10,000 cubic feet per second from Lake Michigan were opposed both by the Chief of Engineers of the United States Army and by an International Waterways Commission, in session in 1906, on the ground that this would interfere substantially with the navigable capacity of the Great Lakes and their connecting rivers by lowering the level of the lake. Furthermore, a treaty of Jan. 11, 1909, between the United States and Canada was believed to stand in the way of any considerable or additional diversion of water from the Great Lakes. Accordingly, on Jan. 8, 1913, the application to the War Department, on the part of the sanitary district of Chicago charged with the control and operation of the canal, was formally denied by Secretary of War Henry L. Stimson. While the Chicago Drainage Canal was a prime necessity to the city of Chicago, as was also, with the growth of the city to the south, the reversal and drainage of the Calumet River then in progress of construction (1913), yet its relations to commerce and international comity were also important. Notwithstanding the granting of limited permission for this work by the Secretary of War in 1910, the right of the city to reverse the flow of the river was pending in the United States Circuit Court in 1913. The possibilities of the canal, in addition to sanitation and the incidental power developed, as a commercial route were also considered, and it was thought possible that with the various improvements in progress the canal could be made an important link in a commercial waterway from the lakes to the gulf. If that were done, it would not solve the question of diversion of water, inasmuch as for the proper dilution and handling of sewage a considerable volume would be required, whereas in even a fairly large barge canal there would be no need of an active current or excessive drafts from the lake once the prism was filled.

CHICAGO HEIGHTS. A city in Cook Co., Ill., 27 miles south of Chicago, on the Chicago and Eastern Illinois, the Elgin, Joliet, and Eastern, and the Michigan Central railroads (Map: Illinois, E 2). It has a Carnegie library and a hospital. Manufacturing is extensively carried on; the most important products are iron and steel goods, chemicals, glass, carriages, lumber, fireproofing materials, automobiles, passenger and freight cars, linseed oil, clothing, pianos, blackboards, globes, and brick. Chicago Heights was settled in 1835 and was chartered as a city in 1900. The water works are owned by the municipality. Pop., 1900, 5100; 1910, 14,525; 1920, 19,653.

CHICAGO JUNCTION. A village in Huron Co., Ohio, 62 miles (direct) west-southwest of Cleveland, on the Baltimore and Ohio Railroad (Map: Ohio, E 3). Chicago Junction is essentially a railroad centre and contains large repair shops of the Baltimore and Ohio system. Lumber is manufactured also. The water works and lighting plant are municipally owned, and the village is known for its fine sulphur water. Pop., 1900, 2348; 1910, 2950.

CHICAGO ORCHESTRA. A permanent orchestra, founded by Theodore Thomas in 1891 and conducted by him until his death in 1905. Its name was then changed to "The Theodore Thomas Orchestra." In 1913 the original name "The Chicago Symphony Orchestra" was again adopted. The present conductor is Frederick A. Stock, who faithfully follows the ideals of the great founder. During the season concerts are given on Saturday nights and Friday afternoons. The rates of admission are designedly moderate, the deficit at the close of the season being periodically met by the guarantors of the association, a number of public-spirited citizens. The organization formerly consisted of about 60 players, but in 1901 the number was increased to 90. A strict adherence to the highest classic ideals and an unswerving refusal to be influenced by local criticism or financial exigencies at first caused considerable friction, but the annually decreasing deficit and the greatly increased attendance have amply justified the course of Mr. Thomas. Orchestra Hall, the permanent home of the organization, was built by popular subscription and opened in December, 1904. The opening concerts were the last Mr. Thomas conducted.

CHICAGO RIVER. A navigable stream in the city of Chicago, which formerly emptied into Lake Michigan, but the direction of whose current has been reversed by the construction of the Chicago Drainage Canal. It is formed by two branches, the North Fork and the South Fork, and it is less than a mile from this junction to Lake Michigan (Map: Chicago, F 7). Nearly 4 miles from the main river, the south branch separates into a west fork and a south fork. The Illinois and Michigan Canal connects the Chicago River at Bridgeport with the Illinois River at La Salle, a distance of nearly 100 miles, and during 1893–1900 the Chicago Drainage Canal (q.v.) was constructed, connecting the west fork of the south branch and Joliet, on the Des Plaines River, the distance being 28.05 miles. See CHICAGO.

CHICHAGOV, chĕ-chä′gŏf, PAVEL VASSILIEVITCH (1765–1849). A Russian admiral. He

served under his father, Vasili Yakovlevitch (1726–1809), a Russian admiral, and completed his studies in England (1792–93). As head of the navy, to which he was appointed in 1802 by Alexander I, he greatly promoted the efficiency of the service. In 1811 he was appointed a member of the Imperial Council, and the year following received an important military command. Failing to prevent Napoleon's recrossing the Beresina, he fell into disgrace and left Russia. His *Memoirs* (1886–88) are valuable.

CHICHÉN-ITZÁ, chī-chän'ē-tzä' (Maya, mouth of the wells of the Itzá). The most important of the ancient ruined cities of Yucatan, Mexico, situated 18 miles southwest of the town of Valladolid in the northern part of the peninsula. It derives its compound name from its former occupants, the Itzá tribe of the great Mayan stock, and from two remarkable natural pools or wells, still existing, which undoubtedly furnished the water supply of the ancient inhabitants and may have determined the original selection of the site. According to tradition preserved in the *Books of Chilán Balám* (q.v.), Chichén-Itzá was founded about 450 A.D. and abandoned for the first time about 600. It was rebuilt about 900 and for 300 years was the most important city in northern Yucatan. Towards the end of this time it became involved in war and was apparently held for a time by foreign invaders from the highlands of Mexico. It was abandoned 100 years or more before the coming of the Spaniards, but was still an important place of pilgrimage.

The principal ruins, which were first described in detail by Stephens in 1843 (*Incidents of Travel in Yucatan*), cover an area of about one square mile, with smaller edifices scattered about the encircling forest. The general structural type is that of the platform pyramid, ascended by means of broad stairways leading up to vaulted chambers, whose walls are covered with sculptured figures and hieroglyphic inscriptions or vividly colored paintings resembling those of the Aztec codices. The material is the white limestone of the country, and the walls consist of a composition of mortar and broken stone faced with neatly cut stone. Each prominent structure is known to the natives under a distinct name. One of the most interesting is that denominated the "Tennis Court" or "Ball Court." It consists of two immense parallel walls, each 274 feet long and 30 feet thick and standing 120 feet apart. Projecting from the centre of each, at the height of 25 feet from the ground, is a sculptured ring of stone, representing two entwined serpents. From contemporary Spanish descriptions it is certain that this was a courtyard, devoted to the playing of a favorite game, in which the effort was made to send the ball through the stone ring fixed in the wall. Another of the important ruins is the "Castillo," a pyramidal mound 200 feet square at the base and rising 75 feet to a platform, the approach being by means of a grand staircase with two colossal serpents' heads in sculptured stone at the base. The Palace, or Nunnery (*Casa de las Monjas*), is a rectangular mass more than 100 feet long and somewhat less in width, with an L-shaped wing on the eastern side, 60 feet long. Resting on this artificial platform, which is over 30 feet high, is a rectangular structure 90 feet long, 18 feet wide, and 18 feet in height; and this, in turn, is crowned by a smaller edifice 30 feet long by 12 feet wide. The L-shaped wing is a specimen of the best Mayan architecture. Minor ruins are the Caracol, or Round Tower, the Clichanchob, or Red House, and the Temples of the Tables, the Tigers, and the Cones. Consult: Holmes, *Archæological Studies in Ancient Cities of Mexico* (Chicago, 1895); Maudslay, "Biologia Centrali-America," *Archæology,* vol. iii, and Spinden, *Maya Art* (Cambridge, 1912).

CHICHESTER, chīch'es-tēr (AS. *Cissanceaster,* Lat. *Cissæ castrum,* camp of Cissa). A municipal borough and episcopal city in Sussex, England, 17½ miles east-northeast of Portsmouth (Map: England, F 6). It is well built and has wide streets. The ancient city walls are now utilized as a public promenade. The cathedral, erected in the twelfth and thirteenth centuries, is remarkable for its unique features of double aisles and detached campanile. Other notable public buildings are the guildhall, formerly the church of a Franciscan monastery; the church of St. Olave, one of the oldest in Chichester; the market cross, erected by Bishop Story about the beginning of the sixteenth century, and counted one of the finest examples of the Perpendicular style in England; and St. Mary's Almshouse, which was founded as a nunnery in the twelfth century. The town has a theological college, and there is an ancient grammar school founded in 1497. The chief trade is in agricultural products and live stock. There are malting, brewing, and tanning establishments and manufactures of wooden ware. The harbor, 2 miles to the southwest of the city, is a deep inlet of the English Channel, about 8 square miles in area, and is connected with Chichester by a canal. Chichester was perhaps the Roman Regnum, or Regni. It was taken and partially destroyed in 491 by the South Saxons, but was soon afterward rebuilt by Cissa, their King. It was for some time the capital of the Kingdom of Sussex, and was incorporated in 1213. During the Civil War it was taken in succession by Royalists and Parliamentarians. Pop., 1901, 12,200; 1911, 12,591. Consult: Hills, "Chichester Cathedral" in *Archæological Journal,* vol. xx (London, 1864), and "The City Walls" in id., vol. xlii (London, 1886); Hay, *History of Chichester* (Chichester, 1804).

CHICHEVACHE, shēsh'vāsh'. A creature in French fable, represented as a lean cow, which lived upon submissive wives. The name and the conception arose from the corruption of the old French *chichefact* ('ugly face') to *chichevache* ('lean cow'). Bicorne, the complement of Chichevache, is a fat beast, nourished on submissive husbands.

CHICHIMECA, chē'chē-mā'kȧ (Aztec, perhaps from *chichiltic,* red + *mecayotl,* race). "Dog people," a term of contempt anciently applied by the more cultured Aztecs to the wild tribes northward of the valley of Mexico. The name has no ethnic significance whatever.

CHICK'ADEE'. See TITMOUSE.

CHICK'AHOM'INY (Algonquian *k'chick-ahäm-min-nough,* coarse-pounded-corn people). A river in Virginia, about 75 miles long, flowing into the James about 40 miles southeast of Richmond. On and near this river occurred, during the Civil War, the battles of Seven Pines or Fair Oaks, Mechanicsville, Gaines's Mill or Cold Harbor, Savage's Station, Frazier's Farm, Malvern Hill, and the second battle of Cold Harbor (qq.v.). The first of these engagements was fought on May 31 and June 1, 1862. The battle of Mechanicsville took place on June 26,

1862, and the last of the seven days' battles, that of Malvern Hill, on July 1. The second battle of Cold Harbor was fought on June 3, 1864. See SEVEN DAYS' BATTLES, THE.

CHICK'AMAU'GA, chĭk'ȧ-mą'gȧ. A creek in the extreme northwestern part of Georgia and in southern Tennessee. It is a tributary of the Tennessee River, into which it empties a few miles above Chattanooga. It is famous on account of the battle of Chickamauga, Sept. 19–20, 1863.

CHICKAMAUGA, BATTLE OF. One of the most hotly contested battles of the Civil War, sometimes called "the Great Battle of the West." It was fought Sept. 19, and 20, 1863, near Chickamauga Creek, about 12 miles east of Chattanooga, Tenn., between a Federal army of 55,000, under General Rosecrans (q.v.), and a Confederate army of 70,000, under General Bragg (q.v.). Manœuvred out of Chattanooga (September 8) by the brilliant strategy of Rosecrans, Bragg had started in apparent retreat towards the south and had been followed by Rosecrans, whose troops, forced to cross the mountains at widely separated points, were scattered over a great extent of territory. Soon perceiving that the Confederate retreat was only apparent and fearing an attack in detail, Rosecrans rapidly concentrated his forces and, by shifting Thomas to the extreme left (September 18), thwarted an attempt by Bragg to attain his rear and shut him off from Chattanooga. At 9 A.M. on the 19th the battle began with a fierce attack by the Confederate right, under General Polk, on the Federal left; but Thomas held his ground, and the day ended without decisive advantage to either side. The fighting was renewed early on the 20th and was proceeding with varying fortune, when, in pursuance of a misinterpreted order from Rosecrans, a division was withdrawn from the Federal right. This made a gap in the line of battle through which Longstreet, commanding the Confederate left, poured his troops, soon routing the Federal right and centre (under McCook and Crittenden respectively) and driving them in wild disorder back towards Chattanooga. The whole Confederate army was now massed against the Federal left; but Thomas stood firm against tremendous odds throughout the day, gallantly repulsing attack after attack and inflicting great damage on the enemy. His remarkable courage and skillful generalship alone saved the whole Federal army from meeting with an overwhelming defeat and earned for him the title of "The Rock of Chickamauga." During the night, under orders from Rosecrans, he retired to Rossville and on the 21st withdrew behind the fortifications of Chattanooga. The Federal army lost 16,179 in killed, wounded, and missing; the Confederate, about 17,800. Though the battle was won by Bragg, Chattanooga, the prize for which it was fought, remained in the possession of Rosecrans. Consult: *Official Records,* vol. XXX (Washington, 1890); Cist, *The Army of the Cumberland* (New York, 1882); Johnson and Buel (eds.), *Battles and Leaders of the Civil War* (4 vols., New York, 1887).

CHICKAMAUGA.

CHICKAMAUGA NATIONAL MILITARY PARK. A park in Georgia, situated on the site of the battle of Chickamauga, a few miles southeast of Chattanooga, Tenn., near the Tennessee and Georgia line. It was established under the authority of Congress, with the cooperation of those two States. The legal boundaries embrace a compact area of 15 square miles, which cover the main scene of the battle; but there have also been secured several small neighboring tracts which are the sites of events of special military interest. It is the object, so far as possible, to preserve the conditions as they existed at the time of the battle, and, in order to make clear the positions and movements of the troops engaged, monuments, historical tablets, and other guide marks have been set up at the proper points. Several lofty observation towers have been erected, which command a view of the battlefield. A large part of the park is forest land, but a considerable portion has been cleared of underbrush and small timber, in order to permit free access and unobstructed views. In addition to acquiring these lands, the Federal government has obtained a concession of many miles of approaching roadways which have been beautified. Congress appropriated $725,000 for this work, and the States have given $400,000 additional. The park was dedicated Sept. 19–21, 1895. It is the first time that a battlefield has been so completely marked and set aside as a monument of the event which happened within its boundary.

CHICK'AREE (imitation of its cry), or HACKEE. Old book names of the North American red squirrel. See SQUIRREL.

CHICK'ASAW. An important Muskhogean tribe, formerly occupying northern Mississippi and the adjacent part of Tennessee, and later settled in the western part of Oklahoma with an autonomous government, under the name of the "Chickasaw Nation." They are now citizens of the United States. Originally they were a restless and warlike people, and throughout the Colonial period adhered to the English side as against the French, who tried repeatedly, but without success, to subdue them. From the close of the Revolution they maintained friendly relations with the United States. In 1832 they sold all their remaining lands east of the Mississippi and agreed to remove to their present location. They joined the Confederacy during the Civil War and at its close were obliged to free their slaves and admit them to equal Chickasaw citizenship. Those of pure and mixed Chickasaw blood now number 4204.

CHICKASAW BLUFFS, or **BAYOU,** bī'o͞o, BATTLE OF. A battle fought, Dec. 29, 1862, between a Federal force under General Sherman and a Confederate force under General Pemberton, strongly intrenched on the bluffs above Chickasaw Bayou, the Federals being repulsed with great loss. It was the result of an attempt by Sherman to attain the rear of Vicksburg, by way of Yazoo River, with a view to coöperating with General Grant in his operations against that city. (See VICKSBURG, CAMPAIGN AGAINST.) The

Federal loss in killed, wounded, and missing was almost 2000; the Confederate, less than 200. An interesting account of the engagement is given in Sherman, *Memoirs* (2 vols., New York, 1888).

CHICKASHA, chĭk'ȧ-shā. A city and the county seat of Grady Co., Okla., 48 miles southwest of Oklahoma City, on the Chicago, Rock Island, and Pacific, the Frisco Lines, and the Oklahoma Central railroads, and on the Washita River (Map: Oklahoma, D 3). It is the seat of a State college for women, contains a Carnegie library, and has machine shops, cottonseed-oil mills, flour mills, and large stock-feeding pens. The water works and sewage system are owned by the municipality. Pop., 1910, 10,320; 1920, 10,179.

CHICKEN. See Fowl.

CHICKEN BIRD, or **CHICKEN PLOVER.** The turnstone.

CHICKEN CHOLERA. See Fowl Cholera.

CHICKEN FLEA. See Chigoe.

CHICKEN LICE. See Fowl; Louse.

CHICKEN POX, or Varicella (Neo-Lat., from *variola,* smallpox, from Lat. *varius,* spotted). 1. An acute contagious disease, chiefly of children. It is characterized by early fever, an eruption of papules and vesicles, with mild constitutional disturbance. In most cases fever is present 24 hours before the eruption appears. The eruption comes out in crops, on the face, scalp, or shoulders, as red, widely scattered papules, spreading slowly over the body, one crop maturing while another is appearing. Thus red papules, blebs filled with clear fluid, and crusts are found at the same time in a small area. Pitting is rare and generally occurs on the face, where the lesions are apt to become infected with pus germs. Chicken pox is extremely contagious, but very rarely dangerous. Complications or serious sequelæ are rare. Erysipelas, gangrene, inflammation of glands, abscesses, or kidney disease may occur. Isolation of cases is necessary till all crusts separate and fall off. Chicken pox bears no relation to smallpox and is unaffected by vaccination. While the two diseases differ in all essential characteristics, mild cases of smallpox may easily be mistaken for varicella and severe cases of the latter for smallpox. 2. A disease of fowls, chickens, turkeys, pheasants, peacocks, pigeons, and, much less commonly, waterfowls, caused by a filterable virus and characterized by the formation on the comb, ears, wattles, and other unfeathered parts of the body, of small nodules. These nodules, which may develop to the size of a pea, are sometimes so abundant that they coalesce. There are several clinical forms of the disease to be differentiated. The mortality is said to vary from 50 to 70 per cent of the affected birds. Treatment consists in the local application of ointments and antiseptics. Diseased fowls should be isolated at once and dead birds destroyed. Consult Hutyra and Marek, *Pathology and Therapeutics of the Diseases of Domestic Animals,* and E. W. Hoare, *A System of Veterinary Medicine,* vol. i.

CHICKEN SNAKE. 1. A very slender harmless snake, the southeastern representative of our northern pilot black snake (*Coluber absoletus quadrivittatus*), about 6 or 7 feet long, yellowish brown, with a straw-colored head, tail, and abdomen, and two brown stripes along each side of the body. It is common from South Carolina to Florida and Alabama and often enters buildings in search of mice and young poultry and is sometimes known as the "four-lined snake." 2. In the Northern States, the milk snake (q.v.).

CHICKEN TORTOISE, tôr'tŭs *or* -tĭs, or **CHICKEN TURTLE.** One of the edible "painted" turtles (*Chrysemys reticulatus*) of the southern United States.

CHICK'ERING, Jonas (1797–1853). A piano maker, born at New Ipswich, N. H. In 1818 he became a workman in John Osborne's piano manufactory, a business in which he subsequently became a partner and finally (1823) sole proprietor. Under his management the firm developed into one of the largest piano manufactories in the United States, with an output at the time of his death of 2000 pianos yearly. His three sons continued the business. Consult *The Commemoration of the Founding of the House of Chickering and Sons* (Boston, 1904).

CHICK'LING VETCH. See Lathyrus.

CHICK'-PEA' (corruption of *chich-pea,* from OF. *chiche,* from Lat. *cicer,* chick + Eng. *pea*). A plant of the genus *Cicer,* of the family Leguminosæ, having pinnate leaves, solitary axillary stalked flowers, and two-seeded pods, inflated like bladders. The common chick-pea (*Cicer arietinum*) is a native of southern Europe. It is an annual, 1½ to 2 feet high, of a stiff, upright habit, covered with glandular hairs. The seeds abound in starch and have a slightly bitterish taste. They are about the size of common peas and resemble in appearance a ram's head; hence the specific name. The ripe seeds are eaten either boiled entire or made into pea soup. They are sometimes roasted as a substitute for coffee. A red-seeded variety is extensively grown in the East, both for table and for stock food.

CHICK'WEED'. A name applied to a number of species of *Stellaria,* a genus of the family Caryophyllaceæ. One of the most common weeds of gardens and cultivated fields is a species called also "stitchwort," or "starwort" (*Stellaria media*). It is a native of most parts of Europe and of Asia, appearing during the colder months even on the plains of India, and has been abundantly introduced in America and elsewhere. It is an annual, with a weak procumbent stem and ovate leaves, very variable, but always characterized by having the stem curiously marked with one or two lines of hairs. The leaves of chickweed afford a fine instance of the "sleep of plants," in that they close up on the young shoots at night. Although generally regarded as a troublesome weed, chickweed is used for feeding cage birds. It is a good substitute for spinach or greens. A number of species of a nearly allied genus, *Cerastium,* also bear the name of "chickweed," or "mouse-ear chickweed," and the name is occasionally given to other allied plants, as *Holosteum umbellatum,* introduced into the United States from Europe and called "jagged chickweed."

CHICLANA-DE-LA-FRONTERA, chē-klä'-nȧ-dā-lȧ-frôn-tā'rȧ. A town of Andalusia, Spain, about 12 miles southeast of Cadiz (Map: Spain, B 4). It is pleasantly situated on the Lirio and has manufactures of linen, earthenware, and brandy. Its mineral baths are much frequented by the inhabitants of Cadiz. Pop., 1900, 10,868; 1910, 11,496.

CHICLAYO, chē-klä'yō. A town in the Department of Lambayeque, Peru, situated in a sugar-growing plain near the coast (Map: Peru, B 5). It is the residence of a United States consular agent. Pop., 13,000.

CHICLE. See Chewing Gum.

CHICO, chē′kō (Sp., small). A city in Butte Co., Cal., 96 miles north of Sacramento, on the Southern Pacific and the Butte County railroads and on Chico Creek (Map: California, D 3). It has a State normal school, a Carnegie library, and a natural park, 2000 acres in extent. The city has important fruit-growing, dairying, lumbering, and mining interests. The industries include the plant of the Diamond Match Company, flour mills, foundries and machine shops, electric-car shops, etc. Pop., 1900, 2640; 1910, 3750.

CHICOMOZTOC, chīk-ō′mōs-tōk′ (Nahuatl, seven caves). The mythical birthplace of the Nahuatl race, in Aztec legend.

CHICOPEE, chīk′ō-pē. A city in Hampden Co., Mass., 3 miles north of Springfield, on the east bank of the Connecticut River, at the mouth of the Chicopee, and on the Boston and Maine Railroad (Map: Massachusetts, B 3). By means of several dams abundant water power is derived from the Chicopee River for the variety of manufactures for which the city is noted. These include firearms, cotton and knit goods, rubber tires, automobiles, knitting machines, agricultural implements, bronze statuary, swords, machine and mechanics' tools, carpets, counting scales, drop forgings, athletic goods, and many other articles. The city contains a large public library and has municipal water works and a lighting plant. The government is vested in a mayor and a council with various administrative departments. Pop., 1890, 14,050; 1900, 19,167; 1910, 25,461; 1920, 36,214.

Settled about 1675, Chicopee was incorporated as a town in 1848, including the villages of Chicopee Falls, Fairview, and Willimansett, and was chartered as a city in 1890. Consult Holland, *History of Western Massachusetts* (Springfield, 1855).

CHICOPEE RIVER (N. Amer. Indian, violent water). A river formed near Three Rivers, Mass., by the junction of the Quaboag, Ware, and Swift rivers (Map: Massachusetts, B 3). It flows west and empties into the Connecticut River at Chicopee. It is 20 miles long from the mouth to Three Rivers and with the Quaboag about 50 miles. It drains an area of 700 square miles and has 28 ponds in its basin. It has a rapid fall, thus affording extensive power at Chicopee, Chicopee Falls, Ludlow, and Three Rivers. The name "Chicopee" is sometimes applied to the Quaboag branch as well.

CHICORY, chīk′ō-rĭ, or **SUC′CORY** (Fr. *chicorée*, Lat. *cichorium*, from Gk. κιχόριον, *kichorion*, chicory). A plant belonging to the genus *Cichorium*, of the family Compositæ, the same family of plants to which the sunflower, the oxeye daisy, the dandelion, the lettuce, and other useful and obnoxious plants belong. The few species are all herbaceous perennials, with spreading branches and milky juice, natives of Europe and western Asia. Chicory has become naturalized in the United States, occurring as a weed along roadsides, in fence rows, and in fields. Common chicory (*Cichorium intybus*) grows from 1 to 5 feet high. The leaves resemble those of the dandelion, but are generally larger, with the exception of those on the upper part of the stalk, which are small and inclined to be lance-shaped, and the flowers, of a beautiful blue, though sometimes pink or white, occur in heads from 1 to 1½ inches in diameter. The plant has a long, carrot-shaped root, whitish yellow or grayish yellow in color on the outside, but white within. Chicory is quite extensively cultivated in Europe for use as a table salad, for fodder, and for the roots. It is also grown to some extent for its roots in the United States. (For illustration, see Salad Plants.) The young leaves, when properly blanched, are considered equal as a salad to those of endive, a plant belonging to this same genus. The young green leaves are eaten much in the same manner as spinach, and the roots, as long as they are young and tender, are also used as a food. The plant also has some merit as a forage crop. It is principally cultivated, however, for its roots, which are roasted and ground and in that form are used as a substitute for coffee and as an adulterant for coffee, snuff, and other articles. Chicory itself, however, is sometimes adulterated.

CHICOT, chē′kō, *Fr. pron.* shē′kō′. See Gymnocladus.

CHICOUTIMI, shē-kōō′tē-mē′. The capital of Chicoutimi Co., Quebec, Canada, at the confluence of the Chicoutimi River with the Saguenay, and on a junction line of the Quebec and Lake St. John Railway (Map: Quebec, G 2). It is an important lumber town, with an extensive lumbering establishment and two large pulp mills. It is the see of a Roman Catholic bishopric, and has a cathedral, a classical college, convents, and sailors' hospital. The settlement dates from the Jesuit chapel built in 1670, relics of which were found during the erection of a new chapel in 1893. Pop., 1901, 3826; 1911, 5880.

CHIEF (OF. *chef*, chief, It. *capo*, from Lat. *caput*, head). In heraldry (q.v.), an honorable ordinary.

CHIEF JUSTICE. In the English and American judicial systems, the title of the presiding justice of a bench or court of judges—the terms "judge" and "justice" being identical in meaning. The presiding or superior judge of the King's (or Queen's) Bench and of the Court of Common Pleas in England has always borne this title, the former being known also as the Chief Justice of England, and ranking all other judicial officers of the kingdom except the Chancellor (q.v.). The corresponding officer of the Court of Exchequer, whose judges were known as barons, was called the Chief Baron. See Baron.

The presiding justice of the Supreme Court of the United States, and of the courts of highest jurisdiction in most of the several States, bears the title of Chief Justice or Chief Judge, as the case may be. The Chief Justice of the United States is the highest judicial officer of the Republic. Among his functions are those of administering the oath on the occasion of the inauguration of the President and Vice President, and of presiding over the Senate of the United States when that body is resolved into a high court for the trial of impeachments. The Chief Justice ranks next after the President of the United States in official dignity.

CHIEMSEE, kēm′zā′. The largest lake of Bavaria, situated in Upper Bavaria, about 42 miles southeast of Munich, at an altitude of over 1700 feet. It covers an area of about 33 square miles and is irregular in shape. The south coast is generally swampy; on the other sides the country is hilly and picturesque (Map: Germany, E 5). The tributaries of the lake are the Roth, Achen, and Prien, and its outlet is the Alz. It contains three islets; Herrenwörth, on which is the royal palace built by King Louis

II; Frauenwörth, on which is a Benedictine convent founded in 766; and Krautinsel.

CHIERI, kyā′rê (Lat. *Carea,* or *Ceara*). A city in the Province of Turin, north Italy, in a fertile, hilly country, 11 miles southeast of Turin. The most interesting churches are San Domenico, dating from 1260, and Santa Maria della Scala, from 1405. Chieri has a gymnasium, a technical school, and a theatre, and linen, cotton, and silk factories. It was a manufacturing centre as far back as 1422. In the eleventh century it was an independent republic. Pop., 1900, 14,312; 1911, 15,454.

CHIETI, kyā′tê. An archiepiscopal city in south Italy, capital of the Province of Chieti, 99 miles south of Ancona, near the Pescara (Map: Italy, J 5). It has nine churches besides the magnificent Gothic cathedral, a gymnasium, a normal school, a technical school, a seminary, a theatre, four conservatories of music, a military hospital, and a chamber of commerce. It is an important centre of trade; markets wine, oil, grain, and silk, and manufactures silk and wool. There are a few remains of the ancient Teate Marrucinorum, which was the most important city of the Sabelli and fell into the hands of the Romans 305 B.C., in the last Samnite War. It was held successively by the Goths and by the Lombards and was destroyed by Pepin the Short. It was rebuilt by the Normans, who made it the capital of the Abruzzi. From it the Order of the Theatines, founded in 1555 by Paul IV, was named. Pop., 1901, 26,000; 1910, 26,897.

CHIFF′CHAFF′ (imitation of its cry). A small European warbler (*Phylloscopus collybita*), having a twittering note suggesting the name; also called "willow wren" in Great Britain, where it is common about gardens during summer.

CHI-FU or **CHEFOO,** chē′fo͞o′. A city in the Province of Shantung, China, so called by foreigners, though the Chinese name is Yen-tai, and Chi-fu proper is on the opposite side of the harbor (Map: China, F 4). Chi-fu is in lat. 37° 32′ N. and long. 121° 22′ E. The town was opened to foreign trade in 1858. The natives are very orderly and civil. The climate is so bracing that in summer Chi-fu, with its good hotels and boarding houses, is a much-visited sanitarium, being but two days' journey from Shanghai. The winter is severe, the spring lovely and cool, the summer hot and rainy, and the autumn perfect, with warm days, cool winds, and cold nights. Since the Chino-Japanese War Chi-fu has become a coaling station much resorted to by the navies of foreign countries. The city was the seat of the famous convention of 1876 between Sir Thomas Wade and Li Hung Chang. The trade is largely in bean cake and beans, exported mainly to ports in the southern part of China. Silk, straw braid, and vermicelli are the other chief exports. The making of wine is a promising industry. Gold mines 20 leagues away are worked by native capital. The value of the foreign trade for 1905 was over $23,287,000, of which $13,725,000 represented imports and $9,562,000 represented exports. During the investment of Port Arthur by the Japanese in 1904–05 Chi-fu was a rendezvous for blockade runners. Pop., 1910 (est.), 54,000.

CHIGGER. See CHIGOE.

CHIGI (kē′jê) **FAMILY.** An eminent Italian family, mentioned as early as the thirteenth century. AGOSTINO CHIGI, its first prominent member, was a celebrated banker, born at Siena about the year 1465. Established in Rome as early as 1485, Chigi grew immensely wealthy through banking and the possession of valuable alum mines. His income was estimated at 70,000 golden ducats a year (about $700,000). He was one of the great art patrons of the day, and the leading artists, including Peruzzi, Perugino, Sebastiano del Piombo, and, above all, Raphael, owed much to his generosity and friendship. Peruzzi built for him the famous Villa Farnese, which Raphael and Sodoma decorated with frescoes. He died in Rome in 1520. There is a good biography of him in Italian by Cugnoni, *Agostino Chigi, il magnifico* (Rome, 1881–83). Consult also Gregorovius, *Geschichte der Stadt Rom* (4th ed., 8 vols., Stuttgart, 1886–96; Eng. trans., London, 1894–1902).—FABIO CHIGI. See ALEXANDER VII, Pope, 1665–67.—FLAVIO CHIGI, Cardinal, born in 1819, was, up to the year 1848, an officer in the papal noble guard. He then took orders and became Bishop of Mira *in partibus.* In 1856 he represented the papacy at the coronation of Alexander II, Czar of Russia, and from 1861 to 1873 he was the papal nuncio in Paris. In the last-named year he was created a cardinal. Chigi was distinguished for his finesse and courtesy of bearing in all diplomatic business. He died in Rome, Feb. 15, 1885.

CHIGNECTO (shĭg-nĕk′tō) **BAY** (Micmac *sigunikt,* footcloth). The northern extension of the Bay of Fundy, partly separating Nova Scotia from New Brunswick (Map: Nova Scotia, E 3). The main portion of the bay is about 30 miles long and averages 8 to 10 miles in width; but in its northern part it separates into two narrow arms, one extending northward about 12 miles, and the other about the same distance to the northeast. Numerous towns border the bay and its extensions, and it receives several tributary streams. See also FUNDY, BAY OF.

CHIGNON, shĭn′yŏn, *Fr. pron.* shê′nyôN′. See HAIR DRESSING.

CHIGOE, chĭg′ō, **CHIGGER,** chĭg′gẽr, or **JIG′GER** (of West Indian or South American origin). 1. A species of flea (*Sarcopsylla penetrans*), rather smaller than the common flea and with less powerful limbs, found in the West Indies and South America, where it is excessively troublesome. The female insect attacks any exposed part of the human body and effects a lodgment between the skin and the flesh, often under the skin of the foot or the nails of the toes. At first its presence is indicated only by a slight itching or tingling; but this soon becomes intolerable, and an ulceration due to the development of a mass of eggs is likely soon to be the result, which is not only very painful, but even dangerous. Another species (*Sarcopsylla gallinacea*) attacks the eyelids of poultry.

2. In the southern United States the name is applied to the minute scarlet forms of various mites which attach themselves to the skin of man and other vertebrates or even burrow into it; they seek those parts of the body particularly upon which the clothing presses tightly. Their bite is very annoying, though not fatal to man; but they may collect in such numbers under the wings of newly hatched chicks as to cause death. Salt-water bathing alleviates the burning of their bites on man, and on such animals as chicks salted lard or the drippings of salted bacon soon give relief when smeared on the infested surfaces. During the Civil War the soldiers often kept a

piece of bacon with which to rub infested parts of their bodies after the day's march.

CHIHUAHUA, chē-wä′wȧ (Aztec, water-course). An inland, and the largest, state of Mexico, bounded on the north by the United States, on the east by the Mexican State of Coahuila, on the south by Durango, and on the west by Sinaloa and Sonora. Area, 89,998 square miles. The surface can be divided into the two regions of an elevated plateau on the east and a mountainous section formed by the Sierra Madre on the west. Neither region is well watered. The state's chief river is the Rio Conchos, a tributary of the Rio Grande. The climate is temperate and healthful and the soil fertile wherever watered. Agricultural products consist of corn, wheat, several kinds of vegetables, and fruit, including grapes. Cotton is also grown successfully in the Torreon district. The forests are found mostly in the mountainous districts of the west. Chihuahua has considerable mineral deposits, its silver mines being among the richest in the republic. Some of them were worked by the Indians at the time of the Spanish Conquest. The state's production of lead is noteworthy. Zinc is also abundant. Over 5250 mining properties are recorded for its entire area. The state is traversed from north to south by the Mexican Central Railway. Other important lines operated within its area are: the Sierra Madre and Pacific; the Mexican Northern; the Chihuahua and Pacific, and the Kansas City, Mexico, and Orient. Pop., 1900, 327,784; 1910, 405,265. A considerable portion of the population is creole or white; the rest consists of Indians partly civilized. There are some Apaches in the mountains, who still continue their forays on the settlements. The close of the nineteenth century, however, witnessed great changes in the status of the state. Large numbers of foreigners, chiefly Americans, have secured control of the industries and have already raised the state to a leading place in the republic. A flourishing Mormon agricultural colony was founded in 1886 west of Ciudad Juarez. Capital, Chihuahua.

CHIHUAHUA. The capital of the North Mexican state of the same name, on the Mexican Central Railway (Map: Mexico, F 3). It is situated at an elevation of about 4650 feet, on the Chihuahua River, in a plain surrounded by mountains on all sides except the north, and it is regularly built, with broad, well-kept streets. It has a fine public square, in which is a monument erected to Hidalgo and his generals, the leaders of the revolution of 1810. The parish church, completed in 1789, is the most pretentious building, and other features of interest are a college, formerly belonging to the Jesuits, and an aqueduct which dates from the close of the seventeenth century. The city is the centre of a rich silver-mining district and is known also for its stock-raising and industrial interests, the cotton and woolen mills being among the most important in the republic. Fruits, particularly grapes and figs, are grown extensively in the adjacent region. A United States consulate is located here. Chihuahua was founded in 1703 or 1705, and at one time was a much larger city, its population in the late eighteenth century having reached 70,000. Pop., 1895, 18,279; 1910, 39,061.

CHIKARA, chē-kä′rȧ. See CHOUSINGHA.

CHIKHACHEV, chē′kȧ-chĕf′, PETER ALEXANDROVITCH (1808–90). A Russian geologist and traveler. In 1843 (with Elie de Beaumont, Heppert, and Verneuil) he investigated the Altai Mountains, the result of these investigations being embodied in *Voyage scientifique dans l'Altaï oriental et les parties adjointes de la frontière de Chine* (1845). An attaché in the Russian Embassy at Constantinople (1845–47), he mastered Turkish and during 1848–63 traversed Asia Minor, making large geological, paleontological, archæological, zoölogical, and botanical collections. He embodied the results of his studies in *Asie Mineure* (8 vols., 1853–69). Among his other works are *Voyage dans l'Altaï Oriental* (1844–45), presenting an account and scientific interpretation of his explorations in the Orient; and *Etudes de géographie et d'histoire naturelle* (1890).

CHILÁN BALÁM, chē-län′ bȧ-läm′, BOOKS OF. The native name of a series of documents in Spanish script but Maya words preserved by the Maya Indians of Yucatan. The name refers to the priests who wrote them and means 'priestly interpreter,' or, more literally, 'tiger mouth.' The books are based on ancient records destroyed at the time of the Spanish Conquest and relate primarily to history. The count is made in 20-year periods, called "katuns," and in Chronicle I extends back to 160 A.D. The events refer primarily to the tribe of the Itzás and to the cities of Chichén Itzá, Uxmal, and Mayapan. Consult Brinton, *Maya Chronicles* (Philadelphia, 1882), for the translation, and Morley, *Am. Journ. Arch.*, vol. xv (2d series, 1911), and Spinden, *Mem. Peabody Mus.*, vol. vi (1912), for the historical value. Under the caption *The Book of Chilán Balám of Chumayel* a facsimile reproduction has recently been issued by Dr. Gordon in the "Anthrop. Series," vol. v, of the Museum of the University of Pennsylvania.

CHIL'BLAIN, or FROSTBITE. A dermatitis, or skin disease of the feet with inflammation, following exposure to the cold and to chafing or pressure in the shoes. It may affect also the fingers, the nose, chin, or cheeks. The lesion is a small oval or round patch of reddened and elevated tissue with a purplish centre. Ulceration, or even sloughing, may follow in severe cases; but in ordinary chilblain, or *pernio*, there are only itching, burning, and stinging of the spots when warm, with tenderness on pressure. Tincture of iodine, ichthyol, tincture of the chloride of iron, tincture of camphor, are all efficacious. Sweating of the feet and sudden changes of temperature should be avoided. Hosiery should be changed whenever moist. General tonic treatment and outdoor exercise should be taken. See FROSTBITE.

CHILCOTT, ELLERY CHANNING (1859–). An American agriculturist, born at East Hamburg, N. Y. From 1882 to 1892 he was United States deputy surveyor, during most of this period also owning and managing a stock ranch in Campbell Co., S. D. He became State Senator in 1892. At South Dakota Agricultural College he was professor of agriculture in 1892–97 and professor of geology and agronomy and vice director from 1897 to 1905. He was agriculturist in the United States Experiment Station, South Dakota, from 1893 to 1905, when he was placed in charge of the dry-land agricultural investigations of the Bureau of Plant Industry. He is author of *A Study of Cultivation Methods and Crop Rotations for the Great Plains Area* (1910), a bulletin of the Department of Agriculture.

CHILD, DEVELOPMENT AND GROWTH OF. The

poet calls the child "an epitome of man." Not so the scientist, who sees rather a creature very simple, yet very complex, who will, by many changes and much evolution, one day become a man. These changes are anatomical, physiological, and mental. Says Camerer, "The most interesting task in anthropology is the study of child growth."

We begin with the skeleton. Although the bones are very incomplete in development, having ends largely cartilaginous, the relative proportion to body weight is greater than in the adult, viz., 16.7 per cent. The infant bones are soft, and the larger ones are abundantly filled with red marrow, while the adult bones are hard and filled with yellow marrow. This is significant, as the chief function of the red marrow is the formation of red blood cells, so essential to growth and good health. The infant spine is nearly straight, because of little rigidity in its many parts, the vertebræ; but, as time goes on, lime is deposited, so that the cartilage, instead of containing 2.24 per cent of salts, contains 7.29 per cent. Moreover, the cartilage largely becomes solid bone. The muscles keep pace with this development and, acting upon the limbs and trunk, bring about the curves in the small of the back and at the neck. The infant head differs much from the adult in size and in proportion—the diameter of the former exceeding the height of the face and skull, while in the adult the diameter is but half the height. The bones of the skull are imperfectly joined at birth, which allows the head to mold itself in passing through the rigid pelvis of the mother. There is an entire absence of bone at the anterior fontanelle, the soft spot on the top of the head where the parietals meet the frontal bone. This space is filled by solid bone at the age of a year and a half. If rachitis (q.v.) develops, the space becomes more than full and is knobbed and elevated.

The ribs of the young infant are more nearly horizontal than in later life; hence the barrel-like chest and abdominal breathing. The lungs until birth are collapsed, but with the first cry they are expanded by the inrushing air and never cease their function while life lasts. From now on the heart and lungs coöperate in a very intimate manner, as we shall consider later. The heart at birth is .89 of 1 per cent of the body weight, but the labor of constantly pumping causes it to grow until at maturity it has increased to 12 times its original size, and the left ventricle has become greatly thickened as compared with the right, which only forces blood through the lungs. The infant heart is comparatively small, but the arterial system is large; hence the low blood pressure. Studies by the writer showed an average blood pressure of 91 millimeters at three years, 109 millimeters at 15 years, and thence on to 120–140 millimeters, the standard in the healthy adult.

The eyes are imperfect at birth: the macula lutea is not distinct; the lens is nearly a sphere, which grows less spherical in adult life and in old age becomes flattened. The lachrymal glands for a time do not secrete tears, and the

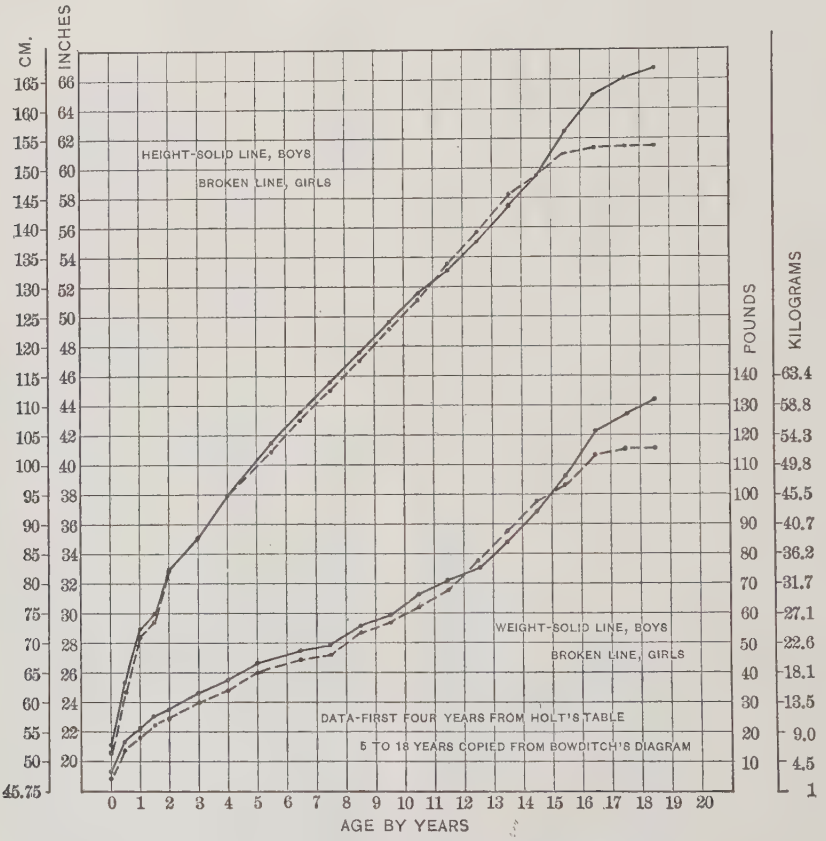


Chart showing height and weight (redrawn from Carr and Yale).

eyes do not coördinate perfectly until the age of three months. The ears undergo considerable change: in the beginning the membrana tympani, i.e., the drum membrane, is on a plane almost horizontal, and the Eustachian tube also. Later, both assume a nearly upright position. In the flattened and patent tube we find one explanation of the ease with which children become affected with catarrhs and infections of the middle ear. At three months the child listens attentively, though it evidently can hear a month earlier.

The digestive tract is practically a long tube. The portion called the stomach is in the infant an upright dilatation, having a capacity of about an ounce and a half. There is little muscle tissue at first and therefore little sphincter action. This accounts for the ease with which infants vomit or pour out the stomach contents. By the time the child is weaned the muscle fibres have grown thick and strong, so that there is peristaltic action sufficient for other foods than milk. The rectum of the young child is straight, as its name implies, and for this reason prolapse of the bowel is common.

The lymphatic system with its glands is early in evidence, but there is more variableness in the glands having secreting functions. The parotid gland, e.g., with its starch ferment, does not functionate until the fifth month. The glands of Lieberkuhn and of Brunner in the intestine are not fully developed until needed to digest mixed diet. The thyroid and thymus glands in the neck behave very unlike—the former relatively diminishing towards adult life, while the latter practically disappears.

The liver is relatively a third larger than in the adult. In general, the liver and lungs have similar ratios of growth and also the heart and kidneys. Secretion and absorption are much influenced by blood pressure, and are normal in the growing child, but distinctly abnormal in the adult with heart or kidney disease. The suprarenal capsule is as large at birth as in the adult, although the kidney beneath will increase 15 times in size.

The blood of the infant is not so rich in hæmoglobin as is that of the adult, therefore it does not carry so much oxygen. The proportion of white cells is high, 2100 at birth and averaging 10,000 to 14,000 at six months, the latter figure being double the normal for adults. Infant blood is deficient in coagulating ferment.

The average infant at birth measures 20.5 inches in length and weighs seven and a half pounds. He has 20 years in which to become an adult in stature and in mental and moral development. Man alone has so long a period of infancy, and it has been said that "the brute pets and playmates of his childhood all die of old age before he reaches his majority."

For the first few days after birth the infant loses weight, but by the end of the first year he has reached three times his birth weight. During the second year he adds six pounds and during the next year four. Growth is not steady, there being periods of special activity, as at the time of the second dentition and a year or two before puberty. Until 12 years of age boys are both taller and heavier than girls, but after that girls assume the lead for about three years. At 14 girls cease to grow much in height, but increase in weight, with the deposit of fat characteristic of adolescence. The changes in growth and in height are clearly set forth in the accompanying chart, adapted from that of Yale and Carr, based upon studies of American children. Statistics of English children show less height and weight, while those of German children show greater.

The Development of the Faculties of the infant were carefully recorded by Preyer, from whom the following statements are mainly taken. During first month: eyes follow object on eleventh day; recognizes sound towards end of the month; first tears on the twenty-third day; begins to hear about fourth day; begins to smile. During second month: recognizes human voices, and direction from which they come; smiles when music is heard; recognizes mother; turns head towards sounds. During third month: moves arms to express pleasure; able to support head a little; listens attentively. During fourth month: eyes coördinate perfectly; reaches after objects; first attempt to sit upright. During fifth month: recognizes strangers as such; holds head straight; sits alone; moves legs as if to walk; stretches out arms to be taken. During sixth month: distinguishes faces, staring at strangers but smiling at friends; turns head towards person leaving the room; begins to creep and to "crow." During seventh month: purposive movements; points with finger at pictures; extends hand when asked; follows objects dropped from hand; associates persons and names; recognizes with pleasure its image in a mirror. During eighth month: sits upright when carried; some children attempt to walk at this time. During ninth month: begins to imitate tunes; laughs heartily; begins to beg for things. During tenth month: takes intense interest in its food; begins to walk alone; answers questions by motions and indicates where certain things are. During eleventh month: stands quite alone; pushes chairs, begins to articulate its own name; understands language fairly well. During twelfth month: imitates laughter of others; puts out arms to enforce its demands; improvement in walking and standing; watches other persons attentively. Fourteenth to sixteenth month: independent speech is acquired; repeats spoken words easily; in seventeenth month speaks short sentences, using verbs; from this time on there is steady improvement in the memory of words and the use of language; at two years repeats rhymes. Colors are distinguished before their names are learned; in fact Garbini found that only 35 per cent of children name colors at six years of age.

Speech. "Action is eloquence, and the eyes of the ignorant more eloquent than their tongues." Actions are much the same in children of all nations, and the gesture language of primitive races and of children is everywhere similar. The intelligent use of words begins at about the second year and increases in proportion to the culture and intelligence of parents or guardians. Recent records show that children have a much larger vocabulary than was formerly taught. For example, the Salisbury boy at five and a half years had 1528 carefully checked words which he "used understandingly." Children can easily acquire any language if they begin to hear it soon enough. Moreover, the natural aptitude of all races is about the same. Three boys, known to the writer—a Hottentot, a Bushman, and a Negro from an asylum—were brought up in the same mission school; they were quite like normal white boys of the same

age. Their bodies were inherited, but their language was acquired.

Teeth. At birth the teeth are in sacs buried in the gums. In six or eight months the lower central incisors come through and are followed at irregular intervals by others until the temporary set of 20 teeth is completed at 24 to 30 months. The accompanying diagram indicates the relative position of the temporary or deciduous teeth with reference to the permanent teeth, also their order and time of ruption. Order in Roman numerals, months and years in Arabic numerals.

The ruption of teeth in the healthy child is a physiological process without disturbance, but in some it is accompanied by swelling of the gums and pain.

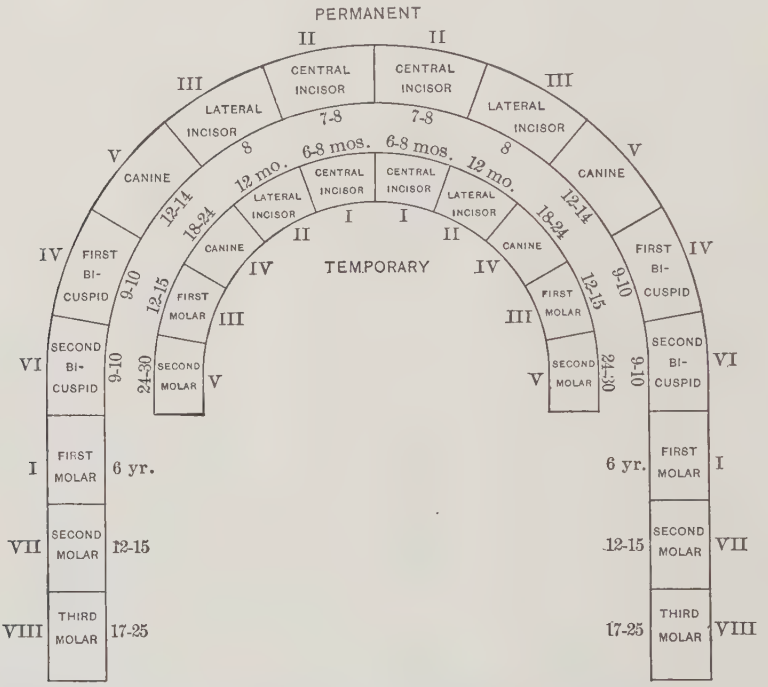


Diagram showing what permanent tooth replaces each temporary tooth, and also the order of succession of the teeth of each set, with time of ruption (in part after Gerrish).

The Brain. At birth the weight of the brain is one-sixth of the body weight, while at 20 years it is one-thirty-sixth; however, "growth is less important than development, and perfect function than either." In the development of the brain the centres first perfected are those presiding over the viscera, as the heart and lungs, then the limbs, next the centres of sensation, and lastly the centres of thought and reason. The child acquires knowledge very rapidly, at first by observing and imitating its associates; reason and conviction are developed after school age. At the adolescent period the child begins to realize that his brain is his own, and his independence may exasperate his superiors. This state passes with the approach of maturity and the realization of personal responsibility. It is said that the nerve cells are not functionally perfect until 18 or 20 years of age; therefore we should not be surprised if the young fail sometimes fully to appreciate truth, right from wrong, or exhibit those moral characteristics that adults have acquired from experience and by injunction. Imagination is active in the child, but logic and judgment are the products of time.

Hygiene of Childhood. The normal body heat of 98.6° must be maintained in young or old in all seasons and climates. The metabolism necessary therefor is dependent upon the amount of muscular activity and the proportion of body surface, both great in the young child. The infant gives off a very large amount of carbonic-acid gas and therefore needs a relatively large amount of fresh air. The skin contains 28 miles of ducts, carrying off effete matter in the perspiration; hence the need of clean skin properly protected. Infants require a daily bath, and older children two or three baths each week. Proper protection means woolen clothing next the skin in cold weather and at all times except when there is great heat. Children, on account of their activity, do not need heavy clothing, but should have warm wraps to wear when at rest. They should never remain in damp clothing or shoes, but change to dry as soon as they cease being active. The circulation is feeble during sleep; hence the need of warm night clothing. The temperature of the sleeping room should be 50°–60° and the windows open according to season. It should be remembered that one gas jet consumes as much oxygen as five persons, therefore excess of lighting should be avoided.

Sleep. The heart rests one-quarter of the time between beats, but the brain can rest only during sleep. A child under four years of age requires a nap in midday; a child of six or eight years, 12 hours of sleep; at 10 years, 11 hours; at 12 to 14 years, 10 hours. A child restless in sleep probably has trouble with his digestion. "Do not blame Providence for parental improvidence." The child should have sim-

ple food and proper action of the bowels daily. Physiological habits must be commenced in early life.

Diet. Children require food both for fuel and for growth, whereas the adult needs are for heat and repair only. The feeding of infants is such an important matter that it will be dealt with as a special topic. (See INFANT FEEDING.) A few simple principles are sufficient for the purposes of this article. After weaning, young children should have an abundance of milk both as food and drink; a variety of cereals; stale breads of all kinds, never hot; baked potatoes; stewed fruits; milk products such as junket, custard, rice pudding, etc. Though meats are not allowed, clear soups are permitted, and a little later chicken is added. Sweets are to be avoided except with meals, and even then if there be feeble digestion. Milk and eggs should be the source of proteids for the very young. They need not be stinted as to vegetables and ripe fruits. When 9 or 10 years old, they may have meat once or twice a day. Healthy children at 12 or 13 years require about as much food as an adult and of as great variety, plain food of course being understood. Neither tea nor coffee is nourishing, and although commonly used should be dropped from the dietary. Milk and cocoa or water are the proper drinks, and if children were taught to chew their food more thoroughly, they would not want so much fluid. Articles difficult of digestion should be avoided, e.g., rich pastries and puddings, hot breads, unripe fruit; among meats, pork, tongue, corned beef, and salted fish; also nuts or cheese in excess. The amount of food required will depend largely upon the weight of the child; e.g., a child of 3 years, weighing 30 pounds, will need 980 calories per day; a 5-year-old, weighing 40 pounds, will need 1200 calories, and a 15-year-old, weighing 100 pounds, will require 2000. The chemistry of food and the fuel value of ordinary diets will be found under FOOD (q.v.).

Exercise. Children play with little urging, but not always in active games. An active body means an active circulation, which in turn leads to an active mind. Young boys and girls should play the same games together, especially out of doors. At the time of puberty there are anatomical and physiological reasons for the girl desisting from some of the more strenuous sports. A list of active games for young children would include hoop rolling, skipping rope, bean bags, handball, tether ball, roller and ice skating, and, for indoors, calisthenics. Older children will play baseball, tennis, hockey, "shinny," leapfrog, tag, etc., and will also row and swim. It should be stated, as a principle, that adults may wisely suggest games, but that they are to be carried through with a minimum of outside interference.

Play is work to children and an important factor in their development. They are keenly interested in company drills, military, Swedish, or any of those common in school and gymnasium. Gorst especially advocates jiu-jitsu, which in Japan is practiced by men and women without apparatus other than their partners. Rankin wisely remarks that "some children break down from overstudy, but more from underhygiene." See PARENT AND CHILD; CHILD STUDY; CHILD PSYCHOLOGY; CHILD LABOR.

Bibliography. There has grown up a very extensive literature upon "the child" viewed from many sides. The following titles indicate works each of special value in its own field. Preyer, *The Mind of the Child* (1881); Hall, *Adolescence* (1904); Chamberlain, *The Child* (1900), with very extensive bibliography; King, *Psychology of Child Development* (1906), also extensive references; Rankin, *Hygiene of Childhood* (1890); Oppenheim, *The Development of the Child* (1898); Rowe, *Physical Nature of the Child* (1899); Gorst, *The Children of the Nation* (1907); Pfaundler and Schlossman, *Diseases of Children* (1912), for metabolism, foods, etc.

CHILD, FRANCIS JAMES (1825–96). A distinguished American scholar and teacher. He was born in Boston, was educated there in the public schools, and graduated from Harvard College in 1846. He immediately entered into the service of the college, becoming in 1851 Boylston professor of rhetoric and oratory, and in 1876 professor of English, which post he held until his death, Sept. 11, 1896. His zeal for learning and genuine love of literature, supplemented by a thorough knowledge of the best in foreign scholarship, enabled him not only to make his courses at Harvard very valuable, but also to enrich American scholarship with a series of excellent editions and studies. His contributions are an edition of *Four Old Plays* (1848); the *Poetical Works of Edmund Spenser* (5 vols., 1855), which remains the best edition of the poet and which was his special contribution to the American edition of the British poets, of which he was general editor; *Observations on the Language of Chaucer* (1862); *Poems of Sorrow and Comfort* (1865); *Observations on the Language of Gower's Confessio Amantis* (1866); and his greatest work, the definitive and monumental edition of the *English and Scottish Ballads.* This was first issued in 8 small vols. (Boston, 1857–58) and, after a most painstaking research and revision, appeared in 10 large vols. (Boston, 1882–98). For biographical sketches of Professor Child, consult Norton, in vol. vi of the *Harvard Graduates' Magazine* (Boston, 1899), and Kittredge, in the revised edition of the *English and Scottish Ballads* (1904).

CHILD, SIR JOSIAH (1630–99). An eminent London merchant and one of the popular English writers on commerce and political economy. He was the second son of Richard Child, a merchant of London. His principal work is entitled *Brief Observations Concerning Trade and the Interest of Money* (1668); a second edition, much enlarged, entitled *A New Discourse of Trade,* was published in 1694. In this work Child takes the position of a moderate mercantilist, accepting the balance of trade doctrine, but urging the advantage of a relaxation of the restrictions upon trade. The work was translated into French by Gournay in 1754 and exerted an important influence upon the development of liberal doctrines. The work is also of significance as a contribution to the literature of pauperism. Child was one of the directors, and for some time governor, of the East India Company, and a tract entitled *A Treatise wherein it is demonstrated that the East India Trade is the most National of all Foreign Trades* (1681) is attributed to him. In 1678 he was created a baronet. He died June 22, 1699.

CHILD, LYDIA MARIA FRANCIS (1802–80). An American author, born in Medford, Mass. Inspired by an article in the *North American Review,* she wrote a novel dealing with early New England life entitled *Hobomok* (1821).

Her next story, *The Rebels* (1822), dealt with Boston before the Revolution. In 1829 she wrote *The First Settlers of New England*, and in 1836 a biography of Madame de Staël. After a short experience at school-teaching, she married, in 1828, David Lee Child, a journalist, and a little later, coming under Garrison's influence, both she and her husband found their real life work. In 1833 she published what is regarded as the first antislavery book by an American, *Appeal for that Class of Americans Called African*. She was, of course, more or less ostracized, but made converts. In 1840 she began to edit the *National Anti-Slavery Standard* in New York. In 1844, with her husband, she settled in Wayland, Mass., and continued her work of propaganda, having meanwhile published many volumes of a miscellaneous nature, including her best performance, *Philothea* (1836), a tale of the time of Pericles. In 1853 she issued *Isaac T. Hopper: A True Life* (reprint, New York, 1881), having learned to know that philanthropist during her stay in New York. She should also be remembered as a writer for children. Her literary work has not continued popular, being often overambitious, as in the case of her *Progress of Religious Ideas through Successive Ages* (3 vols., 1855); but her personality was a fine one and is well depicted in Higginson, *Contemporaries* (Boston, 1899). Consult her *Letters* (Boston, 1882).

CHILDBIRTH. See OBSTETRICS.

CHILDEBERT. See FRANKS.

CHILDE (chīld) **HAR'OLD'S PILGRIMAGE.** A narrative poem, by Lord Byron, in four cantos, the first two of which appeared in March, 1812, in quarto, and the last two in 1816 and 1818, severally. The publisher, Murray, gave £600 for the first two cantos and 2000 guineas for the fourth. The piece abounds in descriptive passages and is conceived in an eminently "Wertheresque" spirit, detailing the impressions of a romantic youth during his *Wanderjahre*.

CHILDERMAS, chīl'dēr-mâs (AS. *cilda mæsse*, or *cildra mæsse*, children's mass), or HOLY INNOCENTS' DAY. A day (December 28; in the East, December 29) observed by the Roman, Greek, Anglican, and other churches in remembrance of the children killed by Herod. The learned Gregory says: "It has been a custom—and yet is elsewhere—to whip up the children upon Innocents' Day morning, that the memory of Herod's murder might stick the closer." It is also a holiday in the Church of England.

CHILDERS, chīl'dērz, ERSKINE (1870–1922). Irish revolutionist, opposition leader to the Free State in 1921; the son of R. C. Childers, the Orientalist; educated at Trinity College, Cambridge, and became widely known in 1903 by his book *The Riddle of the Sands*, which prefigured a German invasion. For many years he was a champion of Home Rule, and in 1917–18 was in the secretariat of the Irish Convention. When that body failed, he went to the extreme in opposition and became a leader in the revolt against the new Free State government after the peace negotiations in 1921. He was captured by Free State troops in County Wiklow, Nov. 10, 1922, tried by court martial and shot Nov. 23. He also wrote a volume of *The History of the War in South Africa*, published by the London *Times* (1907); *German Influence on British Cavalry* (1911); and *The Framework of Home Rule* (1911).

CHILDERS, ROBERT CÆSAR (1838–76). An English Oriental scholar. He was educated at Wadham College, Oxford, where he was Hebrew scholar. In 1860 he was appointed a writer in the Ceylon Civil Service and acted as private secretary to the Governor, Sir Charles McCarthy. The state of his health forced him to return to England in 1864, and in 1872 he became sublibrarian at the India Office, London. From 1873 until his death he was the first professor of Pali and Buddhist literature at University College, London. While a resident in Ceylon, Childers had acquired a thorough knowledge of the Singhalese or Ceylonese language. In 1869 he published his first contribution to Oriental literature, in the *Journal of the Royal Asiatic Society*. This was the Pali text of the *Khuddaka Patha*, with a translation into English, and notes. It was the first Pali text ever printed in England. To the preparation of the Pali dictionary, of which he felt the imperative need, Childers devoted nearly all of his time from 1869 until his death. This work was completed in 1875, in 2 vols., and was awarded the Volney prize for 1876 by the Institute of France. After the completion of this great work he contributed many minor papers to the transactions of the learned societies, and had in contemplation a complete translation of the Buddhist Jataka Book. His unwearied exertions, however, told upon his enfeebled constitution, and he developed consumption, of which he died, July 25, 1876.

CHILD LABOR. The employment of children in industry, while dating from the earliest historical times, did not become a social problem of the first importance until the introduction of the factory system in England in the latter part of the eighteenth century, in other modern countries during the nineteenth century, especially after 1860. Under earlier conditions the employment of children, either under their own parents or as apprentices under a master bound by law and custom to safeguard their interests, was regarded as an excellent thing. Thus the habits of steady industry, so necessary under the existing system of production, were inculcated in the earliest years. The close personal relation between the master and apprentice or parent and child and the restraining influence of public sentiment were, as a rule, sufficient to prevent serious abuse; moreover, experience showed that it was difficult to drive a child beyond his powers of physical endurance.

In the last quarter of the eighteenth century the introduction in England of power machinery for spinning cotton, and later for spinning wool and for weaving, brought about a fundamental change in the conditions of child labor. The work required rather deftness than physical strength; accordingly the labor of children was in many cases more productive than that of the existing adult population, trained in agriculture or in the more leisurely methods of domestic industry. A large supply of child labor was to be had from the poorhouses, the custom having long existed of apprenticing pauper children to any person who would engage to bring them up to honorable employment. Accordingly the new cotton mills in the north and west of England collected pauper children throughout the kingdom, obtaining their services for the cost of their maintenance. Profits were naturally high at first, and competition increased. In the struggle to maintain profits the various manufacturers—especially those who operated antiquated

machinery—lengthened the hours of employment for their child workers and cut down the costs of food and housing, until at last an indescribable condition of child slavery came into existence. Children of five years were in some cases compelled to work from 13 to 16 hours a day; their food was barely sufficient to keep them alive, and no regard was had for the most primitive rules of sanitary housing. At length in 1802 an Act of Parliament limited the working day to 12 hours, forbade night work, and required elementary instruction for apprentice laborers in cotton factories. In the meantime the competition of the factories had practically destroyed domestic production of textiles, and families formerly engaged in home work were driven to migrate to the factory towns, where the low rate of wages and high cost of living compelled them to place their children in the mills. To such children the Act of 1802 did not apply; and the evils of the apprentice system were duplicated in the case of children living with their parents. In 1819, after many years of agitation, a law was enacted forbidding employment in cotton factories of all children under nine, and limiting hours for children under 16 to 12 daily. No special provision was made for the enforcement of the law, and it was frequently evaded. In 1825 an Act was passed which provided a Saturday half holiday for child workers in cotton factories, and in 1831 night work of persons under 21 was prohibited. This legislation was replaced by the Factory Act of 1833, which made provision for factory inspectors, prohibited night work for persons under 18, fixed 48 hours a week as the maximum for children between 9 and 13, and 69 hours for persons between 13 and 18. Two hours' schooling per day was required for all children. The Act applied to all textile works with the exception of silk mills. In 1842 employment of children under 10 in mines and collieries was prohibited. The Act of 1844 limited the hours of children under 13 to 6½ per day and required school attendance for the remaining half day. In 1848 the hours for children under 13 were limited to 5, and those of "young persons" (13–15) to 10. This Act may be regarded as the basis of all modern regulation of child labor. In the following three decades a number of acts were passed extending the scope of the law and improving its machinery for enforcement. In 1878 all previous legislation was consolidated into one great factory act. The minimum age of employment was raised to 10 years, and children from 10 to 14 might be employed only one-half day or on alternate days. For persons from 14 to 18 the work day was required to begin at either six or seven in the morning and to close at the same hours in the evening, with an intermission of two hours for meals and rest. All Saturdays were made half holidays, as well as eight other days in the year. Minute regulations were made relative to the fencing of dangerous machinery and to sanitary conditions. In 1902 a new and more complete code went into effect, raising the minimum age to 12 years. Many of the provisions of the law were extended to home workshops.

In the United States, while some children were employed in factories in the first half of the nineteenth century, the problem did not become serious until the great industrial expansion in the first decade after the Civil War in the Eastern and Middle Western States and in the last decade of the century in the Southern States. By 1879, in Massachusetts children from 8 to 11 were found working in factories from 11 to 14 hours daily. Even worse conditions prevailed in New York and Pennsylvania. According to the census of 1900 children under 16 formed 13.3 per cent of all persons engaged in cotton manufacture in the United States. In 1909 the percentage had declined to 10.4. For manufactures in general the percentage of children under 16 declined from 3.4 in 1899 to 2.4 in 1909. The largest percentages of child workers were in South Carolina (12.9) and North Carolina (11.3). The total number of children under 16 employed in manufactures remained practically stationary through the decade 1899–1909. In the former year the number was 161,276; in the latter, 161,493. The greatest employer of child labor in 1909 was the cotton manufacturer (40,221). Hosiery and knit goods (11,111) and canning and preserving (11,035) were next in order of importance. Over one-half of the children employed in industry were found in the Middle Atlantic States (44,464) and the South Atlantic (41,856). New England employed 33,575.

Laws relating to child labor in the United States generally fix a minimum age limit prohibit certain kinds of employment for children, as dangerous to health or morals, limit the number of hours a person under a certain age may be employed, prohibit night work for children, and, in a large number of cases, fix educational requirements for children under a given age as a prerequisite to employment.

The attempt to regulate child labor by the Congress of the United States has not been very successful. In 1916, after years of effort, a law was passed by Congress which prohibited the employment of children in mills, factories, mines, and quarries under the power of Congress to regulate commerce among the several States. This law became effective on September 1, 1917. Almost immediately the constitutionality of the statute was attacked. The opponents of the measure stated in the hearing before the Supreme Court that the statute contravened the "due process" clause of the fourteenth amendment, and that it deprived the States of opportunity to limit the ages of employment so as to adjust them to differences of climate, industry, and wealth. The government argued that the new knowledge of child hygiene and the newer ideals of preparation for citizenship and economic efficiency made child labor repugnant to the modern standards of morality. The government also showed how the States with advanced child labor laws suffered from the competition of States with inadequate laws. The decision of the Supreme Court was handed down on June 3, 1918. It declared the act unconstitutional, on the grounds that it interfered with the powers reserved to the States under the tenth amendment. The question of child labor in mines and factories was a "matter purely local in its character." "The power of the States to regulate their purely internal affairs by such laws as seem wise to the local authorities is inherent and has never been surrendered to the general government." It was further held that the act transcended the power of Congress over interstate commerce.

Congress almost immediately determined to pass a new law which would avoid the constitutional pitfalls of the old one. An act was signed

by President Wilson, on February 24, 1919. This act placed a 10 per cent tax on the net profits of any mine or industry in which child labor was employed, thus shifting the constitutionality of the law from the interstate power clause to the broad field of taxation. Public opinion seemed to believe generally that the law would stand the test of the courts and be declared constitutional. The opium law and the sulphur match law were cited as similar taxation laws which had been upheld. A suit was brought under the law in the courts of South Carolina and the measure was declared unconstitutional. The case was appealed to the United States Supreme Court and came before that body on December 10, 1919. A decision was not handed down until May 15, 1922. Contrary to widespread belief the act was declared unconstitutional. The law was attacked on the ground that it attempted to regulate an exclusively state function in violation of the tenth and fourteenth amendments, and was defended as a mere excise tax levied by Congress under its broad power of taxation. The decision, which was rendered by Chief Justice Taft (without dissent), stated that the law was invalid because it was an attempt by Congress to regulate through its taxing powers, something entirely within the jurisdiction of the various States in the exercise of their police powers. The decision also attacked the idea of taxing as a "penalty" instead of as a means of revenue.

These two decisions of the Supreme Court thus left the question of child labor entirely in the hands of the States. One of the most useful sources of information, nevertheless, comes from a Federal Bureau (the Children's Bureau, under the Department of Labor), which was created in 1912 to systematize inquiries into the conditions under which children, particularly child laborers, live throughout the country. The legal standards adopted by the various States to protect children from the hazards of too early employment are summarized by the Children's Bureau as follows: In all except 4 States the minimum age for work at least in factories and often in many other employments is placed as high as 14 years, and 7 States have an age minimum of 15 or 16 years. Exemptions exist in most of these States, but they apply in many cases to children employed outside school hours or during vacations. Twenty-nine States have recognized the 8-hour day standard for children under 16 by prohibiting them from working longer hours in certain occupations, or by extending this prohibition to all gainful employments, usually, however, exempting housework and work on farms. Of the other States, nearly half limit the working hours in the regulated occupations to 54 or less a week. The 11-hour day still exists in 2 States, with a weekly maximum of 60 hours. Forty-one States have some prohibition of night work applying to children under 16, and of these 17 prohibit such work without exemptions, except in some cases for agricultural pursuits and domestic service. Eighteen States, including some of the principal industrial States, require a child under 16 to have a physician's certificate of physical fitness before he can obtain an employment certificate, and 10 others permit the certificate-issuing officer to impose this requirement in his discretion. For work in mines the general minimum age standard is 16, but 10 States still permit the employment of boys 14 years of age, and 6 have no minimum age for such work.

The administration of the child labor laws is in some States intrusted to factory inspectors. In some States, especially in the south, no machinery for enforcement is provided. In very few of the States is the law effectively enforced. Trade unions and voluntary organizations give active aid to enforcement agents. In some 15 States child labor committees have been formed to secure the carrying out of existing laws and the enactment of further legislation. The State committees are federated in a National Child Labor Committee, which holds annual meetings and carries on a propaganda throughout the country. In this way it is hoped that one of the most serious objections to child labor legislation may be removed, viz., that stringent laws in one State tend to drive industries across the border into States where such laws are lax or uninforced. A uniform child-labor law was adopted by the committee in 1911, which in several instances has been enacted by State legislatures.

Before the Great War which broke out in 1914, the child labor laws in the various European countries were very strictly enforced. Great Britain was the pioneer in child labor legislation (1833). Germany modelled her law after Great Britain's (1839). In other countries child-labor legislation is of much more recent date. European laws fixed a minimum age, limited the working day for children employed in certain occupations, and prohibited night work and employments, regarded as dangerous to health or morals. Although the standards were high in some countries, the general average was considerably below that of many of the American States.

The effects of the war were serious and far-reaching. The combination of high wages and high prices had resulted in the United States in children leaving the schools at earlier ages, being more irregular in attendance, applying more frequently for work permits, or otherwise reducing their schooling. A systematic propaganda as to the advantages of an education and the severe economic depression that followed the war resulted in a strong "back to school" movement which rapidly restored the pre-war conditions.

In Europe the effects of the war on child labor were far greater than in the United States. In Great Britain alone it was estimated that more than 600,000 children were prematurely taken from school. In the other European countries practically all restraints and safeguards were cast aside. General estimates placed the number of children engaged in all forms of industry anywhere from 25 to 50 per cent of those of school age.

The child-labor question was so pressing that the Commission on International Labor, appointed by the Peace Conference, recommended, among other things, a minimum age of 14 for all countries. The Peace Conference failed to adopt the recommendation but adopted instead a resolution, providing for "the abolition of Child Labor and the imposition of such limitations as shall permit the continuation of their education and assure their proper physical development." In 1921 and 1922 the International Labor Office of the League of Nations (Geneva) reported progress from a number of countries that have passed laws restricting child labor.

Consult: Oliver, *Dangerous Trades* (N.Y., 1902); Murphy, *Problems of the Present South* (ib., 1904); Adams and Sumner, *Labor Problems* (ib., 1905); Spargo, *Bitter Cry of the Children* (ib., 1906); United States Bureau of Labor, *Report on the Condition of Woman and Child Wage Earners in the United States* (19 vols., Washington, 1909–13); Ogburn, *Progress and Uniformity in Child Labor Legislation* (N. Y., 1912); Andrews and Hobbs, *Economic Effects of the War on Women and Children in Great Britain* (Oxford, 1918); Fuller, *Child Labor and the War* (N. Y., 1918); United States Children's Bureau, *Industrial Instability of Child Workers* and *State Laws and Minimum Standards for Child Protection* (1920); Loughran, *Historical Development of Child Labor Legislation in the United States* (Washington, 1921). See LABOR LEGISLATION; FACTORY LAWS.

CHILD OF NATURE, THE. A play by Mrs. Inchbald. It was produced at Covent Garden, Nov. 28, 1788, and published in London.

CHILD OF THE SEA. A surname given to Amadis de Gaul, the mediæval hero. It originated in the story that, while still in his cradle, he was thrown into the ocean by his mother to conceal her dishonor.

CHILD PSYCHOLOGY. The study of the mind of the child forms one department of general psychology. The existence of such a department implies that the mental processes of the child are, in a certain measure, different from our own or, perhaps, that they demand a special method of investigation. In some cases the child has been subjected to experiment and asked to give a verbal report, though it must be admitted that these cases are few in number. The methods employed in the experiments of Darwin and Preyer are precisely the same as the methods of animal psychology (q.v.), except that they were not so well controlled; the behavior of the infant was taken in lieu of a verbal report and was interpreted as accurately as might be. The behavior report is, however, much less precise than verbal report, and the interpretation also must therefore be less precise. Moreover, neither kind of report is of scientific value unless the experiment has been controlled, unless every known source of error has been eliminated and the experiment varied and repeated. Unfortunately these conditions have not been met in a large proportion of the work in child psychology. An evaluation of the results cannot be made, therefore, until the methods have been examined.

One of the methods used extensively in child psychology is known as the questionary method. The procedure is to prepare a list of questions and to send it to parents, interested friends, teachers, students, etc., with the request that they record the behavior report of the child. In cases of this kind it is evident that the person who records the report is, ipso facto, an experimenter, whose business it is to note the conditions, to eliminate the errors, and to interpret the report. As a general rule, such an experimenter is untrained in scientific method, is unable to distinguish between fact and fancy, and he may have a personal affection for the child and a desire to show its superior intelligence. The results are, then, on a par with those obtained by the anecdotal method of animal psychology. The person who originally submitted the lists, and who also has the task of interpreting the many replies, is a second experimenter, who has at hand a large amount of material obtained under conditions of which he knows practically nothing; who finds that many of his questions have not been answered specifically, while some replies defy interpretation; who is forced to sift, to pick and choose, and, finally, to bring his material under some imposed system of classification; so that the accuracy of the final product is doubtful in the extreme. However, it should in justice be said that many psychologists have never used the method, and that of recent years it has tended, save in a few exceptionally favorable cases, to fall into disuse.

Another method which has been frequently employed, and which may be designated the "diary method," has proved to be of greater value, especially when employed by skilled observers. By its use we have obtained a great deal of knowledge of the sensory and motor development of the infant, of the beginnings of its perceptual and emotional life, and of its early attempts at the construction of a language.

The psychology of the child of school age has been investigated, for the most part, by means of methods devised for the purposes of experimental pedagogy. These methods usually take the form of tests, and they are designed to discover the "ability" of the child to discriminate between stimuli, to concentrate the attention, to memorize such and such material, etc. (See MENTAL TESTS.)

It appears, from this brief review of its methods, that child psychology, as it exists, is not a structural or qualitative psychology, but is rather a functional or statistical psychology. The fault, if it be a fault, is not due to method per se; for, with additional refinements, a qualitative study of the child mind would be possible. The results obtained, however, are of the kind needed by experimental pedagogy, in the interest of which much of the investigation has been done. Moreover, the results do not show us a typical child mind, as experimental psychology has given us a typical adult mind; but there are several child psychologies, each typical in the sense that it discusses the same set of faculties or capabilities at different levels. Since, now, these capabilities are functions of the nervous system, and since the nervous system shows well-marked periods of growth and development, child psychology is necessarily written from the genetic point of view, and the stages of mental development are naturally brought into correspondence with periods of physical growth. (See CHILD STUDY.) We have, then, three periods: infancy, from birth to school age; childhood, from school age to puberty; and adolescence, from puberty to about the twenty-fifth year. However, from the psychological point of view as opposed to the physiological, the first six years in the life of the individual comprise two epochs, that which precedes and that which covers the acquisition of language; the period of infancy, therefore, might well be subdivided.

The most general result of the investigations of the child mind is that the sensitivity and the power of discrimination of the child, in all sense departments, are less than in the adult; and they are the less developed, the younger the child. However, with the possible exception of sound, the newly born infant experiences intensive stimuli of all kinds.

By the end of the first six months the child has learned to perceive and localize objects within its reach, has recognized persons, and

has experienced the emotion of fear. By the close of the first year the child has perceived objects at a distance, has experienced the emotion of anger, has learned to walk, and has thereby increased his notions of space. He is also learning to speak, a fact which probably marks the beginnings of conscious meaning. From this time until the school age of the child the most important acquisitions are those of the images of memory and imagination. These images are apparently more vivid than in adult experience, and it is with great difficulty that memories and fancies are distinguished from each other and from sensory experience. Sensory discrimination and sensibility develop slowly. The ability to name colors is poorly developed even by the seventh year, though white and black are well known; of the colors, red and orange are best known, then follow purple, violet, and blue, then green, and finally yellow; pitch discrimination and memory for melodies show wide individual variation. Spatial perceptions develop much earlier than temporal; infants from 14 to 16 months are often able to follow a rhythmical movement, but boys of six and seven years have shown great difficulty in marking a rhythm with the proper time intervals; children also have much difficulty in forming temporal ideas of long periods of time, like weeks or months, though the shorter periods of the day give less trouble. The most important characteristic of the adolescent period is the appearance of new emotions, many of which are doubtless the correlate of the development of the sexual life; but the intellectual, ethical, æsthetic, and religious sentiments also, as a rule, become manifest for the first time.

Consult: Preyer, *The Mind of the Child* (New York, 1888–89); Shinn, *Notes on the Development of the Child* (New York, 1893); Tracy, *The Psychology of Childhood* (Boston, 1910); Claparède, *Psychologie de l'enfant* (Genève, 1909); Meumann, *Vorlesungen zur Einführung in die experimentelle Pädagogik* (Leipzig, 1907); Hall, *Adolescence* (New York, 1905).

CHILDREN, Diseases of. Diseases of children have occurred as far back in history as have diseases of adults, but in recent years their study has become a recognized specialty under the title "Pediatrics" (child cure).

Monographs on the subject began to appear in the fifteenth century, usually in Latin. The English translation of Harris's *De Morbis Acutis Infantum* appeared in 1734; the original appeared in 1715. French and German books followed at intervals, and by 1850 Meissner of Leipzig completed his *Grundlage der Litteratur der Pädiatrik* containing 7000 titles.

Among the larger works should be mentioned Keating's *Cyclopædia of the Diseases of Children,* 1889, and *The Diseases of Children* by Pfaundler and Schlossman, 1908. Americans seem to give more attention to the diseases of children than do other nations, and the specialty is well recognized here. A few authors have subdivided the specialty and now treat of the surgery of children. A generation ago medical students heard the subject alluded to or attended an occasional clinic by the midwifery professor, who might show a sick child. Now every well-regulated college has a chair of pediatrics with regular lectures and clinics.

Since 1880 there has been a children's section in the leading medical associations, both here and abroad. The American Pediatric Society was founded in 1889. In 1913 New York City contained 121 hospitals, 12 of which were specifically for children, and most of the general hospitals had a children's ward. These statements indicate the importance of the subject. Children are not merely small adults. They differ in anatomy, in much of their physiology, and in their reaction to drugs. (See Child, Development and Growth of.) The children's physician has a field quite his own, with distinct pathology, symptomatology, and therapeutics.

Children give off heat rapidly and therefore bear cold badly. They are, consequently, frequent sufferers from catarrh of the nose, throat, lungs, and intestinal tract. The tonsils are frequently enlarged in the young, and with that condition may occur adenoids (q.v.). Bronchitis is very common and causes 45 per cent of the deaths under five years. Pneumonia is of the catarrhal form in children, rather than croupous, as in adults. Diarrhœa and enteritis are catarrhal troubles and cause seven times as many deaths under two years as after that age. In 1910, in the registration area of the United States, 28.9 per cent of infant deaths were diarrhœal. Intussusception of the intestine is an infantile ill and often fatal. Most intestinal diseases of childhood and infancy are unlike those of adults in that they are more severe and likely to be fatal.

Fevers are well borne by the young, even typhoid, which they not infrequently contract from infected milk. Diphtheria and the eruptive fevers, as measles, scarlet fever, German measles, chicken pox (q.v.), are counted as children's diseases, though adults may have them if they have not acquired immunity by attacks in youth. Croup is diphtheritic membrane in the larynx. It calls for antitoxin as much as if it were a visible exudate in the throat.

The nervous system is undeveloped in the young; hence the readiness with which they have fits or convulsions, not as the initial symptom of acute illness, but at any time. Poliomyelitis, or infantile paralysis (q.v.), and chorea (q.v.), or St. Vitus's dance, are seen in the young almost exclusively. Hydrocephalus, acute or chronic, begins in early life. According to Gowers, 12 per cent of the cases of epilepsy begin before three years of age. In the intestinal tract we find parasites: *Ascaris lumbricoides,* or round worms, and *Oxyuris vermicularis,* or threadworms. The child host of a tapeworm generally entertains *medio-canellata,* while the adult harbors *Tinea solium.* (See Worms.)

Acute articular rheumatism is not so common in children as in adults; nevertheless they often have valvular lesions of the heart. Tuberculosis occurs in the lungs of children, to be sure, but its favorite seat of attack in the young is the bones or glands. Orthopædic hospitals are mostly filled with children, and the majority of them suffer from spinal, hip, or other joint diseases that are probably tuberculous. Any doubt as to diagnosis is cleared up by the Von Pirquet test, a cutaneous inoculation with tuberculin (q.v.). Enlarged glands were called strumous by the older writers, but are now regarded as tuberculous. (See Scrofula.)

There are several rare affections of the newborn known by the names of the first describers —*Buhl's disease,* an acute fatty degeneration of the tissues with ecchymosis and extravasations of blood everywhere. The symptoms are very like phosphorous poisoning. It is caused by an

infection of unknown origin and leads to death in a week. *Winckel's disease* is similar, being a disorder showing a tendency to punctiform hemorrhages, jaundice, cyanosis, and hæmoglobinuria. It is at times endemic and usually ends in death. *Barlow's disease* is infantile scurvy, and is found in older infants, especially those fed upon improper artificial foods. It is characterized by hemorrhages in the gums and under the periosteum of the long bones, thereby causing pain on motion or on being handled. *Duke's disease,* also called "Fourth disease," is in its *eruption* like scarlet fever, though the temperature does not rise so high nor are there likely to be serious sequelæ.

The following diseases are common in infancy and childhood, but show deviations from the adult form when occurring. *Jaundice* or *Icterus neonatorum:* This appears on the second or third day after birth and continues for a week or two in varying degrees of intensity. It is due in some cases to sepsis rather than to obstruction of the bile ducts, as in later life. No treatment is required, though saline laxatives are sometimes given. *Diseases of the navel:* If the navel fails to heal properly, it may be dusted with boric acid. Should it tend to form a hernia, it should be reduced by placing a coin firmly upon it and fastening it with adhesive plaster. *Congenital debility:* This is not always from prematurity nor from syphilis. Warmth and proper nourishment will effect a cure. The first is had by putting the baby in an incubator; the second will tax the ability of the physician to the utmost. *Scleroderma:* A serous or adipose hardening of the skin, chiefly of the lower extremities, but extending all over the body. It begins soon after birth, and if slight will recover under the use of warmth. The cause is not known. *Diseases of the blood:* As compared with the adult, the infant blood contains less hæmoglobin and an excess of leucocytes, or white cells. Many illnesses result in anæmia, and many conditions lead thereto, e.g., poorly ventilated schoolrooms. The remedy is plenty of fresh air, or the out-of-doors school in some cases. To these add iron, arsenic, and other tonics, with a liberal diet, preferably vegetable. *Leukæmia:* A disease with excessive increase of white blood cells and an increase in size of the lymphatic vessels and glands. It is possibly due to parasites. The spleen becomes very large. Treatment is unsatisfactory, death occurring in a few weeks or months. Cause unknown. The blood shows diminished hæmoglobin and in general the picture of anæmia with nucleated red cells. The mortality of hæmophilias is 87 per cent (Von Etlinger). *Heart disease* is likely to show in the pulmonary or mitral valves in the young, whereas the aortic valves are affected in later life. The *tumors* of childhood are most often sarcomata, rather than cancer as in adults.

The therapeutics of childhood differs from that of the adult in more than the size of dose administered. The young do not bear cold baths well, nor bleeding, nor shock. Burns and blisters are exceedingly severe on the tender skin of the child. Opiates must be given with care, if at all, and not often repeated. Preparations of arsenic, belladonna, iron, and mercury, on the other hand, are well borne in comparatively large doses. Mercury, if given in too large quantity, does not salivate the child, but causes intestinal irritation. The child tolerates heart stimulants in large doses, but not so depressants. The metabolism of childhood is active, and the prognosis is better than in adult life, because of the strong tendency to growth and repair instead of degeneration.

Consult: Holt, *Diseases of Infancy and Childhood* (1911); Sachs, *Nervous Diseases of Children* (1905); Pfaundler and Schlossman, *Diseases of Children,* Eng. trans. by Shaw and La Fetra (1912); Grulee, *Infant Feeding* (1912); Batten and Thursfield, *Diseases of Children* (London, 1913).

CHILDREN, Societies for. In modern charitable work great emphasis is laid upon work for the children, as they stand in the greatest need of protection and assistance and can be most easily influenced for the better. The children's aid societies and foundling hospitals care for the dependent children and find homes for them, while the Humane Association and Society for the Prevention of Cruelty to Children shield them from abuse. Juvenile offenders are trained in industrial schools and reformatories. There are homes for crippled children, special hospitals for the sick, crèches for those whose mothers must work, schools for the deaf and dumb, the blind, and feeble-minded. Boys' and girls' clubs are found in all cities. Home libraries bring books within easy reach. In some States boards of children's guardians become responsible for those left destitute. See Dependent Children; Penology.

CHILDREN IN THE WOOD, The. A British ballad, better known under the title of "The Babes in the Wood." According to Ritson, it "appears to have been written in 1595, being entered that year on the Stationers' Books." Bishop Percy considers the subject to have been derived from an old play by Robert Yarrington (1601), which tells of "a young child, murthered in a wood by two ruffins with the consent of his unkle." As the scene of the latter piece, however, is laid in Padua, not in Norfolk, Percy's reasons for a later date are by no means conclusive. As a matter of fact, nothing is definitely known of the authorship or date of the poem. A black-letter copy, very old, was contained in Pepys's collection and bore the title *The Children in the Wood, or the Norfolk Gentleman's Last Will and Testament; to the tune of Roger.*

CHILDREN'S AID SOCIETY. An association for rescuing neglected, wayward, and dependent children. The first was started in New York City in 1853 by Charles L. Brace. Its objects are to rescue neglected and dependent children, train them, and find situations and homes, chiefly in country districts. These and similar societies, under various names, are found in all cities and have done a valuable work. See Dependent Children.

CHILDREN'S BUREAU. A bureau established under the Department of Commerce and Labor (in 1913 placed under the Department of Labor) by law of April 9, 1912. Under the law the bureau is authorized to investigate, and report to the Department of Labor, all matters pertaining to child welfare and child life. Such matters as the birth rate, infant mortality, juvenile courts, accidents and diseases of children, child labor, labor laws of the various States affecting children, are specified in the law as falling within the province of the bureau. The bureau is under the direction of a chief appointed by the President with the advice and

consent of the Senate. The first chief of the bureau was Miss Julia C. Lathrop.

CHILDREN'S COURTS. See JUVENILE COURTS.

CHILDREN'S CRUSADE. A movement in 1212, in which thousands of boys and girls with some older persons set out to recover Jerusalem. Many French children wandered about in processions for a time, but soon were compelled to return home. The German children, who are said to have numbered 20,000, marched up the Rhine valley, across the Alps, and down to Genoa. They believed the Mediterranean would open and leave a passage, as the Red Sea had done for the children of Israel. Some went on to Rome and Brindisi; some were induced to embark and sold into slavery; some remained in Italy; the remnant returned home after some months of wandering. The movement excited great interest among contemporaries and gave rise to many false stories. Modern accounts, such as Gray's *Children's Crusade*, have generally followed the fabulous tales and are untrustworthy. See *American Historical Review*, April, 1914, for the true story.

CHILDRESS. A town and the county seat of Childress Co., Tex., 200 miles (direct) northwest of Fort Worth, on the Fort Worth and Denver City Railroad (Map: Texas, B 2). The railway shops are located here and comprise the town's chief industry. The water works are the property of the municipality. Pop., 1900, 697; 1910, 3818.

CHILDS, GEORGE WILLIAM (1829–94). An American publisher and philanthropist. He was born in Baltimore, entered the navy in 1842, and spent 15 months in the service. He then became a clerk in a bookstore in Philadelphia, but established an independent business in 1847, and in 1849 became a partner in the publishing house of Childs and Peterson. In 1864 he purchased the Philadelphia *Public Ledger*, one of the earliest cheap newspapers of the country, which under him attained a wide circulation and influence. His public gifts were munificent, including a memorial window in Westminster Abbey to Cowper and George Herbert; one in St. Margaret's, Westminster, to Milton; a rereados in St. Thomas's, Winchester, commemorating Bishops Ken and Andrews; a monument at Kensal Green to Leigh Hunt; a memorial fountain at Stratford-on-Avon; and in the United States, the presentation to the Typographical Society of Philadelphia of the printers' cemetery, Woodlands, in that city; the erection of monuments over the graves of Edgar A. Poe and Richard A. Proctor; the erection of a stone cross on the site of the first Christian service on the California coast, at Point Reyes; and a subscription that made possible the erection and endowment of the Home for Union Printers at Colorado Springs. His benefactions to private persons also were large. Childless himself, he educated as many as 800 boys and girls. He constantly had a number of aged literary workers on his private pension list and made many gifts and loans to struggling authors. He frequently bought up an entire edition of some book of an author whom he wished to aid. In 1885 he published *Recollections of General Grant* and in 1890 a volume of *Personal Recollections*.

CHILDS, THOMAS SPENCER (1825–). An American clergyman, born at Springfield, Mass. He was educated at New York University and Princeton Theological Seminary. Having been ordained to the Presbyterian ministry, he held pastorates at Hartford, Conn. (1851–66), Norwalk, Conn. (1866–70), and Washington, D. C. (1882–90); from 1871 to 1879 he was professor of biblical and ecclesiastical history at Hartford Theological Seminary, and from 1880 to 1882 professor of mental and moral science at the University of Wooster. He joined the Protestant Episcopal ministry in 1890 and was first archdeacon of Washington from 1894 until 1901, when he became rector of the church of Chevy Chase. His writings include: *Justification* (1861); *Hints to Christians* (1862); *The Heritage of Peace* (1868); *Christ His Own Witness* (1880); *The Voice of God to the Nation* (1901); *Christian Unity and Church Unity* (1902); *Mormonism and the Labor Question* (1904).

CHILD STUDY. A term which has been used to include the studies of the physical, psychological, and educational development of the child from birth to adulthood. At the present time many of the topics which were formerly included under child study either have an independent existence of their own or have been absorbed into experimental pedagogy. The study of the child seems to have had its origin in the pedagogical revival with which the names of Rousseau and Basedow are associated, although the first systematic study is credited to Tiedemann (1787). It was nearly a century later, however, that the best known of the earlier writers upon child study, Darwin in England and Preyer in Germany, published personal observations of infants, and Stanley Hall in America began a child-study movement which soon extended to other countries and which aroused widespread enthusiasm for the popular and scientific study of the child. While much of the earlier investigation had little scientific value, the interest in child study has grown until at the present time there are no less than 23 periodicals published in five languages devoted entirely to the child. Furthermore, we have at least the beginnings of a child psychology and a human genetic psychology, and we possess a fairly accurate knowledge of the anatomical and physiological development of the child. In recent years child study has concerned itself more and more with such problems as child labor, delinquency, defectives, abnormalities among children, juvenile courts, school hygiene, etc.; and these in turn have given rise to the child-welfare movement, which seeks to conserve and protect the child by improving the educational, hygienic, and social conditions under which he must live.

Since the mental development of the child is treated under child psychology and genetic psychology, and the educational studies are discussed under experimental pedagogy, there remain for discussion here the methods and results of the investigations of the child's physical development.

Methods. The methods which have been employed are (1) careful observations of individual children, principally as regards inherited and acquired reflexes and muscular coördinations, gross changes in the size and appearance of the body, changes in the voice, etc.; (2) the various methods of physiology which are employed in the study of the development of the organs of the body and of their functions, of changes in the composition and circulation of the blood, in respiration, voice, and speech, activities of the skin, digestion and assimilation of food, bone and muscle, and of the development of the

nervous system and sense organs; and finally (3) the anthropometric methods by means of which the size and weight of the body, shape of the head, etc., at different stages of growth are accurately measured. See ANTHROPOMETRY.

General Results. The most general result of these investigations is that the child is not, as is frequently supposed, an adult in miniature; on the contrary, the relative size and function of the bones, muscles, vital organs, and nervous system of the child are vastly different from those of the mature individual. For example, in the child the bones, at least in many parts of the skeleton, are not completely formed; they are more pliable and not so easily broken; the legs are relatively shorter, the trunk longer, and the head larger; the pulse rate is more rapid, the work demanded of the heart is greater, and the blood pressure is less; the capacity of the lungs is smaller and the frequency of respiration is greater; the total length of the digestive canal is relatively longer; bodily movements are quicker, but more irregular; and finally, the child has about one-third of the height and one-nineteenth of the weight of the adult. The development of the child is therefore not uniform in all its parts, and the rate of growth is not constant.

Periods of Development. By computing the average of a large number of measurements which show the development of each part and function of the body for each year of age, physiological norms have been made out (physiological age). However, any one individual may show a considerable variation from the norm, and for the following reasons: the nationality, the physical environment, and the health of the child, the social position, the occupation, and the material circumstances of the parent are factors which must be taken into account. Moreover, since the parts of the body may fail to develop in accordance with the requirements of the norm, a child whose chronological age is seven years may have the height of the eighth year, the weight of the sixth year, and the vital capacity of the seventh year of physiological age. But in spite of these individual variations, and because the normal organism grows now in one part and now in another, it is possible to distinguish periods or stages of growth. While there is some disagreement as to the boundaries of these periods, we may regard the first six years as the period of infancy, from 6 to 12 or 14 years as the period of childhood, and from the close of childhood until about the twenty-fifth year as the period of adolescence.

Infancy. The period of infancy is marked by a rapid growth in height and weight of the body, by an increase in the weight and size of the brain, and by the large number of muscular coördinations which are effected. The brain has increased in weight more than threefold by the sixth year of age, and it has then reached almost its normal size. The child has also acquired its permanent teeth and the difficult coördinations of locomotion and speech.

Childhood. Growth in this stage is much slower and more uniform than in the former period. There is, however, a prepubertal increase in the rate of growth, near the close of the period, which begins earlier for girls than for boys, so that at this time the girls are heavier than boys of the same age. The strength of the heart is not in proportion to the size and activity of the body in the earlier years of this stage, so that the child is easily subject to fatigue.

Adolescence. In both sexes there is at first a very rapid increase in the rate of growth in all parts of the body. At the age of 18 girls have reached the normal height of adulthood, while boys continue to increase in height until the twentieth or twenty-first year; both sexes, however, may continue to increase in weight until middle life. The period of adolescence is also characterized by the development of the sexual organs, changes in the voice, lessened motor control, increase in strength of muscle and in vital capacity, and a decrease in the frequency of heart rate. See CHILD, DEVELOPMENT AND GROWTH OF; CHILD PSYCHOLOGY.

Consult: Preyer, *The Mind of the Child* (New York, 1888–89); Dearborn, *Moto-Sensory Development* (Baltimore, 1910); Meumann, *Vorlesungen z. Einfürhrung in die experimentelle Pädagogik* (Leipzig, 1907); Stanley Hall, *Adolescence* (New York, 1905); Whipple, *Manual of Mental Tests* (Baltimore, 1910); Claparède, *Psychologie de l'enfant* (Geneva, 1909).

CHILE, chē'lā, or **CHILI,** chē'lē (an Indian name whose origin has not been satisfactorily explained, no less than six derivations having been suggested; perhaps from the Quichua *chiri* or *chili,* cold, referring to the perpetual snow on many of the mountains). A republic in South America, occupying the west coast of the continent from the river Samu, 17° 57′ S., down to Cape Horn. In the terms of the decision of King Edward VII, signed Nov. 20, 1902, as referee in the Argentine boundary dispute, all the territory south of lat. 52° S. belongs to Chile, with the exception of the eastern half of the Tierra del Fuego Territory and Staten Island, both assigned to Argentina. Chile is bounded by Peru on the north, by Bolivia and Argentina on the east, and by the Pacific on the south and west. Thus defined, Chile has a length of about 2700 miles, while its width varies from about 250 miles in the Province of Antofagasta to about 68 miles in its narrowest part, with an average of about 87 miles. Pop. (est.), 1921, 3,754,723, of which the larger part is of European origin. It includes 50,000 Indians. The area and population in 1903 and 1910 are shown in the following table:

PROVINCE	Area square miles	Population 1910	Population 1903	Population per square mile 1910
Magellanes(Ter.)	66,174	23,650	13,729	0.2
Chiloé	8,580	91,657	95,914	10.4
Llanquihue	35,390	113,285	96,994	2.9
Valdivia	8,352	131,751	78,073	13.7
Cautin	5,830	161,935	71,435	23.1
Arauco	2,446	62,259	93,013	25.2
Malleco	2,973	113,020	114,978	36.8
Biobio	5,245	100,495	105,249	18.7
Concepción	3,560	225,054	220,974	66.7
Nuble	3,406	169,858	175,419	48.8
Maule	2,474	115,568	143,146	44.6
Linares	3,941	111,773	122,679	27.7
Talca	3,834	132,730	147,897	33.9
Curicó	2,978	108,120	125,102	36.0
Colchagua	3,855	159,421	186,761	41.3
O'Higgins	2,289	94,257	96,868	40.3
Santiago	5,663	546,599	483,060	91.4
Valparaiso	1,953	299,466	252,009	144.3
Aconcagua	5,485	132,730	132,670	23.9
Coquimbo	13,457	178,731	193,193	13.0
Atacama	30,720	65,118	72,901	2.1
Antofagasta	46,597	118,718	53,188	2.6
Tarapacá	18,125	115,940	101,802	6.1
Tacna	9,248	42,925	28,938	3.1
Total	292,575	3,415,060	3,205,992	11.6

Topography. The coast rises steeply from the sea throughout the greater part of its length. The region bordering it is called the "Coast Cordillera." This is not a mountain range, but a diversified table-land rising at some points to 3300 feet, but usually much lower. It is composed of granite and mica schists, skirted in some regions by Tertiary deposits which in places extend far inland. Older sedimentary rocks do not occur in the coast regions excepting a narrow strip of chalk skirting the shore. Chiloé and the smaller islands to the south have the characteristics of the Coast Cordillera and are a continuation of it.

The topography of the country behind the Coast Cordillera may be divided into four parts. The most northern, extending from the border down to the neighborhood of Copiapo, about 27° 25′ S., is a fairly even plain falling steeply towards the sea and rising to the Bolivian plateau from 12,000 to 14,000 feet above sea level. Here and there are terrace escarpments, and mountains rise in some places above the plateau; but there is no continuous range, and the numerous volcanoes, one of which, the Llullailaco, is higher than Chimborazo by about 100 feet, are completely isolated from one another. There are no east-and-west cordilleras in this part of Chile, which is crossed by the railroad from the port of Antofagasta to Bolivia with no zigzags and without a single tunnel, large cutting, or great embankment.

The second division, between 27° 25′ and 33° S., is marked by a number of transverse spurs running from the cordilleras which form the eastern boundary to the ocean and separating the river valleys from one another. These spurs, in traveling north or south, are crossed by passes which are often very steep.

In the third section the mountainous coast lands are separated from the cordilleras by a longitudinal valley which extends without interruption from the transverse ridge of Chacabuco, north of Santiago, to Puerto Montt, sloping from an elevation of 2300 feet in the north to sea level at Puerto Montt; continuing under the sea, it cuts off the island of Chiloé from the mainland. This central valley, about 600 miles in length, was originally a huge cleft that was gradually filled up by detritus washed down from the Andes and the Coast Cordillera. The drift and alluvial deposits form a layer fully 330 feet thick through which no well has yet been sunk. The soil is very rich, and as the valley is traversed and irrigated by numerous rivers from the Andes, it is the great agricultural region of Chile. In the northern part of the valley is Santiago, the capital.

In the fourth section, south of Puerto Montt, the cordilleras approach the sea, and the mainland consists of nothing but the slopes of the mountains and a strip of country lying to the east between some of the highest elevations of the cordilleras and the water parting between the two oceans. Possession of this strip was long disputed by Argentina and Chile. A treaty defined the boundary as the water parting formed by the high cordilleras. When it was ascertained that the water parting did not coincide with the line of greatest elevation, but was in large part east of it, the Chileans claimed all the country west of the water parting, while Argentina insisted that the line of greatest elevation formed the frontier. The dispute, referred to the British government, was settled by a compromise in 1902. The chain of the Andes is composed not only of volcanic products, but also of upheaved strata of the older Cretaceous and Jurassic formations. It continues straight to Cape Horn, forming a labyrinth of fiords, heading in glaciers, islands, and peninsulas. This configuration is similar to that of the Norwegian coast and of western North America, north of lat. 50°.

The chief rivers run from the Andes straight to the sea through openings in the Coast Cordillera. Their principal tributaries, however, flow from south to north in spite of the slope southward of the central valley, a singular fact first observed by Dr. Peter Möller. The river Maule, which reaches the Pacific at about lat. 35° S., is navigable from the central valley for light craft; farther south, the rivers Imperial, Biblio, Valdivia, and Bueno are navigated for some distance by small steamboats. Many rivers rise east of the cordilleras and for a space run north or south until they find an opening in the range through which they reach the ocean. A striking feature of the southern part of the central valley is the existence of several large lakes at the western foot of the Andes.

Most of the coast line is remarkably uniform, and it is only in the region of the fiords, mainly south of the forty-second parallel, that excellent natural harbors are found; but commerce here is small and the harbors are little utilized. Valparaiso, the principal port of the west coast of South America, stands on a bay exposed to heavy seas, and vessels are wrecked in the harbor every year. The ports to the north are merely roadsteads, the most important being seven little towns from Arica to Taltal, known as the "Nitrate Ports," because nitrate of soda, the leading export of the country, is shipped from them. The best shipping facilities south of Valparaiso are at Constitución, Tomé, Arauco, and Lebu (coal shipments), Valdivia, and Puerto Montt. Punta Arenas, on the Strait of Magellan, is a coaling station for all vessels passing through the strait.

Climate. The climate of Chile must be characterized as oceanic or insular, the changes of temperature being relatively slight. The northern coast lies within the region of winds which in summer blow both towards the equator and towards the interior of the continent, and is in winter almost free from storms. The southern coast lies within the region of strong westerly winds which blow at all seasons of the year. The fact that the sea air is drawn towards the land accounts for the uniform temperature. The climate of the Chilean coast much resembles that of the coast of California. In the summer the diurnal periodicity of the wind is one of the marked climatic features; on the coast the sea breeze blows during the day with great strength, and on the Andean heights with stormy violence. The average temperatures at low altitudes vary during the year from 65° F. at the north to 40° F. at the extreme south; during January they vary from 72° F. at the north to 50° F. at the south, and in July from 62° F. at the north to 32° F. at the south. The temperature decreases about 1° F. for each 300 feet of altitude. The average annual rainfall along the coast is less than 8 inches north of lat. 35° S., but from the latter parallel the amount increases very rapidly southward to over 80 inches in lat. 38° S.; and this excessive rainfall, reaching in some cases 130 inches, ex-

PACIFIC OCEAN
ATLANTIC OCEAN
CHILE
ARGENTINA
BOLIVIA
PARAGUAY
BRAZIL
TROPIC OF CAPRICORN
Iquique
Antofagasta
Valparaiso
SANTIAGO
Concepcion
Valdivia
Puerto Montt
CHILOE I.
Gulf of Penas
Strait of Magellan
TIERRA DEL FUEGO
STATEN I.
Cape Horn
Great Plateau of Patagonia
Sa. de Apire
Sa. de Zevallos
Mt. Yankeles
Mt. Zeballos
Mt. Belgrano
Mt. Viedma
Mt. Fitz Roy
Mt. Stokes
Mt. S. Valentin
Mt. Torador
Mt. Tronador
Mt. Yanteles
Mt. Iae
Mt. Huemules
Mt. Millimoyu
Mt. Triste
Mt. Chacabuco
Mt. Hornopiren
Mt. Palo

SOUTH AMERICA
SOUTHERN PART
SCALE OF STATUTE MILES
0 50 100 200 300 400 500 600
SCALE OF KILOMETERS
0 100 200 300 400 500 600 700 800
Important towns are shown in heavy face type
Railways shown thus
TROPIC OF CAPRICORN
ATLANTIC OCEAN
RIO DE JANEIRO
SANTA CATHARINA
RIO GRANDE DO SUL
Ouro Preto
São Paulo
Santos
Curitiba
Porto Alegre
Rio Grande do Sul
Pelotas
Desterro
Blumenau
Itajahy
Campinas
Victoria
Espirito Santo
Rio de Janeiro
Campos
Cabo Frio
Macahe
Angra dos Reis
Parahyba
Parnahyba
Paranagua R.
Maldonado
MONTEVIDEO
West from Greenwich

tends almost to the Strait of Magellan. The rainfall towards the interior increases slightly at the north, but decreases very rapidly in the region of great precipitation at the south. In the northern part all months lack rain; between latitudes 30° and 40° S. winter is the rainy season, with dry summers, but south of about lat. 40° S. not only is the winter rainy, but in the summer time considerable precipitation occurs.

The marked contrasts in the amount of rainfall in different parts of Chile show clearly the climatic control over the distribution of the population and their pursuits. From about lat. 28° S. to the northern boundary, the country lies in the rainless zone of the southeast trade winds and is consequently a desert, agriculture being impossible except in small irrigated districts. Mining is here the only important industry, minerals are the only exports, and nearly everything in the way of food must be brought into the northern third of Chile. South of the twenty-eighth parallel the influence of westerly or sea winds begins slightly to be felt, some rain falls, and the quantity steadily increases towards the south. In this region agriculture is profitable and is the chief occupation. The barren nitrate fields and mining districts are replaced by green valleys and vine-clad hills. The agricultural zone extends south to about the fortieth parallel, where the rainfall becomes excessive, as the coast is exposed to the full force of the prevailing westerly winds. This is a region of extensive forests, and, when developed, its large industries will be lumbering and fisheries. South of the forty-fifth parallel the size and variety of the trees begin to diminish under the influence of the lowering temperature.

Flora. About lat. 40° S. the vegetation of Chile reaches its maximum growth. In this climate of no extreme cold the flora is always green and of mixed variety; in luxuriance the plant growth is almost tropical. The plains have the peumo tree, and a species of palm which is becoming rare. Forests of beech and cypress also occur. North of this middle region the rainfall diminishes, and the vegetation becomes thinner; the forests are confined to the mountain slopes, and the plains remain bare. The cacti are the last plants bordering on the arid plateau region of northern Chile. South of the central region, where the temperature decreases while the rainfall increases, are forests in which are found the *Fitzroya patagonica*—wrongly called a larch—the cypress, and the beech. The most widely diffused plant introduced from Europe and other regions is the oak, which grows more rapidly in Chile than in the Northern Hemisphere; among other imported plants are the poplar, which lines the favorite drives in the larger towns; the willow, chestnut, eucalyptus, and apple trees, and a number of economic plants, as wheat and the vine.

Fauna. Chile is poor in animal life. The chief mammals are the puma and other wild cats, fox, polecat, otter, the guanaco (which frequents the southern sections in large herds), the huemul, the pudu deer, the chinchilla, and the coypu. Among the marine mammals are the whale, dolphin, and seal. Birds include condors, buzzards, hawks, owls, cranes, parrots, humming birds, and, in the southern archipelagoes, many varieties of waterfowl. Among the reptiles of the northern part are found several kinds of lizards, and farther south toads and frogs. Turtles are absent. Snakes are not numerous or venomous. Few fishes exist in the Chilean fresh waters, but the coastal marine waters are prolific of both animal life and algæ, Beetles abound. Land mammals are scarce in the archipelago regions.

Agriculture. The agricultural activities of Chile are almost wholly confined to the great central valley. This is the region of large estates equipped with modern machinery and owned by the wealthy classes, who are so potent in the political life of the republic. Furthermore, a large part of the best agricultural land is held by the Roman Catholic church, whose political and material power is relatively greater in Chile than in any other of the Spanish-American states. The census returns show that about half of the population is engaged in agricultural pursuits. A large proportion of the natives are engaged as farm laborers on the extensive estates. The high price of lands prevailing in the central valley (based more on the mineral deposits they are supposed to contain than on their fertility) makes purchase difficult for the lower classes. The unoccupied land in the less favorable part of the country usually requires a considerable outlay of labor and capital before it yields crops; even then its fertility is not always sufficient to repay the farmer. Another obstacle to the development of the farming resources of the country is the "nitrate boom." Owing to the rapid development of nitrate mining and the scarcity of labor in Chile, wages increased in a considerable degree, and many families from the agricultural districts of the south were induced to move to the mining districts of the north, thereby greatly raising the price of agricultural labor. The most important crops are wheat, maize, and barley. Apples and grapes are the leading fruits. Most of the breadstuffs of California were formerly supplied by Chile, which also exported great quantities of cereals to Europe; but owing to the development of grain raising in the Pacific coast region of the United States and the increasing competition of Argentina, grain exports have largely declined. The revision of the United States tariff, and the opening of the Panama Canal are expected to open new markets for Chilean raw materials and to increase production. The principal crops of 1911–12 were: wheat, 248,460 tons; potatoes, 101,240 tons; barley, 26,281 tons. Next to cereals, the vine is the most important agricultural industry, about 250,000 acres, for the most part in the provinces of Concepción and Colchagua, being given to grape raising. Wine is the preferred beverage in the provinces, where the industry is important, and considerable quantities are exported to other Latin-American states. The figures for 1911 are: wine, 26,004,394 gallons; chichas, 5,591,782 gallons; cordials, 4,794,980 gallons. Many other farm crops and fruits of the temperate zones thrive in the central valley. Industrial plants such as flax, hemp, and tobacco are cultivated only with a view to supplying the local needs. The climate is very favorable for domestic animals. On Dec. 31, 1912, the live stock of Chile comprised: horses and mules, 415,000; oxen, 1,640,322; sheep, 3,537,738; pigs, 159,000. The horse of Chile is valued as highly as that of Argentina. Cattle raising has made rapid progress since a heavy tax was placed upon imports from Argentina in 1896. Ox teams are

everywhere employed on the farms; the cows are inferior as milkers, but dairy farming is on the increase. Sheep thrive in the central valley, and superior wool grades are being introduced. Goats are very numerous in the mountainous regions.

Mining. Chile is one of the chief mineral-producing countries of South America. Prior to the Peruvian War the mineral for which Chile was mainly known was copper, which still occupies an important place in the mining output of the country. With the acquisition of the Province of Tacna from Peru, the inexhaustible nitrate deposits of that region attracted the attention of foreign investors, and since then the output of that mineral has reached such enormous proportions that Chile is found to be the chief source of the world's entire supply. The nitrate deposits are worked mainly by European, and especially English, capital, and the output is almost entirely exported to Europe and the United States, where it is used for fertilizing purposes. The export of this material, which first entered the trade reports in 1884, shows the following figures in recent years, the amounts being stated in tons: 1907, 1,649,000; 1908, 2,033,000; 1909, 4,657,000; 1910, 5,078,000; 1911, 5,323,000. The copper mines are chiefly in the provinces of Coquimbo and Atacama in two ore belts about 100 miles apart. The total production of fine copper from 1844 to 1900 is estimated at 1,830,000 gross tons. Chile was in 1875 the largest copper producer in the world, but has now fallen to the sixth place after the United States, Mexico, Spain, Japan, and Australia. There is becoming apparent a revival of the industry, due to improved methods in smelting low-grade sulphide ores. Gold and silver ores are in paying quantities, and the annual output of these two metals amounts to more than $4,000,000. While most of the mining industries are in the north, a large field of coal, somewhat inferior in quality, is found in the south; coal is carried to the sea by the Arauco Railroad, and some is exported to the more northern republics. Borax, lead, tin, borate of lime, and a few other minerals are also mined. The value of all the mineral exports from Chile in 1911 was $124,400,000, United States money.

Manufactures and Commerce. The manufacturing industries of Chile are unimportant. The natives, like most Spanish-Americans, do not take readily to manufacturing, while the foreign element is still too small to exercise a perceptible influence on the industrial life of the country. In the southern part of Chile, and especially in the German settlement of Valdivia, there are a number of large breweries, distilleries, tanneries, and saw mills. Soap, furniture, and shoes are also manufactured. The mineral products constitute about 85 per cent of the total value of the exports, and agricultural products about 9 per cent. The imports are made up chiefly of manufactured articles, and include necessaries of life, articles of luxury, also machinery and other metal products. The scarcity of labor and inadequate communication facilities will probably prevent the industrial development of the country for some time, foreign capital confining itself chiefly to the more remunerative exploitation of the mineral resources, whose rapid development has been attended by a corresponding increase in both its export and import trade, as shown in the following table:

YEARS	Exports	Imports
1855	$19,000,000	$17,000,000
1894	25,000,000	18,000,000
1905	96,801,000	68,838,000
1907	102,940,700	107,267,000
1908	118,852,725	97,618,000
1909	111,716,834	85,726,000
1910	118.955,045	108,657,000
1911	127,500,000	126,472,000

Over 35 per cent of the trade is with Great Britain. Germany figures second, and the United States third. The trade of the United States with Chile amounted at the close of the century to more than $10,000,000, and in 1911 to $17,431,969. While the exports from Chile to the United States greatly increased during the last decade of the century, the imports from the United States remained practically stationary, as the following figures will show:

YEARS	Exports from Chile to the United States	Imports into Chile from the United States
1891	$3,403,000	$3,146,000
1896	4,709,000	3,432,000
1900	7,112,826	3,288,000
1905	15,624,000	6,887,000
1910	10,810,015	5,860,733
1911	11,484,831	6,915,493

Nitrate of soda and other chemicals make up about 95 per cent of the value of the exports of Chile to the United States, while the chief imports from the United States are iron and steel manufactures (nearly 25 per cent), petroleum (less than 20 per cent), cotton textiles (16 per cent), breadstuffs (6 per cent), besides wooden articles, instruments, and other manufactures.

The chief ports are Valparaiso, Iquique, Talcahuano, and Antofagasta. The first serves mainly for imports, and the second handles most of the export trade. In 1912 the first state bank of issue, Caja de Emisión, was authorized by law. There were 19 joint-stock banks of issue at the close of 1912. These institutions guarantee their note issue by depositing gold or accepted securities with the government. The public savings banks, 72 in number, had 301,353 depositors Dec. 15, 1912. A number of land banks issue interest-bearing scrip payable to bearer, and lend money when secured by first lien on real estate.

Transportation. In regard to transportation and communication facilities, Chile stands in the front rank among South American countries. The first railway line in Chile was opened in 1852—the short line connecting Copiapó, the capital of Atâcama, with Caldera, on the coast. The construction of railway lines by the state was begun as early as 1857, when the line between Valparaiso and Santiago was opened. It was not, however, until 1888 that the construction of state lines was begun on a large scale. In that year Congress authorized the construction of 12 lines by the state, with a total length of about 750 miles. In 1911 the total length of railways in operation was about 3952 miles, of which 1979 miles were operated by the state; 1828 miles were under construction at the beginning of 1912. The state lines are conducted in a progressive way in regard to equipment and management, while the rates are unusually low. Numerous new railway lines are projected,

and a number are nearing completion. The line connecting Valparaiso with Buenos Aires, Argentina, has been completed by building from Los Andes to the summit of the Cordillera, where it effects a junction with the Argentine line from Mendoza, the system being put into continuous operation in April, 1910. The Arica line to La Paz was opened Aug. 6, 1912, with a length of 127 miles in Chile and 139 in Bolivia. (For a further account of this undertaking, see *Railways,* under ARGENTINA.) Tramway lines are operated in every city of importance. The telegraph lines owned by the state had a total length of 16,513 miles in 1910. There were 5821 miles owned by private companies. The telegraph rates are very low, and the use of the telegraph and telephone is extensive, owing to the poor condition of the country roads. There were 8000 miles of telephone lines owned by the telephone and railway companies, also a wireless telegraph system with 13 stations. The shipping of the Chilean ports exceeds that of any other country in South America. In 1911, 14,698 vessels of 26,164,068 tons entered, and 14,649 vessels of 25,941,833 tons cleared. About 40 per cent of the carrying trade is done in British bottoms, and the rest in German, French, and Chilean. The Chilean merchant marine numbered, in 1911, 84 steamers of 69,604 tons net, and 91 sailing vessels, 52,918 tons net. The Chilean South American Steamboat Company under state subvention operates 12 steamers in ocean trade and 7 in river navigation. The British-owned Pacific Steam Navigation Company operates 43 steamers on the coast and to the United Kingdom, and six other British companies are in Chilean trade. The Cosmos and Roland lines afford communication with Germany, and the Italian Lloyd Pacific operates a line to Genoa.

Finance. The financial condition of Chile is far from satisfactory. The occasional wars have enormously increased the public debt, and the rapid increase in the revenue since the Peruvian War, on account of the export duties on nitrate, brought about extravagance in public expenditures.

In the last years for which a statistical return has been made the state of the national finances is shown in the following table, in terms of the gold peso, valued at 36 cents American, and the paper peso, subject to fluctuations around 20 cents:

YEARS	REVENUE		EXPENDITURE	
	Gold	Currency	Gold	Currency
1908....	$65,230,892	$160,428,470	$39,102,517	$198,311,785
1909....	123,088,021	245,267,030	135,169,887	300,459,758
1910....	82,764,423	152,975,645	60,677,704	234,143,253
1911....	71,908,379	213,214,928	60,775,635	204,191,707
1912....	101,050,000	189,200,000	71,358,378	281,128,726

The external debt of Chile amounted to $85,650,000 at the beginning of 1905, and the internal debt to $39,116,000. The external debt on June 1, 1912, amounted to 336,781,600 pesos gold, or about $175,818,000. The internal debt was 180,593,372 pesos paper ($36,479,860), of which 150,366,403 represent issues of paper money. The rate of interest on the external debt varies from 4½ to 6 per cent, and the annual service amounts to about $6,000,000. The gold standard was adopted by Chile in 1895. In 1898 paper money to the amount of about $17,000,000 was issued, and a new loan of $20,000,000 was authorized for the conversion of this paper within four years. In 1901 the government decided to extend this period two years.

Government. The constitution of Chile, adopted May 25, 1833, guarantees to all citizens equality before the law, the inviolability of property, immunity from restraints on domicile and migration, and freedom of instruction, association, petition, and the press. The legislative authority is vested in a National Congress, consisting of a Senate and a House of Representatives, which meet at the capital, Santiago. The members of the lower house are elected directly by the people (one for every 30,000 inhabitants), for a term of three years, while the members of the Senate are chosen from the provinces, by the same electorate, for a period of six years, on the basis of one senator for every three deputies. Electors to either house must be 21 years of age and able to read and write. Members of Congress receive no remuneration. The executive power is exercised by a president, elected for a term of five years, by delegates chosen by the people of the provinces, to the number of three delegates for every deputy. He is assisted in the discharge of his duties by a council of state, consisting of five members nominated by himself and six members named by Congress, and by a cabinet of six ministers who preside over the departments of the Interior, Foreign Affairs, Worship and Colonization, Justice and Public Instruction, War and Navy, Industry and Public Works. The supreme judicial power is lodged in a high court of justice, located at Santiago, which is composed of seven members, and exercises control over the tribunals of the nation.

A democratic republic in form, the government of Chile in reality is more like an oligarchy than a democracy. The overthrow of the Spanish authority produced no change in economic or social conditions, and political power under the new régime remained in the hands of the great landowners who had controlled affairs under the monarchy. The great majority of the population have continued to remain content under the old conditions. The Conservative party has been dominant from the very beginning of the establishment of the republican form of government, when Spanish rule was thrown off, and has always wielded a great influence over the people at large. As a result of the monopoly of power by a small number of families, the civil service has suffered. Lucrative places under government are distributed as favors to impecunious relatives, or as rewards for political services, and the country is overburdened with public functionaries. Higher ideals of government, however, are upheld by an active Liberal opposition, which agitates its cause in Congress and in the press, and has best furthered its aims by secularizing and reorganizing public education.

The system of local government is uniform in Chile, and is characterized by the concentration of authority in the president of the republic and his agents. For administrative purposes, the country is divided into 23 provinces, which are subdivided into 78 departments and one territory, 865 subdelegations, and 3068 districts. At the head of each district is an inspector; the inspectors are responsible to the subdelegates, the subdelegates to the governors of the departments, and these to the

intendentes of the provinces. The governors and intendentes are appointed and controlled by the president. The departments constitute one or more municipal districts, whose affairs are administered by a council of six aldermen and three alcaldes, presided over by the intendentes, governors, or subdelegates, who possess a veto power. No one may be a member of the council who is connected with the state either as employee or as a contractor for the performance of some public service. The authority of the municipality extends over the matters of police (in the capitals of the departments the police are under the control of the president), sanitation, primary instruction, and the regulation of agriculture, industry, and commerce. The expenses of government are met partly by direct and indirect taxation and partly by subsidies from the general government. The council is responsible to the popular assembly, composed of all registered electors, whose sanction is required in such important matters as the negotiation of municipal loans, the inception of important public works, or the alienation of the public domains. The popular assembly, too, votes the annual budget and audits the municipal accounts as submitted by the alcaldes.

Justice is administered in the first instance by district judges in petty or civil disputes and misdemeanors, and by justices of subdelegation in more important civil suits and minor criminal offenses. Cases of greater consequence are tried, in the first instance, before the judges of letters, of whom there is one at least in every department. Appeals from their decisions lie to the courts of appeal, six in number, located permanently in the chief cities, and exercising jurisdiction over groups of provinces. The tribunal of last resort is the high court at Santiago. For national colors see Colored Plate of FLAGS.

Education. Public instruction is gratuitously provided by the state, and until recently was in an unsatisfactory condition. Steady advance, however, has been made in late years through the efforts of the progressive element among the people. A large number of teachers have been brought over from Germany, and not a little has been done towards reorganizing the educational system on the most modern principles of pedagogy and school administration. Primary instruction is provided in elementary and graded schools, controlled by district visitors and inspectors. In 1911 there were 2896 public primary schools, with 375,274 pupils and 4829 teachers. Secondary instruction is afforded by the Instituto Nacional; also by the lycées, 77 in number, of which there is one in every provincial capital and in the chief towns of the principal departments; in 1911 the number of students in the secondary schools was 20,329. The State University at Santiago gives courses in law and political science, medicine and pharmacy, the physical and mathematical sciences, and fine arts, omitting the doctorate degree as undemocratic. There are, besides, schools of agriculture and mining, seminaries, etc., for girls, a pedagogical institute, normal schools, 6 for men and 10 for women, free of all charges for the five-year course, but entailing an obligation of service as state teachers for at least seven years; an academy of painting and sculpture, a conservatory of music and oratory, and military and naval academies. In every bishopric there is a seminary for the training of the Catholic clergy. Every year the state sends to Europe, to be educated at the national expense, such students as may have distinguished themselves in the institutions of higher learning at home. Upon their return they are required to render some service to the state for a certain period, in whatever calling they may have chosen. The number of students in private institutions of different grades was 66,962 in 1911.

Population. The population of Chile, according to the census of 1885, was 2,527,320; but these figures are regarded as too high. In 1895 the population was 2,712,145, and at the end of 1910 it was given at about 3,415,000, or about 11.6 per square mile, a ratio about twice as great as that of Argentina, and Brazil. The number of foreigners in 1910 was 134,500, and included 18,755 Spaniards, 9800 Frenchmen, 10,724 Germans, 13,000 Italians, 9800 Englishmen, and natives of 10 more European countries, 27,100 Peruvians, 21,900 Bolivians. About one-fourth of the native population is of pure Spanish origin, while the remainder are either mixed or of pure Indian origin in three stocks, Fuegians, nomadic in the Strait of Magellan; Araucans, numbering about 100,000, in the south; Changos of the north coast.

Immigration, notwithstanding the energetic efforts of the Chilean government, has been rather light and attended with little success. One of the most promising colonial ventures is the German colony of Valdivia; pop., 1910, 17,681. Its success, however, has been due to the exceptional character of the colonists, as well as to the conditions under which they came. When the Chilean government, encouraged by the example of the Valdivia colony, began to encourage colonization on a larger scale, by means of foreign agencies and free passage to the country, the immigrant population became less desirable in character, and only a small proportion became permanent settlers. Still, the foreign population has played not a little part in the development of the country. Throughout Chile, nevertheless, the natural increase of population is small, owing to the utter disregard for life among the natives, and to the high rate of infant mortality, amounting to about 59 per cent among children below the age of seven.

Religion. The Roman Catholic faith is the religion of the state, and is maintained by the general government, which has the right of nomination to the archiepiscopate of Santiago and to the bishoprics of Concepción, San Carlos de Ancud (Chiloé), and Serena, and to the Vicariates Apostolic of Tarapacá and Antofagasta. Religious instruction is compulsory in the public schools, and the clerical institutions are allowed full freedom of education. The congregations are formed by the state, and the constitutional limitations on their rights to acquire property are disregarded. The priests possess an immense influence over the people, who look to them for guidance in politics as well as in matters of faith. The privilege of religious worship is accorded to other faiths by a law of 1865, with the secularization of cemeteries. Marriage was made a civil contract by the law of 1888.

Army and Navy. Military service is obligatory on all citizens between 18 and 45. The army, of which the permanent nucleus is 6000 men, ranks in importance below the navy, which, after that of Argentina, is the most powerful in South America. The national guard comprises all citizens between the ages of 20 and 40. Re-

cruits are called up in their twentieth year and are trained under arms for one year, serve for nine years in the reserve of the active army, then pass to the second reserve until 45. In 1912 the peace establishment was fixed at 19,360 of all arms and 1737 gendarmerie, the army budget calling for $6,000,000.

History. The Araucanians were the most important of the Indian tribes living in what is now Chile, and the history of the country before 1800 is mainly concerned with the continuous efforts of the Spanish to subjugate this fierce and intelligent nation. The survivors of the pure native race who still maintain their virtual independence are few; in general, the mixture of Araucanian blood with that of the Spanish conquerors has given to the Chilean race its remarkable efficiency in war. The Incas of Peru, at the period of their greatest power (1450–1533), subdued a few of the northern branches of the Araucanian race, but at the time of the Spanish conquest their dominion was not firmly established. As soon as the Incas in Peru had been overwhelmed, Almagro gathered a force for the conquest of Chile, and in 1535 started south. He spent two years and a half in the country, but, encountering little success, withdrew to Peru in 1538. In 1540 Valdivia led a second expedition into the Araucanian territory and began the real conquest of Chile. He founded Santiago in 1541, Concepción in 1550, and Valdivia in 1552, and thus secured, after much hard fighting, a permanent hold on the country.

For 250 years the history of Chile is the record of slow expansion, through the development of mines and farms, and of almost constant wars with the natives. These were finally forced to sign a treaty in 1773, which in their weakened condition they continued to respect. The governors of Chile were appointed for the most part by the viceroys of Peru, and the post was considered the regular stepping-stone to the viceregal office. The news of Napoleon's invasion of Spain and the abdication of Ferdinand VII aroused great unrest in all the Spanish-American colonies, and induced a number of leading Chileans to call an assembly which forced the Governor to resign, and, Sept. 18, 1810, organized a *junta de gobierno* to govern the land so long as the French should hold Spain. This date is considered the anniversary of Chilean independence. There followed several years of intermittent fighting with the Spanish forces in Peru, with numerous struggles between rival factions among the patriots, led by the Carrera brothers and by Don Bernardo O'Higgins. In 1814 this rivalry enabled the Viceroy, Osorio, to reëstablish his authority in the south, and to maintain it for two and a half years. In the winter of 1816–17 Gen. San Martin led an army of Argentine *gauchos* across the mountains, and by the decisive victory of Chacabuco, Feb. 12, 1817, forced the Spaniards out of Chile. A year later, on the anniversary of the battle, O'Higgins formally declared the absolute independence of Chile. The Chilean forces were defeated by Osorio on March 19, 1818, but on the Maipú Plains, near Santiago, on April 5, another battle was fought which virtually ended the Spanish domination, although desultory fighting continued for a few years, Chiloé, the last stronghold of the Spanish, being taken in 1826. It was not until 1844 that Spain formally recognized the loss of her provinces.

O'Higgins ruled as dictator from 1818 to 1823, when he was induced to withdraw, and a constitution was adopted. This was revised in 1828, and again in 1833, when substantially the same document in force at present was adopted. It has, however, been amended frequently, the most important changes being made in 1874. This constitution provides for a republican form of government, with a property qualification so high that the voters form practically an oligarchy. In 1843 the question of the Argentine boundary arose, and continued a menace to peaceful relations until 1881, when a treaty was signed which gave Chile half of Tierra del Fuego and the shores of the Strait of Magellan, providing, however, for the neutrality of this waterway. Another boundary commission was then needed to determine the exact position of the line, which was to follow the watershed of the Andes. Disputes and rumors of war continued to distract both countries until 1902. (See ARGENTINA.) Spain, in 1864–65, forced both Peru and Chile into war by a series of petty squabbles over diplomatic titles, and there followed a year of active naval warfare. Hostilities dragged on until 1869, when the United States minister succeeded in putting an end to active operations. Spain, however, refused to acknowledge herself beaten until 1871, when a provisional treaty was signed at Washington, followed by a definitive peace in 1879.

The valuable nitrate deposits in the Atacama Desert, north of Chile, were opened up by Chilean capital, but disputes ensued with Bolivia owing to the absence of definite boundary lines in the region. In February, 1879, Chile seized the Bolivian port of Antofagasta, and in April Peru, as the ally of Bolivia, declared war on Chile. The Chilean armies were outnumbered, but were far better equipped and officered than those of their opponents, and Chile's fleet was much superior. Naval operations were watched with special interest by all outside powers, as being the first between modern ironclads. On Oct. 8, 1879, the Peruvian battleship *Huascar* was taken by the Chilean fleet, and on November 19 the combined Peruvian and Bolivian forces were almost annihilated at Dolores. In October, 1880, Chile was in possession of all the disputed territory, and the United States minister succeeded in bringing about negotiations for peace. The conditions imposed by Chile were not accepted by the allies, negotiations were broken off, and the battle of Miraflores, Jan. 15, 1881, gave the Chileans possession of Lima, Callao, and practically all of the other Peruvian cities. Desultory fighting continued until Oct. 20, 1883, when a treaty dictated by Chile was finally signed. Bolivia ceded to Chile the Province of Antofagasta, while Peru gave up Tarapacá in perpetuity and Tacna and Arica for 10 years, a plebiscite at the end of that period to determine whether the inhabitants wished to return to Peru or continue under Chilean rule. The government of Chile, however, was careful to postpone such an appeal to the popular voice, and as late as 1900 the Chilean Congress rejected a convention concluded with Peru in 1898 providing for a plebiscite. In 1891 war broke out between the President, Balmaceda, and his opponents in the congress. The Congressionalists induced the principal part of the national fleet to revolt, and seized the nitrate provinces, and, with the revenue derived from them, purchased modern arms and munitions, with which they defeated the regular army near Valparaiso, cap-

tured that city, and entered Santiago (August). Balmaceda committed suicide, and order was promptly restored with the election of Jorge Montt as his successor. During the Civil War the United States had taken sides with the established government, and, as a result, after the capture of Valparaiso, there was much ill feeling against her. A number of sailors from the United States steamship *Baltimore* on shore leave were attacked by a mob, and one of them was killed. Serious complications threatened for a while, but the Chilean government eventually apologized and paid $75,000 for the benefit of the injured sailors. President Montt was succeeded in 1896 by Federico Errazuriz, during whose administration the boundary dispute with Argentina entered on an acute phase. It was settled under his successor, German Riesco (1901–06), largely through American and British good offices, and, after the settlement of outstanding difficulties, Chile and Argentina in 1902 signed a permanent arbitration treaty. The administrations of Pedro Montt (1906–10), who died suddenly while abroad after a visit to the United States, and of Ramón Barros Luco (1911–) were marked by a continuation of the period of peace and progress. Only the recurrence of periodic financial depression, due to fiscal conditions and the cost of internal administration, marred this season of prosperity. Extensive harbor improvements were made, and trans-Andean railway connection was completed with Argentina and Bolivia. The long-standing Alsop claims, which in 1909 threatened diplomatic difficulties with the United States, were adjusted through the arbitration of Great Britain in 1911, while the unsettled territorial dispute with Peru, seemingly on the way to settlement in 1912, was undetermined in 1914. Throughout 1913 the more important events in Chile were anticlerical riots in Santiago, brought about by the sale of church lands; the extensive enlargement of the navy, and efforts to monopolize the fast-disappearing nitrate deposits. The most recent general history is that of Barros Arana, *Historia general de Chile* (16 vols., Santiago, 1884–1902). Consult also: Wright, *The Republic of Chile* (Philadelphia, 1905); Aurique and Silva, *Ensayo de una bibliografia historica y geografica de Chile* (Santiago, 1902); Mansfield, *Progressive Chile* (New York, 1913); Koebel, *Modern Chile* (London, 1913); Chisholm, *The Independence of Chile* (Boston, 1911); Elliot, *Chile* (New York, 1907); Orrezo, *Chile contemporaneo* (Santiago, 1904).

CHIL'EAN GUAVA, gwä'vä. See MYRTLE.

CHILE PINE. See ARAUCARIA.

CHILI. See CHILE.

CHI-LI, chē'lē. See PE-CHI-LI.

CHILI MILLS. A machine used for pulverizing ore preliminary to recovering the values. These mills have vertical rollers running in a circular inclosure on a die. The rollers and dies may be of stone or steel. They are largely used on ores of gold-silver and the sulphides of the base metals.

CHIL'KOOT PASS. A pass in the coast range of the Rocky Mountains in Alaska. It crosses the watershed which divides the headwaters of the Yukon River from the affluents of Lynn Canal. Its greatest height is 3502 feet. It is about 29 miles long, extending from Dyea, at the head of Lynn Canal, to Lake Bennet, in the Canadian-Yukon district. It was the route taken by gold seekers in the rush of 1896–98, but has been superseded as a route by the railroad over White Pass, which was completed in 1899.

CHILLÁN, chē-lyän'. The capital of the Province of Nuble, Chile, 56 miles northeast of Concepción (Map: Chile, C 11). It is regularly built and has a Franciscan missionary church and a normal school. To the east-southeast are sulphur baths which were discovered in 1795, and to the east is the volcano of Nevado de Chillán, 9528 feet high. Pop., 1907, 34,269. Chillán was founded in 1579 and rebuilt in 1835, after its destruction by an earthquake.

CHILLICOTHE, chil'li-kŏth'ē. A city and the county seat of Livingston Co., Mo., 86 miles northeast of Kansas City, on the Chicago, Milwaukee, and St. Paul, the Wabash, and the Hannibal and St. Joseph railroads (Map: Missouri, C 2). It has a public library, the State Industrial Home for Girls, Sisters of St. Joseph Academy for Girls, and a private normal school. The city is the commercial centre of an agricultural, lumbering, coal-mining, and stock-raising country; ships apples, eggs, poultry, wool, and hides; and manufactures staves, handles, boxes, etc. The water works are owned by the city. Pop., 1910, 6265.

CHILLICOTHE. A city and the county seat of Ross Co., Ohio, 98 miles by rail east by north of Cincinnati, on the Baltimore and Ohio Southwestern, the Cincinnati, Hamilton, and Dayton, and the Norfolk and Western railroads, and on the Scioto River and the Ohio and Erie Canal (Map: Ohio, E 7). The notable features of the city include the large public library, the city hospital, Grandview cemetery, Adena, the home of Ohio's first governor, and two attractive parks. The leading industrial establishments are the railway shops of the Baltimore and Ohio Southwestern Railroad, pulp and paper mills, and manufactories of wagons, shoes, furniture, flour, carpet sweepers, canned goods, cigars, engines, etc. Chillicothe was first incorporated in 1802 and is governed under a general law of 1902, which provides for a mayor, department of public service, president of council, treasurer, and solicitor, all elected for two years. Pop., 1900, 12,976; 1910, 14,508; 1920, 15,831.

About 9 miles from Chillicothe was situated the Indian village of the same name, which in May, 1779, was unsuccessfully attacked by a band of Kentuckians under John Bowman, and in August, 1780, was burned by Colonel Clark. Chillicothe was first settled by the whites, under Nathaniel Massie, in 1796 and was the capital of Ohio from 1800 to 1810. Consult Howe, *Historical Collections of Ohio,* vol. iii (Columbus, 1889–91).

CHIL'LIES. See CAPSICUM.

CHIL'LINGHAM CATTLE. See CATTLE, CHILLINGHAM.

CHILLINGWORTH, WILLIAM (1602–44). An eminent English theologian. He was born in Oxford in 1602, educated at Trinity College, Oxford, and elected fellow in 1628. The arguments of a Jesuit named Fisher induced him to become a Roman Catholic, and in 1630 he withdrew to Douai; but his godfather, William Laud, then Bishop of London, persuaded him to reëxamine the whole controversy between Roman Catholics and Protestants, the result of which was that in 1631 he left Douai, and in 1634 returned to the Anglican Church. In 1637 he published a work entitled *The Religion of Protestants a Safe Way to Salvation.* It

was exceedingly keen, ingenious, and conclusive in point of argument. Chillingworth was perhaps the ablest disputant of his age; and had there not been a certain fickleness and want of solidity about his intellect, and a nervous suspicion that all human reasoning might be vitiated by undiscovered fallacies, he might have produced a really great work. *The Religion of Protestants* acquired a wide popularity. Chillingworth was offered church preferment, which he at first refused—having certain scruples in regard to the subscription to the Thirty-nine Articles—but afterward accepted. He became chancellor of Salisbury, prebendary of Brixworth, in Northamptonshire (1638), and master of Wigton's Hospital in Leicestershire. He was a strong Royalist and on the outbreak of the Civil War (1643) accompanied the King's forces. He died, a prisoner of war, at Chichester, Jan. 30, 1644. The best edition of *The Religion of Protestants*, along with his other works, appeared in 3 vols. (1838). For his life, consult T. Birch (London, 1742).

CHILLON, *Fr. pron.* shē'yôn', *Eng. pron.* shĭl'lŏn *or* shĭl-lŏn'. A castle and fortress of Switzerland. It is situated in the Canton of Vaud, at the eastern end of the Lake of Geneva, on an isolated rock almost entirely surrounded by water. The castle was founded many hundred years before the fortress, which was erected by the rulers of Savoy in the middle of the thirteenth century and is celebrated in connection with Bonnivard, the Genevan patriot, who was imprisoned in one of its underground dungeons from 1530 to 1536. Byron has treated this subject in his "Prisoner of Chillon." See BONNIVARD. The illustration "Alpine Scenery" in the article ALPS shows this castle.

CHILOÉ, chē'lō-ā'. The insular province of Chile, consisting of an archipelago off the west coast of South America. The group takes its name from its principal island (Map: Chile, C 12). It is separated from the rest of the republic by the Gulf of Corcovado and the Strait of Chacao, and consists of the main island and over 100 small, mostly uninhabited islets, with a total area of 8693 square miles. The principal island contains most of the population of the province. It is of volcanic origin and mountainous, covered largely with thick forests yielding great quantities of wood for export. In the eastern part the soil is fertile and well cultivated. The climate, although hot and moist, has none of the deadly qualities which characterize that of the mainland. Corn, wheat, barley, and hemp are produced extensively, and domestic animals are raised in large numbers. Pop., 1895, 77,750; 1903, 95,914; 1910 (est.), 91,657. Ancud, or San Carlos Ancud, the seat of government and chief seaport, is situated on the north coast and has a population of 3979. The archipelago was discovered by the Spaniards as early as 1558. It was the last portion of Spanish America to throw off the mother country's yoke, which it did in 1826.

CHILOGNATHA, kī-lŏg'nà-thà (Neo-Lat. nom. pl., from Gk. χείλος, *cheilos*, lip + γνάθος, *gnathos*, jaw), or DIPLOPODA (Neo-Lat. nom. pl., from Gk. διπλόος, *diploos*, double + πούς, *pous*, foot). A division of Myriopoda containing the millipedes (q.v.).

CHILON, kī'lŏn (Lat., from Gk. Χίλων). A Lacedæmonian, son of Damagetus, first Ephor in 560 or 556 B.C. (he is said to have originated that office). It is further said that he died of joy at the news of his son's victory in the Olympian games. He was reckoned one of the Seven Wise Men of Greece, and many pithy sayings, among them the famous "Know thyself" and "Nothing in excess," are ascribed to him. Consult Mullach, *Fragmenta Philosophorum Græcorum*, vol. i.

CHILOPODA, kī-lŏp'ō-dà (Neo-Lat. nom. pl., from Gk. χείλος, *cheilos*, lip + πούς, *pous*, foot). A division of Myriopoda containing the centipedes (q.v.).

CHIL'PERIC. The name of two Merovingian kings. CHILPERIC I, King of Soissons from 561 to 584, was the husband of Fredegunda. He did not rule over all the Franks, but divided the kingdom with his three half brothers. (See BRUNHILDA.) He was cruel, unjust, and irreligious, but energetic and brave. CHILPERIC II was King of Neustria from 715 to 720, but was conquered by Charles Martel. In 719, after submitting to the latter, he was proclaimed King of all the Franks, but ruled only one year longer. Consult Sergeant, *The Franks* (New York, 1898).

CHIL'TERN HUNDREDS, STEWARD OF THE. An English crown officer, formerly appointed to preserve peace and protect the inhabitants and neighbors of the three hundreds (nominally villages) of Stoke, Burnham, and Desborough in Buckinghamshire, from the robbers who infested the beech forests of the adjacent Chiltern Hills. This primary purpose is, however, obsolete; the office is now applied for by members of the House of Commons who wish to resign their seats, an allowable excuse for such resignation being the acceptance of a place of "honor and profit" under the crown. As such, the stewardship of the Chiltern Hundreds, among other similar sinecure offices, more generally presents itself, with its salary of 20 shillings and accompanying fees. It is rarely refused by its patron, the Chancellor of the Exchequer, and, as soon as obtained, is vacated in readiness for the next resigning member. The practice began about the year 1750. Its legality has been disputed, but numerous precedents have established it. One refusal is recorded in 1842. Consult *Standard Library Cyclopedia* (London, 1848), and Foster, *The Chiltern Hundreds* (London, 1897).

CHIL'TON. A city and the county seat of Calumet Co., Wis., 78 miles by rail north of Milwaukee; on the Chicago, Milwaukee, and St. Paul Railroad, and on the Manitowoc River (Map: Wisconsin, E 4). It is the centre of an agricultural and dairying district largely interested in barley cultivation and the manufacture of cheese, and has grain elevators, condensed-milk and canning factories, flour mills, machine shops and boiler works, brewery and malting plant, sash, door, and blind factory, etc. Pop., 1900, 1460; 1910, 1530.

CHILTON, ROBERT HALL (1817–79). An American soldier, born in Virginia. He graduated in 1837 at the United States Military Academy, rose to be captain of the First Dragoons in 1846, and major and paymaster in 1854. During the Mexican War he distinguished himself at the battle of Buena Vista. In 1861 he resigned from the United States army, in the same year was appointed a lieutenant colonel in the Adjutant General's Department of the Army of the Confederate States, and in 1862 became a brigadier general. For some time he was chief of staff to Gen. R. S. Lee, and inspector general of the Army of Northern Virginia. In 1869–79

he was president of a manufacturing concern in Columbus, Ga.

CHILTON, WILLIAM EDWIN (1858–). An American lawyer and legislator, born at St. Albans, Kanawha Co., W. Va. In 1880 he took up the practice of law at Charleston, W. Va., and in 1891 became a practicing attorney before the Supreme Court of the United States. He was appointed prosecuting attorney of Kanawha County (1883), was chairman of the Democratic State Executive Committee (1892), and Secretary of State for West Virginia (1893–97). Later he became United States Senator for the term 1911–17.

CHIMACHIMA, chē′mȧ-chē′mȧ. A caracara of the American Isthmian region (*Ibycter chimachima*), prevailingly white when adult. See CARACARA.

CHIMÆRA, kī-mē′rȧ (Lat., from Gk. χίμαιρα, *chimaira*). A mythical monster, killed by Bellerophon (q.v.) with the aid of Pegasus. According to Homer, the chimæra was a fire-breathing monster with a lion's head, a goat's body, and a serpent's tail, who long devastated Lycia and Caria. According to Servius (q.v.), on *Vergil, Æneid,* vi, 288, Chimæra represented a mountain whose top was the resort of lions, its middle of goats, and the marshy ground at the bottom of serpents; Bellerophon first made this mountain habitable. The district in which Chimæra was localized was volcanic. The chimæra alone and in conflict with Bellerophon is not uncommon in ancient art. The finest representation is the large bronze in Florence. The word "chimæra" is now used figuratively to denote any monstrous or impossible conception, the unnatural birth of the fancy.

CHIMÆRA. A representative of a family (Chimæridæ) of strange cartilaginous fishes (q.v.) constituting the Holocephali. They are sharklike and very interesting to the ichthyologist in their structure, which shows their strong affinity to ancient types of which they are the scant survivors, but have nothing but their grotesqueness to attract popular interest, as their flesh is not good. The large eggs, fertilized internally, are surrounded by a horny case which in some species may be 10 inches long. There are three living genera—*Chimæra, Callorhynchus,* and *Harriotta. Chimæra* is found along the coasts of Europe and Japan, on the west coast of North America, and at the Cape of Good Hope. *Chimæra monstrosa,* of the Mediterranean and Atlantic, is its largest and best-known species and may reach a length of 3 feet; in Europe it is called "king of the herrings"; in America, "chimæra, ratfish, sea cat," etc. *Callorhynchus* occurs in the south temperate zone, and *Harriotta* is confined to the deep seas. Consult Dean, *Chimæroid Fishes and their Development,* Carnegie Institution Publication, 32 (Washington, 1906). See Plate of DIPNOI AND CHIMÆRA.

Fossil Forms. The genus *Chimæra* is found in a fossil state in the Tertiary deposits from the Miocene upward. Many related but extinct genera are known from the Devonian upward. The chimæroids reached their maximum of evolution in the Cretaceous and Eocene, and many of the extinct species were much larger than any now living. The strong cutting teeth of *Rhynchodus* and *Ptyctodus,* described from the Lower Devonian of North America and Russia, are the only remains of the earliest members of the group, of which no other traces have been found. In the Liassic of England specimens of *Myriacanthus* have been found so well preserved as to show the form of the cartilaginous snout, which resembles that of the modern genus *Callorhynchus.* Teeth and dorsal spines of chimæroids are common in the Mesozoic and Tertiary rocks. One genus, *Ischyodus,* of which a perfect skeleton was found in the lithographic limestones of the Solenhofen Jurassic, has also been found in the Cretaceous of New Zealand and the Eocene of North America, indicating that this genus enjoyed in those early days a very wide distribution. See SQUALORAJA.

CHIMÆRA, IN PLANTS. A name applied to certain graft hybrids which combine the characters of both stock and scion. The term "graft hybrid" is applied when the stock and scion fuse in such a way as to produce new shoots that are intermediate between the two parents. In the chimæra the tissues of the two parents remain distinct from one another in the hybrid. For example, the epidermis may belong to one parent and all the inner parts to the other. In this case, when the tissue of one parent insheathes that of the other, the chimæra is spoken of as a periclinal chimæra. In other cases the hybrid is a sort of patchwork or mosaic of the characters of the two parents; these cases being called hyperchimæras. A notable case of the latter kind has been produced by a graft between the tomato and the nightshade, a shoot arising which combines the characters of both stock and scion. Of course, in all such cases the seedlings revert to one or the other of the parent forms.

CHIMANGO, shē-mäṅ′gō. A widespread and familiar carrion hawk (*Milvago chimango*) of the plains regions of South America, black, with the under parts brownish ochre in the adult. For affinities and habits, see CARACARA and the books there mentioned.

CHIMAPHILA, kī-măf′ī-lȧ. See WINTERGREEN.

CHIMAY, shē′mȧ′, JEANNE MARIE IGNACE THÉRÈSE DE CABARRUS, PRINCESS DE (1773–1835). She was the daughter of the Comte de Cabarrus, Minister of Finance in Spain; was married at 16 to the Marquis de Fontenay, but divorced from him in 1793 and in the same year married Tallien, the French revolutionist, whom she induced to engage in a plot for the overthrow of Robespierre, thus becoming the chief promoter of the Revolution of July, 1794. Her social triumphs, consequent from her beauty and her free manners, gave her husband offense, and he left her, going with Napoleon to Egypt. A divorce followed on his return (1802) and Jeanne married in 1805 the Comte de Caraman, afterward the Prince de Chimay, with whom she lived peaceably. While ranking first among the beauties of the time, she was never admitted to court circles. Consult Houssaye, *Notre Dame de Thermidor* (Paris, 1866).

CHIM'BORA'ZO, *So. Amer. pron.* chēm'bŏ-rä′sō (native name, *Chiquipoya*). A volcanic peak, one of the highest of the Andes, in Ecuador, rising 20,500 feet above sea level, but only about 11,000 feet above the level of its own tableland of Quito (Map: Ecuador, B 4). Its lat. and long. are 1° 20′ S. and 79° W. The mountain has no crater, is built up of trachytic volcanic rocks, and is evidently an extinct volcanic peak. It is capped with perpetual snow and was long regarded as the loftiest mountain in the world. The summit was for the first time reached by Whymper in 1880. Humboldt, Bous-

singault, Hall, and Stübel all made ineffectual attempts to reach its top.

CHIMBOTE, chêm-bō'tâ. A seaport in the Department of Ancachs, Peru, situated on the Puerto Ferrol (Map: Peru, B 5). It has an active trade and is the terminus of the railroad from Huaraz, whose port it is.

CHIMENTI, kē-mān'tē, JACOPO DI. See CLEMENTI, JACOPO DI, DA EMPOLI.

CHIMERE, shī-mēr'. See COSTUME, ECCLESIASTICAL.

CHIMES (from AS. *cimbal, cimbala*, from Lat. *cymbalum*, from Gk. *κύμβαλον, kymbalon*, cymbal, from *κύμβος, kymbos*, Skt. *kumbhā*, jar). Music played on a set of bells in a church tower, either by a performer or by mechanism. This ancient and interesting class of music is believed to have originated in some of the German monasteries. In the fifteenth century the ringing of church chimes became very general in North Germany, Holland, and Belgium; the last-mentioned country was especially famed for its bell ringing, retaining this prestige for three succeeding centuries. Bell ringing has always reached its greatest popularity in flat countries, where the sound of the bells can "carry" over a great distance. In England, where it is often called "change ringing," this custom has also found great favor and may be said to be one of the national institutions. A chime of bells may number from 5 to 12 and is rung by swinging, causing the clapper inside to strike the bell. With this limited scale, and the rather uncertain method of producing the tone, only very simple diatonic melodies are possible. *Carillons* are more elaborate affairs, in which the bells are stationary and are rung by striking on the outside with a hammer. Carillons were formerly played by a performer, who struck the huge keys that connected with the hammer and with his feet operated the pedals that communicated with the larger bells. His place is now usually taken by machinery. The number of bells in a carillon varies from 10 to 40, or even more; the famous one at Ghent has 48. Chimes have been introduced into many American churches. Those of Christ Church in Philadelphia, Christ Church in Boston, and Trinity Church in New York are probably the oldest in the United States. The chimes of the old Christ Church of Philadelphia have an historic interest. The bells were sent from England as a present from Queen Anne, and during the Revolution they were taken down and sunk in the Delaware River, as it was feared the British might capture them. At the close of the war they were rehung in the old belfry. Among the celebrated chimes of Europe are those of Copenhagen, Ghent, and Amsterdam. The word "chimes" is here used in its general sense, including both carillons and the smaller set of bells. Consult: F. E. Robinson, *Among the Bells* (London, 1909); J. Berthelé, *Archives campanaires* (Abbéville, 1911); O. H. Metzger, *Die Glocken im Friedländischen* (Friedland, 1912). See BELL.

CHIMES, THE: A GOBLIN STORY OF SOME BELLS THAT RANG AN OLD YEAR OUT AND A NEW YEAR IN. A Christmas tale by Charles Dickens, written in Genoa in 1844 and published in London in December of the same year. It was illustrated by Doyle, Leech, Maclise, and Stanfield.

CHIMESYAN, chĭm'e-syan. A small linguistic family on the Nass and Skeena rivers, British Columbia. They comprise the Tsimshian, Sitksan, and Niska tribes. They are athletic and well formed, practice tattooing, and wear labrets, together with rings in the nose and ears, but do not flatten the head as do the more southern tribes. They are expert fishermen, weavers, and basket makers, and live in large communal houses of boards, with gable roofs and verandas. They have the clan system and are organized into three distinct social orders. Slavery also exists among them, as among other tribes of the northwest coast. They have many ceremonial customs, including the potlatch (q.v.). The name is said to signify people living 'on the main river,' i.e., the Skeena. They number now about 2450 in British Columbia, besides some 729 who have within recent years crossed the line into Alaska. (See METLAKAHTLA.)

CHIM'NEY. Any structure, vertical or otherwise, of metal or masonry, including stone, brick, and reinforced concrete, having a hollow interior or flue serving the purpose of carrying off the waste gases of combustion from a stove, furnace, or fireplace, and at the same time creating a draft. It is quite probable, since we have no record to the contrary, that the chimney was unknown in either the early Greek or early Roman house, and that the smoke from a fire was permitted to escape through an aperture in the roof. Chimneys in their very simplest form were first introduced into England about the year 1368, while in Venice it is recorded in an account of the great earthquake of 1347, that a number were overthrown there.

The action of the chimney depends upon the principle that a column of heated air is lighter than a cooler one of equal height; when therefore a flue full of heated air communicates freely by the lower part with the cooler air around it, the weight of the latter pushes the warm air up, and thus an ascending current is produced. The draft velocity of flow varies as the square root of the height. In engineering work, where the chimney has received its greatest development, it is constructed either of steel, self-sustaining or supported, brick, stone, or concrete.

The design of the structure depends upon certain conditions which in Germany are required to satisfy government specifications. The practice there, upon which American construction is largely based with more or less modification, requires that the wind pressure on the base be assumed as acting upon a full median vertical section with a force W equal to 25.6 pounds per square foot, and that the centre of pressure be taken as the centre of gravity. If this area be called A, for different forms of chimney we have the following effective pressures: for round stacks, 0.67 WA, for octagonal stacks, 0.71 WA, and for rectangular stacks, 1.0 WA. The permissible stresses on the brickwork are (1) 100 pounds per square inch for common brick laid in 1 to 3 lime mortar, (2) 171 to 214 pounds per square inch for masonry of hard-burned brick laid in lime-cement mortar, and any other unit stress may be used up to 365 pounds per square inch where the factor of safety is 10 or over. If the foundation is made of concrete, the maximum allowable stress shall be 85 to 114 pounds per square inch when the concrete is simply laid, and 142 to 214 pounds per square inch when it is well rammed. On good soil the maximum shall be 43 to 57 pounds per square inch.

Chimneys of reinforced concrete, which were

attempted on a large scale in the United States about 1901, are now successfully built of considerable heights and give eminent satisfaction. The advantages in such chimneys that make them more desirable than those of either brick or steel are (1) the smoothness of the interior surface, which reduces the friction factor, (2) the fact that concrete is a poor conductor of heat, and (3) its ability to resist high temperatures. From the standpoint of cost it comes next to steel, which is least, and is followed by brick, which is the most expensive. For durability it excels both of the others, with brick next and steel last.

That reënforced concrete can be used in structures of considerable height is shown by the chimney at Butte, Montana, which is 350 feet in height by 18 feet in diameter. Another notable chimney, which up to the time of its completion, in May of 1905, was the tallest reënforced concrete chimney ever built, was put up for the Tacoma (Washington) Smelting Company, a branch of the American Smelting and Refining Company. The height of this chimney is a little over 300 feet with a constant interior diameter of 18 feet. The construction is quite typical of work of this character and may be briefly outlined. For a distance of 90 feet above the foundation the chimney consists of a double shell, the outer being 9 inches in thickness and the inner 5 inches, separated by an air space of 4 inches, with air inlets at the bottom. Above this 90-foot section the chimney consists of but one shell 7 inches thick. At the top is a lead lining extending over the coping and to a depth of 20 feet on the interior.

The concrete used for reënforced concrete chimneys usually is composed of 1 part cement, 3 parts sand, and 5 parts gravel for the foundation, while the chimney proper is of 1 part cement and 3 parts sand. The wind pressure, which is an important consideration in chimney design, is commonly assumed as exerting a force of from 25 to 50 pounds per square foot on an area equal to one-half a vertical median section; but this is believed to be higher than is necessary, for even with a wind velocity of 100 miles per hour ability to resist 20 pounds per square foot is considered ample.

There is a chimney 230 feet high and 12 feet in diameter at the plant of the Portland, Oreg., General Electric Company, and one 250 feet in height by 11 feet in diameter at Lawrence, Mass.

Steel Chimneys are of two general kinds—those that require to be braced or supported by steel guy ropes and those which are self-sustaining. Naturally the former are less important and simpler in construction. In the latter the base of the chimney, which rests on the foundation, is usually bell-shaped, though it may be secured by means of turnbuckles, bolts, angle irons, etc. Such chimneys are usually partially lined, the object of the lining being to protect the metal skin, as it is found that it is destroyed quite quickly from various causes. Corrosion of the iron also frequently takes place, caused by the condensation of the gases of combustion upon the sides of the stack. This, in a measure, may be avoided if the chimney is given a coating or two of graphite paint.

Two very tall stacks of this type were constructed for the Maryland Steel Company at Sparrows Point, Maryland. They are duplicates, each being 225 feet high, with an internal diameter of 13 feet 9 inches. They rest on an elevated masonry foundation 13 feet above the ground and have no bracing. The weight of metal in each chimney is 77 tons, while the weight of brick is equal to 900 tons. The pedestal and foundation weigh 1600 tons, making a total of 2600 tons for this form of construction, as against 7400 tons had brick alone been used. The base is a square, 40 feet on the side, and the unit load is 1.62 tons per square foot. Inside, the shaft is lined with brick, diminishing in thickness in 40-foot sections from 7 bricks at the bottom to 2 bricks at the top.

What was believed to be the tallest steel stack in the world was under construction during 1913 at the new works of the United Verde Copper Company, at Jerome, Ariz. This chimney, 400 feet 1 inch in height from the top of the foundation to the top of the steel, has a lining 30 feet in diameter inside of the steel shell, which is 30 feet 9½ inches inside diameter. The brick lining is supported on the legs of circular angles riveted to the inside of the shell and spaced 15 feet apart, so that the weight of brick is carried directly by the entire structure and not merely by the lining itself, whose bearing capacity might thus be exceeded. Furthermore, any section can be removed at once for replacement or repair. There are connections for three flues, and the steel plates are protected from the flue gases. The total weight of the chimney is about 875,000 pounds, and it is founded on a concrete base.

Among other high steel chimneys in America is that of the Nichols Chemical Company of Brooklyn, N. Y., with a height of 310 feet and a diameter of 35 feet at base and 12 feet at the top. Notable, also, is the chimney of the Compañia de Penoles, of Mapimi, Mex., which is 300 feet high.

Brick Chimneys. The tallest chimney on record which is also built of brick is at the plant of the Boston and Montana Copper and Silver Mining Company, Great Falls, Mont., built in 1908. It is 506 feet in height, has a foundation 74 feet in diameter, an interior top diameter of 50 feet, and exterior top diameter of 54 feet, and was designed so that 60 feet additional could be added if desired. In this the barrel has a circular ring section, but the lower 46 feet, which forms the base, is octagonal in exterior outline. The chimney has four separate batters, the upper 180 feet having 1 per cent, the next 100 feet 2 per cent, the next 180 feet 3½ per cent, and the octagonal base 4 per cent. A heat-protecting lining, 4 inches thick, extends from top to bottom. The cost was about $200,000. Next in height among brick chimneys is probably the Hallsbrückner Hüt chimney near Freiburg, Saxony. It has a height of 460 feet and an internal diameter of 15 feet 7 inches, its outside diameter being 33 feet at the base and 16 feet at the top. Of more recent construction is the brick chimney of the Heller and Merz Company, Newark, N. J., 350 feet in height with an inside diameter of 8 feet. This chimney was made of special radial brick, which finds wide employment in making American chimneys, laid in mortar of 1 part cement, 2 parts lime, and 5 parts sand. It is lined with 4 inches of special brick to resist acids, and an air space of 2 inches is left between the lining and the shell. The

Eastman Kodak Company, at Rochester, N. Y., has a chimney 366 feet in height, with an internal diameter at the top of 9 feet 10 inches and at the bottom of 20 feet 5 inches.

Another large brick chimney is that of the power plant of the Metropolitan Street Railway Company in New York City. It is 353 feet high, with an internal diameter of 22 feet, weighs 8540 tons, and required 3,400,000 bricks for its construction. The chimney is built of two concentric shells, and the outer shell is stiffened by 12 interior longitudinal ribs projecting radially towards the inner shell and having a clearance on one-half inch. The top of the chimney is protected by a cast-iron cap.

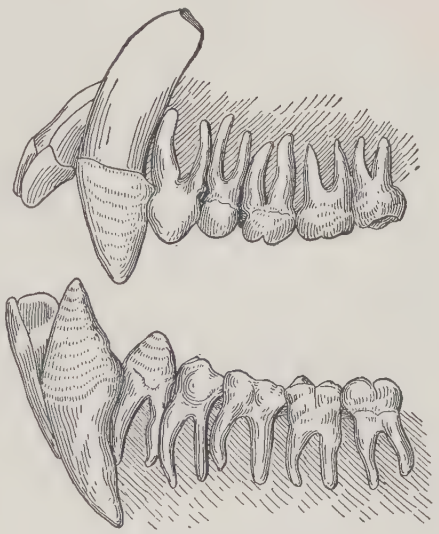
Bibliography. Consult section on "Chimneys" in Kent, *Mechanical Engineers' Pocket Book* (8th ed., New York, 1913), where are given lists of notable chimneys and bibliographical references. Merriman, *American Civil Engineers' Pocket Book* (2d ed., New York, 1913), also may be consulted. The most satisfactory sources of information on recent practice and construction are the files of the engineering magazines and the records of engineering societies, as well as the descriptive matter prepared by various constructing engineers and manufacturers. See STEAM ENGINE.

CHIMNEY SWALLOW. 1. In North America, the chimney swift (q.v.). 2. In the Old World the familiar house swallow (*Hirundo rustica*), which ranges eastward into western China, where it is replaced by another species (*Hirundo gutturalis*). Several African swallows belong to this group, as also does our barn swallow (q.v.), which English writers sometimes call, unfortunately, the "American chimney swallow."

CHIMNEY SWIFT. The small, sooty, swallow-like bird, commonly but mistakenly called a "swallow," which throngs about chimneys in all parts of North America and represents an almost cosmopolitan family. (See SWIFT.) It is migratory, spreading northward into Labrador and the fur countries in early summer and escaping in winter to Central America. Supported upon narrow wings, each an inch longer than its total length (about 5 inches) from beak to tail, it spends its time almost continuously in the air, rarely if ever alighting except inside the hollow tree or chimney where it lives, and ceaselessly pursuing, open mouthed, the minute insects upon which it lives, catching all of them on the wing and doing us an important service. It even gathers in this way the materials for the nest, grasping with its beak tiny dead twigs projecting from lofty tree branches, snapping them off and bearing them away, without a pause in its flight. Before the civilization of the country, as yet in remote districts, it inhabited hollow trees, sometimes for many generations in succession, attaching its nest to their interior wall; but as soon as houses were built, the old trees were abandoned for the new chimneys, the superior attractiveness of which lies in greater safety and in better satisfying a racial tendency to inhabit caves. In some northerly districts these birds are latterly abandoning chimneys for attics and similarly sheltered but light situations. The nest is formed of small twigs, glued together by the bird's saliva, shaped like a half-cup or hollowed bracket, and glued to the interior wall of the chimney. The eggs, four to six, are small and pure white; and it is some time after the nestlings are fledged before they are permitted to scramble out and try their wings. In these chimneys or trees the swifts sleep at night, clinging upright with their long toes to the surface, and supported upon the stiff spine-tipped feathers of the tail, firmly pressed against the wall. In accustomed and favorable places large flocks live together; and one of the most familiar and pleasing exhibitions of American bird life is to watch the swifts at sunset circling in a twittering crowd about the chimney top, into which, as dusk comes on, they drop, one after the other, as if each went down the vortex of a whirlpool. The scientific name of the common species of the United States is *Chætura pelagica*. See Plate of SWIFTS AND THEIR NESTS.

CHIMNEY SWIFT, SHOWING SPINES AT END OF TAIL FEATHERS.

CHIMPANZEE, chĭm-păn′zē *or* chĭm′pan-zē′ (Guinea). An anthropoid ape of equatorial Africa, which has been known to Europeans for 500 years. The chimpanzee, though taller than an orang-utan, falls short of the stature of



DENTITION OF CHIMPANZEE.

the gorilla and never exhibits the breadth and massiveness of frame shown by an old male of that species; 5 feet is a good height for this animal, and no great difference is observable between the sexes. This height is a matter of measurement rather than of observation, however, as the chimpanzee rarely stands upright and habitually walks bent over and supporting itself upon its long forearms and knuckles, the fingers being bent in; most of its time, indeed, is passed in trees. The range of the genus extends from the Atlantic coast of mid-Africa eastward through the forest region to the Nile, from about 10° south to 12° north of the equator. Throughout this great area it seems to be fairly numerous and is known under many names. Although it is convenient to speak of *the* chimpanzee, several species are

recognized, and there are probably a number of others as yet undescribed. Dr. Elliot, in the latest summing up of these animals, admits 10 species, one of which is divisible into two subspecies. *Pan* is the latest accepted name for the genus; former names being *Troglodytes*, *Mimetes*, and *Anthropopithecus*. The species are *calvus*, *fuliginosus*, *satyrus*, *kooloo-karuba*, *leucoprymnus*, *chimpanse*, *aubryi*, *vellerosus*, *fuscus*, *schweinfurthi*, and *s. marungensis*. They are strictly forest-dwelling animals, haunting the densest jungle and climbing to the topmost branches, where they go about in families or small bands, feeding almost wholly upon soft fruits, but varying their diet with grubs, insects, honey, birds' eggs, fledglings, birds, etc. This appetite causes them to wander widely in search of fresh food, and in some districts they are greatly destructive of the banana and other plantations of the natives. Simply guarding these plantations, when the fruit is ripe, is usually sufficient to save the crop, since the apes are timid towards men and run when they can; but if cornered they prove very troublesome foes to deal with, showing much courage and seeking to grasp their enemy in their long arms, chew his hands, and gash his throat with their terrible teeth. Dr. Livingstone and others say that the chimpanzee is a match for the leopard, but is quickly killed (but not eaten) by the lion. The robust natives of the central Sudan chase these animals into the tree tops, drive them into traps, and otherwise kill them off by regular hunts. They seem to be largely nocturnal and often fill the woods with loud, reiterated cries, which are varied through every variety of horrid noise; can be heard a long distance, and seem to be uttered by large troops in concert, though perhaps only a few are really screaming and bellowing together. Such noises doubtless serve the double purpose of keeping the apes wandering through the blackness of the forest night, within hail of one another and of terrifying possible enemies. No particular sleeping place seems to be made by this ape, but when one is about to become a mother, the pair build a platform-like nest in a tree top, upon which the female rests until her young one (twins are only occasional) is born and able to travel. The young are often captured and kept as tame pets by the negroes and wandering Arabs, and thus for two or three centuries the civilized world has been supplied with living examples.

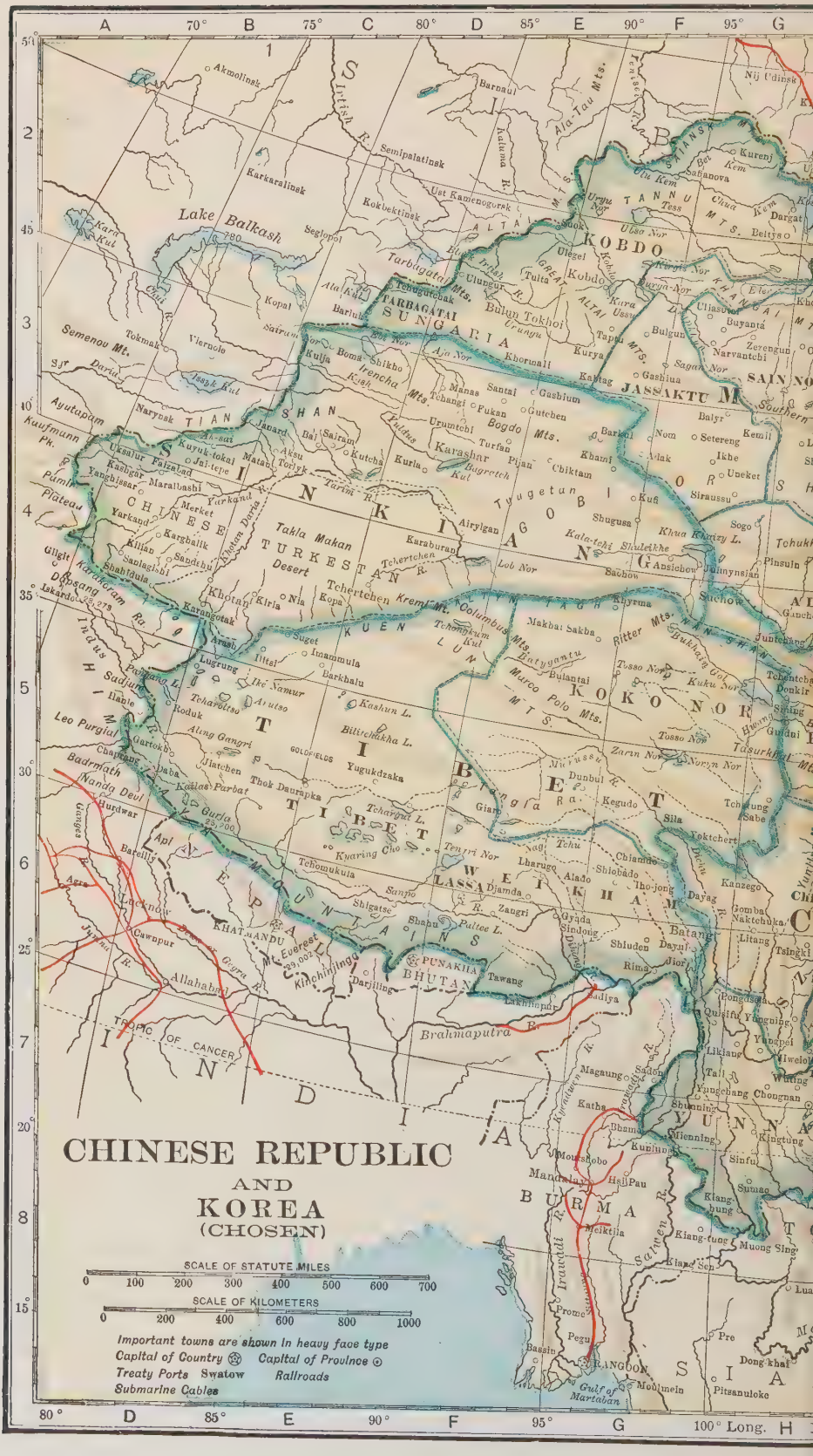
No other of the greater apes is so human in its characteristics, appearance, and intelligence, and numberless accounts exist of the interesting ways and great docility of the animal when properly treated and trained. Though it often becomes morose and savage when old (if able to survive the pulmonary diseases which kill most of its kind in youth), when young it is teachable, affectionate, and playful to a remarkable degree. Like most other animals, wild chimpanzees when young show the instinct for play as strongly developed as when confined in a zoölogical garden. So entirely human are the chimpanzees in their ways that the natives of certain tribes believe them to be relations which have been degraded from a former higher state to their present forest life.

The structural resemblance to the gorilla has been noted; but the head is rounder, and the face lacks the great ridges above the eyes and massive jaws of that animal, and the canines are smaller, while the lips are more extensile and mobile and the whole expression milder; the ears are very large and the nose insignificant. The naked skin of the face is yellowish, darkening with age, but that of the palms of the hands and soles of the feet much darker; and gray hairs often become conspicuous about the mouth and chin. The body is covered everywhere else with shining black hair, most abundant on the head and shoulders, where it hangs long and thick.

Much has been written as to these animals, especially in the works of Savage, Du Chaillu, Livingstone, Schweinfurth, and other explorers of western and Central Africa; also in regard to chimpanzees in captivity. A good general account is contained in *Cassell's Natural History*, vol. i (London, 1883); and a more scientific one in Hartmann's *Anthropoid Apes* (New York, 1886), where a full account is given of "Mafuka," the supposed hybrid between gorilla and chimpanzee, long resident in Dresden. A famous educated captive, "Sally," lived for eight years in the London Zoölogical Gardens and was the subject of psychological training and experiment, described by Romanes in the *Proceedings of the Zoölogical Society of London* (1889); and the history and exploits of another celebrated chimpanzee, "Joanna," are recorded in the same *Proceedings* (1899, pp. 296 et seq.). For the latest technical treatment of these animals, see Elliot, *A Review of the Primates* (New York, 1912). See GORILLA; ORANG-UTAN; and Plate of ANTHROPOID APES.

CHINA (Fr. *Chine*, ML. *China*, Ar. *Sin*, Pers. *Chīn*, Skt. *Cīna;* Gk., for the people, *Σῖναι*, *Sinai*, *Σῆρες*, *Sēres*, Lat. *Seres;* Turk. *Khatai*, Mongol. *Kítat*, whence Eng. *Cathay*, Russ. *Kitai*, from the race, generally held to be Tungusic, of *Kitan*, or *Khitan*, who ruled in the north of China from the tenth to the twelfth century; the natives call their country *Chung-ku*, 'Midland,' poetically *Chung-hua*, 'Flower of the Middle.' The name "China" and the corresponding ancient names (*Sinai*, etc.) are derived from the westernmost feudal state called *Ts'in*, which stood in close relations with the Central-Asiatic Tatars, and this may possibly be the channel through which it reached the countries of the West. The name *Sin* (*Sinim*), used in the Book of Isaiah in reference to the most distant nation in the East, may thus refer to those of the Ts'in state centuries before one of its sovereigns became Emperor of China in 220 B.C.). A country, formerly an empire, but a republic since Feb. 7, 1912, extending over most of the southeastern third of Asia, and embracing the whole area of continental drainage into the Pacific south of the Amur River, with the exception of Indo-China and Korea. It has an area of approximately 4,376,400 square miles. It is irregularly circular in shape, lying between lat. 18° and 54° N. and long. 74° and 135° E.; and it includes, besides China proper, Tibet, Eastern Turkestan, Mongolia, and Manchuria.

Tibet, with an elevation of 15,000 feet above the sea, is cold and sterile except in the south, where valleys teem with cultivation. To the north is Eastern Turkestan, a remarkable depression, with a central sand waste, drained by the Tarim River and bounded by lofty mountains. To the east, Turkestan merges with the high table-land of Mongolia with its summer heats and subarctic winters. To the east of Mongolia is Manchuria, with an exceptionally rich


CHINESE REPUBLIC
AND
KOREA
(CHOSEN)
SCALE OF STATUTE MILES
0 100 200 300 400 500 600 700
SCALE OF KILOMETERS
0 200 400 600 800 1000
Important towns are shown in heavy face type
Capital of Country
Capital of Province
Treaty Ports
Railroads
Submarine Cables
Lake Balkash
Semenov Mt.
Tarbagatai Mts.
Ala-Tau Mts.
Bulun Tokhoi
Kobdo
Jassaktu M
Tian Shan
Chinese Turkestan
Takla Makan Desert
Kuen Lun Mts.
Columbus Mts.
Ritter Mts.
Marco Polo Mts.
Koko Nor
Tsaidam
Tibet
Himalaya Mts.
Mt. Everest
29,002
Kinchinjinga
Punakha
Bhutan
Darjiling
Lassa
Tengri Nor
Brahmaputra R.
Yangtze Kiang
Yunnan
Burma
Rangoon
Gulf of Martaban
Tropic of Cancer
India
Siam
Annam
Tonkin
Hainan
Yangtze Kiang
Hwang Ho
Tsaidam
Nan Shan
Kuen Lun
Karakoram Pass
Khyber Pass
Bolan Pass
Indus R.
Ganges R.
Irrawadi R.
Mekong R.
Salween R.
Red R.
Tsing Hai
Lop Nor
Turfan
Karashar
Kuchar
Khotan
Yarkand
Kashgar
Aksu
Urumtchi
Hami
Barkol
Suchow
Kansu
Shensi
Shansi
Hupeh
Szechuen
Kweichow
Kwangsi
Kwangtung
Fukien
Chekiang
Kiangsu
Anhwei
Honan
Hopeh
Manchuria
Mukden
Kirin
Harbin
Port Arthur
Dalny
Antung
Newchwang
Chefoo
Weihaiwei
Kiaochow
Tsingtau
Shanghai
Nanking
Hankow
Ichang
Chungking
Changsha
Foochow
Amoy
Swatow
Canton
Hongkong
Macao
Haiphong
Hanoi
Saigon
Bangkok
Mandalay
Bhamo
Myitkyina
Lashio
Kengtung
Muong Sing
Luang Prabang
Vientiane
Korea
Seoul
Fusan
Gensan
Chemulpo
Wonsan
Pyengyang
Yalu R.
Tumen R.
Sea of Japan
Yellow Sea
Korea Bay
Gulf of Pechili
Formosa
Pescadores
Philippine Islands
Luzon
Manila
Mindanao
Sulu Archipelago
Borneo
Sumatra
Java
Celebes
Singapore
Malay Peninsula
Andaman Islands
Nicobar Islands
Ceylon
Colombo
Bay of Bengal
Arabian Sea
Karachi
Quetta
Peshawar
Kabul
Srinagar
Leh
Gilgit
Simla
Delhi
Agra
Lucknow
Cawnpur
Allahabad
Benares
Calcutta
Darjiling
Gaya
Patna
Bombay
Poona
Madras
Pondicherry
Trichinopoly
Madura
Tuticorin
Cape Comorin
Hyderabad
Nagpur
Indore
Ahmedabad
Surat
Rajputana
Central India
Deccan
Malabar Coast
Coromandel Coast
Persian Gulf
Gulf of Oman
Muscat
Aden
Red Sea
Suez Canal
Port Said
Alexandria
Cairo
Mecca
Medina
Jeddah
Abyssinia
Somaliland
Zanzibar
Mombasa
Lake Victoria
Lake Tanganyika
Lake Nyasa
Zambesi R.
Cape Town
Natal
Transvaal
Orange Free State
Cape Colony
Rhodesia
Portuguese East Africa
Portuguese West Africa
German East Africa
German West Africa
Belgian Congo
Angola
Nigeria
Gold Coast
Liberia
Sierra Leone
Senegal
Morocco
Algeria
Tunis
Tripoli
Egypt
Sahara
Nile R.
Niger R.
Congo R.
Zambesi R.
Orange R.
Limpopo R.
Madagascar
Tananarivo
Mauritius
Reunion
Azores
Canary Islands
Cape Verde Islands
Madeira
Gibraltar
Malta
Cyprus
Crete
Rhodes
Smyrna
Constantinople
Black Sea
Caspian Sea
Aral Sea
Lake Balkash
Lake Baikal
Lake Tanganyika
Lake Victoria
Lake Nyasa
Lake Tsing Hai
Lake Lop Nor
Lake Tali
Lake Dianchi
Lake Erhai
Lake Kokonor
Lake Tsaidam
Lake Tengri Nor
Lake Yamdok
Lake Manasarowar
Lake Rakastal
Lake Chilka
Lake Pulicat
Lake Kolleru
Lake Tonle Sap
Lake Inle
Lake Toba
Lake Singkarak
Lake Maninjau
Lake Ranau
Lake Laguna de Bay
Lake Taal
Lake Lanao
Lake Buhi
Lake Mainit
Lake Bunaken
Lake Poso
Lake Matana
Lake Limboto
Lake Tondano
Lake Sentani
Lake Rudolf
Lake Albert
Lake Edward
Lake Kivu
Lake Tanganyika
Lake Nyasa
Lake Bangweulu
Lake Mweru
Lake Ngami
Lake Chad
Lake Tchad
Lake Victoria
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Lake Edward
Lake Kivu
Lake Tanganyika
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Lake Bangweulu
Lake Mweru
Lake Ngami
Lake Chad
Lake Tchad

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Naran Bulak
Makotu
Fuoring
Kara-manchar
Mubulun
Sergsen
Baiu-belki
Tsaganlugurik
Ingir
Khailastal
Kobdo
Orta
Parin
Kulsu
Kotton
Mingan
Sudjil
Deloonor
Tsaganbulak
Kukuchoton
Galgan
Suenwa
Kuisiu
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Fuchau
Liao Shan
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Canton
Swatow
Amoy
Foochau
Wenchau
Ningpo
Hangchau
Shaoking
Yochau
Kuchau
Taichau
Changte
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Yochau
Chinchau
Yuenchau
Kienchang
Kienning
Yenping
Namkuan
Funing
Lienkiang
Haitan I.
Tingchau
Hingchau
Ouping
Tsaochau
Chaochau
Kwangtung
Kwangsi
Nanning
Taiping
Lienchau
Pakhoi
Bacchan
Leichau
Kwangchau-wan (Fr.)
Gulf of Tonkin
Hainan Str.
Nightingale I.
Hainan
Kiung-chau
Wanchau
Yaichau
Dong-hui
China Sea
Hongkong
Breaker Pt.
Chuenpi Pt.
Lyemun Pt.
Hongkong (Br.)
Kowloon
Namoa
Anping
Takau
Taiwan (Formosa)
Tainan
Mt. Morrison
Formosa Str.
Pescadores
Kelung Har.
South C.
Botel Tobago Shima
Bashee Channel
Bashee Is.
Balintang Channel
Babuyan Is.
C. Engano
Luzon
Philippine Islands
Tuguegarao
Vigan
Lingayen B.
Philippine Sea
Pacific Ocean
Tropic of Cancer
Miako I.
Ishigaki I.
Nihijo I.
Rasa I.
Albrecjos I.
Okinawa Shima
Borodino Is
Oho Shima
Toku I.
Erabi I.
Linschoten Is.
Yarasu Shima
Kazuno Shima
Tanega Shima
Yen Dienen Str.
Kagoshima
Kiushiu
Nagasaki
Shikoku
Sika
Bungo Chan.
Tsu-shima
Quelpart I.
Cheju
Mokpo
Kangju
Korea Str.
Yellow Sea
Kiauchau B.
Kiauchau
Tsingtau
Chefu
Shantung Prom.
Weihaiwei (Br.)
Clifford Is.
Kunsan
Chinju
Naju
Fusan
Korea
Seoul
Jinsen
Chemulpo
Thalan
Kongju
Pingchen
Haijo
Port Adams
Dalny (Korea Bay)
Talienwan
Port Arthur (Jap.)
Liaotung Pen.
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Kuinanko
Bekiri
Jugatu
Hosho
Giyues
Petuna
Kirin
Ninguta
Vladivostok
Olga B.
Sea of Okhotsk
Nikolaievsk
Amur R.
Ussuri R.
Khabarovka
Constantinovka
Alexandrovsk
Gulf of Tartary
Sea of Japan
Broughton B.
Wonsan
C. Duroch
C. Rouge
Kirisiu
Fusan
Gensan
Tongchuen
Yenchar
Matsuyama
Hamada
Osaka
Hiogo
Kumamoto
Dagelet I. (Matsu-shima)
Oki Is.
C. Itsoumo
C. Kosakof
C. Bruat
Slongchin
Sanchul
Wiwen
Pepi
Shan Mts.
Sanchoi
Kirin

soil and potential resources, but colder by 10° to 20° than the corresponding latitudes of New England. These outlying dependencies, with their snow mountains and half-desert plateaus, gave China the buffer territory desired, shutting it off from the rest of the world on the land side. They supply only a little over 4 per cent of the population and a mere trifle of the total products of the country, but, in area, they are two-thirds of it.

China Proper. This is the compact, roughly quadrangular area forming the southeastern third of the country, extending from the coast (some 2500 miles in length) westward to the lofty and crowded mountain ranges that form the eastern border of the Tibetan plateau, and northward to the southern border of Mongolia. The only artificial boundary is the comparatively short one between China and Tongking. The total area of China proper is estimated at about 1,532,420 square miles, or about one-third of that of the whole Republic, and within this area is included all but 3 or 4 per cent of the total population of the Chinese Republic. The whole circuit of the land frontier (about 4000 miles) consists of almost impassable mountains and deserts, which from remote antiquity have effectually cut off this corner of the world from interchange of people, products, and ideas with other regions and races; from this physical isolation have arisen most of the peculiarities characteristic of Chinese civilization and manner of thought. The vast mountains and plateaus between China and Tibet cover a wide area, and send many spurs eastward and southward, especially into north-central China, where the Kun-lun is prolonged eastward in two lines, which diminish to hills towards the coast, but rise again in the Shan-tung peninsula. Similarly, the Himalayas are continued across the southern part of China in reduced and broken lines of elevation, and this prolongation then sweeps northward in the prominent range which reaches from Canton to Ning-po, outside of which is the coast region of Kuang-tung and Fu-kien. Southwestward of all lie the heights that form the northern backbone of Indo-China.

These primary east-and-west lines of mountains divide China into three great valleys. The southernmost, south of the Himalayan extensions, is that of the Si-kiang, which drains the two Kuang provinces into the sea at Macao. North of its watershed, and dividing China proper into two very nearly equal portions, lies the valley of the Yang-tse-kiang, which is the most densely populated, highly cultivated, and important part of the whole country. This mighty river, exceeding 3000 miles in length, originates in central Tibet and flows through hundreds of miles of self-eroded mountain valley, leading first eastward, then southward to northern Yün-nan, then northeastward through the cañons of the Province of Sze-chuan, until it finally reaches the plains and traverses them to the Yellow Sea. It has many names, but all recognize it as Ta-kiang, 'great river.' As far up as Hankow-Wu-chang (680 miles) it may be navigated by ocean steamers; still farther, 363 miles up to Ichang, by smaller vessels. There the gorges begin, and further navigation is by hand boats, which can scarcely be hauled at high water. Yet navigation is being effected by small steamers as far as Chungking and beyond to the boundary of Yün-nan. Like all snow-fed rivers, the Yang-tse-kiang is subject to sudden floods, which often amount to 50 feet as far down as Hankow; a resultant compensation, however, is the constant renewal of fertility to the flooded lands, which enables them to be incessantly cultivated by a dense population. The largest lowland tributary of the Yang-tse-kiang is the Han, which drains the interior valley of the double Kun-lun extension.

North of the watershed of the Yang-tse-kiang, occupying the northern quarter or third of all China, is the vast basin of the Huang-ho, or 'Yellow River,' a river hardly inferior to the Yang-tse-kiang in size though not in economic importance. It also forces its way out from its lofty Tibetan birthplace through hundreds of miles of mountain gorges, makes a long detour to the north, then flows for a great distance due south, after which it turns abruptly to the east, and finally flows due northeast to the Gulf of Pe-chi-li. Down this vast stream come floods from the melting of snows or from sudden storms in the mountains along its upper course; and, as the river is constantly shallowed by silt, the inundations are frequently so overwhelming, in spite of marvelous protective works, that thousands of lives are lost, and sometimes widespread famine follows the desolation of the land. The river has changed its lower course 11 times in 25 centuries.

On the whole, China is very mountainous, so that about half of the country, including much of the western half, is not available for tillage, except in the valleys and on mountain slopes, many of which the Chinese terrace and cultivate to a high altitude. There are only two great low-lying plains, both of them in the east, in the basins of the lower and middle Huang and Yang-tse rivers and coastal streams mostly to the north of the Yang-tse. Nowhere else is population so dense as on these plains, excepting in the Province of Shan-tung. The larger plain extends north and south, from the Gulf of Hang-chow, south of Shanghai, to the mountains north of Peking, 700 miles in length, with a maximum width near the latitude of the Yang-tse mouth of 400 miles. It extends everywhere to the sea, excepting among the mountains of Shan-tung. The smaller plain is that of the middle Yang-tse and lower Han and comprises only about 20,000 square miles. It is connected with the lower Yang-tse by a plainlike valley. Subordinate drainage basins of less extent are those of the Pei-ho, in Pe-chi-li; the Huai-ho, in Ho-nan, consumed in irrigation works; and the small coast streams cut off from the Yang-tse-kiang basin by the coast range that runs from Hong-kong to Ning-po. The coast is broken with many bays and gulfs and a number of fairly good harbors. On the north is the Gulf of Pe-chi-li, with its arm, Liao-tung Gulf. South of the mountainous Shan-tung peninsula is the Yellow Sea, and in the south coast is the Gulf of Tong-king. Of islands, the largest is Hainan, off the south coast.

Nearly all the lakes are in two groups on both sides of the Yang-tse River. The upper group (400 to 700 miles up the river) are gradually silting up, but in flood time they extend far beyond their borders and cover the cultivated fields. The lower group (to the north and south of the Yang-tse mouth) are shallow. Several of them are important as feeders for the Grand Canal. The largest lake, Tung-tien-hu, is fabled to be the cradle of the aboriginal kings. Po-yang-hu, 90 miles long, is famous for its artificial floating islands. The Grand Canal, running from Hangchow to Tientsin, but practically

serviceable through its feeders from Nanking to Peking, was formerly the route of the great fleet of vessels bearing the tribute of rice to the capital. Artificial rivers and canals greatly aid navigation in China.

The Great Wall. The Chinese rarely use stone for architectural purposes, except in commemorative arches and bridges, and chiefly for trimming or paving; they are much given to the use of brick. The great wall is surfaced with brick. This wall, one of the most stupendous works ever conceived and executed by man, was primarily erected towards the close of the third century B.C., in sign of the destruction of the feudal system in China, and of the unification of the many provinces into an empire by Shi-Hwang-ti, i.e., 'first' Emperor of the Ts'in dynasty. It has been preserved and extended through many reigns with the futile idea of keeping back the Tatars. About the year 1547, under the Ming dynasty, its length was increased by about 300 miles. At the present time it is, along large parts of its course, little more than a mass of débris. It is 25 feet thick at the base and 15 feet at the top, with towers at intervals of about 100 yards. It is over 1500 miles long, stretching over high hills and very deep valleys and across rivers. Beginning at the western frontier of Kiang-su, it follows the general eastward trend of the mountains, making great bends north and south. In Shan-si it has a long loop embracing over half the province and forming double walls many miles apart. It reaches the sea at Shan-hai-kwan.

Climate. China lies mainly in the north temperate zone, the extreme southern portion only being within the tropics. Lying on the eastern side of the Continent, with most of its area within the region of the prevailing westerly winds, it has a continental climate, with considerable range of temperature throughout the year, except upon the immediate seacoast. The mean annual temperature at Peking, in the north, is 51°; at Canton, in the south, 69°. At Peking the monthly range of temperature is from 79° in July to 23° in January, while at Canton the corresponding figures are 82° and 55°. The temperatures at Canton are greatly modified by the monsoon winds, to which the south coast is exposed. Inland the range of temperature is much greater. On the whole, the climate shares the extreme character of all continental east coasts, i.e., it is cold and rough in the winter and excessively hot in the summer.

The rainfall is greatest on the south coast, where it often exceeds 100 inches annually, and diminishes northward. At Hongkong it is 90 inches, at Peking 24 inches. It is greatest on the coast and diminishes inland over the inhabited areas, though it is in most parts of China and in most years sufficient for the needs of agriculture; still, disastrous local droughts have occurred, causing famines. The coincidence of most of the rains with the summer months enables parts of north China to grow cotton, sugar cane, and other products that are usually confined to warmer latitudes.

Flora. Tea, rice, the mulberry, and bamboo are the four most valuable vegetable products—the first for drinking (not usually taken at meals), the second for food, the third for the production of silk, and the fourth for the construction of habitations and implements. The vast area and climatic conditions of China allow a wonderful variety both of natural products and of products grown by man. Northern China is remarkably bare of trees, shrubs, or herbage, except shade and fruit trees, crops, and, on steep hillsides, strong-rooted grass. This is the work of man, who has destroyed vegetation in supplying individual need. The tallow, varnish, and camphor trees, pine and banyan, cypress and mulberry, flourish. The mulberry is cultivated by the millions, but rather as a bush, and almost wholly for its leaf, which is the food of silkworms. In the south the coconut and other kinds of palm, with the subtropical fruits and nuts, are numerous. Among the fruits, those of the Occidental genera prevail in the north, such as apples, pears, grapes, peaches, many excellent varieties having been introduced from America. In the south the oranges, pineapples, pomeloes, mangoes, li-chi, bananas, and many fruits of native growth without European common names, enable most of the inhabitants to enjoy fruit throughout the year. The bamboo, of which over 60 varieties have been described, is of all sizes, furnishing not only its young sprouts as food, but serving numberless purposes. What iron is to the American, bamboo is to the Chinese. It is used in the building trades, in the decorative arts, and in the manufacture of furniture and utensils and also of paper. It plays an important part in pharmacy. It furnishes themes for Chinese poets. "Order used to be maintained throughout the whole Empire by it, and a sprig of it is borne in the van of the funeral procession." Many plants now common in the West, such as camellias, azaleas, and gardenias, are natives of China; on the other hand, quite a number of cultural plants have been imported into China from abroad, such as the jasmine shrub and the henna plant, brought to Canton by Western traders during the early centuries of our era.

Fauna. The vast tracts of sparsely inhabited country, and the wide variations of elevation and climate, cause considerable differentiation in the fauna. Tigers, panthers, leopards, wild cats, civet cats, tree civets, and martens, black and brown bears, 20 species of bats, several varieties of monkeys, wolves, foxes, antelopes, deer of 11 kinds, including three of the musk deer, and, in Yün-nan Province, the elephant, rhinoceros, and tapir, are some of the wild animals. The water buffalo, cattle and horses (few in number), sheep and goats, mules and donkeys, pigs, weasels, otters, badgers, stoats, sea otters, moles, muskrats, hedgehogs, hares and rabbits, 12 kinds of squirrels, and 25 species of rats and mice are known. The lists of Swinhoe and David contain 200 species of mammalia. Sea food is so abundant that in Macao one may have a different kind of fish for breakfast every morning in the year, it is said. Porpoises, fin whales, eels, sharks, and sturgeons are numerous off the coasts; and alligators, snakes, frogs, and tortoises abound. Of birds, over 700 species have already been described. The entomology has been very little studied. Locusts in swarms often do great damage, and scorpions, the mantis or "praying beetle," centipedes, fireflies, and beetles are found everywhere.

Geology and Mineral Resources. Our knowledge of the geology of China is still based largely upon the wide researches of Pumpelly and Von Richthofen, supplemented recently by those of other explorers, such as Bailey Willis, and especially by mining and railroad engineers. The prolongations in China of the Kun-lun

Range are almost wholly composed of granites, gneisses, and other crystalline and some eruptive rocks, and approximately mark the boundary between very distinct formations to the north and south of them. To the south the predominating formation is a vast area of Jurassic strata, including all the Red Basin of Sze-chuan which, with irrigation, has been made the most productive part of China; carboniferous limestone is also conspicuous in the south. To the north the prevailing rocks were said by Von Richthofen to be carboniferous limestone, but the fossils discovered by Bailey Willis have proven it to be limestone of Ordovician age. This geologist also discovered on the Yang-tse, as far south as the latitude of New Orleans, a large body of Glacial deposits of Cambrian age. This demonstrates the existence of Glacial conditions in a very low latitude in the early Paleozoic. His observations also show that the history of mountains in North America and China run closely parallel in time, in manner of development, and in resulting features of relief. The recent studies of specialists in western Asia and central Europe extend the same generalization to those regions, and this is a point of prime interest in the comparative geology of the continents.

One of the problems of China's geology has been the extensive and thick mantle of yellow earth with fine texture and vertical structure to which Von Richthofen gave the name of loess. It spreads over a vast area in east China, especially in Shen-si, Shan-si, Ho-nan, and Hu-peh, and even extends in small areas to the south of the Yang-tse. It forms a remarkably fertile and friable soil, so porous however that much rain is required to keep it in good condition for cultivation. Many of the beds are hundreds of feet in thickness, and great quantities of it are carried by the Huang-ho and other rivers to the ocean, tinting its waters; hence the name of the Yellow Sea. Von Richthofen maintained the theory that the material is wind-carried dust from the deserts of Central Asia. Later students, in view of the enormous mass of the loess, incline to the opinion that both rivers and winds contributed to the deposits. Rock débris borne to the sea is adding to the eastern land area.

The mineral resources of China are enormous, and the most important is coal. Such researches as have been made since Von Richthofen only confirm his judgment as to the vast extent and richness of these fields. Those in eastern Shan-si and southern Hu-nan stand out above all others in richness. The Shan-si anthracite field has an area of about 13,500 square miles with seams up to 40 feet and everywhere at least 15 feet in thickness, the fuel being equal to the best Pennsylvania anthracite. The western half of this province is nearly as rich in bituminous coal. Southeastern Hu-nan is one great coal field, but in about one-half of the area, which is 22,000 square miles in extent, the coal is buried too deep to be mined. Sze-chuan, Kan-su, Pe-chi-li, and Shan-tung are the other provinces that are especially rich in coal. Iron ores are also widely diffused, but only ores that may be easily smelted by native methods are as yet utilized. Such ores exist in great abundance throughout the Shan-si coal fields, and the fact that coal and iron are near together in three of the mining regions of Manchuria gave rise to the iron industry of that country. Iron ores are sparsely distributed, however, in the coal regions of Hu-nan. Considerable gold is washed out of the sands and gravels of many streams in the Red Basin of Sze-chuan, and copper is mined in the same region for minting the current coin of the realm. The tin mines of Yün-nan are confined to an area of about 10 square miles west of Meng-tse. Silver, lead, zinc, and salt are among other minerals and metals.

Agriculture. China is essentially an agricultural country, the bulk of the people being tillers of the soil. Agriculture is held in the highest honor, the farmer ranking, in theory at least, next to the scholar, and before the merchant and artisan, in the four classifications of the people. With solemn ceremonies the Emperor, in the Temple of Agriculture in Peking, annually used to inaugurate the farming season at the spring equinox. China has a more equal distribution of land than any European or American nation, estates of a few thousand acres being rather rare, and a plot of 10 acres being considered a good-sized farm. Nominally the land belongs to the government, and as a matter of actual practice a man's title to his land ceases as soon as he fails to cultivate it. Owing to the great congestion of population, extremely small subdivisions of acreage are the rule. However, as it results in a highly intensive method of cultivation, it is by no means an unmixed evil, for the land is cultivated with a care and an intelligence unrivaled in the world. The system of rotation of crops has been adopted since time immemorial, and such a high appreciation is shown of the value of fertilizers that no part of the animal and vegetable refuse is wasted. Not satisfied with cultivating every inch of fertile land, the Chinese proceed with wonderful patience and endurance to create artificial fields wherever they can find place for a layer of soil. Thus, it is a matter of common occurrence to meet in Chinese waters floating fields consisting of large rafts covered with earth. Another and more important extension of arable land is by means of the so-called terrace fields, which are formed by covering the mountain slopes with fertile soil. Even the shifting sand fields are gradually converted into rich ground. The implements of the Chinese are crude and clumsy. They cannot buy expensive farm machinery, for their holdings are too small. Irrigation is highly developed, and the country is covered with canals and ditches—even the terrace fields on the mountain slopes have abundant water.

The chief agricultural products of China are grain, cotton, and tea. Of grain, rice is the most important staple, and is raised largely in the middle and southern parts. In the north wheat, corn, buckwheat, oats, and a little rice are produced. Tea is grown mostly in the south, although its cultivation is carried as far north as lat. 31° N. It is planted, as a rule, on the mountain sides sloping to the south, and in soil composed mainly of loam. The tea bushes yield three crops a year—April, July, and August. (For further details, see TEA.) Cotton is raised as far north as the Province of Shan-si, but only in the low valleys here. The provinces in which it is considerably grown are Shen-si, Kiang-su, An-hwei, Che-kiang, Hu-peh, Kiang-si, Hu-nan, and Kuang-si. Tobacco is cultivated throughout China, and the opium-smoking habit, though now suppressed by government, may yet call for the cultivation of the poppy here and there. By an Imperial decree of 1908 the plantation of poppy was to have been eradicated by the year 1915. Cane sugar is successfully produced in four

southern provinces—Che-kiang, Fu-kien, Kiang-si, and Kuang-tung; indigo in Che-kiang and Kiang-si; and hemp in two middle provinces—Hu-nan and Shen-si. The silkworm culture centres in the Province of Kiang-su and in the delta lands south of Canton City. The vegetables include carrots, peas, cabbage, pepper, garlic, and beans. Stock breeding claims little attention. Milk, butter, and cheese are practically unknown, and eggs, fish, and game are considered more important than the flesh of domestic animals.

Manufactures. The Western world is under a great debt to China for many inventions which have been brought to Europe and there improved. For many centuries the Chinese alone had silk, paper, jade, porcelain, the art of printing, the magnetic needle, and gunpowder. They excel in whatever requires patience and routine skill. For political reasons, western machinery was formerly discouraged, but is now being rapidly applied. Materials used are silk, cotton, linen, bamboo, clay, and wood. Printing by means of wooden blocks and also by movable type was known in China from an early age, and many books thus made and still extant are older than the time of Gutenberg and Koster. However, the invention of movable type, so strikingly useful in a system having but 26 phonetic letters, is of far less value when tens of thousands of characters are used. The making of porcelain goes back to about the year 600 A.D., though the question of its discovery depends, of course, largely on the definition of the term "porcelain" in the technical sense. Their weaving, embroidery, engraving on wood, stone, and metal, fine gold and silver work, ivory carving, lacquer ware, and bronze casting are worthy of high admiration. Foreign methods and machinery have been introduced, and native spinning, weaving, and flour mills, ironworks producing rifles, cannon, steel rails, and other iron and steel products, match factories, and some other industries conducted on Japanese or Western lines are making progress. Most of these establishments are under the supervision of foreigners.

Transportation and Communication. There are many roads throughout the well-settled parts of China, but they are in bad repair and are almost impassable for wheeled vehicles; but broad macadamized roads have been constructed in the larger towns, where land was available. The navigable rivers furnish many avenues of commerce, and these, with canals, carts, wheelbarrows, and porters, carry a vast volume of trade. The railway question may be said to be the pivotal matter of Chinese economic and political life. Great strides have been made, although lack of funds has been and still is an impediment in carrying out the several plans. The immense extent of territory and the wretched condition of Chinese highroads combine to hinder commercial intercourse between the various parts of the country. Heroic sacrifices are being made to improve the highways and to complete a series of trunk and subsidiary lines connecting the chief towns and ports. Railways were introduced as concessions to rival foreign claims for trading privileges; but, as the necessary capital and experts are lacking in China, the subject of railroads has become a politico-diplomatic matter, each Power endeavoring to secure concessions for what are expected to be the most profitable roads, as well as for such as may have strategic value should a partition of China or a conflict of foreign powers in her territory eventually take place. Railway building in China is in its infancy; but some of the lines that will become main trunk roads have not only been mapped out, but actually surveyed, and all preliminary steps, such as securing government concessions and financial backing, have been taken.

Mr. Liang Tun-yen, who studied at Yale University, was placed, in May, 1914, in charge of China's railways as Minister of Communications. He set about developing the plan prepared for Dr. Sun Yat-sen by several American experts. At the end of 1912, with 5886 miles of railway in operation, China proper had 0.3 mile of line to every 100 square miles. This is very little, but progressive, and China will soon have a respectable net of lines, if funds required are obtainable.

Railroads would have been introduced long ago if it had not been for the hostility of the Chinese government. The first railroad, built in 1876 between Shanghai and Wu-sung, was thronged by the people, but in a year was bought and destroyed by the authorities. The next line was from the Kaiping collieries, northeast of Tientsin, to navigable water, and this was followed, in 1897, by a line 73 miles long from Tientsin to Peking, which was so successful that it was soon double-tracked. The expected has happened. It is not only that railroads are a part of the new government policy of development, but also that existing lines have been object lessons to the nation, and their advantages have been so conspicuously demonstrated that regions which do not yet possess them are beginning to demand them. The Chinese themselves are eager to participate more largely in the building and ownership of railroads. As it is, the Chinese government is closely in touch with all railroad enterprises and projects. All the companies are subject to the regulations imposed by the Department of Railroads, forming under the Republic the first division of the Ministry of Communications; no road can be built except on the authority of a government concession, and concessions are withdrawn if development does not go forward as stipulated. Many concessions have been granted, and the building of railroads is in progress in many parts of the country. Most of the detailed information on the geography of large parts of China has come from foreign engineers who have been looking for favorable railroad routes. Thus the Americans, under Mr. Parsons, made a distinct contribution to our knowledge of the largely unknown Province of Hu-nan while selecting a route from Hankow to Canton; and the British have surveyed most of the country to the east of Sze-chuan in seeking a favorable route through the mountains by which this rich region may be tapped. The aims chiefly in view are to construct trunk lines like that from Peking to Canton, now partly completed; to build feeders from these trunk lines, especially to the coal and iron fields, so that their commodities may be cheaply moved; and to construct lines from the leading ports to interior cities that are great collectors and distributors of commerce in the regions around them. The Chinese railroads that were in operation, being constructed, or were still merely projected in 1912, may here be briefly noticed. In all there were in 1912 about 5886 miles of road in operation and 2300 additional under construction.

The railways of China may be more or less accurately divided as between government railways, railways constructed under foreign concessions, and provincial railways. The government railways are financed in various ways—some through loans by the government and some through loans by private parties. The following are the principal government railways.

The Canton-Hankow has in operation 209 miles of main line and 32 miles of branch lines on what is known as the Kuang-tung section and 560 miles of main line and 65 miles of branch lines, part of which is open for traffic and part still under construction in 1912 on the Hupeh-Hunan section. The Kuang-tung section was built under the direction of a Chinese engineer, Jeme Tien-yu. The Hupeh-Hunan section is being built under the direction of a British engineer, A. H. Collinson. The gauge of both sections is 4 feet, 8½ inches. The Kuang-tung section is being built by a Chinese company with a nominal capital of $40,000, of which it is understood the paid-in part has been subscribed for in China, largely in Canton. The Hupeh-Hunan section is being financed by a foreign loan from British bankers, amounting to about £6,000,000.

The Peking-Hankow, which was begun in 1898, was opened for traffic in December, 1905. The gauge is 4 feet, 8½ inches, and the main-line mileage 755 miles, with 62 miles of branch lines. The engineer in charge of construction was a Belgian, Jean Jadot. The cost of construction is estimated to be about $87,960,000, and the capital was raised largely in France and Belgium, there being, however, a £500,000 loan by British and French bankers jointly. In 1911 the company earned gross $11,311,536, and its expenses, presumably exclusive of any interest charges, amounted to $3,642,043. The remarkably low operating ratio is worthy of attention. The total tonnage of freight carried in 1911 amounted to 1,854,370, and the total number of passengers carried, 2,147,586. There is no available data to show what the average length of haul for freight or the average length of passenger journey was, but the receipts from freight amounted to $7,657,559 and from passengers $3,653,977. Even if the average haul of freight were 200 miles, which would be an unusually long average haul for an 800-mile road, the total ton mileage would be 371,000,000, and if the passenger journey averaged 100 miles, which again is taking an extremely long average, the total passenger mileage would amount to 214,800,000, and under this assumption the average receipts per ton per mile would be two cents, and per passenger per mile 1.7 cents. It will be seen that while the ton-mile receipts look very high as compared with American or European freight rates, the receipts per passenger per mile are correspondingly low. With the very low rate of wages in China it is not therefore surprising that the operating ratio should be so very much better than that shown on either American, English, or European roads.

The Shanghai-Nanking is probably the best-built railroad in China. It was begun in 1904, and the first 80 miles were open for operation in July, 1906. The last section from Chinkiang to Nanking was opened in April, 1908. The total mileage operated is 203 miles. Fifty-four miles are double track. The gauge is 4 feet, 8½ inches, and many of the cars and some of the locomotives were ordered from the United States. The road was built largely through British loans, and expenditure for materials and supplies was under the supervision of English engineers. The road runs over a nearly level country, but is the most expensive in China; its construction cost was about $50,000 per mile. In 1911 the company earned $2,251,072, and the expenses for that year amounted to $1,490,186. The great bulk of the business done is passenger business. The total number of passengers carried in 1911 was 4,672,335; the tonnage of freight carried exclusive of live stock was 314,516 tons. Passenger fares per mile on this road are about 2 cents, first class, 1 cent, second class, and ½ cent, third class. There is a fourth-class rate for coolies, averaging about ⅓ cent per mile. Approximately 95 per cent of the total passenger business is third class.

The Peking-Kalgan was begun in 1905, and, in 1913, 218 miles were in operation and about 140 miles projected but not completed. Taotai Jeme Tien-yu was the engineer in charge of construction. He was a graduate of Yale University of the class of 1883. The line was built very cheaply, and Chinese newspapers generally base their plea for having Chinese railroads built without the supervision of foreigners on the very much lower cost of the work done in this way, contrasting the cost of the Shanghai-Nanking with the Peking-Kalgan. The capital for building the road was largely the surplus earnings of the Peking-Mukden. The road runs over the Nankou Pass; this part of the line represents the most difficult railroad construction in China. Trains are broken up into two sections, and at one place on the line a switchback is employed. Passenger trains are taken over the pass with Mallet locomotives, and freight trains with the American-geared Shay locomotives, such as are used on the coal branches in West Virginia on the Chesapeake and Ohio Railway.

The Kiangsu-Chekiang, about 78 miles long, was begun in 1904 and was opened for operation in 1906. The line was built entirely with Chinese capital and has $10,000,000 which was subscribed by about 53,000 stockholders. Some idea of labor costs on Chinese railways may be had from the fact that an engineman's wages on the Kiangsu-Chekiang are from $28 to $37 per month, and station labor is paid from $8.50 to $16 per month.

The Tientsin-Pukow was built in two sections. The northern section, about 455 miles, which is known as the German section—a German engineer was in charge of the specifications for material, etc.—was begun in 1908, and various subsections were opened at different times in 1910, 1911, and 1912. The southern (British section) will be about 236 miles long when completed, and a part of the line was opened for traffic in 1912. The Revolution had very much hampered the completion of this line, but the country traveled is one in which a large amount of freight traffic originates, most of which now goes by the Grand Canal.

The principal foreign concessionary railroads in China are the Chinese Eastern, the South Manchuria, the Shantung, and the Yün-nan.

The Chinese Eastern was begun in 1897 with Russian capital, and the engineer in charge of the construction was a Russian, M. Turgovitch. There are in operation about 1078 miles of road, which is of 5-foot gauge. The line was opened

for operation in 1901, and after the Russo-Japanese War the southern portion, from Kuanchengtze to Tairen, was turned over by the Russians to the Japanese. The road carried, in 1910, 1,362,644 passengers and 1,141,200 tons of freight.

The South Manchuria Railway was opened for operation in 1907. A part of the road, as mentioned above, had been begun by the Russians and was ceded to Japan under the Treaty of Portsmouth. The gauge was changed to 4 feet, 8½ inches. In the year ended March 31, 1912, the road carried 3,158,270 passengers and 4,705,690 tons of freight.

The Shantung was built with German capital, is about 256 miles long, and began operation in 1904. The Yün-nan was built with French capital, is meter gauge, and was opened for operation in 1910. It is part of the Chemins de fer de l'Indo-Chine et du Yün-nan, of which about 289 miles are in China.

Early in 1914 it was reported that the Chinese government had granted to Japan the right to build about 1250 miles of railway in Manchuria. The several lines included are as follows: Ssupingkai to Taonaufu, about 190 miles; Changchun to Taonaufu, about 150 miles; Taonaufu to Jehol, about 454 miles, or to Hulutao, about 364 miles; Kaiyuan to Kirin via Hailungcheng, about 220 miles, and from Kirin to the Korean frontier, about 212 miles. It is said that the construction work will be done by the South Manchuria Railway, with whose lines the proposed ones will be connected. The first line to be constructed will be that between Ssupingkai and Taonaufu. At the present time the existing highway between these two points is 230 miles long. The railway will be but 190 miles in length. The estimated cost is about $4,980,000, or $25,896 per mile. There will be no great engineering difficulties or unusually expensive construction work, with the exception of a bridge across the Liao River. Japan will probably have to negotiate a foreign loan for this work, and it is supposed that, if a loan of $9,960,000 can be negotiated under favorable conditions, the line between Kaiyuan and Hailungcheng will also be undertaken in 1914. The purchase of such materials as will be required from abroad will be made at Dairen, where the South Manchuria has its general offices.

An Imperial edict of May 9, 1911, ordered that all trunk lines under construction or projecting in China were to be taken over by the government, and branch railways were to be built by local interest or presumably provincial governments. This order was one of the contributing causes of the Chinese Revolution. Dr. Sun Yat-sen, after he resigned as President, made a study of China's railway needs and recommended the building of three main trunk lines: (1) from Hainan through the provinces of Kuang-tung, Kuang-si, Kuei-chow, and Sze-chuan to Tibet; (2) from Shanghai through Kiang-su, An-hwei, Honan, Shen-si, Kan-su, and Sinkiang to Ili; (3) from Chinwangtao in the gulf of Chihli through the peninsula of Liaotung and through Mongolia to Urianghai. The National Railway Union, which met in Peking to consider Dr. Sun's proposals, recommended that No. 1 be extended westward to Constantinople, and that No. 3 should be a trunk line connecting Peking with Tomsk in Siberia. This work was to be done by granting concessions to foreign syndicates for the construction and operation of the roads for 40 years, at the end of which time the roads were to revert to the Chinese government. Dr. Sun is now engaged in trying to interest foreign countries in these proposals and in getting the necessary concessions from railroads and companies who already have franchises for parts of the routes covered in his proposals.

In 1908 the government took over all telegraph lines in China. There are in operation in China about 36,339 miles of telegraph lines (1912) and about 102 miles of underground cables. There are about 561 telegraph stations. On June 1, 1912, a uniform charge for telegrams (in a foreign language) was adopted at the rate of 9 cents per word for all places in the same province and 18 cents per word from stations in one province to stations in any other; and 6 cents and 12 cents respectively for telegrams in Chinese.

The Chinese postal service, which had originated from a side department of the Maritime Customs under Sir Robert Hart, was in May, 1911, transferred to the new Ministry of Posts and Communications, where it now forms a special department under a Chinese and a French director. Although the unsettled state of affairs in China has somewhat interfered with the regularity of its working, the new service justifies all the hopes placed in it. At the beginning of 1912 more than 6000 postal establishments were in existence, and the statistics of articles dealt with show most noteworthy increases. The service is being gradually extended to Chinese Turkestan and Tibet.

Commerce. Commercial relations between China and foreign countries have existed ever since the great expedition to western Asia of the general Chang K'ién at the end of the second century B.C., when the markets of Central Asia and the countries of the Mediterranean began to exchange their products against Chinese silk, skins, and iron. This trade was carried on by caravans through Eastern Turkestan to about the middle of the second century A.D., when ocean trade connections were added with a city called Cattigara, probably on or near the coast of Tungking, as the terminus of western navigation. It appears that Syrians and Indians were the principal traders in that period. They were followed by Persians of the Khalif Empire, who monopolized Oriental trade up to the fifteenth century, when the Portuguese arrived in India via the Cape of Good Hope. Trade was during this period carried on under the name of "tribute," the Chinese court receiving and trading in tribute goods, for which counter gifts were bestowed. That these counter gifts were equivalents encouraging regular traffic may be concluded from the continuous tribute missions arriving from Arabia, India, and other foreign countries as registered in Chinese records. The Portuguese established a trading port in China as early as 1522, and trade was thenceforth carried on almost without interruption by them and the Dutch, the English, and the Americans; but these secular relations lacked stability and safety, owing to the refusal of the Chinese government to grant suitable protection and to its avowed hostility to foreigners. Only since 1842, the year of the conclusion of the Treaty of Nanking, which followed the so-called Opium War with England, has commerce enjoyed the official sanction of the Chinese government in specially designated ports. The number of these ports steadily increased as one or another European power succeeded in wringing concessions from China. At the end of 1912

trade in foreign bottoms and under foreign treaty regulations was carried on in 48 different ports and stations. The more important ones are enumerated below, together with the estimated gross values with which they participate in the total trade of China.

PLACE	GROSS VALUE OF THE TRADE		
	1905	1911	1912
Newchwang	$34,428,000	$42,981,420	$37,274,900
Chinwangtao	14,498,000	7,031,480	6,834,640
Tientsin	59,505,000	86,237,380	75,671,920
Chefoo	23,288,000	22,622,540	21,264,640
Kiaochow	14,445,000	34,145,080	40,486,880
Chungking	18,180,000	21,562,860	19,652,540
Ichang	2,282,000	3,556,440	4,111,220
Shasi	998,000	2,179,260	4,098,120
Changsha	4,168,000	1,309,060	16,308,020
Yochow	371,000	2,557,440	4,650,900
Kiukiang	17,545,000	25,657,280	25,649,880
Wuhu	22,803,000	15,859,680	21,814,440
Nanking	7,612,000	6,706,620	9,081,280
Chinkiang	21,747,000	17,375,200	15,952,180
Shanghai	131,450,000	14,597,240	137,573,400
Shoochow	2,929,000	5,091,200	8,414,540
Hangchow	11,712,000	13,096,520	14,952,440
Ningpo	12,817,000	16,443,540	16,503,480
Wenchow	14,369,000	1,969,520	2,775,000
Santuao	1,761,000	2,128,240	2,690,160
Foochow	13,005,000	12,799,040	13,344,420
Amoy	9,918,000	15,105,620	14,453,420
Swatow	22,777,000	38,047,840	42,469,340
Canton	67,875,000	75,645,576	71,166,540
Kowloon	29,786,000	32,743,520	29,010,220
Lappa	8,125,000	13,490,200	12,750,200
Kongmoon	2,728,000	4,071,480	4,892,880
Samshui	2,921,000	4,206,900	4,567,280
Wuchow	6,865,000	7,886,920	9,084,240
Nanning	.....	3,478,740	5,205,160
Kiangchow	5,309,000	4,007,100	3,947,160
Pakhoi	2,250,000	1,819,920	1,876,640
Mengtsz	7,675,000	8,432,300	14,481,800
Tengyueh	1,344,000	1,246,160	1,854,980
Total	$495,030,000	$565,189,316	$714,864,140

The growth of China's foreign trade since the opening of the above treaty ports may be seen from the following table:

YEAR	Imports	Exports
1845	$10,277,000	$19,098,000
1875	50,496,000	51,484,000
1885	64,586,000	44,254,000
1890	94,778,000	65,358,000
1895	125,338,000	107,470,000
1896	147,891,000	98,314,000
1899	193,266,000	146,838,000
1900	154,081,000	119,246,000
1904	227,080,000	158,061,000
1905	358,128,000	182,538,000
1910	342,593,100	281,816,000
1911	348,913,000	279,230,000
1912	350,192,000	274,184,000

These figures show the unexampled increase in the trade of China in the year preceding the Boxer uprising, when both the imports and exports more than doubled in value as compared with 1890. The Russo-Japanese War did not have any important effect upon the trade of most parts of China, and commerce is still steadily increasing. As the statistical secretary of the Maritime Customs of China said some years ago, there is no reason why these figures should not treble within a comparatively short time—as soon as railway facilities shall enable the Chinese producer to dispose of his surplus products to the foreign trader. He cannot do this all at once, owing to the extremely high cost of transportation. To quote from the official report: "To form an idea of what future prospects are, it is fair to make a comparison with India. The areas of the two empires are almost identical and their products very similar. But China has a larger, a more industrious, and more intelligent population; while, on the whole, the country is probably more fertile and possesses greater mineral resources. In the former country trade is assisted by good roads, railways, and lightness or absence of taxation; in the latter, at present, it is hampered by directly opposite conditions. The result is that the exports from India are worth three times the exports from China. With equal opportunities, which the building of railways and opening of mines will bring about, the discrepancy should disappear."

As may be gathered from the following table

CHINA'S TRADE BY COUNTRIES, 1912

COUNTRIES	Imports from	Exports to	Total trade with
Great Britain	$55,393,662	$11,765,260	$67,158,700
Hongkong (mostly British products	109,372,740	76,504,160	185,877,640
Japan	67,352,580	40,893,880	108,246,460
Continent of Europe (except Russia)	27,729,280	59,988,840	87,718,120
United States	24,361,199	29,573,732	53,934,931
India	34,518,040	5,604,020	40,122,060
Russia	15,711,680	33,445,780	49,157,460

of the export and import trade with the leading countries in 1912, the closest rivals for the growing trade of China in order of importance are Great Britain, the continent of Europe, Japan, and the United States.

The principal imports and exports in 1912 were as follows:

LEADING IMPORTS AND EXPORTS, 1912

IMPORTS		EXPORTS	
Cotton and cotton goods	$106,625,860	Silk, raw and manufactured	$69,232,180
Metals	13,499,080	Raw cotton	1,259,554
Copper (included in above)	2,630,720	Tin	9,141,220
Railway plant	1,897,360	Hides	8,666,140
Other machinery	3,341,840	Wool	5,078,620
Kerosene oil, America	10,453,980	Hemp	2,360,600
" " Sumatra	5,086,630	Oil	10,471,000
" " Borneo	2,204,460	Matting and straw goods	8,446,360
" " Russia	608,280	Paper	2,405,000
Coal	6,032,480	Tea	2,499,720
Matches	5,168,900	Beans and bean cake	3,049,244
Opium	35,303,180	Sesame	8,854,840
Cigars and cigarettes	6,759,900	Eggs	1,753,800
Sugar	17,823,640	Cattle	2,146,000
Flour	9,393,560		
Fish	7,807,740		

Leading net imports for 1912, expressed in quantity, were as follows: cotton, raw, 279,192 piculs; cigarettes, 4,339,782,000; cigars, 38,638,000; coal, 1,516,801 tons; fish and fishery products, 1,204,893 piculs; hemp, 14,036 piculs; hides (cow and buffalo), 24,569 piculs; leather, unmanufactured, 92,711 piculs; matches, 30,090,020 gross; condensed milk, 387,253 dozen tins; kerosene oil, American, 123,441,777 gallons, Sumatra, 47,345,842 gallons, Borneo, 22,423,644 gallons, Russia, 3,975,648 gallons; flour, 3,202,501 piculs; sugar, all kinds, 4,725,279 piculs. Leading Chinese exports, 1912, in quantity, as follows: silk, raw and unmanufactured, 227,458 piculs; cotton, raw, 805,711 piculs; tea, 1,481,700 piculs; eggs, 291,705,236; beans and bean cake, 19,099,489 piculs; cattle, 77,949; pigs, 266,125; poultry, 2,403,581; hides, dressed and undressed, 7,876,612; tin, 145,227 slabs; sesame, 1,999,761 piculs (1 picul = 133⅓ pounds).

The value of American trade for the last three fiscal years was as follows:

	1910	1911	1912
Imports into U. S.	$29,990,370	$34,227,503	$29,573,732
Exports from U. S.	16,320,612	19,287,836	24,361,199

In silk China furnishes one-third of the world's supply, besides using an enormous quantity for home consumption. Tea is largely exported by land to Russia and Siberia, via Tientsin and Kiachta, and also by caravan through Mongolia. Manchuria is the great bean-producing province and had a good crop in 1912 in spite of the internal situation. Opium again showed an increase in cultivation, because the checks had been removed by the temporary disorganization of the government. On the whole, in spite of the prevailing uncertainty, the year was fairly good in trade. One advantage came in the conversion of much trade from junk to steamer for greater security, and this change will doubtless be permanent. China offers a fair field for all nations, and at present there is not much rivalry in the main for the trade. Japan holds most of the tobacco market, while the United States again has the flour trade, besides a monopoly on dried fruits, but cotton and cotton goods from America seem to be a little too fine in quality and too high in price to suit the average Chinese purse. However, the recently concluded agreement of the Standard Oil Company with the Chinese government for the exploitation of oil in partnership will tend to divert this important commodity into American channels. The prosperity of Manila under American rule has been carefully observed by the Chinese, and the United States could use this to good advantage by making Manila the distributing point for American goods and samples. Chinese trade is capable of enormous increase—in fact, beyond the bounds of imagination; but first the people must be taught to use foreign goods and to acquire a taste or a desire for them. As China's industries are as yet undeveloped, there is no danger of China competing seriously in the world market for the present, and for many years to come the Republic will be dependent upon the great trading nations, Japan, Great Britain, France, Germany, and the United States.

Shipping. The total shipping of the treaty ports, entered and cleared, in 1911, was as follows:

Flag	Tons
British	34,712,440
Japanese	19,172,727
German	6,849,069
French	3,154,157
American	712,161
Total foreign shipping	67,890,431
Chinese	17,881,542
Grand total	85,771,973

The flags sharing most in the Chinese carrying trade in 1911 were the British, with 40.47 per cent of the total; the Japanese, with 22.35 per cent; and the German, with 7.99 per cent. The United States received only 0.83 per cent, whereas in 1906 it had been 1.78 per cent. Since 1905 there has been a steady decline in the percentage of American tonnage. On the other hand, the Japanese increased from 15.01 per cent in 1906 to 22.35 per cent in 1911. The following table shows the Chinese carrying trade during the 10 years beginning with 1902 and ending with 1911:

YEAR	TOTAL SHIPPING		CHINESE SHIPPING	
	No.	Tons	No.	Tons
1902	66,498	53,990,000	26,303*	9,341,000
1903	77,012	57,290,000	30,708	9,111,000
1904	223,835*	63,775,000	146,865	14,768,000
1905	223,959	72,756,000	148,755	16,407,350
1906	208,547	75,819,888	139,304	16,186,750
1907	217,932	80,109,424	147,193	16,686,300
1908	207,605	83,991,289	136,663	16,945,860
1909	208,516	86,771,809	135,053	17,860,810
1910	219,810	88,776,689	146,075	19,597,822
1911	193,398	85,771,973	130,828	17,881,542

* This and the following include Chinese junks and tonnage.

The above figures are all the more remarkable as compared with 1894, when only 38,063 vessels entered and cleared, with 29,622,001 tons.

Government. Recent events in China not only led to the expulsion of the Manchus, but caused a revolution in government as well. While it is true that several old offices and abuses still survive, the Chinese are exhibiting a willingness to discard the customs and traditions of past centuries. Now, for the first time, China is becoming really nationalized.

China has always suggested a confederation of provinces rather than a powerfully centralized government. The vast extent of the country and the lack of communication and transportation facilities naturally led to the provinces and their viceroys and governors assuming much power without interference from Peking. Of course, the Emperor was the autocratic head of all, and his edict or command was law, but with the ordinary routine of affairs the Imperial court rarely interfered. When extraordinary matters arose, the Provincial Governor had the right to petition the Emperor directly. Between the Emperor and the provincial governors was the Viceroy. This office, like that of High Commissioner, gave scope to men of special abilities, and this explains the fact that in recent years foreigners have been familiar with the names only of two or three prominent viceroys. The viceroyalties consisted of two or three provinces, and there were thus 10 or 12 viceroys or

governors-general, who worked together with or independently of the provincial governors. Usually the Governor and the Viceroy were the sole mediums of communication between the capital and province, though the provincial Treasurer and the Provincial Judge were powerful assistants or checks, as the case may have been. Thus these four functionaries constituted the actual government of each province.

Each province had its own army and navy, and in past years may have been uninterested and may have taken no part in wars going on in distant sections of the Empire. Such was the case in the Chino-Japanese War, which was regarded by most Chinese as a personal quarrel of the Manchu court with Japan over Korea. The highest viceroyalty was that of the two Kiangs, with its seat at Nanking; the second was that of Pe-chi-li, with its seat at Peking; the third was that of the two Kwangs, with its headquarters at Canton, the other important capitals being at Fu-chow, Hang-chow, Wu-chang, Chang-sha, Yün-nan, and Ku-yang. The provinces of Shan-tung, Shan-si, and Ho-nan, the oldest parts of China, had no viceroy, while Sze-chuan had no governor, but only a viceroy. Thus each of the 18 provinces, with its own army, navy, and tax system, and its own social customs, was in the past a complete state in itself, whose corporate existence was in no way dependent upon any other state. Only in the regulation of the salt trade, the management of the navy, and occasional "Imperial" appropriations were they under Imperial control. The Peking government made no new laws, left each province to its own devices, and resembled rather the general staff of an army, absorbing and giving out, when necessity called, able men for the administration of affairs.

Although the internal situation of the provinces is changing, the administrative system is still based on the real unit of Chinese corporate life, the *hien*, or city district. Of these there are 1300 in the Republic. Each province has from 70 to 100 or more *hien*, a term which Europeans translate 'district,' 'department,' 'canton,' or 'prefecture.' Thus the half-barbarian Kwei-chow has but 34 *hien*, with numerous districts in which dwell half-civilized natives, while Pe-chi-li has 140 *hien*, the total including the Peking and Mongol districts. The *hien* always consists, in pure Chinese tracts, of a walled city and an area of 500 or 1000 square miles around the town. The *hien* magistrate is the heart and soul of all official life. The people call him "father and mother officer," for he is always close to the masses. Usually entering office with literary or scholastic qualifications only, he is assisted by a permanent staff of trained specialists. He must keep also from 30 to 300 runners, collectors, lictors, and policemen for the administration of justice.

Every group of two or more *hien* is under a *fu*, or city of the first class, and each province has from 5 to 10 *fu*. The ancient customs and privileges of each province, district, and city are still potent in practical politics and make it utterly impossible to give a uniform description of the system of administration, for in reality this federation of states and cities is much on the order of mediæval Germany. The Republic is studded with villages and hamlets, and, as in European nomenclature, many popular names for places are words denoting shop, temple, nunnery, rapids, school, inn, fair, market, bend, etc. The various Chinese districts less than provinces may be likened to the capital, cathedral town, state capital, municipality of the first rank, municipality of the second rank, abbey town, and borough of Europe, differing greatly in territory and population, however, and also in relative historical or commercial importance. But, on the whole, China is a nation of villages, three-fourths of the people dwelling in these. Relatively to the whole population there are fewer large cities in China than in Western lands.

At Peking there was the Emperor as autocrat, assisted by two councils. These were (1) the Grand Secretariat and (2) the Grand Council. The Grand Secretariat was composed of 4 members, 10 learned aids chosen from the Hanlin College, and 200 secretaries. This council deliberated on state affairs and assisted the Emperor in general. The Grand Council, or Imperial Privy Council, was composed of 5 members and 60 secretaries. This one was in recent times the more important, and consulted with the Emperor and prepared edicts for the Imperial signature.

Assisting these two councils were six administrative boards, as follows: 1. Civil Board; had jurisdiction over the mandarin, or official, classes, as to appointing them and regulating their pay, duties, promotion, etc. 2. Board of Revenue; received contributions from the provinces, also selected women for the Imperial harem. 3. Board of Rites; provided for ceremony and feast days, court dress, observances, and etiquette. Governed strictly by the "Book of Rites" (14 vols.). 4. Board of War; never of much importance in past Chinese history, as the "Book of Rites" carefully prescribed the discipline and conduct of the Imperial armies. 5. Board of Punishment; like a court of appeal, a sort of supreme court for deciding capital offenses; also formed the judicial department at Peking. 6. Board of Works; controlled everything in the nature of building, construction, sanitation, repairing highways, etc.

An additional department was created in 1861, as one of the conditions of peace with Great Britain and France. This was the famous Tsung-li Yamen, or Foreign Office, and was closely identified with the Grand Council. In the Peace Protocol of 1901, concluding the Boxer Rebellion, its name was changed to the Wai Wu Pu, now called Waichiaopu, and from then on it took rank before the above six boards. Before 1900, so little did the Chinese regard the importance of foreign affairs that to be ordered to serve on this board was looked upon as a sort of official censure or punishment.

Thus the system of government in old China was largely one of checks and balances, where all divisions were practically free to manage their own affairs, and yet where all coöperated, one with the other, when necessity so demanded.

Since the inauguration of the Republic there have been considerable changes. It is too early to say what the outcome will be, as China is in a state of transition, and some time must elapse before reconstruction assumes a permanent form.

The provisional constitution, adopted March 10, 1912, by the National Council at Nanking, proved impracticable and unworkable. Its greatest defect lay in the inadequate powers it gave to the president, but in other respects it failed to provide for the needs of govern-

ment, and it led to the trouble which arose immediately after the convocation of the first National Parliament at Peking. President Yüan Shï-k'ai found himself seriously hampered by the Kuomintang partisans, some of whom were very sincere, though visionary reformers, and others openly distrustful of Yüan. This party refused to permit the President's message to be read at the opening session and employed obstructive tactics to embarrass Yüan, such as meaningless interpellations, refusal of financial relief, and an attempt to impeach members of the cabinet. Finally Yüan Shï-k'ai's patience gave way, and he issued three mandates dissolving the Kuomintang and unseating its parliamentary members. As this threw out some 300 members, the Parliament was useless as a representative body, and on petition of the Vice President (General Li Yuan-hung), many of the *tutus* (military officers of the provinces), and other high officials, Yüan Shï-k'ai dissolved the Parliament. At the same time he created an administrative council of 71 members and announced that a new parliament really representative of the people would be summoned to meet as soon as the necessary changes could be effected in the constitution. In fulfillment of this promise, on March 18, 1914, a call was issued for a constitutional convention composed of two members from each province, four from Peking, and eight from the territories. This convention met and drew up a workable constitution, with the assistance of foreign advisers, including Dr. Frank J. Goodnow, now president of Johns Hopkins University, formerly professor of administrative law and municipal science at Columbia University, and Dr. N. Ariga, the noted European expert on government.

The new provisional constitution was promulgated May 1, 1914. It contains 68 articles and is believed to meet and overcome all the objections discovered in the document hurriedly adopted by the earlier Nanking Council. It is entitled "The Constitutional Compact of the Chung Hua Min Kuo." The following is an epitome of its provisions:

The first part (Arts. 1–3) is introductory in character. Arts. 4–13 relate to citizens, their equality and rights, freedom of speech, assembly, religion, and petition. Arts. 14–29 refer to the President. He can convoke the Legislature, open, prorogue, and close its sessions. He may initiate legislation and may issue special ordinances in time of need which will have the force of law. He is the head of the army and navy, can declare war and conclude peace, and has extensive treaty-making powers. Arts. 30–38 relate to the Legislature and enumerate its duties. It is composed of one house, chosen by the people. It may impeach the President. Sessions are public and are four months in duration. Members enjoy inviolability for their official acts. Arts. 39–43 refer to administration. Assisting the President are departments of Foreign Affairs, Interior, Finance, War, Navy, Justice, Education, Commerce, and Communications. Arts. 44–48 refer to courts of law, composed of officers appointed by the President. Art. 49 provides for the Council of State. Arts. 50–58 relate to finance. The remaining articles are supplementary in character.

The following plan was adopted (June, 1914) with regard to the provinces: 1. Abolition of the revolutionary *tutuh*. 2. Appointment of governors-general for each province, the Governor-General to be assisted by two lower classes of officials, (*a*) the *tao-yi*, or Prefect, and (*b*) the magistracy.

The Governor-General and his subordinates have direct control over internal provincial affairs, education, and industries. The provincial departments of finance are abolished, also the provincial courts of justice. It is intended that all matters of finance and justice be under the control of the central government.

Formerly the government of China resembled that of a confederation of semiautonomous provinces rather than one with a powerful central authority. The Emperor interfered as little as possible with his viceroys, the latter enjoying almost regal powers in their respective administrations. In the present scheme a radical reorganization is effected, with the purpose of making every part of the country subordinate to the central authority at Peking. Thus many offices heretofore associated with the provinces have been transferred to Peking, or to officials responsible to the Peking government.

The Chinese have never yet had training in popular government of a parliamentary kind, and the absence of definite, well-organized parties makes such popular government difficult at this time. Furthermore, the Chinese need to be educated in the principles of modern republicanism, and, to be successful to any great extent, the whole nation and not only a small portion must take part in the work of rehabilitation. Drawing heavily on what other nations have adopted as the best systems may be the only way at present, but to comprehend the value of these systems is extremely difficult for the majority of the people. In time, no doubt, China will evolve a system of her own based largely on her own peculiar needs. In the meantime the best the Chinese can do is to follow the advice of foreign experts in creating a strong, centralized government and a powerful executive, and then trust to the future for the necessary additions to meet the local situations. In the great changes which are needed for the reorganization of Chinese life, much time and patience will be required for their fulfillment. It is reasonable to suppose that the Chinese, who have for ages followed a fixed routine, will not painlessly adapt themselves even to the better things of a civilization that has been so completely foreign to their nature, training, and environment. For National Colors, see Colored Plate of FLAGS.

Chinese Law. Chinese law is the growth of many centuries and is based on immemorial custom. Though voluminous and complex, it is regulated by the fundamental principle of parental authority which has been the great conserving force and unifying power throughout the ages. The laws are divided into *lut* and *lai*, i.e., fundamental and supplemental—the former permanent, and the latter liable to revision every few years. They may be classified as general, civil, fiscal, military, criminal, and those relating to public works. The criminal code is remarkable for the conciseness and simplicity of its language, yet the actual punishment inflicted depends very much on the judge. In theory the accused is already guilty, and a Chinese judge, like the French, acts as prosecutor as well as arbiter. In spite of the prevalence of bribery, judges are apt to give common-sense decisions,

as public opinion plays a greater rôle in China even than in Western lands, because of the absence of a comprehensive code and statute system. Torture is still used to extract testimony, and punishments inflicted are flogging with the bamboo, banishment, and death by strangling or decapitation. A criminal usually receives short shrift in China. As far back as 1901 the process of mixing Chinese and Western law was begun, to supply what was lacking in the native legislation. Yet China to-day is far behind Japan and the Western Powers in her legal system. This makes it necessary to have foreign courts in China for the protection of foreigners, and to enable them to be judged by their own law. The United States District Court at Shanghai was established in 1906. This system of foreign procedure grafted upon Chinese life, and called extraterritoriality, will necessarily continue until China succeeds, like Japan, in bringing her law up to date in spirit and essence like the law of Europe and America. When China succeeds in doing this, and, with the consent of foreign Powers, abolishes extraterritoriality, she will be a full-fledged member of the family of nations, and not before.

Army and Navy. Until 1895 China had no regular troops in the modern sense. Military forces consisted of the eight Banners (composed of Manchus, Mongols, and Chinese, these Chinese being the descendants of those who aided the Manchus in the conquest of China) and the Green Flag or provincial troops. In the eight Banners were enrolled all descendants of the Manchu forces that had overthrown the Ming dynasty; originally these were a fine body of mediæval soldiery, but they had degenerated into a worthless rabble, living on government rations. As modern soldiers they were entirely useless. They were stationed at Peking and other important towns and were commanded by Tatar generals. The Green Flag army was composed of the forces which each province was supposed to maintain, and these were more like garrisons and constabulary than regular troops. The disastrous War of 1894–95 led to the first attempt to reform the army. Five divisions were raised, but disbanded some years later, except for one division under Yüan Shī-k'ai. A division was composed of about 12,500 soldiers on a peace footing, and in war numbered some 20,000 officers, men, and noncombatants. In 1901 a decree ordered the reorganization of the military, but little was done, except again by Yüan Shī-k'ai, who by 1906 raised six divisions of troops on the modern scale. These formed the basis for the new Chinese army. Then it was planned to form 36 divisions by 1912. Eight divisions were organized by 1907, and by 1912 there were 12 divisions and 19 mixed brigades. Service in the army at present is mainly voluntary. An enlistment of three years is required, and then three years in the First Reserve, where drills are held one month in a year. From there they pass into the Second Reserve, where there is only one month's drilling in alternate years. After that there is no further liability for military duty. Careful regulations now govern enlistments, and opium smokers and other undesirables are not accepted. Military service is now looked upon with favor as an honorable profession, whereas in past years the soldier was ranked among the lowest in Chinese life—in fact was treated with contempt. The Revolution and modern China completely overturned that idea. A pension system has been elaborated, and full military education for officers and men, which in recent years has been given mainly by Japanese and German instructors. An attempt is also being made to put the provincial forces on a strict military footing. The division of Imperial Guards, formed in 1908, and originally intended for the royal service, still remains without change in numbers and pay, but is now attached to and controlled by the Republican government. Figures showing the present strength of the army can be approximate only. One estimate placed the number of men under arms, regular and irregular, at the abdication as 800,000. The estimate of the *Luchun*, or national army, and the *Hsun Fang Tui*, provincial forces, in 1911, was given as 517,796, and in 1912 the Chinese army, including all forces, was placed at 428,485.

Under the Manchus each province controlled its navy independently of the Peking government, but now all will be controlled by the Ministry of the Navy. The budget for 1912 estimated naval expenditure at $17,500,000, including pay, manœuvres, balance still owing for shipbuilding abroad ($10,000,000), construction, and arsenals. In 1912 the *personnel* of the navy was about 1000 officers and 4830 men.

The navy is deficient, with no dreadnoughts or first-class battleships. In 1912 the enrollment included 1 second-class cruiser, 3 third-class cruisers, 1 training cruiser, 8 torpedo boats, 16 gunboats, 3 transports, and 2 training ships. Of ships being built there were, in 1912, 5 destroyers, 2 gunboats, 7 river gunboats, 1 training cruiser, and 1 cruiser. Ships not organized, belonging to the various provinces, totaled 19 gunboats, 11 torpedo boats, and 2 transports.

Population. The population of China has never been definitely determined, as no census on the Western plan has ever been taken. In 1912 the customs' estimate, including Manchuria (19,290,000), was placed at 441,983,000. The Mincheng-pu, Chinese census, returns the number in the same year as 331,188,000, to which must be added Chinese Turkestan, 2,491,000; the Manchu military organization, 1,700,000; Tibet, 6,500,000 (some say only 1,500,000); and other dependencies, 760,000; making a grand total of 342,639,000. W. W. Rockhill gave the number in 1904 as 270,000,000; while H. B. Morse believes 385,000,000 the safest estimate for China proper, 16,000,000 for Manchuria, and 10,000,000 for Mongolia, Tibet, etc. Total 411,000,000. A 1919 estimate places it at 327,910,000. The figures for Peking vary between 500,000 and 1,650,000. Other large cities are: Siang-Tau 1,000,000, Si-gnan 1,000,000, Tientsin 80,000, Chungking 614,000, Shanghai 651,000, Canton 900,000, Suchow 500,000, Hangchow 594,000, Chang-sha 250,000, Hankow 870,000, Fuchow 624,000, Amoy 114,000, Chinkiang 184,000, Nanking 270,000, Shasi 95,000, Ichang 55,000, Wuhu 98,000, Wen-chow 100,000. If the Chinese should develop their energies by the introduction of scientific farming, mining, engineering, and railways, China proper could easily double its population without endangering its food supply. The following is a list of provinces, with the meanings of their appellations:

PROVINCES	Meaning of name
Pe-chi-li (Chi-li)	Direct Rule
Shan-tung	Mountain East
Shan-si	Mountain West
Ho-nan	River South
Kiang-su	River Su
An-hwei	Peace Glory
Kiang-si	River West
Che-kiang	Che River
Fu-kien	Happiness Established
Hu-peh	Lake North
Hu-nan	Lake South
Shen-si	Shen West
Kan-su	Sweet—Sedate
Sze-chuan	Four Streams
Kuang-tung	Broad East
Kuang-si	Broad West
Kwei-chow	Noble Tract
Yün-nan	Cloudy South

The Chinese abroad are found in every civilized and uncivilized country—there being in the United States, including Hawaii, about 95,000; in the Dutch, British, and American East Indies and French Indo-China, between 5,000,000 and 7,000,000, with many also in Australia, Japan, and Korea; 13,000,000 Chinese are estimated to be in Manchuria and 2,250,000 in Formosa. In 1912 there were in China 2328 commercial houses and 144,754 foreigners.

The following table contains the areas and populations of the provinces, as estimated by the Chinese government in 1911.

Provinces	Areas in square miles	Population (est.) 1911
Pe-chi-li	115,800	20,937,000
Shan-tung	55,970	38,247,900
Shan-si	81,830	12,200,456
Ho-nan	67,940	35,316,800
Kiang-su	38,600	13,980,235
An-hwei	54,810	23,670,314
Kiang-si	69,480	26,532,125
Che-kiang	36,670	11,580,692
Fu-kien	46,320	22,876,540
Hu-peh	71,410	35,280,685
Hu-nan	83,380	22,169,673
Shen-si	75,270	8,450,182
Kan-su	125,450	10,385,376
Sze-chuan	218,480	68,724,890
Kuang-tung	99,970	31,865,251
Kuang-si	77,200	5,142,330
Kwei-chow	67,160	7,650,282
Yün-nan	146,680	12,324,574
Total	1,532,420	407,253,029

Ethnology. In common parlance the term "Chinese" is applied indiscriminately to the general population of Chinese territory. The Chinese proper are the result of a fusion of peoples, few of whom were far removed from one another in speech or in blood, though in the process of conquering the vast territory which they now control, they have received the blood of a number of more primitive races, not all of whom are with certainty to be credited to the Mongolian stock. Chinese literature throws no light on any of the alleged wanderings which some Western scholars have credited the nation to have performed before they settled down in and near the valleys of the Wei-ho and the Yellow River in its lower course. Babylonia, India, Khotan, Siberia, and other parts of Asia have been designated as the original homes of the Chinese, but the several books and papers published on the subject furnish no tenable proofs of any prehistoric wanderings. We have to content ourselves, for the present, with knowing that, according to Chinese tradition, the nation occupied a comparatively small territory about the present city of Si-an-fu. By conquest and amalgamation with the neighboring non-Chinese tribes it extended its territory, chiefly to the east and south. While this expansion was going on, the northwest and north of the country were invaded by a succession of barbaric Sibiric tribes, from which quarter came also the Mongol conquerors of the Chinese in the thirteenth century of our era, and the Manchu dynasty that since 1644 has reigned over the people.

In general the Chinese present the characteristic features of the Mongolian race. The features are square, angular, and flattened, the cheek bones high, the ears usually large and standing out from the head, the chin usually small; the neck short and thickset, and the expression of the face monotonously uniform. The average height is 5 feet 4 inches. The cranial capacity is from 1200 to 1300 cubic centimeters, or about 100 cubic centimeters below the Caucasian average. (For illustration, see Colored Plate accompanying article Asia.) Among the Chinese proper three physical types may perhaps be distinguished: 1. A northern, taller, lighter-skinned, less brachycephalic group. Baelz (1901) considers this type to be "Manchu-Korean" in origin, in part at least, with perhaps proto-Aryan admixture. 2. A central group, which Deniker (1900) thinks has preserved best the original Chinese type. 3. A southern, shorter, darker-skinned, partly brachycephalic and partly mesocephalic type, presenting generally an approximation to the physical type of southern Mongolia, with many suggestions of Malayan admixture. In the opinion of Baelz, the Mongol type prevails in central and southern China, while in the extreme south Malayan influences are very perceptible. Underlying all the non-Chinese admixtures Baelz believes there is an element derived from a quasi-Caucasian race (the Aino of Japan, etc., are perhaps a distant offshoot), once widespread over northeastern Asia, and split in two by the advancing Mongol-Tatar tribes. Zaborowski (1900) holds that the Hakkas (immigrants from northern China into the extreme south), a dolichocephalic Mongolian type, which he considers related to the long-headed element found among the Tunguses and in the tumuli of the Trans-Baikal country, are the real representatives of the ancient Chinese proper. Of the more or less "aboriginal" and non-Chinese people of China the following may be mentioned: the Miao-tzï in the eastern parts of Kui-chou, the south of Hu-nan, northern Kuang-si, and northwestern Kuang-tung; the Lolos (or Nésus) of western Sze-chuan and northeastern Yün-nan; the Tu-jen, Meo, Yao, etc., of Kuang-si; the Shans and other Thaï tribes of the Burmese-Chinese frontier, who belong more or less remotely to the same stock as the Burmese, Siamese, etc. Of these aboriginal peoples the most important are the Miao-tzï, looked upon by many authorities as representing the earlier population of a great part of China and as having a "sub-Caucasian" strain of blood, but considered by others as allied to the Tibetan type. The Lolos appear, by speech at least, to be closer to the Thaï peoples of Farther India. All through the south and west of China the intermingling of peoples has taken place, sometimes on a large scale. The "savages" have not been so nearly exterminated or driven out as some believe.

The most marked mental peculiarity in the Chinaman is the wonderful development of the faculty of memory, without a corresponding exercise of the faculty of judgment. Books are frequently learned by heart and repeated from beginning to end without mistake. The Chinese are persevering and industrious, patient, peaceable, and polite. Their dread of giving offense makes them seem to the foreigner deceitful, often when they are least so. Credulity and sympathy are marked characteristics. As to their morals and religion, the judgments of foreigners are worth very little, for these differ greatly and are so tinged with the personality of the observer that fair conclusions are impossible. With little fear of death, though they politely avoid the subject in conversation or make use of euphemisms, the Chinese resort readily to suicide when in difficulties. In the stolidity with which they undergo torture they resemble the North American Indians. As a rule, they look with contempt upon arms and war, and have always cultivated the arts which maintain peace and harmonious human intercourse, so that for ages China has been practically without an army and without a police force. In one respect China is the freest country in Asia; local self-government has been carried to a very high degree, insuring both personal freedom and excellence in civil organization. The Chinese are lacking, however, in military or naval discipline, and are apt to lose self-control and yield to panic in times of sudden danger. In the main they are temperate, practical to the last degree, unimaginative, imbued with a mercantile spirit, yet literary. Though there are manifold varieties of character and disposition, the inhabitants of China proper are practically one people, notwithstanding that differences in dialect are so great as to make it nearly impossible for the uneducated of distant provinces to understand one another.

The essence of the Chinese social system, which has survived all political changes, assimilating all new elements, and absorbing China's conquerors, is the worship of ancestors, the word "worship" being taken in the old English sense of honor. Filial piety is the first of all virtues. All Chinese worship at the tombs of their parents. In the houses of the well-to-do one room, the domestic sanctuary, is set apart for the tablets inscribed with the names of deceased relatives and ancestors, before which ceremonies, regulated by the classic 'Book of Rites,' are performed. Indeed, China is ruled more from the cemetery than from the Emperor's palace, the care of the dead being often apparently a more important duty than the sustenance of the living. It is always the past that is the Golden age, and reverence for a man or thing is in proportion to age. Much thought is given to the location of graves and cemeteries, this matter, like a myriad of others, being regulated by the *fang-shui* (literally, wind and water), a most elaborate system of superstition, which contains the germs of a rude natural science. To be buried properly is the ambition of every Chinaman; the possession of a handsome coffin is often the most desirable of assets, and frequently this article is a most acceptable present to elders or relatives. The dead are honored by banquets, and in the crises of life ancestors are appealed to for help and direction. In ancient times human sacrifices were made at the graves of the dead. The firecrackers, which are set off in such great numbers at the burial of the dead or in visits to cemeteries, are but substitutes for the figures of men; in the course of time the powder-charged paper has taken the place of the human sacrifice. At the present time these pyrotechnics are supposed to drive away the foul spirits which love to lurk about the haunts of men, and with which the Chinese imagination overpopulates heaven, earth, and air.

Next to death, marriage is the most important event, and is universal, bachelors and old maids in health and mature life being quite unknown. Yet in social life there is a strict separation of the sexes, and the preliminaries of marriage are taken in charge by parents or professional matchmakers called the go-betweens. Often the future bride and groom do not see each other until the woman raises her cap from her covered eyes on the wedding day. Minute regulations direct every step in this and in all other social ceremonies, so that at all times and circumstances the Chinese know just what to do, and even in a house know just where and when to sit down or to stand up. Polygamy is not legal or general, but if the wife proves barren the husband is very apt to take a concubine, for the order of Chinese society requires heirs, and especially sons, to keep up the ancestral sacrifices. The parents have full power over their children, but the duty of administering chastisement is usually left to the wife. Though in times of generous food supply child murder is but little practiced, yet millions of young children die every year; for a sick child when unresponsive to remedies is suspected to be nonhuman and must pass through an ordeal of neglect, cold, or starvation. If it dies, the inference is that it was not human, but either of demoniac origin or else possessed. If it lives, it is human. The Chinese are thus continually under the influence of superstition, which not infrequently bursts out into great disorders, as in the Boxer uprising. In all their intercourse, especially among the higher classes, a tedious and laborious etiquette rules all actions, the Chinese being the slaves of precedent, a circumstance which accounts in part for that lack of mental initiative which is the curse of the nation. Chinese manners were regulated by the code in the *Li-ki*, or 'Book of Rites,' 3000 years ago, and anything that savors of innovation is hooted down as impiety, if not treason. At Peking a department of the government, the Board of Rites, has charge of the interpretation of the *Li-ki* and the direction of ceremonies. The Chinese are therefore prone to think that most Occidentals, though good mechanics, perhaps, are destitute of politeness and morals.

The daily food of the Chinese is for the most part rice with a morsel of fish, pork, or poultry, though millet is much used by the poor in the north. In their cookery, which in the main is wholesome, are some peculiar delicacies, such as soup made from a glutinous substance that is found in birds' nests, sharks' fins, deer sinews, and ducks' tongues. Their drink is brewed from rice and is a mild beer, though distilled liquors from the same grain are very strong. The samshu of southern China and the whisky of Manchuria, with the unextracted fusel oil, make mischievous drunkards. Usually, however, liquor is drunk hot out of tiny cups at mealtime, and tea before or after meals only, in cups that have no saucer or handle, but a cover which

holds the "draw." Out of this cover the Europeans, on introducing tea, made a saucer, adding a handle to the cup. Many festivals and holy days, local, religious, and national, are celebrated, but the greatest of all is New Year's Day, before which debts are paid and new clothing is bought. Congratulations and festivities prevail, for this is every one's birthday, all dating their ages from this day. Though a child be born 24 hours before New Year's Day, it is considered to be in its second year. The Festival of the First Full Moon, the Feast of Lanterns, and the Festival of the Dragon Boat, are the other famous holidays. The streets on such occasions are full of music and gayety, and night is turned into day by myriads of lanterns made of paper and gorgeous with painted scenes in many hues. The Chinese are usually afraid of losing their dignity by active effort, and outdoor sports are not as yet in vogue, unless some utilitarian object is in view, kiteflying and shuttlecock being the most violent in which adults engage; but cards and dominoes, the theatre, gossiping and visiting, story-telling, peep shows and entertainments given by itinerant showmen are very common and much enjoyed. There are hundreds of children's games and sports. Thousands of traveling performers, acrobats, wonder-workers, marionette players, and purveyors of amusements of every sort, including movable refreshment stands and bakeshops, gain a living by amusing the little folks. Nonsense rhymes and comic doggerel for children are chanted by nurses and parents, though for the most part these are as unknown to foreigners as of old the Arabian Nights' Entertainments were to the closest students of Arabic. The Chinese do not shake hands with friends, but join their own hands by way of salutation, and kissing is unknown among them, but prostrations and congratulations are very frequent.

From the standpoint of common sense the Chinese dress is one of the best in the world, varying in material and thickness according to the season; the state of temperature usually takes its name and quality from the number of garments put on. One prominent idea in the theory of Chinese dress is to conceal or minimize the visible distinctions of sex, and only in their headdress and footgear are the women noticeably different in appearance from the men. A loose jacket fitting closely around the neck, and short wide trousers, are the principal garments. Shoes are made of silk or cotton, with thick felt soles, but the upper classes wear boots of satin, into which they thrust their fans or pipes. The mourning color is white. Until their conquest by the Manchus, the Chinese wore their hair like the Koreans, gathered in a knot at the top, and only after much bloodshed were the conquerors able to compel the Chinese to adopt the symbol of subordination and loyalty. Not so very long ago all males without exception shaved the front part of their heads and braided their hair in a long queue. This fashion gave employment to multitudes of barbers, for it is rarely that even a poor man attends to his own hairdressing. For months after the death of an emperor, an event which allowed no one to shave for 100 days, the barbers had difficulty in earning a living. Hot water is preferred both for drinking and washing. After meals the face is wiped with a damp hot cloth. It is thought dangerous in itself to put cold water in the stomach, as it certainly is where drainage is so little attended to. Water to be drunk is first boiled. Unlike the Manchu women, Chinese girls, especially among the upper classes, had their feet bound in early childhood. After the torture of years is over, the lady with "lilies" totters about as best she can, rarely going out of the house, and hearing of the outside world through servants and visitors, her circle of friends contracting rather than enlarging as life goes on.

Many of these habits of life are undergoing a change at present which may do away with a great many time-honored customs. As in Japan, the old Chinese calendar has been exchanged for the Western one. The better-class natives are more and more taking to European styles, queues are no longer worn by officials, including the President of the Republic, and by soldiers; tailors and shoemakers are prepared to work in Western patterns, and that cruel habit of binding the feet of female children is but seldom resorted to, thanks to the agitation of a society initiated by foreign ladies for the special purpose of persuading Chinese families to give up that objectionable custom. Foot binding was not a custom of Manchu families, though, and the late Empress Dowager was one of the first to patronize the anti-foot-binding society. The enormous change now taking place in the social habits of the people is, of course, followed by a great demand for foreign piece goods, hats, shoes, etc., and will cause fluctuations in many branches of the import trade.

For art in China, see CHINESE ART.

Religion. There are five religions in China that are well established. These are the Confucian, Buddhist, Taoist, Mohammedan, and Christian; each of them a "book" religion, and, excepting Taoism, each with an historical founder. The religion of the ancient Chinese consisted of the double worship of God and of ancestors. Confucius gathered up and gave literary form to the national traditions. In doing this he so edited the ancient documents as to throw into shadow the spiritual and to lay emphasis upon the material side of life. By forbidding ambition he cut the taproot of progress and produced a stagnant civilization. His system is still the basis of Chinese society and has a strong influence on the government. It is less a religion than a philosophy and practical code, having reference simply to this life, and making good citizens and neighbors rather than developing the possibilities of mankind. On its philosophical side Confucianism has gone through many changes, until it has become the creed and the substitute for religion with the lettered classes. (See CHU HI.) Though his tablet is saluted, and sacrifices of oxen and sheep are made before it at the equinoxes, it is hardly accurate to say that Confucius is worshiped.

Lau-tzï (q.v.)—or, to Latinize it, Laocius—a contemporary of Confucius, though older than he, was more of a true philosopher or inquirer into the causes of things. He taught the doctrine of Tao. His remarkable treatise, the *Tao Teh King* (*tao* means 'reason'), contains neither superstition nor religion, but a system of rationalism. A vast, intangible, impersonal first principle is regarded there as the parent of all things, and man must try to realize this principle by escaping from all distraction. Lao Tses speculations paved the way for introduction of Buddhism. In its subsequent develop-

ment, or degradation, it has become little more than a fantastic system of spirit worship, of which alchemy, incantation, and intercourse with the dead are the chief characteristics. As a religion it is not so ancient as Buddhism, and there is little or no connection between Lau-tzï's teachings and the Taoism of to-day.

Buddhism entered China shortly after the opening of the Christian era, and in its development has taken the Northern, or expanded form, with its paradise, goddess of mercy, scriptures, voluminous and imposing ritual, passionate rhetoric, and a thousand stimulating influences which satisfied a mental craving not provided for in the simple materialism of Confucius. Besides monasteries and images, the Buddhist temples are found all over China, but in decay. The priests are illiterate, and despised by the educated. The monks and nuns are usually beggars, the former recognizable by their yellow robe. Only in a few places can Buddhism be said to be vigorous. The language of the sacred canon is Sanskrit, now known to few in China.

Mohammedanism was introduced directly from Arabia, and, as is believed, by the maternal uncle of Mohammed. Arriving in caravans from Central Asia, or in ships by sea, the missionaries preached the faith industriously, and there are now from 15,000,000 to 20,000,000 Moslems in the Republic. They have obtained state recognition, but their religion marks them as separate from the rest of the Chinese. Yet many of them have attained high positions in the service of the government. Three provinces—Yün-nan, Kan-su, and Shen-si—contain nine-tenths of these believers in one God, there being 10,000,000 north of the Yang-tse-kiang and 200,000 in Peking. Mosques are numerous, each containing a tablet in gold letters and reading "May the Emperor live 10,000 years." There is a large native literature on the subject of the faith of Islam in China.

The progress of Christianity has been slow. A tablet found in 1626, at Changan, Shen-si, indicates that the Nestorians introduced Christianity into China early in the sixth century. The Jesuits Ruggiaro and Ricci went to China in 1579 and 1581. Protestant missions were led by Robert Morrison in 1807. The latest estimates attribute to the Roman Catholics 1,363,697 converts, 49 bishops, 1426 foreign and 701 native priests, and to the Protestants about 325,000. Many of the men in the Reform party have been pupils of the missionaries.

Confucianism has enjoyed state patronage and protection for about 2100 years. There have been severe struggles among the various adherents of "the three religions" for supremacy; but the Chinese mind, indifferent to things abstract, is in its way tolerant, and there is outward peace. Millions of natives, scarcely knowing "the three religions" as separate, accept them in a mechanical unity, each meeting a different want in human nature. Confucianism supplies the need of a moral code, Taoism ministers to the superstitious mind, and Buddhism, with its metaphysics and vague aspirations, appeals to the mystic element in man. There is also a state ritual, with the Temple of Heaven in Peking, at which sacrifices of the first class, to heaven and earth, are made. This leading offering was originally made by the Emperor for his people. With the abdication it was discontinued for a time, but recently Yüan Shï-k'ai again performed the ceremony, to hold the people true to the old standards of morality which had grown somewhat lax during the Revolution. The second class of offerings is to the sun, moon, gods of the land, spirits, and sages, and the third class to deceased statesmen and scholars. On a smaller scale these ritual ceremonies are observed by the magistrates; for, above all, the Chinese in every rank are pantheists. Practically the Chinese are religiously inclined, having deep veneration for the idea of a soul and of immortality. Hence their great respect for the dead, love of funeral ceremonies, readiness to spend money over graves, desire to propitiate the ghosts of ancestors, yearning for sons, the strong family sentiment of unity, and the strict subordination of the younger to the elder. They are tolerant and nonmilitant. Except that there is no day of rest, and that the idea of "praise" never enters the Chinese mind, a good man in China is, in natural religion, very much what a good man is in Christendom. In faith, doctrine, and dogma it is very different, for the average Chinese is uninterested in metaphysics. In the propagation of religion by foreigners true and simple Christianity exercises a lasting effect for good on China. Most of the so-called "religious" troubles come from the clashing of militant alien doctrine with the village customs and social habits so dear to the rustic mind. Towards the questions of liquor, slavery, and concubinage, and in social customs generally, the entire mental attitudes of Europeans and natives still differ to a great extent.

Education. Enormous numbers of the adult population are unable to read or write. The reform of education is one of the greatest subjects now before the Chinese. The government in 1903 appointed a commission of three high officials to study the whole question. The result of its report is that a board of education was established in Peking to decide upon methods of introducing Western education and a school system of different grades. For ages there has been a special literary class who alone knew the literature of their country. Examinations, confined chiefly to moral philosophy and literature, have been held at frequent intervals in the chief cities of each province for the purpose of awarding the degrees that were the necessary passport to positions in the public service. This entire system of literary examinations was abolished by an Imperial decree of Sept. 3, 1905, which introduced a new system by which scholars in the modern scientific schools that are to be introduced will be able to enter the civil or military services.

Practically the only immediate result of the Emperor's attempted reforms in 1898 was the establishment of the Peking University, which to-day is in a flourishing condition. In 1911 there were foreigners engaged with this university and the College of Laws, as follows: 8 professors of science, 5 of law, 6 of engineering, 3 of agriculture, 1 of commerce, and 4 for the preparatory classes at Peking University. A National Education Conference was held, July 11–Aug. 11, 1912, at Peking, at which it was proposed to make the primary grade a four years' course for the ages 7 to 10, and which was to be compulsory. Other grades recommended were the higher primary schools, 3 years' course for ages 11 to 13; the middle schools, 4 years' course for ages 14 to 17; the

preparatory schools for colleges, 3 years' course for ages 18 to 20; and the college and professional institutions, 3 years' course for ages 21 to 24. In addition, three new government universities were proposed, at Nanking, Canton, and Wuchang, to embrace courses in science, law, commerce, medicine, agriculture, and industry.

Great credit is due to the missionaries for having fostered the cause of Western learning in years past, and it is largely the result of their efforts that the old Chinese system is now being abolished. Of foreign colleges in China there are over 35 of Protestant denominations, and also numerous schools and colleges of the Roman Catholic church. The British at Hongkong opened a university March 11, 1912, which is already proving effective. Several of the large American universities are actively engaged in extension work, of which the medical institution at Canton is a conspicuous example.

History. The historical period in the development of the Chinese may be said to begin with the Chou dynasty, founded in 1122 B.C., and, on the strength of a number of sacrificial bronze vessels and bells containing hieroglyphic inscriptions ascribed by Chinese critics to the preceding Shang dynasty, we may accept the latter part of that period, falling into the end of the second millennium B.C., as quasi-historical. Unfortunately China cannot boast of any such living witnesses of the high antiquity ascribed to her history by her own literature as the pyramids and the royal tombs of Egypt. It is for this reason a matter of individual choice how far we can trust the literary tradition in its earliest periods. The only unmistakable criterion is the casual mention, with year, month, and day, of an eclipse of the sun, stated in an old poem of the *Book of Odes* to have occurred in 776 B.C., which European astronomers have calculated to have actually occurred and been visible in north China on that very day. This is the reason why some Western critics date the historical period from the eighth century B.C., though Chinese historians give it fully 2000 years more. We cannot blame them for their credulity, if we see what the much too ingenious combinations of the lively imagination of some Western scholars have made of the clearly legendary traditions of Chinese literature. Some of these speculations look for the original home of the race in Babylonia (Terrien de Lacouperie), or in Khotan (Von Richthofen), or in Egypt (De Guignes). In the face of these and other untenable theories Professor Giles's view is the only one dictated by common sense, when he says, "No one knows where the Chinese came from," and he adds, "it appears to be an ethnological axiom that every race must have come from somewhere outside of its own territory." The Chinese themselves have certainly, as far as their literature goes, never assumed that their forefathers 4000 or 5000 years ago were seated anywhere but at what they consider the cradle of their race, the valley of the Wei River and the neighborhood of the present Si-an-fu. There they imagine lived the man whom they considered the first Emperor of their history, Fu-hi (2852 B.C., according to that entirely fictitious chronology). Fu-hi is considered the founder of Chinese social order, to which he raised his people out of a state of chaos characterized by the absence of family life—children knowing their mothers, but not their fathers. The legendary account of this Emperor's life refers to a period of hunting and fishing, whereas his successor, Shen-nung (2737), represents an agricultural period. It is important to note that, although the names of these quasi-historic emperors were not unknown in the literature of the Chou dynasty, most of the deeds ascribed to them must have been invented by later writers. The great historian Ssïma Ts'ién, known as "the Herodotus of China," begins his history with Huang-ti, the 'Yellow Emperor' (2704–2595), to whom most of the elementary inventions of cultural life are ascribed. But the favorite heroes of these most ancient times are Yau and Shun (2357–2206), the model emperors, who stand at the head of Confucius' extract from older records known as the *Shu-king*. In Yau (the Chinese King Alfred) and Shun the Chinese find not only the patterns of regal virtue and the models of all wisdom, but the originators of their civilization and prosperity. These legendary worthies established marts and fairs, drained flooded lands, extended the Empire to the sea, and, in brief, made the golden age of China. Their descendants became degenerate and were supplanted by the Shang dynasty (1766–1154 B.C.), with 28 rulers, most of them vicious and cruel. The feudal system arose under the Chou dynasty (1122–255 B.C.), by which China was governed for 900 years, during which period literature and the fine arts flourished. China was divided into 72 principalities, out of which arose several states whose names and importance, even yet in the twentieth century, exert a potent influence on the internal politics of China. All traces of nomadic life disappeared, agriculture became universal, and great public works were constructed. This is the classical China pictured in ancient poetry and affecting so powerfully the imagination of the modern Chinese. Luxury, misrule, and internecine war, however, brought the nation to deep distress, in the midst of which Confucius was born (551 B.C.). The three great sages, Confucius, Lao-tse, and Mencius, flourished within a century or two of one another. Vice and anarchy were too great to be checked by the wise men; and in 255 B.C. the Chou dynasty came to an end, and was followed by the Ts'in, from which China derives its name.

The Ts'in restored order, abolished the feudal system, drove back the Hun Tatars into the desert, began to build the Great Wall as a symbol both of defense and of United China, and extended the Empire southward of the Yang-tse-kiang valley. To break utterly the power of feudalism, which was popular with the scholars, the Ts'in ruler beheaded hundreds of them and ordered all literature to be destroyed. He was the first Emperor, or Shï-huang-ti. The title "Huang-ti" has been borne since by the emperors of China, and forms the basis of Chinese political orthodoxy and of China's claim to sovereignty over all the nations of the eastern half of Asia. After his death rebellion broke out, and the Han line of rulers (c.206 B.C.–220 A.D.) began. Henceforth no dynasty occupied the throne for so long a period as three centuries, most of them lasting a much shorter time. China's political organization, with its changes and developments (there have been no fewer than 33 dynasties),

compels contrast with the stability of her social system. Under the great Emperor Wu-ti (140–86 B.C.), China began to realize that she was not the only great nation on the Asiatic continent. The Emperor's ambassador Chang K'ien, sent on a diplomatic mission to the West, penetrated as far as the Oxus and Bactria and brought back the descriptions of the great kingdom of western Asia. From this time onward, expeditions to these countries were fitted out, and a lively exchange of products and cultural ideas, including influences in art, followed. From Wu-ti's time dates the trade in Chinese silk overland to Syria and the Roman market. During the time of the Hans the Jews entered China, settling in Ho-nan Province. Buddhism was also introduced about that time. The ancient texts of Confucius were recovered and engraved on stone, ink and paper were introduced, libraries were established, and famous scholars arose. The system of competitive examinations for entrance into the civil service became an institution. The soldiers of China drove the Tatar hordes as far west as Turkestan and added Mongolia to the Empire. The Chinese still proudly call themselves the "sons of Han." The epoch of the three kingdoms (220 to 265 A.D.) was one of war and misrule, but, owing to the adventures of its heroes, was also the romantic period of Chinese literature. During the great T'ang dynasty, one of the longest in the annals of historic China (618–907 A.D.), the Empire extended from the Caspian Sea to the Pacific Ocean, and embassies from Persia, Japan, Korea, Tibet, and various other nations often met at the court of China. Chinese armies won victories on all sides. The Han-lin Yüan ('Forest of Pencils'), or the Imperial Academy (whose library, the largest in China, was burned during the siege of Peking, 1900), was founded. The art of printing by blocks imparted a powerful stimulus to native literary activity in this golden age of literature, when commerce with western Asia, Japan, and the East Indies also flourished. On the fall of the T'ang dynasty, through vice and effeminacy, five feeble dynasties ruled, between 907 and 960. Then the era of the Sung (960–1278) opened, with a fresh burst of literary splendor, and brought in the Augustan age of China, with its amazing activity in bookmaking and printing, and the formation of libraries.

But another great change was impending. Under the leadership of Genghis Khan, the Mongols overran northern China. Under Kublai (1280–94), grandson of Genghis, who established the Mongol dynasty in China, the Empire reached its most splendid development. Kublai's realm extended from the Dnieper in Russia to the Pacific Ocean and from the Arctic Ocean to the Straits of Malacca. The laws were codified, and literature and public works flourished. For a half-century there was considerable commerce with Italy. Marco Polo and his two uncles then lived in the Empire, in the service of the Khan, used paper money and passports, and traveled on the Grand Canal, at a time when paper money, passports, and canals were unknown in Europe. Intercourse with the Arabs and the Persians was continuous, and the highway into Europe was maintained until the Mongols in Central Asia embraced Islam and turned bigots, when communication ceased. The Mongol dynasty, one of the many foreign dynasties of China, ended in 1368, when the throne was occupied by the native Ming or Bright dynasty, noted as patrons of the arts of peace. They cultivated friendly relations with other nations and encouraged Christian missions. Under their rule the Portuguese and Spaniards entered China, Canton became the centre of foreign trade, and Peking, under Ricci, the focus of Roman Christianity.

Modern History. The last Chinese Imperial line, the Ming dynasty (1368–1644), was of low origin, its founder having risen to power in a national reaction which followed the period of disorder due to the disintegration of the Mongol Empire under the successors of Kublai Khan. The first Ming sovereign added Tongking and Cochin China to the Empire. China, however, was continually harassed by the Tatars, and in 1643 the warlike Manchus, besought to defend the country against its enemies, entered it as peaceful conquerors, and a Manchu prince established himself in Peking without serious opposition, beginning the Tats'ing, or 'Great Pure,' dynasty (1644). The enforced adoption by the Chinese of the plaited queue of the Manchus at first produced friction between the races, but this gradually disappeared, and Manchus and Chinese assumed harmonious relations, although the former remained a distinct military and official caste. In most cases the customs of the country and the methods of administration remained Chinese, as did the language, and, like most numerically weak conquerors, the Manchus were assimilated to the ways of the people whom they had subdued. K'ang-hi (1662–1723), the second of the Manchu emperors, was perhaps the greatest of his line. Under him the boundaries of the Empire were extended, notably by the conquest of Tibet; sciences and arts were encouraged, and the great dictionary of the Chinese language and a number of other extensive compilations were begun. His successor, Yung-cheng (1723–36), began the persecution of the Catholic missionaries. These had entered the country following in the footsteps of the Portuguese traders, who had appeared in China as early as 1516, and had been well received at first. The Chinese were never able to comprehend how adherents of the same religion could quarrel as they saw the Jesuits, Franciscans, and Dominicans quarrel, and the missionaries lost credit accordingly. Nor did the Portuguese traders conduct themselves in a way to win the respect of the Chinese, and the avarice, violence, and the spirit of bitter rivalry exhibited by them, as well as by the Spanish, Dutch, and English, all of whom in the seventeenth century followed the Portuguese in the Chinese field, tended to accentuate the suspicion with which the foreigners were regarded. A narrow and exclusive policy, intended to protect China from the aggression of the "barbarians," was initiated before the close of the Ming period, and was developed by the Manchu emperors as time went on. Mutual misunderstandings due to the collision of diametrically opposed civilizations generated continual troubles. Since the liberal days of the Mongol rulers the Chinese had been retiring within themselves, and the admission of foreigners to privileges of trade and intercourse was regarded as a special grace to inferiors. Diplomatic intercourse, in the Western sense, they could not understand, since

the Emperor, the Son of Heaven, had no equals, and those who approached him could do so only as vassals. The Western nations failed to understand this point of view, and Portugal, Spain, Holland, and England tried to enter into permanent relations with the Chinese government, with most humiliating results. Only Russia had any success in dealing with China officially before the first English war. Russia's rapid march across Asia had brought it into contact with China in the sixteenth century, and the first treaty made between China and a Christian Power was that of Nertchinsk with Russia, Sept. 12, 1689, by which the latter's advance on the Amur was checked. The Russians, with their knowledge of Oriental peoples, have always known better than other Europeans how to deal with the Chinese, conceding much to their prejudices in nonessentials, but refusing to acknowledge any inferiority. The United States entered the China field in 1785; and in the palmy days of the old Oriental trade the commerce of the United States was second in volume among the Western nations; but the American government made no attempt to safeguard the interests of its citizens, or to enter into relations with the Chinese government. England began to trade with Canton in 1635, but this amounted to little until 1664.

From 1664 until 1834 England's Chinese trade was in the hands of the East India Company, which the people of the Far East could never learn to regard as a political power. The Chinese government looked upon the representatives of the East India Company in the same way as they regarded the *hong* merchants, i.e., the foreign merchants of Canton—a body without political status, to whom all matters regarding foreign trade had been relegated. The growth of English trade was vigorously fought by the Portuguese, who were first in the field and wished to maintain a monopoly; but the trade and influence of the Portuguese declined rapidly after 1753, until their once prosperous station of Macao hardly paid its own expenses. The growth of European interests in the Far East created an epoch in Chinese history in spite of the spirit of exclusiveness prevailing on the Chinese side. A crisis was precipitated when the monopoly of the East India Company came to an end in 1834, at about the same time when the heavy responsibilities to their own government which the *hong* merchants were compelled to assume had made several of them bankrupt. Trade, which had been regulated by these two corporations, became demoralized, and, under the conditions of mutual distrust and misunderstanding which already existed, trouble was inevitable. The opium traffic, a most important part of Oriental trade, brought existing differences to a head. This traffic had been made illegal by the Chinese government in 1796, but the edicts had never been enforced. Chinese officials connived at the trade, the *hong* merchants found it profitable, and the English government refused to suppress it. In 1837 the Chinese government decided to carry out its decrees, and a governor, Lin, was sent to Canton in 1839 for that purpose. Lin called upon the *hong* merchants and others to surrender the opium in their possession. Elliott, the British superintendent of trade, secured all the opium in the hands of British subjects and turned it over to the Chinese governor; but he refused to sign a bond which would have made all vessels thereafter engaging in the traffic subject to confiscation, and persons connected therewith punishable with death. The reluctance of the British government to interfere with a trade that was worth from $5,000,000 to $8,000,000 annually to the government of British India made all efforts to avoid war unavailing, and hostilities were opened at the beginning of 1840. After the British had captured several ports, taken Ching-kiang in a bloody assault, and threatened Nanking, a treaty was made at the latter city in 1842 by which the five ports, Canton, Amoy, Foochow, Ningpo, and Shanghai, were opened to British trade; a war indemnity of $21,000,000 was exacted; the island of Hongkong was ceded to England; a regular customs tariff was established at the open ports; and in consideration of a transit duty to be levied in addition, goods were given free conveyance to all places in China. The opium question was not touched upon. This first commercial treaty entered into officially by China aroused great interest in Europe and America. An embassy from the United States, headed by Caleb Cushing, negotiated a similar treaty in 1844, and a treaty with France was concluded the same year. British trade grew rapidly after the treaty, the terms of which China persistently sought to evade. In 1856 a Chinese *lorcha*, the *Arrow*, was seized by Chinese officials for alleged piracy, whereupon the owners ran up the English flag and claimed that the *Arrow* was an English boat. Thereupon England's representative in China, Sir John Bowring, made an imperative demand upon China for restitution and an apology to the British government. His demands, though unwarranted by the facts in the case, were all met by China, except that for an apology. This the Chinese officials refused to make, and the complications arising from the incident brought on a new war in the autumn of 1856. France had an old complaint against China for the murder of some missionaries, and joined England in 1857. The war closed temporarily in 1858, with the Treaty of Tientsin. England and France were to have ministers at the Chinese court, at least on special occasions, and China was to be represented at London and Paris. Christianity was to be tolerated in China. A certain measure of freedom of access to Chinese rivers for English and French merchant vessels, and to the interior of China for subjects of the contracting powers, was guaranteed. China was to pay the expenses of the war, and the term "barbarian" was no longer to be applied to Europeans in China. Two years later it became necessary to renew the war to secure a ratification of the treaty by the Imperial government, and this was obtained only when the allied armies held Peking at their mercy. At the time of the conclusion of the Treaty of Tientsin with England and France China signed a treaty with Russia, in which she ceded the Amur territory to that power.

Meanwhile, in 1850, there had broken out in southern China a formidable insurrection, which did not fail to affect the foreign relations of the country. This was the T'ai-p'ing Rebellion, as it was known outside. By the Chinese it was called the "War of the Long-haired Rebels." A schoolmaster named Hung Siu-ts'üan had become possessed of a religious enthusiasm through the writings of some Protestant con-

verts, and had set up a propaganda to overthrow Confucianism and bring China to the worship of the true God. His followers were known as "God worshipers." They soon allied themselves with lawless bands of rebels against the government. Their leader assumed the title of T'ien-wang, or 'Heavenly King,' and established himself as a ruler in Nanking, where he lived a life of cruelty, license, and tyranny. The dynasty which he intended to found was named the P'ing-ch'au, or 'peace dynasty,' which, with the prefix T'ai ('great'), gave the popular foreign name to the rebellion. In the early part of 1853 the rebels had become masters of Wu-chang and Nanking, which latter place became their capital. In 1860 the treaty port of Shanghai was threatened by the T'ai-p'ing, who thus came into collision with the Western powers. A small army, raised at the expense of the Shanghai merchants and maintained by the Imperial government, was created. It was named the Ever-Victorious Army and was organized and led by an American, Ward, who showed great ability, but died before much had been accomplished. His successor, Burgevine, also an American, was promptly dismissed, and the army remained under the command of an Englishman, Holland, until he was defeated at Tai-tsan, Feb. 22, 1863. Li Hung-chang, then Governor-General of the Kiang provinces, applied for an English officer, and Charles George Gordon was authorized to enter the Chinese service. He brought the little army of 3000 or 4000 men to a discipline and steadiness that enabled him to perform wonders with it. At the same time the French forces gave effective aid to the Imperialists. In July, 1864, the Imperialists took Nanking, and the rebellion was practically stamped out, although desultory warfare still continued for a time. Bad faith shown by Li in dealing with the defeated rebels led Gordon to refuse to serve longer in connection with him; he refused all rewards from the Emperor, but completed the overthrow of the rebels. See GORDON, CHARLES GEORGE.

The United States had watched with deep interest the progress of the second Anglo-Chinese War, and President Buchanan sent William B. Reed to follow the course of events, and to mediate on behalf of his government if that should be possible. In its friendly attitude the United States was supported by Russia. The efforts of Mr. Reed resulted in a new treaty between the United States and China, negotiated on June 18, 1858. This was a treaty of amity and commerce under which the United States government guaranteed that no American vessels should engage in contraband trade with China. The United States Minister to China from 1861 to 1867, Anson Burlingame, was so successful in winning the confidence of the Chinese administration, then in progressive hands, that upon his resignation he was asked to head a Chinese embassy accredited to 11 leading nations. In 1868 he set out from Peking at the head of an imposing deputation of the highest Chinese officials, and during the short time before his death in 1869 he did much to bring about friendly relations between China and the Christian Powers. The Burlingame Treaty with the United States supplemented the Reed Treaty in some important respects. Even as late as this China had not recognized the full equality of other nations by admitting their envoys to personal audience with the Emperor, but on June 29, 1873, the Chinese Emperor, under the enlightened influence of Prince Kung and his associates, gave personal audience to the Japanese Ambassador and to the ministers of Russia, the United States, Great Britain, France, and Holland, with the German Secretary as interpreter. The significance of this audience is evident. It represented the final breaking down of Chinese isolation, and the recognition of the Great Powers of Europe as the equals of China. In 1884 France, in attempting to make good her protectorate over Annam (q.v.), became involved in a campaign against the Chinese forces in Tongking. The war was ended in June, 1885, by a treaty giving France control of Tongking and Annam, but leaving open the question of Chinese suzerainty.

In 1894 Japan took advantage of disorders in Korea to revive certain old claims to rights in that country (see JAPAN and KOREA), and sent an expeditionary force into the peninsula. China, which had always claimed suzerainty in Korea, but had allowed Japan to obtain distinct diplomatic advantages in 1876 and 1882, hastened to meet this demonstration, and after minor collisions had taken place Japan declared war, August 1, and on the 26th concluded an offensive and defensive alliance with Korea. On September 16 the Chinese were defeated at Ping-yang, and on the 18th a Chinese fleet was destroyed in a severe naval battle at the mouth of the Yalu River. In November Port Arthur, in the Liao-tung peninsula, China's strongest fortress, was invested, while the main column of the invading army pressed on through Manchuria towards Peking. Prince Kung made an appeal to the Powers for intervention. The United States offered its services as mediator, but they were declined by Japan. Port Arthur was taken on the 21st. The Japanese pushed their operations vigorously, without regard to the approach of winter; defeated the Chinese at Kung-wa-sai, December 19; captured Kai-ping, Jan. 10, 1895; and the strongly fortified port of Wei-hai-wei, in the Shantung peninsula, on February 14. The loss of Wei-hai-wei, together with the remnant of her navy, left China at the mercy of her enemy, with Peking in imminent danger of capture. Li Hung-chang (q.v.) was commissioned to negotiate a peace. By the Treaty of Shimonoseki, April 17, 1895, China recognized the full independence of Korea, ceded to Japan the peninsula of Liao-tung, the island of Formosa, and the Pescadores, and agreed to pay an indemnity of 200,000,000 taels. A new commercial treaty with Japan, much more favorable than that which had been invalidated by the war, was promised. Japan was to retain military occupation of Wei-hai-wei until the commercial treaty was made and the second installment of the indemnity paid, the balance of the latter to be secured by pledging the customs revenue. The collapse of China surprised most of the world, which had been taught to believe that there was tremendous reserve force and power of endurance in this unwieldy but ancient Empire. The revelation of its weakness seemed to be just the opportunity for the great European Powers that were ambitious of influence in the Far East. Russia, France, and Germany promptly protested against the cession of the peninsula of Liao-tung, and brought such pressure to bear that Japan relinquished this part of its conquest.

In the weakened condition of the Chinese gov-

ernment it was more than ever apparent that political influence must go hand in hand with commercial development in China. The embarrassments of the Imperial government resulting from the war afforded an opportunity to the Powers to obtain valuable concessions. Russia in 1895 placed, through France, a loan amounting to $77,200,000, to enable China to meet the payments of the indemnity. In 1896 the sum of $80,000,000 was provided by German and American capitalists, and in 1898 the same amount was advanced by the Hongkong and Shanghai Banking Corporation and the Deutsch-Asiatische Bank. In return for these loans, valuable railway and trading concessions were exacted, with a view to establishing in the decaying Empire spheres of influence which could in any event be guarded against dangerous rivals. In 1897 Germany, by way of reparation for the murder of two German missionaries, seized the port of Tsing-tao (Kiao-chow), on the Shan-tung peninsula, and obtained extensive mining, trading, and railway privileges in the rich Province of Shan-tung. In the early part of 1898, while the British government was endeavoring to secure guarantees that the Yang-tse-kiang region should not be alienated in any way, and that the river should be more freely opened to navigation, Russia obtained a lease of the harbors of Port Arthur and Talien-wan in the Liao-tung peninsula, with railway concessions in the adjacent territory. As an offset, Great Britain obtained Wei-hai-wei for as long a period as Russia should retain Port Arthur.

The danger to China from the foreign Powers now became so evident that two parties appeared, divided upon the method of resistance. One was a nationalist reform party, led by K'ang Yu-wei, a Cantonese, and including Chang Chi-tung, the Viceroy of Hu-peh and Hu-nan; the other a reactionary conservative party, inspired by the Dowager Empress. For a brief period the reformers seemed to have gained control at the palace and held the ear of the young Emperor Kuang-sü. Their wish was to bring China into the ranks of modern nations, along the road which Japan had trod so swiftly and so surely, and to throw off foreign influence by creating a strong and independent Chinese nation. Numerous edicts issued from the palace during the summer of 1898, which seemed to point to the regeneration of China. But against this attempt at reform by proclamation there were the inertia of the most conservative of people, the hatred of all things foreign, and the constant intriguing of the Empress Dowager, a relentless and unscrupulous woman, mother of the late Emperor T'ung-chï and aunt of Kuang-sü, whom she had put upon the throne. Long accustomed to control the affairs of the palace, she kept the weak young Emperor in subjection. In September, 1898, he issued a proclamation practically transferring the sovereign authority to her and confessing himself sick in body and mind. From that time he was lost sight of, and rumors of his death became frequent. A number of the reformers were executed, but K'ang Yu-wei escaped and went into exile. Antiforeign demonstrations in many quarters began almost immediately, and marines were sent to Peking from the foreign naval vessels on the China station to guard the legations. Assaults on the missionaries and destruction of their property became of frequent occurrence, and it was evident that the exactions and dictatorial ways of the foreigners had irritated the Chinese. If the liberal reformers could have had their way, the difficulty might have been peaceably met by creating an orderly, civilized government that would command the respect of the world; but with the triumph of the reactionaries in the government, the spirit that was abroad found vent in violent and barbaric outbreaks that only served further to discredit China with civilized nations. The seizure of full power by the Empress Dowager was marked by the substitution of Manchus for Chinese in the higher offices, which meant the infusion of a more brutal and violent spirit in the government. In January, 1900, the puppet Emperor was heard from once again, in a proclamation made by the orders of the Empress Dowager, naming Pu Chun, son of Tsai Yi, Prince Tuan, as the successor to the throne.

Reports were heard soon after of the activity in Shan-tung of the organization popularly known as the Boxers (a very free translation of the Chinese name meaning 'The Fist of Righteous Harmony'). This organization and another which seems to have become identified with it were apparently the beginnings of a patriotic volunteer militia which was intended for the defense of the country against foreign aggression. It had at the outset the favor of many really well-meaning men, but it soon came into the control of fanatics, whose motto was "Exterminate the foreigners." As reports of its acts began to come in, the foreign ministers made frequent representations to the Tsung-li Yamen, or Board of Foreign Relations, but without obtaining any satisfaction. Matters went from bad to worse, until the very legations in Peking were threatened by the reign of terror which enveloped the capital. A relief force of 2000 marines and sailors from the foreign fleets set out from Taku for Peking, June 10, under the command of Vice Admiral Seymour, the British commander, but this force was unable to reach Peking. On June 11 the Chancellor of the Japanese Legation was murdered in Peking by Chinese soldiers. Already there was little doubt that the Boxer outbreak was encouraged from the palace. On June 17 the allied fleets bombarded and captured the Taku forts. Three days later Baron von Ketteler, the German Ambassador, was murdered in the streets of Peking, on the way to the Tsung-li Yamen. The diplomatic corps, together with their households and guards, before the end of June, were all gathered in the British Legation, which was fortified as well as possible. Cut off from all communication with the outside world, they endured the horrors of a siege for nearly two months. Meanwhile an allied army of relief had been assembled at Taku. It captured Tientsin on July 14 and advanced to the relief of the besieged legations. The march began on August 4, the force numbering about 18,000 men—Japanese, Russian, British, American, and French. Peking was reached and the legations were relieved on the 14th, the Imperial City being taken on the following day. The court escaped into the interior. On the 28th troops of all the nationalities represented (now including some bodies of Germans also) marched through the sacred precincts of the Forbidden City, as a symbol of the humiliation of China.

The advance on Peking and the occupation of Chinese territory were attended with much looting, brutality, and license, not at all creditable to the Christian nations. Li Hung-chang and Prince King (or Ching) were commissioned to treat with the Powers, and after months of wearisome negotiation, prolonged by the differences among the Powers and by the peculiar methods of Oriental diplomacy, a protocol embodying the terms of peace to be imposed upon China was submitted to the Imperial government. This document set forth the expiatory measures imposed upon China on account of the Boxer outrages; forbade the importation of arms and ammunition or the materials for their manufacture; provided for the payment and distribution of an indemnity of 450,000,000 Haikwan taels, or $333,000,000; the conversion of ad valorem into specific duties, and the improvement of the Pei-ho and Whang-pu rivers, at the joint cost of the foreign Powers and China; prohibited Chinese membership in antiforeign societies under pain of death, and abolished government examinations for five years in cities where foreigners had been massacred; ordered the dismissal of governors who should hereafter permit antiforeign agitation; and transformed the semiofficial Tsung-li Yamen into a Ministry of Foreign Affairs, the Wai Wu Pu, taking precedence of the other ministries. A legation district in Peking which might be fortified and guarded was defined, and certain points were indicated that might be occupied by the foreign Powers to keep communication open between the capital and the sea. In accordance with this protocol, all foreign troops except the legation guards were to be withdrawn in September, 1901, and the status quo was to be reëstablished.

In an Imperial edict issued in February, 1901, China accepted these terms. While the Boxer movement was in progress and the siege of the legations in Peking was going on, the Chinese forces made a vigorous and at first irresistible advance against the Russians in Manchuria, which became the scene of bloody warfare. In July, 1900, the Chinese cannonaded Blagovyeshtchensk, on the Amur River. Russia assembled large forces which finally drove back the enemy, and at the beginning of October Mukden was in Russian hands. During the progress of the peace negotiations the Powers dispatched punitive expeditions in various directions, these operations continuing into the spring of 1901. In June, 1901, Count Waldersee, who had been at the head of the allied forces in China, laid down his command. In January, 1902, the Chinese court returned to Peking. The outcome of the Boxer uprising did not leave the Empress unaffected. The return of the court was followed by the promulgation of various reform edicts placing Western sciences and arts among the courses of study at the Imperial military academy, legalizing intermarriage between Chinese and Manchus, and urging the abandonment of the custom of foot binding. An edict of April, 1903, provided for the establishment of a single monetary standard for the Empire and the erection of a mint at Peking to supply the provinces with a uniform currency. On Sept. 5, 1902, a treaty was concluded with Great Britain providing for the abolition of the *likin*, or internal taxes, as soon as the other Powers should have made like agreements; for the opening of a number of treaty ports; and for the revision of the laws governing mining and internal navigation. Similar treaties were concluded with the United States and Japan, Oct. 8, 1903, and with Portugal, Nov. 11, 1904, but nothing was done by the government to carry its promises into effect, other than the appointment of the progressive Yüan Shï-k'ai (q.v.) as Minister of Commerce with full control over mines, railways, and telegraphs. But, however the Chinese government might be affected by collision with the modern Powers, the national character rendered it seemingly impossible for China to follow the example of Japan in assimilating Western civilization thoroughly and rapidly. The forces of conservatism were as yet too strong, and in consequence the high hopes of speedy reform entertained in some quarters after the Boxer uprising were in large measure destined to remain unrealized.

The question whether the Boxer indemnity should be paid in gold or silver was debated for a number of years. It was settled by an agreement between the government and the Powers on July 2, 1905, making the indemnity a gold debt. During 1905 the last of the foreign troops guarding the line of communications between Peking and Tientsin were practically withdrawn.

Russia, in spite of an agreement entered into April 8, 1902, for the evacuation of Manchuria, made little effort to redeem its promise, and at the beginning of 1904 was still in full control. The war between Japan and Russia followed. (See Russo-Japanese War, where the Manchurian question is treated in detail.) Soon after the outbreak of hostilities the Chinese government issued a proclamation of neutrality (Feb. 12, 1904), and acting under the inspiration of Japan announced the intention of preventing military operations from extending to any part of the Empire but Manchuria. Japan in return disclaimed all desire to acquire any increase of territory at the expense of China. The sympathies of the Chinese people were with Japan, primarily because the defeat of Russia was necessary to the restoration of the integrity of the Empire. In the field of war the Chinese rendered valuable assistance to the Japanese as scouts, while armed bands of the Hungshutz, or Chinese bandits, sometimes under Japanese officers, operated on the western flank of the Russian armies and in Mongolia. The Chinese government made some attempt to obtain representation in the peace conference at Portsmouth in 1905, but without success. The outcome of the negotiations, however, was to its advantage. Russia and Japan pledged themselves to evacuate Manchuria within 18 months and to restore it to the exclusive administration of the Chinese. The two governments, however, were to retain their guards for the protection of their respective sections of the Manchurian Railway. Russia abandoned all claims to territorial advantages or preferential concessions in Manchuria. The transfer by Russia to Japan of the Liao-tung peninsula and the railway from Port Arthur north to Chang-chun was made conditional on the consent of the Chinese government. Such consent was granted in the Treaty of Dec. 22, 1905, between Japan and China, which provided in addition for the opening to trade of 16 principal ports and cities in Manchuria after the evacuation of the country by the forces of the two combatants.

The triumph of the Japanese arms reacted

on the Empire in a twofold manner: it spurred on the throne to an increasingly progressive policy and quickened among the people at large the feeling of national consciousness. Important factors in this development were the large number of Chinese students in Japan and the presence of Japanese teachers, military instructors, and engineers in the various centres of the Empire. The growth of the native press was greatly fostered by the war. Directly this was due to the efforts made by both the Russian and the Japanese government to influence public opinion through the establishment of subsidized vernacular publications, but the general interest in the events of the war also led to a considerable increase in the number of newspapers and a far greater increase in the number of newspaper readers. The influence of the budding "fourth estate" in China was apparent in the boycott movement of 1905 mentioned below. Military progress was conspicuous after 1902. A highly efficient army of more than 50,000 men was developed by the able Yüan Shï-k'ai, Viceroy of Chi-li, as the nucleus of a future army commensurate with the extent and the resources of the Empire. In July, 1905, an Imperial edict ordered the dispatch of four missions abroad for the purpose of studying modern political institutions. One of these visited the United States in January and February, 1906, and a second mission on its way to Europe passed through the country in March. In September, 1905, an Imperial decree ordained the abolition of the old system of literary examinations for office and the institution of a method of selection from the schools of new learning. Parallel with this reforming activity was manifested a tendency to refuse the grant of all further railway or mining concessions to European capital and to reacquire concessions already granted, as in the case of the American concession for the construction of the Canton-Hankow Railway, which was canceled in August, 1905. Partly as a result of general anti-Western feeling and partly in retaliation against the treatment of Chinese in the United States, a boycott of American goods was set on foot in southern China in the summer of 1905 and continued with more or less thoroughness during the year. Probably unconnected with the boycott but attributable to the same state of ill feeling was the murder of five American missionaries by a Chinese mob at Lienchow in October. In December there were serious riots at Shanghai arising from a conflict of authority between the European and the native members of the mixed tribunal. In May, 1906, an Imperial edict placed the entire customs administration of the country, including the Imperial Maritime Customs, which had been managed by Sir Robert Hart since 1863, under two supreme native administrators to whom the Inspector General was made subordinate. The Powers united in opposing the terms of the edict, but with some modifications and guaranties it remained in effect. It was believed that the Chinese government intended to make use of the revenue funds in the upbuilding of the army.

Among the many reforms planned and completed as the result of the Russo-Japanese War, none was perhaps, for practical reasons, more important than the strengthening of China's defensive power. In 1907 Yüan Shï-k'ai and Chang Chï-tung, the viceroys of Chi-li and Hu-kuang respectively, were appointed to memberships of the Grand Council, in which capacity they pushed matters considerably towards reshaping the Chinese government on the lines of modern progress. To Yüan Shï-k'ai, the experienced creator of foreign drilled troops, fell the rôle of reorganizing the army, besides that of furthering advanced views in education and improvements in the civil service, and Chang Chï-tung was not slow to follow as far as his provinces were concerned. A centralization of military forces was aimed at by weakening as much as possible the control of provincial authorities and placing the military reins in the hands of metropolitan chiefs. Naval reforms followed more slowly, but the promises for liberal changes in the Imperial government were but partially and very reluctantly complied with, although many important changes had taken place. The much-longed-for convocation of a national parliament was in 1907 deferred to a distant future. An agitation, fostered by the Imperial government as well as by patriotic circles among the population, for suppressing the opium vice was one of the great reforms following an Imperial edict issued in September, 1906, according to which all opium smoking was to cease within 10 years, and steps towards the gradual extinction of the vice were taken by the Chinese government with the coöperation of Great Britain, the government of India promising to decrease the importation of the drug at certain rates per annum, and opium dens being closed in Hongkong. Many of the reforms suggested by K'ang Yu-wei and suppressed by the coup d'état of 1898 were now carried out, chief among which was the abolishment of the so-called wen-ch'ang system of civil-service examination. The celebrated examination halls were now devoted to other purposes; temples and public halls were changed into schools where foreign sciences were taught by native and foreign teachers. Among the latter many Japanese were engaged, and Chinese students were sent to Japan, the United States, and Europe. The United States had an important share in the education of young Chinese, and the very best class of students were sent to American schools and universities, because, unlike the other belligerents, America had remitted to China the indemnity due from the Boxer War in 1900 so that large sums could be appropriated for purposes of education in the United States. It is quite possible that the fact of so many of the best students having picked up their first lessons in constitutional law, political economy, education, etc., in republican surroundings has helped to pave the way towards the great change in China from the most absolute monarchy to a republic.

The prelude to this great change may be seen in the sudden deaths of both the Emperor Kuang-sü and the Empress Dowager Tz'ï-hi in November, 1908. Kuang-sü's successor was the infant son of the Emperor's brother, Prince Chun. He reigned under the style Süan-t'ung with his father as regent, whose liberal inclinations certainly were no impediment in the progress of reforms. In 1909 provincial assemblies were called in, and a Senate was formed in 1910, and several new railway lines were completed and opened to traffic. But, though the Imperial government was now free from committing such crimes as had marked former generations, the foundation had been laid

for changes which nobody at the time dared to foresee. If we review the several factions then at work in China according to the views of their leaders, we may make the following distinctions. There was, in the first instance, the Manchu conservative, or reactionary, party, counterbalanced by the liberal adherents to the Manchu government. K'ang Yu-wei and Liang K'i-chou, the reform philosophers of 1898, were by no means opposed to the Manchu dynasty, as has been occasionally assumed. Their programme was in favor of a constitutional monarchy under a Manchu emperor, with the exclusion of the Empress Dowager Tz'ï-hi, and after her death they looked upon the young Emperor Süan-t'ung with his liberally inclined uncle, the regent Prince Chun, as the power that would carry out their ideas in the future. A comrade as it were in his wish for liberal government in China and a fellow victim of the persecution of the late Empress Dowager, though with widely different aims before him, was Dr. Sun Yat-sen, a native of the Kuang-tung Province, educated in Honolulu and Hong-kong, where he studied medicine under Sir Patrick Manson's successor, Dr. Cantlie. His patriotism, coupled with the impressions he had received from his education in a quasi-foreign atmosphere, led him to conceive the plan of organizing among his countrymen a revolution against the Manchu dynasty. In this, in spite of many reverses and after years of patient perseverance, he succeeded. In 1896, while on a visit to the United States and England, he issued a manifesto calling upon the people to rise against their oppressors, the Manchu government. An attempt to make him a prisoner at the Chinese Legation in London had failed through the interference of the British government, and for a number of years he traveled abroad as one of the most indefatigable and finally successful agitators the cause of liberty has ever seen. The attempt at an insurrection made on the frontier of Tongking in 1907 had failed; but the fruit of his great work was to ripen in the summer of 1911. A railway strike in Sze-chuan, caused by the introduction of foreign capital and material, had resulted in the sending of Imperial troops from Wuchang, and this furnished the ground for a general rising against the Manchus. This rising spread from province to province, the people of which soon found themselves to be one in the cry for a change in government. The ground had been well prepared, and when, in the face of too many reverses the Imperial troops had suffered in various parts of the Empire, the court seemed prepared to yield to the demands of public opinion, it was too late even for Yüan Shï-k'ai, who had been recalled from his voluntary retreat and appointed Prime Minister in November, 1911, to save the dynasty. The revolutionary committee, which had been joined by the former envoy to the United States, Wu Ting-fang, had invited Yüan Shï-k'ai to become the head of a Chinese republic, the establishment of which seemed to be unavoidable, but the Premier may have thought his opportunity had not come yet; but on December 28 the Imperial family left the capital, placing the decision as to the form of government, whether monarchy or republic, in the hands of the people in its National Assembly. The result was that Dr. Sun Yat-sen, the spiritual father of the republican idea, was elected the first President of the Chinese Republic under a provisional constitution. In the meantime weeks elapsed until the court could be got to acknowledge the course of events by the abdication of the Emperor Süan-t'ung, which was formally announced on Feb. 7, 1912. The Manchu dynasty had reigned in China since 1644. A parliament created by the revolutionary provisional government met, Aug. 8, 1913, and through a committee drafted a constitution, but only the articles providing for the election of a President and Vice-President became law. Yüan Shï-k'ai was elected President, October 6, for the term of five years, but died, June 6, 1916, having meanwhile given offence to Dr. Sun Yat-sen and the radical element by governing without a parliament and by his high-handed measures. He was succeeded in the Presidency by Li Yuan-hung under whom the parliament was restored and resumed its work of framing a constitution. In March, 1917, China having decided to take sides with the Allies in the European war severed diplomatic relations with Germany. At this time there was an irreconcilable conflict over the constitution between the President and the Legislature on the one hand, and the Prime Minister, Tuan Chih-jui and the Cabinet on the other, and the question of the proper method of declaring war brought matters to a crisis, which resulted in the dismissal of the Prime Minister. The latter rallied to his side the generals of the Northern Provinces and after a *coup d'état* by a dissident military governor in July who proclaimed the restoration of the emperor, Tuan and his party prevailed. Tuan was then restored as Premier. Meanwhile, after the dissolution of parliament in 1914, Dr. Sun Yat-sen and his supporters had established an independent military government at Canton, which they declared to be the sole representative of the constitutional government set up by the revolutionists in 1911, and thenceforth a state of war existed between the north and the south, marked by desultory hostilities down to and after the Disarmament Conference at Washington. Hsu Shih-Chang was inaugurated President, Oct. 10, 1918. By that time the Peking Government had lost all real authority owing to the usurpation of the local governors, who from time to time attempted a *coup d'état*. In addition to this civil confusion China was constantly involved throughout this period in difficulties with Japan. The latter's retention of Shantung, occupied by her during the European war, was one of the stumbling blocks of the Peace Conference, and its decision as embodied in the Treaty of Versailles was objectionable in China, who refused to sign the Treaty. Friction between China and Japan over this and other matters continued during the Disarmament Conference of 1921, and afterwards, and led at intervals to a Chinese boycott of Japanese goods. At the same time there was an increasing body of public opinion in China that opposed the exploitation of the country by the western powers and insisted on national integrity and independence. See SUPPLEMENT. For national coat of arms, see Colored Plate in article HERALDRY.

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CHINA and **CHINAWARE.** See POTTERY.

CHINA (kī'nȧ *or* kē'nȧ) **BARK.** See CINCHONA.

CHINA CINNAMON. See CASSIA.

CHINA CLAY. See CLAY; KAOLIN.

CHINA GRASS, or **CHINESE GRASS.** The popular name of a fibre used in China for the manufacture of a beautiful fabric known as grass cloth. The name appears to have originated in the belief that the fibre was that of a grass; but this is not the case, it being obtained from *Bœhmeria nivea*, a plant allied to the nettle. Grass cloth is now brought in considerable quantity to stores, especially in the form of handkerchiefs and other textiles. It has a fine glossy appearance and a peculiar transparency. See BŒHMERIA; RAMIE.

CHINA INK. Another name for India ink (q.v.).

CHINANDEGA, chē'nän-dā'gȧ. A town of Nicaragua, situated 25 miles northwest of León and connected with the Pacific coast by railroad (Map: Central America, D 4). It is the capital of a department of the same name, is the centre of a corn district, and has considerable trade. Pop., 12,000. In this town was formulated in 1849 the celebrated Chinandega Agreement, an unsuccessful attempt to form a strong federation of the Central American States. San Salvador, Honduras, and Nicaragua drew up the agreement. Later Costa Rica adopted it, with certain specific limitations; but Guatemala rejected it with indignation.

CHINA SEA, or SOUTH SEA. A partially inclosed sea, lying off the southeast coast of Asia (Map: Asia, L 7). It is bounded by China and Formosa on the north, where it connects by the Strait of Formosa with the Eastern Sea; by French Indo-China, Siam, and the Malay Peninsula on the west; and by the island loop of Borneo and the Philippines on the south and east. On its west border are the indentations occupied by the Gulf of Siam and the Gulf of Tongking, the latter being partly shut off by the island of Hainan. The sea increases in depth from south to north; soundings of more than 13,000 feet have been made off Luzon, but much of the southern portion has a depth of less than 1000 feet. Typhoons of great violence endanger navigation during certain seasons. The chief ports on the China Sea, or close to it, are Manila, Singapore, Bangkok, Saigon, Canton, and Hongkong. The largest rivers draining into it are the Mekong, Menam, and the Si-kiang, or West River. With the exception of Hainan, there are no large islands.

CHINA TREE, PRIDE OF INDIA, or PERSIAN LILAC (*Melia azedarach*). A handsome tree, a native of India and Persia, and the type of the family Meliaceæ. The tree is widely distributed throughout the warmer portions of the globe. It grows to a height of 30 or 40 feet, and has bright-green compound leaves and fragrant lilac flowers. It resists drought and is highly thought of as a shade tree in regions adapted to its requirements. It will withstand considerable cold, but cannot be recommended for regions where freezes are frequent. The abundant lilac-colored flowers appear early in the spring, and the leaves are retained late into autumn, followed by the clusters of yellowish berries, making the tree attractive at all seasons of the year. The wood is rather coarse, but durable and handsomely marked, making it valuable for cabinet use. The leaves, flowers, and berries are reputed to have medicinal properties, although not recognized in some pharmacopœias. In Australia the tree is known as white cedar, and its uses are numerous. A number of forms of China trees are common in cultivation, one of the most handsome being that known as the Texas umbrella tree. Its spreading habit and dense foliage make it one of the most desirable shade trees known.

CHINA WAX. The secretion of an insect (*Coccus*) which lives on the ash trees of China. See WAX.

CHINCHA ISLANDS, *Sp. pron.* chēn'chȧ. A group of three small islands in the Pacific, near lat. 13° 40′ S. and long. 76° 30′ W., 12 miles from the coast of Peru (Map: Peru, B 6). The area of the entire group is only about 4000 acres. The surface is rocky and devoid of vegetation. The islands were of some importance formerly, due to immense guano deposits which began to be exported by the government in 1840 and were exhausted by 1874.

CHINCH BUG (from Sp., Portug. *chinche*, It. *cimice*, from Lat. *cimex*, bug, and Eng. *bug*). A small blackish bug (*Blissus leucopterus*), with white wing covers marked with a 6-shaped dark line. It belongs to the Lygæidæ, one of the most extensive and injurious families of plant bugs, of which some 175 species belong to North America. The chinch bug is spread all over the United States and throughout Central America and the West Indies, and is the most destructive bug, and probably the most destructive insect, in the country, especially in the Mississippi valley. It appears in incalculable numbers in dry seasons, and the Department of Agriculture places the average annual damage at $20,000,000. The adults live through the winter in old grass and rubbish. Early in the spring the female lays 500 or more eggs on the roots and stems of grain. The young, at first, are red in color, and, clustering in crowds on the stems and leaves

of grain or maize, suck out the juices and kill the plants. Wheat suffers most. There are two generations in a year. When arriving at maturity, the broods scatter, and should a strong wind be blowing at the time the insects are on the wing, they may be blown or carried many miles. Wet and cold springs and severe winters help to keep down the number of this pest. In Kansas several contagious diseases that attack this bug have been discovered, and to facilitate the spread of such diseases infested chinch bugs are sent to various parts of the State with alleged encouraging results. Several illustrated monographs of this species have been issued, of which the most complete is that by F. M. Webster, *The Chinch Bug* (Department of Agriculture, Washington, 1898).

CHINCHILLA, chĭn-chĭl'lȧ (Sp., from So. Amer. Indian). A small South American rodent allied to the cavies, but outwardly much resembling a ground squirrel, which represents an extensive family (Chinchillidæ). All the species are gregarious, feed much on roots, for which their strong and sharp incisors are particularly adapted, and live either in holes, which they select for themselves in rocky districts, or in burrows, which they excavate. They are valued for their fur, particularly the chinchilla of the Andes (*Chinchilla lanigera*), whose mouse-gray and extremely soft and lustrous fur constitutes an important article of commerce; but their numbers are said to be perceptibly decreasing. The ancient Peruvians were accustomed to employ the wool of the chinchilla for the manufacture of fine fabrics. See Plate of CAVIES.

CHINCHILLA DE MONTE-ARAGÓN, chĕn-chē'lyȧ dȧ mōn'tȧ ä'rȧ-gōn'. A town of Spain, in the Province of Albacete, 10 miles southeast of the city of that name (Map: Spain, E 3). It is surrounded by walls and has a castle. Previous to the nineteenth century Chinchilla was considered the most important city in the territory of what is now called the Province of Albacete. It has manufactures of cloth, linen, leather, earthenware, and glass, and a trade in the agricultural produce of the district. Pop., 1900, 6544; 1910, 6795.

CHINDWARA, chĭnd-wä'rȧ. The capital of a district of the same name in the Nerbudda Division, Central Provinces, British India (Map: India, C 4). It is situated in lat. 23° 4′ N. and long. 78° 57′ E., on the Satpura plateau amid the Deoghur Mountains, 2200 feet above sea level. Its climate is agreeable and salubrious and attracts many visitors in search of health or recreation. The city contains an English school, an Arabic private school, and two dispensaries. Area of district, 4631 square miles. Pop. of town, 1901, 4216; 1911, 3404; of district, 1901, 407,865; 1911, 516,948.

CHINESE ARROWROOT. See NELUMBO.

CHINESE ART. Until recently very little was known of Chinese art. But the publications of the Japanese, with their admirable reproductions in color, the looting of the Imperial treasures at the sack of Peking, and the recent political events, culminating in the real opening of China to the western world—these and other factors have not only thrown light upon the development of Chinese art, but have enabled us to study it from the originals. The recent expeditions sent by the various European governments, especially the German and British to the Kingdom of Khotan on the northwestern Chinese frontier, have thrown much light upon its origins. Chinese art is a homogeneous and continuous development, the beginnings of which rival the Egyptian and Babylonian in antiquity, and its development has continued into our own day. China occupies the same important and influential position in the art of the Far East, with its endless ramifications, as Greece in the Occident. The art of China began to be important in the third millennium before Christ, attained an important development under the Shang dynasty (1766–1154), a second in the Chow (1122–255); a third and stronger creative effort with the Han dynasty in the second century B.C.; its culmination in the T'ang period (618–907 A.D.) and the Sung (960–1280). It continued to flourish under the Mongol conquerors (1280–1368), experienced a renaissance under the Ming dynasty (1368–1644), and continued, though with less originality and force, under the Manchus to our own day. Although a highly national and characteristic development, it was repeatedly influenced by external forces. It seems to have felt the remote influence of the Mycenæan style and was certainly affected by the Scythian and by the mixed style of Central Asia. China was not unaffected by the Hellenic culture of the Eastern Empire, with which it had commercial relations. The most powerful external influence, however, and the chief factor in the development of Chinese art, followed the adoption of Buddhism. A modified form of the Greco-Indian art, starting from its home in Gandhara (northern India), progressed triumphantly through Central Asia and entered by way of Khotan into China during the third and fourth centuries A.D.

Painting. The origin of painting, which is the most important development of Chinese art, is found in calligraphy. For Chinese script is written with the brush and requires highly artistic execution. Only fluid colors are used on highly absorbent materials, such as silk or paper, upon which no change or retouching is possible. Unlike Occidental painting, Chinese is essentially romantic rather than naturalistic in character. Its purpose is not to represent facts, but to suggest a poetic idea. Although exquisite in color, its chief beauty is one of line. It is decorative in character, avoiding modeling and shadows. The Chinese painter must conform to certain conventional schemes, which are themselves admirable syntheses of the chief structural formations in nature, but is unrestricted in the expression of feeling. As early as the third century B.C. there was in China a highly developed painting, secular in character and devoted chiefly to history and portraiture. Paintings were then made on wooden panels and on walls prepared with line, as well as on silk and paper. In the second century we hear of the beginnings of landscape. The T'ang period (618–907 A.D.), under the influence of Buddhism, was the age of classic figure painting, with Buddha and the sages as principal subjects. The human figure was decoratively conceived, not naturistically, but with wonderful power of expression. The chief characteristic of Buddhist painting was a grand rhythm of line and arrangement; the colors were bright and harmonious. Wu Taotsü, universally conceded the greatest of all Chinese painters, flourished during the period. A painting in the Freer collection (Detroit), attributed with some probability to him, affords an excellent idea of his style. This age saw the further

development of landscape painting in two great schools—the southern, which was romantic and literary in character, and the more naturalistic northern. At the head of the former was Wu Wang Wei, of the latter Li Ssühsün. The golden age of painting was under the Sung dynasty (960–1280) which saw the culmination of the landscape. Like the painters of Barbizon, 1000 years later, the Chinese depicted all the moods of nature with the most intimate charm and with a power of suggestion never after equaled. Their theme, however, was the spirit of nature rather than its actual appearance. Particularly delightful are the paper scrolls upon which whole series of landscapes are painted. The solitary figures of hermits or sages in the landscape serve to accentuate the emotional quality. Among the greatest landscape painters of the epoch was the Emperor Hwei-tsung. There were animal as well as landscape painters; and every object of nature, animate or inanimate, was depicted with impartial love and skill. The Mongol (Yuen) dynasty continued the established manner, but with a certain petty realism. Genre, flowers, birds, and insects were favorite subjects. The early Ming period (till c.1500) attempted a renaissance of Sung painting, but with emphasis of the accidental rather than the typical, but afterward followed rather the Yuen style. Elegance replaced simplicity, yet such painters as Lin Lang are worthy of comparison with those of the great age. Pictures of court life with brilliant color effects were favorite subjects. Under the Manchus art petrified. Technical ability remained, but this was chiefly an age of copies. Still, much good painting was produced, even to the present time. One of the most characteristic forms of Chinese painting is the ink sketches of the Sung and later periods, which are marvels of vigorous and delicate executions. The finest collection of Chinese painting in the western world is probably that lately acquired in China by Charles L. Freer, which will pass after his death to the National Museum in Washington. Other important collections are those in the British Museum, and the Musée Guimée of Paris, the Metropolitan Museum of New York (q.v.), and the Boston Museum.

Architecture. Architecture in the usual sense is not known to have been carried to important results in China before the appearance there of the Buddhist influence in the course of the first century A.D. Then Indian types were introduced, and the Taa, or pagoda, of Chinese form appeared; although none of such early date has been identified. These towers, as they now exist, are usually constructed of brick, which material is concealed in many cases by an elaborate facing of what are spoken of as "tiles," but which are frequently very massive and of elaborate form, embossed with sculptured designs very richly painted. Others exist, which are built chiefly of stone. Some reach the height of 13 stories, but this seems to be unusual.

The roof is far more prominent in Chinese architecture than in that of Europe; and the roofs must have been always of wood, as they are to this day; round logs of no great size, or lengths of bamboo. The curious and often noted tentlike form of these roofs with hollow curves, the steep pitch of the upper part, growing less and less until the broad eaves are almost horizontal, are not to be ascribed to any attempted imitation of the actual tent of canvas or textile material. They are unquestionably the result of the peculiar framing of the roof, which, whether built of hollow bamboos or of light solid pieces, whether squared or preserving the natural form of the log, is constructed in a way altogether different from that used in the roof building of Europe. The artistic importance of these roofs, their value, individually or in groups, and their novelty to Europeans, have led to a hasty assumption that Chinese architecture takes its forms and its design mainly from original timber building. Of this, however, there is no evidence; bricks are known to have been used in great abundance in China at an epoch long before the commencement of our era, and skill in handling granite and stratified stone is traditional. Wood must have been common, from an antiquity comparable to that of the buildings of Chaldæa.

As to the general plan of buildings, it is evident that from the beginning until the present time the Chinese idea of a residence has been nearly that which the peoples of the Mediterranean held during the years of classical antiquity; and that the Chinese palace and temple have been what those of the Mediterranean world were until the time came for competition between towns and states in the way of more striking and more permanent structures. A Chinaman's house, if he is a rich man, is a group of small one-story buildings interspersed with gardens, all within a bounding wall. Precisely the same tendency is visible in the temples of China, the "pagodas" or tower-like structures of whatever form being decorative and symbolical accessories, like the church steeple in a village of low wooden houses in America. In such low buildings the roof is, of course, the most visible and striking feature, and the fact that the forms of this roof interested the builders and became the dominating element in their design, even in the towers, is in no way surprising. We see this in full glory in Japan down to an epoch now scarcely closed. (See JAPANESE ART.) The construction is unlike that of Europe, inasmuch as it ignores diagonal bracing and substitutes for it a steplike series of vertical struts and horizontal ties. Thus, if we have to carry a pair of sloping rafters, these rafters are, in Europe, secured at the top of the wall and again where the two rafters meet at the ridge; but the Chinaman supports each rafter at four, five, or six points in its length, and thus prevents it from having any tendency to push sidewise. The purlins, or long horizontal pieces which carry the light outer rafters and the roof coverings are supported in Europe by the main rafters of the truss (see ROOF), but in the East on the successive steps resulting from the square-framed structure. The scientific construction of Europe is so entirely identified with the triangle (see ROOF; TRUSS) that we can hardly imagine wooden architecture which ignores it; and yet such buildings in China and Japan have been found to last 1000 years in perfect condition.

The monumental gateways of China have always been admired by Europeans. The term *pai-loo* is applied to these, although some writers use that term for such a gateway when having several divisions, and *pai-long* when there is but one opening or passage. The pai-loo on the road leading to the tomb of the Ming emperors is of marble and has five openings; another, at the

entrance of the Chun-Tsiang-Cha, has three round arches, and the one called the Porcelain Gate has three pointed arches—all these being in Peking. There is a great pai-loo of granite in the city of Ning-po, and several in the southern provinces are elaborately worked in marble. These gateways are frequently set up as memorials, approved by the sovereign as deserved by one of his subjects.

Although public buildings are very commonly devoid of great massiveness and of that kind of dignity which comes of ponderous and enduring structure, this is replaced very largely by elaborate surface decoration. For this purpose the unequaled skill of the Chinese in all forms of ceramic art, their great power as decorative sculptors in wood and stone, and the knowledge and taste they show in painting in permanent colors by a method which we call roughly "lacquering"—though in reality lac does not enter into it—give their permanent decoration great value. Wooden screens and partitions, verandas and garden houses, receive exquisite adornment in modeled and colored patterns, the use of textile fabrics and enameled tiles.

Sculpture. Carving in stone was practiced in China during the earliest periods, but the first real impulse towards a monumental sculpture came with Buddhism. Temples, similar to those in India, were adorned with rock-cut images of Buddha and his disciples, carved in the Greco-Indian manner. A typical example of such a temple with a multitude of carvings is at Tatong (Shansi) dating from the fifth century, and there are a number of others. Colossal Buddhas of stone were characteristic of the T'ang period. Owing to the inability to represent the human figure, except in a conventional fashion, the Chinese never produced anything comparable to the sculpture of Western lands, excepting in decorative work. On the whole, sculpture in China is identified with movable pieces of decorative effect more than with architectural enrichment or with close representation of nature. Wood carving and elaborately wrought modeling in clay, which is afterward fired, and the surfaces painted and glazed, are carried to a refinement unknown in Europe. The carving of hard stones, like jade and rock crystal, and soft stones like opaque, veined talc and steatite, and of ivory, is an art especially identified with China. Jade carvings are of great elaboration, as where a single piece containing 250 cubic inches is wrought into two complete vases, side by side and separated from one another, except as leaves and twigs, all cut out of the solid mass, connect them.

Bronzes. In the modeling and casting of bronzes, especially those of a decorative character, the Chinese are unexcelled. The development of the art has lasted uninterruptedly for a period of 3000 years. The products are for the most part images and utensils used in the temple services, such as vessels for offerings, vases for wine, flowers and many other purposes, bells, drums, as well as objects of a similar character intended for secular use. These bronzes have been preserved in such numbers that it is possible to form an adequate idea of the development of the art. Pieces of temple furniture exist as early as the Shang and especially the Chow (1122–255) dynasties. They are severe and grandiose in form, to which the rich ornament is strictly subordinated. During the Han period conventionalized decorative images of human, animal, and plant life are used in decoration, and Hellenistic methods appear. The T'ang style unites more realistic conceptions with a more suave execution, and prefers curved linear form. This character was further developed during the Sung period, in which the effect is gained more through quality of surfaces and purity of form than through detailed execution. This was also the period of some of the finest inlaid work, in which gold, silver, and semiprecious stones were used, a technique in which the Chinese especially excelled. Artists of the Ming period, on the other hand, emphasize a richly decorative detail, sometimes to the neglect of the general effect. Ancient forms were reproduced with remarkable technical skill, but with an added elegance which somewhat impaired their purity. The same remarkable technical ability continued throughout the Manchu period to the present day, but with too much emphasis upon detail and decoration.

Applied Arts. The importance and beauty of Chinese porcelain and cloisonné are such as to require special treatment under the titles PORCELAIN and ENAMEL. The textile fabrics likewise are treated under VELVET and similar titles.

Bibliography. A very extensive literature on Chinese art, much of it written contemporaneously with the great art epochs, exists in Chinese; but the works accessible to Occidental readers are, for the most part, of a recent date. The following works treat, with some detail, all the arts of China: Giles, *An Introduction to the History of Chinese Art* (Shanghai, 1905); Bushell, *Chinese Art* (2 vols., London, 1904–06); Münsterberg, *Chinesische Kunstgeschichte* (2 vols., Esslingen, 1910–12); Fenollosa, *Epochs of Chinese and Japanese Art* (New York, 1912); Glaser, *Die Kunst Ostasiens* (Leipzig, 1913). The Chinese point of view is admirably expressed in Binyon, *The Flight of the Dragon* (London, 1911); Fischer, in *Repertitorium für Kunstwissenschaft*, vol. xxxv (Berlin, 1912). Mention should also be made of such earlier works as Paléologue, *L'Art chinois* (Paris, 1888), and Hirth, *Fremde Einflüsse in der chinesischen Kunst* (Munich, 1896). For Chinese painting, consult, besides the above works, Hirth, *Scraps from a Collector's Notebook: Notes on some Chinese Painters* (New York, 1906); Sei-ichi Taki, *Three Essays on Oriental Painting* (London, 1911); Binyon, *Painting in the Far East* (London, 1913). The Japanese periodical, *The Kokka*, with Japanese and English text, contains admirable colored reproductions of Chinese paintings (Nos. 191 (1906) et seq.). For a summary of Chinese architecture, see Cram, in *Dictionary of Architecture and Building* (New York, 1901–02); Chûta Itô, in *The Kokka*, Nos. 197, 198; Boerschman, *Die Baukunst der Chinesen*, vol. i (Berlin, 1911), others to follow. For the influence of Græco-Buddhist art, consult Stein, *Ruins of Desert Cathay* (London, 1912). For sculpture, see Chavannes, *La sculpture sur pierre en Chine au temps des deux dynasties Han* (Paris, 1893). For the extensive literature on Chinese porcelain, see the bibliography of PORCELAIN.

CHINESE EMPIRE. See CHINA.

CHINESE GORDON. The name given to Gen. Charles George Gordon from his exploits in putting down the Tai-ping Rebellion in 1863.

CHINESE GRASS. See CHINA GRASS.

CHINESE HEMP. See CORCHORUS.

CHINESE IMMIGRATION. This subject first assumed importance in the United States about the year 1870, although legislation hostile to the Chinese began in California in 1855. The California Legislature investigated the subject in 1862, and the United States Congress sent a joint special committee to the Pacific coast in 1876, the voluminous report of which gives the most authentic information on the subject yet published (*Rep. 44th Cong., 2d Sess., Sen. R. 689*, p. 1281, Washington, 1877).

Up to 1868 the United States was trying to compel China to admit Americans into that country for the pursuit of trade and commerce. The first treaty (1844) with China gave Americans the right of residence in five ports and gave them the rights of extraterritorial consular jurisdiction. The Americans, though not participating in the Chinese War of 1858, secured all of the privileges obtained by other nations which were stipulated in the Reed Treaty of 1858. Nothing was said in these treaties about Chinese in America, who came here under the same conditions as the citizens of other nations. The Burlingame Treaty of 1868 deprecated involuntary immigration—aimed at coolie labor—but declared the right of migration to be an inherent one, and a special resolution of Congress (July 27, 1868) declared the right of expatriation to be a natural and inherent right of all people, the obstruction or restriction of which is inconsistent with the fundamental principles of the republic. This declaration became subsequently an object of embarrassment in dealing with the Chinese when anti-Chinese feeling on the Pacific coast made it necessary for both political parties in 1876 to insert anti-Chinese planks in their platforms. The question of abrogating the Treaty of 1868 was discussed in Congress. A bill to restrict Chinese immigration passed both Houses of Congress in 1879, but was vetoed by President Hayes because it violated the Treaty of 1868. A commission was sent to China in 1880 to negotiate a new treaty to permit the absolute prohibition of Chinese immigration. The Treaty of 1880 declared that "the government of the United States may regulate, limit, or suspend such coming or residence, but may not absolutely prohibit it." The treaty further stated that the limitation must be reasonable and apply only to Chinese laborers. The Act of 1882 suspended the immigration of Chinese laborers for 10 years and gave those in the United States or those who should arrive within 90 days after the passage of the act the right to remain, but forbade the naturalization of Chinese, and the act applied to both skilled and unskilled laborers. The act was amended in 1888, while a treaty, in which the Chinese government undertook to prohibit Chinese laborers from coming to the United States, and our government agreed to protect those here from the violence and outrages to which they were constantly subjected without redress, was still pending. The amendment prohibited the return on certificate of Chinamen once here who went back to China, declared all such certificates void, and practically made Chinese exclusion permanent. This act angered the Chinese government, which did not ratify the treaty. The Act of 1882 expired in 1892, and the Geary law continuing the exclusion for a further period of 10 years was passed May 5, 1892. The Act of 1902 continued existing legislation until further enactment should be made. It extended the exclusion laws to the island possessions and forbade the migration to the mainland or to other island groups of Chinese domiciled in one island group.

The methods by which Chinese exclusion has been accomplished have not been above reproach, but public opinion forced radical action on the part of the government. It is asserted by those who advocate Chinese exclusion that the Chinese come here not in families, but chiefly as male laborers for a temporary stay, to secure about $1500 in savings and then return to China with a competency. The difference between the American and Chinese civilization makes it almost impossible to assimilate them. They work for low wages and live very cheaply. Whether or not they would ever come to this country in sufficient numbers to constitute a menace to the economic interests of American labor, which the American workingman supposes, is doubtful.

The number of Chinese who came to the United States from 1848 to 1852, when they began to come as a result of the gold discoveries, is estimated at 10,000. From 1852 to 1854 the excess of arrivals over departures amounted to 31,861. During the next 15 years the annual departures were about as great as the arrivals; 1868 showed a net gain of 6876, and from that year down to 1876 the net gain was about 11,000 per annum. The census of 1880 showed 105,465, exclusive of Hawaii; 1890, 107,488; 1900, 89,863; 1910, 71,531. Consult Mayo Smith, *Emigration and Immigration;* Hall, *Immigration* (New York, 1906); United States Bureau of Immigration and Naturalization, *Treaty, Laws, and Regulations Governing the Admission of Chinese* (Washington, 1912); Library of Congress, *Select List of References on Chinese Immigration* (Washington, 1904). See IMMIGRATION.

CHINESE LANGUAGE, WRITING, AND LITERATURE. The language of China is ancient and important because of the vast number of human beings speaking it; but it ranks among the most rudimentary forms of speech that have maintained a long existence anywhere in the world. It is monosyllabic, each word being uttered by a single movement of the organs of speech and expressing a complete idea or thing. It is characterized by the unchangeability of the root. Hence it is without inflections or distinct parts of speech. The relation of a word is recognized by its position in the sentence and the addition of other words. The same word may often serve as noun, adjective, verb, or adverb. Gender, number, person, and case are signified, not by the form of the word itself, but by related additional words. In the absence of inflection, position and the use of auxiliary words are much more important in Chinese than in other languages. Chinese is one of the simplest languages in the world and at the same time one of the most difficult; for while there is no grammar except syntax, to be a scholar one must learn the book language in its two or three different forms, the colloquial or spoken languages in their various vernaculars, and the tones (as many, it may be, as seven to a single sound), which increase the number of simple words or roots from nearly 500 to 1200 or more. It is very difficult for a Western man to be a master of the Chinese tones. The variety of dialects and their difficulties are overcome by

what is commonly called the "mandarin," or court, dialect, the medium of official communication, which, though phonetically the poorest of the dialects, has received considerable literary cultivation. There is a vast difference between the literary and colloquial idioms. Yet, though poor in form—indeed, one of the poorest—the Chinese language has been made, through ages of cultivation and solely by the genius of those who use it, superior as an instrument of thought to many, perhaps to most, inflected languages. "The contrast between the means and production in Chinese," says Steinthal, "is a perfectly unique phenomenon in language history."

The symbols, or ideographs, of the written language, at first few in number and derived from natural or artificial objects, became stereotyped by use and so modified by contractions as presently to lose all resemblance to the original hieroglyphs. Native philologists seem to recognize some such process as this in arranging their language in "six writings" (*liu shu*), 608 imitative symbols, 107 signs of thought, 740 combined ideas (e.g., "woman" and "broom" denoting a 'wife'), 372 inverted significations (the character for "hand" turned one way meaning 'right,' the other 'left'), 21,810 phonograms—the bulk of the language—combining an imitative with a sound symbol, and 598 metaphonic symbols and combinations, for the most part accepted conventions difficult to explain. This constitutes a vocabulary of 24,235 separate words, which is approximately the total of words in good usage; though this is increased by obsolete and compound characters in Kang-hi's dictionary to 44,449. Here, as elsewhere, however, the vocabulary of ordinary life is much more limited, not far exceeding 3000; that of the nine canonical books is only 4601. Doubtless the aspect of the written character underwent a change upon the invention of the hair pencil or brush, ascribed to a general in the third century B.C., when the hard stylus ceased to be used; and other changes in the mechanics of writing must account for the obliteration of almost every semblance of its hieroglyphic origin in the modern script. There being no alphabet in Chinese, the difficulties in arranging this assemblage of arbitrary signs are very great. After various phonetic plans had been tried, the characters were classified in the sixth century by selecting the most significant part of each as its key or radical and by grouping together those in which the same element occurred. These groups were subsequently reduced from 542 to 214 in the sixteenth century, the characters under the same radical being listed consecutively according to the number of strokes required to write the extra-radical portion. This latter part—usually called the primitive—may be written above, below, on either side, or inclosed within the radical; it is necessary, therefore, to become familiar with these 214 signs before the first step can be taken in acquiring a knowledge of the written language. The number of characters listed under each of these in the dictionary varies from 5 to 1354. A remarkable limitation in Chinese is the paucity of its sounds, hardly more than 400 in the modern mandarin dialect, though possibly twice that number in the ancient language. The difficulty arising from this is relieved by the employment of tones, mentioned above, and by breathings or aspirates (e.g., *t'ang* and *tang* are two different words); but in spite of these the number of homophones is excessive and embarrassing, and the spoken tongue, with its varying dialectic pronunciations of the same written character, may be considered the most difficult in the world for an alien to acquire. Great attention is paid to its calligraphy; no educated man allows himself to write carelessly, and the appearance of a written or printed page of Chinese characters in vertical columns is more ornamental than that of a page in any other language. Six different styles of script are recognized, of which only two—the "pattern" and "running" hands—are in common use. Finally, in addition to the difficulties already enumerated, it may be said that a language which cannot express by single words such abstract ideas as space, relation, etc., must have severely restricted the intellectual development of the race compelled to employ it during 40 centuries of comparatively high civilization.

Literature. Owing to the lack of durable monuments, there are no credible texts of very ancient inscriptions in China, as there are in Babylonia and Egypt. By the sixth century B.C., when Confucius edited the famous sacred canons known as the *king*, there evidently existed a considerable literature in verse and prose already considered old. To the *king*, the model of literary form, the acme of philosophic wisdom, is largely due that extraordinary stability of Chinese thought and institutions which is the wonder of their history. They consist of the "Five Canons"—*I-king*, the 'Book of Changes'; *Shu-king*, the 'Book of History'; *Shï-king*, or 'Book of Odes'; *Li-ki*, or 'Book of Rites'; and the *Ch'un-ts'iu*, or 'Spring and Autumn,' the last being the only one claiming Confucius as the actual author—and to these are added the "Four Books": The *Lun-yü*, or 'Analects,' of Confucius, his views and maxims retailed by disciples; the "Book of Mencius"; the *Ta-hio*, or 'Great Learning,' and the *Chung-yung*, or 'Doctrine of the Mean,' a short treatise enlarging upon Confucius' teaching as to conduct. These classics of the Far East constitute as interesting a body of literature as can be found in any ancient civilization. No written product of the human mind has for so long a period or so completely molded the culture, morals, and government of a large fraction of civilized mankind. Its profound and continuous study has not only left abiding traces upon Chinese thought and institutions, but has, through veneration for the letter as well as the spirit, preserved the language almost unchanged during 3000 years, set a permanent standard of literary style, and stimulated the critical faculties of an acute people to the production of thousands of volumes of commentary and discussion. The 'Book of Changes,' probably the oldest of the "Five Canons," is ascribed to Wen-wang, the father of Wu-wang, the founder of the Chou (or Chow) dynasty in the twelfth century B.C. It consists of a series of apparently random deductions based upon the groupings of divided and undivided lines said originally to have been copied and arranged from the back of a tortoise by the Emperor Fu-hi, 28 centuries B.C. These 'eight diagrams' (*pa-kua*) consisted of a combination of continuous and broken lines, each corresponding to certain elements of nature besides representing the male principle in that old natural philosophy in continuous lines, the female in the broken lines. The male principle (*yang*) is the positive element, the female (*yin*) the negative. All good things are male, their opposites female.

These eight diagrams of triplet lines (☰, ☱, ☲, ☳, etc.) were enlarged to 64 by doubling into sextets, each representing some natural force or element and followed by a short essay ascribing to every line its highly fanciful and allegorical import. The text is followed by the so-called "Ten Wings," or commentaries, long ascribed to Confucius, but unquestionably of later origin. It is impossible to do more than guess as to the real purpose of this antique puzzle, foreign speculators calling it a philosophy, a vocabulary of pre-Chinese tribes, a calendar of the lunar year, etc., while the natives persist in venerating it as divinely inspired, though they cannot interpret its true meaning. The 'Book of History,' or *Shu-king*, embodies, like the Hebrew Scripture, fragments of very ancient documents; but its present form is the work of Confucius, who infused into its brief and rather monotonous records his ideas of virtue, statecraft, and philosophy. Though its text is not always beyond dispute, this record places China indisputably in the first rank of Asiatic nations for its authentic data on ancient times. Scarcely less important in this respect, and as a sociological document, is the 'Book of Odes,' or *Shï-king*, while its human and literary interest far surpasses all the other *king*. This poetical relic consists of 305 odes, chants, and ballads, said to have been garnered by the Sage from 3000 songs current in China at his time. They date from the eighteenth to the sixth century B.C., and many if not most of them seem to have a religious use and meaning; but it is hardly possible to exaggerate their interest to the scholar as true pictures of the life and thought of antiquity, or their value in illustrating the language, cults, and customs of old China. They have inspired 80 generations of Chinamen since Confucius expressed approval of them by declaring that "He who knows not the *Shï* stands with his face towards a wall." The fourth classic, the 'Book of Rites,' or *Li-ki*, does not properly belong to the Confucian period, being the compilation of two cousins named *Tai*, in the first century B.C. It got its present form after remodeling in the second century A.D., and until the fourteenth century was always joined with two older works—the *Chou-li* and *I-li*—both devoted, as it was, to ceremonial forms and usages. The 'Spring and Autumn Annals,' or *Ch'un-ts'iu*, is the title of a brief record of Confucius' native state between the years 722–484 B.C., written by the Sage himself, a book upon which he considered his reputation would stand for all time. It is hardly more than a simple statement of events, devoid of comment or interest, but its dry annals were expanded by the *Tso-chuan*, the illuminating commentary of his disciple, Tso-kiu Ming, who made it altogether one of the most readable accounts we have of the remote past, earning for its author the title of the Froissart of ancient China. In style and as a historical text it is so much superior to the *Ch'un-ts'iu* itself that some scholars have suggested that Confucius himself must have had a hand in it.

The "Four Books" are the works of three disciples of the Sage and of Mencius, his great expositor, in the century following his death. The 'Analects' gives some accounts of the habits and records the teachings of the great moralist as nearly as possible in his own words, thus forming an invaluable repository of information about Confucius and his moral system. In this is formulated the famous text of altruism, the Golden Rule, in its Chinese form, "What you would not others should do unto you, do not unto them"; and here are expressed his ideas as to the nature of man, the necessity of education, of etiquette, of self-repression, of filial surrender, and here his agnosticism stands out in bold relief. The "Book of Mêng-tsz'," or Mencius, supplies at rather greater length the teachings of Confucius' greatest follower, a man who subordinated his whole doctrine to the system of his master, but who in breadth and strength of character seems to have been superior to the Sage himself. Like Socrates, he devoted himself to crushing the sophists of his time, and through his learning and influence in combating heterodox philosophers he may be said to have established the supremacy of the Confucian system in the mind of China. As third among the "Four Books" comes the *Ta-hio*, the 'Great Learning,' once constituting a chapter of the 'Book of Rites.' It enlarges upon the regulation of the individual, the family, the state, and the Empire, and has conduced, theoretically at least, to the maintenance during successive ages of China's political solidarity under a system allowing considerable liberty of home rule. Lastly, the *Chung-yung*, also originally a section of the 'Book of Rites,' develops the idea of the princely man who, basing his actions upon the principle of *cheng*, or 'uprightness,' and submitting to the all-pervading *ho*, or 'harmony of the universe,' never departs from the just mean. From this source come in great part the attitude of calm and the assumption of impartiality studiously cultivated by Chinese gentlemen.

In a sense these classical works may be considered the sum and substance of Chinese literature, for not only have the example and ethical system of Confucius become supreme over the minds of his countrymen, but forms of thought and style have ever been kept subservient to these early products of the national genius. Confucius did much for his people, but he has much to answer for in repressing original speculation, freedom of research, and imagination by a colorless formalism. Such was the idea of Ts'in Shï-huang-ti the 'First Emperor' of Ts'in, who in 220 B.C. consolidated feudal China into a real empire and greatly extended its domain. In order to combat the conservative *literati* who resisted his violent and rapid reforms by preaching the doctrines of the dead past, the Ts'in Emperor decreed in 213 B.C. the destruction of all books excepting those on science, agriculture, and divination (the last saving the *I-king* alone of the classics), and forbidding their reproduction or study. The edict, which was carried out with extraordinary thoroughness, brought death upon 460 recalcitrant scholars and forms an epoch in the history of Chinese literature. The tyrant's dynasty did not endure long, and within a half century of his death the ancient learning was revived with double zest under the Han dynasty (206 B.C.–221 A.D.). The new zeal also brought with it a harvest of forgeries of old works alleged to have been discovered in hiding places, but in reality efforts of clever writers to imitate the resuscitated ancients, whose prestige in eastern Asia always far exceeds the most brilliant successes of authors among their own contemporaries. Before touching upon this revival of learning in China, however, it is proper to refer briefly to the non-Confucian literature of Taoism and the mystics.

The philosopher Lau-tzï, an earlier contemporary of Confucius, gave birth to a philosophy of quietism, the esoteric meaning of which is hard to determine. The pursuits of *tau*, as set forth in the *Tau-te king*, a work ascribed (improperly) to the teacher, suggests Hindu transcendentalism and may be derived from India. In its purity it never took much hold on the practical and worldly minded Chinese, but idealists exist even there, and to these such speculations have invariably appealed. In the fourth century B.C. there arose an author, Chuang-tzï, who illuminated for his followers the dark places of *tau* and by the charm and erudition of his style elevated his exposition to a high place in the literature of a country where style atones for all heresy. The history of the sect of *tau*, which passed from pure mysticism to the utmost pretensions of alchemy and divination, does not belong here, nor is there much more than this to be said of the numerous writings of the Buddhists, which begin here in the first century A.D., but which have never greatly affected the literary life of educated China.

While elucidations of the Confucian canons constitute an important part of the literary output of China during its mediæval period, the chief distinction of the Han era comes from the development of poetry and of historical writing. To Mei Sheng (second century B.C.) belongs the honor of first exhibiting the beauties of the five-word metre, in which form have been produced the finest specimens of the poetic art in the language. Rhymes are, of course, easily found in a monosyllabic language of few sounds, but Chinese verse calls for similar tones to perfect the rhyme and demands also the disposal of rising and falling tones in the line in accordance with a scheme which recalls the niceties of metrical arrangement among the Greeks. The identification of the human mood with nature, which was almost unknown in Europe until modern times, appears strong and fresh as a poetic *motif* in China, as elsewhere in the East, from very early ages. In our comprehension of their art, however, the need of translation is a portentous obstacle; whatever the care of the translator, there must always remain differences in standpoint, in mode of life, and intellectual environment to thwart and prejudice the resulting effect upon readers in an alien land. Where every chance allusion to history and familiar custom, where nature herself, as exhibited in an exotic clime, require explanation before the sense is secure, it is hard to keep the flowers of Chinese verse from withering when transferred to another speech. In history the language, of course, fares better, and scholars have reason to look for larger results from translations of the standard Chinese historians than from those of any other Asiatic peoples. First of these authors in time and reputation—next to Confucius, who preached but could not write history—is Ssï-ma Ts'ien (born about 145 B.C.), whose "Historical Record" relates the history of China from the Emperor Huang-ti down to nearly his own period. Its 526,500 words, all originally scratched on bamboo tablets with a stylus, have been conned and counted with such affectionate care in subsequent ages as to have become the unvarying type of historical presentation in China ever since. Each dynasty has made it a serious business to compile the nation's annals during the preceding dynasty as well as to collect records for its own reigns, and the 24 dynastic histories produced in a uniform set of 219 volumes in 1747 are an exhibit of intellectual activity creditable in the extreme to the Chinese mind, even if their pages do not glow with marks of genius or lofty imagination. These official histories are supplemented by private memoirs, local annals, travels, and topographies, and at long intervals authors have appeared to continue the work of Confucius and Ssï-ma Ts'ien by revising and condensing the national history into acceptable literary form. Such have been Ssï-ma Kuang, whose history in 360 books appeared in the eleventh century, and Chu Hi, who issued an "abridgment" in 55 books in the twelfth century. On the whole, the mass of historical literature of all kinds in China may be called enormous, a mine as yet almost unworked by European students. In the rather scant literature of foreign travel should be mentioned the accounts of the journeys of the Buddhist pilgrims Fa-hien in the fourth century and of Hüan-tsang in the seventh century to India in search of holy books and images. They seem to have inspired in China no lasting interest in foreign lands or desire to travel abroad, but by the efforts of these and other priests in translating Buddhist books much of the literature of that creed which would otherwise have perished in its extinction in India has been preserved for the researches of modern scholars.

After a long period of political disturbance and comparative intellectual sterility following the fall of the house of Han, there arose the T'ang dynasty (618–907 A.D.), during which China may be said to have reached the zenith of its intellectual life. "Poetry," declares a Chinese critic, "began with the *Shï*, developed with the *Li Sau*, burst forth and became perfect under the T'ang. Much excellent work was achieved under the Han and Wei dynasties; their writers appear to have selected good subjects, but their language was unequal to its expression." It was notably the age of lyric verse, expressed in a language which had by this time become refined and adapted to the highest literary purposes. Long flights are almost never attempted, the epic being a product altogether alien to the Chinese mind; but as tests of skill under great technical difficulties the eight-line poem and the still harder four-line epigram or "stop-short" have remained favorite forms. Professor Giles describes the invariable arrangement of the two conventional tones in the latter stanza as follows:

Sharp sharp flat flat sharp
Flat flat sharp sharp flat
Flat flat flat sharp sharp
Sharp sharp sharp flat flat

"The effect produced by these tones," he says, "is very marked and pleasing to the ear, and often makes up for the faultiness of the rhymes, which are simply the rhymes of the odes as heard 2500 years ago, many of them of course being no longer rhymes at all. Thus there is as much artificiality about a stanza of Chinese verse as there is about an Alcaic stanza in Latin. But in the hands of the most gifted this artificiality is altogether concealed by art, and the very trammels of tone and rhyme appear to be necessary aids and adjuncts to success." The names of famous poets in this era are legion, and it would be difficult as well as useless to enumerate them. Anthologies of the period are numerous and always studied for their famous poems, as they are set as standards for imitation. The

"Complete Collection," published in 1707, contains nearly 50,000 poems of all sorts arranged in 900 books. Chief among their poets must, however, be mentioned Li Po, or Li T'ai-po (705–762), and Tu Fu (712–770). The former, a sort of Chinese Anacreon, enjoyed immense popularity, became a spoiled child of the Imperial palace, where he performed prodigies of impromptu verse making when too drunk to stand, fell a victim to court intrigue, and was drowned at last, very appropriately, in a maudlin attempt to kiss the moon's reflection in a river. Rather curiously, the Chinese, though a temperate people, are passionately fond of songs in praise of wine and rejoice in a long array of poets who were more or less drunkards. On the other hand, their literature as a whole is singularly pure, standing in this respect high among those of Orientals, though social life among them is far from clean, and obscenity in familiar intercourse is often if not always condoned. Li Po's contemporary, Tu Fu, was also a court officer and favorite and likewise compelled to retire. His career resembled that of Villon and ended in the mire, but his name has been for 1000 years a household word in Asia. One of his verses will serve as a sample of the *summum bonum* of Chinese poetic art and as an illustration of what is admired in the four-line lyric epigram:

> "White gleam the gulls across the darkling tide,
> On the green hills the scarlet flowers burn;
> Alas! I see another spring has died . . .
> When will it come, the day of my return?"

It is perhaps creditable to Chinese institutions that many of their great writers have been men of official rank. In a land where the road to office has long lain through the study of letters this has resulted in efforts more or less serious on the part of every mandarin to "write," and produced in the aggregate a long list of respectable works. Among these the poet, philosopher, and statesman Han Yü (768–824), of the dynasty of T'ang, stands preëminent as a model of nobility of character, ability in high office, and remarkable elevation of literary style. His career is familiar to every well-read Chinaman, one of his compositions being customarily read by the bier as a part of the funeral service, while another, his protest to the Emperor on the subject of receiving a bone of Buddha with Imperial honors, an ode which caused him a long banishment, is one of the favorite "pieces" for reading in the language. Several women emerge from the obscurity of female life in this time and take their places among the famous men of letters in China—a galaxy which knows neither creed nor sex, which stands or falls only by the great test of an approved style.

The literary life of China decreases in originality and power after the great T'ang period, but some phases of its later periods are notable for various reasons. The Sung and some minor dynasties cover the tenth and twelfth centuries, during which renewed attention was paid to history, and Ssï-ma Kuang (1019–86) and Chu Hi (1130–1200) flourished. The latter, one of the most remarkable minds China ever produced, is famous not only as a historian, but as a philosopher, and it is his original interpretations of the classics that constitute the system or code commonly called Confucianism by foreigners. The rise of metaphysical speculation may be said to be the distinguishing mark of this era, within which, however, no phase of literature or learning was neglected and during which the invention of block printing (tenth century) gave great impetus to book making and the formation of libraries. The Mongols themselves added nothing to China's intellectual life, but their dynasty is marked by the introduction of the drama and of novels. Both of these forms of literature are as important now in China as elsewhere, and it is remarkable, in view of the passion common to all Asiatics alike for the story, that the art of fiction in its two highest forms should have been so tardy in developing here. Chinese plays, contrary to the notion accepted in the West, are usually very short, their plots being often ingenious and highly melodramatic, but seldom complicated. No scenery is used, and some of the accepted conventions are naïvely frank. The plays follow each other without change of scene or intermission, the sessions, like school hours in China, lasting all day long. Novels under the Ming (1368–1644) and Manchu dynasties (1644–1912) absorb increasing attention and show great ability, though the plots are often too long and intricate and the characters too numerous to suit the taste of Europeans. Their short stories are, at their best, altogether admirable, if their almost invariable introduction of the supernatural be allowed, some of them, like the *Strange Stories* (1679), ranking among the world's best *contes*. China, like modern Europe, has during recent centuries passed through the encyclopædic age, when scholars have devoted themselves to amassing great repertories of the literature, knowledge, and wit of past generations. No country, in fact, surpasses China in the wealth and variety of her dictionaries and encyclopædias of all kinds, but these can hardly be called literature. Nor does the often scurrilous wit of their proverbs and gross wall literature—anonymous placards frequently found on street corners—call for mention in an account of Chinese letters. The intellectual record of the race is, on the whole, one to be proud of and deserves more attention than it has yet received from Western scholars.

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CHINESE MUSIC. The music of no other nation presents such a vast difference between the theoretical writings and the practical execution as does that of China. The theory of music had reached a high state of development at the earliest times of which we have record; but the practical execution of music was then, and is still to-day, nothing else than a barbarous, cacophonous combination of noises worthy of the rudest savages. The oldest Chinese scale consists of but five tones: F, G, A, C, D. The names of these tones were, *kung, chang, kio, che, yu.* For centuries this incomplete scale remained in use until Tsay-Yu introduced, against violent opposition, the two remaining tones B, E, known as *pien-chung* ('the mediator') and *pien-ho* ('the leader'). Strange to say, from the very beginning the Chinese theory was acquainted with the full octave and its division into 12 semitones. Each semitone was called *Lü.* The idea was conceived of arranging a series of 12 bamboo pipes so that each pipe would produce one Lü. As the older hymns, moving within the compass of the old five-tone scale, could not be adapted to this new device, the pipes were divided into two series, in each of which the progression should be by whole tones—one called perfect, the other imperfect:

1. Series F, G, A, B, C♯, D♯—perfect.
2. Series F♯, G♯, A♯, C, D, E—imperfect.

This progression of whole tones was soon found unsatisfactory. As the result of various experiments, a new scale, consisting of 14 tones, was adopted. This began with the tetrachord B, C, D, E, to which was added the octave F, G, A, B, C, D, E, and three tones above, F, G, A. Within this compass our C major scale is comprised, and the fact that the tones have the same names in different octaves proves that the Chinese understood the principle of the octave. But F was still regarded as the fundamental tone. The fifth tones above and below F are regarded as its helpers, for by means of progression in fifths it was possible to arrive again at the starting tone: F—C—G—D—A—E—B—F♯—C♯—G♯—D♯—A♯—E♯(F). The first seven of these tones, in the progression, are called "principles," the other five "complements." The fifth above is called *Ta-Kinen-Keu* ('great interval'), the fifth below *Tchao-Kinen-Keu* ('small interval'). Every Lü, or semitone, may be taken as the fundamental tone (*kung*) of a scale, and thus the same scale can appear in 12 transpositions. As, moreover, every Lü can change its place seven times within the same scale (i.e., it may be on the first, second, third, etc., step), there arises the total number of 84 scales.

The musical instruments of the Chinese are strictly divided into eight classes, according to the material employed to produce a tone. One of the chief instruments is the *king,* consisting of a frame on which are hung stone plates, which are struck by a mallet. There are in all 16 plates, hanging in two rows. They are tuned in the 12 Lüs of the octave and four additional tones. The *nio-king* is a *king* made of especially fine plates, this instrument to be played only by the Emperor himself. The *cheng* is a peculiar instrument somewhat resembling a small organ. It consists of a gourd over which are arranged 12 or 24 bamboo pipes closed at the lower end with metal plates, with which are connected reeds. Each pipe has a hole which is stopped with the finger to produce the tone. The necessary wind is produced by a bellows. The cheng is the diapason of the Chinese. By it all other instruments are tuned. The *kin* is a stringed instrument with 25 strings made of twisted silk. *Yo* and *che* are flutes made of bamboo. The *ov* is seriously regarded as a musical instrument. It consists of a wooden image of a tiger. The end of a concert is indicated by striking three blows upon the head of this tiger and running a small stick (*chen*) over the back of the figure. The drums are built in all sizes and occupy a position of importance, for the chief purpose of Chinese music is to make as much noise as possible. As everything else, the number of instruments, of singers, etc., is strictly regulated by laws. According to the importance of the occasion, the number of performers may vary from 2 mandarins, 2 singers, and 12 instrumentalists to as many as 13 mandarins, 4 singers, and 52 instrumentalists. The actual Chinese melodies are devoid of all artistic sense; there is no rhythm, no symmetry, no melody. Most of the airs illustrate the conservatism of China by the fact that the tones B and E, which were wanting in the oldest scale, are almost always avoided. For full information the reader is referred to Ambros, *Geschichte der Musik,* vol. i (Leipzig, 1880); Roussier, *Notes et observations sur le mémoire du P. Amiot concernant la musique des Chinois* (Paris, 1779); E. Fischer, *Beiträge zur Erforschung der chinesischen Musik* (Berlin, 1910); J. A. Aalst, *Chinese Music* (Shanghai, 1884); F. Kühnert, *Zur Kenntniss der chinesischen Musik* (Vienna, 1900).

CHINESE WALL. A wall over 1500 miles long, and which has never yet been surveyed, extending between Mongolia and China proper from Suchau, in Kiang-su, eastward to Shanhaik Wan, on the Gulf of Pe-chi-li, with an extension northeastward to the Sungari River. It is called in Mongolian the White Wall, in Chinese the wall of 10,000 Li, and is the most gigantic defensive work in the world. In the third century B.C. an earthwork against the incursions of the Tatars was thrown up which in parts corresponds with the present wall. The latter, however, as recent researches indicate, dates only from the latter part of the fourteenth century. Since the accession of the Manchu dynasty in 1644, the wall has been allowed to fall into decay, except at a few points where it is maintained for customs purposes. The wall is generally about 22 feet high, 20 feet thick, with towers 40 feet high at intervals of some hundred yards. It is built of a brick or dressed granite shell filled with earth, and covered with a very hard coating of bricks in lime. Its course

is irregular, but chosen without regard to natural obstacles, following a serpentine course over mountains and through valleys. At present the wall is still intact for hundreds of miles, but here and there the granite and brick facing and some of the towers have fallen away, causing an appearance of ruin, while at a point near Kalzan it has been cut through to admit the railway line from Peking. Consult Geil, *The Great Wall of China* (London, 1909), and Von Moellendorf, "Die grosse Mauer von China," in *Zeitschr. d. Deutsch. Morgenl. Gesellsch.* (1881).

CHINESE WHITE. The white oxide of zinc now used as a pigment in place of the preparations of white lead. It changes very little, either by atmospheric action or by mixing with other pigments, but it has not the body of white lead. It is prepared also for use in water-color painting, and when so employed is known as body color (q.v.). It renders water colors less transparent when mixed freely with them, but is very useful when sketching on tinted paper, as by its means quick results and sharp effects may be obtained.

CHIN FLY. A bot (*Gastrophilus nasalis*), smaller than the horse bot (*Gastrophilus equi*), densely hairy and with the thorax rust-colored, troublesome to equine animals in the southern United States. "The eggs are laid on the lips or nostrils within easy reach of the tongue. . . . Measures of prevention must consist in preventing as far as possible the deposition of the eggs, for which purpose the application of a little tar and fish oil to the hairs of the under lip may be of service, and where eggs are suspected the use of a wash of carbolic acid to the lips and the margin of nostrils." See Bot.

CHINGACH'GOOK. An Indian chief, who plays a prominent part in Cooper's *Last of the Mohicans, Pathfinder, Deerslayer,* and *Pioneer.*

CHING-HAI, chĭng-hī'. A fortified seaport in the Chinese Province of Che-Kiang, situated at the mouth of the river Yung, about 18 miles from Ning-po (q.v.), of which it is the seaport. It has a citadel and an estimated population of over 140,000. It was taken by the British in 1841.

CHING-TU, chĭng-to͞o'. See Cheng-tu.

CHINIQUY, shē'nē'kē', Charles Pascal Telesphore (1809–99). A Canadian preacher. He was born at Kamouraska, Quebec, ordained in 1833 as a Roman Catholic priest, and after having had charge of several parishes, started his successful temperance crusade (1846). In 1851 he established at Kankakee, Ill., an extensive Roman Catholic colony. He became a Presbyterian minister in 1858 and thenceforth spent much time in public addresses against the Roman Catholic church and published a number of works, largely controversial, of which the principal one, *Fifty Years in the Church of Rome,* first published in 1886, reached its forty-third edition in 1913. His other publications include: *The Priest, the Woman, and the Confessional* (1874; 43d ed., 1913); *Papal Idolatry: Exposition of the Doctrine of Transubstantiation* (1887); *The Murder of Abraham Lincoln Planned and Executed by Jesuit Priests* (1893); *Forty Years in the Church of Christ* (1899).

CHINKARA, chĭn-kä'rȧ (from Skt. *chikkāra,* sort of antelope). The Indian gazelle (*Gazella bennetti*), sometimes improperly called "ravine deer." See Gazelle.

CHINKIANG, or CHEN-KIANG-FU, chēn'-kyäng'fo͞o'. A city and port in China, named Rule-the-River City, because of its former military importance. It is situated at the junction of the Grand Canal, on the right bank of the Yang-tze-kiang, about 150 miles from its mouth (Map: China, E 5). It was opened to commerce by the Treaty of Tientsin (1858). Waterways connect it with Shanghai and the several Yang-tze ports, and by the Grand Canal with the country north and south of the great river, but with the construction of railroads the Grand Canal is about to lose its former importance. It has a bund or river-fronting esplanade, clubhouse, and churches. In 1889 a native mob destroyed half the foreign houses. Nearly destroyed by the Tai-ping rebels, who occupied it from 1853 to 1857, it has fully regained its commercial importance. Goatskins, silk, rice, hides, wool, and fancy products are exported, and opium, cotton goods, and sugar are imported. In 1912 the foreign trade amounted to $15,952,000, the traffic in goods having gradually declined within the last few years, partly owing to railway freights having entered into competition with river steamers. The population is about 160,000.

CHIN'NERY-HAL'DANE, James Robert Alexander, Lord Bishop of Argyll and the Isles. See Argyll and the Isles.

CHINON, shē'nôN' (anciently called *Caino,* probably connected with OIr. *cáin;* OWelsh *cein,* beautiful; Gk. *καίνσθαι, kainsthai,* to surpass; Alban. *si,* eye). A town of France in the Department of Indre-et-Loire, situated on the left bank of the Vienne, 25 miles southwest of Tours (Map: France, N., F 5). It has the remains of the huge old Château de Saint-Georges, the occasional residence of the Plantagenet kings of England and also of some of the French sovereigns. Chinon is celebrated as the birthplace of Rabelais, and in the Château de Milieu Jeanne d'Arc first met Charles VII of France, in 1429, both events being commemorated by monuments. Chinon has manufactures of druggets, serges, earthenware, baskets, wines, rope, etc. Pop. (commune), 1901, 6033; 1911, 5943. Consult De Cougny, *Chinon et ses monuments* (Chinon, 1874).

CHINOOK, chĭ-no͞ok'. Formerly an important tribe occupying the country at the mouth of the Columbia River in Washington. They were venturesome fishermen and enterprising traders, traveling long distances up the river and along the coast in great canoes hewn from immense cedar trunks. They lived in houses made from cedar boards, flattened the head, owned slaves, and practiced the potlatch (q.v.). Together with the Clackamas, Clastop, Wasco, and Wishram, they constitute the Chinookan linguistic stock. Though once numerous and occupying both banks of the Columbia as far up as the Dalles, they have dwindled to 897 individuals. Consult Chittenden and Richardson, *Life, Letters, and Travels of Pierre Jean de Smet* (New York, 1905).

CHINOOK. A term applied by the early settlers of the Northwest Territory and in meteorological literature to a strong, warm, and dry south or west wind descending the eastern slopes of the Rocky Mountains into Montana and Wyoming, evaporating or melting the snow and bringing great relief in cold weather. The name was probably given to it because the wind occurred in, or blew from, the territory occupied by the Chinook Indians. It was at first supposed by the settlers to be a branch of the

warm southwest wind of the Pacific Ocean that had crossed over the Rocky Mountain Range; indeed, the moist southwest winds on the coasts of Oregon and Washington have also been called "chinook winds." It is a mistake to think that the Montana chinook originates over the warm waters of the Pacific; it is essentially a descending wind and owes its temperature and dryness to this fact; it belongs to the same class as the föhn winds of Switzerland. Several very different combinations of conditions may cause descending winds, but in any case descending air by coming under greater pressure must be compressed and therefore warmed up at the rate of about 1° F. for each 183 feet of descent, or 1° C. per 100 meters. Therefore a fall of 5500 feet, such as is very common in flowing over the Rockies, will raise the temperature of the air by 30°, and as this warmth is very slowly lost, the warm air spreads over a wide extent of ground. The hot winds of Kansas and Iowa undoubtedly also owe their high temperatures to the fact that the air is descending rapidly. As no moisture is added to the mass of descending air, the föhn winds of Switzerland, the chinooks of Montana, and especially the hot winds of Kansas are extremely dry and evaporate and absorb any snow or moisture at the surface of the ground. The proper explanation of chinooks was first given by G. M. Dawson, 1879–80, but the most important early paper on the subject was by Prof. Mark W. Harrington of the University of Michigan, in the *American Meteorological Journal*, vol. iii (Ann Arbor, 1887).

CHINOOK JARGON. An important trade jargon, formerly constituting the chief medium of intercommunication among all the tribes of the Pacific coast from northern California far up into Alaska and throughout the Columbia region. Owing to its great usefulness over a wide area, considerable attention was given to it by traders and missionaries, despite its mongrel and skeleton character. According to an analysis of 500 words, two-fifths are of Chinook origin, two-fifths from other Indian languages and Canadian French, and one-fifth from the English, all, however, being softened and modified to suit the phonetic deficiencies of those using the jargon. Consult: Hale, *Manual of Oregon Trade Language* (London, 1890); Gill, *Dictionary of Chinook Jargon* (Portland, Oreg., 1891); Boas, "Chinook Texts," in *Smithsonian Bureau of Ethnology* (Washington, 1894); Pilling, "Bibliography of Chinook Languages," in *Smithsonian Bureau of Ethnology* (Washington, 1893).

CHINOOK SALMON. The common and most valuable salmon of the Pacific coast. See QUINNAT SALMON; SALMON.

CHINQUAPIN. See CHESTNUT.

CHINS. A general name applied to certain peoples of a more or less primitive type inhabiting the mountains of Assam, Arakan, the Burmo-Chinese frontier, etc., known variously as Chins, Kakhyens, Khyens, Katchins, or Singhpos. Physically they are now somewhat mixed with the other peoples of this area, Karens, Burmese, and Shans, with perhaps a later Hindu and an earlier Dravidian strain, the whole resting upon a Mongoloid (Sinitic) basis. Some of the Chins are very warlike and great hunters. By language they seem to belong in the Tibeto-Chinese stock, being nearest related to the Burmese. Besides the general works on Assam, Burma, etc., the literature relating to the Chins includes Anderson, *Mandalay and Momien* (London, 1876), and Reid, *Chin-Lushai Land* (ib., 1893); and, particularly, for data on mythology and religion, material culture, ethnology, etc., the articles of Father Gilhodes in *Anthropos* for 1908–10, and the monograph of Wehrli, *Beitrag zur Ethnographie der Chingpaw* (Leiden, 1904). The Chins of Dardistan belong to another race altogether and speak an Aryan tongue.

CHINSURA, chĭn-sōō'rȧ. A former town in Bengal, British India, on the right bank of the Hugli, 20 miles above Calcutta, now incorporated with Hugli (q.v.), Hugli-Chinsura (Map: India, E 4). Chinsura was originally the chief Dutch settlement in Bengal and was established in 1656. It was ceded in 1824 to the British, together with other places on the mainland, in exchange for the English possessions in the island of Sumatra. It is noted for its educational institutions, including Hugli College and many missionary schools, but is now slowly declining. Its industry is unimportant.

CHINTREUIL, shăn'trē'y', ANTOINE (1814–73). A French landscape painter, born at Pont-de-Vaux (Ain). He was the most important of Corot's pupils and succeeded better than any other in expressing in his work the poetic sentiment of his master, yet without losing his own individuality. His subjects are chiefly misty melancholy plains, sunlit thickets, and grassy clearings. They are found in most of the French provincial museums; the Louvre possesses three of the best: a "Thicket with Deer," "Space," and "Rain and Sunshine" (1873), his masterpiece.

CHINTZ (Hind. *cīnt, cīt,* Beng. *cīt,* chintz, from Skt. *chitra,* spotted, variegated). A highly glazed printed cotton fabric, with a pattern in many colors on a white or light-colored ground. It was used for bed hangings and other purposes where gay colors were desired and where there was much exposure to dust, which does not readily adhere to its highly calendered surface. See CRETONNE.

CHIO, kē'ō. See CHIOS.

CHIOGGIA, kyŏ'jȧ, or **CHIOZZA,** -dzȧ (mediæval *Clugia,* from Lat. *Fossa Claudia*). An episcopal city and fortified seaport of Italy, in the Province of Venice, 18 miles south of Venice (to which there are frequent daily steamboats) and 63 miles by rail southeast of Padua (Map: Italy, G 2). It is built on piles and is surrounded by the Lombardo Ship Canal. The Vena Canal, which is crossed by nine bridges, cuts it in two, and it is connected with the mainland by a stone bridge, 800 feet long, with 43 arches. The cathedral dates from 1633, the Board of Trade building from 1322. The inhabitants have always been distinguished by quaint customs, costumes, and dialect, and the fisheries have long been important. The other principal industries are flax spinning, shipbuilding, and the manufacture of sails, bricks, candles, and lace. The rivalry of Genoa and Venice was decided here, Dec. 23, 1379, by the victory of the Venetian fleet. Pop. (commune), 1881, 28,000; 1901, 30,563; 1911, 35,052. See VENICE, *History.*

CHION, kī'ŏn (Lat., from Gk. Χίων). A native of Heraclea, on the Euxine Sea, son of Matris and pupil of Plato. In conjunction with Leonides and others, he tried, in 352 B.C., to liberate his native city from the tyranny of

Clearchus. Clearchus was killed, but his brother, Satyrus, brought about the death of chion and reasserted the tyranny. Seventeen extant letters are wrongly ascribed to Chion.

CHIONIDES, kī-ŏn′ī-dēz (from Gk. Χιονίδης). A Greek comic poet, whose representations date from 487 B.C. He is called the earliest writer of the Old Attic Comedy in that he was the first to impart to it its characteristic spirit of censorious criticism, whether of morals, politics, or literary taste. The extant fragments of his works have been edited in Meineke, *Fragmenta Comicorum Græcorum* (Paris, 1839–57), and Kock, *Comicorum Atticorum Fragmenta*, vol. i, pp. 4–7 (Leipzig, 1880–84).

CHIOS, kī′ŏs (Gk. Χίος, *Chios;* Turk. *Sagis adásch; Scio* in the Genoese form). A Turkish island 7 miles off the west coast of Asia Minor, about 50 miles in a direct line west of Smyrna (Map: Turkey in Asia, A 3). Its length from north to south is 32 miles; its greatest breadth, 18; area, about 318 square miles. Chios is one of the largest islands in the Ægean Sea and is, or was, until the terrible earthquake of 1881, one of the most productive and beautiful, the name having furnished in ancient times a synonym for wealth and profligacy. The surface is largely occupied by chalky limestone mountains, which in the north reach an altitude of 4080 feet in Mount Oros. Along the centre of the east coast lies an extensive plain around the capital, Chios. It is a rich and picturesque district, abounding in vines and orange, lemon, and almond trees, and embellished with villas. The climate is dry, especially in summer, and delightful. The wine of Chios, famous in antiquity, is still of some repute. Oil, cotton, and the usual fruits of that latitude are produced, and in the southwestern part a well-known variety of mastic. Cheese, silk, wool, and silk and woolen stuffs, as well as grain, cattle, salt, and preserved fruits, figure prominently among the products. The leading export articles are leather, mastic, fruits, and distilled spirits. The leading imports are hides and grain. Chios, with the islands, forms a sanjak of the archipelago (Jezairi-Bahri-Sefid) vilayet and has a population of 59,600, mostly Greeks. The population of the capital (Chios or Kastro) is about 14,250. The city has an aga, a bishop of the Greek church, and is, with its new haven, protected by a fortress.

In early times the island was colonized by the Ionians and remained an independent and powerful state till 546 B.C., when it was subdued by the Persians. It took part in the Ionian revolt and contributed 100 vessels to the Greek naval force which was defeated at the battle of Lade (494). From that time until 479 it was again subject to the Persians, but in the latter year it was freed from the Persian yoke, and became in 477 an independent member of the Delian Confederacy. In 415 it took part in the Sicilian expedition with 50 ships. The island remained on its original footing of autonomous ally of Athens, retaining its armed force, its ships, and its fortifications, until 412 B.C., when it attempted to revolt—an attempt which led in the end to its conquest and devastation. It supported the Romans in their wars in the East, and was made by them a free and allied state. In more recent times the island has changed hands repeatedly and has experienced many vicissitudes of fortune. In 1089 it was devastated by the Turks under Tzachas. In 1172 it was in the possession of the Doge of Venice, Vital Michieli. In 1346 it fell into the hands of the Genoese, and in 1566 it was taken by the Turks, in whose hands it has since, except for a short interval (1694–95), remained. It was conferred as private property upon the Sultana, enjoyed her protection, and consequently prospered. In 1822, a number of the Sciotes having joined the Samians in a revolt against Turkey, the island was attacked by a Turkish fleet and army, and the inhabitants were mercilessly slaughtered or sold as slaves. The town and island were laid waste. The island has since recovered, however, and is now in a prosperous condition. In recent years the island has suffered from earthquakes, notably in March, 1881, when much property was destroyed and over 5000 persons lost their lives.

On Nov. 24, 1912, in the course of the Balkan War (q.v.), a Greek expedition effected a landing on the island and after a stubborn campaign obliged the last Turkish garrison to surrender, Jan. 3, 1913. By the Treaty of London (May 30, 1913) the final political disposition of Chios was left to the arbitrament of the Powers, and this arrangement was confirmed by the Treaty of Athens between Greece and Turkey (Nov. 13, 1913).

CHIOS, HIPPOCRATES OF. See HIPPOCRATES OF CHIOS.

CHIOZZA. See CHIOGGIA.

CHIP′MAN, NATHANIEL (1752–1843). An American jurist and politician. He was born in Salisbury, Conn., graduated at Yale in 1777, served as a lieutenant in the Revolutionary army, and was at the battles of White Plains and Monmouth. He was admitted to the bar in 1779 and began practice in Vermont, where he served in the Legislature in 1784–85 and became a judge of the State Supreme Court in 1786 and Chief Justice in 1789. In 1791 he was a member of the convention called to decide whether Vermont should join the Union, and was one of the commissioners to arrange for the State's admission. He was judge of the United States Court for the district of Vermont in 1791–93. He served as United States Senator in 1798–1804, in the State Legislature in 1806–09 and 1811, and was again Chief Justice of the Supreme Court in 1813–15. In 1826 he revised the laws of the State. He was professor of law in Middlebury College from 1816 to the time of his death. He published *Principles of Government: A Treatise on Free Institutions* (1833) and other works of a similar character. Consult the memoir (Boston, 1846) by his brother Daniel (1765–1850), also a prominent Vermont jurist.

CHIP′MAN, WARD (1787–1851). A Canadian jurist, born in St. John, New Brunswick, son of a Massachusetts Loyalist (1754–1824) of the same name. He graduated at Harvard College in 1805, and was crown agent for determining the northwest "angle" of Nova Scotia in 1824–29. He was Advocate-General, clerk of the circuits, and Solicitor-General, puisne judge of the Supreme Court (1825), and Chief Justice (1834). He was also President of the Legislative Council and Speaker of the Assembly.

CHIP′MUNK (N. Amer. Indian, probably originally imitative). An American ground squirrel of the genus *Tamias*, which forms a connecting link between the arboreal squirrels proper and the spermophiles. It is a small animal, about 6 inches long, with a slender 4-inch tail. The color is reddish brown or gray, with

black and white stripes on the back. The chipmunk (*Tamias striatus*) is one of the commonest and most pleasantly familiar animals in eastern North America, living in stone walls and stumps. Four geographical races are recognized. It is almost always to be found along old fences and hedgerows, especially near woods, and lives in a burrow, wherein it stores for winter use large quantities of small nuts, acorns, etc., and where it remains in a snug nest until spring, frequently appearing, however, on the warmer days. Other species occur in the central and western United States, of which the "four-lined" is extremely numerous and active throughout the whole Rocky Mountain region. (See Plate of SQUIRRELS.) For life history, consult Thompson Seton, *Life Histories of Northern Animals* (New York, 1909). For systematic review of the genus, consult J. A. Allen, *American Museum of Natural History Bulletin*, vol. iii (New York, 1890).

CHIPPAWA, chĭp'à-wä. A village and port of entry in Welland Co., Ontario, Canada, at the junction of the Chippawa with the Niagara River, 2 miles above the great falls, and on the Michigan Central Railroad. An electric railway running from Queenston terminates at Chippawa. Here Maj. Gen. Joseph Brown, July 5, 1814, with 1900 Americans defeated the English under Major General Rial, who had 2100 men. The Americans had 68 killed and 267 wounded and the English 138 killed and 365 wounded. Pop., 1910, 707.

CHIPPENDALE, THOMAS (?–1779). A famous English cabinetmaker of the eighteenth century, who, with his father of the same name, a carver and maker of picture frames, moved from Worcester to London before 1727. He took a shop in Conduit Street, Long Acre, at Christmas, 1749, and four years later moved to larger premises at 60 St. Martin's Lane. In April, 1754, he published the first edition (two following) of his *The Gentleman and Cabinet Maker's Director*, and by 1760 he had become so prominent as to be elected a member of the Society for the Encouragement of Arts, Manufactures, and Commerce, an organization that still flourishes. Chippendale's name in this connection appears in an autograph book with those of Sir Joshua Reynolds, Edward Gibbon, Samuel Richardson, Dr. Johnson, David Garrick, Horace Walpole, the Earl of Bute, and John Wilkes. From 1766, when his partner, Ranney, died, until his own death, Nov. 13, 1779, Thomas Chippendale carried on his business alone; he was succeeded by his eldest son, Thomas, in partnership with Thomas Haig. For facsimile reproductions of two of the firm's bills, consult MacQuoid, *History of English Furniture*, vol. iii (New York, 1904–08). Much of the furniture enumerated in these bills is still in existence and illustrated by MacQuoid. Consult, for detail, Simon, *English Furniture Designers of the Eighteenth Century* (London, 1905).

CHIPPENDALE CHAIRS. The great name in chair making is Chippendale. For many years before and after the middle of the eighteenth century he flourished in London, and his famous book, *The Gentleman and Cabinet Maker's Director*, published in 1754 and sold mainly to the trade, brought him posthumous reputation as well as immediate business. Ever since then the strongest and handsomest chairs used in England and America, and to some extent in Germany, have been Chippendale chairs made in the master's own shop or reproduced from them and his book. Thomas Chippendale was a genius in the workroom. Chinese and rococo, Dutch and Gothic, were all alike to him. From bad designs as well as from good designs, made by architects as well as by professional furniture designers, he produced models that are marvelous for beauty of proportion, comfort in use, strength, and durability. Characteristic of Chippendale chairs is the carved and pierced openwork of the splat in the back. Chairs of the Hogarth and Queen Anne type that preceded Chippendale have a solid splat. Also characteristic is the starting of the splat in the rail of the seat. The backs of Hepplewhite and Sheraton chairs, that followed Chippendale, are supported entirely by the side posts and consequently look fragile even when they are not. The only chairs built by Chippendale for the great architect Robert Adam came through absolutely Chippendale in construction and feeling, though completely classic in line, made in light mahogany and after designs by Adam. Chippendale's favorite wood was dark mahogany, and his favorite ornament carving. Inlay and the fancy woods in light colors affected by Hepplewhite and Sheraton, he avoided. While Chippendale's book in its different editions shows many kinds of furniture besides chairs—some of it atrocious, particularly the rococo mirrors—and he undoubtedly made all kinds in his shop, his fame rests upon his chairs.

Consult: Chippendale's own book named above; MacQuoid, "The Age of Mahogany," vol. iii of his *History of English Furniture* (London, 1904–08); Foley, *The Book of Decorative Furniture*, 2 vols. (New York, 1911); Lockwood, *Colonial Furniture in America* (ib., 1903); Singleton, *The Furniture of our Forefathers* (ib., 1901); Strange, *English Furniture* (London, 1901).

CHIPPENHAM, chĭp'en-am. A market town in Wiltshire, England, on the Avon, 22 miles east of Bristol (Map: England, D 5). Chippenham is famed for its markets of cheese and corn, its cheese market being one of the largest in Britain. Pop., 1901, 5000; 1911, 5332. Near the town is Lacock Abbey. It was the scene of the signing of the famous Treaty of Chippenham, or Wedmore, in 878, between King Alfred the Great and the Danish leader Guthrum.

CHIPPEWA, chĭp'pê-wä. See OJIBWA.

CHIPPEWA FALLS. A city and the county seat of Chippewa Co., Wis., 105 miles east of St. Paul, Minn., on the Chicago and Northwestern, the Chicago, Milwaukee, and St. Paul, and the Minneapolis, St. Paul, and Sault Ste. Marie railroads, and on the Chippewa River (Map: Wisconsin, B 4). It contains a public library and a fine county courthouse, and is the seat of the State Home for the Feeble-minded and the County Insane Asylum. Tone Rock battleground, near the city, is of interest as the scene of a Sioux-Ojibwa conflict. The city has fine water power, carries on a considerable trade in lumber, and manufactures beet sugar, chairs, sashes and doors, flour, shoes, gloves, beer, woolen goods, foundry products, etc. It is especially noted, however, for the pure spring water which is obtained from the Chippewa Springs and which is shipped to all parts of the United States and to the Orient. Settled in 1838, Chippewa Falls was chartered as a city in 1870. The government is administered under a general State law, by a mayor and a council. Pop., 1900, 8094; 1910, 8893.

CHIPPEWA RIVER. A river of Wisconsin, rising in the northern part of the State, about 30 miles southeast of Ashland, on Lake Superior (Map: Wisconsin, B 3). It flows southwest, meeting its west branch in Sawyer County, and, receiving the Flambeau from the east and the Red Cedar from the west, empties into the Mississippi River at the lower end of Lake Pepin. It flows through the great lumber region of the State. At Chippewa Falls there is good water power.

CHIP'PEWY'AN. A nomadic hunting tribe of Athabascan stock, roaming over the country along Great Slave River from Lake Athabasca to Great Slave Lake. The name, which must not be confounded with Chippewa or Ojibwa (q.v.), is of Cree origin and signifies 'pointed coat,' referring to a characteristic fur garment worn by the men. They are also frequently known as Athabasca, from the lake near which they reside. They number about 1000, all now Christianized by Catholic missionaries. Consult Goddard, *Texts and Analysis of the Cold Lake Dialect* (New York, 1912).

CHIP'PING WYCOMBE, wĭk'*a*m. See WYCOMBE.

CHIP'PY, or CHIPPING SPARROW (so called from its note). One of the smallest and most numerous of the migratory American sparrows (*Spizella passerina,* or *socialis*), distinguished by its small size, unspotted, ashy blue breast, and chestnut cap. It is a general favorite because of its gentle manners and familiarity. It builds its nest in shrubs, of grass and fine roots, and always lines it with horsehairs, whence it is sometimes called "hairbird." The eggs are four or five in number, blue, speckled at the larger end with blackish brown. Two or three broods are reared in a season. (For illustration, see SPARROW.) Like other sparrows, the chippy feeds chiefly on seeds, but it often eats insects too. It is by no means a songster, but the usual *chippy-chippy-chippy* forms a trill that is musical and sweet. Consult Weed, "Feeding Habits of the Chipping Sparrow," *New Hampshire College Agricultural Experiment Station Bulletin 55* (Durham, 1898), from which it appears that the bird does good service for the gardener as a destroyer of insects and should be protected and encouraged. See SPARROW.

CHIQUICHIQUI (chē'kē-chē'kē) **PALM** (So. Amer. Indian). A palm (*Leopoldinia piassaba*) called "piassaba" in northern Brazil. It is one of the species yielding piassaba fibre, which is employed in the manufacture of brushes. The piassaba fibre exported from Pará is partly obtained from it. It grows in swampy or occasionally flooded lands, on the banks of the Río Negro and other rivers of Venezuela and the north of Brazil, and has a crown of very large, regularly pinnate leaves, with smooth, slender stalks. The leaves, like those of many other palms, are much used for thatching.

CHIQUINQUIRÁ, chē-kēn'kē-rä'. A city in the Department of Boyacá, Colombia, situated 44 miles west of Tunja and 8600 feet above sea level (Map: Colombia, C 2). The town is famed for its Dominican Conventual Chapel having a miraculous picture of the Virgin. The chapel is visited annually by some 30,000 pilgrims, which number swells to 50,000 every seventh year, the time of public celebration. The permanent population is about 13,000. Its educational facilities are good, there being one State college, one private College of Philosophy and Letters, three colleges for women, and one higher school for men.

CHIQUITO, chē-kē'tō (Sp., very small). A group of tribes constituting a distinct linguistic stock, between the headwaters of the Mamoré and the Paraguay, eastern Bolivia. Their territory included the region between 16° and 18° S. lat. and 59° and 64° W. long. They are of rather small stature, whence, according to some, the name, which has also been explained as referring to the small entrance to their houses, and were originally agricultural, but warlike, living in palisaded villages with houses regularly ranged in streets. They resisted the Spaniards for nearly two centuries, but in 1691 accepted the Jesuit missionaries, who established flourishing mission communities among them. In 1831 they were found at Buenvista de Santa Cruz, San Francisco Xavier de Chiquitos, Concepción, San Ignacio, San Miguel, Santa Ana, San Rafael, San José, San Juan, and Santo Corazón; some also at Casalavasco, whither they had been transported by the Brazilians. They selected the Chiquito language proper as the general medium of communication among the converts, who numbered over 50,000, representing nearly 50 tribes, including the Curuminaca, Corabeca, Covareca, Curaveca, Curucaneca, etc. On the expulsion of the Jesuits in 1767 the communities rapidly decayed, and within a generation nearly two-thirds of the Chiquito race had disappeared. A considerable body still survives, living in straw-thatched adobe houses, cultivating cotton and sugar cane, and weaving ponchos and hammocks. Some of the old tribal differences still exist in the Chiquitan villages. Consult Cardús, *Las Misiones Franciscanas entre los infieles de Bolivia* (Barcelona, 1886), and Adam and Henry, *Arte y vocabulario de la lengua Chiquita* (Paris, 1880).

CHIR. See CHEER PHEASANT.

CHIRIGUÁNOS, chē'rē-gwä'nōz. An important Indian tribe, of Tripian stock, occupying a considerable area in southern Bolivia, massed about the region of 63° W. long. and 19°–22° S. lat. They resisted alike the Incas and the Spaniards and were very adverse to accepting Christianity. At one time the Chiriguános seem to have been in confederacy with the Calchaquís, and some authorities would trace Calchaquí culture among them. Consult: Del Campana, "Notizie intorno ai Ciriguani," in the *Archivio per l' Artopologia,* vol. xxxii, pp. 17–144 (Firenze, 1902); Nordenskiöld, *Indianerleben El Gran Chaco,* pp. 173–303 (Leipzig, 1912); Church, *Aborigines of South America,* pp. 206–227 (London, 1912).

CHIR'IMOY'A. See CHERIMOYER.

CHIRIQUI, chē-rē-kē'. A lagoon in the Mosquito Gulf and at the west extremity of Panama (Map: Central America, F 6). The name is also given to a river and mountain range of Panama. The lagoon, which is about 35 miles long and extends inland from 12 to 15 miles, has three entrances and is navigable to the largest vessels.

CHIROGALE, kī'rō-gāl (from Gk. χείρ, *cheir,* hand + γαλῆ, *galē,* weasel). A genus (*Chirogaleus*) of small arboreal lemurs of Madagascar, which curl up in holes of trees and pass the dry season in torpidity. "Before this takes place an immense deposit of fat accumulates upon certain parts of the body, especially upon the basal portion of the tail, . . . which by the time they emerge from their torpor has acquired its normal proportions. The smallest

species . . . live in nests among the small branches on the tops of the highest trees, feeding on fruit and insects." Lydekker, *Mammals* (London, 1891). See Plate of LEMURS.

CHIROL, chĭr′ol, SIR VALENTINE (1852–). An English journalist and writer on the Orient. He was educated in France and Germany, receiving the degree of bachelier-ès-lettres from the University of Paris; was a clerk in the British Foreign Office in 1872–76, traveled in the East and in the United States, was Berlin correspondent for the London *Times*, and was director of the foreign department of the *Times* from 1899 to 1912. In the latter year he was knighted, and was appointed to a commission to inquire into the Indian public services. He wrote: *'Twixt Greek and Turk* (1881); *The Far Eastern Question* (1896); *The Middle Eastern Question* (1903); *Indian Unrest* (1910).

CHIROLEPIS, kī-rŏl′ē-pĭs. See CHEIROLEPIS.

CHIROMANCY, kī′rō-măn′sĭ (from Gk. χείρ, *cheir*, hand + μαντεία, *manteia*, divination), or PALMISTRY. The art of divination through the study of the palm of the hand. The interpretative science of the hand in general is termed "chirosophy." It is divided into two branches—chirognomy, which is concerned with studying man's tendencies through the form of the hand and the fingers, and chiromancy, which pretends to foretell by inspecting the lines of the palm. Chiromancy is an ancient art which was known among the Chaldæans, Assyrians, Egyptians, and Hebrews, and was cultivated by the philosophers Plato, Aristotle, Antiochus, Ptolemy, and others. Aristotle found on an altar dedicated to Apollo a treatise on chiromancy, written in letters of gold, and presented it to Alexander the Great as a gift worthy of his lofty mind. The subject is referred to in Aristotle's *Hist. Animalium* (i, 15) and in the *Problemata* and *Physiognomica*, doubtfully assigned to him. A reference in Juvenal (Sat., vi, 581) indicates that the art was practiced among the Romans. That chiromancy was practiced and accepted seriously in the Middle Ages we know from frequent references to it in the writings of that period. Albertus Magnus, Paracelsus, and Cardanus seem to have been greatly interested in the subject. Later it became involved in jugglery, until in the nineteenth century it again received a certain amount of serious consideration, owing largely to the work of two Frenchmen—Adrien Adolphe Desbarrolles (1801–76) and Casimir Stanislas d'Arpentigny (born 1798), an officer in the French army.

Palmistry treats mainly of the mounts of the hand, with the lines on them and the lines interlacing the palm. The left hand is usually the one studied, since it is less affected by use. There are seven mounts—that at the base of the first finger is the mount of Jupiter; the middle finger, the mount of Saturn; the ring finger, the mount of Apollo; the little finger, the mount of Mercury; beneath Mercury, the mount of Mars; at the wrist, the mount of the Moon; and at the thumb, the mount of Venus. More important even than the mounts are the four great lines—the lines of life, of the head, of the heart, and of fortune. The three first named suggest the letter M and represent the trinity of human existence—sensation, intelligence, and action. The line of life, which follows the mount of Venus and meets the line of the head, determines the length of life, possibility of illness, etc. The line of the head, which crosses the palm obliquely from Jupiter to Mars, indicates the intellectual quality. The line of the heart, which crosses the hand horizontally from Jupiter to Mercury, indicates worth of character; the nearer the line approaches Jupiter the better the character. The line of fortune, which cuts the hand vertically, if clear and straight foretells a prosperous life. Other lines of special interest are the Venus line, the line of the liver, and the line of Apollo. In general, the lines indicate the strength or weakness of tendencies, according to their length and clearness.

Each mount indicates a certain quality; conversely, every missing mount denotes the lack of a corresponding quality. Jupiter normally developed indicates love of honor and a happy disposition; Saturn, prudence and wisdom and therefore success; Apollo, a love of the beautiful and noble aspirations; Mercury, a love of science, industry, and commerce; Mars, courage and resolution; the Moon, a dreamy disposition and moral character; Venus, a taste for beauty and an amorous temperament. Besides the mounts and the lines are squares, stars, circles, points, triangles, crosses, rings, branches, chains, forks, islands, etc., which corroborate or modify, according to their situation, the indications deduced from the inspection of the mounts, the lines, the form of the hand, and the nails.

Bibliography. D'Arpentigny, *La chirognomie* (Paris, 1843); Desbarrolles, *Les mystères de la main* (ib., 1879), and his *Révélations complètes* (ib., 1879); Lenormand, *Souvenirs prophétiques d'une sibylle* (ib., 1814); Firth and Heron Allen, *Chiromancy, or the Science of Palmistry* (London, 1883); L. Cotton, *Palmistry and its Practical Uses* (ib., 1890); Wood, *Scientific Palmistry* (ib., 1900); Oxenford, *Modern Palmistry* (ib., 1900); Benham, *The Laws of Scientific Hand Reading* (New York, 1903); Cheiro, *Cheiro's Memoirs: The Reminiscences of a Society Palmist* (London, 1912). See SUPERSTITION.

CHIRON, kī′rŏn (Lat., from Gk. Χείρων, *Cheirōn*). The most famous of the Centaurs (q.v.), the son of Cronus and Philyra, distinguished from the other Centaurs by his mildness and wisdom and the general benevolence of his character. In works of art he has a nobler and more human bearing. Many Greek heroes—Achilles, Actæon, Alcon, and even Apollo—were educated by Chiron. He was skilled in medicine and was considered the inventor of the lyre. Consult Mannhardt, *Wald- und Feldkulte* (Danzig, 1875–77).

CHIROPRAC′TIC. A system of manipulations which aims to cure disease by the mechanical restoration of displaced or subluxated bones, especially the vertebræ, to their normal relation. It is claimed that slight displacements of the spinal segments are frequent, that they constrict important nerves and arteries, and that chiropractic adjustment corrects the displacement and relieves the pressure. In 1913 there were said to be over 5000 practitioners of the art in the United States and about 1000 students attending seven schools.

CHIROPTERA, kī-rŏp′tĕ-rȧ (Neo-Lat. nom. pl., from Gk. χείρ, *cheir*, hand + πτερόν, *pteron*, wing). An order of mammals, the bats, characterized by the possession of membranous wings (*patagia*) supported upon the highly modified bones of all limbs and extended by the greatly prolonged metacarpals and phalanges of the *manus*. (For details, see BAT.) This order is regarded as an ancient offshoot of the Insec-

tivora, to which it is allied in dentition and many features of internal structure; it is also allied to the Primates in dental characters and especially in the structure and external characteristics of the generative organs. Hence it is usually classified in a linear arrangement next to the Insectivora. It is divided into two suborders—*Frugivorous megachiroptera*, or fruit eaters, and *Animalivorous microchiroptera*, or insect eaters. Geologically the history of the order begins in the Eocene age.

CHIROSOPHY. See CHIROMANCY.

CHI'ROTHE'RIUM. See CHEIROTHERIUM.

CHIRU, chē'rŭ (Hind., from Tibetan). An antelope (*Panthalops hodgsoni*) inhabiting the pine forests and elevated plains of Tibet. It is about 32 inches in height, pale fawn in color, with a black face in the bucks, and these alone have long, gazelle-like horns. They sometimes gather in autumn into great herds and always tax the stalker's patience by their watchfulness.

CHIS'ELMOUTH'. A large, blackish chub (*Acrocheilus alutaceus*) of the Columbia River, also called "hardmouth" and "squaremouth," in reference to the blunt, fleshy mouth, the lower lip of which is covered with a firm, sharp-edged cartilaginous plate. It is occasionally eaten.

CHISHOLM, chĭz'om. A village in St. Louis Co., Minn., 98 miles by rail northwest of Duluth, on the Great Northern and the Duluth, Missabe, and Northern railroads (Map: Minnesota, E 3). It is in a productive agricultural and lumber region and has large deposits of iron ore, which is the chief product. The village contains a library. Pop., 1910, 7684.

CHISHOLM, HUGH (1866–). An English publicist and editor. He was born in London, was educated at Felsted School and at Corpus Christi College, Oxford, of which he was scholar, and became a barrister of the Middle Temple in 1892. As a journalist he advocated imperialism, tariff reform, and colonial preference, and was assistant editor (to Sidney Low) in 1892–97 and editor in 1897–1900 of the *St. James's Gazette*. With Sir Donald Mackenzie Wallace and President Arthur Twining Hadley of Yale, he edited the supplement to the ninth edition of the *Encyclopædia Britannica* published under the auspices of the London *Times* in 1902. A year later he became editor of the eleventh edition of the same Encyclopædia, and he edited the *Britannica Year Book, 1911–12* (1913). In 1913 he became day editor of the London *Times*.

CHISLEHURST, chĭz"l-hērst, or **CHISELHURST.** An urban district in Kent, England, 11 miles southeast of London. It was here, at Camden House, that the exiled Napoleon III fixed his residence in 1871 and died, Jan. 9, 1873. Chislehurst remained the residence of the Empress Eugénie until 1880. Pop., 1901, 7400; 1911, 8666.

CHISOLM, WILLIAM WALLACE (1830–77). An American official, born in Morgan Co., Ga. In 1847 the family removed to Kemper Co., Miss. As a Union sympathizer he was elected sheriff by the negroes after the war and reëlected in 1873. He was an able party leader and succeeded in making the county the chief rallying point of the Republican party in the State. He was arrested in the spring of 1877, charged with murdering John W. Gully, a Democratic leader, who had been shot near Chisolm's dwelling. Chisolm's family, consisting of his wife, three sons, and a daughter, voluntarily accompanied him to jail. On the morning following his arrest the doors of the jail were demolished by the mob, which probably consisted largely of members of the Ku-Klux Klan. Chisolm's son, a boy of 13, was shot; his daughter of 18 mortally wounded; and Chisolm himself was fatally injured. A negro in December, 1877, confessed to murdering Gully, but did not implicate Chisolm. His death at the hands of the mob was due in part to race and partisan prejudice, in part to the abuses of power by the radicals and negroes. The episode of Chisolm's death suggested a chapter in Tourgée's *A Fool's Errand*. An equally exaggerated account is Wells's *Chisolm Massacre* (1877). The other side is told in Lynch, *Kemper County Vindicated* (1879).

CHISOLM v. GEORGIA. A noteworthy case decided by the Supreme Court of the United States in 1793 and reported in 2 Dallas Reports, 419. In 1792 Alexander Chisolm, a citizen of South Carolina, sued the State of Georgia in the Federal courts, but the State refused to make an appearance in the suit. The Supreme Court, when the case came before it, took occasion to review the origin and nature of the Union, and decided that a State could properly be made a party defendant to such a suit under the grant to the Federal courts, in the Constitution, of judicial power over cases "between a State and citizens of another State." The agitation incident to such a decision, apparently invading the "sovereignty" of each State, led shortly thereafter to the adoption of the eleventh amendment to the Constitution, providing that the Federal judicial power should not extend to any suit brought against a State by a citizen of another State or of a foreign State. Later, efforts were made to circumvent this prohibition by a citizen assigning his claim to the State of his domicile, and by then having the suit brought in the name of the assignee State; but it was held that this could not be done, in New York *v.* Louisiana, 108 United States Reports, 76.

CHISTOPOL, chē'stŏ-pôl'. See TSCHISTOPOL.

CHISWICK, chĭz'ĭk (sandy bay). A suburb of London, 7 miles west-southwest of St. Paul's, on the left bank of the Thames (Map: London, E 5). Around Chiswick are many fine villas, extensive market gardens for supplying London, and the gardens of the London Horticultural Society. The churchyard contains the grave of Hogarth, and both Fox and Canning died here. The Duke of Devonshire's beautiful villa, Chiswick House, is situated here. Pop., 1901, 29,901; 1911, 38,772.

CHITAL, chē'tŭl, or **CHITRA,** chē'trå. The axis deer. See AXIS.

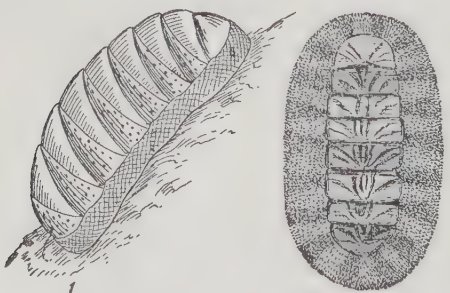
CHITARRONE, kē'tår-rō'nå. A bass guitar over 5 feet long, used in the orchestras of the seventeenth and eighteenth centuries. It had two sets of wire strings which were plucked with a plectrum. Its general construction is that of the theorbo (q.v.).

CHITIN, kī'tĭn (from Gk. χιτών, *chitōn*, tunic). The chief chemical constituent of the skeleton of insects and crustaceans. It differs from the horn substance by being insoluble in alkalies. It may be prepared from the body of articulata by extracting with dilute hydrochloric acid and alkali, then boiling with water, alcohol, and ether. Chitin is insoluble in dilute

acids and alkalies, but dissolves in strong hydrochloric, nitric, and sulphuric acids. When pure, it is a white, amorphous substance usually retaining the skeleton form. It is composed of carbon, hydrogen, nitrogen, and oxygen, as indicated by its "empirical" formula: $(C_{15}H_{26}N_2O_{10})_n$. But its molecular formula is unknown, nor is, consequently, anything known of its chemical constitution. (See CHEMISTRY.) Boiling concentrated acids transform it chiefly into glucosamine, $C_6H_{13}NO_5$.

CHITON, kī'tŏn (Lat., from Gk. χιτών, *chitōn*). In ancient Greece, a sort of shirt or undergarment, worn next the skin by both men and women. In Homeric times it was worn by men alone, the *peplos* being the women's underdress of this period. The Homeric chiton was a close-fitting garment of linen, which, being closed at the sides, was drawn on over the head, while the peplos was a long, loose woolen garment, open at one side and fastened with a brooch at the shoulder. In later times the chiton came into use for both sexes and was of two general forms. That of the men resembled the earlier Homeric chiton, being a short, close-fitting garment, sewed at the sides and provided with short sleeves or mere armholes; while that of the women, the so-called Ionic chiton, was long and loose, and was sewed at the sides and provided with sleeves. The earlier peplos, however, was still used, being especially favored by the Spartan women, whence it received the name of *Dorian.* Later still there came into use a sleeveless chiton for women. The chiton was sometimes worn girded and sometimes not, and it was of various colors and cuts. When one side of the chiton was unsewed, the girdle was regularly worn, so that the body was not left exposed. The length of the chiton could be adjusted at will, by the wearer pulling the skirt of the chiton up and letting part of it hang in a fold outside the girdle. Consult Amelung, in Pauly-Wissowa, *Realencyclopädie,* and Gulick, *The Life of the Ancient Greeks,* pp. 154–158 (New York, 1902). See COSTUME (Greek Section).

CHITON. A group of mollusks, the mail-shells, constituting an order (Placophora) in the class Amphineura. The shell is composed of eight narrow, transverse, calcareous pieces, overlapping each other in a row along the back,



CHITON, OR MAIL-SHELL.
1, attitude in life; 2, detail of shell and integument, dorsal view.

and strongly attached to the mantle, which is remarkably fleshy and fibrous. Chitons have the power of rolling themselves up into a ball like the armadillo (q.v.), thus exposing nothing but the hard shell. The organ of locomotion is an oval foot, extending the whole length of the animal, by means of which chitons cling to rocks so tenaciously that the heaviest surf does not disturb them. More than 200 species are known; they dwell in all climates, but are most abundant in the warmer seas. They occur at all depths, but prefer the rocks along the shore, where they sometimes are found in surprising numbers. All North Atlantic species are small, seldom an inch in length, but some of those found in the tropics and on the coast of California may be 8 or 10 inches long. Most of the chitons are gray or brown in color, but some species are very handsomely marked with red, orange, yellow, green, and other colors. The upper surface may be comparatively rough, with papillæ and spines. In most cases it is nearly covered by the shell plates, but in one or two genera the plates are very narrow and cover only the mid-dorsal part of the animal, while in still others the plates are completely concealed within the thickened integument. "West Indian negroes" are said to "eat the large chitons, which are abundant on their rocky coasts, cutting off and swallowing raw the fleshy foot, which they call beef."

Fossil Forms. The modern chitons are the survivors of a long line of ancestors that made their first appearance in the Ordovician or Lower Silurian rocks, attained some prominence during Carboniferous time, and, with a slight decline during the Tertiary period, have continued with only slight changes of scarcely more than generic rank down to the present era. The group thus affords an excellent example of the persistence of a generalized primitive type. The fossil genera are classified according to the form of the articulating facets of the valves and the proportions of the shell and its segments. See also PLACOPHORA.

CHITOR. See CHITTUR.

CHITRA. See AXIS.

CHITRALI, chē-trä'lē. The natives of Chitral, a region on the borders of British India, northeast of Kafiristan, on the southeastern slope of the Hindu-Kush. They belong, with the Kafirs (Siahposh), physically to the white race and linguistically to the Aryan stock. Their number is estimated at between 150,000 and 200,000. In the last years of the nineteenth century they came into conflict with the English authorities, and their ruler, with Mehtar, is now a British vassal. They are now adherents of Islam, but traces of their former Buddhism still exist. The chief language is known as Khowar. An interesting account of this people and their neighbors is given in Sir George Robertson, *Chitral* (London, 1898). Consult also Holdich, *The Indian Borderland* (London, 1901), and Anderson, *Peoples of India* (London, 1913).

CHIT'TAGONG' (corrupted from *Chatgoan*), or ISLAMABAD (city of Islam). A city in the Presidency of Bengal, India, capital and port of the district of the same name, situated on several small but steep hills on the Karnaphuli, 12 miles from its mouth, in lat. 22° 21′ N. and long. 91° 50′ E. (Map: Burma, B 2). An important commercial centre under the Portuguese, it came into possession of the British East India Company, with Bengal proper, in 1760–65. Originally a part of Arakan, it was claimed 60 years later by the Burmese Emperor, as a dependency of that territory—a claim which constituted one of the grounds of

the War of 1824. It is the seat of Chittagong College, churches, a general hospital; has shipbuilding industries and a considerable export trade in rice, jute, gunny, hides, and tea. Pop., 1901, 22,140; of district, 1901, 1,353,250; 1911, 1,508,433.

CHITTAGONG WOOD. The wood of *Chickrassia tabularis*, a tree of the family Cedrelaceæ, a native of the mountainous countries to the east of Bengal. In some parts of India it is called *cedar* or *bastard cedar;* names, however, which are also given to other kinds of wood. Chittagong wood is much valued in India and is used for all purposes for which mahogany is used in Great Britain. It makes beautiful and light furniture, but is apt to warp in very dry weather. Beautifully veined and mottled pieces are occasionally met with and are highly valued.

CHITTEM BARK. See CASCARA SAGRADA.

CHIT'TENDEN, FRANK HURLBUT (1858–). An American entomologist, born in Cleveland, Ohio. He was educated at Cornell University, edited *Entomologica Americana* in 1890, and became assistant entomologist in the United States Department of Agriculture in 1891. His publications, consisting of a large number of bulletins of the Department of Agriculture describing insect pests, include: *The Colorado Potato Beetle* (1907); *The Harlequin Squash Bug* (1908); *The Common Red Spider* (1909); *The Asparagus Miner* (1911); *The Broad-Bean Weevil* (1912); *The Potato-Tuber Moth* (1912); *The Spotted Beet Webworm* (1913).

CHITTENDEN, HIRAM MARTIN (1858–1917). An American soldier, born in western New York. After graduating from the United States Military Academy (1884), he rose through various grades to be lieutenant colonel of volunteers and chief engineer of the Fourth Army Corps in the Spanish-American War in 1898–99. He retired as brigadier general in 1910. He had charge of government works in Yellowstone National Park and on the Missouri, Ohio, and other western rivers. In 1911 he was appointed commissioner of the port of Seattle. He is author of *Yellowstone National Park, Historical and Descriptive* (1895; 6th ed., 1913); *Reservoirs in the Arid Regions* (1897); *Forests and Reservoirs in their Relation to Stream Flow* (1908); *War or Peace* (1911); *Report on the Water-Supply System of the Spring Valley Water Company* (1912).

CHITTENDEN, RUSSEL HENRY (1856–). An American physiological chemist. He was born in New Haven, Conn., Feb. 18, 1856, graduated at the Sheffield Scientific School of Yale University in 1875, became instructor in chemistry at Yale in 1876, studied in Heidelberg in 1878–79, and received his doctor's degree at Yale in 1880. He became professor of physiological chemistry at Yale in 1882 and director of the Sheffield Scientific School in 1898. From 1898 to 1903 he was lecturer on physiological chemistry at Columbia University, New York. From 1895 to 1904 he was president of the American Physiological Society and in 1907 president of the Society of Biological Chemistry. Dr. Chittenden has carried out several important researches in physiological chemistry, principally on questions pertaining to the chemistry of proteids and their primary cleavage products, and has made very valuable contributions to the knowledge of the process of nutrition. He is the author of an important work on *Digestive Proteolysis* and *Physiological Economy in Nutrition* (New York, 1905).

CHITTENDEN, THOMAS (1730–97). The first Governor of Vermont. He was born in East Guilford, Conn., but emigrated to the so-called New Hampshire Grants (now Vermont) in 1774. Here he took an active part in the controversy with New York and was a member of the convention which declared Vermont a State (1777) and of the State Constitutional Convention of 1778. He was Governor from 1778 to 1789 and again from 1790 to his death. His son Martin (1769–1841) was Governor in 1813–14. A Vermont county bears the family name, and the State erected a monument to the first Governor at Williston in 1896. Consult Chipman, *A Memoir* (Middlebury, 1849).

CHITTIM. See KITTIM.

CHITTUR, chĭt-to͝or′, or **CHITOR.** A town in the State of Madras, India, 100 miles west of Madras (Map: India, B 4). Until 1908 it was the headquarters of the North Arcot district, but due to the prevalence of virulent fever they were removed to Vellose. A Roman Catholic chapel, an English church, a high school, and literary institutes are numbered among its institutions. Pop., 1901, 10,893; 1911, 15,108.

CHIT'TY, JOSEPH (1776–1841). An English lawyer and writer on law. He was a successful practitioner at the bar and enjoyed a great reputation for legal learning. His writings became the textbooks of the generation succeeding his own, their accuracy and systematic character rendering them peculiarly suitable for the purposes of law students. Among his principal works are: *Treatise on Parties to Actions and to Pleadings* (1808); *Treatise on the Law of Nations Relative to the Legal Effects of War on the Commerce of Belligerents and Neutrals and on Orders in Council in Licenses* (1812); *Treatise on Criminal Law* (1816); *Synopsis of Practice in the King's Bench and Common Pleas* (1831–32); *Treatise on Bills of Exchange and Promissory Notes* (1799); and an edition of *Blackstone's Commentaries* (1832).

CHIUN, kī′ŭn. A deity mentioned by the prophet Amos (v. 26), who reproaches the Israelites for having carried "the tabernacle of your Moloch [marg. better; Siccuth, your king], and Chiun, your images, the star of your God." The latter idol, Chiun, is now generally recognized to have the Babylonian name of the planet Saturn—*Kaiwan,* as the Syrians, Mandeans, and Persians called him. The assertion that there is an Egyptian god *Ken,* who may be identified with Chiun, is quite unfounded.

CHIUSI, kyo͞o′sē. A town of central Italy, in the Province of Siena, 37 miles southeast of Siena, with a population of 6000 (Map: Italy, F 4). It stands on an eminence in the Val di Chiana, near the lake of the same name. In ancient times, under the name of Clusium, it was one of the 12 cities of Etruria and the residence of Porsena (q.v.). When Italy was overrun by the barbarians, Chiusi fell into decay, the whole valley was depopulated, and became the pestilential pool described by Dante. Since the improvement of the course of the Chiana (q.v.), Chiusi has begun to flourish again. Necropolises round Chiusi have yielded a long series of objects, representing Etruscan products and imports from Greece. The earliest graves show no Greek wares and must reach well back into the eighth century B.C. Succeeding graves contain Greek

vases of the seventh century and from the beginning of the sixth century are found the chamber tombs, often richly decorated. Three thousand Etruscan inscriptions and 500 Latin inscriptions have been found in Clusium and its neighborhood; some are bilingual, and Latin inscriptions have been found beside Etruscan in the same cemeteries. The objects found in the graves are partly in the local museum and partly in Florence. Beneath the town is a series of underground passages which seems to belong to the old Etruscan system of drainage. Consult Dennis, *Cities and Cemeteries of Etruria*, vol. ii (rev. ed., London, 1907); L. Giometti, *Guida di Chiusi* (Poggibonsi, 1904).

CHIVALRY, shĭv'*a*l-rĭ (Fr. *chevalerie*, horsemanship, knighthood, from *chevalier*, horseman, knight, from *cheval*, horse, from Lat. *caballus*, horse). In the Middle Ages the body of customs and ideals relating to the duties and privileges of knighthood. It owed its development partly to feudal usages, with which it had many relations, and partly to the Church, which adopted and altered the customs of chivalry to further its own control of society. Chivalry probably had its origin in the ancient Germanic custom of arming the youth solemnly in the presence of the warriors. Tacitus refers to this usage, and it seems to have prevailed throughout the early Middle Ages. The chronicles record that Louis the Pious, at the age of 13, received his arms from Charles the Great, and that Charles the Bald, at the age of 16, received his arms from Louis. The cavalry, after the middle of the eighth century, grew to be the most important part of the army, and as feudalism developed there was a tendency to fix the customs for the assumption of the arms and to define the duties of the knight. The last were to a great extent the regular duties of a vassal, which included bravery, fidelity, and loyalty. The conception of knightly honor, which grew up slowly, was comparatively late. The Crusades and the intense interest in religious matters in the twelfth century tended to make chivalry more Christian. It was held to be the knight's duty to defend Christianity, to protect the Church, and to battle against the infidel. Lanfranc Cigala, a little later, wrote: "I do not hold him to be a knight who does not go with a willing heart and all his might to the aid of the Lord, who has so great need of him."

According to the mediæval conception of chivalry, no one was born a knight. The candidate for the honor was sent, at the age of about seven, to act as page or valet in the household of some knight. There he obtained his education, and when old enough might become a squire. The duty of the squire was to attend the knight in battle or in tournament, to care for his horse and weapons, and to act as his aid. In time the squire might be made a knight. The distinction could be conferred in the earlier period by any knight; at a subsequent period the monarchs claimed the sole right to confer knighthood. The age when the squire became a knight varied; there are cases where the honor was conferred on boys of 10 or 11, but later it was usual to defer it until the age of 21 or later. In fact, some squires never became knights, in order to avoid the expense of the ceremony. In France, in the thirteenth century, a royal order punished with a fine noble squires who had not become knights by the time they were 24 years old.

The ceremony of admission into knighthood, known as "dubbing," usually took place on a festival, although squires were often made knights on the battlefield, in recognition of deeds of bravery. Occasionally before a battle took place the dignity was conferred upon a considerable number. The essential parts of the dubbing in the early twelfth century were the *collée*, or accolade, a blow upon the neck or shoulder, and the running *la quintaine*—i.e., tilting on horseback against a figure stuffed with straw. Later there was a symbolical and mystical development, which made the process of initiation mainly a religious ceremony. According to one ritual of the fifteenth century, the following were the details of the ceremony: after bathing, as a symbol of purity, the candidate "watched" his arms for a whole night before the altar of some church or the grave of some saint, and in the morning he confessed, often aloud, attended communion and mass, and listened to a sermon on the duties of purity, fidelity, honesty, the protection of the Church, widows, orphans, ladies, and all who were oppressed. A priest then blessed his sword and other pieces of armor; a knight made him take oath to fulfill all his duties; then the accolade, which consisted of three strokes with the sword, was given solemnly, and the following sentence uttered: "In the name of the Father, Son, and Holy Ghost, I make you knight." The knight who had given the accolade embraced the new knight, and girded him with his sword; the godfathers put on him the golden spurs, the symbol of knighthood; and the lords and ladies present assisted in clothing him with the other pieces of armor. Lastly, he mounted on horseback and ran *la quintaine*.

At the end of the twelfth century and later, chivalry was profoundly influenced by the popular romances of Arthur, Charlemagne, and other famous heroes. Manners became less brutal, and a spirit of knight-errantry grew up. It became the fashion to be rash, imprudent, and extravagant in conduct. The *Orlando* of Ariosto and *Don Quixote* have made the follies of declining chivalry familiar to all. Chivalry was at its best in the twelfth century, in the fourteenth was declining rapidly, and in the fifteenth was thoroughly decadent. Knight and squire gradually became mere titles of honor which might be hereditary. Consult: Gautier, *La chevalerie* (Paris, 1884); id., Eng. trans. by Firth (London, 1890); Sir Walter Scott, *Essay on Chivalry* (ib., 1868); and Stebbing, *History of Chivalry and the Crusades* (ib., 1830). See Feudalism; Knight; Orders; Bushido.

CHIVALRY, Court of, or Marshal's Court. An ancient military court of great dignity, which was formerly held by the Lord High Constable of England and the Earl Marshal. It had jurisdiction over civil matters affecting the naval establishments abroad and of all military matters and infractions of the martial law both within and without the kingdom. The extension of the jurisdiction of the common-law courts and the transfer of the jurisdiction over purely military offenses to modern courts-martial, instituted by parliamentary authority, has reduced the court of chivalry to a purely honorary position at the English court. During the seventeenth and eighteenth centuries it played the rôle of a court of honor (see Herald's College), but at the present time it has no legitimate function but that of "redressing en-

croachments and usurpations in matters of heraldry and coat armor." If in fact it should exercise this authority, the Earl Marshal alone would act as judge of the court, the office of Lord High Constable having fallen into abeyance. Consult the commentaries of Blackstone and Stephen.

Chivalry, Tenure in. The characteristic form of land tenure under the feudal system, the vassal, as tenant in chivalry, holding his land of his feudal lord on condition of military service. See FEUDALISM; KNIGHT'S SERVICE; TENURE.

CHIVASSO, kē-vȧs'sō. A city in the Province of Turin, north Italy, on the left bank of the Po, 18 miles northeast of Turin (Map: Italy, B 2). It markets grain and cattle. It was the residence of the dukes of Montferrat, and a stronghold until the fortifications were destroyed by the French in 1804. There are sulphur baths at San Genesio, 2 miles south. Pop., 1901, 9913; 1911, 10,084.

CHIVE, chīv, or **CIVE,** sīv (from Lat. *cepa,* onion) (*Allium schœnoprasum*). A plant of the same genus with the leek and onion (see ALLIUM), a perennial, ½ to 1 foot in height, with very small, flat, clustered bulbs, increasing by its bulbs so as to form a sort of tuft. The leaves are tubular, cylindrical tapering, radical, nearly as long as the most leafless flowering stem, which is terminated by a hemispherical, many-flowered umbel of bluish-red or flesh-colored flowers. The plant grows wild on the banks of rivers, and in marshy or occasionally flooded places in the middle latitudes of Europe and Asia, and on the northern borders of the United States. Chives are commonly cultivated in kitchen gardens, often as an edging for lots, and are used for flavoring soups and stews. Their properties are very similar to those of the onion. The part used is the young leaves, which bear repeated cutting during the season.

CHIVILCOY, chē'vēl-kō'ē. A town in the Province of Buenos Aires, Argentina, situated in a populous district 90 miles west by south of Buenos Aires (Map: Argentina, F 11). The inhabitants, among whom are many Italians and Basques, are engaged chiefly in agriculture and in the manufacture of brandy, ironware, and machinery. Pop., 15,000.

CHIVOT, shē'vō', HENRI (1830–97). A French writer of vaudevilles. He was born in Paris, where he brought out a large number of very successful vaudevilles, light comedies, and operettas, most of which were written with Alfred Duru (1829–89). Among these may be mentioned: *Le soldat malgré lui,* operetta in two acts, music by M. F. Barbier (1868); *Les cent vierges,* operetta in three acts, music by M. Lecocq (1872), libretto written in collaboration with Clairville; *Le pompon,* music by M. Lecocq (1876); *Madame Favart,* operetta in three acts, music by Offenbach (1879), of which 200 performances were given in Paris; *La mascotte,* comic opera, in three acts, music by Audran (1881); *La cigale et la fourmi,* music by Audran (1886); *La souris blanche* (1897).

CHLADNI, klȧd'nē, ERNST FLORENS FRIEDRICH (1756–1827). A German physicist. He was born in Wittenberg and studied law there and in Leipzig. He ultimately abandoned the legal profession in order to devote himself to physical science and, being acquainted with music, was led to observe that the laws of sound were by no means so well established as those of other branches of physics. He therefore began to apply his knowledge of mathematics and physics to acoustics and traveled for 10 years (after 1802) through Germany, Holland, France, Italy, Russia, and Denmark, giving a series of successful lectures on the subject. He discovered the longitudinal vibration of strings and rods and also produced the experiments since known by his name (see CHLADNI FIGURES), where the vibration of a plate is studied by means of sand figures. Using organ pipes, he was able to determine the velocity of sound in gases other than air and, in addition, was the inventor of many pieces of acoustic apparatus. Chladni's writings include *Entdeckungen über die Theorie des Klanges* (1787); *Akustik* (1802); *Neue Beiträge zur Akustik* (1817); *Beiträge zur praktischen Akustik und zur Lehre vom Instrumentenbau* (1822). Chladni also wrote several essays on meteoric stones. Consult: Bernhardt, *Dr. Ernst Chladni der Akustiker* (Wittenberg, 1856); Melde, *Chladnis Leben und Wirken* (Marburg, 1888); Kohlschütter, *Ernst Florens Friedrich Chladni* (Hamburg, 1897).

CHLADNI FIGURES. Figures produced by sand on a vibrating plate, forming designs more or less complex and depending upon the vibrations of the plate. This important experiment is due to Chladni (q.v.) and illustrates the formation of nodes and segments in a vibrating plate. The plate used in the experiment may be either metal or glass, and in shape may be a disk, a square, or any other form whose

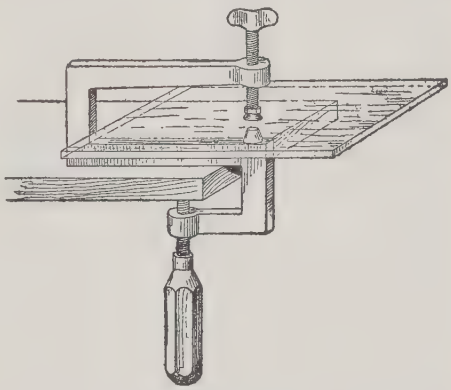


FIG. 1. CLAMP AND PLATE FOR CHLADNI EXPERIMENT.

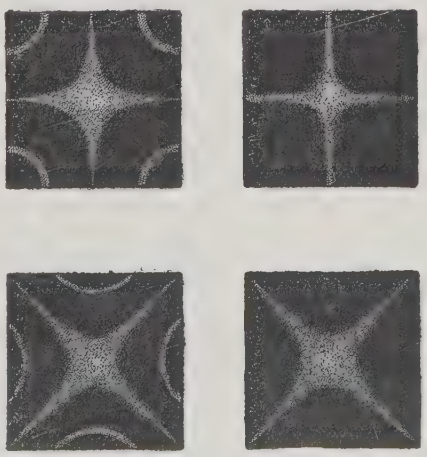


FIG. 2. CHLADNI FIGURES.

vibrations it is desired to study. The plate is clamped to a stand at its centre, and its edge is rubbed with a violin bow and set into vibration. The point where the plate is clamped will of course be a point of rest or node, while the part of the plate in contact with the bow executes the maximum vibration and will be a ventral segment. When sand is strewn on the plate, it will take a position along the nodes, being forced away from the points of vibrations to positions of rest. The figures formed by the sand take various forms, and indicate the vibration of the plate. A few of these figures, together with a plate clamped in position, are shown in the illustrations. The Chladni figures will be found described in most of the larger treatises on physics.

CHLAM'YDOPH'ORUS. See ARMADILLO.

CHLAMYDOSAURUS, klăm'ĭ-dō-są'rŭs. See FRILLED LIZARD.

CHLA'MYS (Lat., from Gk. χλαμύς). A form of cloak worn among the Greeks by huntsmen and horsemen, and the special garment of the Athenian ephebi. (See EPHEBUS.) It was straight on one edge, but circular on the other, with two long sidepieces, from which it was sometimes called the "Thessalian wings." It was gathered round the neck and was clasped over the right shoulder or the breast, in such way as to leave the right arm free. The loose ends were weighted with bits of lead or clay. At Athens it reached to the rider's waist, in colder climates to his feet. As the regular garb of the cavalry it appears in a manifold variety of adjustments on the frieze of the Parthenon. The material was usually wool, and it seems often to have been of bright colors.

CHLOAS'MA. A skin disease characterized by the appearance of spots or patches of discoloration which may be brownish, fawn colored, or yellowish. They are irregularly distributed and vary in size from a mere spot to a patch as large as the palm of the hand, or the color may be diffused all over the body. Chloasma is due both to local and systematic influences; chronic local irritation, pressure, blistering, or sunburn (producing freckles) being local causes. Examples of systemic affections producing discoloration of the skin are Addison's disease (q.v.), cancer, pregnancy, malaria, and liver disease. Chloasma appears on the face or any part of the body. The term is frequently but erroneously applied to patches of pigmentation on the chest (popularly called "liver spots"), due to *Tinea versicolor*, a parasite.

CHLOË, klō'ē (Lat., from Gk. χλόη, blooming, verdant). A pretty, sportive shepherdess in the Greek romance *Daphnis and Chloë*, by Longus (q.v.). She has become the stock idyllic heroine. The name and character appear in Sidney's *Arcadia*, in Fletcher's *Faithful Shepherdess*, in Prior's poems, and elsewhere. The Chloë in Jonson's *Poetaster* can hardly be described as bucolic.

CHLOPICKI, klô-pĭts'kĭ, JÓZEF (1771–1854). A Polish general and dictator of Poland during the revolution of 1830–31. He was born in Galicia, entered the army in 1787, and fought gallantly in the war for independence under Kosciuszko. After the surrender of Warsaw to the Russians, Nov. 8, 1794, Chlopicki went to France and joined the Army of the Cisalpine Republic, under General Dombrowski. In 1806, when Dombrowski and Wybicki called the Poles to arms, under the protection of Napoleon, Chlopicki returned to his country and fought gallantly at Eylau and Friedland (1807). From 1808 to 1811 he took part in the Spanish campaign. In 1812 he followed Napoleon to Russia, taking part in the bloody engagements at Smolensk and on the Moskva. After the remnants of the invading force had returned Chlopicki left the Imperial service on account of certain slights. After the taking of Paris by the allies in 1814, Emperor Alexander made him a general of division in the new Polish army, but he soon resigned, owing to the violent temper of the commander in chief, the Grand Duke Constantine. When the insurrection of the Poles broke out in 1830, Chlopicki, who foresaw the hopeless nature of the attempt, reluctantly obeyed the voice of the nation, which had conferred upon him the dignity of dictator (December 5). His moderate views and hesitating policy involved him in disputes with the patriot party, and on Jan. 23, 1831, he resigned his office; but to prove his sincerity, he entered the Polish army as a private soldier and took part as such in the battles of Waver and Grochow. After the suppression of the insurrection Chlopicki went to Cracow and withdrew altogether from public life. Consult Maczynski, *Life and Death of Joseph Chlopicki* (Cracow, 1858).

CHLO'RAL (from Gk. χλωρός, *chlōros*, greenish yellow), CCl_3CHO. A colorless oily liquid extensively used in medicine, in the form of its hydrate. It has a peculiar irritating smell and an acrid taste. Its specific gravity at 20° C. is 1.512. It is made on a large scale by the prolonged action of chlorine on ethyl alcohol; this yields first chloral alcoholate, which is then transformed into chloral by distilling with strong sulphuric acid at temperatures slightly below 100° C. When mixed with an equivalent quantity of water, chloral forms the hydrate $CCl_3CH(OH)_2$, which no longer contains the aldehyde group, CHO, contained in chloral.

Chloral hydrate is a colorless crystalline substance freely soluble in water and melting at 57° C. When distilled with sulphuric acid, it is retransformed into chloral. Alkalies transform chloral or its hydrate into chloroform. If taken internally, chloral acts as a powerful depressant, especially of the heart, causing a slow, feeble, irregular pulse. It acts directly on the brain and, if administered in medicinal doses, produces a refreshing and natural sleep. Frequent administration of chloral is, however, liable to cause chronic poisoning and may permanently affect the mind. In cases of poisoning from an overdose of chloral, the stomach should be washed out, sleep should be prevented by all means, and a strong coffee solution should be injected into the rectum. Chloral is often administered in tetanus, whooping cough, acute mania, delirium tremens, infantile convulsions, chorea, and other spasmodic affections; but it must always be given with caution on account of its depressant action on the heart. Locally chloral is an antiseptic and analgesic, being used for toothache, earache, and various neuralgic pains. It is also a useful sedative in itching skin diseases. Chloral was discovered by Liebig in 1832, and Liebreich in 1869 was the first to use it as an anæsthetic and hypnotic. *Chloralamide* and *chloralimide* are chemically allied to chloral, and have been used as substitutes for it.

CHLO'RALAM'IDE, and **CHLO'RALIM'IDE.** Substances used in medicine as substitutes for chloral (q.v.).

CHLORAL HY'DRATE. See CHLORAL.

CHLORAS'TROLITE (from Gk. χλωρός, *chlōros*, greenish yellow + ἄστρον, *astron*, star + λίθος, *lithos*, stone). A green, opaque, usually mottled and stellated variety of *prehnite* or *thomsonite*, that is found in amygdaloid trap rock on the Île Royale, Lake Superior. The mineral generally occurs in the form of rolled pebbles on the beach and takes a high polish, in consequence of which specimens are cut as gems and sold to tourists.

CHLOREN'CHYMA (Neo-Lat., from Gk. χλωρός, *chlōros*, greenish yellow + ἔγχυμα, *enchyma*, injection, from ἐγχεῖν, *enchein*, to pour in, from ἐν, *en*, in + χεῖν, *chein*, to pour). A collective name for the tissues which bear chlorophyll (q.v.), the characteristic green pigment of plants. See LEAF.

CHLO'RIC ACID (from Gk. χλωρός, *chlōros*, greenish yellow), $HClO_3$. A colorless liquid with a pungent odor, first obtained by Gay-Lussac in 1814. It is prepared by decomposing barium chlorate with dilute sulphuric acid. It rapidly bleaches vegetable colors and gives up its oxygen to organic bodies so rapidly that they take fire. With the metals chloric acid forms a series of salts called "chlorates." The most important of these is potassium chlorate, a white crystalline compound made on a large scale by passing chlorine gas into a hot solution of lime and adding potassium chloride. Potassium chlorate then separates out in the form of a mass of crystals and may be purified by recrystallization from water. Potassium chlorate is largely used as a source of oxygen gas. It also finds application in calico printing, in the manufacture of safety matches, in the production of fireworks, and as a detonator. Finally, it is employed medicinally in throat troubles, and it is especially valuable in the treatment of ulcerative stomatitis. Potassium chlorate was discovered by Berthollet in 1786 and is sometimes called "Berthollet's salt."

CHLO'RIC ETHER. A name formerly given to chloride of ethylene, or *Dutch liquid*, $C_2H_4Cl_2$. The name is now applied to spirits of chloroform, a mixture containing 6 per cent of chloroform and 94 per cent of alcohol; spirit of chloroform is often used in medicine as a flavoring agent.

CHLO'RIDES. See HYDROCHLORIC ACID.

CHLO'RIDIZING. A metallurgical term referring to the roasting of sulphide or complex silver ores with salt to convert the silver into a chloride which is soluble in hyposulphite solution or recoverable by amalgamation. This method of extraction is known as the Russell process and has been replaced by the cyanide process. See SILVER, *Metallurgy*. Consult Hoffman, *The Hydro-Metallurgy of Silver*.

CHLORIM'ETRY, or **CHLOROM'ETRY** (from Gk. χλωρός, *chlōros*, greenish yellow + μέτρον, *metron*, measure). The process of estimating the amount of chlorine in hypochlorites, as bleaching powder. The process depends upon the oxidizing power of chlorine. The laboratory methods usually employed consist in determining the amount of bleaching powder required in order to convert a known amount of arsenious acid into arsenic acid, or a known amount of ferrous salt into ferric salt; or else in determining the quantity of iodine which will be liberated by a given amount of bleaching powder from a standard solution of potassium iodide.

CHLO'RINA'TION. The conversion of gold contained in an ore into a soluble chloride by the addition of chlorine gas. In 1848 C. F. Plattner suggested that this method could be adopted on a large scale for the recovery of gold from ores. The method as developed is known as the chlorination process and was successfully used for many years in various parts of the world, though later it was replaced by the cyanide process. The chlorination process may be subdivided into two heads: the Plattner process, in which free chlorine gas is added to the ore, and the barrel process, in which chlorine is liberated in the ore from chemicals previously added. With the Plattner process the concentrates or residues are first subjected to a "dead" roast. The roasted ore is dampened and placed in tanks containing false bottoms through which chlorine, generated in another vessel, is introduced. After the ore becomes saturated with chlorine the tank is closed for about 24 hours, during which time the gold is converted into a soluble chloride. The soluble gold chloride is then leached from the ore with water and precipitated from the solution by the use of ferrous sulphate, sulphuretted hydrogen, or some other suitable reagent. The precipitated gold is then collected, melted, and cast into bars. The barrel process is also known as the Thies process, from improvements introduced by Adolph Thies about 1877. This process consists in charging the pulverized ore, together with a small percentage of bleaching powder, into a lead-lined barrel and adding from 40 to 60 per cent of water and the proper amount of sulphuric acid. The barrel is then closed and revolved until all of the gold is converted into a chloride. The recovery of the gold from the chloride is similar to the Plattner process. Many advantages were claimed for the barrel process, and it was used successfully in many gold mills throughout the world. This process has also been replaced by the cyanide process. Consult Rose, *The Metallurgy of Gold* (London, 1902).

CHLO'RINE (from Gk. χλωρός, *chlōros*, greenish yellow). A gaseous element discovered by Scheele in 1774. It was supposed by its discoverer to be hydrochloric acid deprived of phlogiston and was called by him "dephlogisticated marine acid gas." In 1785 Berthollet advanced the view that this gas should be regarded as a compound of hydrochloric acid with oxygen, and this view was universally maintained for nearly a quarter of a century. The error was first pointed out by Gay-Lussac and Thénard in 1809, and in the following year Davy demonstrated clearly the elementary nature of the gas, which he named "chlorine." It is never found free, but occurs extensively in the form of chlorides, as in the mineral halite, or rock salt, and in sea water; in sylvite (potassium chloride); in cerargyrite (silver chloride); also as alkaline chlorides in plants and animals. It may be readily prepared by the action of hydrochloric acid on manganese dioxide and purified by passing through water. Chlorine is employed as such in the manufacture of dyestuffs. It is largely transformed commercially into metallic chlorates and especially into bleaching powder (q.v.). It was formerly obtained by the wasteful Weldon process, i.e., by the action of manganese dioxide on the hydrochloric acid formed as a by-product in the manufacture of salt cake. (See SODA.) At present it is obtained partly by the electrolysis of common salt (see SODA) or of potassium chloride, partly

by the Deacon-Hasenclever process. The latter consists in first passing the hydrochloric-acid gas of the salt-cake manufacture into water, then expelling it by means of sulphuric acid, mixing it with air, heating the mixture to from 450° to 460° C. (842° to 860° F.), passing it at that temperature over brick fragments coated with cupric chloride, and freeing the resulting chlorine from unchanged hydrochloric acid by passing it through water. The cupric chloride itself unchanged (see CATALYSIS) acts as a "catalytic agent," causing the hydrochloric acid to give up its hydrogen to the oxygen of the air, the result being free chlorine and water.

Chlorine (symbol Cl; atomic weight 35.46) is a greenish-yellow gas with an irritating odor. It is readily liquefiable. Under normal atmospheric pressure the liquid boils at 33.6° below 0° C. Hence no compression beyond normal atmospheric pressure is needed to liquefy chlorine at —33.6° C. At 0° C. (freezing point of water) a pressure of 3.66 atmospheres is required. At 80° C., 28.4 atmospheres are required. The highest temperature point at which it is still possible to liquefy chlorine (i.e., its "critical point") is 146°, and at that point the necessary and sufficient pressure is 93.5 atmospheres (the critical pressure). Liquid chlorine is heavier than, and not miscible with water. Chlorine is a nonconductor of electricity and is exceedingly poisonous; it attacks the mucous membranes, causing much irritation, and if inhaled is capable of causing death. It dissolves in cold water, yielding a solution that resembles the gas in color, odor, and other properties. The solubility, curiously enough, increases up to 9° C., but diminishes again as the temperature rises. Chlorine finds important application in the arts as bleaching powder (q.v.), which is very extensively used in the cotton and paper industries. Its bleaching action is due to the readiness with which it combines, in the presence of water, with the hydrogen of the coloring matter. This avidity for the hydrogen of organic matter may be demonstrated by introducing a lighted taper into an atmosphere of chlorine—the taper will continue to burn, its hydrogen combining with the chlorine while its carbon is liberated in the form of soot. Chlorine is also a powerful disinfectant and deodorant and is much used for the destruction of the germs of infectious diseases. In chemical processes chlorine is frequently used as an oxidizer. Chlorine combines readily with basic radicles to form chlorides. Its most important compounds are described under SALT; BLEACHING POWDER; HYDROCHLORIC ACID; ETC. Consult Lunge, *Handbuch der Soda-Industrie und ihrer Nebenzweige*, vol. iii (Brunswick, 1896); also the authorities referred to under BLEACHING.

CHLO'RIS (Lat., from Gk. Χλωρίς). 1. The Greek goddess of flowers, identified with the Roman goddess Flora. 2. One of the daughters of the Theban Amphion and Niobe. She and her brother Amyclas, alone of the children of Niobe, escaped being slain by Apollo and Artemis. 3. The daughter of Amphion of Orchomenos and the mother of Nestor.

CHLO'RITES (from χλωρός, *chlōros*, greenish yellow). A group of minerals crystallizing in the monoclinic system and related to the micas. They are silicates of aluminum, magnesium, and ferrous iron—the latter constituent causing the characteristic green color—and also contain chemically combined water in varying proportions. The aluminum may be replaced partially by ferric iron. They occur as distinct crystals, or in the form of fibres and scales, which possess a well-marked cleavage. The chlorites are usually secondary minerals—i.e., they have been formed by the alteration of other magnesium silicates, such as garnet, amphibole, pyroxene, biotite, etc. This process of alteration, commonly called "chloritization," may be frequently observed among the older rock formations. (See CHLORITE SCHIST; METAMORPHISM.) In chemistry the name "chlorites" is applied to the salts of chlorous acid.

CHLORITE SCHIST, klō'rīt shĭst. A foliated rock containing more or less chlorite in parallel plates. Associated with the chlorite may be quartz and feldspar in considerable quantity, hornblende, talc, mica, iron ores, and a great variety of the rarer minerals. Chlorite varies in quantity from an exceedingly small amount to predominance. Chlorite schists are metamorphic rocks resulting from the alteration of igneous or sedimentary rocks of appropriate composition. The chlorite may result from such original minerals as biotite, amphibole, pyroxene, and garnet, and its presence is usually denoted by a green color as well as by a soft, somewhat greasy feel. See CHLORITES; METAMORPHISM.

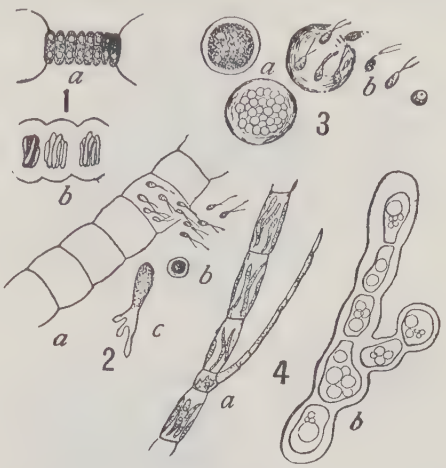
CHLO'ROFORM (from *chlorine* + *formyl*), or TRICHLOROMETHANE, $CHCl_3$. A colorless, heavy liquid having a sweetish, ethereal odor and burning taste. It does not mix with water, but dissolves freely in alcohol and ether. Its specific gravity at 15° C. is 1.498, and it boils at 61.20° C. It is an excellent solvent for a variety of substances, such as camphor, iodine, sulphur, phosphorus, resins, fats, alkaloids, etc. It is chiefly used, however, as an anæsthetic. It is formed by the direct action of chlorine on methane, or marsh gas, in sunlight; further, by the action of sodium or potassium hydroxide on chloral (q.v.). The method usually employed in making chloroform on a large scale consists in distilling from iron retorts a mixture of bleaching powder, water, and ethyl alcohol, or preferably acetone; the crude product of distillation is purified by shaking with strong sulphuric acid and redistilling. For anæsthetic purposes chloroform must be perfectly pure; and as by the action of light it is readily decomposed if kept in contact with moist air, bottles containing chloroform should be well stoppered and kept in the dark. Pure chloroform is not darkened by shaking with sulphuric acid; it should also contain no phosgene gas, which forms by the action of moist air on chloroform, and may cause bad aftereffects when the latter is employed as an anæsthetic. To prevent the formation of phosgene gas a small amount (0.6–1.0 per cent) of alcohol is added to chloroform. Attempts have been made to find a more efficient preservative of chloroform, but as yet without success: solid caustic potash, e.g., does more harm than good, its contact with chloroform resulting in decomposition, with steady evolution of carbon-monoxide (carbonic oxide) gas. The presence of chloroform in substances submitted for examination may be readily detected by the so-called carbylamine reaction; a small quantity of the substance is gently warmed with a mixture of aniline and an alcoholic solution of caustic potash, when, if chloroform is present, an intensely nauseous smell is observed, due to the formation of carbylamine (phenyl isocyanide). Preparations of chloroform are often used to mask the taste of nauseous medicines. Exter-

nally chloroform is irritant and if confined produces vesication. It is used as a liniment in chronic rheumatism, neuralgia, and chronic inflammations. The chances of danger from using chloroform as an anæsthetic are very small when it is skillfully given in properly selected cases: statistics show that no more than one death occurs in 3000 cases of administration of the substance. Ether, however, is even safer, and is in this country preferred to chloroform. If inhaled in small quantities, chloroform has the effect of abolishing the sensation of pain; for this purpose it is successfully employed in labor. It may also be inhaled to relax spasms in cases of tetanus, gallstone colic, or renal colic. As an anæsthetic, chloroform should be administered with the greatest caution, and ether is substituted for it if the patient suffers from heart disease. If anæsthesia be prolonged several hours, three stages may be distinguished: at first the highest functions of the organism are affected; confusion of the mind is accompanied in the patient by a pleasurable feeling throughout the body; general sensation is blunted, while the lower motor functions are powerfully excited, and the arms and legs are tossed about in a disorderly manner. This is followed (second stage) by general depression, and soon general anæsthesia sets in. The administration of chloroform is, however, carried on until the patient is partially narcotized and reflex excitability is completely abolished (third stage). During the administration of chloroform vomiting is very liable to occur. If dangerous symptoms appear, artificial respiration should at once be resorted to. Chloroform was discovered in 1831, independently by Samuel Guthrie at Sackett's Harbor, N. Y., by Liebig in Germany, and by Soubeiran in France. It was introduced as a general anæsthetic by Simpson, of Edinburgh, in 1848. Consult Baskerville and Hamor in *Journal of Industrial and Engineering Chemistry* for 1912.

CHLOROM'ETRY. See CHLORIMETRY.

CHLO'ROPHANE (from Gk. χλωρός, *chlōros*, greenish yellow + φαίνειν, *phainein*, to appear). A variety of fluorite or fluor spar which emits a bright emerald-green light on a comparatively low rise of temperature, in consequence of which it has some value as a gem stone. Excellent specimens of this mineral are found in Trumbull, Conn., and also Amelia Courthouse, Va.

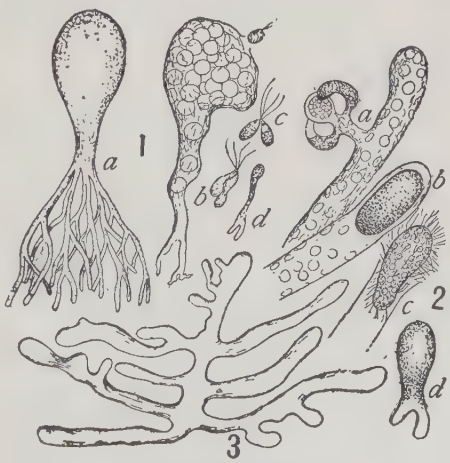
CHLO'ROPHY'CEÆ (Neo-Lat. nom. pl., from Gk. χλωρός, *chlōros*, greenish yellow + φῦκος, *phykos*, seaweed). One of four great groups of algæ, and commonly called the "green algæ." They usually contain no pigment in addition to the chlorophyll, so that the appearance of the group justifies the name. Chlorophyceæ are usually made to include six orders, but two of them at least are included for convenience rather than because they are closely related to the other groups. These six orders have been described partly in the article on ALGÆ. The group includes the simplest algæ, and these are generally supposed to be the forms from which the higher groups of plants have been derived. On this account green algæ may be regarded as the beginning of the present vegetation. The most primitive of the green algæ are the aquatic Volvocales, which are distinguished from all other green algæ by the fact that the vegetative cells have cilia and are therefore motile. By many they are regarded as animals. The forms of Volvocales range from isolated cells to complex spherical colonies. The Protococcales include a very heterogeneous assemblage of forms and are evidently closely related to the Volvocales. They occur mainly in fresh water and range from an extreme aquatic



CHLOROPHYCEÆ.

1, *Scenedesmus* (*a*), and its division (*b*); 2, *Ulothrix*, showing escaping spores (*a*), a resting spore (*b*), and its germination (*c*); 3, *Chlorosphæra*, showing resting stage (*a*) and formation of spores (*b*); 4, *Stigeoclonium*.

habitat to occurrence in moist places, such as tree trunks, shaded earth, etc. They differ from the Volvocales in the fact that the vegetative cells have no cilia and are therefore quiescent. Their range of form is also from a solitary cell to a complex colony, the water net being an extreme expression of colony formation. The most important assemblage of Chlorophyceæ is that called Confervales, which is also a very artificial assemblage, including aquatic and

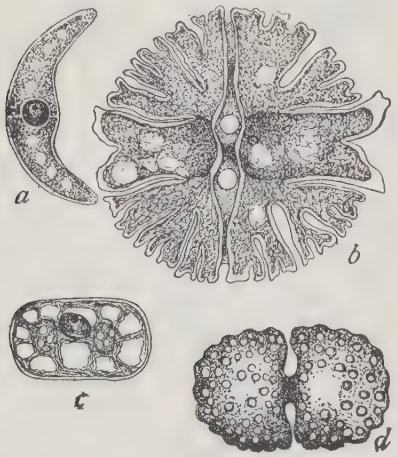


CHLOROPHYCEÆ.

1, *Botrydium* (*a*), showing formation of gametes (*b*), their fusion (*c*), and a young plant (*d*); 2, *Vaucheria*, showing sex organs (*a*), formation of large spore (*b*), its escape (*c*), and germination (*d*); 3, *Bryopsis*.

usually filamentous forms. All of them produce swimming spores and have worked out some form of sexual reproduction. The Confervales are supposed to represent the particular group of Chlorophyceæ from which the higher plants have been derived. The Siphonales represent a very

well-defined group, mostly marine, and characterized by having no cross-walls, the whole body, often quite complex, being one continuous cavity. The Conjugales are very distinct forms, and perhaps are not related, at least closely, to the other green algæ. They are characterized by the



CHLOROPHYCEÆ.
Desmids: *a*, Closterium; *b*, Micrasterias; *c*, *d*, Cosmarium.

absence of spores and by the peculiar method of sexual reproduction. It is in this group that the desmids occur, one-celled plants which are often extremely beautiful in form. In the same group is the well-known *Spirogyra*, with its very characteristic chloroplasts, which are spiral bands. The final group which is included under green algæ, simply on account of its pigment and not at all on account of its structure, is called Charales (q.v.).

There are many special monographs covering various orders in this large group. For general treatment, consult Engler and Prantl, *Die natürlichen Pflanzenfamilien* (Berlin, 1899 et seq.). See ALGÆ.

CHLOR'OPHYLL (Neo-Lat. *chlorophyllum*, from Gk. *χλωρός, chlōros*, greenish yellow + *φύλλον, phyllon*, leaf). The green coloring matter of ordinary foliage. This is not a single pigment, but a mixture of at least two—one a green pigment to which the name is sometimes restricted, and a yellow pigment, carotin (q.v.), or xanthophyll. Chlorophyll is also often associated with blue (phycocyanin), brown (phycophæin), or red (phycoërythrin) pigments, especially in the algæ showing these tints. Chlorophyll is only found associated with protoplasm, by which, indeed, it is produced. In some of the small plants it may color the whole protoplasm of the cell, but usually it is restricted to certain definite portions of the protoplasm called chloroplasts (q.v.). It is restricted to plants, though it is not found in all, being wanting in the whole class of fungi, and in some of the seed plants, especially those which live as parasites or saprophytes (q.v.). Chloroplasts have been said to occur in animals, but they turn out on examination to be minute green algæ, which live associated with the animal (e.g., hydra, sponges, certain radiolaria, etc.). The amount of chlorophyll in leaves, according to Tschirch, varies from 0.2 to 1 gram per square meter of surface. From the chloroplasts it may be extracted by various solvents, alcohol, ether, fatty and volatile oils, etc., but probably at once undergoes an alteration in its composition. In alcoholic solution it exhibits the property of fluorescence, being emerald green by transmitted light and deep blood red by reflected light. Molisch's test for chlorophyll is as follows: If a bit of dry tissue to be tested be wetted with a saturated watery solution of potassium hydrate, it instantly turns brown and after 15–30 minutes becomes again green. This change appears immediately on heating or adding water.

The chemical nature of chlorophyll has been discovered during the last five years. It is found to be a complex consisting of at least two green pigments, which are different oxidation stages of the same substance. These two pigments have been called α and β chlorophyllin. They have been crystallized, the form and structure of the crystals varying with the alcohol used. Chlorophyll is chemically related to hæmoglobin, the red coloring matter of the blood. It is found that, if the iron of the hæmatin molecule be replaced by magnesium, the result is chlorophyllin. The best account of the constitution of chlorophyll as shown by recent investigations will be found in Haas and Hill, *An Introduction to the Chemistry of Plant Products* (London, 1913).

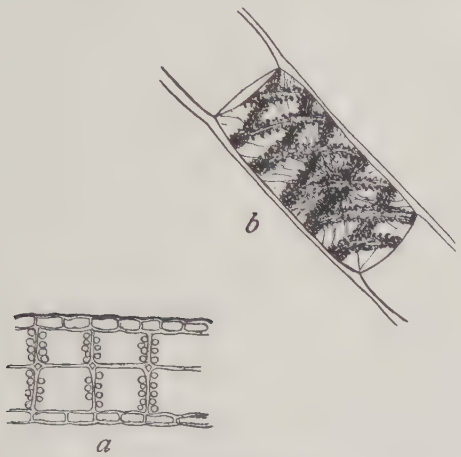
The coloring matters in a live leaf absorb certain wave lengths of light, notably λ 680–660 (between the B and C lines of the spectrum). There are also weaker absorption bands about λ 615–600, λ 560–540, λ 530–527 (nearly E line), and extensive absorption beyond λ 490. (See LIGHT, *Rectilinear Propagation.*) These absorbed portions are utilized in part for the making of food (see PHOTOSYNTHESIS); though the greater portion of the energy is dissipated in evaporating water. In the absence of chlorophyll, however, no formation of carbohydrate foods can occur. To this there are only unimportant exceptions.

Chlorophyll is formed usually only in the plastids which lie near the surface of a plant exposed to light of certain intensity. It is produced in darkness in certain exceptional plants, e.g., embryos of pines. It is only produced within certain limits of temperature and in the presence of oxygen. Probably under the normal conditions of life it is being continually formed and as continually destroyed. Intense light promotes its destruction, so that plants may become blanched thereby. Ordinary blanching (e.g., of celery) is accomplished by darkening, whereby the formation of chlorophyll is checked. See XANTHOPHYLL and CAROTIN.

CHLO'ROPLAST (from Gk. *χλωρός, chlōros*, greenish yellow + *πλαστός, plastos*, formed from *πλάσσειν, plassein*, to shape). In botany, the protoplasmic body found in green plants and distinguished by the green pigment chlorophyll. Chloroplasts are developed only in the cells to which a sufficient amount of light penetrates; therefore in the larger plants they are found only in the cells near the surface. The absorption of light by 6 to 10 cell layers is so complete that neither chlorophyll nor chloroplast is developed. Chloroplasts originate from preëxistent structures of the same kind. Unspecialized protoplasmic organs known as plastids (q.v.) multiply by direct division as the cells divide. Later those plastids in the superficial cells may differentiate into chloroplasts, which also may increase by direct division; those in storage organs may become leucoplasts (q.v.); or in

appropriate regions they may form chromoplasts (q.v.); or the chloroplasts may later be transformed into chromoplasts.

The form of chloroplasts is quite various in some of the algæ. In *Spirogyra* there are one to several chloroplasts in each cell. Each is ribbonlike, with an irregularly toothed edge, somewhat depressed and thicker along the median



CHLOROPLASTS.

a, *Lemna*, with chloroplasts against the vertical walls; *b*, *Spirogyra*, the two chloroplasts consisting of spiral bands.

line (thus troughlike) and spirally coiled in the protoplasm near to the cell wall. In *Mougeottia* the chloroplast is single and platelike, occupying the axis of the cell. In *Zygnema* there are two chloroplasts, each an irregular mass, with radiating arms reaching to the periphery. All these chloroplasts are peculiar in having one or more pyrenoids (q.v.) imbedded in them. In species of *Anthoceros* and *Selaginella* each cell contains a single irregular chloroplast. But in most algæ and mosses and in all the higher plants the chloroplasts are several or many in each cell and have a somewhat flattened globoid or ovoid form.

The structure of the chloroplast, like that of other protoplasmic organs, is not definitely known; but it appears to be vacuolate, i.e., to consist of a firmer colorless portion inclosing many minute spaces filled with chlorophyll; but just how the latter is related to the colorless portion, and whether dissolved or not, is not satisfactorily determined.

The chloroplasts are capable of moving about the cell. When the protoplasm is rotating, the chloroplasts are swept along with it; but they are capable of independent creeping. When a leaf of sorrel, e.g., is exposed to diffuse light, the chloroplasts arrange themselves on the best illuminated sides (top and bottom) with their broad sides turned to the light. This position is known as epistrophe. In direct sunlight they pass to the side walls, standing edgewise to the light—a position known as light apostrophe. A somewhat similar position is assumed in prolonged darkness (dark apostrophe), the chloroplasts accumulating also on the bottom of the cell.

Photosynthesis depends wholly upon the chloroplast and its associated chlorophyll. The decolorized chloroplast is unable to form carbohydrates, and chlorophyll separated from the chloroplast is equally functionless. See ETIOLIN; PHOTOSYNTHESIS; MOVEMENT; PROTOPLASM.

CHLORO'SIS (Neo-Lat., from Gk. χλωρός, *chlōros*, greenish yellow). A peculiar form of anæmia, common in young women, and often associated with menstrual disorders. Constipation, tight lacing, mental anxiety, overwork, and faulty hygiene are factors in its production. In chlorosis the red blood corpuscles are not markedly reduced in number, but are pale, and their hæmoglobin content greatly lowered. It has been called the *green sickness*, from the greenish-yellow hue of the complexion in some patients. The disease is attended with great debility, with breathlessness, palpitation, and occasionally a perverted appetite. Chlorosis is curable in a large proportion of cases. The principal means to be employed are rest, fresh air, moderate exercise, a selected diet, proper clothing, iron, and arsenic. See ANÆMIA.

CHLOROSIS. A diseased state of plants, in which a sickly green or greenish-yellow color takes the place of the natural color. Sometimes only a particular shoot is affected by it, but very generally the whole plant; and it seems to depend upon causes which render the plant altogether unhealthy, the pallid appearance being merely symptomatic, and not only the formation of chlorophyll, but all the functions of vegetable life being languidly and imperfectly carried on. There seems to be considerable evidence that chlorosis is largely the result of malnutrition of the plant. Plants affected by this disease are often to be seen among crops generally healthy; but whole crops of grain, potatoes, etc., sometimes perish from it, or are much diminished in value. Fruit trees also suffer from it. Most investigators claim that chlorosis in plants is due to a superabundance of carbonate of lime in soils, although a lack of magnesia is also considered a contributing cause. Pineapples in Porto Rico became chlorotic when grown in soils containing more than 2 per cent calcium carbonate. The green color was restored by the use of iron sulphate as a fertilizer or sprayed on the leaves. A mixture of nitrate of potash, superphosphate, and iron sulphate may be used as a fertilizer with excellent results. In France grapes are subject to chlorosis to a great extent, and good results are reported to have followed washing the vines and fertilizing them in winter or early spring with an iron sulphate solution.

CHMEL, KMĚL, JOSEPH (1798–1858). An Austrian historian, born at Olmütz. He was appointed in 1846 vice director of state archives in Vienna. His works include *Die Handschriften der kaiserlich-königlichen Hofbibliothek zu Wien* (1840–41); *Geschichte Kaiser Friedrichs IV* (1840–43); and *Urkunden, Briefe und Aktenstücke zur Geschichte Maximilians I* (1845).

CHMIELNICKI, KMYĚL-NĪTS'KÊ, BOGDAN (1593–1657). The leader of the Cossacks in the great revolt against Poland in the middle of the seventeenth century. He belonged to a noble Polish family and was born in the Ukraine. By his courage and daring he won a high position among the Cossack tribesmen about the Dnieper. Oppressed by the Poles, the Cossacks rose in insurrection in 1648 under the leadership of Chmielnicki, who had been wrought up against the Poles by wrongs inflicted upon him. For a time Chmielnicki waged war victoriously, his followers committing the bloodiest excesses. At last, however, fortune forsook his standard,

and in 1654 he placed himself under the protection of the Czar of Russia, who, in return for the suzerainty thus obtained, guaranteed to the Cossacks their ancient rights and privileges. In 1873 an equestrian statue of Chmielnicki was unveiled at Kiev. For his life, consult Kostomarov (St. Petersburg, 1859).

CHMIELOWSKI, kmĕ-lôf'skĕ, Piotr (1848–1904). A famous Polish writer. He was born in Podolia and was educated at Warsaw University and in Leipzig, where he subsequently received his Ph.D. In 1880 he began to lecture on the history of Polish literature at Warsaw University. These lectures were delivered in Polish, and when he was asked to substitute Russian for his native tongue, he preferred to abandon the course rather than comply with the request. Then he devoted himself to literary work with great zeal and success, showing in all he did a scholarly insight and a breadth of view but little known in Polish writers before his day. His many-sidedness is evidenced in the diversity of his interests, for he wrote on literature, pedagogy, art, and the lives of great men. Polish literature of the earlier nineteenth century claimed his particular attention, while he tirelessly combated the maxim of "art for art's sake" expounded by his contemporaries at home and abroad. From 1881 to 1897 he was editor of the *Ateneum*, a monthly literary review published at Warsaw. As author, editor, and translator, Chmielowski did very much to promote the culture of Poland.

Among his numerous works are: *Rousseau* (1878); *Goethe* (1878); *Liberalizm i obskurantyzm* (1882); *Autorkipolskie* (1885); *Adam Mickiervicz* (2 vols., 1886); *Jozef Ignacy Kraszewski* (1886); *Studja i szkice* (1886); *Nasza literatura dramatyczna* (1897); and *Estetyka Mickiewicza* (1898).

CHOATE, Joseph Hodges (1832–1917). A distinguished American lawyer and diplomat. He was born in Salem, Mass., and graduated at Harvard College in 1852 and at the Harvard Law School in 1854. He then practiced law for a year in Boston and afterward went to New York City, where he soon became remarkably successful as a lawyer. In 1884 he became a member of the legal firm of Evarts, Choate, and Beaman. As a trial lawyer he became widely known and after 1865 conducted many noteworthy cases before State, Federal, and international tribunals. Among them may be mentioned his successful defense of Gen. Fitz-John Porter, the Tweed Ring prosecution, the Tilden will contest, the Chinese exclusion cases, the cases in which he successfully contested the constitutionality of the Income Tax Law of 1894, and the Bering Sea dispute, in which he represented the Canadian government. Mr. Choate became a Republican in 1856, when he supported John C. Frémont, and in 1894 he was president of the New York State Constitutional Convention. He became an active opponent of machine government and in 1896 was defeated for the United States Senatorship by Thomas C. Platt. He was president of the American Bar Association in 1898–99. From 1899 to 1905 he was the Ambassador of the United States to Great Britain, serving in that capacity with distinction and notable personal popularity. He received the degree of D.C.L. from Oxford, and that of LL.D. from many foreign and American universities, and was made an honorary bencher of the Middle Temple. In 1907 he was first delegate of this country to the International Peace Conference at The Hague. Throughout his active life, and even after retirement from professional and official duties, he was much in demand as a speaker on public occasions; as an after-dinner speaker his fame was international.

CHOATE, Rufus (1799–1859). One of the most famous of American lawyers. He was born in Ipswich, Mass., on Oct. 1, 1799. As a child he was remarkable for precocity, beginning to read while still almost an infant, and being able before his sixth year to repeat large portions of the Bible and of *Pilgrim's Progress*. In 1815 he entered Dartmouth College, where he soon attracted attention by his scholarly habits and unusual abilities and evinced an aptitude for classical and historical studies which characterized him through life. He graduated in 1819 as valedictorian of his class, was a tutor at Dartmouth during the following year, and then, under the inspiration of Webster's great speech in the Dartmouth College case, which he had heard in 1818, he took up the study of law, entering the Cambridge Law School in 1821 and subsequently removing to the office (in Washington) of William Wirt (q.v.), then Attorney-General of the United States. He returned to Massachusetts in 1822, continued his studies in Ipswich and Salem, was admitted to the bar in the following year, and began practice in Danvers. He married, in 1825, Miss Helen Olcott. He remained in Danvers until 1828, when he removed to Salem. In 1830 he entered Congress as a Whig, and immediately attracted general attention by a brilliant speech in favor of a protective tariff. He was reëlected in 1832, but resigned in 1834 before the expiration of his term, and opened an office in Boston, where he soon became the acknowledged leader, first of the local, then of the State, and finally of the New England bar. In 1841, Daniel Webster having become Secretary of State, Choate was elected to serve out his term in the United States Senate and represented Massachusetts until 1845, taking a conspicuous part in the debates on the Oregon boundary, the tariff, and the annexation of Texas. Weakened by overwork, he spent the summer of 1850 in Europe. In 1852, as a member of the Whig Convention in Baltimore, he led the faction which advocated the nomination of Webster, delivering on this occasion one of his most eloquent addresses; and in 1856, along with a section of the conservative Whigs, he supported Buchanan in opposition to Frémont. In 1859 his health failed him, and under the advice of his physician he sailed for Europe, but, feeling unable to complete the voyage, landed at Halifax, where in a few days—on July 13—he died. Throughout his life he was a thorough student, not only of law, but also of the classics, English literature, and history, reading with avidity and remembering everything that he read. His eloquence and remarkable facility in the use of the English language, his intuitive knowledge of human nature, and the acuteness and vigor of his intellect combined to make him preëminently successful as a lawyer, especially as a jury lawyer, and in the course of a long career he seldom lost a case. Consult: Brown, *Life of Rufus Choate* (Boston, 1870); *The Works of Rufus Choate, with a Memoir* (2 vols., Boston, 1862); *Addresses and Orations of Rufus Choate* (6th ed., Boston, 1891); Neilson, *Memories of Rufus Choate* (Boston, 1884); and Whipple, *Recollections of Eminent Men* (Boston, 1886).

CHOBI, chō'bē. A Bantu people in southeastern Africa, extending from the lower Limpopo to the sea. They are called Chobi on the river and Mindonga on the coast. They disfigure their faces with lumps raised by scarification.

CHOC'OLATE (Mex. *chocolatl*, from *choco*, coca, *latl*, water). A preparation made from the seeds of *Theobroma cacao*, a plant whose culture is restricted to an area bounded by 20° on either side of the equator. (See CACAO.) These seeds, after being removed from the pods, which are shelled and broken, are allowed to ferment and cure. The beans are then washed, dried, "finished," and polished for export. In the process of manufacture the beans are first graded, then roasted, cracked, nibbed, husked, and winnowed. They are then ground in a mill, and, if the fat or oil which constitutes not far from 50 per cent of good cacao beans must be removed for cocoa, the mass is then treated in a press, and the cocoa left after the fat is expressed is removed, allowed to cool, and crushed and powdered. Chocolate, which contains more of the fat, is taken direct from the grinding mill and is mixed with sugar or other materials as desired and then placed in molds, where it cools and hardens. Chocolate is used as a beverage and for this purpose is dissolved in hot water or milk. It is also much used as a confection and for this purpose is mixed with sugar, flavoring matters, and various other substances. The cacao tree, from which chocolate is made, flourishes in tropical regions, and the increase in the annual production and consumption of cacao beans practically doubled in the period 1903–13, amounting in 1911 to 550,000,000 pounds. The leading producers of that year were Ecuador, 88,660,000 pounds; Brazil, 86,000,000 pounds; Gold Coast, 77,000,000 pounds; St. Thomas, 73,000,000 pounds; Trinidad, 53,000,000 pounds; Dominican Republic, 214,000,000 pounds; and Venezuela, 40,000,000 pounds. The world's consumption in 1911 was stated as about 512,000,000 pounds, of which the approximate amounts taken by the leading countries were as follows: United States, 135,000,000 pounds; Germany, 110,000,000 pounds; France, 63,000,000 pounds; England, 56,200,000 pounds; Holland, 52,000,000 pounds; Switzerland, 22,700,000 pounds. In 1913 crude cacao, or cocoa, to the amount of 140,039,172 pounds, valued at $17,389,042, and 3,469,680 pounds of prepared cocoa and chocolate, exclusive of confectionery valued at $787,678, were imported into the United States. Chocolate was brought to Europe by the Spaniards, who learned its use from the Mexicans at the time of the invasion of Cortés in 1519. It was introduced into England about 1657. In the time of Charles II it was still a great luxury, costing 6s. 8d. per pound. In the United States chocolate was first manufactured at Milton Lower Mills, near Dorchester, Mass., in 1765.

Good chocolate is externally smooth, firm, and shining—not gritty in the fracture—easily soluble, and aromatic; not viscid after having been liquefied and cooled, but oily on the surface, and leaves no sediment of foreign substances. Chocolate is adulterated in many ways, by mixing it with rice meal, oatmeal, flour, potato starch, roasted hazelnuts, or almonds, and with benzoin, storax, etc., in place of vanilla.

Bibliography. Whymper, *Cocoa and Chocolate: Their Chemistry and Manufacture*, with bibliography (London, 1910); *Bulletins, United States Department of Agriculture*, Ewill, No. 13; No. 107 (1907); No. 32 (1910); Duval, *Confiscrie moderne* (1908); Zipperer, *The Manufacturer of Chocolate* (New York, 1902). Also various volumes by manufacturers, such as Baker, *Cocoa and Chocolate* (Dorchester, 1904), and Historicus, *Cocoa and All about It* (London, 1880).

CHOCÓS, chō-kōz'. An Indian tribe, whose language constitutes a distinct stock, occupying the valley of the Río Atrato and the Pacific coast of Colombia between 4° and 8° N. lat. Consult Brinton, in *Proc. Amer. Philos. Soc.* for 1896 and 1897, and Rivet in *L'Année linguistique* (1908–10), vol. iv, pp. 123–126 (1912).

CHOC'TAW. An important Muskhogean confederacy, formerly occupying southern Mississippi and the adjacent parts of Alabama. They were sedentary and agricultural, slow and unwarlike in disposition, contrasting strongly with their cousins, the restless Chickasaw. Throughout the Colonial period they generally sided with the French, but were always doubtful allies. They flattened the head and had peculiar burial rites, the body being disinterred after a few days, when the bones were picked clean, by old men appointed for the purpose, and afterward preserved in their houses. About the close of the Revolution they began to drift westward into Louisiana. In 1830 they ceded all their remaining lands east of the Mississippi and removed to Oklahoma, where, under the style of the "Choctaw Nation," they maintained an autonomous form of government similar to that of the Cherokee (q.v.) until admitted to citizenship. There are now about 15,000 "citizens" in the nation, of whom perhaps two-thirds may be of pure or mixed Choctaw blood. There are also 1366 still remaining in Mississippi, Louisiana, and Alabama.

CHODAT, shō'dä', ROBERT (1865–). A Swiss botanist, born at Moutier-Grandval, Jura-Bernois, Switzerland. He was educated largely at Geneva University, where he became assistant professor (1889) and professor (1890) of systematic botany and (1900) professor of botany, and where he was dean of the faculty of sciences from 1898 to 1906 and rector of the university from 1908 to 1910. Besides some 200 articles in various journals of botany, his publications include: *Principes de botanique* (1907; 2d ed., 1911); *Sur le polymorphisme des Algues* (1908); *Aperçu de la géographie botanique du Paraguay* (1910).

CHODKIEWICZ, kōd'kē-ā'vĭch, JAN KAROL (1560–1621). A Polish general. He learned the science of war in the Spanish army, serving under Alva and Maurice of Nassau. On returning home he was made a lieutenant to Zolkiewski, and in this capacity he aided in crushing the Cossack uprising of Naleujko. He took part in the campaigns against Wallachia, in 1602 received command of the Polish army in Livonia, and in 1605 severely defeated Charles IX of Sweden near Kirchholm. For lack of adequate funds he was unable properly to follow up this victory, and in 1611 he concluded a truce with the Swedes. He was sent by Sigismund III to Russia to prosecute the war there in behalf of the Pseudo-Demetrius; but, hampered by the disorganization of his army, was compelled to relinquish Moscow and ultimately returned to Poland. He commanded in 1620–21 an army against the Turks, beating back an army of 160,000 trained veterans under Sultan Osman.

A few days after this victory (Sept. 24, 1621) he died of exhaustion in his camp. Consult the biography by Naruszewicz (new ed., Cracow, 1857–58).

CHODOWIECKI, kō'dō-vyĕts'kê, Daniel Nikolaus (1726–1801). A German painter and engraver, born in Danzig, West Prussia. At first a merchant in Danzig and Berlin, he afterward studied painting in the latter city; was for a time a miniature painter, but was chiefly successful as an engraver. He was appointed director of the Academy of Arts in Berlin in 1797. He executed over 2000 engravings, of which the best are genre studies of everyday life. Admirable plates were prepared by him for Lessing's *Minna von Barnhelm,* Gellert's *Fabeln,* Schiller's *Räuber,* and German versions of *Don Quixote* and Goldsmith's *Vicar of Wakefield.* Most of his paintings are rather weak imitations of Watteau, but he is best in family groups, such as "The Departure of Jean Calas." The Berlin Museum contains two unimportant pictures in oil, and the Berlin Academy a number of wash and pen-and-ink drawings. Consult: Engelmann, *Chodowieckis sämtliche Kupferstiche* (Leipzig, 1857; supplement, 1860); Hirsch, *Nachträge zu Chodowieckis sämtliche Kupferstiche* (Leipzig, 1906); Meyer, *Chodowiecki, der Peintre-Graveur* (Berlin, 1887).

CHODZKO, kōdz'kō, Leonard Jakob (1800–71). A Polish historian, born at Oborek (Government of Vilna). After study at the University of Vilna he traveled with Prince Michael Cleophas Oginski, who had commanded a regiment in the insurrection of 1794. Having taken up residence in Paris, he received the appointment of adjutant to the Marquis de Lafayette for his activity in connection with the July Revolution (1830). During the insurrection of 1863–64 in Russian Poland he was agent at Paris of the revolutionary government. He wrote many historical works, most of them in French. These include *Observations sur la Pologne et les Polonais* (1827), designed as an introduction to Ozinski's *Mémoires sur la Pologne et les Polonais depuis 1788 à 1815* (2 vols., Paris, 1826); *Histoire populaire de la Pologne* (1835); *La Pologne historique, littéraire, monumentale, et pittoresque* (2 vols., 1835–37; 8th ed., 3 vols., 1854–57).

CHŒNIX, kē'nĭks (Lat., from Gk. χοῖνιξ, *choinix*). A Greek dry measure, varying in size under different standards. In Athens, according to the system introduced by Solon, it was equivalent to 4 cotylæ, 1.08 liters, 1.14 quarts. In the later Athenian system, established about 100 B.C., the cotyle was equivalent to 0.2047 liter, the chœnix to 6 cotylæ, 1.228 liters, 1.297 quarts. Consult Hultsch, *Metrologie der Griechen und Römer* (1882).

CHOËPHORI, kō-ĕf'ō-rī, The. The second tragedy of the Orestean trilogy by Æschylus (q.v.).

CHŒRILUS, kēr'ĭ-lŭs (Lat., from Gk. Χοιρίλος, *Choirilos*). An Athenian dramatist of the late sixth and early fifth centuries B.C., the rival of Pratinas, Phrynichus, and Æschylus. Tradition says that he was preëminent in satyric dramas. The lexicographers attribute to him 150 plays in all and report that he won 13 victories.

CHŒRILUS OF SAMOS (c.470 B.C.–). The author of an epic poem called the Περσηΐς, *Persēis,* or Περσικά, *Persika,* descriptive of the Persian wars. He was, according to tradition, a friend of Herodotus and of Lysander the Spartan; he lived also at the court of Archelaüs (q.v.) of Macedonia. He was the first epic poet to choose his subject from contemporary history. His work received the honor of public recitation together with the poems of Homer, and was admitted to the Epic Canon, later to be ejected by the grammarians of Alexandria, in favor of that of Antimachus (q.v.). The fragments are included in Kinkel, *Epicorum Græcorum Fragmenta* (Leipzig, 1877). Consult also Müder, in *Klio* for 1907.

CHOG'SET. See Cunner.

CHOIR, kwīr (older forms *quire, quier, queer;* modern spelling affected by Fr. *chœur,* Lat. *chorus,* from Gk. χορός, *choros,* whence the word is derived). Strictly speaking, the choir is the part of the church occupied by the singers, wherever that may be; but at different periods in church architecture it came to designate two distinct sections: (1) in early churches, the part midway between the upper end, or sanctuary, occupied by the higher clergy, and the lower end, or nave and aisles, occupied by the laity; (2) in mediæval and later churches, the entire upper or eastern end of the church, including high altar and apse, to which the singing had been transferred. The ritualistic sense, however, does not always agree with the architectural; for we speak of the choir of a cathedral, meaning the entire upper end beyond the transepts with its aisles or chapels, whether the singing is done there or not. In early basilican churches the upper end is called *apse,* and not choir, and the choir, as in San Clemente in Rome, is the space below the high altar, extending part way down the nave and slightly raised above its level, surrounded by a decorative parapet within which are marble benches for the singers, with a pulpit on each side and a paschal candlestick attached to the gospel pulpit (on the left side as one faces the high altar). This arrangement still persists in many Spanish cathedrals. This kind of choir is less a part of the architecture than of the ritualistic furniture and ornament. But, when monasticism gained complete control of church architecture in the eighth century, the old distinctions between higher and lower secular clergy no longer obtained, the division between choir and sanctuary lapsed, and the entire upper end became the choir. As the monks were numerous, and on the mediæval theory the worship of God was the primary consideration, the edification of the laity being secondary, the size of the choir increased, and the choir screen, shutting off the monks and the services from the laity in the lower part of the choir, was made lofty and heavy. Only when episcopal power returned and with it cathedral architecture and numerous lay congregations, in the eleventh and twelfth centuries, was this segregation of the choir partly broken down and some return made to early Christian custom. But the monastic custom of high choir screens was retained in many cathedrals, especially in England, where nave and choir are completely separated, attendants upon the services being usually seated within the latter. In England the term "chancel" (q.v.) is used to designate the upper end of churches without canons, e.g., parish churches. Ordinarily architects distinguish an apse from a choir in the sense of using the latter only when there is a considerable projection beyond the transept or nave. This projection often includes a cer-

CHOIR OF THE CATHEDRAL OF SAINT JOHN THE DIVINE, NEW YORK CITY

tain straight portion, as a continuation of the nave and aisles; then a semicircle with projecting choir chapels and choir aisles. An important feature of the architectural effect of the mediæval choirs was provided by the choir stalls, or sedilia. These are ranges of individual seats, sometimes in two or even three rows on either side of the choir, each higher than the one in front of it, those of the rearmost or highest row having an elaborate pinnacled canopy over each seat. The seats were pivoted to fold back while the choristers stood for the singing, with a carved projection (*miscrere*) on the underside to relieve somewhat the strain of long standing. These choir stalls are superb examples of wood carving and inlay. For the æsthetic significance of the development of the choir in mediæval churches, the varieties of its form in different schools, see ARCHITECTURE. Choir is also the name given to the singers of the choral service.

CHOIR SCREEN, or **CHOIR WALL.** The screen or wall which divides the choir and presbytery from the nave and side aisles. When it bears a cross over the central entrance, it is sometimes called the rood screen. In the great monastic churches it was a solid wall with a single archway in the centre; but in many English cathedrals this has been replaced by a screen of open ironwork in modern times. Wooden screens are not uncommon in the smaller churches. The choir screens of the fourteenth and early fifteenth centuries in France are especially rich, as at Albi and Brou.

The term "choir wall," or "choir inclosure," is commonly applied to the screen wall separating the choir from the side aisles. Celebrated examples of this are those of the French cathedrals of Chartres and Amiens.

CHOISEUL-AMBOISE, shwä'zēl' äN'bwäz', ETIENNE FRANÇOIS, DUC DE (1719–85). A French statesman. He fought bravely in the War of the Austrian Succession, but did not attain any prominence until later, when his attractive bearing and disposition won for him the favor of Madame de Pompadour, and as long as she lived his advancement was continuous and regular. He was made lieutenant general in 1748. In 1756 he was sent as Ambassador to Rome, where he adjusted with Pope Benedict XIV the dispute over the sacraments. In the same year he went to Vienna, intrusted with the mission of uniting Austria with France against Prussia. After accomplishing this he was made Minister of Foreign Affairs (1758) and created Duc de Choiseul (he had formerly been Count Stainville). He was the author of the *Pacte de famille,* which in 1761 brought about the alliance of all the Bourbon crowns against foreign aggression. His popularity with the court and the nation was increased when in 1763 he secured terms of peace for France, which, though humiliating, were far better than the French dared to hope for. His reputation was enhanced by his success in suppressing the Jesuits, whom Madame de Pompadour had come to hate no less than did the nation. His patroness died in 1764, but Choiseul continued to direct both the internal and external affairs of France. He was a skillful courtier and shrewd diplomatist and so controlled the intrigues of European courts that Catharine II of Russia gave him the name *le cocher de l'Europe* ('the coachman of Europe'). In 1768 he brought Corsica under French dominion. In 1770 Madame du Barry caused his dismissal. He lived magnificently in Chanteloup and (under Louis XVI) in Paris. He died May 7, 1785. Consult: *Mémoires de Choiseul* (2 vols., Paris, 1790); Boutry, *Choiseul à Rome* (ib., 1895); Broglie, *L'Alliance autrichienne* (ib., 1895).

CHOISEUL-GOUFFIER, gōō'fyā', MARIE GABRIEL AUGUSTE FLORENT, COMTE DE (1752–1817). A French diplomatist and archæologist. In 1776–82 he visited Greece and made a careful study of the whole country. His investigations resulted in the magnificent work *Voyage pittoresque de la Grèce* (2 vols., 1782–1822). He became a member of the French Academy in 1784 and two years later was sent as Ambassador to Constantinople, where he remained eight years. During the Revolution he adhered to the royal cause and afterward went to Russia, where he was made director of the Imperial libraries and of the Academy of Fine Arts. He returned to France in 1802 and under the Restoration was Minister of State. He was a lifelong friend of Talleyrand.

CHOISEUL-PRASLIN, -prä'lăN', EUGÈNE ANTOINE HORACE, COMTE DE (1837–). A French politician. He served in the navy from 1853 to 1865, held some minor offices, and in 1869 was elected to the Corps Législatif. In 1871 he was chosen to represent Seine-et-Marne in the National Assembly. He was elected to the Chamber in 1876, 1877, 1881, and 1889. From March to November, 1871, he was Minister Plenipotentiary of France to Italy and in 1880 was appointed Undersecretary of State in the Ministry for Foreign Affairs. In 1887 he was dispatched on a botanical mission to Ceylon and the United States. He was regarded as very influential in the Republican majority.

CHOISEUL (shwä'zēl') -STAINVILLE, CLAUDE ANTOINE GABRIEL, DUC DE (1760–1838). A French soldier and politician. He was a colonel of dragoons during the French Revolution and warmly supported the royal cause. He was one of those who arranged the flight of Louis XVI in 1791, but, after the royal party was captured, a price was set upon his head, and he was finally taken prisoner and confined at Dunkirk. He escaped, but was recaptured and condemned to death. He escaped, however, and at the Restoration received a seat in the House of Peers from Louis XVIII. In the Revolution of 1830 he was a member of the provisional government and afterward was appointed by Louis Philippe to the offices of governor of the Louvre and royal aid-de-camp. He wrote an account of the flight of the King (1822).

CHOISY-LE-ROI, shwä'zē'le-rwä', or **CHOISY-SUR-SEINE,** sụr-sān'. A town in the Department of Seine, France, on the river Seine, 6 miles southeast of Paris (Map: Paris). It owes its importance to the pleasure château built here by Mlle. de Montpensier in 1682, which was acquired later by Louis XV as a residence. It was destroyed during the French Revolution. The church and the town hall were built in the reign of Louis XV. Among its monuments is a bronze statue of Rouget de l'Isle, author of the *Marseillaise,* who died here in 1836. The industries comprise textile, porcelain, glass, hat, and chemical factories. Pop. (commune), 1901, 11,281; 1911, 15,908.

CHOKEBORE. A shotgun (q.v.) whose bore is slightly narrowed towards the muzzle in order to concentrate the shot.

CHOKECHERRY (so called on account of its astringent fruit). A name given to those

species of the genus *Prunus* of which the fruit is astringent. They are comprised in the section *Padus* of the genus *Prunus;* they are natives of North America and have small fruit that hangs in racemes. The true chokecherry is *Prunus virginiana,* which is a shrub or small tree. Closely allied to it is the wild black cherry, *Prunus serotina.* This is an important forest tree, 60 feet high, and ranging over the United States from Maine to Florida and west to the Dakotas and Texas. It is a handsome tree, and its wood is one of the most valuable of American woods for cabinetwork. It has a considerable resemblance to the Portugal laurel, although the leaves are deciduous. The bark is used as a febrifuge, pectoral, and tonic, under the name of wild-cherry bark; and by distilling it with water, a volatile oil is obtained from it associated with hydrocyanic acid, called oil of wild cherry. This bark allays nervous irritation and is particularly suitable as a tonic. See WILD CHERRY.

CHOKE DAMP. See CARBONIC-ACID GAS.

CHOKED DISK. See OPTIC NEURITIS.

CHOKING. See LARYNGOTOMY; TRACHEOTOMY.

CHOLAGOGUE, kōl'ȧ-gŏg (Gk. χολαγωγός, *cholagōgos,* from χολή, *cholē,* bile + ἀγωγός, *agōgos,* bringing, from ἄγειν, *agein,* to carry). An old term for a cathartic medicine which increases the flow of bile. The most reliable are calomel, phosphate of soda, and podophyllum. Cholagogues act either by promoting the secretion of bile or by facilitating the flow of bile from the gall bladder into the duodenum. See PURGATIVES.

CHOL'ELITHI'ASIS. See CALCULUS, or STONE.

CHOLERA, kŏl'ê-rȧ (Lat., from Gk. χολέρα, *cholera,* the cholera, from χολή, *cholē,* gall bile). A term applied to four different diseases known respectively as *cholera morbus, cholera nostras, cholera Asiatica,* and *cholera infantum.* An account of the last-named disease is given in a special article. The others may be briefly described in the present sketch.

Cholera Morbus. This is a rarely serious attack of gastroenteritis, characterized by vomiting, diarrhœa, cold surface, cramps in the abdomen, and some prostration. It is caused by eating indigestibles or overloading the stomach, by excessive drinking of ice water, exertion or exposure immediately after eating, etc., and usually occurs in the summer. In adults the treatment consists in emptying the digestive tract, then giving opium and carminatives, and resting the alimentary canal for several hours.

Cholera Nostras. This is an intense form of acute enteritis, which has appeared in various parts of Europe, sometimes in epidemic form, since the days of Hippocrates. The name was adopted after Asiatic cholera appeared and invaded Europe, to distinguish it from the latter disease. Cholera nostras is brought on by similar causes, and resembles cholera morbus except that the invasion is less sudden, the pains are more severe, and the prostration is more pronounced. Cramps occur in the legs, fingers, and arms, the skin becomes blue, and delirium or convulsions occur. Death is rare except among the aged, children, and invalids. No one cause can be named for it. The ordinary and normal intestinal bacteria (*Bacillus coli communis*) have been found in the fæces, but not the spirilla. The disease is not frequent in the United States, unless it be considered identical with the severer forms of cholera morbus. The term is but rarely used by American physicians. During an epidemic of true cholera it is difficult to differentiate cases of cholera nostras, except by the absence of the spirilla in the dejections. In treating cholera nostras the digestive tract should be emptied by washing out the stomach and by using purgatives; the rectum should be irrigated with large quantities of hot tannin solution; the patient should take a hot bath and be warmly covered; the heart should be supported by proper medication. The attack may last several days and is usually followed by considerable weakness and digestive disturbances.

Asiatic Cholera. This is an infectious disease caused by drinking water or food contaminated by the fæces of other cholera patients and containing a flagellated vibrio, the *Spirillum choleræ.* It is probably never communicated by contagion, i.e., through the breath, perspiration, or other emanation from the patient. The disease originated in India, where it is endemic. The earliest-known account of the disease is probably that of Sueruta, a Hindu physician. Its permanent home is Calcutta and the southern part of Bengal. It has existed since 1817 in endemic form, and epidemics of it antedate the Christian era. Cholera first appeared in China in 1820; in Arabia, Persia, and Mesopotamia in 1821; in Syria, Palestine, and on the shores of the Caspian in 1823. The second epidemic, starting from the Ganges in 1826, passed through Persia and Astrakhan to Russia in 1830 and to Poland in 1831. Meanwhile it extended through Mesopotamia, Arabia, Palestine, and Egypt, and from Russia it passed into Germany. After invading Austria, Hungary, Wallachia, and Turkey, it reached England in 1831. Brought by Irish immigrants to Quebec in 1832, it entered the United States by way of Detroit, Mich., and thence it spread through the West to the Pacific coast and south to New Orleans. Subsequent epidemics occurred in 1841, 1863, 1871, 1883, 1891, and 1893. The disease prevailed in America in 1848 and 1852 and from 1865 to 1868. It appeared in New Orleans and the valley of the Mississippi River in 1873, and in 1892 a few cases came to the port of New York from Hamburg, Germany. In 1899 it was found by the United States troops in the Philippine Islands, where it has probably been often prevalent.

Most cases of cholera begin with nausea, restlessness, and chilly sensations, followed by violent and frequently recurring diarrhœa, with vomiting and vertigo. In from one to six hours buzzing in the ears, palpitation of the heart, pressure over the stomach, an anxious gray face, and blueness of the whole surface supervene. The bowels are emptied, painlessly, of discharges resembling rice water. Pain in the stomach and in the region of the heart is often severe, and cramps occur in the calves and arms. The patient suffers continually from thirst. The external temperature is subnormal, being about 95° F., or lower, while the rectal temperature may be 103° or 104° F. The pulse rarely exceeds 100, while the respiration is usually increased to 30 or 40. Urine may be suppressed. The patient may sink into a somnolent and then a comatose condition and die, or else he may suddenly improve, and then either go on to convalescence or sink into fatal coma in a

few days. Of the mild cases, about 50 per cent die; while of those with subnormal temperature, cyanosis, and coma, 90 per cent die. A mild form of true Asiatic cholera, known as *cholerine*, is rarely fatal, but is dangerously infectious. Lobar or lobular pneumonia, enteritis, nephritis, and neurasthenia may follow cholera.

Asiatic cholera is due to a slightly curved bacillus which, from its shape, is called the comma bacillus (*Spirillum choleræ Asiaticæ*). The bacillus, discovered by Koch in 1883, is a short motile rod from 1 to 2 micromillimeters long. A number of such bacilli are often found clinging to one another at their ends and thus forming spirals of various lengths. The bacillus grows in the presence of oxygen and does not produce spores, the temperature best adapted to its growth being about that of the human body. It is, however, quite resistant to cold, though it is readily destroyed by drying or boiling. Its definite biological characteristics usually enable an expert to determine its pressure or absence in intestinal evacuation early in the disease. The bacilli are usually confined to the intestines, and during the active stages of the disease may be present in enormous numbers. The systemic effects seem to be due to absorption of toxins produced by the bacilli and are of the nature of a toxæmia. The pathological changes are not characteristic, and an autopsy shows those degenerative changes which usually accompany acute infection. In the small intestines, where the bacteria are present in greatest abundance, there are apt to be hemorrhages into the mucous membrane and intense congestion. The lymph follicles of the intestines are swollen and congested. The contents of the intestines may either consist of the typical rice-water fluid or else may be dark colored and bloody.

Patients suffering from cholera should be thoroughly isolated. Suspicious cases, also, should be isolated as soon as possible, and their dejections subjected to bacteriological examination. The vessels receiving the dejecta should contain a 5 per cent solution of carbolic acid and should be cleansed with boiling water after being used. The bedding and clothing of the patient should be disinfected by steam or soaked for one hour in a 5 per cent solution of carbolic acid. The room used should be scrubbed with a similar solution, and all loose articles either burned or sterilized by steam or by formaldehyde vapor. Bodies of the dead should be promptly wrapped in a close sheet saturated with bichloride of mercury or carbolic-acid solution and buried at once. Nurses, physicians, and undertakers should disinfect their hands, faces, and clothes with the greatest care. According to a rule adopted in the United States and in Germany, all persons arriving from infected districts are quarantined five days; if cases of cholera have broken out among them, the quarantine must be extended a week longer. As further preventive measures in time of danger, all water used for drinking or for washing tableware should be boiled, and all fruit, ice, and milk should be carefully inspected.

The treatment of cholera consists in supporting the patient by opium, astringents, stimulants, heat, etc. Some success has followed flushing the rectum with salt solution, and subcutaneous injections of the same. The immense losses of fluid from the body engender an intense thirst and concentrate the toxins; therefore the patient should be given a liberal supply of water by mouth. Anticholera inoculation has been used with considerable success, according to Haffkine's method. Artificial immunization is secured by subcutaneous injection of cultures of diminished virulence followed by injections of cultures of increased virulence. Forsyth reports on the use of Haffkine's serum in 1903 that no ill effect followed 30,609 inoculations. Of these 329 were attacked by cholera, of whom 15.1 per cent died. The uninoculated suffered a mortality of 45.2 per cent. Others report 40 per cent mortality among the inoculated who subsequently contracted cholera, and 75 per cent among uninoculated cholera patients. See SERUM THERAPY. Consult Wendt, *Treatise on Cholera* (New York, 1898).

CHOLERA INFANTUM (Lat., the cholera of children). A fatal form of diarrhœa, of infectious origin, occurring in infants and young children, especially in the summer months. The *Bacillus dysenteriæ* of Shiga is believed to be the specific infectious agent, but it is not always found in the stools. Attacks are caused by the ingestion of impure milk or other foods and are generally precipitated by chilling of the abdomen, the child lying uncovered during a cool night following a hot day. The onset of the disease is sudden, with great prostration, a rise of temperature to 103°–105° F., almost constant vomiting of food, mucus, and bilious material; 12 to 15 passages from the bowels each day, first of green, yellow, or brownish color, later of colorless serum, in most cases odorless, in some few instances overpoweringly offensive; rapid emaciation and loss of weight; depressed anterior fontanelle, sunken eyes, sharp features, a peculiar pallor, and an anxious expression; nervous irritation and moaning or crying; dullness, rarely delirium. The disease is fatal in two-thirds of the cases, and almost all cases occur in bottle-fed children of the poor during the first or second summer of their lives. In institutions the mortality is sometimes as high as 90 per cent. In such a fatal disease preventive treatment is most important. Strict attention to the preparation and keeping of milk is the chief consideration. During the summer months the milk should be pasteurized, or certified milk should be used; the enforcement of municipal milk inspection in many large cities has reduced the death rate from summer diarrhœa to a minimum. The child should be protected by suitable clothing from chilling of the abdomen at night. Treatment, when the attack is established, varies in individual cases, but the general indications are in the beginning to empty the bowels of infectious material by purgatives, such as calomel or castor oil, or by enemas; to withhold all food for 24 hours, meanwhile giving plenty of water to combat emaciation and relieve thirst, and following that by rice, barley, or albumen water, and a gradual return to the normal food. Small doses of brandy constitute the best stimulant. If the diarrhœa persists, opium, bismuth, or chalk mixture is useful. The term "cholera infantum" is also sometimes used, inaptly, as a synonym for gastroenteritis (q.v.). Consult Holt, *Diseases of Infancy and Childhood* (New York, 1904).

CHOL'ERINE. See CHOLERA, *Asiatic.*

CHOLESTERIN, kō-lĕs'tĕr-ĭn (from Gk. χολή, *cholē*, bile + στερεός, *stereos*, solid), $C_{26}H_{43}OH.H_2O$. A white crystalline substance occurring as a normal constituent in cell protoplasm. It

is therefore widely disseminated in both the animal and vegetable kingdoms. It is found in considerable quantities in the nerves and the white matter of the cerebro-spinal axis, and also occurs in milk, in the blood, and the bile, and is the main constituent of gallstones, from which it may be readily prepared by extracting with boiling water and dissolving in hot alcohol. On cooling, the alcoholic solution thus obtained deposits cholesterin in somewhat impure form; the substance is then purified by recrystallization from alcohol. Cholesterin crystallizes in glittering nacreous scales, melting at 148.5° C.; it may be distilled in vacuo, without decomposition, at temperatures above 360° C. Chemically it is a monatomic alcohol. When its solution in chloroform is shaken with strong sulphuric acid, the solution assumes a blood-red coloration, which gradually changes to blue, green, and finally yellow. Cholesterin is insoluble in water. An alcohol of the same molecular formula as cholesterin, called "phytosterin," or "plant cholesterin," is widely distributed in the vegetable kingdom and may be readily obtained by extracting peas with ligzoin, filtering, evaporating the filtrate to dryness, and recrystallizing the residue from alcohol. With chloroform and sulphuric acid phytosterin shows the same reaction as cholesterin. Phytosterin melts at 133° C. Both cholesterin and phytosterin are optically active, both turning the plane of polarized light to the left, though not to the same extent.

CHOLET, shō'lā'. A town of France, in the Department of Maine-et-Loire, on the right bank of the Maine, 37 miles southwest of Angers (Map: France, N., E 5). It has manufactures of linen, cotton, and woolen goods, including batiste and flannel, which industries in this and the surrounding territory employ between 50,000 and 60,000 operatives. There is a brisk trade in lumber, grain, and cattle. Granite is quarried near by. The first considerable growth of the town was when a colony of weavers settled here under Edouard Colbert, Count of Malévrier. Pop. of commune, 1901, 15,335; 1911, 21,058. Here, during the Vendean War, two actions were fought in 1793, in both of which the Royalists were decisively defeated.

CHOLIAMB, kō'lī-ăm̆b. See VERSIFICATION.

CHOLMONDELEY, chŭm'lī, MARY (?–). An English novelist, born at Hodnet, near Condover in Shropshire, daughter of the rector there. In 1896 her father's health broke down, and the family removed to London. Her novels comprise, notably: *The Danvers Jewels*, under the pen name of "Pax" (1887); its sequel, *Sir Charles Danvers* (1889); *Diana Tempest*, the first novel to appear under her name (1893); *The Devotee* (1897); *Red Pottage* (1899); *Moth and Rust* (1902); *Notwithstanding* (1913). Beginning with a detective story, Miss Cholmondeley has worked her way into the novel of contemporary life. She possesses humor and pathos and usually keeps a firm hold on her characters; but a tendency to melodrama prevents her work, in spite of its popularity, from being wholly admirable.

CHOLÓNES, chō-lō'nāz. An Indian tribe, whose language constitutes an independent stock, occupying a limited area on the left bank of the Huallagá, between 8° and 9° 30′ S. lat., in central Peru. The language of the Hibitos is said to belong to the Cholonan stock. Consult Brinton, "The Cholona Language," in his *Studies in South American Native Languages*, pp. 30–36 (Philadelphia, 1892), and Chamberlain, in *Journ. de la Soc. des Amér. de Paris*, N. S., vol. vii, pp. 185–186 (1910).

CHOLULA, chō-lōō'lå. An old town of Mexico, in the State of Puebla, situated at an altitude of nearly 7000 feet, about 8 miles west by north of Puebla, with which it is connected by rail (Map: Mexico, K 8). It is well built and contains a pyramid of clay and brick supposed to have been built by the aborigines in honor of one of their deities and surmounted by a half-ruined chapel, probably erected by Cortés. Cholula, at the time of Cortés, was a flourishing city of 20,000 houses and a large number of temples. It was the chief city of a semi-independent state settled by a tribe of the Nahuatl race. The inhabitants carried on a considerable trade and had a more or less democratic form of government. It was visited by Cortés in 1519, and in spite of his friendly reception by the inhabitants, he massacred a number of them, suspecting them of plotting against the Spaniards. The population of Cholula is about 9000.

CHONCHO. See CHUNCHO.

CHON'DRODITE. See HUMITE GROUP.

CHONDROPTERYGII, kŏn-drŏp'tĕr-ĭj'ĭ-ī (Neo-Lat. nom. pl., from Gk. *χόνδρος, chondros*, cartilage + *πτερύγιον, pterygion*, fin), or ELASMOBRANCHII. A group of cartilaginous fishes, including the sharks, rays, and chimæra. See FISH.

CHONDROSTEI, kŏn-drŏs'tê-ī (Neo-Lat., from Gk. *χόνδρος, chondros*, cartilage + *ὀστέον, osteon*, bone). An order of fishes within the group Teleostomi, which includes the sturgeons and closely allied forms. See STURGEON.

CHONDROSTEUS, kŏn-drŏs'tê-ŭs. A Jurassic fossil fish, the direct ancestor of the modern sturgeon, found in the Liassic beds of England. The form of the body is very similar to that of the sturgeon, and the skeleton differs only in the form and arrangements of the cranial bones and in the presence of a series of branchiostegal rays, which latter character is reminiscent of the Palæoniscidæ. The body was free from scales, except on the upper edge of the caudal fin, where thick rhombic scales like those of the sturgeon were present. The type species, *Chondrosteus acipenseroides*, was only 3 feet in length. Another species was about 6 feet long; and an associated genus, *Gyrosteus*, is known only by fragments that indicate for it a length of 20 to 25 feet. See STURGEON.

CHONEK, or **TSONEKA, TZONEKA.** See TSONEKAN (TEHUELCHEAN).

CHONETES, kō-nē'tēz (Neo-Lat. nom. pl., from Gk. *χώνη, chōnē, χοάνη, choanē*, funnel, from *χεῖν, chein*, to pour). A genus of fossil Brachiopoda, of the order Protremata, which may be recognized by the semicircular outline of the much-compressed concavo-convex shell, and by the row of hollow spines on the upper margin of the hinge area of the ventral valve. The outer surface of the shell is ornamented by radiating striations in most of the species, while in some Carboniferous species there is also a mesial fold and sinus. The species are mostly small, seldom exceeding an inch in transverse diameter. In America the genus appears first in the Silurian rocks, it attains its maximum evolution in the Devonian and Carboniferous, and it became extinct with the close of the Permian; thus it is a valuable index fossil for the Upper Paleozoic rocks. About 60 American species are known, and there is probably an equal number known

from Europe and Asia. See BRACHIOPODA; DEVONIAN SYSTEM; CARBONIFEROUS SYSTEM.

CHONODENDRON, kō'nō-dĕn'drŏn. See CISSAMPELOS.

CHONOS, chō'nôs. A tribe of Indians, now extinct, who formerly occupied the Archipelago of Chonos and the adjacent regions of the Chilean coast, from about 45° to 52° S. lat. Their language, apparently, formed a distinct stock. Consult Chamberlain, on the Chonoan stock, in *American Anthropologist*, N. S., vol. xiii, pp. 467–468 (1911).

CHONOS ARCHIPELAGO, chō'nôs är'kĭ-pĕl'ă-gō. A group of 45 larger and many small islands, aggregating 4700 square miles, off the coast of Chile, extending from about lat. 44° to 46° S. and from about long. 74° to 75° W. (Map: Chile, B 12). Many of the islands are barren, and the total population is small, being chiefly Araucanians. Administratively the group belongs to the Province of Chiloé.

CHONS, kŏnz, or **KHONSU,** kŏn'sû. An Egyptian deity worshiped at Thebes, where he had a special temple, built by Rameses III at Karnak (q.v.). Of his original character little is known. The sparrow hawk was his sacred animal. Later he was associated with the two principal gods of Thebes, Ammon and Mût. He was called their son and is usually represented as a child or youth, wearing the side lock, the badge of princely rank. As Ammon and Mût were solar deities, Chons, their child, had to take a lunar part, and he is therefore depicted bearing the moon on his head. This led to his identification with other moon gods, e.g., Thout. The Greeks identified him with Heracles, as son of Ammon-Zeus.

CHOPIN, shō'păn', FRÉDÉRIC FRANÇOIS (1810–49). The greatest master of pianoforte composition. He was born at Zelazowa Wola, near Warsaw, Poland, Feb. 22, 1810. The son of refined parents, his musical education began as soon as his predilection for music manifested itself. Adalbert Zwyny was his piano teacher, and later he had lessons in composition from Joseph Elsner. When not quite nine years old, he played in public a concerto by Gyrowetz. The father was a professor in the Warsaw gymnasium, and the family in comfortable circumstances. From the aristocratic social surroundings of his younger years Chopin inherited the liking for fashionable society which was one of his characteristics. A delicate boy, he seems nevertheless to have enjoyed a jest, and he had a talent for mimicry which convinced his friends of later years (Liszt, George Sand, and Balzac among them) that he could have succeeded as an actor.

In August, 1829, he gave two concerts in Vienna, which were attended by all the musical celebrities, who were unanimous in praising both his compositions and performance. His first concert in Warsaw was given in March, 1830, and was followed by a second, the net receipts from both being $600, by no means an inconsiderable sum for a young pianist in those days. He had a love romance with Constantia Gladowska, a vocal pupil at the Warsaw Conservatory, who, however, married a merchant. While giving concerts in Munich, in September, 1831, he heard of the Russian occupation of Warsaw. As a result, he settled, in October of the same year, in Paris, which was his home for the remaining 18 years of his life.

He had composed, but not published, several of his études, among them the great C minor, op. 10, no. 12, sometimes called the "Revolutionary," because inspired by his wrath at the fall of Warsaw before the Russians, his first sonata, and his F minor concerto. The adagio and the rondo had been publicly played by him. (It may be said, in passing, that the dates of publication of Chopin's works are misleading as to the years of composition. Most of them were composed much earlier.) During his life in Paris he was surrounded by men of genius and women at least of talent, among them Liszt, Heine, Berlioz, Mérimée, Meyerbeer, Bellini, Nourrit, Delacroix, Balzac, Dumas, De Musset, Ary Scheffer (who painted his portrait, destroyed in Warsaw by Russian soldiers, in September, 1863), and George Sand. During the first four years of his residence at Paris he made frequent public appearances as a pianist. His E minor concerto he played in February, 1832. Mendelssohn was among those who applauded him. Kalkbrenner was eager to have Chopin study with him—on the mechanical side. Chopin by letter consulted his former teacher, Elsner, who wisely counseled against it, for fear it might impair his originality. Great delicacy and a singing quality of tone seem to have been the characteristics of his playing. His own more colossal pieces, as some of the polonaises, ballads, scherzi, and études, were beyond his physical powers. "Young man," he is reported to have said to a budding virtuoso who apologized to Chopin for having broken a string while playing the famous polonaise militaire, "if I could play that polonaise as it should be interpreted, there would not be a string left in the piano." During the winter of 1835 he gave a concert in the *Opéra des Italiens*. The tone volume was not sufficient to fill the large hall, and the exquisite shading and details were lost, so that the audience was less responsive and enthusiastic than usual at Chopin's concerts. After that the sensitive master, to whom playing before a large audience had always been an ordeal, withdrew entirely from the concert platform, and thereafter played only to a small, select circle in the salons of the aristocracy and of his own friends.

During the summer and early autumn of 1835 Chopin was in Germany. He met his father at Karlsbad, and in Dresden fell in love with Marie Wodzinski, whose brothers had been his schoolmates. On his return trip to Paris he stopped at Leipzig, where he played at the homes of Wieck and Mendelssohn, and also made the acquaintance of Schumann, who had written most enthusiastically about Chopin's works. The following summer Chopin again visited Germany and became engaged to Marie. But scarcely had he returned to Paris, when he learned that the young lady had broken her troth and married a Count Skarbek. In July of that year he made a trip to England of only 11 days, but this sufficed to develop the germs of consumption latent in his constitution. (This disease was in the family. A sister died of it, and his father succumbed to combined chest and heart trouble.)

To Chopin's sensitive nature Marie's faithlessness proved a severe shock. He sought distraction in incessant work and the whirl of society. In this state of mind he met George Sand (q.v.) in the winter of 1837. She was then living separated from her husband, absorbed in her work and her children. With a woman's intuition she divined Chopin's sorrow, with an artist's

intuition Chopin's genius. The inevitable result was a passionate love, which Chopin soon reciprocated. How much they were in need of each other's company became evident when in the fall of 1838 the physician ordered Sand to spend the winter in a southern climate because of an illness of one of her children. The very thought of a possible separation threw the master into a feverish excitement. The problem was solved by going together to Majorca. Unfortunately the winter proved cold and rainy, so that Chopin suffered severely from bronchitis. George Sand proved a tender and constant nurse and inspired his genius to some of its most beautiful utterances, among them those immortal préludes. In the spring they returned, and passed the summer of 1839 at Sand's estate at Nohant.

The next few years passed uneventfully. The winters were spent in Paris, where Chopin was the lion of the salons, the summers at Nohant, where almost all the works of the last years were written. From the very beginning of his residence at Paris, Chopin had been in great demand as a teacher by the foremost families. Unlike some other great masters, Chopin loved teaching, and the money thus earned was his principal source of revenue. Before long publishers also sought his works, for which they paid handsome sums, so that the master was able to indulge his inborn taste for refined and even luxurious surroundings, which were as much a necessity for him as constant association with refined and brilliant people. Chopin was by no means the melancholy dreamer which he has been frequently, but unjustly, represented. Wherever he appeared he was the centre of attraction, not only because of his exquisite art, but also because of the wit and brilliancy of his conversation. His sensitive nature and delicate health, however, rendered him subject to sudden changes of mood and fits of depression. In his intercourse with strangers he was naturally reserved, for in his life, as in his art, he instinctively shrank from anything that was in the least commonplace.

The year 1844 was a momentous one, for in short succession Chopin lost his father and one of the dearest friends of his youth, Matuszynski. A deep gloom settled over his spirit, so that even George Sand lost her influence over him. As his strength failed, his nervous irritability increased, and the relation between the lovers became more and more strained. The complete break came in 1847. The exact cause of their final quarrel will probably never be known. Chopin himself never gave an explanation; Sand said and wrote so much that it is impossible to distinguish truth from fiction. For her it was the end of one of the episodes of her life; for him it was the end of life itself.

In order to forget the master threw himself madly into his work, often teaching seven hours in one day. He even prepared for a public concert, which he actually gave on Feb. 16, 1848. It was his last concert, and the enormous enthusiasm with which his works were received fired his ambition once more, so that he planned a trip to England in spite of the fact that his health was constantly growing poorer. In April he left Paris for London, where he played frequently in select circles. In the hope of enjoying a much-needed rest he accepted an invitation from Jane Stirling, a former pupil, to spend the summer at the castle of her family in Scotland. Late in the fall he returned to London without any improvement of his health. When in January, 1849, Chopin arrived in Paris, his friends were shocked at his appearance. A persistent cough racked his frame. In spite of his completely exhausted condition he resumed his lessons, but soon was compelled to abandon them. He now realized that the end was near. In the morning of Oct. 17, 1849, he died. With imposing splendor the body was conducted to the cemetery Père Lachaise and interred near the graves of Cherubini and Bellini. But his heart was sent back to Poland, where it is preserved in the church of the Holy Cross at Warsaw.

That Chopin was the creator of a new style of writing for the pianoforte has long been admitted. That at the same time he was one of those masters who have enormously increased the means of emotional expression and enriched the art by the creation of absolutely new forms was generally realized only within the present century. Still later came the knowledge that the sum total of Chopin's achievements entitles the composer to a foremost place among the supreme masters of music.

The increase in the range and power of the piano, together with the perfection of the damper pedals, about the year 1830 suggested new possibilities undreamed of before. Foremost among these were the wide distribution of the tones of a chord, the attainment of a real "singing" tone, practically an endless variety of tonal color and the utmost refinement of dynamic shading. Intuitively Chopin recognized all this and adopted a new style of writing, which he also carried to the point of perfection, so that neither Schumann nor Liszt, who both adopted this style, was able to develop it further. Had he accomplished nothing else, Chopin's fame would rest on a firm foundation. But he did infinitely more. He overthrew the whole system of harmony as taught at that time, and by means of enharmonic modulation brought the most remote tonalities into close relation. In his later works Beethoven had shown how ornamentation could become a means of real expression. This idea Chopin developed to the last degree, making embellishments a potent factor of musical expressiveness, a real heightening and intensifying of the melodic line, almost an integral part of the melodic and harmonic scheme. All this means a lasting contribution to the means of emotional expression. When speaking of Chopin's melodic gift, it is not possible to employ anything but superlatives. His wealth of melody, in the best sense of the word, is inexhaustible, like Schubert's. Almost invariably his themes are broad, flowing melodies, of noblest beauty and irresistible power. They captivate and grip the listener at the first hearing and never lose their charm. In this respect Chopin stands alone among the masters of the first rank. The music of Bach, Beethoven, Wagner, Brahms, and, to some extent, even of Schubert, discloses its real greatness and surpassing beauty only after repeated hearing. It grows with familiarity. Chopin's music discloses itself more readily; its appeal is almost instantaneous, but deep and lasting. In this last respect it is separated by a vast gulf from the music of lesser masters. Their melodies soon pall, in direct ratio to the frequency of repetition, whereas Chopin's never lose their perennial freshness.

Unsurpassed among the master's works stand the four great ballads, op. 23 (G m., 1836), op. 38 (F, 1838), op. 47 (A flat, 1841), and op. 52 (F m., 1843). According to the composer's own statement they were inspired by poems of Mickiewicz. Instead of choosing some existing form Chopin crystallizes his inspiration in a new, compact, and symmetrical form and calls it "ballad," thus indicating in a very general way the epic character of the works. The listener's imagination may supply any programme that he pleases, if a programme is needed.

On the same high level as the ballads stand the four scherzi, op. 20 (B m., 1835), op. 31 (B flat m., 1837), op. 39 (C sharp m., 1840), op. 54 (E, 1843). The name is absolutely misleading, for the form is entirely Chopin's own, and the contents have nothing of either the lightness or the robust humor that characterize the scherzo of Beethoven. Instead, the Polish master portrays poignant sorrow, fierce revolt, bold defiance, passionate regret. Occasionally, indeed, are heard calmer strains of transcendent beauty and infinite longing, but soon the seething sea of passion bursts upon them.

In some of his 13 polonaises the master soars to lofty heights, and frequently compasses the region of the sublime. The inequality among these works is due to the fact that six are early works, several of these having been published without the composer's sanction after his death. The great ones are the two constituting op. 40 in A and C m. (1840), op. 44 in F sharp m. (1841), op. 53 in A flat (1843), and the polonaise-fantaisie, op. 61 in A flat (1845). In some of these Chopin gives intense subjective expression to the melancholy, gloomy side of his own character; in others, from a more objective standpoint, he portrays with irresistible brilliancy and elemental power the chivalrous and warlike spirit of the Polish nation.

Throughout his life Chopin cultivated the form of the mazourka. In 13 opus numbers he published 55 of these national dances. It is in them that the national element appears most strongly. Frequently the composer employs genuine folk melodies, which generally are conceived in the old church modes. (See MODES.) The distinctive character of these modes is faithfully preserved in the harmonic treatment, while the melody and rhythm are idealized. The proper performance of these idealized dances depends largely on a judicious use of the *rubato* (q.v.).

Likewise, in the waltzes, 17 in number, the form and content are idealized to such an extent that they are dances rather of the spirit than of the body. There is about them an aristocratic air, the refinement of the elegant salons, the atmosphere of which was so congenial and essential to the composer.

The four impromptus, op. 29 in A flat (1838), op. 36 in F sharp (1840), op. 51 in G flat (1843), and op. 66 in C sharp m. (published 1855), are free fantasies, real improvisations, but withal in well-defined form, with which Chopin never could dispense. The effect of abandon is due to the unexpected juxtaposition of varying moods rather than to looseness of formal structures. Closely allied in spirit to the impromptus is the fantaisie, op. 49 in F m. (1843), a work of intense power and concentration, beyond the capabilities of all but the greatest pianists.

In his 19 nocturnes the master has poured out a profusion of noble melody, infinitely tender. As through a silvery veil we behold mystic shapes moving in the fairyland of dreams. No other works of the master disclose to a similar extent his marvelous skill in the use of ornamentation. But one of these nocturnes, the greatest of all, op. 48 in C minor (1842), towers far above the others, both in formal dimensions and grandeur of content. Those passionate, mournful strains with their incisive rhythm, the sublime middle section with its sonorous chord progressions, the agitation and stress of the closing section, tell of heroic struggles doomed to a tragic ending.

During his stay at Majorca in the winter of 1838 Chopin wrote the greater part of those small pieces which he published under the title of "Préludes, op. 28." Each and every one of these, some only a dozen bars in length, is an immortal masterpiece, showing some distinctive trait of the composer's genius. Here we find the power of the scherzos, the fire of the ballads, the brilliancy of the polonaises, the elegance of the waltzes, the grace of the mazourkas, the dreaminess of the nocturnes. Short as these sketches are, each is a well-rounded artistic unit, marvelously expressive and suggestive.

The berceuse, op. 57 (1845), and barcarolle, op. 60 (1846), are works of such intimate and delicate sentiment, of such supreme refinement of figuration, that a public performance in a large auditorium seems to despoil them of their ethereal charm.

In his treatment of classical forms Chopin was not successful. This frank admission does not in the least detract from the master's greatness, nor does it cast the slightest reflection on the artistic value of the form. It only means that Chopin's individuality required some other form for its fullest expression, and that, like Wagner's, it was powerful enough to create its own form. Chopin, the ardent admirer and student of Bach and Mozart, began by expressing himself in the classical forms of the rondo, variation, and sonata. These works are the rondos, op. 1, 5, 16; the variations, op. 2 and 12; a trio for piano, violin, and 'cello, op. 8; a sonata in C minor, op. 4; the two piano concertos in E minor and F minor, op. 11 and 21; and the Allegro de Concert in A, op. 46. In spite of its advanced opus number and its publication in 1841, this last work bears all evidence of being an early composition. Niecks believes it to be a movement of a concerto for two pianos mentioned by Chopin in a letter dated Dec. 21, 1830. In all these works there is pretty close adherence to the traditional forms and much beautiful, occasionally even quite characteristic, music. Yet it is not the true Chopin, the bold innovator of the later period. The two sonatas in B flat minor, op. 35 (1840), and in B minor, op. 58 (1845), two of the master's great works, cannot be classed with the early compositions, which are distinctly cast in the classical forms. These two sonatas are as different from the classical sonata as are Chopin's scherzi from the classical scherzo. In the exposition and development sections Chopin follows the classical tradition quite faithfully, but breaks away entirely in the repetition after the development. In both sonatas he intentionally discards in this place the principal subject entirely and follows his own form as determined by the musical ideas, giving great prominence to

the second subject. In every bar of these works we feel a conscious purpose and the guiding hand of the master. Among the most remarkable works are the 24 études in two sets, op. 10 (1833) and op. 25 (1837). Primarily they were written to furnish much-needed material for the mere mechanical study of the new piano technic employed by Chopin. Each étude deals in masterly fashion with some particular problem of finger technic or tone production. With almost prophetic foresight provision is made for every possible contingency. But, above all this, these studies are musical masterpieces of the highest order, of the widest emotional range, of transcendent beauty.

For the sake of completeness brief mention must be made of Chopin's 17 Polish songs, published as op. 74 in 1855. Between 1824 and 1844 the master wrote a considerable number of songs, most of which have been lost, because the composer himself did not deem them worthy of publication. After his death his friend Julius Fontana collected all manuscripts and published them in 1855. These posthumous works bear the opus numbers 66–74. With the exception of the beautiful fantaisie-impromptu, op. 66 (1834), all are early works written before 1830, scarcely worthy of the name of their author.

And yet they are of great value in another respect. Considered together with the other early works, op. 1–20 (approximately), they prove conclusively that Chopin, just as every other great master, passed through a stage of development; that he did not appear as the real Chopin, the supreme master, in his first works. The fact is that his development was very rapid, that he soon found himself, that the early compositions indeed foreshadow the individuality of the later ones. But in the concessions which they make to the display of virtuosity on the part of the performer they are quite the product of their time. They also show that the composer is still groping about in search of a proper vehicle of expression. Yet one thing arrests the attention: all are marked by a striking characteristic, the conscious employment of the new piano technic. With the ballad in G minor, op. 23, in 1836, Chopin strikes out in his own peculiar path, on which until now none has followed him. As he had found no form that would adapt itself to his new and strikingly original utterance, his genius intuitively created those forms which permitted him his fullest and freest artistic expression. In his earlier attempts Chopin had also gained the conviction that it was not for him to dominate the orchestra, and after that time he devoted all his energy to the piano. This fact has been held against him by no less a man than Schumann, and it certainly has retarded the appreciation of Chopin's towering greatness. It is not the means of expression nor any particular form that determines greatness, but the content, the essential quality of the musical ideas themselves, the power of thematic invention. When this test is applied, there must be assigned to Chopin a prominent place among the few supreme masters of the first rank.

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CHOPINE, chō-pēn′ (from Sp. *chapin*, clog). A high clog or slipper, deriving its name possibly from the sound *chap, chop*, made by the wearers in walking. Chopines probably originated in Turkey and were worn in Spain and Italy about 1600. It was from Venice that these exaggerated shoes found their way into England. There is scant evidence, however, that they became fashionable among English ladies, although they are repeatedly mentioned in English literature as parts of seventeenth-century costume. Thus they were worn by ladies under the shoes and were usually made of wood covered with leather, often of various colors and frequently painted and gilded. Some of them were as much as half a yard high; and in Venice, where they were usually worn, their height distinguished the quality of the lady. Evelyn, in his *Diary* (1645), defines them as "high-heel'd shoes particularly affected by these proude dames, or, as some say, invented to keepe them at home, it being very difficult to walke with them." Frequent references to them are found in Scott and other writers, even as late as Charles Reade, whose *Cloister and the Hearth* (1861) has the line: "Your wooden-heeled chopines to raise your little stunted limbs up."

CHOP′TANK RIVER. A river rising in Kent Co., Del. (Map: Maryland, O 5). It flows southwest through that State and Maryland and becomes a wide estuary 20 miles long as it nears Chesapeake Bay, into which it empties. It is navigable for small vessels for about 40 miles.

CHORAGIC (kō-răj′ik) **MONUMENT** (from Gk. χορᾱγικός, *choragikos*, choragic, from χορᾱγός, *choragos*, leader of the chorus, from χορός, *choros*, dance + ἄγειν, *agein*, to lead). The choragus, or person at Athens who, on behalf of his tribe, had borne the expense of furnishing and instructing the chorus (q.v.), and who, in competition with the other tribes, had exhibited the best musical performance, received a tripod for a prize; but he had the expense of consecrating it and of building the monument on which it was placed. There was in Athens a whole street formed by these monuments, called the "Street of the Tripods." A fine specimen still remaining is "the choragic monument of Lysicrates," erected in 334 B.C., in honor of a victory with a chorus of boys. Consult E. A. Gardner, *Ancient Athens* (New York, 1902), and Weller, *Athens and its Monuments* (ib., 1913).

CHORAGUS. See CHORAGIC MONUMENT; CHORUS.

CHORALE, kō-rāl′ (ML. *choralis*, from Lat. *chorus*, Gk. χορός, *choros*, dance, chorus). A melody to which hymns or psalms are sung in church by the congregation in unison. The Catholic church service has from early times contained chorales, but the name is generally applied to those in the style introduced by Luther into the German Protestant church in the sixteenth century. Realizing the great power of music to awaken religious emotion, he deter-

mined to carry his reforms into the music of the church service and to invigorate it with new life. He selected simple tunes from many sources, sacred and secular, and arranged them to fit the hymns and psalms used in the service. Some of the most attractive of the ancient Latin hymns were chosen; the chorale "Herr Gott, dich loben wir," is adapted from a song of praise by St. Ambrose. German songs furnished material for many others.

The inspiration proved a great success; congregations everywhere joined heartily in singing the familiar melodies, and their religious interest took a new growth. The chorale became a popular form of composition, and many fine examples of this style were written during the sixteenth and seventeenth centuries. The most important of the early collections of chorales was the one published by Luther and his friend Johann Walther, in 1524, called the *Enchiridion*. Chorales were intended always to have an organ accompaniment, which was usually contrapuntal, and as time went on these accompaniments were made more and more elaborate by the organists, who found this a tempting field for display. Originally chorales were strongly rhythmical in character, with frequent alternations of duple and triple rhythm; and this, being in direct contrast to the droning, unrhythmical nature of the Gregorian chant, formed one of their greatest attractions. By a gradual process of change, however, this rhythmic element has disappeared, and chorales are now sung in notes of almost uniform length. German writers complain of this "flattening-out" process and regret the loss of character which has resulted. But even without its original rhythm the fine simplicity and stately solemnity of the chorale render it an ideal form for the expression of religious fervor. Probably the most famous of all chorales is the one popularly accredited to Luther himself, "Ein' feste Burg ist unser Gott." This stirring tune has been incorporated into many compositions. It appears in one of Bach's cantatas and in Mendelssohn's *Reformation Symphony*, is heard in Wagner's *Kaiser Marsch*, and forms an important theme in Meyerbeer's opera *Les Huguenots*.

Bach's works abound in beautiful chorales, and when these are sung by a large chorus the effect is wonderfully impressive and inspiring. Consult F. Spitta, *Das deutsche Kirchenlied* (Leipzig, 1912), and P. Griesbacher, *Kirchenmusikalische Stilistik und Formenlehre*, vol. i (Ratisbon, 1912).

CHORAL (kō′*ral*) **MUSIC.** Music written in parts, usually for four different voices, and performed by a chorus or choir. See ANTHEM; HYMNOLOGY.

CHORAL SOCIETIES. Associations of amateur singers formed for the purpose of performing large choral works are of comparatively recent date. During the Middle Ages and down to the end of the eighteenth century vocal works were performed exclusively by professional musicians, who composed the regular church choirs or were attached to some royal or aristocratic chapel. Public concerts were of rare occurrence. The chief musical interest after the beginning of the seventeenth century was the opera. As operatic performances were prohibited during Lent, performances of oratorios and other works of a sacred character were instituted. With the growth of musical culture music lovers were no longer satisfied with the few public performances, but met together for the purpose of studying concerted works. For the instrumental parts the services of professional musicians were enlisted. Although the absence of any high standards or lofty aims did not allow these early attempts of amateurs to reach a high degree of perfection, these meetings, nevertheless, did prepare the way for the establishment of the choral societies with artistic aims. The sudden and rapid growth of instrumental music, beginning with Haydn and Mozart, and resulting in the perfection of the modern orchestra, also created a desire for a higher standard in the performance of vocal music.

The merest accident led to the establishment of the first permanent choral society, which is still in existence to-day and world-famous as the Berliner Singakademie. Karl Christian Fasch (1730–1800) had settled in Berlin as a singing master. In 1783 Reichardt, at that time royal chapelmaster, submitted to Fasch the score of a 16-part mass by Benevoli. In a spirit of rivalry Fasch at once set to work to compose a similar mass, which he attempted to perform with a chorus of 20 singers selected from the royal chapel in Potsdam. This attempt proved a failure, and the work was laid aside. Meanwhile the number of Fasch's pupils had increased considerably. Among these were the daughter and stepdaughter of the Privy Councilor von Milow, who were so much interested in their teacher that they persuaded a number of fellow students to form a little chorus for the purpose of performing Fasch's mass. This was in the autumn of 1790. During the winter the meetings were discontinued; but when in the following spring a meeting was called, 27 members were present. A record of the meetings was then kept, and from the date of the first of these (May 27, 1791) the foundation of the Singakademie is reckoned. These singers entered heart and soul into the task they had undertaken, and when the mass had been successfully performed they did not disband, but decided to remain together under the able leadership of Fasch. In 1793 the society numbered 43 members, and permission was obtained to hold their meetings in the Royal Academy of Science and Art. Fasch then formally organized the society. He retained absolute control over all musical affairs, while the administrative duties were vested in a board consisting of three men and three women. Each member paid 12 groschen a month, while the professional instrumentalists were exempt from dues in consideration of their services. At first the meetings of the society were strictly private. On April 8, 1794, a limited number of persons were invited, who were so much impressed with the excellence of the work done that a demand for public concerts was created. Accordingly several concerts were given every season. Admission was only by invitation. When in 1800 Zelter succeeded Fasch, a regular scale of admission prices was adopted. By that time the chorus of the society had increased to 115 voices. In 1802 the membership was 200; in 1813, 300; in 1827, 400; in 1833, 500. At present the membership is about 600. Among the proudest achievements of the Singakademie is the performance of Bach's *Passion according to St. Matthew*, under the direction of Mendelssohn, in 1829.

In spite of the great success of the Berlin Singakademie, the other cities of Germany were slow to follow in the establishment of choral

societies. Thirty years after the foundation of the Berlin institution only 10 such societies were in existence. But after that one city followed another, so that to-day there is scarcely a single town which does not boast its choral society. In England choral culture was widely diffused through the growth of music festivals. Although originally the chorus at such festivals was recruited from the regular choruses of the churches, it was not long before the number of singers was considerably increased by the addition of amateur voices. To-day England surpasses all other countries in the excellence and efficiency of its choral societies. The history of English choral societies is practically that of the English Music Festival, to which article the reader is referred.

In the United States choral societies enjoy the popular favor as much, and are cultivated almost as extensively, as in England. When the Pilgrim Fathers first landed, they opposed the use of any kind of music in church; but gradually a more liberal spirit gained ground, so that not only was music introduced into the services, but schools of singing also were established. The aim of these was merely to teach the singing of simple hymns, but in 1724 a "sacred singing school" was founded at Stoughton, Mass., and this, on Nov. 7, 1786, became the Stoughton Musical Society. Now that a beginning had been made, other choral societies came into existence. Up to 1820 the choral societies in the United States exceeded in number those of Germany, but could not compare with them in the quality of the work done. With increased facilities of communication with the Old World musical culture in America advanced step by step, so that in 1815 the Handel and Haydn Society was established in Boston. This institution became to the development of music in America what the Singakademie was in Germany—a model for all similar organizations. At its first concert, on Christmas Day, 1815, the chorus of the Handel and Haydn Society consisted of 100 members. Until 1847 the president of the society acted as conductor, and consequently the performances were rather crude, although marked by a spirit of earnestness. In that year a professional musician was elected as regular conductor. When, in 1852, Carl Bergmann assumed the leadership, the performances rose to a high level. But the present excellence of the society is largely due to the untiring and efficient labors of Carl Zerrahn, who directed the destinies of the organization from 1854 to 1898, with the exception of the seasons 1895–97, when B. J. Lang was the conductor. Since 1899 Emil Mollenhauer has been the conductor.

Shortly after the establishment of the Boston Handel and Haydn Society, a choral society bearing the same name was organized in New York. This, however, was short-lived and in 1823 branched out into two rival societies—the New York Choral Society and the New York Sacred Music Society. The former of these began its career on a very ambitious scale and soon was disbanded; whereas the latter rose to great importance, though it came to an end in 1849. But as soon as one society disbanded another sprang up so that New York was never without performances of choral works. This continued until 1873, when Dr. Leopold Damrosch founded the Oratorio Society. The first concert took place Dec. 3, 1873, at which occasion the chorus numbered about 60 members. When Dr. Damrosch died, in 1885, his son Walter succeeded him as conductor. Under his direction the chorus increased to 600 members. In 1898 he was succeeded by his brother Frank Damrosch, after whom Louis Koemmenich assumed control in 1912. Another choral society of importance is the Musical Art Society, founded by Frank Damrosch in 1896. This organization is unique, inasmuch as it consists exclusively of professional trained singers. The purpose of this society is the performance of older church music of the Palestrina style. The People's Choral Union is a society founded by Frank Damrosch in 1892. It consists of over 3000 members, recruiting themselves from among the laboring classes. The organization has three classes of members—those constituting the elementary class, the advanced class, and the choral union proper. Any self-supporting man or woman may join the elementary class, where thorough instruction as to the proper use of the voice and the rudiments of music is given. From this class the pupils are promoted to the advanced class, whence upon graduation they pass to the choral union. The attendance at the various classes numbers about 2500, 450, and 1200 respectively. Meetings are held every Sunday, and once, in May, a public concert is given. Another important New York society, the Arion, was founded in 1854. By 1902 its membership had increased to 1200.

In the West, Cincinnati, Chicago, and Milwaukee are famous for their choral societies. Here chiefly the German element of the population forms male choruses. But there is no lack of mixed choruses, which meet yearly for a great singing festival. In making these festivals a means for the spreading of musical culture and intelligence, Theodore Thomas (q.v.) and Frank van der Stucken (q.v.) were indefatigable. See Musical Festival.

CHORASSAN, kō′rȧ-sän′. See Khorasan.

CHORAZIN, kō-rā′zĭn (Gk. Χοραζείν, *Chorazein*). A town in Galilee mentioned in Matt. xi. 21 and Luke x. 13 (Map: Palestine, D 2). Along with Bethsaida, it is referred to as one of the cities in which Jesus had performed "mighty works" and which was condemned by Him because of its unreceptivity to them. As there is no record in the Gospels of any ministry of Jesus in these cities, the latter of which was the native place of three of His disciples (John i. 44; xii. 21), it has been surmised that Jesus carried on in this region an individual work before He called the disciples to His following (Mark i. 16–20). The site is uncertain, but the most probable identification is with the modern *Kerāseh*, located in a small valley a short distance from the north end of the Sea of Galilee and west of the Jordan, 2½ miles north of *Tell Hum*. Extensive ruins are to be seen here, showing the former importance of the town, which, however, is not mentioned in ancient writings outside the New Testament.

CHORD. See Harmony, *Chords*.

CHORDATA, kôr-dā′tȧ (Neo-Lat. nom. pl., from Lat. *chorda*, chord). The phylum of the animal kingdom that embraces all the vertebrated animals — fishes, amphibians, reptiles, birds, and mammals, together with the Urochorda, or ascidians, and the Adelochorda, or Hemichorda (see Balanoglossus)—based upon the fact that all these have as a common feature a structure termed the notochord, although in some of the lowest it is present only in the very

young condition. The notochord represents, and in the higher forms is replaced by, the spinal column. "Another nearly universal feature is the perforation of the wall of the pharynx, either in the embryonic or larval condition only, or throughout life, by a system of clefts—the bronchial clefts; and a third is the almost universal presence at all stages, or only in the larva, of a cavity or system of cavities, the *neurocœle*, in the interior of the body, lying above the central nervous system."

CHOREA, kō-rē'ȧ (Lat., from Gk. χορεία, *choreia*, dance), or SAINT VITUS'S DANCE. A disease due to an infectious agent or a toxin, of undecided origin, but probably rheumatic, acting on the central nervous system, and characterized by involuntary and irregular jerky movements of the muscles of the face, neck, chest, arms, hands, legs, feet, back, or abdomen. The infectious type of chorea was first recognized by Sydenham and is still known as Sydenham's chorea, but the term *Chorea Sancti Viti* was first used by Paracelsus and applied to a form of dancing mania, of an hysterical nature, prevalent in central Europe in the sixteenth century, called in Italy "tarantism" (q.v.). Those afflicted sought a cure at the shrines of various saints, notably those of St. Vitus, St. John, and St. Anthony. Most cases occur in neurotic children 5 to 13 years old, and attacks are superinduced by fright, shock, injury, or worry, overstudy, errors of refraction, and to some extent by imitation. Girls are attacked more than twice as often as boys. Women during pregnancy are occasionally attacked. The movements occur either when the person is performing voluntary motions or when at rest; but they generally cease during sleep. Often the attack begins by dropping articles, grimacing, stumbling, or winking. It may last from six weeks to six months, and relapses are frequent. The appetite is variable, and nutrition is impaired, with resulting anæmia. In many cases fibrinous deposits are found on the walls of the heart. The seat of the trouble is in the brain and spinal cord, but there is no mental change in the patient, except slight emotional excitability. Chorea is rarely fatal in the United States. In England the mortality reaches 2 per cent. The treatment consists in rest from violent exercise and all mental exertion, cold sponging, nourishing food, iron, and arsenic, and a few other drugs, electricity, and change of air and environment. One variety of chorea (Huntington's) is hereditary; this is attended with progressive mental deterioration and terminates in dementia. (See INSANITY.) Consult Church and Peterson, *Nervous and Mental Diseases* (Philadelphia, 1901).

CHORE'A SCRIPTO'RUM, or WRITER'S CRAMP. See NEUROSIS.

CHOREE, kō-rē'. The same as trochee (q.v.).

CHOREPISCOPUS, kō'rē-pĭs'kō-pŭs (Lat., from Gk. χωρεπίσκοπος, *chōrepiskopos*, from χώρα, *chōra*, place + ἐπίσκοπος, *episkopos*, overseer, bishop). An order of ministers of ancient origin, whose functions were to assist city bishops in rural districts or remote places. They acted in a subordinate capacity and possessed limited powers, acting as colleagues or vicars of the bishops. They possessed the privilege of attending councils in their own right and not merely as substitutes for bishops. At first they were confined to the Eastern church, but began to multiply in the Western church in the fifth century. They were succeeded after the tenth century by archdeacons, vicars-general, and rural deans. In the East, the order continued to exist until the ninth century, when it was superseded by the exarchs.

CHORIAMBUS, kō'rī-ăm'bŭs. See VERSIFICATION.

CHORLEY, chôr'lĭ. A market and manufacturing town of Lancashire, England, on the Leeds-Liverpool Canal, 22 miles northwest of Liverpool (Map: England, D 3). It is a thoroughly progressive municipality. Since the incorporation, in 1881, it has obtained control of its gas supply, and it maintains markets, slaughterhouses, and cemeteries. Its water is supplied by the Liverpool municipality. The ancient Norman parish church is worthy of notice. The manufacture of cottons, muslins, and calicoes constitutes the principal industry. Railway cars are also made. In the neighborhood are stone quarries and collieries. Pop., 1901, 26,900; 1911, 30,315.

CHORLEY, HENRY FOTHERGILL (1808–72). An English author and musical critic. He was on the staff of the London *Athenæum* from 1830 to 1868. He was also for a while musical critic for the *Times*. During most of that time his literary reviews, especially in belles-lettres, were numerous and important, and the entire direction of the musical department was in his hands. He wrote many librettos, and several novels, dramas, and poems, but was more successful as a critic and biographer. Among works separately published were: *Memorials of Mrs. Hemans* (1836); *Music and Manners in France and Germany* (3 vols., 1841); *Modern German Music* (1854); *Handel Studies* (1859); *Thirty Years' Musical Recollections* (1862). His unfinished autobiography formed the basis of the *Autobiography, Memoir, and Letters*, ed. by Hewlett (London, 1873).

CHOROGI, kō'rō-gī. See STACHYS.

CHOROID (kō'roid) **COAT.** See EYE.

CHORON, shô'rôN', ALEXANDRE ETIENNE (1772–1834). A French writer on music. He was born at Caen, studied with Roze and Bonesi, and is said to have accumulated more information on the theory and practice of music than any French musician before him. As corresponding member of the Academy (1811), he undertook the reorganization of the *maîtrises*, or training schools for church choirs, and was successively appointed conductor of religious festivals and director of the Grand Opéra (1816). In 1816 he reopened the Conservatoire, which had been closed in the previous year, under the name of the Ecole Royale de Chant et de Déclamation. In 1817 his appointment to the directorship of the Opéra was suddenly revoked, and he established the famous Conservatoire de Musique Classique et Réligieuse, which existed until 1830 and greatly promoted the musical instruction of the masses. Choron was a pedagogue of pronounced genius, who opened a new field to French musicians. His numerous works include: *Principes d'accompagnement des écoles d'Italie* (1804); *Introduction à l'étude générale et raisonnée de la musique*, a capital work, though unfortunately unfinished; *Méthode de plainchant* (1818); *Manuel complet de musique vocale et instrumentale*, etc. (1836–38). His compositions, which include a requiem and an opera, were never published. Consult H. Reity, *Notice historique sur Choron et son école* (Paris, 1873), and G. Vauthier, *Choron sous l'empire* (Poitiers, 1909).

CHORRILLOS, chô-rē'lyôs. A bathing resort of Peru, situated on the bay of Chorrillos, 7 miles south of Lima (Map: Peru, B 6). The town is a favorite summer resort for the inhabitants of Lima. Pop., 5000. It was the scene of a Peruvian defeat at the hands of the Chileans, Jan. 13, 1881.

CHORUS, kō'rŭs (Lat., from Gk. *χορός, choros,* dance, chorus; connected with *χόρτος, chortos,* inclosure, Lat. *hortus,* garden, OIr. *gort,* crop, Ger. *Garten,* garden, Eng. *yard*). Among the early Greeks, a festal dance, accompanied by music. Through its development in the Attic theatre the word came to mean particularly the group of dancing singers who took part in the rendering of a play, and was also applied to the parts of the composition itself which they performed. The primitive dithyrambic chorus of 50 voices in honor of Dionysus, supplemented by the addition of actors (see ARION; THESPIS), was, in fact, the source of the Greek drama.

In the time of the Attic tragedy the chorus consisted of 12 or 15 persons, in character befitting the scene and nature of the plot, who usually made their entrance to the orchestra from the sides early in the play and remained there before the stage throughout the performance. At pauses in the acting the chorus, with an accompaniment of dancing movements, sang lyrical passages having reference suggestively to the subject and progress of the drama and serving to heighten and solemnize the impression produced by the actors. Occasionally the chorus, in the person of its leader, called the "coryphеus," participated briefly in the dialogue itself. The chorus has been thought to represent the attitude of the ideal spectator of the action, taking part with or against the persons on the stage by advice, comfort, exhortation, or dissuasion. At times the chorus was divided and spoke or sang antiphonally. These divisions passed from side to side in movements from which originated the naming of the single songs or stanzas, such as strophe, antistrophe, and epode. Of the musical element in the composition of the ancient choruses little is known with any certainty. Possibly it was only a kind of rhythmic declamation and very simple, though the metres of its verse are often complicated. It was accompanied by flutes in unison.

The charge of organizing the chorus was considered a great distinction among the people of Athens, being one of the public services (*λειτουργίαι, leitourgiai*) offered by rich citizens to the state. The person appointed for the purpose was called the *choragus,* and the one most successful in each competition was awarded a prize. The honor was expensive, as the choragus had to pay all the cost of training the chorus, besides feeding and lodging them and providing their masques and dresses.

In comedy the chorus was somewhat more numerous than in tragedy, and was often fantastically adapted to the humor of the story, as, e.g., that in the *Clouds* and that in the *Frogs,* comedies of Aristophanes. Later comedy, however, gradually discarded the chorus, and with the decline of ancient tragedy the chorus fell into disuse. In recent times there has been some attempt, as in Schiller's *Bride of Messina,* to produce the chorus on the stage in the manner of the ancients; but the music that has been occasionally set to some of the Greek tragedies can give but slight idea of that which originally accompanied them. Consult: Haigh, *The Attic Theatre* (Oxford, 1889); id., *The Tragic Drama of the Greeks* (ib., 1896); Donaldson, *The Theatre of the Greeks* (8th ed., London, 1875).

In music, a vocal composition in which each part is sung by a number of singers, as distinguished from a duet, trio, quartet, etc., in which each part is sung by a solo singer. The term also denotes the entire body of vocalists performing a choral composition. Choruses may be written for one part (unison), two, three, four, five, or six parts. Eight-part choruses are almost invariably double choruses, consisting of four parts each. Works written for 12, 16, 20 and more parts are really four-part works written for a number of choruses. The greater the number of parts, the more the individuality of each part is destroyed. Hence modern composers rarely write for more than double chorus. The foundation of all choral writing is the four-part chorus. According to the quality of voices employed choruses are distinguished as mixed choruses (sopranos, altos, tenors, basses), male choruses (first and second tenors, first and second basses), female choruses, also sung by boys' voices (first and second sopranos, first and second altos). Choruses without instrumental accompaniment are called *a capella* (q.v.). The effect produced by a body of singers depends far more on the quality and training of the individual voice than on mere numbers. It is reported that at the coronation of Napoleon I in Notre Dame at Paris the chorus of 35 highly trained singers from the Papal Chapel singing a capella *Tu es Petrus* produced a far greater effect than the special chorus of hundreds of voices accompanied by 80 harps.

In the earliest operas the chorus took no part in the action. To it was assigned the rôle of the chorus in the Greek drama, that of narrator or commentator. One of Gluck's most important reforms was the employment of the chorus as an essential factor of the dramatic action. In the operas of Spontini, Auber, Halévy, Bizet, and Verdi the chorus is of prime importance. Wagner, who in his earlier works had obtained some of the greatest climaxes from his masterly treatment of the choruses, banished this form on purely theoretical grounds from his *Tristan* and *Ring,* but later modified his extreme view and reinstated the chorus in his *Meistersinger* and *Parsifal.* Consult A. Mees, *Choirs and Choral Music* (New York, 1901); H. Coward, *Choral Technique and Interpretation* (London, 1911).

CHOSE (shōz) **IN ACTION** (Fr. *chose,* thing, from ML. *cosa, causa,* thing, Lat. *causa,* cause). In the law of England, that kind of property which is founded not in possession, but in the legal right to possess. As this right can, in general, be vindicated and made available only by means of an action, the property to which it relates, whether real or personal, is called a thing (Fr. *chose*) in action, to distinguish it from a thing already in possession. The right to recover money due on bonds and bills, and that to recover on goods bought and not yet delivered, are examples of choses in action, as is also the right to compensation for damages occasioned by breach of contract or by tort.

By the strict rule of the ancient common law, no *chose in action* could be assigned or granted over, because it was thought to be a great encouragement to litigiousness if a man were allowed to make over to a stranger his right of going to law. (See CHAMPERTY.) But this

nicety is not now so far regarded as to render such a transaction really ineffectual. It is, on the contrary, in substance a valid and constant practice; though, in compliance with the ancient principle, the effect of assigning a chose in action is to confer on the assignee a power of attorney to prosecute the action in the assignor's name for the assignee's own benefit. The assignment has this effect in law, and not in equity alone, as is commonly stated. If, however, the assignor interfered with his assignment by collecting the chose in action, or otherwise, equity would protect the assignee's rights, provided the assignment was made for value. The King is an exception to this general rule, for he may always either grant or receive a chose in action by assignment. By the law merchant an indorsee of negotiable paper could sue upon the paper in his own name. The law relating to *choses in action* was formerly the same in the United States as in England. But in many States, as in New York, the assignee of a chose in action is now allowed to sue in his own name, provided the chose in action does not belong to one of the excepted classes (such as the right to recover for personal injuries, for breach of promise to marry, for seduction, etc.). The assignee of a chose in action, however, takes it subject to all defenses which might have been interposed to it had the action been brought upon it by the original owner. Choses in possession are commonly called "chattels" (q.v.). The branches of the law relating to choses in action are specifically treated under such titles as ASSIGNMENT; SPECIFIC PERFORMANCE; NEGOTIABLE INSTRUMENTS; ETC. Consult the authorities referred to under CONTRACT; and for a discussion of the early English law upon the ownership of choses in action, consult Pollock and Maitland, *History of English Law* (Boston, 1899).

CHO'SEN'. See KOREA.

CHOSHI, chō'shê. A prefectural town of Japan, situated on the east coast of Nippon, 72 miles by rail from Tokio (Map: Japan, G 6). It extends for about 2½ miles along the river of Tonegawa and has a temple situated on an eminence in the centre of the city. The chief occupation is the manufacture of fish oil. Pop., 1903, 16,154; 1906, 18,721.

CHOSROES. See KHOSRU.

CHOTA NAGPUR, chō'tà năg-pōōr', or CHUTIA NAGPUR. A southwest division of Bengal, Bihar, and Orissa, British India (q.v.). The division formerly comprising the five districts of Hazáribágh, Ranchi, Palamau, Mánbhum, and Singhbum. It is sparsely inhabited, with a density of 181 per square mile compared to 438 for the whole of Bengal, the largest towns not exceeding a population of 5000. Area, 27,679 miles. Pop., 1891, 4,628,792; 1901, 4,900,429; 1911, 5,754,008. The political agency comprises nine tributary states, whose area is 16,054 square miles. Pop., 1891, 883,500; 1901, 982,400. The region is mountainous, being largely contained in three plateaus, and lies between the basins of the Ganges and its tributaries, the Sov and the Manahadi. It is largely inhabited by aboriginal tribes. Coal in considerable quantities is found, some gold and mica. Tea, rice, corn, potatoes, and oil seeds are cultivated. The climate is dry and healthful.

CHOTIN. See KHOTIN.

CHOUANS, shōō'ăn' (corruption of Fr. *chat-huant,* screech owl). The bands of insurgent peasants in Brittany and Maine who during the French Revolution, following the Vendéans, fought for the King. They were so called from Chouan, the nickname of their first leader, Jean Cottereau, smuggler and soldier. The species of mingled brigandage and warfare known as the *chouannerie* first broke out in 1793, after having been fomented assiduously by the priests and the agents of the royal family. After several exploits of the guerrilla sort Cottereau was killed, July 29, 1794, near Laval. Other leaders, however, appeared: Cadoudal, Désoteux, Charette, Puisaye. The pacification of La Vendée in 1795 gave Hoche an opportunity to crush the Chouans; but they sprang up again in 1799 and forced Napoleon to send against them Brune, with 30,000 men, who suppressed the rising and put an end to organized chouannerie. Eruptions of chouannerie continued till 1803, and it made its appearance once more in 1814–15. Consult: Beauchamp, *Histoire des Chouans* (Paris, 1806); Kérigant, *Les Chouans* (Paris, 1882); Moulin, *Mémoires sur la chouannerie* (Paris, 1893).

CHOUGH, chŭf (AS. *cēo,* originally imitative of the bird's note). A small crow of the genus *Pyrrhocorax,* specifically the Cornish chough, or red-legged crow (*Pyrrhocorax pyrrhocorax*), a widely distributed but very local and diminishing bird, inhabiting the high mountains of Europe, Persia, India, the north of Africa, and some parts of the British seacoasts, but almost exclusively confined to high cliffs. In these it generally makes its nests; sometimes, however, in ruined towers. Its long hooked claws enable it to cling easily to a rough rock, but it seems unwilling even to set its feet on turf. It lives in societies, like the rook. It feeds on insects, berries, grubs, and grain. It is easily tamed, becomes very familiar and forward, and exhibits in the highest degree the curiosity, pilfering disposition, and delight in brilliant or glittering objects which also characterize others of the crow family. Other species of chough are known, one, the chocard or Alpine chough (*Pyrrhocorax graculus*), being confined to the European Alps, and the others natives of Australia, Java, etc.

CHOUICHA, chou'ī-chà (Alaska). The quinnat (q.v.).

CHOULANT, shōō'läN', JOHANN LUDWIG (1791–1861). A German physician, born in Dresden. He studied in Dresden and Leipzig and became connected with the clinics in Dresden, in which he was appointed professor of therapeutics in 1823 and director in 1828. Beginning in 1842, he acted for a number of years as head of the Academy. His published works include the following: *Lehrbuch der speciellen Pathologie und Therapie des Menschen* (1831 and several later eds.); *Handbuch der Bücherkunde für ältere Medizin* (2d ed., 1841); *Bibliotheca Medico-historica* (1842); *Die Anfänge wissenschaftlicher Naturgeschichte* (1857); *Graphische Inkunabeln für Naturgeschichte und Medizin* (1858).

CHOUQUET, shōō'kâ', ADOLPHE GUSTAVE (1819–86). A French writer on music, born in Havre and educated at the Institution Massin in Paris. He lived in the United States from 1840 to 1860 and then returned to Paris, where he twice won the Prix Bordin (1864 and 1868) for works on the history of music. He was appointed custodian of the collection of instruments in the Conservatory in 1871 and in 1875 published a catalogue of them. He also wrote the

text of several cantatas, among them the *Hymne de la Paix*, the prize cantata of the Exposition of 1867. Of his literary productions the *Histoire de la musique dramatique en France depuis ses origines jusqu'à nos jours* (1873) is the most important.

CHOUSINGHA, chou'sĭng-hâ (East Indian). The four-horned antelope (*Tetraceros quadricornis*) of India. It is a small brown species resembling the duikerboks and distinguished by the buck having four short smooth horns upon the forehead. These animals are not gregarious and conceal themselves in bushy places. See Plate of GAZELLES.

CHOUTEAU, shōō'tō', AUGUSTE (1739–1829). An American pioneer of French descent, born in New Orleans. Under the direction of Pierre Laclède Liguest he made the first settlement on the site of St. Louis, Mo., on Feb. 15, 1764. (See SAINT LOUIS.) He and his brother, Pierre (1749–1849), were well known as traders for many years in the West.

CHOUVACHES, chōō-väsh'ez. See TCHUVASHES.

CHOWCHOW (strictly an adjective, meaning 'mixed,' 'miscellaneous,' 'broken'; of unknown origin, usually considered pidgin English). A name most commonly used to denote a kind of mixed pickles, made originally in the East Indies and now imitated elsewhere. Among its principal ingredients may be mentioned cucumbers, onions, cauliflower, and beans all steeped in mustard. A kind of Chinese sweetmeats, consisting of odds and ends of orange peel, ginger, bamboo sirup, pumelo rind, etc., is also called chowchow. The word is also used to denote a mixture or medley of any kind or constituency.

CHOWCHOW. A Chinese domestic dog which resembles a modern Pomeranian, although much lighter in weight, with so thick, plain, and even a coat that when it is pressed down by the hand it rises again, just as a close-wooled sheep's coat will do. It has one characteristic which differentiates it from all other dogs, a black tongue. Many dogs have black roofs to their mouths, but no chowchow is of the true breed that has not a black tongue. The dog is frequently eaten by the Chinese. Two varieties have been exhibited at bench shows, one all red and the other all black, though yellow, blue, white, or other colors (not in patches) may be shown by full-blooded specimens. In all cases the tail should be curled well over the back. Consult Leighton, *The New Book of the Dog* (London, 1907). The chowchow made its first appearance in America at the Westminster Kennel Club's show in New York in 1900.

CHOW'DER (Fr. *chaudière*, pot, caldron; Lat. *caldaria*, boiling pot, from *caldus*, *calidus*, warm, hot). A savory stew of fish or shellfish cooked with pork and vegetables and thickened with crushed hard bread. The term seems to have originated in the Breton fishing villages, where *faire la chaudière* is to provide a kettle in which is cooked a stew from ingredients furnished by the fishermen, each of whom receives a share of the prepared dish. The practice seems to have been carried by the French fishers to Newfoundland, from whence it spread to Nova Scotia, New Brunswick, and New England.

CHOY'A. See CHAY ROOT.

CHRESTIEN DE TROYES, krā'tyăn' de trwä (c.1140–c.1195). A French poet, the founder of the mediæval courtly romance and one of the most important writers in French literature, both for his influence and the qualities of his new style. He was probably born in Troyes and was attached to the court not only of the Count of Champagne, his native district, but also to those of the neighboring principalities of Flanders and Hainaut. He traveled in England and died, according to Gaston Paris, in 1180, when only about 40 years of age, though Förster places his death at a much later date. Chrestien is the most famous of the authors who developed the Arthurian romances in France and expressed the spirit of the later chivalry, much more refined and approaching more nearly modern ideas than the fierce and warlike epics of the Charlemagne cycle. Arthur's court, in his hands, becomes a civilized and brilliant gathering, modeled after those with which the poet was familiar. In fact, though finding his subjects in the fantastic and ideal legends of an earlier age, he treats them most successfully when he deals with details of everyday life, which he renders with the fidelity of a modern novelist, delighting in the reproduction of scenes of pomp and ceremony to please the aristocratic society for whom he wrote. His main topic is love; and as his poems were intended for women, he is fond of describing beauty and the adornments of the toilet. He is distinctly a stylist, showing a desire to produce a definite effect through choice of expression, which, however, often causes him to fall into affectation and trifling. It is probable that to the novelist's instinct of Chrestien is due the rounding out and completion of what we may call the plot of the Arthurian story, in which case a very high place must be assigned to him among the romancers of the world. From his working in of the Grail legend (see GRAIL, THE HOLY) in his huge romance of *Perceval le Gallois* (ed. Potvin, 6 vols., Mons, 1866–71), which with its continuations by other hands extends to 63,000 lines, sprang the great epic of Wolfram von Eschenbach which furnished Wagner with the material for the libretto of *Parsifal*. His other main works, in the best editions, are *Erec et Enide* (Förster, Halle, 1896); *Yvain* or *Le Chevalier au Lyon* (id., ib., 1887; 3d ed., 1906); *Le Chevalier à la Charrette* (Jonckbloët, The Hague, 1850; Förster, Halle, 1899); and *Cligès* (id., ib., 1884). They are written in octosyllabic couplets, light, flowing, and full of charm. Consult Potvin, *Bibliographie de Chrestien de Troyes* (Brussels, 1863); Förster, *Sämtliche Werke von Chrestien de Troyes* (4 vols., Halle, 1884–99); *Contes del Graal: Percevaus li galois* (Freiburg, 1909); Borodine, *La femme et l'amour au XIIe siècle* (Paris, 1909); Thüre, *Die formalen Satzarten bei Crestien von Troyes* (Marburg, 1909); Wilmotte, *L'Evolution du roman français aux environs de 1150* (Paris, 1903); Zenker, *Zur Mabinogionfrage* (Halle, 1912); and see FRENCH LITERATURE; ARTHUR; PERCEVAL.

CHRIEMHILD, or KRIEMHILD, krēm'hĭlt. See NIBELUNGENLIED.

CHRISM, krĭz'm (from AS. *chrisma*, OHG. *chrismo*, Ger. *Chrisam*, from OF. *chresme*, Fr. *crême*, It. *crisma*, Lat. *chrisma*, oil, from Gk. *χρῖσμα*, ointment, from *χρίειν*, *chriein*, to anoint). The name given to the oil consecrated on Maundy Thursday in the Roman Catholic and Greek churches by the Bishop and used in baptism, confirmation, orders, and extreme unction. There are two kinds of chrism used in the Roman Catholic church—the one, a mixture of oil and

balsam, is used in baptism, confirmation, and orders; the other, which is merely plain oil, is used in extreme unction. That in the Greek church contains many ingredients.

CHRISOM, krĭz'om (variant spelling of *chrism*). The name of the white vesture laid by the priest on the child in former times at baptism, to signify its innocence. It was generally presented by the mother as an offering to the church when she came to be "churched"; but if the child died before the mother was "churched," it was used as a shroud. By a common abuse of words, chrisom came to be applied to the child itself if it died before it was baptized. A chrisom child is a child in a chrisom cloth.

CHRIST (Lat. *Christus*, Gk. Χριστός, *Christos*, anointed, from χρίειν, *chriein*, to anoint). The Greek term is found in the Septuagint, where it translates varied forms of the Hebrew verb *māshakh* (to anoint), most frequently the nominal form *māshīakh* (an anointed one), whence the English term *Messiah* is derived. The Hebrew conception of anointing was derived from the ancient magical idea that the application of oil endowed the person or object with certain superior and even supernatural qualities. In early Israel the custom of anointing was thus in recognition of the endowment of the person with the qualification for exalted office. It was applied, not only to the priests (Lev. iv. 3) as intermediaries between God and man, but also to the kings (1 Sam. ii. 10) as representatives of God in the theocracy and as thus assuming in their person priestly functions. Later, it was applied to the prophets (1 Kings xix. 16) and was referred to even in connection with the patriarchs (Ps. cv. 15) and with Cyrus (Isa. xlv. 1), though in these cases without any thought of its being literally understood. In the development of the Messianic thought it came to be narrowed down to the redeemer and restorer of the Jewish nation (Ps. ii. 2). The first application of this idea, in its full technical sense, to this expected King is found in the apocryphal Book of Enoch (xlviii. 10).

In the New Testament Christ is used both as an appellative and as a proper name. In both cases it occurs either with or without the article, either alone or in combination with other terms and names (e.g., Matt. xvi. 20; Mark viii. 29; Luke ii. 11, 26; ix. 20; xxiii. 2; Acts ii. 36; xviii. 5; Rom. iii. 24; xv. 3; 1 Cor. iii. 11; 2 Cor. i. 2; iv. 5; 2 Tim. i. 2). Always when used as a proper name, and frequently when otherwise used, it is a designation of Jesus of Nazareth, as the expected Messiah of the Jews. It is from this application of the term that its English meaning is derived. See CHRISTOLOGY; CHRISTIANITY; JESUS CHRIST; MESSIAH.

CHRIST, DESCENT OF, INTO HADES. See APOCRYPHA, *New Testament*.

CHRIST IN ART. See JESUS CHRIST IN ART.

CHRIST, ORDER OF THE KNIGHTS OF, IN PORTUGAL. An order instituted in 1317 by King Diniz, of Portugal (1279–1325), and endowed with property confiscated from the Order of the Templars, which was suppressed in 1312. It was founded in imitation of the Spanish orders of Alcántara (q.v.) and Calatrava (q.v.) and the regulations of the Cistercians. The new order was established "for the defense of the faith, the discomfiture of the Moors, and the extension of the Portuguese monarchy." With some difficulty Pope John XXII was induced, in 1319, to sanction the new order, but only on condition that the knights swore fealty to the Pope and that their Grand Master made a special vow of such obedience before the abbot of the Cistercian monastery of Alcobaça, one of the largest and richest then extant, who was the Pope's special representative. The knights joined in all Portuguese crusades against the infidels and also in their African and Indian expeditions, receiving in compensation continual additions to their own possessions. The Grand Prior of the order was invested by Pope Calixtus III (1455–58) with power equal to that of a bishop; and, as an encouragement to adventure, the knights were promised all the countries which they might discover, to be held under the protection of Portugal. Under such favorable conditions it is no wonder that the order became immensely rich. Its headquarters was the splendid castle of Thomar, 70 miles northeast of Lisbon, whence it had been in 1357 transferred from Castro Marino, at the mouth of the Guadiana. At length their wealth and power excited the jealousy of the kings of Portugal; their future acquisitions, and subsequently even their actual possessions, were declared to be crown possessions, and the offices of Administrator and Grand Master were transferred to the crown. Noble descent and three years' military service against the infidel were required for admission. The members took the three monastic vows of celibacy, poverty, and obedience, till Pope Alexander VI (1492–1503) released them from the first two on condition of their applying the third part of their revenues to the support of the Thomar cloister, the priests of which were bound by the three vows. In 1523 King John III turned the order into a monastic one. In 1797 it was secularized and it is now merely an honorary order. Its membership, which is restricted to Catholics of noble descent, is very large. The order was nationalized in Brazil in 1823, but was dissolved in 1890.

CHRIST, PAPAL ORDER OF. A branch of the Portuguese order created by Pope John XXII (1316–34) for Italians. It has only one class and is now merely honorary.

CHRIST, PERSON OF. See CHRISTOLOGY.

CHRIST, SECOND ADVENT OF. See SECOND ADVENT OF CHRIST.

CHRIST, krīst, WILHELM VON (1831–1906). A German classical philologist, born at Geisenheim. He was professor in the University of Munich from 1861, and was the author and editor of numerous works, of which the most important are: *Die metrische Ueberlieferung der Pindarischen Oden* (1868); *Metrik der Griechen und Römer* (Leipzig, 1879); *Attikusausgabe des Demosthenes* (1882); *Griechische Litteraturgeschichte* (4 editions, 1888, 1890, 1898, 1904); and editions of Homer's *Iliad* (1884), Pindar (1887), Aristotle's *Poetica* and *Metaphysica* (1878, 1895).

CHRISTABEL, krīs'tă-bĕl. 1. An old ballad which deals with the love of a princess, the title character, for the valiant Sir Cauline. The latter is killed in rescuing her from an Eastern potentate, and she thereupon dies of grief. 2. A poetical fragment by Coleridge (1816), a bit of haunting melody and genuine inspiration. Before its publication Scott heard lines of it recited and adopted the metre for his "Lay

of the Last Minstrel" (1805). Saintsbury finds in it a metrical resemblance to Gottfried von Strassburg's *Tristan* and Spenser's "The Oak and the Brere." Admirably adapted as is the vehicle, the story is itself of engrossing interest and is narrated with the poet's best art. A parody appeared in *Blackwood's*, June, 1819.

CHRIS'TADEL'PHIANS (from Gk. Χριστάδελφος, *Christadelphos*, having brotherhood with Christ, from Χριστός, *Christos*, Christ + ἀδελφός, *adelphos*, brother), or BROTHERS OF CHRIST. A religious sect in the United States, Canada, and Great Britain, organized by John Thomas, M.D., an Englishman, who came hither in 1844 and at first belonged to the Disciples. But being "convinced by a study of the Bible that the cardinal doctrines of the existing churches correspond with those of the apostate Church predicted in Scripture," he spread his views. Making converts, he formed them into societies, which, till the outbreak of the Civil War, had no distinctive name, but the one now held was selected when their members claimed exemption from military duty on the ground of conscientious opposition to war. The principles of the sect are thus stated: The Old and New Testaments are equally important; God will restore to immortal life all who love Him in this life, but those who have not accepted this immortal principle cease to exist at death; there is no personal devil; Christ is the son of God, deriving from the Deity moral perfection, but from His mother a human nature; He has the threefold character of prophet, priest, and king; the first office He fulfilled by His life and death on earth, and now as priest He mediates before the Deity; as king He will return to earth and reign over all the world from the throne of David in the Holy Land. In 1913 the Christadelphians had in the United States 70 organizations and some 1400 members. They reject the doctrine of the Trinity, practice immersion, and have no ordained ministry. Consult H. K. Carroll, *The Religious Forces of the United States*, pp. 89–90, 454 (New York, 1896), and *Religious Census of the United States* (1910).

CHRIST AMONG THE DOCTORS. A painting by Ingres. It hangs in the Musée Municipal, Montauban, France.

CHRIST'CHURCH'. A parliamentary and municipal borough and seaport on the English Channel, in Hampshire, England, at the head of the estuary formed by the Avon and Stour, 24 miles southwest of Southampton (Map: England, E 6). The priory church, partly of Norman and partly of early English architecture, one of the most interesting and beautiful of English ecclesiastical structures, dates from the reign of William Rufus and was restored in 1861. It contains a very interesting monument to the poet Shelley. The parliamentary borough comprises two favorite watering places, Muddiford and Bournemouth, and returns one member to Parliament. Christchurch Bay has a double tide every 12 hours. Christchurch was known in Saxon times as Tweonæteam, but took its present name from the Augustinian abbey of Christchurch, founded here before the Conquest. Pop., 1891, 4000; 1901, 4200; 1911, 5104. The church contains a monument to Shelley.

CHRIST'CHURCH'. The capital of the Province of Canterbury, South Island, New Zealand, situated on the river Avon, about 8 miles from the sea (Map: New Zealand, South I., D 4). Its port is Lyttelton, with which it is connected by a railway. It is the centre of a great grazing district and also has flourishing manufactures—boots, clothing, furniture, and agricultural implements being perhaps the chief. There is a large export trade, mainly in timber, frozen mutton, and wool. The city possesses numerous fine public buildings, churches, including a fine reproduction of Caen Cathedral, France, a museum, a theatre, an opera house, Christ College, high schools, parks, and pleasure grounds. The city has electric tramways and owns an abundant artesian-well water supply. The United States is represented by a consular agent. Christchurch is the see of the New Zealand bishopric of Canterbury. The city owes its foundation to the Canterbury Association, a society of influential men which included the Archbishop of Canterbury, Lord Lyttelton, and other prelates and peers. Each of its streets bears the name of an Anglican diocese. In 1903 several suburbs were annexed to the city. Pop., with suburbs, 1901, 17,537; 1911, 80,193.

CHRIST CHURCH. A college at Oxford, England, the magnificent project of Cardinal Wolsey when, as the minister of Henry VIII, he was the most powerful man in England next to the King. The foundation was to be known as Cardinal College and was to have in connection with it a school in Ipswich, Wolsey's native town. The plans for the college were drawn, and the building begun in 1525, but with the fall of the Cardinal in 1529 and his death in 1530 the whole project fell to the ground. In 1532, however, Henry VIII took up the work, refounded the college on a smaller scale under the name of King Henry the Eighth's College, and in 1545–46 he again reconstituted it under the name it now bears, and united it with his newly established see of Oxford by the removal of the episcopal establishment from Osney Abbey to Christ Church. He thus formed a unique union of cathedral and college, from which the foundation was called *Ædes Christi*, or the 'House of Christ.' It is spoken of generally as the "house," not the college, and the incumbents are referred to as the dean and chapter, not of Oxford, but of Christ Church. The original foundation was for a dean, 8 canons, 8 clerks, a schoolmaster, 100 students, choristers, and an organist. In accordance with the few changes of 1882 there were a dean, 6 canons, 31 senior students (i.e., fellows), 2 lecturers, a number of honorary students, 60 scholars, and 29 exhibitioners, besides 6 chaplains, the whole forming the largest collegiate establishment in Oxford. The modern spirit of reform was introduced by one of the most famous deans of the college, Dean Liddell (1855–91), who was also responsible for the restoration of and additions to the college buildings. In 1913 it had 326 undergraduates. The buildings about the great quadrangle (Tom Quad) include the cathedral, which occupies the site and contains some of the work of the Saxon nunnery of St. Frideswide, and the Hall, with the exception of the Hall of William Rufus at Westminster, the most splendid example of its kind in England. Christ Church is one of the foremost colleges in Oxford and has always been famous for its distinguished members. Among these may be mentioned five prime ministers of England in the nineteenth century—Canning, Peel, Gladstone, Salisbury, and Rosebery. Of the other political worthies may be noted Arlington, Nottingham, Godolphin, Bolingbroke, Carteret, Wyndham, Grenville, Sir

G. C. Lewis, Lord Elgin, and Lord Dalhousie. Christ Church has had on its books, besides these, such names as Lyttleton, Mansfield, John Locke, William Penn, Ben Jonson, Camden, Sir Philip Sidney, John and Charles Wesley, Dr. Pusey, and Ruskin. Consult H. L. Thompson, *Christ Church* (London, 1900).

CHRISTEN, krē'sten, ADA. See BREDEN, CHRISTIANE.

CHRISTENING, krĭs'en-ĭng (from AS. *cristenian*, to Christianize, baptize, from *cristena*, Christian, from Lat. *Christianus*, Gk. Χριστιανός, *Christianos*, Christian, from Χριστός, *Christos*, Christ). A term often used as equivalent to baptism (q.v.).

CHRISTENING A SHIP. The present custom of christening ships doubtless grew out of the ancient libations practiced when ships were launched. The action of blessing ships is alluded to by the monks of St. Denys. In July, 1418, the Bishop of Bangor was sent to South Hampton to bless the King's ship, the *Grâce à Dieu*, and received £5 for his expenses. The christening is ordinarily performed by a lady, who breaks a bottle of wine against the stem as the ship starts down the ways in launching and at the same time utters the christening words. In the Russian navy the christening ceremony is performed by a priest and takes place at some convenient time subsequent to the laying of the keel. At the conclusion of it a silver plate bearing the name of the ship, date of christening, etc., is affixed to the keel.

CHRIS'TIAN. The name of the hero of Bunyan's *Pilgrim's Progress*.

CHRISTIAN II (1481–1559). King of Denmark and Norway from 1513 to 1523 and of Sweden from 1520 to 1523. He was born at Nyborg, on the island of Fünen, July 2, 1481. As Crown Prince he distinguished himself in 1502 by the implacable cruelty with which he suppressed a Norwegian insurrection. As King he favored merchants, artisans, and peasantry and deprived the nobility of many of their exclusive privileges. In 1520 he succeeded by force of arms in recovering Sweden for the Danish crown, marked his success by the execution in Stockholm of 94 men of high rank, and followed this up with sweeping executions throughout the country. His severity hastened the approach of the successful revolt of Sweden under Gustavus Vasa, which seated the latter on the Swedish throne in 1523. On his return to Copenhagen Christian found the clergy and nobles of Jutland also in open rebellion, and in April, 1523, he fled to the Netherlands with his wife and children, calling upon the Emperor Charles V, his wife's brother, for assistance. Frederick of Holstein, uncle of Christian, took possession of the kingdom, supported by the clergy and nobles, but stoutly resisted by the burghers and peasantry. Aided by the Dutch, Christian made a final attempt to recover his throne, landing in Norway in 1531, but was defeated and made a prisoner in 1532, and remained until his death, Jan. 25, 1559, a captive in the castle of Sonderborg, on the island of Alsen. See DENMARK; NORWAY; SWEDEN.

CHRISTIAN IV (1577–1648). King of Denmark and Norway from 1588 to 1648. He was born, April 12, 1577, in Frederiksborg, Zealand. In 1611–13 he carried on a war against the young Gustavus Adolphus of Sweden and gained some territory. In the second period of the Thirty Years' War (1625–29) an exaggerated military reputation and England's support made him the leader of the Protestants, but only disaster resulted. His forces were overwhelmed by Tilly at Lutter in 1626. He was driven back into Jutland, which was overrun by the enemy, and in 1629 made peace with the Emperor Ferdinand II at Lübeck. Soon after his Swedish rival became the Protestant leader. He waged war with Sweden unsuccessfully from 1643 to 1645. In civil affairs, however, he proved himself a capable sovereign, introducing financial and legislative reforms, encouraging industry and science, and giving a powerful impetus to both the external and the internal trade of his kingdoms. The present capital of Norway was founded by him and bears his name. See DENMARK.

CHRISTIAN VII (1749–1808). King of Denmark and Norway from 1766 to 1808. He succeeded his father, Frederick V, in 1766. He was miserably feeble and incapable and scarcely exercised any influence in the government. During his reign the reforms carried out by his ministers, Struensee in particular, were profuse, though hasty. The actual power was wielded successively by his ministers, Bernstorff and Struensee, and his son Frederick, who became joint regent with his mother, Caroline Matilda, sister of George III of England, in 1784, and upon the death of Christian assumed the title of King Frederick VI (q.v.). Christian died March 13, 1808. Consult Reverdil, *Danmarks Riges Histoire*, vol. v (Copenhagen, 1897–1905).

CHRISTIAN VIII (1786–1848). King of Denmark from 1839 to 1848. He was a nephew of Christian VII and was born Sept. 18, 1786. When Norway was ceded to Sweden by the Treaty of Kiel, the people of the former country repudiated the act of alienation, and Prince Christian was made Governor. He raised an army and convened a diet, at which a constitution was framed, and he was elected, May 29, 1814, King of Norway under the title of Christian I; but the Norwegians were unable to withstand the invading Swedish army under Bernadotte, and the Allied Powers compelled Christian formally to relinquish the throne on October 10. He succeeded Frederick VI as King of Denmark in 1839. His reign was characterized by industrial progress and by increased political liberty. He made many significant administrative reforms, though in unifying his dominions into a firm whole he was less successful. Consult Thiele, *Christian den Ottende* (Copenhagen, 1848).

CHRISTIAN IX (1818–1906). King of Denmark from 1863 to 1906. He was born April 8, 1818, the fourth son of Duke William of Schleswig-Holstein-Sonderburg-Glücksburg. As the male line of the house of Oldenburg, which had occupied the Danish throne since 1448, was approaching extinction in the person of Frederick VII, the Powers, by the Treaty of London, May 8, 1852, to maintain the integrity of the Danish monarchy, "as connected with the general interests of the balance of power in Europe," guaranteed the succession to Prince Christian, by right of his wife, who was a niece of King Christian VIII. The London agreement was ratified by the Danish Diet by the Act of Succession of July 31, 1853. Accordingly Christian became King on the death of Frederick, Nov. 15, 1863. Soon after his accession the trouble over the duchies (see SCHLESWIG-HOLSTEIN) reached an acute stage, and Denmark

was compelled to relinquish them in 1864, after a brief war with Austria and Prussia. From 1873 to 1894 the King was engaged in a constitutional conflict with the democratic parties over the question of the responsibility of the ministry. The Conservatives finally triumphed. Victory lasted but a brief space of time. In 1901 the Liberals won out at the general elections, and a Liberal government was established in Denmark, much to the joy of the radical wing. Its success was not so great as expected, though the policy of reform was stimulated anew. By his wife Louise, a princess of Hesse-Cassel (1817–98), he had six children. Of these the eldest, Frederick, succeeded him on the throne as Frederick VIII; Alexandra married the Prince of Wales, later Edward VII; Dagmar married the Grand Duke Alexander of Russia, later Alexander III; and George became King of Greece as George I. His grandson, Charles, became King of Norway in 1905, as Haakon VII. The popularity of Christian IX was ever growing, due to his honorable and unassuming nature. Sound of judgment and loyal to the constitution, he won the love of his subjects and the respect of the other European nations. Consult Barford, *Kong Kristian IX's Regerings-Dagbog* (Copenhagen, 1876), and Majestet, *Kong Kristian IX* (ib., 1888).

CHRISTIAN X, Carl Frederik Albert Alexander Vilhelm (1870–). King of Denmark. He was born at Charlottenlund, Sept. 26, 1870, the son of King Frederik VIII. He married Alexandrine, Duchess of Mecklenburg, in 1898. He has two sons—Frederik, the Crown Prince, born in 1899, and Knud, born in 1900. Christian X succeeded his father to the throne of Denmark, May 14, 1912.

CHRISTIAN, of Brunswick (Braunschweig-Wolfenbüttel) (1599–1626). A German prelate and soldier, Lutheran Bishop of Halberstadt, and general in the Thirty Years' War, styled "the Madman of Halberstadt." He was born in Gröningen (Saxony) and became Bishop of Halberstadt in 1616. His military training he obtained in service in the Netherlands, under Maurice, Prince of Orange, against the Spanish. After Frederick V, Elector Palatine (q.v.), had lost Bohemia and the Palatinate through the disastrous battle of White Hill, Christian offered his sword in defense of the electoral cause, and in 1621, with an army of 15,000, plundered Roman Catholic churches and religious establishments along the river Main and through Westphalia. He was defeated by General Tilly at Höchst in June, 1862, and was dismissed from Frederick's service by the Elector. Immediately he joined the forces of the United Provinces, and as a commander under Prince Maurice defeated the Spaniards at Fleurus (in the modern Province of Hainaut, Belgium). Afterward he returned to Lower Saxony and was signally defeated by Tilly at Stadtlohn (Aug. 6, 1623). With English and French assistance he and Count Mansfield took the field in 1625, in command of an army of 14,000, under the general direction of King Christian IV of Denmark, the Protestant leader. He died, however, before anything was accomplished. See Thirty Years' War.

CHRIS'TIAN'A. The wife of Christian in Bunyan's *Pilgrim's Progress.* She is left in the City of Destruction by her husband. In the second part of the allegory she also leaves that place, and her subsequent adventures form the chief interest of the plot.

CHRISTIAN ART (Early). All art in the service of the Christian Church and religion is Christian art. By general usage the term "early Christian" is restricted to those phases of that art which belong to the period before the year 800, when Charles the Great was crowned Emperor of the West. It is therefore Christian art before its mediæval form was developed, while it still retains much of antique tradition. It falls into three divisions: (1) pre-Constantinian (c.100–313); (2) from Constantine to Justinian (c.312–550); (3) Justinian to Charlemagne. The first period is mainly illustrated by the Roman catacombs and shows Christian art in embryo; the second can be studied principally in the great basilicas and other churches of Italy, though the few examples at all well preserved in the East show that art was there quite as advanced; the third is illustrated in both East and West, but its Eastern phases are commonly classed under the term "Byzantine" (q.v.).

Architecture. There was very little opportunity for anything characteristic in the architecture of the earliest Christians. Constantine in 313 gave Christians freedom to erect places of worship. All that remains of early Christian art before this date is described in the article on Catacombs. The style formed in the fourth century is called basilical, because this name was given to the large churches that were by far the most important monuments erected. Christian architects faced the problem of creating a large interior for worshiping multitudes, in contrast with ancient worship, which was in the open air, or carried on individually or by sacrifices in the temples. In pagan temples nearly all the artistic efforts had been concentrated on the exteriors. Christian art neglected the exterior, leaving it of bare brick, conditioned in its form entirely by the interior arrangement and proportions. The arrangements of these churches are elsewhere described. (See Basilica; Apse; Transept; Atrium; Nave; Aisle; Altar; Choir; Confession.) Structurally they were of little importance. No rivalry with the great domed and vaulted halls of the Roman Imperial baths was attempted. The interiors were roofed with wood, and the thin brick walls had simple doors and windows. The general composition was good—columnar vestibule to a high, encircling wall; square open court, or atrium; open porch with three doors leading into an oblong interior divided into three or five aisles by rows of columns, supporting either a straight architrave or a line of arches. The dominant note of the interiors was not form, light, and shade, but color, given by mosaic pictures (see Mosaic) or frescoes (see Fresco) on the upper part of the walls, marble veneer or wainscot on the lower part, elaborately patterned marble floors, and rich hangings between the columns. This is what might be termed the official style, prevalent throughout Italy and in Greek lands, but elsewhere other ideals prevailed. The following schools may be distinguished: 1. *Roman*—in Rome, Milan, and most Italian cities; in southern Gaul; and in Rhenish Germany. 2. *Græco-Roman*—with decided Hellenic and Oriental influences, in several cities of Italy, where this element was strong, as in Ravenna and Naples; in the Adriatic provinces of

Istria and Dalmatia; and in Greece proper and the Balkan Peninsula. 3. *Asia Minor*—with use of stone and of vaulting, with heavier proportions and differences in plan. 4. *Syria*—especially in the ruined cities of the Hauran, and regions of Antioch and Damascus, where stone styles of great originality were developed. 5. *Egypt*—where the Christian Copts drew both from ancient Egyptian and from Hellenic Christian models. 6. *Northern Africa*—especially the present Algeria and Tunis, where the French excavations have brought to light a large number of early churches, but all in ruins. In these schools the earliest works were nearly always the finest, because in the fourth century the Roman Empire was still comparatively flourishing, and Imperial funds were lavishly used in building and decorating churches. The Church itself was far richer than during the barbarian inroads. The early Christian style lasted much longer in the West than in the East or in Greece, because the decay in the West caused by the barbarian invasions prevented the developments and changes that were possible in the East, where civilization continued uninterruptedly at a high level. In Italy, Gaul, Spain, and Germany it ruled far into the Middle Ages, the basilical type of church prevailing in many parts until the twelfth century. But in the Orient, where it never had so uniform a type, it gradually gave way to what is termed the Byzantine style. In Salonica (Thessalonica), which came next to Constantinople as a Greek centre, the wooden-ceiled churches continued to be built side by side with the domical ones until the eighth and ninth centuries. But elsewhere, as early as the seventh century, the flimsier wooden-roofed style had been entirely superseded by the Byzantine vaulted structures. The following are some of the basilicas which remain wholly or in part: In Rome—Santa Maria Maggiore (fifth century), San Paolo fuore le Mura (fifth), Santa Sabina (fifth), San Pietro in Vincoli (fifth), San Lorenzo (sixth, old part), Sant' Agnese (seventh), Santa Maria in Cosmedin (eighth), Santa Prassede (ninth), San Martino ai Monti (ninth). In Ravenna—San Teodoro (fifth), San Francesco (fifth), San Apollinare Nuovo, San Apollinare in Classe (sixth). In Spoleto—San Agostino. In Perugia—San Pietro. Also on the Adriatic, basilicas in Parenzo, Pola, Grado, all of the sixth century. In Constantinople—St. John (fifth). In Bethlehem—church of the Nativity. In Salonica—St. Demetrius. In Syria, such a multitude of churches, from the basilica of Shakka, in the fourth century, to the church of St. Simeon, in Kalat Siman, in the sixth century, that enumeration would be impossible. In nearly all these buildings, and in many others of less importance or poorer preservation, the one official type (see BASILICA) is followed. The differences are mainly in the common use by Greek and Eastern churches of the gallery for women over the side aisles, of double capitals over the columns, of polygonal apses, and of a modification of the old Corinthian and Ionic orders that led up to Byzantine ornament. In fact, from the beginning, architecture in the East was tending towards the Byzantine. If one were to select a half dozen out of all the remaining early basilicas as the finest and best-preserved examples of the style, these would be: church of the Nativity, Bethlehem; Santa Maria Maggiore, Santa Sabina, and Santa Prassede, Rome; the two San Apollinares in Ravenna; and the cathedral in Parenzo. They have preserved a great part of their original decoration as well as their architecture. There was another important class of early Christian buildings—the baptisteries, chapels, sacristies, mausoleums, and other religious structures, that were built not on an oblong, but on a concentric plan, i.e., buildings that were circular, polygonal, or even equilaterally cruciform. These buildings are, of course, comparable to Roman structures like the Pantheon or the temple of Vesta or Minerva Medica, but they were never so bold nor on so large a scale. At first even churches were sometimes built in this form (Antioch; San Stefano Rotondo, Rome; St. George, Salonica); but this was found inconvenient for liturgical reasons, and it was thenceforth confined to other religious and funerary structures. Some were square externally and octagonal internally, by means of niches, like the two baptisteries in Ravenna and that in Kalat Siman; some purely circular, like St. George in Salonica. In these cases the dome rests upon the outer wall, but in the more developed and monumental examples it rests upon a row of columns and is surrounded by a concentric aisle imitated from the straight aisles of the basilica and covered by a lower roof. Sometimes both dome and aisles are of masonry, as in Santa Costanza in Rome and Santa Maria Maggiore in Nocera—both of them of circular plan; at other times, with lighter walls and higher proportions, the coverings are of wood, as in the Lateran baptistery in Rome, which is octagonal, and San Stefano Rotondo, which is circular and with two aisles. This type of masonry vaulted "concentric" building was adopted in the East for church use: by the use of pendentives (q.v.) and the addition of an apse the Eastern architects produced a fine church type that was the germ of the Byzantine style. This is the case with the cathedral of Bozra and St. George in Ezra in Syria, and with Saints Sergius and Bacchus in Constantinople. Some of these buildings have galleries over the aisles.

For civil buildings of this period we must go to the Syrian cities, where there remain thousands of houses, halls, colonnades, sepulchral monuments, all well built in stonework, and telling us as much of the life of that time as Pompeii does for the previous centuries.

In so far as *materials* of construction are concerned, bricks were the common material in the West, including the Greek provinces, and this precluded sculptured decoration, because no marble facing was used. But in parts of the Orient, especially in Syria, local stone replaced brick, and there is a great deal of good carved detail. Here also the normal types of the classic orders, slavishly followed farther west, are varied by many new forms, which are not only connected with Persian and Byzantine ornament, but seem to foreshadow Romanesque and Gothic foliage and ornament. It is in Syria also that the greatest variety and inventiveness of architectural plan, composition, and form are shown. The masterpiece of the school is the monastery of St. Simeon in Kalat Siman.

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der klassischen Baukunst (Stuttgart, 1889); Kraus, *Geschichte der christlichen Kunst* (Freiburg, 1896); and for plates: Hübsch, *Die altchristlichen Kirchen* (Karlsruhe, 1862–63); also French edition, *Monuments de l'architecture chrétienne* (Paris, 1860); for Syria: De Vogüé, *Syrie Centrale; Les églises de Terre-Sainte* (Paris, 1865); Von Quast, *Die altchristlichen Bauwerke zu Ravenna;* Butler, *Architecture and Other Arts in Northern Central Syria* (New York, 1903); Hill, *Architectural History of the Christian Church* (London, 1908); Browne, *Early Christian and Byzantine Architecture* (New York, 1912).

Sculpture. The earliest of the arts to fall, at the decline of the Roman Empire, was sculpture. The carvings on the Arch of Constantine, the Column of Theodosius at Constantinople, and the Imperial portraits of the fourth century show this to have been so, even in the case of the most pretentious monuments. A few works of Christian sculpture of pre-Constantinian date come before this complete decadence. Such are the statue of St. Hippolytus and that of the Good Shepherd in the Lateran Museum and a few of the sarcophagi (q.v.). The latter form the bulk of early Christian marble sculpture during the third, fourth, and fifth centuries, after which there was very little sculpture on a large scale of any sort. These sarcophagi, after the fashion of the earlier ones of the Etruscans and pagan Romans, had a line of reliefs covering face and sides. Sometimes, even, there were two superposed rows of figures. Many subjects were usually crowded together, though sometimes such scenes as the crossing of the Red Sea, or Jonah swallowed by the whale, occupy the entire front. The scenes are selected with evident relation to funerary ideas and belief in future life, and are thus very instructive. (See Iconography.) Most of them occur also in the catacomb frescoes. The technique begins to decline in the fourth century, as is shown by the liberal use of the trepan, the loss of finish, and of good proportions. The museum of the Lateran contains the largest collection, but there are many in Arles. In fact, throughout the Roman world a similar style prevailed. The sarcophagi in Ravenna show the stiffness and limitations of the latest sarcophagi—those of the fifth and sixth centuries. To this time probably belongs the last colossal statue of antiquity—the bronze emperor found at Barletta, hard in its style, showing the loss of ability since the time of the famous bronze statue of St. Peter in the Vatican (fifth century). After the sixth century no attempt was made at monumental sculpture, the religious scruples of the Iconoclasts hastening the total downfall, which was complete both for the East and the West. The eclipse was to last about six centuries.

Painting and Mosaics. The painted ornamentation of the earliest crypts in the Roman catacombs, such as those of Domitilla and Priscilla, show that not until the middle of the second century was there enough that was significantly Christian to be called Christian painting. The technique is exactly the same as in contemporary pagan monuments; but a system of symbolism to express Christian faith is in process of formation. (See Iconography; a more general description is given under Catacombs.) Everything that could be regarded as a symbol of the resurrection and of salvation was represented, whether in the form of animate and inanimate symbols, such as the phœnix, the fish, or the bread; or of symbolic scenes, such as Noah, Daniel, or the three children in the furnace. In its limitation and simplicity this art was very direct and appealed alike to learned and unlearned. After the time of Constantine the historic, descriptive, genre, and dogmatic elements were added to diversify the art, while the deterioration of technique detracted from its appeal. The catacombs continue throughout the fourth century to furnish practically the entire material for study, because the churches of this period still in existence have partly or entirely lost their paintings. The art of mosaic painting now entered the field of figured composition and rapidly displaced fresco painting in the larger and richer churches. The mausoleum of Constantia and the church of Santa Pudentiana in Rome preserve works of this century of very different character—the former, in its semipagan decoration, harking back to the early catacombs, while the latter, with its ordered scene of Christ enthroned teaching the Apostles and establishing the Church of the Jews and of the Gentiles, shows the new dogmatic and didactic tendency. While painting had been rather sentimental and free, it became now more systematically a religious handmaid. (See Iconography.) The desire to tell the people all the main facts of religious history led to the invention of a series of chronological illustrations of the events of the Old and New Testaments which, originating as early as the fifth century, were handed down, almost unchanged, for about 1000 years. The mosaics of Santa Maria Maggiore in Rome, with their scenes from Genesis (c.430), show the early phase of the style before its historic exuberance had been pruned to the selection of fewer types. The historic series soon became subordinate to the dogmatic, as in the later mosaics (c.500) in San Apollinare Nuovo, in Ravenna, portraying the life of Christ. This was due to the influence of the East and of Greece. Although nearly all the preserved works of painting and mosaic earlier than 800 A.D. are found in the West, there are abundant proofs that the change from the symbolic to the dogmatico-historic style was due to the Orient. One of these proofs is the series of Greek illuminated manuscripts of the fifth and sixth centuries, in which this style is fully developed, and which may have served as models to the Western painter—such were the Vienna and Colton Genesis, Rossano Gospels, etc. The Oriental love of color also dictated the replacing of the thinner, colder fresco by the richer, warmer mosaics. The two typical Italian schools are Rome and Ravenna—the former representing the Latin, the latter the Oriental-Hellenic current. In Rome the mosaics of Santa Sabina (fifth century) and Santi Cosmo e Damiano (c.530) are the finest of their class—genuinely Roman; but the invasion of Byzantine methods is shown a little later in San Teodoro and even more in San Venanzio. The Ravenna series is richer in the fifth and sixth centuries, with its two churches of San Apollinare, San Vitale, the two baptisteries, the archiepiscopal palace, and the tomb of Galla Placidia, filled with mosaics by the best artists of the Greek school. The use of the gold ground, which they made popular, revolutionized mosaic painting and made its figures as clean-cut as those of a Greek frieze. The period closes with the supremacy of the East in painting.

Minor Arts. The smaller branches of art appeared to feel the decadence the least. This was especially true of ivory carving (q.v.) and metal sculpture. Yet in the diptychs and triptychs of the sixth to the ninth century, and in the ivory throne of Bishop Maximian at Ravenna, there is fine decorative effect, though the carving of figures is inferior. One branch, that of illuminated manuscripts (q.v.), may even be said to have been created at this time. The subjects portrayed were the same as in the larger arts. Certain branches were especially popular in special localities. Figured woven stuffs were worn in the Orient, especially in Egypt, St. Asterius commenting on the personages who carried all the Old and New Testaments on their garments. Many such textiles have been found in the Fayum. Then there was the special industry of figures delicately outlined in gold on glass, as in so many cups found in the Roman catacombs. The earthenware and bronze lamps also were decorated with religious scenes. But the choicest remaining examples are the ivories and illuminations. The scenes carved on the diptychs were necessarily limited in character to the figures and functions of the consuls; but a greater variety appears in the boxes (pyxes), the book covers, and other objects of ecclesiastical use, carved with great skill throughout this period, but especially between the fourth and the close of the sixth century, which is also the golden age for illuminations.

Symbolism and Iconography. All early Christian figured art expressed or taught some religious truth and was not produced primarily for æsthetic reasons. Therefore the study of its subjects is even more interesting than that of its style. This is treated under the title ICONOGRAPHY, as well as under SYMBOLISM; ALLEGORY.

Bibliography. Besides the authorities referred to under CATACOMBS and ICONOGRAPHY, such as Garrucci, Perate, De Rossi, etc., consult: Kraus, *Geschichte der christlichen Kunst* (Freiburg, 1895–97); Woltmann and Woermann, *Geschichte der Malerei* (Leipzig, 1879); Zimmermann, *Gioto und die Kunst Italiens* (ib., 1899).

CHRISTIAN BROTHERS COLLEGE. A Roman Catholic institution in St. Louis, Mo., conducted by the Brothers of the Christian Schools (q.v.). The college was chartered in 1855 and maintains collegiate, scientific (civil and mechanical engineering), commercial, and preparatory departments. The value of the college buildings and grounds is about $650,000, and the total annual income $40,000. The library contains about 22,400 volumes. The student enrollment in all departments in 1912 was about 400. President, Brother Lawrence Sixtus.

CHRISTIAN CATHOLIC CHURCH. A religious denomination organized in 1896 by the Rev. John Alexander Dowie, a former Congregational minister in Australia. He went to the Pacific coast of the United States and then to Chicago, preaching and practicing faith healing, and he soon attracted a large following. While the generally received principles of the Christian religion are taught and the sacraments are recognized in the Christian Catholic church, special prominence is given to the doctrine of the divine cure of disease in answer to prayer. Dowie claimed for himself extraordinary powers of healing, and these claims he based on the asserted fact that he was a reincarnation of the prophet Elijah. The chief centre of the denominational activities is at Zion City, near Chicago, where Dowie acquired large properties, and where many institutions and business enterprises are located. He established schools and a college. The business enterprises founded by him included a printing and publishing house, a general store, lace making, and other industries. To establish his lace-making enterprise he purchased the complete plant of several lace factories in Dublin and brought over the employees of these plants to operate the enterprise and to instruct others in the making of lace. Dowie was very successful in these enterprises and in his effort to gather believers until 1903, when he led a large number of his followers to New York City for the purpose of carrying on a missionary campaign. This was a failure. He was received with ridicule by the press of the city, and his meetings were attended chiefly as a matter of curiosity. He made few converts. This was followed by disastrous visits to England and Australia. Upon his return to the United States he found considerable opposition to his leadership, and on Feb. 8, 1906, he was deposed and W. G. Voliva became Overseer. Dowie died in 1907. Following his death the importance of the church as a religious movement continued to decrease, while Zion City continued to develop as an industrial community. Two factions developed —those who held strictly to the rules and regulations for spiritual and social government as set down by Dowie, and those, chiefly newcomers to Zion City, who wished more liberal laws for the government of the community and found little significance in the set rules for conduct hitherto in force. This division resulted in financial difficulties, and in 1910 certain of the enterprises of Zion City were put up at auction and were purchased by Marshall Field and Company. The most important of these were the lace factories.

A usual feature of the meetings of the members of the denomination is a united consecration service at its close. Baptism is administered to believers by trine immersion. The organization of the church comprises the General Overseer, the Overseers for the largest districts, and Seventies. Besides the United States and Canada, the church claims to be represented in England, Scotland, Ireland, Australia, New Zealand, China, and Japan. There are no figures for membership later than 1906. At that time the communicants numbered 5865, the churches 17, and the ministers 35. The chief organs are the *Leaves of Healing*, a weekly, and the *Little White Dove*, a weekly. Consult: J. A. Dowie, *A Voice from Zion* (Chicago); *Zion's Conflict with Methodist Apostasy* (Chicago, 1901); Carroll, *Religious Denominations of the United States* (rev. ed., 1912).

CHRISTIAN CHURCH, SOUTH. See CHRISTIANS.

CHRISTIAN CONVENTION. See CHRISTIANS.

CHRISTIAN ENDEAVOR, YOUNG PEOPLE'S SOCIETY OF. A society originated by the Rev. Francis E. Clark, pastor of the Williston Congregational Church in Portland, Me. Its first membership consisted of about 50 boys and girls, who met, Feb. 2, 1881, in the pastor's parlor and pledged themselves to attend and take some part in a weekly prayer meeting and

once a month to hold a consecration meeting. Other duties, social, religious, literary, and of various kinds, were assigned to different members. The idea met with instant acceptance. In 1913 there were 75,063 societies, of which 53,417 were in the United States and Canada and 21,646 in other lands. The total membership was about 3,753,000. More than 100,000 societies under different names, with over 5,000,000 members, are organized on the plan of the Christian Endeavor. These scattered organizations are bound together by a corporation, the United Society of Christian Endeavor, organized 1885, with headquarters in Boston, and managed by a board of trustees. The organ of the society is the *Christian Endeavor World*. In 1895 the World's Christian Endeavor Union was formed. For details, consult L. W. Bacon and C. A. Northrup, *Young People's Societies* (New York, 1900), and Clark, *Christian Endeavor in all Lands* (Boston, 1906).

CHRISTIAN ERA. See CHRONOLOGY.

CHRISTIANIA, krĕs'tē-ä'nē-ȧ, or **KRISTIANIA.** The capital of Norway, situated at the north end of Christiania Fiord, in lat. 59° 55′ N. and long. 10° 43′ E. (Map: Norway, D 7). It occupies about 7 square miles. Christiania is composed of the well-built city proper and of a number of rapidly growing suburbs. There are broad streets and fine, large squares adorned with monuments. The promenade of St. John's Hill is one of the city's attractive features. The historic citadel of Akershus now serves as an arsenal and prison. The most noteworthy churches are the Gamle Akers Kirke, mentioned before 1150; the Trinity Church, erected in the Gothic style in 1853–58; the church of Our Saviour, consecrated in 1697 and recently restored; and the Johannes Kirke, completed in 1878. The more prominent secular buildings are the Parliament House, the Museum of Art, the exchange, the royal palace, constructed in 1825–48, the episcopal residence, and the university. (See CHRISTIANIA, UNIVERSITY OF.) The botanical garden and astronomical observatory are worthy of mention.

Christiania forms a separate official district and is administered by a magistracy composed of the burgomaster and two councilmen. It has good water works and several electric-car lines. The educational institutions include, besides the university, two higher military schools, a gymnasium, a technical school, and a number of Latin schools and *realschulen*. The Museum of Art contains many meritorious paintings by Scandinavian and foreign artists, but no great masterpieces. The Industrial Art Museum has fine ancient and modern specimens of Norwegian handicraft. There are three theatres and a municipal library of about 55,000 volumes.

Industrially Christiania is quite important. Among its leading manufactured products are paper, oil, cotton yarn, tobacco, furniture, ironwares, and liquors. It is the principal seaport of Norway, handling about half of the imports and nearly one-fifth of the exports. The harbor is very spacious and is kept open in winter by means of ice breakers. There is regular steamship communication with Great Britain, Germany, the Netherlands, and France, as well as with Denmark and Sweden. Christiania is the seat of a number of consular representatives, including one from the United States. The population, almost wholly Protestant, was 227,626 in 1900, 241,834 in 1910, and 247,588 in 1912. The environs are very attractive, offering magnificent views. The average annual temperature of Christiania is 42° F. The city was founded in 1624 by Christian IV, on the site of the town of Oslo, which dated from 1048 and was burned in 1624. Consult Annéus, *La ville de Kristiania, son commerce, sa navigation et son industrie: Résumé historique* (Christiania, 1900).

CHRISTIANIA, UNIVERSITY OF. The Norwegian State University. During the union of Norway and Denmark, the Norwegian students frequented the university at Copenhagen; but the awakening of the national spirit at the end of the eighteenth century finally compelled the foundation of the Christiania University, under Frederick VI in 1811–12, mainly through voluntary subscriptions. In the course of the nineteenth century many buildings have been erected, both by the state and by private contributions. The university is under the control of the Minister of Religion and Education. There were in 1912–13 about 1600 students. The library is large, containing 495,000 volumes. The university has a botanical garden and an observatory, besides various laboratories and museums.

CHRISTIAN'ITY (from OF. *Crestiente, Crestientet*, from Lat. *Christianitas*, Christianity, from *Christianus*, Christian). The religion which has grown out of the teaching of Jesus Christ and which looks to Him as the great revelation of the character of God and of the ideals of human life. It exhibits a peculiarly wide variety of forms, only Buddhism being able to compare with it in this respect. At first sight it would seem that there is little in common between, e.g., the elaborate ritualistic religion represented by the Greek church and the simple, bare individualism of the Quakers. Beneath the surface, however, it is easy to see that there is a broad common ground. This consists in the acceptance of Jesus as the revealer of God and of the way of life. The line between Christianity and other religions is clearly defined. As he who can say, "There is no God but Allah, and Mohammed is his prophet," is a Mohammedan, so he who regards Jesus as presenting the highest religious ideals of the world, and who tries to follow those ideals in his own life, is a Christian, whatever else he may or may not believe. Men have divided, however, upon a definition of Christianity from the point of view of its historical content. Four great groups of answers have been made to the question, What is the content of Christianity? 1. The teaching of Jesus only. Even the rest of the New Testament is not authoritative and may be in error in fundamental things. For example, the view of John or of Paul regarding the person of Jesus may be rejected. An example of this general position may be found in Harnack's *What is Christianity?* (Eng. trans.). 2. The teaching of the New Testament. Whatever a reasonable exegesis shows this book to teach becomes authoritative Christian doctrine. This does not mean that all beliefs held by any New Testament writer are necessarily true, but that what the New Testament as a whole combines to teach as fundamental truth is necessary for Christianity. This has been, in the main, the position of the Protestant churches and is expressed in the great Protestant creeds. 3. The New Testament and the decisions of the ecumenical councils of

the early Church. So long as the Church remained essentially undivided, its decisions were so guided by the Spirit of God as to make the decrees of its councils authoritative doctrine. Christianity, e.g., includes the interpretation of the person of Christ expressed in the Nicene Creed. This was the position of the Oxford High Church movement in the Church of England in the middle of the nineteenth century. 4. The New Testament and the formal dogmas of the orthodox church up to the present time. This makes the authoritative doctrines of Christianity a constantly growing body, whose essence, however, may be found in the germinal teaching of Christ. No church claims that this may be superseded or changed, but only interpreted in the growing light of truth, by a church guided by the Spirit of God. This is the position of the Roman Catholic church.

All these interpretations, however, would assign to Jesus a unique position in the religion. (For His Life, see JESUS CHRIST.) His relation to Christianity is different from that of any other religious leader to his system. He is more than a teacher like Buddha, or a prophet like Mohammed, or a lawgiver like Moses. In a sense, He is the religion. He lived its ideals. Orthodox Christianity has regarded the reconciliation between God and man as not only revealed, but actually made, by His life and death. His teaching was not independent of history. The germs of it were in the Hebrew prophets. In fact, He was the last and greatest of the prophets, and in Him the prophetic teaching finds its culmination. In the prophets individual religion was mingled with national religion. In the teaching of Christ the national element completely falls away, and the individual religion stands out as the only type of religion. Christ did not inveigh against the national ideals or the temple worship. He only put forth clearly His conception of religion as a relation of personal trust in the fatherhood of God, and shortly national ideas and ritual worship fell away from His followers of their own accord.

The elements common to Christianity and other religions are the sense of human need of superhuman help; the belief in the possible communion between man and God; the conception of the willingness of God to aid man; and a means of bringing about that communion and so of opening for man the possibility of divine help. Its unique element lies in its conception of the means by which man may come into communion with God. Man comes into that communion through Christ, but the interpretation of this phrase differs in different branches of Christianity. Some hold that the communion must be mediated by the church; some, that it is a matter for the individual alone; but all hold that Christ is, in one way or another, the door of communion with God.

Christianity teaches (1) man's ideal life. This ideal is a life in harmony with God. The conception of God, then, is crucial for Christianity. Christ's common term for Him shows His character. God is the Father in heaven. He is holy, but His holiness does not shut Him away from man. His love is the main characteristic of God which Christianity expresses. He is omnipotent and omniscient, but it is not only as abstract wisdom or power that Christianity presents Him. Rather it dwells upon His all-embracing loving-kindness. Man ought to be in loving accord with the loving Father. As Augustine expressed it, "O God, my heart is restless, and finds no rest until it rests in Thee." (2) Man's actual life. This is very far from rest in God. Man is a prodigal son, wandering far from the loving Father's home. He is a sinner, and Christianity calls him to turn and repent. Here lies what has sometimes been termed the pessimism of Christianity. Christianity does not view the world as inherently miserable, as some Oriental religions do, and recommend self-effacement as the remedy. The world is miserable because of its sin. The world is a lost world. Christianity does not reject evolution (q.v.), whereby the race is viewed as progressing upon the whole, and even the Church as developing in grace and knowledge, but it nevertheless regards man as sinful. The result is that the world is a kingdom of evil. Man was made to know God. Remove this knowledge from him by sin, and he tends to evil. But with this view of man and the world is combined another. The apparent pessimism is changed to an optimism. (3) How man may obtain his ideal life. Man is capable of salvation and has in the divine design great and noble possibilities. Christianity comes to bring into his history the saving power which shall rescue him from himself and make him a son of God. It presents to him in Jesus Christ an ideal of purity which, under the ministration of the divine Spirit, convinces him of his sin. The same Spirit produces a new allegiance in his soul, allegiance to God in Christ, creates a new purpose to do the right, animates him by a new affection, that of an all-embracing love, and produces a new obedience to the will of God. The change in him is not a mere change of purpose. It is accompanied with the gift of the Spirit as an abiding, renovating, inspiring, and enabling presence, so that the man finds a new power in himself to overcome the temptations of the world. Christianity puts him, also, in a new society, and it thus saves him. It brings him out from under the condemnation of the law of God, it puts him in the position of communion with his Father, and thus it both shows what he was intended to be and helps him increasingly to attain that ideal. He knows and trusts his Father, and so not only attains the ideal life, but finds with it perfect peace and rest. His mind responds to Christ's sayings, "Ye shall find rest unto your souls"; "Peace I leave with you."

This ideal is not one of selfish inactivity. Harmony with God implies being animated with the same spirit of love which gives God the title "Father." Such a spirit must necessarily issue in loving sympathy with all men, in the attempt to bring them, by every means in the power of man, into that same realization of the love of God which the Christian has found. Here lies the Christian warrant, and even demand, for works of charity and beneficence; for civic and social reform and for mission work. Such good works are a part of the effort to bring all men to that condition of harmony with God which Christ called the Kingdom of God. Christianity is essentially a missionary religion.

In the classifications of religion Christianity is a universal religion, because it is not limited to any race or stage of culture and may be followed as well in one place as another. It thus differs from national and local religions.

It is the absolute religion among the religions which affirm the independent individuality of man; i.e., it holds up as the ideal complete harmony of will between God and man. All religions seek harmony of some sort, but harmony of will is absolute harmony and represents the final stage, beyond which it is impossible to go without becoming pantheistic and accepting the absorption of personality in a monistic being.

Historic Christianity presents other elements than those given in the teaching of Jesus. He made no effort to separate His followers from the Jewish church. The new religion soon began to make converts among the Gentiles, and the question arose whether those who refused to become Jews could be followers of Jesus, whom His disciples regarded as the Jewish Messiah. The real point at issue was whether Christianity was a Jewish Messianic sect or an independent religion. Paul became the champion of the broader view, and his influence, together with the logic of events, soon launched Christianity upon an independent career. It took over, however, many Judaistic elements. Its idea of God, its first Bible, its emphasis on morality, its conceptions of the future life, were parts of its Jewish heritage. It also borrowed from Greek philosophy and institutions. The development of the Church was influenced by the forms of Greek societies, and its theology by Greek thought, especially by Neoplatonism. Later, national ideas and customs molded the different forms of the religion, so that we find sections of it differing as widely as the intellectual Calvinism of Scotland and the semipagan Christianity of Abyssinia.

Some external organization is, of course, necessary for the growth of any religion. Accordingly there has always been a church. The sacerdotal tendency, transplanted from Judaism into early Christianity, strengthened by Augustine (q.v.) and culminating in the papacy, identified the visible with the invisible Church, made membership in it essential to salvation, and viewed the hierarchy as essential to the being of the Church. This view is largely held in the Anglican communion at the present time. Other Protestant bodies have, however, laid the emphasis upon the invisible Church to such a degree that they have acknowledged the validity of any church organization which seemed to possess the Spirit of Christ.

For specific doctrine, see TRINITY; CHRISTOLOGY; ATONEMENT; HOLY GHOST; SACRAMENT; INSPIRATION; RESURRECTION; JUDGMENT, FINAL; ESCHATOLOGY; GREEK CHURCH; ROMAN CATHOLIC CHURCH; LUTHERANISM; CALVINISM.

The evidences of Christianity vary from age to age according to the needs of that age; they must, however, always consist in the display of the essential meaning of Christianity and its place in the plan of the world. The chief external arguments were formerly derived from the fulfillment of prophecy and from the testimony of miracles. The modern stress upon law in the world has caused a change at this point. Prophecy and miracle themselves have now become an object of attack and need defense. The argument for the truth of Christianity as a whole is derived from two principal sources: from history, particularly from Christianity's place in history as a force coöperating with other forces to make history what it is, and that upon its best side; and from the reasonableness of its doctrines and their agreement with the results of every other realm of human knowledge. The internal evidences of Christianity were formerly occupied largely with the character of Christ and the career of the Apostles as both exhibiting the presence of a supernatural power. While these arguments have not passed away and never can, there has been a tendency of late to lay a new stress upon Christian experience as a source of evidence. Not only does the gospel, when accepted and tried, do for the sinner what it professes itself able to do, and thus prove itself because "it works," but the Christian comes to possess an experiential and thus an independent knowledge of the chief truths of Christianity which is logically independent of the Scriptures and the Church, and is thus able to confirm their claims. Consult Stearns, *Evidence of Christian Experience* (New York, 1891).

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CHRISTIAN KNOWLEDGE, SOCIETY FOR PROMOTING. The oldest religious association connected with the Church of England. Founded in 1698, it did not receive its present name till 1701. It had for object: "(1) To promote and encourage the erecting of charity schools in all parts of England and Wales; (2) to disperse, both at home and abroad, Bibles and tracts of religion; and, in general, to advance the honor of God, and the good of mankind, by promoting Christian knowledge, both at home and in other parts of the world, by the best methods that should offer." It has directed its efforts chiefly to the British dominions, partaking of the nature of an educational association, a missionary society, a Bible society, and a religious tract society; and notwithstanding the operations of other great societies in these several departments of Christian benevolence, it still does a great work. Consult Sewell, *The Society for Promoting Christian Knowledge* (London, 1885), and *An Important Chapter in English Church History* (London, 1905).

CHRISTIAN REFORMED CHURCH. A religious denomination in the United States, numbering, in 1913, 35,142 communicants. It had 209 congregations located chiefly in Michigan, Illinois, and Iowa. The ministers numbered 156, and the Sunday-school scholars about 25,000. The highest church court is the Synod, which meets biennially. This church is the result of secession movements from the Reformed

(Dutch) church (q.v.) in 1822, 1857, and 1882. The doctrinal standards are the same as those of other Reformed churches of Holland origin, viz., the Heidelberg Catechism, Belgic Confession, and Canons of Dordrecht. The Calvin College Theological Seminary, at Grand Rapids, Mich., had, in 1912, 24 students. Most of the churches use the Holland language in divine services; half a dozen are German-speaking; a constantly increasing proportion uses English. The English organ of the denomination is the *Banner of Truth*, published at Holland, Mich. Consult *Religious Census of the United States* (1910).

CHRISTIANS. The religious denomination known as the "Christians" or the "Christian Church" originated near the close of the eighteenth century in three unconnected movements. James O'Kelley and others in Virginia and North Carolina withdrew from the Methodist Episcopal church in 1793 and at first were known as "Republican Methodists." In 1794 they decided to be known only as "The Christian Church," but commonly spoke of themselves simply as Christians. Abner Jones, a Baptist, led a movement in 1800 under which a church was formed in Lyndon, Vt., in which the conditions of membership were simply a belief in Christ and the Holy Scriptures, and the only name for the members was Christian. In 1804, in Kentucky, Barton W. Stone and five other ministers of the Presbyterian church, forming what was known as the "Springfield Presbytery," voted to dissolve that body and henceforth were known to each other as Christian ministers only. At first neither of these groups had any knowledge of the others. But as churches multiplied, they became acquainted, and as early as 1819 general meetings were held. From these developed general organizations for the promotion of publishing, educational, and missionary interests. These are now represented by the American Christian Convention, an incorporated body, composed of representatives of local conferences in the United States and Canada, and of presidents of colleges and State and district organizations coöperating with the convention. It meets every four years. The Mission Board is an incorporated department of the convention, through which mission and church extension work are carried on in the United States, Canada, Japan, and Porto Rico. There were in Japan, in 1913, 9 missionaries, 15 native helpers, 4 mission stations with 15 outposts, 11 churches with 847 members and 2110 Sunday-school scholars. In Porto Rico there were, in 1913, 2 missionaries and 4 churches, with 14 stations and out-stations. In the United States and Canada 32 home-mission pastors and home missionaries were wholly or partly sustained. The educational interests of the convention include the following institutions: The Christian Biblical Institute, Defiance, Ohio; Starkey Seminary, Lakemont, N. Y.; Union Christian College, Merom, Ind.; Elon College, Elon College, N. C.; Weaubleau Christian College, Weaubleau, Mo.; Palmer College, Albany, Mo.; Defiance College, Defiance, Ohio; Jireh College, Jireh, Wyo.; and Franklinton Christian College (colored), Franklinton, N. C. The publishing department is under the control of the Christian Publishing Association. It issues the *Herald of Gospel Liberty*, a weekly religious newspaper, which was established by the Rev. Elias Smith at Portsmouth, N. H., Sept. 8, 1808. Other publications of the Christians are the *Christian Missionary*, *Christian Sun*, *Christian Vanguard*, besides local and conference publications. The Christians had, in 1913, about 110,000 communicants and 1318 ministers. There are 72 conferences, some of which are combined into State or district organizations, such as the New England Christian Convention and the Southern Christian Convention. The latter body was organized in 1856, when the Southern delegates to the American Christian Convention at Cincinnati, Ohio, withdrew on account of resolutions passed by that body condemning slavery. They were practically reunited in 1890. The pioneers of the Christians had little thought of organizing a new sect. In order to maintain public worship and properly care for the membership, they were compelled to organize more perfectly, but they strove to preserve the principles upon which the movement was based. These are: Christ the only head of the Church, excluding popes, bishops, and similar ecclesiastics; acceptance of the Bible as a sufficient rule of faith; avoidance of sectarian or divisible names; Christian character as the only requirement for fellowship or church membership; insistence upon the right of private judgment and liberty of conscience in all matters of theological opinion and ceremonial observance, and advocacy of the union of all the followers of Christ.

CHRISTIANS, or DISCIPLES OF SAINT JOHN, or MANDÆANS, or SABIANS (Lat. *Johannitæ*, from *Johannes*, John). A small religious body in south Babylonia. The name "Christians of St. John" is not used by them and is a misnomer. Their veneration of John the Baptist and the similarity of certain of their rites with those of the Christians led the early Carmelite missionaries to believe them to be the descendants of the early disciples of John. One of these missionaries, Ignatius a Jesu, who came in contact with them in Basra, introduced this name to Europe in a description of them (1652). In fact, the religion is Gnostic in origin, with some infusion of Persian and Indian philosophy. See MANDÆANS.

CHRISTIANSAND, krĭs'tyăn-sănd'. An episcopal city, the largest in south Norway, situated at the mouth of the Torrisdals Elv, in the Bay of Christiansand (Map: Norway, C 7). The town exports lumber, fish, lobsters, hides, copper, and iron. Its harbor is good. It has twice, once in 1880 and once in 1892, been devastated by fires. Its fortifications have become useless because of the fortress built at Flekkerö, 5 miles distant. Pop., 1891, 12,813; 1901, 14,566; 1911, 15,154. It was founded by Christian IV in 1641.

CHRISTIANSBURG, krĭs'chanz-bûrg. A town and the county seat of Montgomery Co., Va., 33 miles southwest of Roanoke, on the Norfolk and Western Railroad (Map: Virginia, D 4). It is known as a summer resort and contains the buildings of the Old Montgomery Female College. Stock raising is the chief industry. Pop., 1910, 1568.

CHRISTIAN SCIENCE. The name given by Mary Baker Eddy to the discovery which she made in 1866 and the religion which she afterward founded. As its name indicates, Christian Science is an interpretation of the religion taught and practised by Christ Jesus. It purports to be the science of God and His universe, including man,

and the science of salvation from all evil.

Christian Science defines God as "incorporeal, divine, supreme, infinite Mind, Spirit, Soul, Principle, Life, Truth, Love" (*Science and Health*, by Mrs. Eddy, page 465). It affirms the divine individuality or infinite personality of God, but denies that He is personal in a human or finite sense, and rejects all anthropomorphic conceptions of Deity. Christian Scientists vindicate the use of unusual synonyms for God by saying that they are intended, and are all required, "to express the nature, essence, and wholeness of Deity" (*Science and Health*, page 465). Christian Science declares that God is the divine Principle of all real being; that is, the cause, origin, source, and substance of all that has actual existence. It also declares that the will of God is the law of divine Love which invariably provides, and is always available, for the welfare and preservation of man. With reference to the relation between God and man as "the creator and the created," and the nature of real personality, Mrs. Eddy has said, "We are not transcendentalists to the extent of extinguishing anything that is real, good, or true; for God and man in divine Science, or the logic of Truth, are coexistent and eternal, and the nature of God must be seen in man, who is His eternal image and likeness. . . . Scholastic theology makes God manlike; Christian Science makes man Godlike." (*Message to The Mother Church* for 1901, pages 5 and 7.)

Christian Science denies the personality of evil, the devil, or Satan, and avers that evil has no real entity or existence. It does not deny that sin, disease, death, want, woe, suffering, and all the phenomena of evil have a relative existence in human experience; but this science does deny that evil, in any form, has the reality of absolute substance or being; it affirms that every phase of evil can be scientifically abated and abolished, and it gives to its students a spiritual understanding that lifts them more and more into the realm of the real.

Why does Christian Science attach so much importance to its healing? Christian Scientists reply that mankind is in great need of relief from disease, and this science is the most effectual means to that end; also, that Christian healing results from the power of good over evil, and is certain to turn thought towards God to-day or to-morrow, even as it did before: "When the multitudes saw it, they marvelled and glorified God, which had given such power unto men" (Matt. ix. 8).

In denying that Jesus is God, Christian Science relies chiefly on the authority of his own utterances, and maintains that this view alone gives full effect to all his sayings. While acknowledging the atoning sacrifice of Jesus, Christian Science finds the essential efficacy of his atonement in his life—in his teaching and demonstration of the truth of being; as he himself said, "Because I live, ye shall live also" (John xiv. 19). Christian Science holds that Jesus acted within the range of what is possible for men, exemplifying universal possibilities, even as he said, "He that believeth on me, the works that I do shall he do also" (John xiv. 12); also, that Jesus was rightly entitled to the name Messiah or Christ, though either of these terms is less a personal name than a designation of his office; that the office of the Christ is to liberate and deliver, to heal and to save; and that, to quote the words used by Mrs. Eddy on page 473 of *Science and Health*, "Christ is the ideal Truth, that comes to heal sickness and sin through Christian Science, and attributes all power to God . . . Jesus is the human man, and Christ is the divine idea; hence the duality of Jesus the Christ."

Christian Scientists, therefore, invite all men to reëxamine the Scriptures in the light thrown upon them by this teaching, to the end that all may begin anew the working out of the salvation which Jesus taught and exemplified. In support of this appeal, they point to the complete change of theory which ecclesiastical Christianity has more than once undergone regarding the way of Christian salvation, to the evident correspondence of Christian Science to all the teachings of Jesus, and to the increased benefits of Christianity which have come to pass since the advent of its science. This science, so they aver, has come to repeat what Jesus knew and taught; to be that "spirit of Truth" which he foretold and promised (John xiv. 15–26; xv. 20–26; xvi. 7–15); to revive his original gospel, without the limitations which have arisen in human belief; to restore the scope and complete the mission of primitive Christianity. In short, the aim of Christian Science is to introduce the practice of original Christianity, with its knowledge of the truth that makes free and its consequent power over error and erroneous conditions.

As an organization, the Christian Science church is remarkable for its simplicity. It consists of "The Mother Church," at Boston, "branch churches" to be found wherever there are a sufficient number of Christian Scientists, and "societies" where the number of Scientists is not yet large enough for a church. The affairs of The Mother Church are conducted by a board of directors in accordance with a definite order established by Mrs. Eddy and published in the *Church Manual*. The branch churches and societies are self-governing, subject only to certain provisions of the *Church Manual*. The functions of The Mother Church, outside its character as a local church with seats for 5000 people, are those related to the denomination as a whole. Included in these activities are the publication of a directory of representative practitioners, the certifying of authorized teachers, the maintenance of a board of lectureship, the issuance of authentic literature, and the employment of other means for guarding the purity and integrity of Christian Science.

As a religious movement, Christian Science is notable for the rapidity of its growth and the intelligent class of people which it has attracted. The First Church of Christ, Scientist, was organized in 1879 at Boston. In 1915 there are 1500 Christian Science churches and societies. A majority of these are in the United States, but they are numerous wherever the English language is spoken, and a considerable number are to be found in other countries. It was predicted that the passing of Mrs. Eddy (in 1910) would mark the highest point for the Christian Science movement, but its growth and vitality steadily increased after that event as before.

Consult: Eddy, *Science and Health with Key to the Scriptures* (Boston, 1906); id., *Miscella-*

neous Writings (ib., 1896); id., *The First Church of Christ, Scientist, and Miscellany* (ib., 1913); Wilbur, *The Life of Mary Baker Eddy* (ib., 1913). See also bibliography under EDDY, MARY BAKER.

CHRISTIANSEN, krĭs'tē-ăn-sĕn, ARNE EINAR (1861–). A Danish dramatist, unconventional, but noteworthy for his mastery of the playwright's art. His first play, *Lindows Börn* ('Lindow's Bairns,' 1881), was a prose comedy. It was followed by another, *En Egoist* (1882). He then passed several years in travel in various European countries and the Orient. On his return he turned to tragedy in *Nero* (1885) and afterward wrote, besides comedies and prose dramas, several romantic historical plays in verse; a philosophic drama in verse (*Cosmus*, 1897), remarkable for its skillful blending of romanticism and idealism; novels (*Joppe*, 1889; *Hjarl*, 1894); and the libretti of several original operas. In 1899 he was made director of the Royal Theatre in Copenhagen. Christiansen is at his best when he depicts the life of the higher Copenhagen bourgeoisie.

CHRISTIANSEN, CHRISTIAN (1843–). A Danish physicist, born in Loenborg. He studied in Copenhagen, subsequently taught at the school of technology there, and in 1886 became professor of physics in the university. He carried out several interesting investigations on subjects of natural philosophy, and wrote general scientific works in Danish, including an introduction to mathematical physics (1887–89). Among his original contributions to physics, his researches on radiant heat deserve mention.

CHRISTIANSFELD, krĭs'tĭ-ăns-fĕlt' (Ger., Christian's field). A settlement of Moravian Brethren, in the northern part of Schleswig, about 2 miles from the Danish frontier, founded in 1773. The houses, which are well built and cheerful in appearance, are arranged in two parallel streets, with the church upon a green plot in the middle. There is a coöperative farm, and there are manufactures of soap, candles, leather, tobacco, and wool. Pop., less than 1000.

CHRISTIAN SOCIAL UNION. An organization founded in England in 1889, by members of the Church of England, for the study and advocacy of Christian socialism and the application of the principles of Christianity to social problems. The first body was organized at Oxford, and a branch was founded in London in 1891. The Oxford branch has given its chief attention to the study of economic facts, while the London branch is active in holding meetings, issuing addresses, and in general carrying on active propaganda. There are branches in other important cities of England, and in Australia and New Zealand. It has two organs in England, *The Economic Review* and *The Commonwealth*. An affiliated organization of the same name and with the same general purpose was founded in the United States in 1891. Its first president was Bishop F. D. Huntington.

CHRISTIANS OF SAINT THOMAS. The name of a branch of the Christian Church still existing on the Malabar coast, southwestern India, hence called by themselves the Syrian Church of Malagala, formed originally by excommunicated Nestorians, although it claims the Apostle Thomas as its founder. In the eighth century it received a metropolitan from the Nestorian patriarch. The liturgy is in the Syriac language. They still celebrate the early agape, or love feast, use bread, salt, and oil in the communion service, and anoint infants on baptism. Their priests are allowed to marry. Consult: Hugh, *History of Christianity in India* (4 vols., London, 1839–45); the monograph by W. Germann, *Die Kirche des Thomaschristen* (Gütersloh, 1877); Richter, *A History of Missions in India* (New York, 1908).

CHRISTIANSTAD, krĭs'tē-ăn-städ', or **KRISTIANSTAD** (Swed., Christian's city). A town in south Sweden, capital of a län of the same name, situated on the Helge, about 14 miles from Ahus on the Baltic, and 265 miles southwest of Stockholm (Map: Sweden, E 8). It is regularly built, possesses an arsenal and a magnificent church of the seventeenth century, a museum, and is the seat of a court of justice. Its fortifications were destroyed in 1847. The chief manufactures are woolen stuffs, tobacco, leather, ironware, and gloves, while the trade in brandy and grain is considerable since the river has been made navigable to this point. Pop., 1901, 10,318; 1912, 11,680. The town, which was founded by Christian IV of Denmark in 1612, came into the hands of Sweden in 1658 and suffered many sieges during the wars between Denmark and Sweden.

CHRISTIANSTED, krĭs'tē-ăn-stĕd' (Dan., Christian's city). The capital of the Danish West Indies and the chief town of the island of Santa Cruz. It is situated on the northeast coast of the island and has an excellent harbor which is defended by a fort and a battery. The chief exports are sugar, molasses, and rum. The population numbers about 6000.

CHRISTIANSUND, krĭs'tē-ăn-sŏŏn' (Norweg., Christian's sound). A seaport on the west coast of Norway, 85 miles west-southwest of Trondhjem, situated on three small islands (Map: Norway, C 5). It is a very flourishing town, having an excellent harbor formed around the islands. But fresh water is scarce and must be brought to the islands in long aqueducts. It exports great quantities of fish. It has also a thriving coast trade, which is carried on in its own ships. Pop., 1891, 10,381; 1901, 12,043; 1911, 13,012. The town was called Christiansund in 1742 in honor of Christian VI, who gave it its privileges.

CHRISTIAN UNION, INDEPENDENT CHURCHES OF CHRIST IN. The Christian Union churches were formed in Ohio during the first years of the Civil War, when enthusiasm for the war in defense of the national Union against secession was strong in the Northern churches, and the duty of supporting the government was freely preached by their ministers. Under the leading, principally, of the Rev. J. Flack, previously of the Methodist Episcopal church, church members who were opposed to the war and those who disapproved of what was called political preaching were gathered into separate congregations. After the period of the war and reconstruction the aim of these churches gradually became to promote Christian unity and undenominationalism. At the General Council of 1878 a paper defining the position of the organization was adopted which was essentially the same in terms with the declaration of the Christian Connection, and the Christian Union churches became affiliated with that body in 1890. At that time they had, according to the census of 1890, 294 congregations, with 18,214 communicant members, in 17 States.

CHRISTIAN UNITY, WORLD CONFERENCE ON. A movement which originated at the general

convention of the Protestant Episcopal church in the United States in 1910, when the following resolution was adopted: "Whereas there is to-day among all Christian people a growing desire for the fulfillment of Our Lord's Prayer, that all His disciples may be one, that the world may believe that God has sent Him; *Resolved:* That a joint commission be appointed to bring about a conference for the consideration of questions touching faith and order, and that all Christian communions throughout the world which confess our Lord Jesus Christ as God and Saviour be asked to unite with us in arranging for and conducting such a conference. The commission shall consist of seven bishops appointed by the chairman of the House of Bishops, and seven presbyters and seven laymen appointed by the president of the House of Deputies." This commission was accordingly appointed, with Bishop Anderson of Chicago as president. Steps were immediately taken to secure the coöperation of Christians in the United States. The leading Protestant communions promptly responded, and the majority of them appointed similar commissions or committees. Conferences with a view to obtaining coöperation were held with officials of the Roman Catholic church, the Eastern Orthodox church, the Holy Orthodox church of Russia, and the Church of Armenia. The greatest interest and sympathy in the movement was shown by these officials. Up to Oct. 15, 1913, 30 commissions or committees had been appointed by denominations throughout the world. These included, in addition to the Protestant denominations in the United States, the Church of England, the Holy Catholic church of Japan, and the Old Catholic churches in Europe. On May 8, 1913, an informal conference was held in New York City, in which representatives of all commissions appointed in the United States were invited to take part. Preliminary arrangements were considered for the holding of a world conference on some future date.

CHRISTIAN YEAR, The. A religious work by John Keble (1827), containing reflections in verse appropriate for Sundays and holy days throughout the year. It is marked by deep religious sentiment, love of nature, and domestic affection.

CHRISTIE, krĭs'tĭ, Anne (1837–). A Canadian poet and novelist. She was born in London, England, but early went to Canada to live on Amherst Island, near Kingston, Ontario. Afterward she removed to North Gower and later to Ottawa. She contributed many short stories and poems to British, Canadian, and American magazines. Some of her poems appeared in *The Magazine of Poetry,* and those written on various phases of the half-breed rebellion in the Northwest received high praise from Sir Edwin Arnold. She also wrote four novels: *Alice Gray* (1873); *Edged Tools* (1880); *Requited* (1886); *Loved I not Honour More* (1887); and a poem, *A Canadian's Appeal to Canada* (1911).

CHRISTIE, krĭs'tĭ, Richard Copley (1830–1901). An English scholar and bibliophile, born at Lenton, Nottinghamshire. He matriculated in 1849 at Lincoln College, Oxford (where began his friendship with Mark Pattison), and afterward studied for the bar. In 1854 he received the appointment of professor of history at Owens College, Manchester, recently founded, and later he was given the chairs of political economy and commercial science and jurisprudence and law. The last of these appointments he resigned in 1869, but his connection with the college, as one of its governors and most interested advisers, lasted until his death. From 1872 to 1893 he was chancellor of the diocese of Manchester. Christie left to Owens College his rare library, containing one of the largest private collections of editions of Horace (800 vols.), as well as his collection of Renaissance literature. As an author his most important book is *Etienne Dolet, the Martyr of the Renaissance* (1880; rev. ed., 1899), which was translated into French by C. Stryienski (1886) and is worthy to be classed with his friend Pattison's *Casaubon.* Among other works by him are valuable studies of certain Renaissance characters. His bibliographical writings include: *The Marquis de Morante: His Library and its Catalogue* (1883); *Catalogues of the Library of the Duc de la Vallière* (1885); *Elzevir Bibliography* (1889); *Chronology of the Early Aldines* (1895). The most notable of his works are collected in the *Selected Essays and Papers of Richard Copley Christie,* ed., with a memoir, by W. A. Shaw (1902).

CHRISTIE, Robert (1788–1856). A Canadian journalist, legislator, and historian. He was born in Nova Scotia, but in early manhood removed to the city of Quebec, studied law, and was called to the bar. He showed little interest in his profession and never succeeded in it; but his keen interest in the issues which precipitated the union of Upper and Lower Canada in 1841 led him into journalism and politics. He took the popular side; but his views were often visionary and unpractical, while his restive temper made him difficult to coöperate with. For some time he was an editorial contributor to the Quebec *Gazette* and the Quebec *Mercury,* and his writing, informed by ample political knowledge, exerted a strong influence. He was elected to the Legislative Assembly of Lower Canada, but in 1829 he was expelled for having wrongfully advised the dismissal of a number of justices of the peace. He was reëlected, and expelled a second time. In 1841–56 he was a member of the Canadian Legislative Assembly. He wrote a *History of the Late Province of Lower Canada* (6 vols., 1866), a work containing a valuable mass of historical material, but ill arranged and marred by serious defects of style.

CHRISTIE, Sir William Henry Mahoney (1845–1922). An English astronomer, born at Woolwich. He received his education at King's College School, London, and at Trinity College, Cambridge. He was elected a fellow of his college in 1869; in 1870 he was made chief assistant at the Royal Observatory of Greenwich and in 1880 secretary of the Royal Astronomical Society. In 1881 he succeeded Airy as Astronomer Royal and held that position until 1910. His published works include a *Manual of Elementary Astronomy* (1875) and a number of valuable technical papers contributed to scientific periodicals.

CHRISTINA, krĕ-stē'nȧ. Queen of Spain. See María Christina.

CHRISTINA (1626–89). Queen of Sweden from 1632 to 1654. She was the daughter of the great Gustavus Adolphus, and was born Dec. 18, 1626. She became Queen after the death of her father in the battle of Lützen, in 1632. Till 1644 she reigned under a regency headed by the Chancellor Oxenstierna. Distinguished by the possession of a lively imagination, a good memory, uncommon intelligence, and remarkable

aptitude for serious study, she received the education of a man rather than that of a woman, and to this may in part be attributed the many eccentricities of her life. Her subjects and counselors earnestly desired her to marry, but the Queen's restless spirit would accept no such bond. In 1649 she had her cousin, Charles Gustavus (see CHARLES X), declared her successor by the Estates of the realm. Her reign was notable for the patronage of learning and science; but the Queen was too eccentric and cared too little for politics to give that force to the administration which the position of Sweden in Europe at that time, and its own lively internal politics, required. In 1654 Christina voluntarily abdicated in favor of her cousin, reserving to herself sufficient revenues, her entire independence, and supreme authority over her suite and household. She embraced Roman Catholicism and afterward resided chiefly in Rome and in France, gathering about her a court of brilliant and learned men and spending much time in literary and scientific pursuits. She covered herself with infamy by the murder in 1657 at Fontainebleau of her grand equerry and favorite, Monaldeschi. After the death of Charles Gustavus in 1660 Christina repaired to Sweden and began to intrigue for the recovery of her throne; but her subjects cut short her pretensions by forcing her to sign another formal act of abdication. She died April 19, 1689. Consult: Geyer, *Geschichte Schwedens*, vol. iii (Hamburg, 1836); Archenholtz, *Vie de Christine par ellemême* (Stockholm, 1751); Bain, *Christina, Queen of Sweden* (London, 1890).

CHRISTINE DE PISAN, krē'stēn' de pē'zäN' (1363–1431). A French writer, daughter of an Italian astrologer. Left a widow with three children, she made letters a livelihood and wrote some controversial and historical prose and considerable didactic verse, such as *Le chemin de longue estude* and the *Poème de la pucelle*, which are valuable pictures of the state of society. She wrote in defense of women. Caxton translated some of her works and printed Earl Rivers's version of her *Moral Proverbs* (1478). There is an edition of her *Œuvres poétiques* by Roy (1887–92). For her biography, consult Koch (Goslar, 1885).

CHRIS'TISON, SIR ROBERT (1797–1882). A Scottish physician. He was born in Edinburgh, studied medicine there, and afterward went to Paris to study chemistry under Robiquet and toxicology under Orfila. In medical jurisprudence and toxicology he became especially eminent. He was twice president of the Edinburgh College of Physicians, was physician in ordinary to the Queen in Scotland, and was created a baronet on Mr. Gladstone's recommendation in 1871. His best-known works were: *Treatise on Poisons* (1829) and *Granular Degeneration of the Kidneys* (1839). Consult his *Life*, edited by his sons (Edinburgh and London, 1885–86).

CHRISTLIEB, krīst'lēp, THEODOR (1833–89). A German theologian, born at Birkenfeld, Württemberg. He was educated in Tübingen, taught in France, and preached in London from 1858 to 1865; returned to Germany, and in 1868 was made professor of practical theology and university preacher in Bonn. In 1873 he was a delegate to the Evangelical Alliance in New York. His best-known works, translated into English, are: *Modern Doubt and Christian Belief* (1870; 4th ed., 1879) and *Protestant Foreign Missions: Their Present State* (1880). Among his other works are: *Leben und Lehre des Johannes Scotus Erigena* (1860); *Der Missionsberuf des evangelischen Deutschlands* (1876); *Der indobritische Opiumhandel* (1874); *Arzliche Missionen* (1884).

CHRISTMAS, krīs'mas (ME. *Cristmas, Cristesmesse*, Christ's mass). The day on which the nativity of the Saviour is observed. The institution of this festival is attributed by the spurious decretals to Telesphorus, who flourished in the reign of Antoninus Pius (138–161 A.D.); but this is unhistorical. It is unknown just when it originated, but surely December 25 was not generally observed as the day prior to Chrysostom's time (fourth century) in the Eastern church, although much earlier in the Western; for there was no uniformity in the period of observing the Nativity among the early churches; some held the festival in the month of May or April, others in January. January 6 was the usual date for the feast of the Nativity in the Eastern church, and still continues to be the date in the Armenian church. Some modern scholars hold that this was also the date in the early times in Rome, and that December 25 was adopted under Pope Liberius in 353 or 354. The celebration of December 25 spread to most parts of the East in the fourth and fifth centuries. It is impossible to establish any date as the exact time in the year of the birth of Christ. It is often objected that December 25 cannot be the true date, for it is then the rainy season in Palestine, when shepherds would hardly have been watching their flocks by night in the fields. The "spirit of Christmas," however, is of far greater importance than the historical exactness of its time. The reasons for the final choice of December 25 cannot now be determined. Calculations, on somewhat arbitrary grounds, of the time of Christ's birth may have influenced it. The desire to displace the orgies of the Roman saturnalia is now less often ascribed as a reason than formerly. A widespread feast of the Great Mother may have had influence. The wish to place a Christian feast in opposition to the feast of the sun (*sol invictus*) at the winter solstice may have had weight. The early Church was eager to replace pagan festivals by Christian. As Christianity spread, the feast of the winter solstice, the time when the day begins to increase, and light to triumph over darkness, was easily turned into the feast of Christ, the light of life. At the winter solstice the Germans held their great Yule feast, in commemoration of the return of the fiery sun wheel, and believed that during the 12 nights reaching from December 25 to January 6 they could trace the personal movements and interferences on earth of their great deities, Odin, Berchta, etc. Many of the beliefs and usages of the old Germans, and also of the Romans, relating to this matter, passed over from heathenism to Christianity and have partly survived to the present day. But the Church also sought to combat and banish—and in this it was to a large extent successful—the deep-rooted heathen feeling, by adding, for the purification of the heathen customs and feasts which it retained, its grandly devised liturgy, besides dramatic representations of the birth of Christ and the first events of His life. Hence sprang the so-called "manger" songs and a multitude of Christmas carols as well as Christmas dramas, which at certain times and places degenerated into farces or fools' feasts (q.v.). Hence, also, originated at a later period the

Christ trees, or Christmas trees, adorned with lights and gifts, the custom of reciprocal presents and of special Christmas meats and dishes, such as Christmas rolls, cakes, currant loaves, dumplings, etc. Thus Christmas became a universal social festival for young and old, high and low, as no other Christian festival could have become. At one time the festivities were continued until Candlemas and Twelfth Day.

Christmas not only became the parent of many later festivals, such as those of the Virgin, but especially from the fifth to the eighth century gathered round it, as it were, several other festivals, partly old and partly new, so that what may be termed a *Christmas cycle* sprang up, which surpassed all other groups of Christian holidays in the manifold richness of its festal usages, and furthered, more than any other, the completion of the orderly and systematic distribution of Church festivals over the whole year.

In the Roman Catholic church each priest celebrates three masses at Christmas, viz., at midnight, at daybreak, and in the morning. The day is also observed religiously by the Anglican and Lutheran churches. The Scotch Presbyterians and English Nonconformists generally rejected all religious observance of the day as a "human invention" and savoring too much of "papistry." It is said that the Puritan founders of New England established the Thanksgiving festival as in some measure a substitute for Christmas. At the present time the tendency is strong towards religious observance of the day in all Protestant bodies.

CHRISTMAS BOX. See BOXING DAY.

CHRISTMAS CARDS. Pictured souvenirs appropriate to Christmas, which modern fashion has introduced into the social world. The earliest example of this art is attributed to J. C. Horsley, R.A., who in 1846 made designs of this character. Subsequently the demand for these tokens has become enormous, and at present Christmas cards are often of much artistic merit in both design and coloring.

CHRISTMAS CAROL. See CAROL.

CHRISTMAS CAROL, THE. A Christmas story by Charles Dickens, published in 1843. It narrates the regeneration of the miser Scrooge by the kind offices of "Marley's Ghost." The story was published in London by Chapman and Hall, and 15,000 copies, bringing the author over £700, were soon sold.

CHRISTMAS ISLAND. A small island in the Indian Ocean, in lat. 10° 25′ S. and long. 105° 42′ E., and about 190 miles south of the west end of Java. It has not a very good anchorage, but was colonized in 1907 from the Cocos-Keeling Islands, chiefly for the purpose of working valuable beds of phosphate of lime. It is under British control and administratively belongs to the Straits Settlements.

CHRISTMAS ISLAND. A large, low atoll in the Pacific Ocean, in about lat. 2° N. and long. 157° 30′ W. It has a good anchorage and belongs to the British government. It was discovered by Cook in December, 1777.

CHRISTMAS PANTOMIMES. Harlequinades given at Drury Lane and Covent Garden theatres at Christmas time. The institution dates from the end of the seventeenth century and reached its highest point under Garrick. The performance usually opens with the representation of some fairy tale, the characters of which change to the harlequin, columbine, and clown of the pantomime which follows.

CHRISTMAS ROSE. See HELLEBORE.

CHRIS'TODO'RUS OF COPTUS (Gk. *Χριστόδωρος Κοπτεύς, Christodōros Kopteus*). A Greek poet resident in Egypt, at the close of the fifth and the beginning of the sixth century A.D. His three books of epigrams have perished, except two epigrams preserved in the *Palatine Anthology.* (See ANTHOLOGY.) He is best known for his description in 416 hexameter verses of 80 statues contained in the gymnasium of Zeuxippus in Constantinople. This poem, which forms book ii of the *Palatine Anthology*, has, in the opinion of some critics, considerable value for both literature and the history of art.

CHRISTOL'OGY (from Gk. *Χριστός, Christos,* Christ + *λογία, logia,* account, from *λέγειν, legein,* to say). A technical term in theology, signifying the doctrine of the person of Christ, or the answer to the question, What is the relation of the divine and human in Christ? The elements of the problem may be said to have been given by the original and unvarying conviction of the Church. That Christ was man was too plain to be denied by any. But no less plain did it seem from the beginning, to the Apostles (John i. 14) and to the humble men who bore the first testimony to Christ by the surrender of their lives (Ignatius, *Eph.* vii, etc.), that He was truly divine. On the subtleties of this problem they did not dwell; but it certainly never occurred to them to divide His personality. And so, when more careful reflection was forced upon the Church, the question was one of adjustment of accepted truths. How could divinity and humanity coexist in the unity of one person?

There were early answers to the question which were tentative and soon rejected as incorrect. The Gnostics (q.v.) generally made the humanity a mere appearance; but their whole system was recognized as anti-Christian.

The great classical period of the growth of Christology was from the second century to the Council of Chalcedon. The first answer to the problem of the person of Christ was Modalist, Patripassian, or Sabellian. (See SABELLUS.) Christ is divine, and His divinity is indistinguishable from God the Father. He is a mode or manifestation of the divine Father. This theory affirmed Christ's divinity and denied His humanity. The discussion closed with Origen, who affirmed the real divinity and humanity, both in one person. Then followed the Arian controversy, which for a time split the Church. Arius held that Christ was divine, of a "like substance" (*homoiousios*) with the Father. He is the first of created beings, and in Him the divine Logos takes the place of a rational soul. Athanasius held that Christ is of the same substance (*homoousios*) with the Father, uncreated, from eternity, yet the Son of God. This became in the end the orthodox belief regarding the divine side of Christ's nature and is expressed in the Nicene creed. Thought about the human side produced another group of controversies. If Christ is of the same substance with the Father, how is His human nature related to the divine? Apollinaris held that Christ had no proper human nature, the divine Logos taking its place. Eutyches held that after the incarnation there was but one nature, the human being absorbed in the divine. Nestorius held firmly to the two natures, but dissolved the personality, making Christ a twofold person, the natures subsisting in "conjunction." The Nestorian position resulted in a schism, the Nestorian church having

a long career in Persia and the East and persisting to the present time.

By the time of the Council of Chalcedon (451) these various efforts at explanation, resulting in the essential modification of some element of the theanthropic person, had all been thought through and all finally condemned. The Church was ready to adopt a creed which reaffirmed all the three elements of the problem in the following words: We confess "one and the same Son, our Lord Jesus Christ, the same perfect in Godhead and also perfect in manhood; truly God and truly man, of a reasonable soul and body; consubstantial with the Father according to the Godhead, and consubstantial with us according to the manhood; in all things like unto us, without sin; begotten before all ages of the Father according to the Godhead; and in these latter days, for us and our salvation, born of the Virgin Mary, the mother of God, according to the manhood; one and the same Christ, Son, Lord, only begotten, to be acknowledged in two natures, inconfusedly, unchangeably, indivisibly, inseparably; the distinction of natures being by no means taken away by the union, but rather the property of each nature being preserved and concurring in one person and one substance, not parted or divided into two persons, but one and the same Son and only begotten, God the Word, the Lord Jesus Christ."

But the creed of Chalcedon was not acceptable to all. The Monophysite ('one nature') church broke off, holding that "two natures" could only mean two persons, not one. The present Coptic, Ethiopic, Armenian, and Jacobite churches are Monophysite, the survivors of this controversy. An attempt was made to bring the two parties together by the statement that Christ, though having two natures, had one will (Monothelite), but this only resulted in further schism, the survival of which is found in the present Maronite church in Syria. With these various objectors excluded, the orthodox church maintained the creed of Chalcedon.

From this period there has been no critical discussion of the fundamentals of Christology within the limits of orthodoxy. In the Greek theology there was a subordination of Christ to the Father, but even that was done away with for the Latin church in the so-called Athanasian creed, where Christ is put on an exact equality with the Father. In the Reformation the Protestant church maintained two natures in one person and jealously affirmed allegiance to the Christology of the historic creeds. The only new phase of the problem was the Socinian solution, which after some shifting finally held that Christ was a mere man. This had no influence on orthodox Protestantism.

During the past century there has been a great deal of interest taken in Germany, in particular, in the Christological problem, and three strenuous and distinct theories of Christ's person have been set forth, all within the bounds of the historic creeds. Professor Dorner of Berlin began, not with the person of Christ, but with the two natures, for, as the person resulted from the union of the natures, it could not be understood till the natures of which it was composed were understood. The humanity of Christ is the full human personality, with full self-consciousness and self-determination. The divine nature is unchangeably the same, possessing all its divine attributes, omnipotent and omniscient. But the humanity is neither of these; and hence the divinity cannot impart itself completely to the humanity. The incarnation is viewed as the gradual impartation of the Logos to the man Jesus, increasing with his development and perfect only after the ascension.

The second theory, that of the "kenosis," begins at the one person of Christ, which the kenotics make to be the eternal Logos of God. This person takes upon himself humanity, so that his consciousness is a truly human consciousness, while it is still the consciousness of the divine element in Christ. This can only be as the divine limits himself to the capacities of the humanity which he assumes. The theory of the kenosis therefore teaches that the eternal Logos, by a conscious divine act of self-limitation, "emptied" himself of his divine form of existence and took upon himself the human form of existence (Phil. ii. 7). Thus, while he was in essence unchanged, he had laid aside the divine attributes of omnipotence, omniscience, etc. This theory has had a considerable following among men of conservative and churchly tendencies.

A third theory is that of Ritschl. Weary of all the long ontological disputes of the centuries, Ritschl sought to render them all unnecessary by a strict limitation of theology to that which is of "interest" to men, i.e., that which furthers the religious life. While he held, therefore, to the divinity of Christ in the true sense, he refused to attempt the explanation of its consistency with His humanity, regarding it as great a mystery as the consistency of the divine government with human freedom. In Christ we have God, for only in Him do we come to know God. Our knowledge of His divinity rests on our recognition of His perfect unity with God. That is enough. What the nature of the Trinity is, does not "interest" us. If we knew all about the preëxistence of Christ, it would rather separate Him from us than render faith in Him easier or more sincere. We must give up definitely the two natures and all attempts to unite them. In the true humanity of Christ we have God. How, we do not know. This view, which falls in with the tendencies of the times to seek simplicity has also found favor, but it scarcely seems to offer substance enough to prove a final resting place for thought.

England and America have contributed little of permanent value to this subject. The Unitarian movement in America represented rather a rejection of the Nicene theology than any positive constructive theory. Sanday, in *Christologies, Ancient and Modern* (New York, 1910), has sought to use the modern theory of the subconscious in the explanation of the divinity of Christ, but the theory is itself still in need of proof. The field is open for a reinterpretation of the person of Christ in the light of the thought of the present, while still retaining the religious values of the ancient creeds.

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1875–81). On the kenosis consult Gess, *Christi Person und Werk* (3 vols., Basel, 1870–87); Thomasius, *Dogmatik* (Erlangen, 1852–61); Frank, *System der christlichen Wahrheit* (Gütersloh, 1885–86); Bruce, *The Humiliation of Christ* (London, 1881); Powell, *Principle of the Incarnation* (London, 1896). On Ritschl, his own *Rechtfertigung und Versöhnung*, vol. iii (Bonn, 1888, 1889; Eng. trans., London, 1900); A. J. Swing, *The Theology of Albrecht Ritschl* (New York, 1901); Garvie, *Ritschlian Theology* (London, 1902).

CHRISTOPHE, krēs'tōf', Henri (1767–1820). A negro king of Haiti. He was born a slave in the island of Grenada, purchased his freedom, and settled in the French portion of Haiti, it would seem, either as a butcher or a plantation overseer. In the insurrection against the French he gained fame as one of the ablest lieutenants of Toussaint L'Ouverture. He held out bravely against General Leclerc for some time in 1802 and, after laying down his arms, took part with Dessalines in the successful rising of 1803. During the short-lived government of Dessalines, who was slain by a military conspiracy in 1806, Christophe was general in chief of the Haitian army. In February, 1807, he was appointed President of Haiti for life. A republic being about the same time organized at Port-au-Prince, with Pétion at its head, a protracted civil war ensued. In 1811 Christophe was proclaimed King of Haiti, by the name of Henry I, and was crowned June 2, 1812. By his power and skill Christophe was enabled to counteract the attempts made by France to regain its authority in the island. His avarice and cruelty led to an insurrection, which was aided by General Boyer, who had succeeded Pétion in 1818. The rebellion spread to the capital, and Christophe's deposition was proclaimed at the head of the troops. Deserted by his bodyguard and his nobles, he shot himself Oct. 8, 1820. He left a code of laws, which he called the Code Henri, in imitation of the Code Napoléon. Consult Hozard, *Santo Domingo, Past and Present: with a Glance at Haiti* (London, 1893), and Madiore, *Histoire de Haiti* (Port-au-Prince, 1897). See Haiti.

CHRIS'TOPHER, Saint (Lat. *Christophorus*, from Gk. Χριστός, *Christos*, Christ + φέρειν, *pherein*, to bear; so the Christ-bearer). A saint of the Roman Catholic and Greek churches. He is supposed to have suffered martyrdom about the middle of the third century. According to vulgar legend, Christopher, whose name was originally Ἀδόκιμος, *Adokimos* (the ignoble, base), was a native of Palestine, Syria, or Lycia, and a person of prodigious bulk and strength. His height was 12 feet. So proud was he of his gigantic frame that he would serve only the mightiest princes. Having attached himself to one who passed for the greatest of his day, Christopher stayed with him for a short time, but soon discovered that his master was terribly afraid of the devil, in consequence of which Christopher, with fearless consistency, passed into the service of the latter. One day, however, when the devil and he chanced to be walking through a wood, they came across an image of Christ. His new master exhibited such perturbation and alarm at the sight that Christopher entirely lost confidence in him and resolved to find out the Saviour and follow him. For a long while he searched in vain, but finally he fell in with a hermit, who showed him Christ and baptized him. Christopher despised the customary penances, and, in consequence, it was imposed on him to carry Christian pilgrims on his shoulders over a stream which had no bridge. One day a little child came to the stream; Christopher took it on his shoulders, but soon began to sink under the weight of his burden. The child was Christ himself, and to prove it, he commanded Christopher to thrust his staff into the ground. He did so, and next morning it had blossomed into a palm tree bearing fruit. This miracle converted thousands to Christianity. Christopher's success excited the enmity of Dagnus, the prefect of that region, who put him in prison, scourged him with red-hot rods, put a burning helmet on his head, and clapped him on a burning stool. Christopher still remained uninjured. Multitudes of poisoned arrows were now discharged against him, but they rebounded from his charmed body, and one even wounded the prefect himself in the eye. Christopher pitied his tormentor and freely offered his head to the executioner, that the prefect might be healed by the blood which should flow from it. This was done, and Dagnus and his family became Christians. The Greek church celebrates his festival on May 9; the Roman Catholic, on July 25.

St. Christopher was greatly invoked in times of pestilence, or when people were digging for treasures, to frighten away the spirits who watched over them. The formula used was called a *Christopher's prayer*. He was also the patron of an order of moderation, founded in Austria in 1517 for the purpose of checking excessive drinking and swearing, and called the Order of St. Christopher.

CHRISTOPHER NORTH. The pen name of Prof. John Wilson (q.v.).

CHRISTOPHLE, krē'stō'fl', Albert Silas Médéric Charles (1830–1904). A French jurist. He was born in Domfront (Orne) and studied law in Caen. In 1876 he became Minister of Public Works in the Dufaure cabinet and greatly improved the department under his charge, placing competent engineers at the head of every branch of the service. He retained the portfolio of public works in the Simon ministry, but resigned with the rest of the cabinet in May, 1877. He was appointed director of the Crédit Foncier in 1878. In 1877 he traveled through France and visited several foreign countries (notably Holland) for the purpose of studying railroad improvements.

CHRISTOPH'ORUS. Pope from November, 903, to June, 904. He thrust out of office and imprisoned his predecessor, Leo V, only shortly afterward to experience the same treatment.

CHRISTOPULOS, krīs-tŏp'ụ-lōōs, Athanasios (1772–1847). A Greek poet, born in Kastoria in Macedonia. He studied in Buda in Hungary, and in Padua, and later became a judge successively in Jassy and Bucharest. In that capacity he prepared a legal code for Wallachia. He translated the fragments of Sappho and the first book of the *Iliad* into modern Greek and wrote a grammar of modern Greek (1805). His best-known work is his collection of Anacreontic songs (2 vols., 1833; in German, 1880), which has long continued popular in Greece. See Romaic Literature.

CHRIST, or CRISSCROSS, ROW. The alphabet arranged in the form of a cross, as the symbols of Christ's crucifixion, for the use of children, and so printed in old hornbooks or

primers. The letter A was at the top and Z at the foot of the cross. By extension, any mark of a cross, but more especially one made by an illiterate person in lieu of his signature. See HORNBOOK.

CHRIST'S COLLEGE. A college in Cambridge, England, founded in 1506 by Lady Margaret Beaufort, Countess of Richmond and Derby, and mother of Henry VII. There was an older foundation called God's House, which had been established by William Byngham, rector of St. John Zachary, London, in 1439, for the study of grammar and the training of grammar-school teachers. It had consisted of a proctor and 24 scholars, but had fallen on evil days, in spite of the support of Henry VI, its second founder in 1448. It had lost its original site by being moved to make room for King's College, and had sunk in numbers and standing. It was refounded for a master, 12 fellows, and 47 scholars, and liberally endowed. Various additions were made to its numbers by gifts of Edward VI, Sir John Finch, and Sir Thomas Baines. There were, in 1913, 15 fellowships, 30 scholarships, several sizarships, some studentships in divinity, and 218 undergraduates. Among those who studied at Christ's are Archbishops Grindal and Bancroft, and Latimer, Cudworth, Quarles, Paley, Milton, and Darwin. Consult J. Peile, *Christ's College* (London, 1900).

CHRIST'S HOSPITAL. An English educational institution better known as the Blue-Coat School. It was founded on the site of the Greyfriars' Monastery, Newgate Street, London, by Edward VI, in 1553, as a hospital for orphans and foundlings. It has been one of the largest and most important schools of its class in England, including a large preparatory school for boys at Hertford, the boys' school at Horsham, and a girls' secondary boarding school at Hertford since 1779. Boys are admitted between 7 and 10 and discharged at 15, except the "King's boys," who attend the mathematical school (founded in connection with Christ's Hospital in 1672, by Charles II), and the "Grecians," the highest class of scholars, of whom four are annually chosen by examination to be sent to each of the universities, Oxford and Cambridge, on scholarships. The right of "presentation," or giving a boy or girl a place in the school, is vested in the managing governors, consisting of the Lord Mayor of London, the aldermen, and 12 common councilmen, besides the "donation governors," consisting of all noblemen and gentlemen who donate £500 to the school. The dress which has been worn by the boys since the days of Edward VI, and from which the school takes its name, is most picturesque. It consists of a long blue woolen gown or coat, reaching nearly to the feet, with a narrow red leather girdle around the waist, knee breeches and yellow stockings, and clergymen's bands. Originally a blue worsted cap was worn, but nowadays the boys generally go about bareheaded. The original building, nearly destroyed by the great fire of London, 1666, was restored after the designs of Christopher Wren, and this building in turn, having fallen into decay, was replaced in 1825 by Mr. Shaw. The Newgate Street property was in 1889 ordered sold, and the corner stone of the new institution was laid at Horsham (about 34 miles from London, in Sussex) in October, 1897. On April 18, 1902, the Blue Coats, assembled in the quadrangle, heard the farewell address of the head master. The school, which is conducted on the usual lines of an English public school, is attended by about 820 boys, who are boarded in 16 houses. The school is divided into three departments, the Latin or classical school, the mathematical or modern language school, and the preparatory school. Pupils are admitted by presentation or by competition, a certain number of places being reserved for pupils from public elementary schools. In the past there have been many distinguished men connected with Christ's Hospital, notably Coleridge, Lamb, and Leigh Hunt.

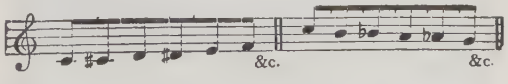
CHRIST'S THORN. See JUJUBE.

CHRISTY, krīs'tĭ, HOWARD CHANDLER (1873–). An American painter and illustrator. He was born in Morgan Co., Ohio, and studied in New York at the National Academy and the Art Students' League under Chase. He first attracted attention with his illustrations of the Spanish-American War, published in *Scribner's* and *Harper's* magazines and in *Collier's Weekly*, gaining especial prominence with the series, "Men of the Army and Navy," and a portrait of Colonel Roosevelt. He is, however, best known for his charming illustrations of the works of such authors as Richard Harding Davis and has created a picturesque and romantic type of society women peculiarly his own. His work is characterized by great facility, a dashing but not exaggerated style, and a strong sense of values. He prefers black and white, but has also worked with success in color.

CHROBAK, krō'bȧk, RUDOLF (1843–1910). An Austrian physician, born in Tröppau, Silesia. He studied in Vienna, where he became professor of obstetrics and gynæcology in 1879. His published writings include important works on anatomy and pathology within the domain of his specialty. These works form parts of the handbooks of Stricker (1869–72) and Pitha-Billroth (1885), and of Nothnagel's *Specielle Pathologie und Therapie* (1896).

CHROMÆSTHESIA, krōm'ĕs-thē'zĭ-ȧ. See COLORED HEARING.

CHRO'MATES. See CHROMIUM.

CHROMAT'IC (Fr. *chromatique*, It. *cromatico*, Lat. *chromaticus*, from Gk. *χρωματικός, chrōmatikos*, relating to color, from *χρῶμα, chrōma*, color, from *χρώζειν, chrōzein*, to touch, color, from *χροά, chroa, χροιά, chroia*, skin). In music, a term applied to a series of notes at the interval of a semitone from each other. Such a series is produced by dividing the whole tones of the diatonic (q.v.) scale into semitones, so that with the two diatonic semitones, already in the natural scale, the octave is divided into 12 semitones. Ascending chromatic passages are formed by the whole tones of the diatonic scale being raised or elevated by a sharp or a natural, according to key, and descending passages by their being lowered by a flat or a natural, thus:

CHROMATICS. See COLOR.

CHRO'MATIN (from Gk. *χρῶμα, chrōma*, color). In biology, a network of fine strands or aggregations of substance that occurs in the nucleus of the cell during its different phases

and has more avidity for staining agents than ordinary protoplasm. See CHROMOSOME; CELL.

CHROMAT'OPHORE (from Gk. *χρῶμα, chrōma*, color + *φόρος, phoros*, bearing, from *φέρειν, pherein*, to bear). A protoplasmic body in plants (see PLASTID), which contains or is capable of forming pigments. They are of three sorts, chloroplasts, chromoplasts, and leucoplasts (qq.v.).

CHRO'MATROPE (by haplology for **chromatotrope*, from Gk. *χρῶμα, chrōma*, color + *τροπή, tropē*, turn, from *τρέπειν, trepein*, to turn). An optical toy, consisting of a revolving disk on which are painted certain designs of various colors. These figures are so arranged that when the chromatrope is made to revolve rapidly streams of beautiful, brilliant colors seem to flow either to or from the centre of motion, according as the disk is made to rotate in one direction or the opposite. The same principle is utilized in the *chromatrope slide*, employed in magic-lantern exhibitions. In this, two circular disks of glass are placed face to face, each with a design radiating from the centre and painted with brilliant transparent colors. By a small pinion gearing in toothed wheels or endless bands, the disks are made to move in opposite directions in their own plane. The effect produced is a beautiful change of design and color.

CHROMATYPE. See CHROMOTYPE.

CHRO'MITE (from Gk. *χρῶμα, chrōma*, color), or **CHROME IRON ORE** ($FeOCr_2O_3$). An oxide of chromium and iron containing when pure 68 per cent chromic oxide and 32 per cent ferrous oxide. Commercial ores contain from 40 to 60 per cent of chromic oxide, together with alumina and magnesia. The color of the mineral is iron black to brownish black. In the United States commercial deposits have been found only in Pennsylvania, Maryland, North Carolina, Wyoming, and California. Statistics show a comparatively small production from the United States: 1880–95 the production averaged 2270 tons annually, valued at approximately $15 per ton; since 1895 the production in the United States has materially decreased; 1900–11 the production averaged about 244 tons annually, valued at $16 per ton. In 1912 the entire production came from California and amounted to 201 long tons, which was used locally for furnace linings. The chromo ore consumed in the United States is imported principally from New Caledonia, Greece, Canada, Great Britain, Asiatic Turkey, and Japan. The annual imports for four years ending in 1910 averaged 36,950 long tons and in 1911 amounted to 37,540 tons.

CHRO'MIUM (Neo-Lat., from Gk. *χρῶμα, chrōma*, color). A metallic element discovered by Vauquelin in 1797. It does not occur free, but is found in combination chiefly with iron as chromite, which is the principal ore of chromium, as crocoisite, a lead chromate, and as wolchonskoite, a native chrome ochre. Chromium is also a frequent constituent of meteoric iron, and the green color of emerald, serpentine, penninite, and other minerals, is due to this element. The metal is now best made by Goldschmidt's "thermit" process. A dry mixture of chromium oxide and powdered metallic aluminium is introduced into a crucible made of magnesia bricks, lined on the outside with iron, and capable of holding a charge of about 500 pounds. With the aid of a cartridge made of powdered aluminium and barium peroxide, the mixture in the crucible is "lighted" at the surface, whereupon the aluminium gradually burns up, withdrawing oxygen from the chromium oxide and reducing the latter to the state of pure metallic chromium. About 400 pounds of chromium can thus be obtained from a single crucible in the course of half an hour. It is in this manner that chromium is now made for the manufacture of chromium steel.

Chromium (symbol, Cr.; atomic weight, 52.0) is a grayish-white powder consisting of small, lustrous, very hard, brittle rhombohedral crystals which have a specific gravity of 6.92 at 20° C. (68° F.), and melt at a higher temperature than platinum. The metal itself has no important uses. But when added in quantities of less than 1 per cent to steel, it yields an alloy called *chromium steel*, which has a fine texture, great hardness, tenacity, and elasticity. An alloy of chromium with aluminium has also been described. With oxygen chromium forms two basic oxides, which yield, respectively, chromous and chromic compounds and an acid-forming oxide which yields chromates. Chromic oxide may be obtained by igniting the hydroxide or by heating a mixture of potassium bichromate and sulphur. It is a green pigment of great permanence that is known in commerce as *chrome green* and *ultramarine green*. The hydrated oxide, which is made by heating to dull redness 3 parts of boric acid and 1 part of potassium bichromate, is the pigment known as *emerald green, Guignet's green, Pennettier's green*, and *Veridian*. Of similar composition is the green pigment called *Arnaudon's green*.

Many of the chromates have considerable commercial value, especially those of potassium, sodium, and ammonium. Among the bichromates that of potassium is the most important, as it is used in the preparation of all other chromium salts. Potassium bichromate is prepared from chromite, the ore being, for this purpose, roasted, finely ground, and mixed with half its weight of potassium carbonate and twice its weight of lime; the mixture is heated to bright redness with an oxidizing flame in a reverberatory furnace, and, on cooling, the resulting mass is treated with hot water; to the solution thus obtained potassium sulphate is added for the purpose of precipitating the lime as sulphate, while the potassium chromate produced remains dissolved; finally, dilute sulphuric acid is added in order to convert the chromate into bichromate. Potassium bichromate crystallizes in the form of bright red prisms. It is used for the preparation of chrome pigments for the production of various colors in calico printing and dyeing; in the manufacture of safety matches; as a bleaching agent for tallow, palm oil, etc., with sulphuric acid; for the oxidation of anthracene to alizarin; in tanning leather; and in consequence of its property of rendering gelatin insoluble when mixed with that substance and exposed to light, it finds extensive application in photogelatin processes. *Lead chromate* is the bright yellow precipitate obtained when a solution of a lead salt is added to potassium bichromate: it is used as a pigment under the name of *chrome yellow*.

CHRO'MOLITH'OGRAPH. See LITHOGRAPHY.

CHRO'MOPLAST (from *χρῶμα, chrōma*, color + *πλαστός, plastos*, formed, from *πλάσσειν*,

plassein, to form). A protoplasmic body in plants which contains a pigment other than green, chiefly yellow or red. It is abundant in fruits and flower leaves. In shape the chromoplasts are rounded, fusiform, angular, or irregular, their form being often determined by the pigment they contain. Sometimes the pigment exists in minute droplets in the protoplasm, but more frequently it is crystalline; or both forms may be present together. The crystals vary from needle-like or rodlike to tabular. The slender crystals are sometimes curved and often occur in fascicles. Chromoplasts are derived from similar bodies by division. A plastid (q.v.), the primary undifferentiated body, may develop directly into a chromoplast, or it may be for a time a leucoplast (q.v.) or a chloroplast (q.v.), and only later produce the red or yellow pigment that characterizes a chromoplast. If the chromoplasts have any special function, it is not known. In a general way the color they impart may be useful, but the color is frequently due to products that hold no relation to further use. See CELL; COLOR IN PLANTS.

CHRO'MOSOME (from Gk. *χρῶμα, chrōma*, color + *σῶμα, sōma*, body). The name given to the loops or other aggregations of chromatin which collect in indirect cell division about the axis of the spindle and split into halves. The two halves move towards opposite poles of the spindle, where they aggregate and unite into the form of the chromatin of a new nucleus. See CHROMATIN; CELL; EMBRYOLOGY.

CHRO'MOSPHERE (Gk. *χρῶμα, chrōma*, color + *σφαῖρα, sphaira*, sphere). The envelope of incandescent gases which surrounds the body of the sun, or photosphere (q.v.), being separated from it by the reversing layer (q.v.). It consists principally of hydrogen, helium, and calcium, and varies in depth from 5000 to 10,000 miles. It was detected by observers of eclipses during the eighteenth and the early part of the nineteenth century, but it was not until 1842 that it was clearly recognized as a solar appendage and differentiated from the more diffused and fainter corona (q.v.) surrounding it. During a total solar eclipse the chromosphere is observed as a deep scarlet rim surrounding the moon's disk, but in broad daylight its brightness is overpowered by the greater brilliancy and whiteness of the light from the underlying photosphere. It is possible, however, to observe it at all times by means of the spectroscope. Its intense color, from which it derives its name, is due to incandescent hydrogen, its chief gaseous component. Many other gaseous elements, such as iron, chromium, magnesium, and titanium, are occasionally identified in the chromospheric spectrum, and it is supposed that these are due to the momentary injection into the chromosphere of the constituents of the reversing layer. Indeed, the chromosphere may be likened to a violently agitated ocean of red flame resting on the comparatively quiescent reversing layer. From the surface of this ocean jets and masses of glowing vapor rise from time to time, occasionally reaching an altitude of hundreds of thousands of miles, and form the "prominences" which are such a conspicuous feature during a total eclipse of the sun. These prominences were first noticed by Vassenius at Gothenburg in 1733, and were ascribed by him to the moon. Later observers agreed in supposing that they were a lunar phenomenon, and it was only in 1860 that Secchi and De la Rue demonstrated their solar origin, while their gaseous nature was not recognized until 1868. During the total eclipse of that year the bright lines due to hydrogen were seen, together with another in the orange, which was at first assumed to be the D line of sodium, but was afterward recognized as distinct, and attributed by Lockyer to a gas to which he gave the name "helium." This remained unknown as a terrestrial element until 1895, when Ramsay detected it in the mineral cleveite. Two kinds of prominences are recognized, cloud prominences and flame prominences. The former are quiescent and often continue without sensible change for several days, and, like the upper chromosphere, consist of hydrogen, helium, and calcium. They are frequently quite extensive in area and resemble huge cloud masses connected with the chromospheric surface by means of stemlike filaments. On the other hand, flame prominences are characterized by their jetlike form and by the extraordinary rapidity with which they spring up and disappear. They are usually associated with sun spots, and the presence of such elements as iron, titanium, sodium, scandium, barium, and titanium from the lower portions of the solar atmosphere indicates clearly their eruptive nature. Consult Clerke, *Problems in Astrophysics* (London, 1903); Schuster, *Solar Research* (London, 1909); Abbot, *The Sun* (New York, 1911). See SUN.

CHRO'MOTYPE, or **CHRO'MATYPE** (from Gk. *χρῶμα, chrōma*, color + *τύπος, typos*, type). A photographic process dependent upon the sensitiveness to light of certain chromium salts, especially the bichromates of the alkalies. The chromotype has been superseded by the photogelatin processes and is at present hardly ever used. (See AUTOTYPE.) The name is also applied to colored prints produced by "chromatic printing."

CHRON'ICLE (from *chronic*, Fr. *chronique*, It. *cronico*, Lat. *chronicus*, from Gk. *χρονικός, chronikos*, relating to time, from *χρόνος, chronos*, time). A species of historical record in which events are treated in detail and in the order of time. A chronicle is understood to differ from annals in being more connected and full, the latter merely recording individual occurrences under the successive years or other dates. A chronicle is not expected, however, to display either literary style or philosophic penetration. A great many of the older histories were called chronicles, such as the *Saxon Chronicle*, Holinshed's *Chronicle*.

CHRONICLE OF PA'ROS. An inscription discovered on the island of Paros in 1627, containing memoranda of much historic interest. It mentions various facts, especially the artistic ones, in Greek history. As a political and military history, the chronicle is faulty. See ARUNDEL MARBLES.

CHRONICLE OF THE KINGS OF ENGLAND, FROM THE TIME OF THE ROMANS' GOVERNMENT UNTO THE DEATH OF KING JAMES. An historical work by Sir Richard Baker, published in 1643, dedicated to Charles, Prince of Wales, containing a laudatory preface by Sir Henry Wotton. It was a very popular work for the century after its publication. It ran through seven editions before the close of 1684 and was translated into Dutch in 1649. In 1730 it was extended up to the reign of George II. It is, however, full of inaccuracies and was sharply criticized in 1672 by Thomas Blount, in a pam-

phlet published in Oxford. It was a favorite with Addison's Sir Roger de Coverley.

CHRON'ICLES (Heb. *Divrai hay-yamim*, events of the days, Gk. Παραλειπόμενα, *Paraleipomena*, omitted, sc. βιβλία, *biblia*, books). The name of two of the books of the Old Testament, which in the Hebrew canon form but one book, entitled "Book of Events of the Times." This appears to have been a designation commonly applied to special histories—such as, e.g., "Events of the Times of King David," or the like. The Greek translators divided the long Hebrew book into two and adopted the title "Things Omitted"—i.e., not recorded in the other historical books. Jerome suggested the title "Chronicon," whence comes the English name. The Book of Chronicles begins with Adam and ends abruptly in the middle of Cyrus's decree of restoration. The continuation of the narrative is found in the Book of Ezra, which repeats and then completes the fragment of the decree of the Persian King. Chronicles, in fact, formed originally one work with Ezra and Nehemiah, displaying throughout the peculiarities of a single author. The apparent separation of Ezra and Nehemiah from Chronicles proper is due to the insertion in the former of extracts from the memoirs of Ezra and Nehemiah and from other earlier documents. Of the authorship of Chronicles nothing is known except what can be determined by internal evidence. The language, and more particularly the syntax, implies that the book is one of the latest of the Old Testament. It is evident that the author lived a considerable time after Ezra and stood entirely under the influence of the religious institutions of the new theocracy. This point of view determined the nature of his interest in the early history of his people. The true importance of Hebrew history centres for him in the fact that this nation was the people of Yahwe. The tragic interest which distinguishes the annals of Israel from the forgotten history of Moab or Damascus lies wholly in that long contest which finally vindicated the reality of spiritual things and the supremacy of Yahwe's purpose by the political ruin of the nation which was the faithless depositary of these sacred truths. After the captivity it was impossible to write the history of Israel's fortunes otherwise than in a spirit of religious pragmatism. But within the limits of the religious conception of the plan and purpose of the Hebrew history, more than one point of view might be taken. The Book of Kings looks upon history in the spirit of the prophets. But before the Chronicler wrote, the older type of prophecy had become extinct. The Jerusalem of Ezra was organized no longer as a nation, but as a municipality and a church. The centre of religious life was no longer the prophetic word, but the ordinances of the Pentateuch and the liturgical service of the sanctuary. The religious vocation of Israel was no longer national, but ecclesiastical and municipal; and the historical continuity of the nation was vividly realized only within the walls of Jerusalem and the courts of the temple, in the solemn assembly and stately ceremonial of a feast day. These influences naturally operated most strongly on those who were officially attached to the sanctuary. To a Levite, even more than to other Jews, the history of Israel meant above all things the history of Jerusalem, of the temple, and of the temple ordinances. The author of Chronicles betrays in every page his essentially Levitical habit of mind. To such a mind there seemed to be room for a new history, which should confine itself to matters still interesting to the theocracy of Zion, keeping Jerusalem and the temple in the foreground, and developing the divine significance of the history in its causes and results, not so much with reference to the prophetic word as to the fixed legislation of the Pentateuch, so that the whole narrative might be made to teach that the glory of Israel lies in the observance of the divine law and ritual. For the sake of systematic completeness, the author of the Chronicles begins with Adam; but he had nothing to add to the Pentateuch, and the period from Moses to David contained little that served his purpose. He therefore contracted the early history into a series of genealogies, which were by no means the least interesting part of his work at a time when every Jew was concerned to prove the purity of his Hebrew descent. From the death of Saul the history becomes fuller and runs parallel with the books of Samuel and Kings. The limitations of the author's interest in past times appear in the omission, among other particulars, of David's reign in Hebron; of the disorders in his family and the revolt of Absalom; of the circumstances of Solomon's accession; and of many details as to the wisdom and splendor of that sovereign as well as of his fall into idolatry. In the latter history the 10 tribes are quite neglected, and political affairs in Judah receive attention, not in proportion to their intrinsic importance, but according as they serve to exemplify God's help to the obedient and His chastisement of the rebellious. That the author is always unwilling to speak of the misfortunes of good rulers is not to be ascribed to a desire to suppress the truth, but shows that the book was throughout composed not in a purely historic interest, but with a view to inculcate a practical lesson. The more important additions which the Chronicler makes to the old narrative consist partly of full details of points connected with the history of the sanctuary and the great feasts, or the archæology of the Levitical ministry, and partly of narratives of victories and defeats, of sins and punishments, of obedience and its reward, which could be made to point a plain religious lesson in favor of faithful observance of the law. The minor variations of Chronicles from the books of Samuel and Kings are analogous to the larger additions and omissions, so that the whole work has a consistent and well-marked character, presenting the history in quite a different perspective from that of the old narrative. It is still possible to determine within certain limits the nature of the sources which were employed by the author. He had before him the canonical books of Samuel and Kings, from which he made excerpts, but, in addition to these, had at his disposal "Midrashic" compilations, in which the past history was no longer told in sober fashion, but, embellished with more or less fanciful details, was intended as a means of illustrating religious ideas and of teaching moral lessons. He mentions such a Midrash of the Book of Kings (2 Chron. xxiv. 27), and also specifically refers to a Midrash of the prophet Iddo (2 Chron. xiii. 22), which appears to have been a separate work either attributed to Iddo or in which the prophet plays a prominent part. There were probably other works of a similar character in existence, and it is important to note that these compilations were based upon

the annals of the kings of Israel and Judah respectively, which also form the sources underlying the canonical books of Kings. The variations of the Chronicles from the latter, however, are due in most instances to his religious pragmatism. Everything is done to emphasize the ancient importance of the Levites, who are introduced at points and on occasions which are most inappropriate. He is also fond of high figures in enumerating sums and armies. The speeches introduced by him and put into the mouths of prominent personages also reflect entirely the Chronicler's peculiar point of view. Taking all this together, it is claimed by many that the historical value of Chronicles, where it varies from the books of Samuel and Kings, is small, and, except in some details, which have chiefly an interest as representing perhaps a more or less widespread tradition, there is a reluctance among modern critical scholars to depend upon it in the study of Hebrew history. From 1 Chron. iii. 19–24, where the genealogy of Zerubbabel is carried on through nine generations, as well as from the mention of Jaddua in Neh. xii. 11, 22, it has rightly been inferred that the Chronicles cannot have been written before the third century B.C.

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CHRONICLES OF THE CANONGATE. A series of tales by Sir Walter Scott. The first set, including *The Highland Widow*, *The Surgeon's Daughter*, and *Two Drovers*, was published in 1827; and the second, containing *The Fair Maid of Perth*, appeared in the ensuing year. They are supposed to be told by a certain Mr. Chrystal Croftangry, who, he informs us, got them from a Mrs. Baliol. See CANONGATE, THE.

CHRON'OGRAM (from Gk. *χρόνος, chronos*, time + *γράμμα, gramma*, letter, from *γράφειν, graphein*, to write), or CHRONOGRAPH. A whimsical device of the later Romans, resuscitated during the Renaissance period, by which a date is given by selecting certain letters among those which form an inscription, and printing them larger than the others. The principle will be understood from the following chronogram, made from the name of George Villiers, first Duke of Buckingham:

GEORGIVS DVX BVCKINGAMIÆ

The date MDCXVVVIII (1628) is that of the year in which the Duke was murdered by Felton at Portsmouth. Consult Hilton, *Chronograms* (1882).

CHRON'OGRAPH and **CHRON'OSCOPE** (Lat. *chronographus*, from Gk. *χρονογράφος, chronographos*, from *χρόνος, chronos*, time + *γράφειν, graphein*, to write; Fr. *chronoscope*, from Gk. *χρόνος, chronos*, time + *σκοπός, skopos*, watcher, from *σκοπεῖν, skopein*, to watch). Terms more or less interchangeable applied to instruments used in physics, physiology, psychology, and many departments of experimental and applied science, such as gunnery, for measuring very short intervals of time, as well as to instruments recording such measures. Chronograph watches, or pocket chronographs, will measure intervals of time down to fifths of a second, for use at horse races and other occasions where a seconds watch is not exactly suited. They have an ordinary quick-train lever movement, carrying hands which move over a dial. One of these is a seconds hand, very peculiarly made. The seconds hand is double, consisting of two distinct hands, one superposed on the other. As the double-seconds hand revolves, it is possible to stop one of its component halves by touching a spring at the side of the case. A record having thus been made of the exact fraction of a second marked by the position of the stopped hand, another pressure of the spring makes it fly back to its former position on the moving component. The instrument is then ready for another observation. There are numerous modifications of this form of instrument; they are sometimes called stop watches, or split-second fly-back watches.

The Astronomical Chronograph is used to record permanently the exact instants of time when certain astronomical observations are made. Such a time record is, of course, extremely important in almost all forms of astronomical work. As usually constructed, the instrument consists of a metal cylinder or drum, upon which is wound a sheet of paper to receive the record. The drum is connected with a clockwork apparatus which makes it turn on its axis once each minute. At the same time a fountain pen, or some other form of marking instrument, is pressed against the paper so that a line is traced around the drum as it turns. The pen is attached to an electromagnet, which in turn is moved very slowly by the clockwork along the axis of the drum. The result of these motions of the drum and pen is to trace a continuous spiral line on the paper around the drum. The electromagnet is connected with the astronomer's standard clock by wires, and once every second an electric signal is sent automatically by the clock into the magnet. This results in a short interruption or break in the line traced by the pen. Such a break, then, marks the beginning of each second on the chronographic time record. When the astronomer wishes to record the exact time of an observation, he has but to tap a telegraphic key held in his hand, and a signal similar to the clock signals will reach the chronographic electromagnet. The result is a break in the record line, similar to those due to the clock. It is then merely necessary to measure the position of the observer's break with reference to the clock breaks, to fix the exact fraction of a second corresponding to the observation. There is little difficulty in thus measuring a chronographic record to the twentieth part of a second of time. In the form of instrument known as the "printing chronograph," in-

vented by Professor Hough of the Dearborn Observatory, the minutes, seconds, and fractions of a second are actually printed on the record sheet. Another form of chronograph is the photochronograph, in which the trail of a star is photographed directly with the spider lines of the telescope on a photographic plate. To mark the time intervals, the plate is given a slight north and south displacement at the beginning of each second, so as to produce a break in the star trail. In this way the recording of the transit of a star becomes purely automatic, and the personal equation (q.v.) of the observer is avoided.

The first attempt to measure a very small period of time was made by Sir Charles Wheatstone in 1834, when he endeavored to ascertain the duration of the electric spark. This was accomplished by means of a revolving mirror; and as this apparatus was the first and simplest of a number of similar instruments, it may be described at some length. On a horizontal axis capable of being revolved at high speed, a mirror was fixed. The rays issuing from a luminous point, such as a small flame, were reflected from the mirror when at rest and reached the eye of the observer. If the mirror is slowly revolved, the image of the luminous point will be either raised or lowered, and if the speed of rotation is increased, instead of a succession of images there will be seen a continuous streak or band of light. If the given source of light be supplanted by an electric spark, and the mirror set in rotation, as long as the duration of the spark is less than is required by the mirror to reflect the rays across the field in the form of a band, then the spark will appear as a point; but, increasing the speed of the mirror, a stage will be reached where the image will be produced in the form of a bright streak. The time of the spark can then be calculated in the following way: First, the velocity of the mirror is observed; then, suppose that the image of the spark extends over what is equivalent to one-half a degree of arc. As the movement of the reflected ray is, from the laws of reflection, twice that of the reflecting mirror, it would follow that when the mirror was revolving at a velocity of 800 revolutions per second, the time consumed by the mirror in causing the spark to appear as a streak of light would be $\frac{1}{800} \times \frac{1}{2} \times \frac{1}{360} \times \frac{1}{2}$ or $\frac{1}{1152000}$ of a second.

Wheatstone also employed this apparatus to study the time consumed by an electric current in passing over a conductor, using for this purpose the sparks furnished at different lengths of the conductor and measuring the difference in time between their occurrences. A rotating mirror was also used by Feddersen in his researches on the electric spark, and again by Rood, the former employing a concave mirror, while the latter used a plane mirror in connection with a system of lenses.

To Wheatstone is due another form of chronoscope, which was used for measuring the velocity of a projectile from the time it left a cannon until any desired point was reached. (See Ballistics.) This apparatus in its essence consisted of a clock which was set in motion and stopped by the armature of an electromagnet. Across the muzzle of the gun a wire was placed which was broken at the exit of the projectile and the circuit opened, thus releasing the armature of the electromagnet and setting in motion the clockwork. When the shot reached the required distance, the circuit was closed, and the clock stopped in a similar fashion. Wheatstone did not claim a greater accuracy for this instrument than to $\frac{1}{60}$ of a second, but improvements by Hipp, who, keeping the clockwork in motion, used the magnets only to throw the indicating part of the apparatus into gear with the movement, made the instrument more serviceable.

W. Siemens used a rapidly rotating cylinder, on a paper covering of which sparks from a circuit containing Leyden jars made the record marks. The introduction of a seconds pendulum into the circuit gave a record of the time by causing spark punctures at regular intervals, and the desired times could be found by comparing the distances. With this apparatus the velocity of a projectile while in the bore of the cannon could be measured, it being only necessary to insert insulated conductors at different points where the circuit could be made or broken by the traveling shot. Siemens also used this form of chronoscope, or chronograph, to measure the velocity of the electric current. Helmholtz improved the instrument by providing mechanism to give a constantly increasing velocity, making his measurement when the desired rate of speed was reached, the regulation being effected by the action of centrifugal force. This form of instrument has been employed extensively in physiological work, and there are numerous modifications now in use.

Tuning forks (see Tuning Fork) are also employed extensively for measuring small intervals of time, as they furnish an extremely accurate means for making such determinations. A device used by Pouillet was a circular disk of glass on which was a smaller circle of tinfoil and a narrow strip extending to the circumference. This was used to complete an electric circuit with a galvanometer, the principle involved being that with a continuous current for an extremely brief space of time, the strength of the current and consequently the deflection of the galvanometer is proportional to the time it is flowing.

In the Noble chronoscope, extensively used in artillery tests, there are eight bronze rotating disks, each covered with a strip of blackened paper, on which a record is made by means of an electric spark. This instrument is used to measure both internal and external velocities, as is also the Schultz chronograph, which employs a tuning fork and electromagnets. The velocity of different distances is obtained by having the circuit opened or closed by means of the wires of a screen through which the projectile passes. In an instrument for a like purpose, the invention of Crehore and Squier, the record is obtained by means of a beam of polarized light falling on a rapidly revolving photographic plate. In this instrument the plane of polarization is shifted by the action of a magnetic field produced on closing the circuit. When a current flows, the beam is rotated so that it does not affect the plate, leaving a blank in the path traced by the beam. A tuning fork is used to keep track of the time, and by means of the wavy line traced by it the time between interrupted points on the tracing of the first beam may be ascertained.

The Boulengé chronograph, much used in artillery tests of velocity, depends upon the distance a body falls in a given interval of time. It will be found discussed and illustrated in

the article on BALLISTICS. The chronoscope and chronograph are also constructed in numerous other forms, in some of which, e.g., the principle of the pendulum is employed, and time can be measured with an extreme degree of accuracy.

The instruments of Fizeau and Foucault to measure the velocity of light must be considered among the early forms of those instruments. In the former a wheel with projecting teeth was used to interrupt a beam of light which was sent to a distant mirror and back. The speed of the mirror was so adjusted that the beam of light which is transmitted through the space between two teeth is received after reflection in the next open space, and the velocity determined by ascertaining the distance traveled by the beam and the time consumed in the fraction of a revolution of the toothed wheel. Foucault used a revolving mirror, as did also Michelson, whose determinations are considered most reliable and accurate.

Bibliography. Consult the larger treatises on experimental physics, psychology, physiology, and ballistics; and for more special information, "The Chronograph" [Dent's], *Nature*, vol. xxiii (London, 1881); Dunn, "Development of a Photo-Velocimeter for Measuring . . . the Maximum Velocities of Recoil and Projectile," etc., *Journal of the United States Artillery*, vol. viii, No. 1 (Fort Monroe, 1897); Bouquet and Chatelu, "Sur le précision des observations au chronographe imprimant," *Bull. Astronom.*, vols. xxii, xxiii (Paris, 1905–06); Salow, "Beschreibung eines verbesserten Chronographen," *Psychol. Studien* (Leipzig, 1909); Mond, "A New Improved Type of Chronograph," *London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 6th series, vol. ii (London, 1906); Huguenin, "Etablissage et repassage du chronographie," *Journal suisse d'horlogerie*, vols. xxix, xxx, xxxi (Geneva, 1905–07); "Hopkins's Band Electro-Chronograph," *Scientific American*, vol. xcii (New York, 1905). See BALLISTICS; PSYCHOLOGICAL APPARATUS; VELOCITY OF LIGHT.

CHRONOL'OGY (Fr. *chronologie*, from Lat. *chronologia*, from Gk. *χρονολογία*, *chronologia*, from *χρόνος*, *chronos*, time + *λόγος*, *logos*, account). The branch of science which treats of time as measured, computed, and recorded. Its object is to establish some method of defining time, to compute the intervals between important historical events, and to fix the dates of events uniformly with reference to some chosen point in the history of the world.

The familiar units of time are the year, the month, and the day. These are astronomical and are determined by recurring celestial phenomena. The epoch universally employed today, before which and after which events are said to have occurred, is the birth of Christ. The years before Christ are marked B.C. and those after A.D. (Anno Domini). The astronomical units, however, have not always been employed, and the epoch or reckoning point differed among various peoples. Thus, in early days, such vague periods as generations, or reigns of kings, were assumed as units; but finally, through the suggestion, it is said, of the philosopher Eratosthenes, who was in charge of the library in Alexandria, in the third century B.C., the year was introduced as the unit of time. The difference in epochs led to various suggestions which were gradually discarded with the spread of civilization and the closer intercourse of men. The systems used by the Greeks and Romans were the most important in antiquity. The Greeks calculated by Olympiads, beginning their era from the years of the victory of Coræbus in the Olympic games, which corresponds to the year 776 B.C. The Romans began their era from the founding of the city, generally accepted as the year 753 B.C.

The study of the astronomical units and the measurement of time belong to the department of mathematical astronomy. The historian employs chronology to enable him to transfer events in history located in time according to various eras to his own system, the Christian era.

The method of reckoning time by Olympiads was used by the historian Timæus about 240 B.C. and was generally adopted by other Greek historians. The Olympiads were determined by the Olympic games, which were held every four years in the summer time. The Olympic year therefore begins in the middle of our year, and the first and latter half of our year belong to different Olympiads. Thus, Socrates was put to death in the first year of the 95th Olympiad. The reckoning is as follows: $94 \times 4 = 376$; this subtracted from 776 gives 400, but his death took place in the eleventh month, hence 1 should be subtracted, so that 399 B.C. is the year of his death with reference to the Christian era. If the date falls after Christ, 776 must be subtracted from the Olympic year. The calculation by Olympiads lasted down to the fifth century of our era.

The date of the foundation of Rome is given by Fabius Pictor in a year corresponding to 747 B.C., by Polybius in 750 B.C., by M. Porcius Cato in 751 B.C., by Verrius Flaccus in 752 B.C., and by Terentius Varro in 753 B.C. Among Roman writers Livy follows Cato and at times Fabius Pictor. Cicero and Pliny follow Varro. The Varronian date is generally accepted by modern writers. The years were designated by the letters A.U.C. (*anno urbis conditæ* = in the year from the foundation of the city). In changing from the Roman to the Christian era, subtract the years of Rome from 754 if the date is before Christ, but if the date is after Christ, subtract 754 from the year of Rome.

The Greek and Roman methods continued in use long after Christ. Constantine the Great is said to have introduced the system known as indiction. This was a cycle of 15 years, which were denoted Indiction 1, Indiction 2, up to Indiction 15, when the series began anew. There are four kinds of indictions, which owe their difference merely to the fact that they are reckoned from different days. Thus the Indiction of Constantinople began with Sept. 1, 312 A.D.; the Imperial, on Sept. 24, 312 A.D.; the Roman or Pontifical, on Dec. 25, 312 A.D., or Jan. 1, 313 A.D. As 1 A.D. equals Indiction 4, add 3 to the year of the Christian era and divide by 15, and the remainder will be the number of the indiction. If there is no remainder the indiction is 15.

The year of the Christian era, as now arranged, like the Julian year, established by Julius Cæsar, extends from January 1 to December 31. The Christian era was first used by Dionysius Exiguus in 533 A.D. He regarded the birth of Christ as taking place in the year of Rome 754, although early Christians placed it in 750. The Dionysian year, however, dated from the Annunciation, March 25 of the preceding year. The commencement of the year was assigned to different days in different places.

Thus in England down to the Conquest it was counted from Christmas or from March 25; from the Conquest to 1155, from January 1; from 1155 to 1751, from March 25. In Scotland the beginning of the year was changed from March 25 to January 1 in 1600, but the change was not generally adopted until it was made in England also. In France the beginning of the year varied in different dioceses, being either Christmas or March 25, until 1564, when January 1 was selected. In the middle of the sixteenth century January 1 was determined upon in Germany, Italy, Spain, and Portugal.

The era of the creation of the world is obtained from the Old Testament, but varies in the different texts. The Hebrew version reckons 1656 years from creation to the flood and 4000 years from creation to the birth of Christ. The Samaritan makes the latter interval much longer, though it counts from the creation to the flood only 1307 years. The Septuagint version removes the creation of the world to 6000 years before Christ and 2250 years before the flood. It is now, however, universally admitted that the creation of the world cannot be placed at so recent a date as 6000 B.C., and the modern understanding of the first chapter of Genesis leaves the period of the creation quite indefinite, and one scheme of interpretation stretches out the days of creation into periods of indefinite length. Des Vignoles, a writer on the chronology of sacred history, collected more than 200 different estimates of the era of the creation, the shortest being 3483 and the longest 6984 years. If such or such a date from the creation means anything, it is probably to be read by the date fixed by Archbishop Ussher, which was 4004 B.C.

Various other eras are worthy of mention. The era of Constantinople dates the creation of the world 5508 years and 4 months before the beginning of our era, the civil years beginning September 1, the ecclesiastical March 21 or April 1. The era of Alexandria used by the Christians of that city placed the creation of Adam 5500 years before the birth of Christ. We must allow three years for the date assigned by the early Christians to the Incarnation. Hence we may change dates of this era to our own by subtracting 5502. When Diocletian became Emperor, 10 years were omitted, and after that date, which is 5786 according to the Alexandrian era, we must subtract 5492. The mundane era of Antioch, used by the Christians of Syria, is the same as the Alexandrians after the time of Diocletian. The Julian period should be mentioned here. It was invented by Joseph Justus Scaliger in 1582 to obviate the inconvenience of counting in two ways, before and after Christ. He estimated a period of 7980 Julian years, and the first year of the Christian era corresponded to 4714 of his era. The era of Nabonassar, which obtains its name from the founder of the Kingdom of Babylon, was used by astronomers. Its date is Feb. 26, 747 B.C., which was calculated from records of Ptolemy, based on celestial phenomena. The Macedonian era, known also as that of the Seleucidæ, began on September 1 of the Julian year, 312 years before our era. The era of Spain, used in Spain, Portugal, Africa, and parts of France, dated from the conquest of Spain by Augustus in 38 B.C. The era of Diocletian, or era of martyrs, still followed by the Copts and Abyssinians, is reckoned from Sept. 17, 284 A.D. The Mohammedan era of the Hejira (q.v.) dates from the flight of Mohammed from Mecca in 622 A.D. The following table gives the precise dates of the beginning of the eras just mentioned and of others of less importance:

		B.C.
Grecian, Mundane	September 1,	5598
Constantinople, Civil	September 1,	5508
Alexandrian	August 29,	5502
Antioch, Mundane	September 1,	5492
Julian Period	January 1,	4713
Mundane, Ussher	October	4004
Mundane, Jewish	October	3761
Abraham	October 1,	2015
Olympiads	July 1,	776
Rome, Foundation of	April 24,	753
Nabonassar	February 26,	747
Metonic Cycle	July 15,	432
Macedonian, or Grecian	September 1,	312
Tyrian	October 19,	126
Maccabean	November 24,	166
Sidonian	October	110
Cæsarian, of Antioch	September 1,	48
Julian Year	January 1,	45
Spanish Era	January 1,	38
Actian	January 1,	30
Augustan	February 14,	27

		A.D.
Christian	January 1,	1
Era of Diocletian	September 17,	284
Armenian	July 7,	552
Mohammedan, of the Hejira	July 16,	622
Persian, of Yezdegerd	June 16,	632

Various other systems of chronology may be found mentioned under the names of the nations by whom they were employed. Consult: Nicholas, *Chronology of History* (London, 1838); Woodward and Cates, *Encyclopœdia of Chronology*, historical and biographical (Boston, 1872); Macdonald, *Chronologies and Calendars* (1897); Grotefend, *Taschenbuch der Zeitrechnung* (Leipzig, 1905); Arbuthnot, *The Mysteries of Chronology* (London, 1900). See also CALENDAR; YEAR; MONTH; DAY; CYCLE; ETC.

CHRONOM'ETER (Fr. *chronomètre*, It. *cronometro*, from Gk. *χρόνος, chronos*, time + *μέτρον, metron*, measure). The name given principally to such timekeepers as are used for determining the longitude at sea. The mechanism is essentially the same as that of a common watch, only the size is generally greater; the balance wheel is compensated for variations of temperature; and the whole instrument is hung in a frame of balancing rings called "gimbals." These prevent the ship's motion from influencing the chronometer's rate too much.

CHRON'OSCOPE. See CHRONOGRAPH.

CHRUDIM, krōō'dĕm. A town in the eastern part of Bohemia, Austria, situated on the river Chrudimka, 74 miles by rail from Prague. It has a number of churches, among them one dating from the thirteenth century. Its principal industries are the making of sugar, liquors, meal, leather, shoes, cloth, and agricultural machinery. Pop., 1890, 12,128; 1900, 13,017.

CHRYSALE, krē'zàl'. The henpecked husband of Philaminte in Molière's *Les femmes savantes*. He is the type of a *bon bourgeois*, and, though under the domination of his *précieuse* wife, is inspired by the love he bears his daughter Henriette to assert his authority and save her from the base Trissotin.

CHRYSALIS, krĭs'ă-lĭs. See BUTTERFLIES AND MOTHS.

CHRYSANDER, krē'sàn-dĕr, FRIEDRICH (1826–1901). A German writer on the science of music. He was born in Lübtheen, Mecklenburg-Schwerin, and studied philosophy in Rostock, but later gave up his time entirely to musical study. He has contributed extensively to the literature of this subject and is especially

CHRYSANTHEMUMS

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1 SINGLE ANNUAL CHRYSANTHEMUM – CHRYSANTHEMUM CARINATUM
2 PYRETHRUM – C. COCCINEUM
3 OXEYE DAISY, WHITE WEED – C. LEUCANTHEMUM
4 IRREGULAR CHRYSANTHEMUM
5 POMPON CHRYSANTHEMUM
6 JAPANESE CHRYSANTHEMUM INCURVED TYPE
7 " " RECURVED TYPE
8 OSTRICH PLUME

well known as the editor of Handel's works, his edition having been the first to be prepared from the original sources. The edition was really published by Chrysander as a private enterprise, more particularly after the death of his collaborator, Gervinus, in 1871, when, equipped with a simple hand press and assisted by only one printer and one engraver of music, he continued the publication of the work at his own expense, in this way completing all but three of the 100 volumes. This gigantic undertaking occupied the editor from 1859 to 1894, during which time he repeatedly visited England for the purpose of studying the autograph scores. Foremost among the striking improvements introduced by Chrysander into this famous edition are the following: a new German translation of the original English text, emphasizing the relation between word and tone; the concentration of the dramatic element; the restoration of the original ornamentation of the arias; and, most important of all, the restoration of the original Handelian orchestration. While working on this monumental edition of the master's works, Chrysander also embodied the wealth of information he had collected in an exhaustive biography, of which, however, only two volumes were completed. A portion of the third volume brings the life down to the year 1740. Unfortunately this greatest biography of Handel has never been completed, although the publishers have made several attempts to induce eminent scholars to undertake the task.

CHRYSAN'THEMUM (Lat. from Gk. *χρυσάνθεμον, chrysanthemon,* from *χρυσός, chrysos,* gold + *ἄνθεμον, anthemon,* flower). A genus of plants of the family Compositæ, comprising some 200 species, natives of Europe, Asia, and northern Africa. The plants of this genus are free bloomers in both the wild and cultivated state. The flower heads are either flat or hemispherical; solitary on long peduncles or in flat-top clusters. Usually the rays spread wide open and are conspicuously showy, white, yellow, or rose-purplish in tint, while the disk flowers are for the most part yellow.

The name "chrysanthemum" is popularly restricted to the many garden and greenhouse forms of Europe and America, all of which are the blended offspring of two distinct Chinese and Japanese species, *Chrysanthemum indicum* and *Chrysanthemum sinense.* Through a continued process of cross fertilization and selection a remarkable diversity of color, shape, and size has been developed in these flowers. They range all the way from the true pompon, or button form, to the huge head that measures nearly 8 inches in diameter, with ray florets 3 or 4 inches in length. In shape they are quilled, twisted, hairy, or plain, double, semidouble, and single, with florets erect, incurved, or reflexed. They are of nearly all colors and shades. The varieties are generally wanting in fragrance, although an occasional sweet-scented form occurs. The chrysanthemum has long held first place as an autumn garden and exhibition flower. In the cut-flower trade of America it is outranked only by roses and carnations. The national chrysanthemum societies of England and America, as well as numerous other horticultural and floral societies, have done much to direct the popular taste away from freakish and fantastic forms and to encourage the production and perpetuation of varieties of merit. The types correspond approximately both in Europe and America as also in Australasia. The many hardy dwarf or pompon types and the early large-flowering types are best for the garden. Many of the pompons retain their beauty until severe freezing weather sets in. Of the large flowers, the Japanese reflexing forms in many colors are rather favored in America, while in England these are slowly giving place to singles and semidoubles. Chrysanthemums are easily propagated from rooted ground shoots. Florists prefer to treat these shoots as cuttings. The plants will endure varied soil and cultural conditions. They grow best in a rich and well-tilled soil. The art of disbudding, practiced by professional florists to secure large well-formed flowers, should be accompanied by a knowledge of varietal tendencies as well as of the different flower buds and their qualities. Consult: Bailey, *Cyclopedia of Standard Horticulture;* Herrington, *The Chrysanthemum: Its Culture for Professional Growers and Amateurs* (New York, 1905); Powell, *Chrysanthemums and How to Grow Them* (Garden City, N. Y., 1911).

Chrysanthemum leucanthemum is the oxeye daisy of pastures in the Atlantic States. Another species, *Chrysanthemum segetum,* is the corn marigold of Europe. *Chrysanthemum frutescens,* known in France as marguerite, and widely cultivated in that country for ornamental purposes, has found its way into other lands and is grown either in pot culture or, where the climate will allow, in the open air.

CHRYSAOR, krī-sā'ôr *or* krīs'ā-ôr (Lat., from Gk. *Χρυσάωρ*). 1. The son of Poseidon and Medusa, in Greek legend. He sprang from his mother's head when she was decapitated by Perseus. He was father of Geryon (q.v.). 2. The name of Artegal's sword in Spenser's *Faerie Queene.*

CHRYSAROBIN, krīs'ā-rō'bĭn (Neo-Lat. *chrysarobinum,* from Gk. *χρυσός, chrysos,* gold + E. Ind. *aroba,* bark of leguminous trees). Goa powder (q.v.).

CHRYSE CHORA, krī'sē kō'rā (Gk. *Χρυσῆ Χώρα,* Golden Land). A name given by the ancients to a part of India comprising the present Burma and the northern part of Pegu.

CHRYSEIS, krī-sē'ĭs. In the *Iliad,* the daughter of Chryses, priest of Apollo at Chryse. When she fell to the share of Agamemnon in the distribution of spoils during the Trojan War, the ransom offered by her father was harshly refused by Agamemnon. Apollo, to punish the slight to his priest, sent a pestilence on the Greek camp, which was averted only by the return of Chryseis to her father. See ACHILLES.

CHRYSELEPHANTINE, krīs'ĕl-ē-făn'tīn (from Gk. *χρυσελεφάντινος, chryselephantinos,* of gold and ivory, from *χρυσός, chrysos,* gold + *ἐλεφάντινος, elephantinos,* made of ivory, from *ἐλέφας, elephas,* ivory, elephant). The art which prevailed among the Greeks of covering some of their statues with ivory and gold. The body of these figures was usually of wood over which a thin plating of ivory was fastened, and certain portions of the garments were made of gold. The hair, also, was of gold. These garments and the hair were usually chased. (See CHASING.) The modeled body of these statues belonged to the art of sculpture, while the chasing and ornamentation of the draperies and hair was called toreutic art. The statues were mainly of religious character and used for the ornamentation of temples. Winckelmann has calculated that

about 100 statues of this kind are mentioned by the ancients. The colossal works executed by Phidias (q.v.) in the time of Pericles are the most famous of this class, the greatest being the Pallas of the Parthenon. It was 26 cubits high and represented the goddess in armor, covered with a long robe. Even grander was the famous Olympian Zeus, which was considered one of the seven wonders of the world. Another famous chryselephantine statue was that of Hera in her temple at Argos, by Polyclitus (q.v.).

CHRYSES, krī′sēz. See CHRYSEIS.

CHRYSIPPUS, krī-sĭp′ŭs (Lat., from Gk. Χρύσιππος) (c.280–207 B.C.). An eminent Stoic philosopher of Soli in Cilicia. He came to Athens when still a youth and eagerly devoted himself to philosophical pursuits, especially under Cleanthes, the successor of Zeno, although he is said to have studied also under the Academic teachers, Arcesilaus and Lacydes, and to have learned from them what were the objections urged by skeptics against the doctrines of the Stoics. He possessed an eager, facile, and catholic mind, and enjoyed the reputation of being the keenest disputant of his time; yet his discourses were clever and subtle rather than seriously argumentative. It was his common practice to take at different times opposite sides of the same question, so that he furnished his opponents, especially Carneades, with the means of convicting him of inconsistency. In philosophy he was an expounder, not an originator. His literary industry was great. He is said to have written no fewer than 500 lines each day, and Diogenes Laërtius speaks of over 705 books by him. These dealt with philosophy proper, logic, physics, ethics, grammar, and the interpretation of the poets; only fragments remain in the works of Plutarch, Ælian, Cicero, Seneca, and Aulus Gellius. These were edited by Petersen, 1827; Ritter and Preller (Gotha, 1886–88). Consult: Baguet, *De Chrysippi Vita, Doctrina et Reliquiis* (Paris, 1882); Zeller, *Philosophie der Griechen* (Leipzig, 1881); Hicks, *Stoic and Epicurean* (New York, 1910); Bevan, *Stoics and Sceptics* (Oxford, 1913).

CHRYS′OBER′YL (from Lat. *chrysoberyllus*, from Gk. χρυσοβήρυλλος, golden beryl, from χρυσός, *chrysos*, gold + βήρυλλος, *bēryllos*, beryl). A beryllium aluminate that crystallizes in the orthorhombic system. It has a vitreous lustre and is found in various shades of green and is sometimes red by transmitted light. The greenish varieties showing a chatoyant effect are called cat's-eye, while opalescent specimens are named *cymophane*. Chrysoberyl was known to the ancients and was called *Oriental chrysolite* or *Oriental topaz*. It is found in Brazil, Ceylon, and in the Ural Mountains. A variety of an emerald-green color, but red by transmitted light, is called *alexandrite*, in honor of the Czar Alexander II. In the United States chrysoberyl occurs at Haddam, Conn., and at Norway, Stow, and several other localities in Maine. The largest transparent crystals are frequently cut into gems.

CHRYS′OCOL′LA (Neo-Lat., from Gk. χρυσόκολλα, *chrysokolla*, gold solder, from χρυσός, *chrysos*, gold + κόλλα, *kolla*, glue). A hydrated copper silicate that is cryptocrystalline. Chrysocolla is found in green to blue masses with an enamel-like texture. Impure varieties often occur in earthy masses, green or dull brown in color. It occurs with other copper minerals, especially in the upper parts of veins. It is found in Cornwall, England; Hungary; Siberia; Australia; Chile; and, with other copper ores, in New Jersey, Pennsylvania, Wisconsin, Michigan, Arizona, and elsewhere in the United States. When found in sufficiently abundant quantities, it is a valuable ore of copper, as it contains when pure 45 per cent of copper oxide. The name "chrysocolla" was applied by the ancients to any green mineral, as malachite, containing copper and capable of being used as a pigment.

CHRYS′OLITE (from OF. *crisolite*, Fr. *chrysolithe*, from Lat. *chrysolithos*, Gk. χρυσόλιθος, *chrysolithos*, from χρυσός, *chrysos*, gold + λίθος, *lithos*, stone). A magnesium-iron silicate that crystallizes in the orthorhombic system. It is of a green color, varying from yellow to brown, with a vitreous lustre, and when cut is prized as a gem stone, the gem varieties being known as *olivin* and *peridot*. Chrysolite is frequently found in lava as at Vesuvius, and in the volcanic rocks of Sicily, the Azores, the Hawaiian Islands, and elsewhere; it is also a frequent and important rock constituent. In the United States it is found in the form of small, olive-green, pitted grains or pebbles, with garnet, in Arizona and New Mexico, where the grains are called "Job's tears" on account of their pitted appearance. It also occurs in basalt near Montreal, and elsewhere in Canada. The so-called chrysolite of the jeweler is usually chrysoberyl, and the *chrysolithus* mentioned by Pliny is supposed to have been topaz. It is said that many of the so-called emeralds in European churches, as those of the "Three Magi" in the cathedral of Cologne, are chrysolites, and not emeralds. See GEMS.

CHRYSOLOGUS, krī-sŏl′ŏ-gŭs (Lat., from Gk. χρυσόλογος, from χρυσός, *chrysos*, gold + λόγος, *logos*, speech; referring to his oratorical powers), PETER (406–450). Bishop of Ravenna in 433. He opposed Arianism and Eutychianism. About 100 genuine sermons of his have come down to us, though there are 76 others attributed to him. They do not bear out his reputation for eloquence, but show an earnest and spiritually minded nature. His works are in Migne, *Patrologia Latina*, lii. There is a partial translation into German by M. Held (Kempfen, 1874). For his life, consult H. Dapper (Cologne, 1867) and F. V. Stablewski (Posen, 1871).

CHRYSOLORAS, krīs′ō-lō′ras, MANUEL (c.1355–1415). A Byzantine Greek scholar, the first important teacher of Greek of the Renaissance. His scholarship became famous in Italy, so that Guarino da Verona went to Constantinople to learn Greek from him. About 1393 he was sent by the Byzantine Emperor, Manuel Palæologus, to the West to ask assistance from Italy and England against the Turks. While on this mission he became known to many Italians, and in 1396, being invited by the Florentine Republic, he settled in Florence as a teacher of Greek literature. Within the next two years Chrysoloras had among his pupils Niccolò Niccoli, Leonardo Bruni, Manetti, and others.

In 1400 he left Florence, and two years later was teaching in Pavia, where he translated Plato's *Republic* into Latin. During the next decade he seems to have traveled in France, Spain, and England, and to have been engaged in teaching Greek in a number of Italian cities. He was employed by Pope Gregory XII in an attempt to bring about the union of the Greek and the Roman churches. He accompanied John

XXIII to the Council of Constance and died while it was in progress.

His most important work was his *Erotemata*, the first Greek Grammar published in western Europe (Venice, 1484), which was for many years the standard work for Greek teaching in Italy and elsewhere. Another interesting work was his comparison of ancient and modern Rome (*Σύγκρισις παλαιᾶς καὶ νεᾶς Ρώμης*). Consult Voigt, *Die Wiederbelebung des klassischen Alterthums*, i (Berlin, 1895), and Symonds, *Renaissance in Italy*, ii (London, 1877).

CHRYS'OPRASE (from Lat. *chrysoprasus*, Gk. *χρυσόπρασος*, *chrysoprasos*, from *χρυσός*, *chrysos*, gold + *πράσον*, *prason*, leek). A variety of chalcedony, the apple-green color of which is due to the presence of a small quantity of nickel oxide. It is found in Silesia, Germany, and near Riddles, Oregon, where it occurs in nickel ore in veins over an inch thick; also in Tulare Co., Cal. Chrysoprase was formerly much sought after as a gem stone, but as it loses its color if kept in a warm place, it is no longer much prized. It is mentioned in the Bible, and by the ancients was described as a gem of a yellowish-green color, the identity of which has never been definitely established. *Chrysoprase earth* is the name given to an apple-green variety of pimelite from Silesia.

CHRYSOSTOM, krĭs'os-tom *or* krī-sŏs'tom (from Gk. *Χρυσόστομος*, *Chrysostomos*, golden-mouthed, from *χρυσός*, *chrysos*, gold + *στόμα*, *stoma*, mouth; so named from the splendor of his eloquence), John, Saint (c.345–407). One of the greatest fathers of the early Church. He was born in Antioch in 345 or 347 A.D. He came of a patrician family. His father, Secundus, died soon after Chrysostom's birth. His mother, Anthusa, was a pious woman, wholly devoted to her son, who grew up under her loving instructions into an earnest, gentle, and serious youth, passing through none of those wild, dark struggles with sinful passions which left an ineffaceable impress on the soul of Augustine and gave a sombre coloring to his whole theology. He studied oratory under Libanius, a heathen rhetorician, as he at first intended to be a jurist, and soon excelled his teacher; but, feeling called to give up worldly pursuits, he abandoned legal for biblical study. About 368 he was baptized and was ordained a reader. He practiced the strictest asceticism while still living at home, and on his mother's death, about 375, he retired to the desert around Antioch. After six years the ascetic severity of his life and studies brought on an illness which forced him to return to Antioch, where he was ordained deacon by Bishop Meletius in 381 and presbyter by Bishop Flavianus in 386. The eloquence, earnestness, and practical tone of his preaching excited the attention of Jews, heathens, and heretics, and secured for him the reputation of the chief orator of the Eastern church. In 398 the eunuch Eutropius, minister of the Emperor Arcadius, who had been struck by the bold and brilliant preaching of Chrysostom, elevated him to the episcopate of Constantinople. Chrysostom immediately began to restrict the episcopal expenditure in which his predecessors had indulged and bestowed so large a portion of his revenues on hospitals and other charities that he gained the surname of "John the Almoner." He also endeavored to reform the lives of the clergy and sent missionaries into Scythia, Persia, Palestine, and other lands. His faithful discharge of his duties, especially in reproof of vices, excited the enmity of the Patriarch of Alexandria, of Theophilus, and of the Empress Eudoxia, who succeeded in deposing and banishing him from the capital (403). He was soon recalled, to be banished again shortly afterward (404). He was taken during July and August to Nicæa, now Isnik, in Asia Minor, the place where the famous Nicene Council was held, and there, to his great disappointment, he learned that his place of banishment was to be Cucusus, a little town in the Armenian highlands, now called Gozene. It was a weary journey, but he finally arrived there. The Bishop of Cucusus received him kindly, and the climate agreed with him. So his zeal was not abated. He labored for the conversion of the peoples in the neighborhood and wrote the 17 letters (or rather moral essays) to Olympias, to whom he also addressed a treatise on the proposition, "None can hurt the man who will not hurt himself." The Emperor, enraged by the general sympathy expressed towards Chrysostom by all true Christians, gave orders that he should be banished to the remote Pityus, on the northeast coast of the Black Sea at the foot of the Caucasus, a most desolate spot, involving a journey of hundreds of miles on foot. It was at the very verge of the Eastern Roman Empire. The march was begun and for three months kept up, but when he reached the chapel of the martyr Basiliscus, about 6 miles from Comana, in Pontus, he could go no farther and there died, Sept. 14, 407, blessing God with his dying lips. The news of his death excited much sorrow among all pious Christians, for Chrysostom was a man who drew the hearts of his fellows after him; a lovable, manly Christian, hating lies, worldliness, hypocrisy, and all manner of untruthfulness, with that honest warmth of temper which all vigorous people relish. A sect sprang up after his death, or martyrdom as they conceived it, called *Johannists*, who refused to acknowledge his successors; nor did they return to the general communion till 438, when the Archbishop Proclus prevailed on the Emperor Theodosius II to bring back the body of the saint to Constantinople, where it was solemnly interred, the Emperor himself publicly imploring the pardon of heaven for the crime of his parents, Arcadius and Eudoxia. The Greek church celebrates the festival of Chrysostom on November 13; the Roman, on January 27. In his *Homilies* (Thomas Aquinas said he would not give those on St. Matthew in exchange for the whole city of Paris) Chrysostom displayed superior powers of exegesis. In general, he rejects the allegorical system of interpretation and adheres to the grammatical, basing his doctrines and sentiments on a rational apprehension of the letter of Scripture. He is, however, far from being a bibliolater. He recognized the presence of a human element in the Bible as well as a divine; and instead of attempting, by forced and artificial hypotheses, to reconcile what he thought irreconcilable in Scripture statements, he frankly admitted the existence of contradictions and shaped his theory of inspiration accordingly. But his greatest and noblest excellence lay in that power, springing from the fervor and holiness of his heart, by which the consciences of the proud, the worldly, and the profligate were awakened, and all were made to feel the reality of the gospel message. The surname "Chrysostom" was first applied some time after his death, and, as it is supposed, by the Sixth Ecumenical Council in 680. Chrysostom's works are very numerous, and consist

of, 1st, *Homilies*, on parts of Scripture and points of doctrine; 2d, *Commentaries*, on the whole Bible (part of which have perished); 3d, *Epistles*, addressed to various people; 4th, *Treatises*, on different subjects (such as Providence, the Priesthood, etc.); and 5th, *Liturgies*. Of these the most valuable, as well as the most studied, are the *Homilies*, which are held to be superior to everything else of the kind in ancient Christian literature.

The best Greek edition of Chrysostom's works is that by Henry Savil (8 vols., Eton, 1613); and the most complete Greek and Latin edition is that by Montfaucon (13 vols., Paris, 1718–38; republished in 1834–40). There is an Eng. trans. in the first series of the *Nicene and Post-Nicene Fathers* (London and New York, 1889–90). For his biography, consult: Stephens (3d ed., London, 1883); Bush (London, 1885); Chase (London, 1887); Marshal (Paris, 1898).

CHRYS'OTILE. A fibrous variety of serpentine, which, owing to its susceptibility of division into fine threads, is used in the manufacture of fireproof fabrics.

CHRYS'OTYPE (from Gk. χρυσότυπος, *chrysotypos*, wrought of gold, from χρυσός, *chrysos*, gold + τύπος, *typos*, impression). A photographic process invented by Sir John Herschel, which depends on the reduction of a ferric salt to a ferrous salt by the action of light, and the subsequent precipitation of metallic gold on the ferrous salt. The process is now hardly ever used.

CHRZANOW, KZHÄ'NŎV. A town in the Austrian Crownland of Galicia, 27 miles west-northwest of Cracow, the centre of an important mineral region. Lead, zinc, coal, and cadmium are mined. There is considerable trade in agricultural products, and brandy and chicory are manufactured. Pop., 1900, 10,200, mostly Poles.

CHRZANOWSKI, KZHÅ-NÔF'SKĒ, WOJCIECH (1788–1861). A Polish general, who participated in Napoleon's Russian campaign and in the battles of Leipzig, Paris, and Waterloo. After Napoleon's final defeat he served in the national army of Poland, and was under Diebitsch in Turkey in 1828–29. In the Polish revolution of 1830 he served with distinction under the provisional government, rose to the rank of general of division, and in 1831 was made Governor of Warsaw. He was suspected of being friendly to the Russians and was for a long time under a sort of ostracism. In 1849 he was chosen by Charles Albert commander in chief of the Sardinian forces in his second war against Austria. Ramorino and Chrzanowski were charged with treachery, and the former was put to death. Chrzanowski lived for a number of years in Louisiana, but died in Paris. He published several works in Polish.

CHTHONIAN (thŏn'ĭ-*an*) **GODS.** In Greek mythology, the deities connected with the lower world, as HADES, PLUTO, PERSEPHONE, DEMETER, and HERMES.

CHUB (variant of *cub*). A fish (*Leuciscus cephalus*) of the family Cyprinidæ, bluish black on the upper parts, passing into silvery white beneath, with the cheeks and gill covers golden yellow. The chub is plentiful in many rivers of England and continental Europe, rarely reaches a weight of 5 pounds, spawns in April and May, and affords sport to anglers. In the United States the name is applied to several species of this family, most familiarly to the horned dace. (See DACE.) The river chub (*Hybopsis kentuckiensis*) measures 9 inches and is found on both sides of the Alleghanies. The chub of the Columbia River is *Mylochilus caurinus*, 12 inches long. See Plates of CARP AND ALLIES, and of DACE AND MINNOWS.

CHUBB, PERCIVAL (1860–). An American educator, born at Devonport, England. He was educated at the Stationers' School, London, and for 10 years was in the service of the Local Government Board. After removal to this country he was, in succession, lecturer on literature, Brooklyn Institute of Arts and Sciences; instructor in pedagogy, Pratt Institute; head of the English department of the Manual Training High School, Brooklyn; and principal of the high school department of the Ethical Culture School, New York. For a time he was also associate leader of the Society for Ethical Culture in New York, and in 1911 he became leader of the Society in St. Louis. He edited *Emerson's Selected Writings* (1888), *Dryden's Palamon and Arcite* (1899), *Select Writings of Lincoln* (1909), and wrote *The Teaching of English* (1902) and *Festivals and Plays in Schools and Elsewhere* (1912).

CHUB MACKEREL. A mackerel (*Scomber colias*), widely distributed throughout both oceans in temperate latitudes, and a food fish of some importance, though smaller than and inferior to the common mackerel. Its form is shown in the Plate of MACKERELS; the color is blue with about 30 wavy blackish streaks across the back. It is locally known by many names, as "linker," "easter," and "thimble-eyed" mackerel and in England as "Spanish" mackerel. It is extremely numerous in the Mediterranean Sea.

CHUB SUCKER. A small brown sucker (*Erimyzon sucetta*), called also "creekfish," numerous in lakes and quiet streams throughout the central United States and along the Atlantic coast. The sexual difference is strong, males in spring usually having three large tubercles on each side of the snout and the anal fin much swollen.

CHUBUT, chōō-bōōt'. A territory of Argentina, occupying the northern portion of Patagonia, and bounded by the Territory of Río Negro on the north, the Atlantic on the east, the Territory of Santa Cruz on the south, and Chile on the west (Map: Argentine Republic, D 12). Its area is over 93,000 square miles. It is only slightly elevated in some parts, is traversed by the rivers Chubut and Senguer, and contains a number of lakes. Pop., 1905, 12,417. The chief settlement is Rawson, a colony of Welsh, near the east coast, with a population of about 500. Towards the close of 1907 petroleum was discovered at a depth of 1768 feet in the southern part of Chubut.

CHUCKWAL'LA. A large, stout-bodied iguanid lizard (*Sauromalus ater*) of the desert region of the southwestern United States. It is the largest lizard of the Colorado River plateaus, except the heloderma. "The broad body is black or blackish, and the large blunt tail is usually marked with white, or entirely white. It was generally found on lava or other dark rocks, with which its coloration harmonizes. It is a vegetarian, feeding entirely on the buds and flowers of plants, with the addition sometimes of a few leaves." It is much prized by the local Indians as an article of food, and when well cooked is liked by white men, its flesh resembling chicken. A name for it in southern California is "alderman lizard."

CHUCK-WILL'S-WIDOW (imitative of its cry). A large nightjar (*Antrostomus carolinensis*) of the southern United States, whose call note resembles its name, is articulated with great distinctness, and reiterated like that of its congener, the whippoorwill. It is a much larger bird than the whippoorwill, being a full foot in length, but has the same pattern of plumage. The mouth is enormous. The rictal bristles have prominent lateral branches, and both humming birds and sparrows have been found in the stomach, though insects are its usual food. It lays its two eggs on the ground, making no nest.

CHUFA (Sp.). A name applied to *Cyperus esculentus*, a perennial sedge that spreads extensively by its underground rootstocks. It bears numerous small tubers, on which account it is also often called "nut grass," or "ground almond." The tubers are edible and are eagerly sought after by hogs, which are frequently allowed to pasture upon them at will. Chufas grow well upon light, sandy soils, producing large crops. Upon land required for general farming they are liable to become a serious pest on account of the difficulty of their eradication. When dried or parched, the "nuts" have a fine flavor. They contain considerable amounts of oil, starch, and sugar, the proportions of which vary considerably. The oil is sometimes expressed and for culinary purposes is said to be unsurpassed. A similar species is *Cyperus rotundas*, to which the name "nut grass" more properly belongs. Both are met with in a wild state in many parts of the United States, especially in the South.

CH'Ü FOU. See KIUH FOW.

CHUFU. Another name for Cheops (q.v.).

CHUGACH FOREST RESERVE. See ALASKA.

CHU HI, chōō'hē' (1130–1200). The modern apostle of Confucianism in its philosophical form, whose writings are the recognized standard of orthodoxy and the creed of educated men in China. He has been officially approved by successive Imperial dynasties and even canonized. His father was a government officer and he was born in Fu-kien. Precocious from childhood, he took his second degree before he was 20 years old. He devoted his leisure time when in office to studying Buddhism and Taoism, but throwing these aside after a few years, he became an enthusiastic student of the writings of the schoolmen of the Sung dynasty (960–1126 A.D.). Confucianism, under the analysis and exposition of the scholars Chou Tun-i and the brothers Cheng, had received a new statement, emerging as something like a philosophical system, instead of the ancient simple ethics and ritual. Chu Hi, expanding and expounding the doctrines thus set forth a century before his day, won fame all over the Empire, and was summoned by the Emperor to the court for consultation in regard to things literary and political. He elucidated the doctrines of Confucius and Mencius, more especially with reference to the nature of man, the origin of good and evil, and the principles of creation. In 1180, as governor of a city in Kiang-si, he applied his principles and greatly improved public morals. His study room was the White Deer Grotto, on the hills near Lake Po-yang. Not content with philosophy, he summoned around him famous scholars, who were his pupils and worked over the great historical annals of Ssī-ma Kuang, and thus furnished the standard history of China; for Chu Hi's work, having been many times since reprinted with commentary and continuation, has been widely read in all Chinese Asia. Nearly all the histories and biographies (apart from annals) written since his time in China, Korea, Japan, etc., have been powerfully influenced by Chu Hi's model—i.e., on the plan of philosophy and edification, being less consecutive narratives of events than appraisals of men and their actions as righteous and unrighteous, according to Chu Hi's standards.

Chu Hi extended his labors in every direction of metaphysical speculation, and his commentaries on the ancient writings of the sages have held the intellect of learned men of China and surrounding countries almost without challenge or criticism, until about the beginning of the second half of the seventeenth century, when they began to be vigorously assailed in China and later in Korea and Japan. In Japan Chu Hi's system is called Tei-shu, which is the Japanese pronunciation of the names of the Cheng brothers and of Chu-(Hi). It was officially encouraged by Iyeyasu and his successors very much as a state church, and to oppose it openly was at first politically dangerous. Its most famous Japanese expounders were Kyuso, Seiga, and Arai Hakuseki, the opponents of this orthodox school and the critics of Chu Hi being Jinsai, Sorai, Togai, and others. The latter, forming the Kogahu school, was noted for its doubt of the truth of the teachings of Chu Hi. Chu Hi's philosophy in Japan, as well as in China, profoundly influenced the form and spirit of literature, both scholastic and popular; but in Japan the Chinese teachings, becoming amalgamated in a common cause with Shinto, served powerfully to stimulate the national sentiment and feeling which overthrew the Shogun and Yedo government and restored the Mikado to supreme power. Especially in the Province of Mito was this union of Chinese philosophy and Shinto teaching successfully carried out, powerfully influencing the minds of the gentry and scholars in bringing about the great revolution of 1868. Thus one of the strangest phenomena in history was witnessed in that the rule of the Tokugawa family (1604–1868) was first shaken and then overthrown by the very doctrine "which generations of able shoguns and their ministers had earnestly encouraged and protected."

In China Chu Hi's philosophy held its own until near the close of the Ming dynasty (1368–1644), when Chinese scholars began to feel that Chu Hi's system was too narrow to hold all the truth. As a result of the profound thinking stimulated by the Manchu conquest, a school of criticism and opposition arose whose demand was for a study of the ancient texts in their purity. By continuation and expansion of philosophical labor, and especially by coming into contact with Occidental science and speculation, modern reformers have become prominent, but their activity and aims have been much obscured to Western minds by the Boxer uprising (1900) and the necessary foreign invasion.

In brief, the system promulgated by Chu Hi is a body of thought which may be called the result of Chinese reflection during 1500 years, put into logical Chinese form indeed, but in reality an amalgamation of the three systems or religions of China. It is the ethics of Confucius transfused with the mystical elements of Taoism and the speculations of Buddhism, though very little acknowledgment is made to

any thought originating outside of the Confucian cycle. It is less rationalistic than pantheistic, for the cultivated Confucians believe in heaven as a bundle of laws and forces, or at least an orderly system of abstract principles and regulated energy, but with no clear expression of personality. Their voluminous discussions of Spirit, Way, Reason, Law, deal with what is formless and invisible. When a term for Creator is used, it is a rare word and found only in the vocabulary of scholars. There is no clear grasp of the idea of a personal Creator. Man is the highest expression of the forces of the universe, and even gods and devils fear his determined mind. The ultimate realities are force and law. Man has no immortal soul; he is highest in the scale of existence, yet he is only one in the endless series. The station, duty, or position in life is greater than the individual, and it determines him. Hence, in Japan, while loyalty (not filial piety, as in China) is the root of the system, the high sense of honor and willingness of self-effacement is the line of duty. Hence, also, in China the determination at all hazards to "save the face" of everything, and the making of form and ritual equal to substance and containing it. In Japan in the twentieth century Chu Hi's system is but a memory, or at most an evanescent shadow; in Korea it is powerful, yet rather as an adjunct to political economy; in China it still holds its own, but precariously, against the assaults of the modern radical reformers, of whom Kang Yu-wei, who in 1899 emerged into notice as adviser to the Emperor, is the most conspicuous example and best known in the Occident.

CHUKCHI, chōōk′chē′. See TCHUKTCHI.

CHU-KIANG, chōō′kyäng′ (Chinese, pearl river), called also the CANTON RIVER. A river of south China, in the Province of Kwang-tung (Map: China, D 7). It is formed by the North and West rivers, which unite about 30 miles from Canton, which is situated at the head of its extensive delta. The estuary is very wide. The total length of the river is about 100 miles. The Si-kiang is connected with the delta of the Chu-kiang. See BOCA TIGRIS.

CHUKOR, *chu*-kōr′, or **CHICKORE,** chĭ-kōr′ (Hind. *cakōr*, Skt. *cakōra*, partridge). The Anglo-Indian name of the common red-legged hill partridge (*Caccabis chukor*), a favorite game bird in northern India and westward to the Black Sea. See PARTRIDGE.

CHULALONGKORN, chōō′là-lŏng′kŏrn, SOMDETH PHRA PARAMINDA MAHA (1853–1910). A king of Siam. He was born in Bangkok, the son of King Paraminda Maha Mongkout, and was elected to succeed his father upon the latter's death in 1868. He assumed full royal powers in 1873. By introducing reforms and modernizing the government he became known as a progressive ruler: slavery was practically abolished during his reign, internal taxes reduced, canals and roads opened, postal telegraph and telephone services established, and lighthouses erected along the coast. One of his first reforms was to modify the ceremony which surrounded the approach to the King. He also established a new code of laws, improved the educational system, proclaimed religious freedom, and built hospitals and museums. At his request General Grant, while on his tour of the world, visited him for six days.

CHUMBUL, chŭm′bŭl, or **CHAMBAL,** chŭm′-bal (Skt. *Carmanvati*, having hides, from *carman*, hide). An unnavigable river of British India, rising in the Vindhya Mountains, which form the southern limit of the basin of the Ganges. Its source, at a height of 2019 feet above sea level, is in lat. 22° 26′ W. and long. 75° 45′ E. In its generally northwestern course of 514 miles it receives many tributaries on both sides, till, in lat. 26° 30′ N. and long. 79° 19′ E., it enters the Jumna from the right with such a volume of water that, when flooded, it has been known to raise the united stream 7 or 8 feet in 12 hours.

CHUN, kōōn, KARL (1852–1914). A German zoölogist, born in Höchst-am-Main. He studied the natural sciences in Göttingen and Leipzig from 1872 to 1875. In 1878 he became a privatdocent in Leipzig; in 1883 professor of zoölogy in Königsberg, then in Breslau in 1889, and in Leipzig in 1898. He has written: *Das Nervensystem und die Muskalatur der Rippenquallen* (1878); *Die Ktenophoren des Golfs von Neapel* (1880); "Cœlenterata," in Bronn's *Klassen und Ordnungen des Thierreichs* (1891 et seq.); and many less important works.

CHUNAM′ (Tamil *cunnam*, Hind. *cūnā*, lime, from Skt. *cūrṇa*, powder). A very fine kind of quicklime made from calcined shells or from very pure limestone, and used for chewing with betel (q.v.) and for plaster. It is very white and takes a high polish. Both fresh and fossil shells are used for making chunam. Extensive beds of fossil shells employed for this purpose occur in the south of India, particularly in low, marshy places near the seacoast. The chunam from Madras is among the best made. The shells used are in the first place very carefully cleaned; they are then calcined in kilns, with wood charcoal. When chunam is to be used for plaster, it is mixed with fine river sand and thoroughly beaten up with water. The name is applied also to a weight for gold used in northern India.

CHUNCHO, chōōn′chō, or CHONCHO. A group of savage and warlike tribes living in the forests at the extreme headwaters of the Ucayali River, central Peru. They have communal houses, cultivate corn, bananas, and pineapples, and range the forests for game. They bury their dead in their houses and are said to be afraid to be at any time in utter darkness for fear of evil spirits. On account of their ferocity, very little is definitely known of them. By some they are believed to be closely related to the Anti (q.v.), who are of Arawakan stock; but Rivet records Chonchos, of the region about Noyobamba, as belonging to his Cahuapana (i.e., Mainan) stock.

CHUNGA, chŭŋ′gà, or **CHUN′NIA** (Neo-Lat., from the native name). A cranelike bird (*Chunga burmeisteri*) of Argentina, closely related to the çariama (q.v.), but smaller, darker, and more addicted to wooded districts. It is shy, has a barking note, feeds largely upon locusts, and nests on the ground; but the young are easily and commonly domesticated.

CHUNG-KING, chōōŋ′kĭng′ (Chinese, middle city). A city of China, the commercial capital of the Province of Sze-chuan and one of the most important commercial centres of west China (Map: China, C 6). It is situated in lat. 29° 33′ N. and long. 107° 2′ E., on a small elevated peninsula at the confluence of the rivers Kia-ling and Yang-tze-kiang. It is surrounded by a strong stone wall, about 5 miles in circumference and pierced with nine gates. The climate is neither pleasant nor healthful. Chung-

king was opened to foreign trade in 1891 and has since become the centre from which the imports for west China are distributed through the affluents of the Yang-tze-kiang. Pop., 1910 (est.), 598,000.

CHU'PRA. See CHAPRA.

CHUQUET, shŭ'kâ', NICOLAS (c.1445–c.1500). A French mathematician. He was born in Paris and died in Lyons. His work, entitled *Le triparty en la science des nombres* (1484), has been copied many times, but was first printed in Boncompagni's *Bullettino di bibliografia e di storia delle scienze matematiche e fisiche* (Rome, 1880), from a manuscript in the Bibliothèque Nationale. The work consists of three parts: (1) treatment of rational numbers; (2) treatment of irrational numbers; (3) treatment of equations. Chuquet used the successive convergents of a continued fraction to approximate roots of numbers (the method used by Etienne de la Roche), and called it *ediocion entre le plus et le moins.* In the Triparty appear not only the signs $\bar{\mathrm{d}}$ and $\bar{\mathrm{m}}$ for plus and minus, but also expressions like

$$\mathrm{R}^4 \cdot 10,\ \mathrm{R}^2 \cdot 17 \text{ for } \sqrt[4]{10},\ \sqrt{17}.$$

Chuquet used the Cartesian exponent notation $a_0, a^1, a^2 \ldots$ for $a, ax, ax^2 \ldots$; $a^{1\bar{\mathrm{m}}}$ for ax^{-1}, the expressions "equipolence" and "equipolent" for "equivalence" and "equivalent," and the words "byllion, tryllion, quadrillion, quyllion, sixillion, septyllion, ottyllion, nonyllion," as well as "million." Consult Boncompagni, *Bullettino XIII* (Rome, 1880), and Cantor, *Vorlesungen über Geschichte der Mathematik,* vol. ii (Leipzig, 1900).

CHUQUISACA, chōō'kê-sä'kȧ, **CHARCAS,** chär'kȧs, or **SUCRÉ,** sōō-krȧ' (So. Amer. Indian, place of gold). A department in the southeastern part of Bolivia, bounded by the Department of Santa Cruz on the north, Brazil on the east, Paraguay and the Department of Tarija on the south, and of Potosí and Oruro on the west (Map: Brazil). Its area is 26,417 square miles. The western part is mountainous and has a good climate. The eastern part is mostly flat and very sparsely inhabited. The forests are extensive, and plenty of grazing as well as agricultural land is found. The chief mineral deposit is silver, which is mined to some extent and exported. The civilized population was officially estimated in 1890 at 125,000, including 85,000 Indians and about 7500 whites; according to the census of 1900 it amounted to 204,434, including 8000 uncivilized Indians; in 1906 it was estimated at 228,966. Capital, Sucré (q.v.), which had formerly been the capital of the republic.

CHUR, kōōr (Fr. *Coïre,* It. *Coira,* Lat. *Curia Rhætorum*). The capital of the Swiss Canton of Grisons, and an episcopal city, situated on the Plessur, 60 miles southeast of Zurich in the valley of the upper Rhine, in a fertile plain about 2000 feet above sea level, and surrounded by high mountains (Map: Switzerland, D 2). The town stands on uneven ground and has narrow streets. The bishop's palace and the quarter around it, inhabited by Roman Catholics, occupy the summit of an eminence and are separated from the rest of the town by walls and battlements, closed by double gates. In the same quarter stands the old cathedral, called the church of St. Lucius, a Romanesque edifice, founded in the eighth century and containing interesting paintings by Dürer and Holbein. The episcopal palace, in the Renaissance style, displays two old Roman towers and has rich archives and library. Behind it is the monastery of St. Lucius. In the lower city are the town hall, with fine painted windows, the Rhætian antiquarian museum, the cantonal library, and two theological seminaries. Chur was formerly an important trade centre on the road from Germany to Italy before the construction of the St. Gotthard Railroad. It flourishes still, owing to throngs of tourists, and to the traffic in wine, fruit, and agricultural products. Pop., 1905, 12,284; 1910, 14,485. The town was settled by the Romans, who named it Curia Rætorum, and from 451 it was an episcopal see. It was ruled by its bishops down to about the close of the Middle Ages. It entered the Confederation in 1498. Consult Planta, *History of the City of Chur in the Middle Ages* (Chur, 1879).

CHURCH (AS. *circe,* Ger. *Kirche,* from Gk. *κυριακόν, kyriakon,* church, from *κύριος, kyrios,* lord). The word has the same double meaning as its Græco-Latin equivalent, *ecclesia;* it signifies both the ecclesiastical body of believers and the building for worship.

Building. There were at first, among the Christians, no separate buildings for worship. The faithful met in the large room of a private house during the first and possibly the whole of the second century. The gatherings at the cemeteries to celebrate the anniversaries of the deaths of martyrs probably gave rise to the earliest special buildings for services, in chapels connected with the cemeteries outside the city walls, often built also at the entrance to the catacombs. The catacomb chapels were also used as churches. In the third century there were separate churches of considerable size. Then and during the two succeeding centuries there were two main classes of churches: cemeterial churches outside the walls, consecrated to martyrs; parish churches inside the walls, for more regular worship. Then came two further distinctions: (1) the episcopal church or cathedral, in which the bishop had his seat, among the parish churches; (2) the conventual church, attached to a monastery or nunnery, also called an abbey church. Rarely, and chiefly in England, an abbey church served also as a cathedral, the abbot being the bishop of the diocese. (See CATHEDRAL.) A subclass of the episcopal is the metropolitan church, that of the archbishop or patriarch of a diocese; still higher was the pontifical church—like the Lateran basilica. A subclass of the conventual church is a priory, belonging to a monastery governed only by a prior. A numerous class of churches is formed of the rural or country churches, in charge of the country curate. Palatine churches and chapels belong to Imperial, royal, or private palaces and castles.

The strict definition of a church is an ecclesiastical building for worship in which full service can be performed and the sacraments administered; in this it differs from oratories and chapels, where only prayers can be offered and the sacraments cannot be given, except occasionally, as on the patron saint's day. There was always a certain ceremony required for the consecrating and licensing of a church. The most famous early instance was that of the basilica at Tyre early in the reign of Constantine, when Eusebius pronounced his celebrated oration before a great assemblage of

bishops and the court and people. Mediæval chronicles are full of descriptions of the magnificent reunions and festivals on such occasions. Often the popes were present with the college of cardinals at the consecration of cathedrals or large monastic churches. In every case the bishops of the neighboring dioceses gathered. No church could be built and opened without being consecrated by the local bishop or his representative. No early written formulas of consecration have survived, but there are a number dating from the period between the tenth and the thirteenth centuries, which show the development of an elaborate symbolism. The consecration was often recorded in a special inscription, with the names of the attending bishops.

A church consists of two essential parts: the *nave*, for the congregation, and the *sanctuary*, for the clergy. As distinguished from pagan methods of worship, the mass of believers was gathered within, not kept outside the place of worship. In fact, the *agapæ*, which were the original form of the Christian gathering, had so slight a liturgy as not to call for separation of clergy and people. The third and fourth centuries, however, with the development of Church organization and liturgy, witnessed the enrichment of church architecture. The semicircle of the *apse* held the presbyters and bishop; and in front of it was placed the *altar;* beyond the altar the *choir* held the readers and singers, separated from the body of the church, or nave, by a parapet, which inclosed the pulpits or ambones. The nave itself was at first generally single, the men being placed in front and the women behind; but very soon the form of the basilica with its side aisles separated by columns was adopted, and the men were placed in one aisle, the women in the other, in order of rank and condition. In the Orient, however, the separation of the sexes, which was always considered necessary, was made even more effective by constructing galleries over the side aisles, in which the women were placed. The use of martyrs' relics, soon required by Church regulations in every church, led to the construction of a shrine to contain them in or beneath the altar. This shrine, called the *confession* (q.v.), developed, between the sixth and eighth centuries, into a monumental *crypt* (q.v.), sometimes filling the entire space beneath the church, but more often only that under the choir, whose pavement was thus raised above the level of the nave. This arrangement, almost universal in monastic and other Romanesque churches, went out of fashion in the Gothic cathedrals.

Churches are generally oriented, i.e., are placed so that the apse faces the east (*ex oriente lux*), while the façade faces west. But the earliest practice was the reverse, the apse facing west, and the priest officiating with face towards the altar and the congregation. This was a part of Christian symbolism which bears a curious analogy to Old Testament (Garden of Eden) and ancient Oriental ideas, especially sun worship. Over the door of the church was often an inscription such as "I am the Door," etc. The world was left outside. The wheel of fortune so often represented on the façade figured the vicissitudes of carnal life. Inside was the spiritual life. The church was consecrated to the people of God, "Plebs Dei"; its walls were covered with paintings or mosaics expressing all the themes of Christian history and belief necessary for the Christian people to know—the book of the unlearned. In the Orient, especially, but often also in the West, there was a strict order in the arrangement of sacred themes throughout the church, so that the people should be led gradually from the more elementary figurative subjects near the doors to the most fundamental and sacred ones in the sanctuary or apse, generally filled with the figure of the triumphant Christ and His attendant apostles and saints.

Speculation as to the origin of the form of the church is more or less idle. The connection with the already existing halls of the public and private basilicas is self-evident. The building was oblong, with a semicircular east end, on either side of which was a small room used to keep the treasures of the church and as a vestiary for the clergy. These sacristies were afterward thrown into the church as side apses. In some large early churches the form of a T was given to the plan by the addition of a cross arm between apse and nave. (See BASILICA.) The nave itself was flanked by one aisle on each side; sometimes by two aisles; sometimes also by lines of side chapels, though this was not done until the later Middle Ages. The façade, usually at the west end, sometimes took the outline of the nave and aisles, sometimes was a mere screen whose outline was not determined by the structure behind it: this was the case in Italy, but rarely in the West. Near it or connected with it was a bell tower, while, as the Middle Ages progressed, towers were multiplied, especially in northern and central Europe, and became an integral part of the architectural composition. It was in the Carolingian period, under monastic influence, that the plan of churches was changed into the form of the cross (see ARCHITECTURE; GOTHIC ART; ROMANESQUE ART), thus bringing in the *transept*, and still later that the choir was so enlarged as almost and sometimes quite to rival the nave in size, as was the case in many Gothic cathedrals. Other forms, however, were sometimes in use: Concentric churches, either round or polygonal, such as San Stefano Rotondo in Rome, Nimeguen, Ottmarsheim, etc.; Greek crosses, as San Marco in Venice; single-nave churches, sometimes domed, as in Byzantine architecture, sometimes vaulted or roofed, as in Dominican and Franciscan churches, whose hall form was invented for the sake of the sermon.

Accessory Structures. There were many accessory structures connected with churches. The most usual were the *episcopal palace*, or the *parish house;* the *cloister* for the canons or monks attached to its service; the *chapels* dedicated to special saints and martyrs; the *baptistery*—in the case of churches where baptism was allowed; the *atria* or cloistered courts in front or beside the main building. The cathedral of Parenzo shows a typical grouping. In front, the episcopal residence; then the baptistery, on the axis of the church; then the rectangular atrium surrounded by colonnades; then the church itself. This was the type from the fourth to the ninth century. The cathedrals of the twelfth and thirteenth centuries show the perfecting of quite a different plan; all the structures in front of the church have disappeared, and it fronts directly on the city street or square. This scheme has ever since been retained, except in monastic churches, which were within the conventual walls. These monastic

and conventual churches were often of great size and formed the dominant element of a group of imposing extent and often of great splendor (see MONASTERIES), with their cloisters, dormitories, refectories, hospitals, storehouses, and chapels.

Church furniture and decoration were always a very important feature. A church was not regarded as completed in the Middle Ages unless it was covered with instructive sculptures or paintings, through which it carried out a large part of its mission. These decorations were not left to the artist, but planned by the ecclesiastical authorities. (See ICONOGRAPHY.) Mosaics, frescoes, tapestries, and painted-glass windows within, sculptured reliefs and statuary without, were used in profusion even in the times when art had fallen lowest. Thrones for bishop and priests, choir stalls for the singers, altars and altarpieces, pulpits, tombs, hanging lamps, and tapestries—all gave ample opportunity for rich display of color and form. St. Bernard's anger was excited by the very profusion of this ecclesiastical art; and he carried on a crusade for simplicity, which was successful only within his own order of Cistercian monks. A second reaction against church magnificence came with Protestantism, which destroyed so many churches, and in building its own often showed the most rigid simplicity, to the great loss of art. But with the growth of Protestantism has come progress in church building. Wren's cathedral of St. Paul in London and his many parish churches were early examples: the types he devised were followed in a measure in American Colonial and early Republican churches. Since the Gothic revival of the last century many beautiful parish churches have been built in that style, both in Europe and America, though few of great size, because the emphasis on preaching in most Protestant bodies necessarily limits the size of the building. Modern churches are built in various styles, both mediæval and neoclassic. Among modern examples may be mentioned Brompton Oratory and Westminster Cathedral, both Roman Catholic, in London; Sacré-Cœur de Montmartre (Roman Catholic), at Paris; cathedral at Berlin; Trinity Church, New York; Trinity Church, Boston; St. Patrick's Roman Catholic Cathedral, New York; All Saints, Albany; St. John the Divine (Episcopal Cathedral) and St. Thomas, New York.

Bibliography. Up to the time of the Renaissance the history of architecture is the development of the church building. The most complete work covering the whole ground is Dehio and Von Bezold, *Die christliche Baukunst des Abendlandes* (Stuttgart, 1887–1901; 5 vols. plates, 2 vols. text). See also Hübsch, *Altchristliche Kirchen* (Karlsruhe, 1862–63); Lübke, *Vorschule zur Geschichte der Kirchenbaukunst des Mittelalters* (Leipzig, 1873); C. E. Norton, *Church Building in the Middle Ages* (New York, 1880); Quast, *Entwickelung der Kirchenbaukunst des Mittelalters* (Berlin, 1858); Clausse, *Monuments du Christianism au moyen âge* (Paris, 1893); Hasak, *Einzelheiter des Kirchenbaues* (Stuttgart, 1903). For Germany, consult Schäfer, *Mustergiltige Kirchenbauten des Mittelalters in Deutschland* (Berlin, 1886); for France, Viollet-le-Duc, "De la construction des édifices religieux en France," in *Annales archéologiques*, i–iv (Paris, 1844–46); and "Architecture" and "Cathédrale" in his *Dictionnaire raisonné de l'architecture française*. For the lesser church buildings, see Braudot, *Eglises de bourgs et villages* (Paris, 1867); Brandon, *Parish Churches* (London, 1848). For Protestant church architecture, consult Schultze, *Das evangelische Kirchengebäude* (Leipzig, 1885), and especially *Der Kirchenbau des Protestantismus* (Berlin, 1893), published by the Vereinigung Berliner Architekten, and treating the entire period from the Reformation till the present date. For Colonial churches, Everett, *Historic Churches of America*.

CHURCH. An organization of Christians, generally defined by Western theologians in substantial accord with the Articles of the Church of England—"a congregation of faithful men, in which the pure word of God is preached, and the sacraments be duly administered in all those things that are of necessity requisite to the same." The Roman Catholic church emphasizes in addition the "rule of legitimate pastors," and especially subjection to the Bishop of Rome as Vicar of Christ. Under these general definitions a great variety of forms of outward organization are recognized. The *papal* government makes all authority finally dependent upon the Pope, who is the Bishop of Rome. The *episcopal* government is administered by bishops, who are all essentially equal in honor and authority, although there may be archbishops who have a certain priority and jurisdiction over other bishops in definite particulars. (See BISHOP.) The *presbyterian* government puts authority in the hands of elders, ministerial and lay, elected ultimately by the congregation. (See PRESBYTERIANISM.) The *congregational* government puts the entire authority over each local congregation of believers in that congregation alone. (See CONGREGATIONALISM.) All Protestants understand by the true Catholic Church (invisible) the whole number of the truly regenerated. Various theories are held as to the manner in which the life of the Church is perpetuated—that maintained by the great majority of Christians, the members of the Roman Catholic, Eastern, and Anglican churches, being known as the theory of apostolic succession (q.v.), while the Protestant churches in general, agreeably to the definition quoted above, postulate no formal system of handing down the Church from age to age. For the discipline of the Church, see DISCIPLINE, ECCLESIASTICAL. See also CREEDS AND CONFESSIONS; SACRAMENT; WORSHIP; CIVIL CHURCH LAW.

CHURCH, A(LEXANDER) HAMILTON. An English efficiency engineer. He became known as one of the pioneers in reducing the commercial organization of factories to the basis of a science, a work in which he was early associated with J. Slater Lewis. His writings include *Production Factors in Cost Accounting and Works Management* (1910), and *The Proper Distribution of Expense Burden* (1908; 2d ed., 1913), both of which had previously appeared as series of articles in the *Engineering Magazine*. He also published a series of papers entitled "Practical Principles of Rational Management" in the same periodical in 1913.

CHURCH, ALFRED JOHN (1829–1912). A prolific English author and scholar, born in London. He was educated at King's College, London, and at Lincoln College, Oxford; ordained (1853); assistant master of Merchant Taylors' School, London (1857–70); head master of Henley Grammar School (1870–72) and

of Retford Grammar School (1873–80); professor of Latin in University College, London (1880–88); rector of Ashley, Tetbury, Gloucestershire (1892–97). He has done much to diffuse a knowledge of ancient culture and is best known for his retellings of classical tales and legends for young people, many of which are published both in England and America. Among his works are a translation of Tacitus, in conjunction with W. J. Brodribb (1862–77); stories from Homer, Vergil, Livy, the Greek tragedians, and Herodotus; *Roman Life in the Days of Cicero* (1883); *Two Thousand Years Ago* (1885); *To the Lions*, a tale of the early Church; *Carthage* (1886); *Pictures of Roman Life and Story* (1892); and the following between the last-named date and 1913: *Early Britain; Heroes of Chivalry; Helmet and Spear; Memories of Men and Books* (1908). Church also edited a collection of translations from Tennyson into Latin verse, under the title *Horæ Tennysonianæ* (1868).

CHURCH, Sir Arthur Herbert (1834–1914). An English chemist, born in London. He received his education at King's College, London, the Royal College of Chemistry, and Lincoln College, Oxford. In 1863 he was appointed professor of chemistry in the Royal College of Agriculture, Cirencester, and from 1879 to 1911 he held the corresponding chair in the Royal Academy of Arts. He lectured at Cooper's Hill from 1888 to 1900, and presided over the Mineralogical Society from 1898 to 1901. He was created K.C.V.O. in 1909. Besides several new minerals, including *churchite*, he discovered the animal pigment *turacin;* and he also carried out a number of interesting researches in organic, inorganic, physiological, and industrial chemistry. His published works include: *Precious Stones* (1883; 5th ed., 1905); *English Earthenware* (1884; 6th ed., 1911); *English Porcelain* (1886); *Food Grains of India* (1886); *Color* (2d ed., 1887); *The Laboratory Guide* (1894; 8th ed., 1906); *Food* (1901); *Chemistry of Paints and Painting* (3d ed., 1901); *Josiah Wedgwood* (2d ed., 1902); *Classified Papers and Letters and Papers in Royal Society Archives* (1907–08); *Guide to Corinium Museum* (10th ed., 1910).

CHURCH, Benjamin (1639–1718). An early New England soldier, famous as an Indian fighter. He was born in Duxbury, Mass., founded the town of Little Compton, Mass., in 1674, and took an active part in the war against King Philip, who was finally defeated and killed by a force under Church in 1676. In 1689 he commanded a futile expedition against the Indians in the Kennebec region, and in the following year was again sent into Maine, where he captured several Indian forts along the Androscoggin. In 1704 he commanded a force of about 700, which, in retaliation for the French and Indian attack upon Deerfield, destroyed Grand Pré and Beaubassin in Acadia. From memoranda kept by him, his son, Thomas Church, published in 1716 a book entitled *Entertaining Passages Relating to Philip's War—as also of Expeditions more lately made against the Common Enemy and Indian Rebels in the Eastern Parts of New England*—"a soldier's bluff narrative of his own dangerous and enticing adventures," which was widely read during the Colonial period, appeared in numerous editions, and was reprinted in Boston under the editorship of H. M. Dexter in 1865–67.

CHURCH, Frederick Edwin (1826–1900). An American landscape painter, of the so-called Hudson River school (q.v.). He was born in Hartford, Conn., May 4, 1826, and was a pupil of Thomas Cole, with whom he worked until the latter's death. He first derived prominence by his "View of East Rock, near New Haven," and "Scenes in the Catskill Mountains." He traveled extensively in South America (1853 and 1857), Labrador (1863), Ecuador, New Granada (1866), the Holy Land and Europe (1868). The subjects of his paintings were largely taken from sketches of these different countries. Church had a fine pictorial sense and good feeling for correct composition, and in spite of his minute execution and infinite detail, the effect of these large panoramas is often impressive and nearly always interesting. He conceived the proper subject of landscape painting to be the most striking and wonderful scenes of nature, and thus his work depended largely on scenic interest for its popularity. During his own day his reputation was very great both in the United States and Europe. Good examples of his work are "The Ægean Sea" (Metropolitan Museum, New York), "Cayambe, South America" (Public Library, New York), "Landscape, South America" (Academy of Design Gallery, New York), "Chimborasso" (1876), "Weltausstellung" (Philadelphia), "Eise Berge" (London). Others are "The Parthenon," "Heart of the Andes," "Cotopaxi," "Horse-Shoe Fall, Niagara," "Damascus," "Jerusalem." Consult Isham, *American Painting* (New York, 1905).

CHURCH, Frederick Stuart (1842–1924). An American animal and figure painter, illustrator, and etcher. He was born in Grand Rapids, Mich., and studied with Shirlaw in Chicago and Wilmarth in New York. He is a member of the National Academy and American Water-Color Society. Among his pictures are "Weirdness," "Mad as March Hares," and "The Sea Princess," in oil; and "Hard Times" and "The Phantoms," in water colors. He exhibited "St. Cecilia" in 1896. He also exhibited, in the National Academy of Design, 1901, "The Sea Serpent," "Companions" (1909), "The Were Wolf" (1910), "St. Cecilia" and "Summer" (1911), "The Stowaway" and "Refuge" (1912), "Conquered" (1913). Church has a sensitive and delicate feeling for color which he realizes more fully through his use of water color than in the medium of oil. His conceits partake somewhat of the German order of fancy and are quaint, sometimes humorous, and sometimes philosophic. His sense of composition and line is graceful and decorative.

CHURCH, Sir Richard (1784–1873). A British soldier, born in Cork, the son of a Quaker. He served for many years in the British army and in 1809 and 1812 raised two regiments of Greek light infantry, in vain attempts to free the Peloponnesus. In 1817 he entered the Neapolitan army. In 1827 he was chosen generalissimo of the land forces of the Greek patriot army. Thereafter he lived in Athens. He wrote *Observations on an Eligible Line of Frontier for Greece* (1830). Consult Poole's biography (London, 1890) and E. M. Church, *Sir Richard Church in Italy and Greece* (Edinburgh, 1905).

CHURCH, Richard William (1815–90). An English author and ecclesiastic, nephew of the preceding. He was born in Lisbon, studied in Oxford, was appointed a fellow of Oriel in

1838, was a friend of the more prominent Oxford Tractarians, started the *Guardian* in 1846, became a rector near Frome in 1852, and was dean of St. Paul's from 1871 until his death. Dean Church was a liberal High-Churchman. He was a scholar with a masterly style and wrote: *Essays and Reviews* (1854); *Civilization and Religion* (1860); *University Sermons* (1868); *The Beginning of the Middle Ages* (1877); able volumes on *Bacon* (1879) and *Spenser* (1879), in the "English Men of Letters Series"; a posthumous work on *The Oxford Movement* (1891); and *Occasional Papers* (1897). Consult his daughter's memoir (1895) and a biography by Lathburg (1907).

CHURCH, William Conant (1836–1917). An American editor, born at Rochester, N. Y. He was educated in the Boston Latin School. While still a youth he engaged with his father in editing and publishing the New York *Chronicle*. In 1860 he became publisher of the New York *Sun* and in 1861–62 was Washington correspondent of the New York *Times*. He resigned this position on his appointment as captain in the United States Volunteers in 1862. He served for one year, receiving brevets of major and lieutenant colonel. In 1863, with his brother, he established the *Army and Navy Journal* and in 1866 founded the *Galaxy Magazine*. He was government commissioner to inspect the Northern Pacific Railroad in 1882. With George W. Wingate he established the National Rifle Association and was its first president; he was one of the founders of the Metropolitan Museum of Art, an original member of the Military Order of the Loyal Legion, and became a life member and director of the New York Zoölogical Society.

CHURCH ALE. An annual festival, held in England in a churchyard or near a church, at which much ale was used. It is said by some to have celebrated some anniversary, as the dedication of a church, or Easter or Whitsuntide. The profits were used for church repairs. Church ales are now represented by village fairs, wakes, etc.

CHURCH ASSOCIATION FOR THE ADVANCEMENT OF THE INTERESTS OF LABOR, The. An organization founded in 1887, in New York City, by communicants of the Protestant Episcopal church. Its object is to interest the clergy and the laity of the church in problems of the laboring man and to show sympathy with laboring classes in their struggle for justice. Bishop Huntington was the first president, and over 60 bishops are honorary members. Communicants of the church are eligible for membership and others for honorary membership. There are standing committees on strikes, sweatshops, etc. The organ of the association is the *Hammer and Pen*.

CHURCH CALENDAR. A table of holy days, saints' days, church festivals, and the like. The earliest now existing, which contains the Christian festivals, is that of Silvius, 448 A.D. A fragment of a Gothic calendar remains, which probably belongs to the fourth century. The name is applied also to the *fasti*, or catalogues for particular churches, of the saints most honored by them, such as bishops, martyrs, etc. At the Reformation the German Lutheran church retained the Roman calendar. The full calendar of the Church of England contains nine columns, giving the golden number, days of the month, the dominical or Sunday letter, the calends, nones, and ides, the daily Scripture lessons, and the holy days of the Church, together with some of the Roman festivals which have been retained, not as having any religious value, but because the practice of the courts or popular customs had become interwoven with them. The calendar of the Protestant Episcopal church in the United States retains only the festivals which are referable to a scriptural origin.

CHURCH CONGRESS. The name of free gatherings of ministers and laymen of the Established church of England, annually convened for the discussion of ecclesiastical and religious questions. The first church congress was held in 1861 in Cambridge and in the following years successively in Oxford, Manchester, Bristol, York, etc. The attendance is usually very large and comprises many bishops and lower dignitaries. Full reports of the proceedings of each session are published. Such meetings, having the advantage of free interchange of views, but with no claim to ecclesiastical authority, have been found very profitable; and in the Protestant Episcopal church of the United States they have been held since 1875 in the years when the General Convention does not meet.

CHURCH DIET. The free gathering of ministers and lay members of German Protestant churches. Such meetings arose in consequence of the revolutionary movement of 1848, which threatened to endanger the influence of the Evangelical church upon society. Members of the Lutheran, Reformed, the United Evangelical, with the High Church "confessionals," participated in the earlier meetings; but after 1860 only the evangelical parties were represented. Annual reports are published.

CHURCH DISCIPLINE. The means employed by the Christian Church, besides the ministration of word and sacraments, to secure on the part of its office bearers and members a faithful adherence to their profession and a corresponding blamelessness of life. It rests upon the authority of Christ and at the same time necessarily arises in some form out of the very constitution of the Church as a society. Among the early Christians it soon assumed forms of great severity towards offenders, especially towards the *lapsed* (q.v.). At a later period the discipline of the Church was chiefly exercised with respect to persons accused of heresy and schism. The penances of the Church of Rome have long formed an important part of its discipline, and therewith its *indulgences* are closely connected, as well as its doctrine and rule of *auricular confession*. (See Confession.) In the Protestant churches public confession of sins by which public scandal has been given, and submission to public rebuke, are sometimes required. Practices more analogous to those of the primitive Church were established in many churches after the Reformation, but in general have fallen greatly or entirely into disuse. The power of exclusion from the Lord's Supper, and from the rights and privileges of church membership, is, however, generally retained and exercised, until, by profession of repentance and by reformation of life, the cause of such exclusion is removed; and ministers or other office bearers are, upon offense given in their doctrine or conduct, suspended from their functions or altogether deposed from their office. The exercise of church discipline belongs more or less exclusively to a hierarchy,

or to the office bearers assembled in church courts, or to the members of each congregation, according as the church is Episcopalian, Presbyterian, or independent in its church government.

Legality of Church Discipline. In the United States church discipline is administered exclusively by church officials and judicatories. The complete separation of church and state deprives the civil tribunals of all power to revise or question ordinary acts of church discipline, or of exclusion from church membership. Secular tribunals have to do only with the rights of property and of personal liberty. If these are illegally invaded, under pretext of administering church discipline, the civil courts have authority to afford redress. See CIVIL CHURCH LAW.

Whether a church member is amenable to ecclesiastical punishment is to be determined by the proper officers or judicatories of the particular church, in accordance with its rules of government and discipline. From their final decision no appeal lies to a civil court. In the language of the United States Supreme Court: "The law knows no heresy and is committed to the support of no dogma, the establishment of no sect. The right to organize voluntary religious associations to assist in the expression and dissemination of any religious doctrine, and to create tribunals for the decision of controverted questions of faith within the association, and for the ecclesiastical government of individuals, congregations, and officers within the general association is unquestioned. All who unite themselves to such a body do so with an implied consent to this government and are bound to submit to it." The disciplinary authority of such bodies, and the rights and duties of their members, are governed by the same general rules of law that control in case of social or political clubs or other private organizations. See RELIGIOUS SOCIETIES; and cf. CANON LAW and CLUB.

CHURCHES OF ASIA, THE SEVEN. The churches addressed in the opening chapters of the Book of Revelation, under the following names: Ephesus, Smyrna, Pergamum, Thyatira, Sardis, Philadelphia, and Laodicea. These churches represented groups into which the churches of the Province of Asia had come to be organized before the Book of Revelation was written. These groups were not so much of territorial character, marked off by geographical limits, as postal districts, having respectively, as their distributing centres, one of these seven cities lying on the main route which forms an inner circle around the most important part of the province. Ephesus would be the distributing point for the Cayster and lower Mænander valleys and the coast; Smyrna for the lower Hermus valley and the North Ionian coast; Pergamum for the north; Thyatira for the inland district to the northeast and east; Sardis for the middle valley of the Hermus; Philadelphia for upper Lydia; Laodicea for the Lycus valley and for central Phrygia—the whole of the province being thus compassed through supplementary messengers who would proceed from these distributing cities through the secondary districts which they represented.

From the qualities assigned these churches in the above chapters, Smyrna, in spite of her poverty, possessed the most commendable spiritual life, being designated in its message as "rich" (ii. 9). This was perhaps due to its continued exposure to persecution, which later (c.155) resulted in the martyrdom of its bishop, Polycarp, at the instigation of the hostile Jews of the city. In its Byzantine period its bishopric was originally subject to Ephesus, though it afterward became independent and was finally raised to metropolitan rank. Its endurance remained a characteristic of its life, though it was largely its strategic position, as well as its commercial relations with the West, which made it the last Christian city in Asia Minor to yield to Turkish rule (1402). On the other hand, in spite of its great wealth, Laodicea possessed the least commendable spiritual life and is spoken of as in the unendurable condition of lukewarmness (iii. 16). Little is known of its later Christian life beyond the fact that it seems to have been beset with a spirit of compromise. In the ecclesiastical organization the city came to be the leading bishopric of Phrygia.

Of the remaining churches, Philadelphia is commended in terms similar to those addressed to Smyrna, though betraying, along with its fidelity, a lack of strength in its religious living, doubtless due to the smallness of the church's numbers (iii. 8). It rose to the first place among the bishoprics of Lydia, and with an endurance almost equal to that of Smyrna, resisted until the very close of the fourteenth century (c.1390) the Turkish conquest. Sardis, on the other hand, is rebuked almost as severely as Laodicea (iii. 1), though a reservation is made of a few names in the church which are worthy (verse 4). At the time these letters were written, it was a city whose greatness belonged to a barbarous civilization that had passed away. In the organization of the churches, however, its bishopric was of metropolitan rank within the Province of Lydia, though it finally yielded its primacy to Philadelphia (1316 A.D.).

With the life of the churches of Pergamum and Thyatira fault is found chiefly because of failure to separate the religious life clearly and distinctly from the life of the irreligious world; the blame of Ephesus is that it had lost its first enthusiasm. Ephesus continued for centuries the first ecclesiastical centre of western Asia, being the place of the Council of Ephesus (431 A.D.). And though at the time of these letters its importance was shared with Pergamum, which was the historical and still remained the official capital, and at the first was the sole metropolis of Asia, yet in these letters it stands as representing the whole province, as the province represents the whole Church. Of the later history of the churches of Pergamum and Thyatira little or nothing is known. Pergamum, however, became a bishopric and so continued through the Byzantine period.

Bibliography. Ramsay, *The Letters to the Seven Churches* (1905); *Cities and Bishoprics of Phrygia*, vol. i (1895); Von Dobschütz, *Christian Life in the Primitive Church*, pp. 255 ff. (1904).

CHURCH GOVERNMENT. See CHURCH; CHURCH DISCIPLINE; BISHOP; INDEPENDENTS; PRESBYTERIANISM.

CHURCH HISTORY. The history of the Christian religion and Church. With much diversity on minor points, there is a general agreement in dividing the history of the Church into three great periods: the first, from the birth of Christ to the time of Constantine; the second, from that epoch to the Reformation; and the third, from the Reformation to the present day. The earliest facts of Church history

are to be learned only from the New Testament and from the brief hints in the letters and other writings of the primitive fathers. Hegesippus, a Jewish Christian of the latter half of the second century, put together some memorials of these early times; but his work has survived only in a few quotations. The real father of ecclesiastical history is Eusebius of Cæsarea (died c.350). His work was continued to the fifth century by three important historians—Socrates, Sozomen, and Theodoret. In the West attempts were made to translate, combine, and complete these Eastern histories by Rufinus, Sulpicius Severus, and Cassiodorus. In the sixth century Theodorus Lector, Zacharias, and Evagrius were of some importance. But the stagnation which came over Eastern theology was felt in the historical department, and only one Greek author is worthy of mention throughout the whole of the Middle Ages—Nicephorus Callistius, a priest of Constantinople who wrote in the early fourteenth century, and who drew his materials from the library of the church of St. Sophia, of which he had charge. In western Europe, on the other hand, the stirring religious life which found expression in so much development of doctrine and discipline also led to the careful recording of important events. The product of this literary activity falls into three main classes—histories of separate peoples; attempts at universal histories; and the mass of annals, chronicles, and bibliographies. The most prominent names in the first class are: Isidore of Seville, for the Goths and Vandals; Gregory of Tours, for the Franks; Bede, for the Anglo-Saxons; and Paulus Diaconus for the Lombards. The earliest mediæval attempt at a general Church history was made by Haymo of Halberstadt (died 853); another followed in 872, by Anastasius, the librarian of the Roman church. Ordericus Vitalis produced a notable work about 1412. But the greatest general history written in the Middle Ages was that of the Dominican Antoninus, Archbishop of Florence from 1446 to 1459. In places, especially in his account of the donation of Constantine, he shows an awakening of the critical spirit which was fostered by Laurentius Valla and Nicolas of Cusa. The third class is far too large to treat in detail. A *catalogue raisonné* of it may be found in Potthast, *Bibliotheca Historiæ Medii Ævi* (Berlin, 1862), or in Chevalier, *Répertoire des sources historiques du moyen âge, Bio-bibliographie* (Paris, 1886).

A new era began for ecclesiastical history about the end of the fifteenth century. The critical tendency aroused by the revival of letters, the bringing to the West of early Greek texts, the rendering of sources accessible by the invention of printing, and the controversial spirit of the Reformation, which forced both sides to attempt to justify their position by history—all these made great changes in the method. About the middle of the sixteenth century the Magdeburg Centuriators (q.v.) undertook their great work with a view of proving the utter iniquity of all that had ever been done by the papacy, which to them was Antichrist, and though they had unusual scholarship and knowledge of sources, their polemical bias detracted much from the value of their work. It called forth a counterblast from the Catholic side in the *Annals* of the Oratorian Baronius, who had access to an immense number of valuable documents. He produced a work far in advance of any previous attempt, and accepted so generally that a century passed before any other work of the same scope was undertaken. The next important works from the Roman Catholic standpoint came from France, as part of the general efflorescence of the reign of Louis XIV. The names of Godeau (died 1672), Maimbourg (died 1686), Fleury (died 1724), and still more Natalis Alexander (died 1724) and De Tillemont (died 1698), deserve to be remembered. Of modern French Roman Catholic works, the best are Rohrbacher (died 1856), Darras, and Guettée. Italy does not supply many names of excellence in the general field; the most notable are Orsi (died 1761), De Graveson (died 1733), and Berti (died 1766). The Italians distinguished themselves more in special studies, particularly Mansi, Muratori, De Rossi, Moroni, and Tiraboschi. In Germany there has been since the Reformation a continuous tradition of apologists for that movement and its principles. Special histories of it were composed by Sleidan and Seckendorf. In the seventeenth century Calixtus distinguished himself in this department, and, after him, Illig, Rechenberg, and Thomasius. In the general field, from the Lutheran point of view, are the mystic Arnold (died 1714), Mosheim (died 1755), and his pupil, Schröchk (died 1808); Semler (died 1799), who led the way to a more rationalistic treatment; and Planck (died 1833). In modern times the first great name is Neander (died 1850). F. C. Baur, who followed out the impulse of Semler, has had much influence, and his work was continued by his son, F. Baur, and his son-in-law, Zeller. Hase (died 1890) holds a middle ground between Baur and the more orthodox; and later still in time come Harnack, Hauck, and Loofs. Other historians in the Reformed churches have been largely specialists, such as Pearson, Dallæus, Dodwell, Beveridge, Bingham, Ussher, Cave, and Blondel. The Church of England, to which some of these names belong, and which produced in the middle of the nineteenth century Milman's *History of Latin Christianity* and the work of Robertson, has later been adorned by the learning of Stubbs and Creighton. A succession of learned German writers in the Roman Catholic church dates from Count von Stolberg (died 1819), whose work was continued by Von Kerz, Brischar, and Katerkamp. Others of this school are Hortig (died 1847), Ritter (died 1857), Alzog (died 1878), Hefele (died 1893), Cardinal Hergenröther (died 1890), and Pastor. In America Church history has not been much cultivated, but the best general historian is Philip Schaff. Others who have done good service are G. P. Fisher, J. H. Hurst, and H. C. Sheldon. The modern tendency everywhere, as in other branches of learning, is towards specialization rather than an attempt to cover the entire field; and a multitude of works bearing on the history of particular churches and periods will be found referred to in the bibliography of the articles on those subjects. For bibliography of a more extended nature, consult: Hagenbach, *Encyklopädie und Methodologie der theologischen Wissenschaften* (12th ed. by Reischle, Leipzig, 1889); Crooks and Hurst, *Theological Encyclopædia* (New York, 1884), which is based upon Hagenbach; and, for the names of Roman Catholic works, Hurter, *Nomenclator Literarius* (5 vols., Innsbruck, 1871–86). A review of the development of Church history may be found in

the introduction of vol. i, Schaff, *History of the Christian Church* (5th ed., New York, 1890).

CHURCH'ILL, CHARLES (1731–64). An English poet, born in Westminster, where his father became a curate. He was educated at Westminster School and two years later, at 17, made a clandestine marriage. In 1756 he was ordained and soon afterward succeeded his father as curate of St. John's, Westminster. In 1761 he published anonymously (at his own risk, the booksellers having offered him only five guineas for it) *The Rosciad,* a satire on theatrical managers and performers. Its success was instant, and he avowed himself the author. Later in the same year he brought out *The Apology,* a bitter attack on his critics, which added alike to his purse and to his notoriety. He now totally neglected the duties of his office and led a most dissolute life. His parishioners were scandalized, and his dean remonstrated; whereupon, to show his utter contempt for the ministerial profession, Churchill appeared in a blue coat, gold-laced hat and waistcoat, and large ruffles. He was obliged, however, to resign his preferment. A friend of John Wilkes (q.v.), he contributed to the *North Briton.* Among his other poems, all more or less satirical, are: "Night"; "The Prophecy of Famine: A Scot's Pastoral"; the "Epistle to Hogarth"; "The Author"; "The Candidate"; "The Ghost"; "Gotham"; and "The Duelist." He died Nov. 4, 1764, while on a visit to Wilkes in Boulogne. Consult *Genuine Memoirs of Charles Churchill* (London, 1765), and the Aldine edition (London, 1892) of his works, containing notes by Tooke, and a memoir by Hannay.

CHURCHILL, JOHN. See MARLBOROUGH, JOHN CHURCHILL, DUKE OF.

CHURCHILL, LORD RANDOLPH HENRY SPENCER, usually called LORD RANDOLPH CHURCHILL (1849–95). An English Conservative statesman. The third son of the seventh Duke of Marlborough, he was born at Blenheim Palace, Feb. 13, 1849. He was educated at Eton, and Merton College, Oxford, and entered Parliament in 1874 as member for Woodstock. The same year he married the brilliant Miss Jennie Jerome of New York, who, as a prominent member of the Primrose League, gave him valuable assistance throughout his political career. He was a quiescent member until 1880, when the Conservative defeat roused him to action as the leader of the Fourth party—a small band of keen-minded Conservatives. He distinguished himself as a ready, unconventional debater, attracting particular attention by his audacious criticism of Gladstone's foreign and domestic policy. At the same time he was so fearless a critic of various Conservative leaders that his group gained the nickname of the "Fourth party." He became still more prominent as chairman of the Conservative Union (1884) and in 1885 unsuccessfully attempted to defeat Mr. Bright in Birmingham, but was returned for South Paddington, which was kept in reserve for him. From June, 1885, to January, 1886, he was Secretary of State for India, his period of office being marked by the annexation of Burma. For six months in 1886 he was Chancellor of the Exchequer, but resigned, expressing the resolve "to sacrifice himself on the altar of thrift and economy." Thenceforward he incisively criticized governmental expenditure, although always voting with his party. He was the exponent of Tory democracy and had a considerable following of young Conservatives. "Congenital causes" suddenly occasioned a failing of power; and in 1892 he sought recuperation by travel and hunting in South Africa, sending interesting descriptions of his tour to the *Daily Graphic,* and publishing *Men, Mines, and Animals in South Africa* (1892). During his absence he was re-elected, but died in 1895. His *Life* (London and New York, 1906) was written by his son, Winston Spencer Churchill. Consult also Rosebery, *Lord Randolph Churchill* (London, 1906).

CHURCHILL, WILLIAM (1859–1920). An American Polynesian ethnologist and philologist, born in Brooklyn, N. Y. He was educated at Yale University. In 1896 he became Consul General to Samoa, where he also served as judge of the consular court, as senior member of the consular board under the Berlin General Act, and as adviser to Malietoa Laupepa, King of Samoa. He was also receiver and custodian of the Samoan revenues and president of the Municipality of Apia. In 1897 his commission was extended, making him also Consul General to Tonga. Later he became a member of the editorial staff of the New York *Sun.* He was elected a fellow of the Royal Anthropological Institute in 1912 and an honorary member of the Polynesian Society in 1913. He is author of *A Princess of Fiji* (1892); *The Polynesian Wanderings, Tracks of the Migration Deduced from an Examination of the Proto-Samoan Content of Efaté and Other Languages of Melanesia* (1910); *Beach-la-Mar, the Jargon or Trade Speech of the Western Pacific* (1911); *Eastern Island, Rapanui Speech and the Peopling of Southeast Polynesia* (1912); *The Subanu, Studies of a Sub-Visayan Mountain Folk of Mindanao* (1913), with Col. John Park Finley. He was also editor of the Malayo-Polynesian section of the *Standard Dictionary* (1913), and a contributor of articles to the second edition of the NEW INTERNATIONAL ENCYCLOPÆDIA (1914–15).

CHURCHILL, WINSTON (1871–). An American novelist. He was born in St. Louis, Mo., and graduated at the United States Naval Academy in 1894. He wrote *The Celebrity* (1898), a novel, but first became widely known through *Richard Carvel* (1899). This was followed by, notably, *The Crisis* (1901), *The Crossing* (1904), and *Coniston* (1906), all remarkably successful novels, and the last named considered by some his best effort. Later books of his are *Mr. Crewe's Career* (1908); *A Modern Chronicle* (1910); and *The Inside of the Cup* (1913). As an historical novelist and as a novelist of contemporary American life, Winston Churchill has done good and substantial work. He writes slowly and carefully, and the texture and structure of his novels are evidence of this commendable characteristic, which honorably distinguishes him from too many gifted and popular writers whose literary methods are more perfunctory. He made his home at Cornish, N. H., and in 1906 took an active part in that State's politics, practically forcing upon the Republican convention his programme for various reforms. See also AMERICAN LITERATURE.

CHURCHILL, RT. HON. WINSTON LEONARD SPENCER (1874–). Statesman and author, son of Lord Randolph Churchill. He was educated at Harrow and Sandhurst, entered the army in 1895, served with the Spanish army in Cuba, and fought with distinction in India (1897) and the Sudan (1898). On the out-

break of the Boer War (1899) he went to the Transvaal. On November 15 he was taken prisoner by the Boers while acting as correspondent for the *Morning Post*. He was imprisoned at Pretoria, but escaped later in the year. In September, 1900, he was elected Conservative member of Parliament for Oldham. He opposed Mr. Chamberlain's tariff reform proposals and in the sessions of 1904–05 acted with the Liberals. He became Parliamentary Secretary for the Colonies under the Campbell-Bannerman ministry in December, 1905, and in the general election of the following month was chosen as a Liberal from Manchester, Northwest. He then became Undersecretary of State for the Colonies, was promoted to the cabinet in 1908 as President of the Board of Trade, made Home Secretary in 1910, and First Lord of the Admiralty in 1911. An excellent orator, brilliant in repartee, fearless on the platform, Churchill, with the possible exception of Lloyd-George (q.v.), has become the foremost popular parliamentary speaker in the country. In his administrative work he has been tireless; as President of the Board of Trade he took an active part in the settlement of trade disputes; as First Lord of the Admiralty he has descended to the ocean bottom in submarines and has ascended in aëroplanes, holding, indeed, in person, an aviator's license. Although making tentative offers to Germany in 1913 for the declaration of a so-called "Naval Holiday," or an agreement for a year's respite from new armaments, Churchill has insisted on a consistently accelerated naval programme. He wrote: *The Story of the Malakand Field Force* (1898); *The River War* (1899); *Savrola* (1900); *London to Ladysmith via Pretoria* (1900); *Ian Hamilton's March* (1900); *Lord Randolph Churchill* (2 vols., London, 1906); *Free Trade in its Bearing on International Relations* (1908); *My African Journey* (1908); *Liberalism and the Social Problem* (1909).

CHURCHILL RIVER. A tributary of Hudson Bay from the west, its waters being discharged into Churchill harbor at Fort Churchill (Map: Northwest Territory, K 3). This river is in water connection with a large series of lakes in Keewatin, Athabasca, and Saskatchewan, and itself consists of a series of lakes and intervening narrower river channels. Through Reindeer or Caribou Lake the Churchill River appears to be in connection with Wollaston or Great Hatchet Lake, a portion of the water of which flows into the Mackenzie River. The general course of the Churchill River is at first east and then northeast; the distance from the source to the mouth is about 925 miles.

CHURCHING OF WOMEN. A religious usage prevailing in the Christian Church from an early period, of women, on their recovery after childbearing, going to church to give thanks. See Lev. xii. 6. In the Greek and Roman Catholic churches it is still frequent. In the Church of England, also, a service for the churching of women finds its place in the liturgy. It takes place after the fortieth day from parturition.

CHURCH OF ENGLAND. See ENGLAND, CHURCH OF.

CHURCH OF ENGLAND, FREE. See REFORMED EPISCOPAL CHURCH.

CHURCH or **CHURCHES OF GOD.** A religious denomination in the United States, sometimes called Winebrennerians, whose doctrines agree generally with those of the Baptists. It originated in revivals which took place under the preaching of the Rev. John Winebrenner, a German Reformed pastor, at Harrisburg, Pa. Mr. Winebrenner's views having undergone some change, he met with other ministers, in 1830, and they adopted a basis of church organization, the leading points of which were that the believers in any given place are, under the divine order, to constitute one body; that division into sects and parties under human names and creeds is contrary to the spirit of the New Testament; that the believers of any community, organized into one body, constitute God's household or family, and should be known as the Church of God; that the Scriptures, without note or comment, constitute a sufficient rule of faith and practice, while creeds and confessions tend to divisions and sects; and that the ordinances of immersion in water in the name of the Trinity, the washing of the saints' feet, and the partaking of bread and wine in commemoration of the suffering and death of Christ, are binding upon all believers. The organization of the church consists of 17 annual elderships, covering districts in 16 States, Oklahoma, and the Indian Territory, and a general eldership, composed of delegates from the annual elderships, meeting every four years, which has charge of general concerns, with various boards serving four years. The words "Church of God" in the titles of the general and annual elderships were changed in 1896 to "Churches of God." No official statistics are compiled. The ministerial register for 1905 contained 479 names. Other estimates for 1905 give 580 churches and 38,000 communicants. The denomination has a college at Findlay, Ohio, with an endowment approaching $100,000, a collegiate institute at Fort Scott, Kans., and an academy at Barkeyville, Pa.; has a large bookstore and publishing house at Harrisburg, Pa.; sustains four missionaries in India, in part of the territory assigned to the Free Baptist church, and is also represented by missionaries working in other foreign fields and under other boards; and has, further, an active Woman's Missionary Society. It is interested in beneficiary education for the ministry and is making progress in educational matters generally. Its organs are: *The Church Advocate*, weekly; *The Workman Quarterly, The Sunday School Gem, The Sunbeam, The Primary Quarterly.* Consult: Winebrenner, *A Brief View of the Church of God* (Harrisburg, Pa., 1840); id., *Practical and Doctrinal Sermons* (ib., 1860); a *History and Doctrines of the Churches of God* is in preparation by J. H. Forney.

CHURCH OF GOD IN CHRIST. See MENNONITES.

CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS. See MORMONS.

CHURCH OF THE BRETHREN, THE. A considerable body of Christians, also known as DUNKERS, or DUNKARDS, and among themselves as Brethren, whose faith and practice are not generally known outside of the localities in which they live. Thus the reiterated statements that they are celibates, that they discourage marriage, that they do not marry outside of their own fraternity, that they keep the seventh day as the Sabbath, that they live in communities, and other similar errors set forth in the books, always have been without foundation. The movement which resulted in the closer organization of the Church of the Brethren grew out of the great religious awakening which

occurred in Germany in the latter part of the seventeenth century, when large numbers, becoming dissatisfied with the lack of spirituality in the state church, withdrew from its communion. They organized at Schwartzenau, Germany, in 1708, with Alexander Mack as their first minister; but in no way do they regard him as the founder of the church.

Driven by persecution to Wittgenstein, they rejected all human creeds and accepted the gospel of Jesus Christ as their rule of faith and practice. The church suffered from persecution and finally emigrated (1719–29) to America, settling near Germantown, Pa., where the first church in this country was organized in 1723. Among the early emigrants was Christopher Saur, who was the first in America to print the Bible in a European tongue. From this nucleus the church spread southward and westward, and flourishing congregations are now to be found in most of the States. They are, however, most numerous in Pennsylvania, Maryland, Virginia, Ohio, Indiana, Illinois, Iowa, Missouri, Nebraska, Kansas, and North Dakota. At the annual conference held in 1913, 30 States and several foreign countries were represented. They now number about 120,000 communicants, have 1240 congregations, with 3485 ministers, who, as a rule, serve without salary. They are largely engaged in agricultural pursuits, though in recent years the denomination has expanded to include many prosperous city churches, with pastorates filled by men of liberal education. The denomination supports 10 colleges. They are: Juniata College, Huntingdon, Pa.; Mt. Morris College, Mt. Morris, Ill.; Bridgewater College, Bridgewater, Va.; McPherson College, McPherson, Kans.; Botetourt Normal College, Daleville, Va.; Lordsburg College, Lordsburg, Cal.; North Manchester College, North Manchester, Ind.; Elizabethtown College, Elizabethtown, Pa.; Blue Ridge College, New Windsor, Md.; Bethany Bible School, Chicago, Ill. Missions have been established in Denmark, Sweden, Asia Minor, and India. There are about 60 missionaries in India and China, with 1500 converts. A theological school has been opened at Bulsor, India. The Missionary Society has an endowment fund of nearly $500,000. A large and well-appointed publishing house, located at Elgin, Ill., is owned by the church. The *Gospel Messenger*, the church paper, has a circulation of over 24,000.

In doctrine the Brethren are strictly orthodox. They hold the Bible to be the inspired and infallible word of God, and accept the New Testament as their only rule of faith and practice. They believe in the Trinity, in the divinity of Christ, in the Holy Ghost, and in future rewards and punishments. In the subtleties of speculative theology they take but little interest. Faith, repentance, and baptism are held to be the conditions of salvation. These three constitute true promise of the forgiveness of sins and the gift of the Holy Ghost. In practice they follow closely the Scripture teaching and observe the primitive simplicity of the apostolic church; hence they regard nonconformity to the world as an important principle. They enjoin plainness of dress, settle their difficulties among themselves without going to law, affirm instead of taking oath, refrain from taking a prominent part in politics, are opposed to secret societies, advise against the use of tobacco, and have a rule more than a century old against the manufacture, sale, and use of intoxicants. As early as 1782 they prohibited slavery and pronounced in strong terms against the slave trade. They baptize believers only, dipping them face forward at the mention of each name in the Trinity given in the baptismal formula in Matt. xxviii. 19. Communion is observed in the evening, after a full meal called the Lord's Supper. Before the supper the ordinance of foot washing is observed, the brethren washing one another's feet, and the sisters performing the same service among themselves. After supper, before the communion is taken, the sexes extend the right hand of fellowship and exchange the kiss of peace. Bishops, or elders, ministers in the first and second degree, and deacons, are elected by the congregations. Ministers are advanced from the first to the second degree, and bishops are chosen from the latter and ordained by the imposition of hands. Congregations are organized into State districts, and both elect delegates to the annual conference, which is the chief ecclesiastical body. Here the fullest and freest discussion of all questions coming before the assembly is permitted. The final decisions are rendered by a two-thirds vote of the churches. Women are eligible to serve as delegates in conference.

In 1881–83 the church suffered the loss of about 8000 communicants by a division in its ranks, resulting in the secession of two parties, known as the Old-Order and Progressive Brethren. The former objected most seriously to the advance the church was making in educational, missionary, and Sunday-school work, while the latter insisted strenuously that the church was too conservative, that the rules laid down by the annual conference were oppressive, and that greater liberty should be enjoyed in matters of dress. After some years of contention these parties withdrew from the mother church and formed separate organizations. The Old-Order Brethren in 1913 had 222 ministers and about 3500 members. They determinedly oppose higher education, missionary work, Sunday schools, and revival services. They publish a paper, the *Vindicator*. In 1890 the Progressive Brethren numbered 8000 and have since then increased, claiming 22,000 members and 300 ministers in 1914. They have a college at Ashland, Ohio, where their publishing house is located. The *Evangelist*, their church paper, circulates generally among the members of their body. For the German Seventh-Day Baptists, an early offshoot of the German Baptist Brethren, see BAPTISTS.

Bibliography. Brumbaugh, *History of the Brethren; Two Centuries of the Church of the Brethren* (Elgin, Ill.); Yoder, *God's Means of Grace, on the Doctrines;* Kurtz, *An Outline of the Fundamental Doctrines of Faith;* Carroll, *Religious Denominations of the United States* (new ed., 1912).

CHURCH OF THE NEW JERUSALEM. See SWEDENBORGIANS.

CHURCH RATES. In England, a tax or assessment laid on the parishioners and occupiers of land within a parish, by a majority of their own body in vestry assembled, for the purpose of upholding and repairing the fabric of the church and the belfry, the bells, seats, and ornaments, the churchyard fence, and the expenses (other than those of maintaining the minister) incident to the celebration of divine service. The parishioners are convened for this

purpose by the churchwardens. The chancel being regarded as belonging peculiarly to the clergy, the expense of maintaining it is laid on the rector or vicar, though custom frequently lays this burden also on the parishioners, as in London and elsewhere.

The church rates were anciently a charge on the tithes of the parish, which were divided into three portions—one for the structure of the church, one for the poor, and the third for the ministers of the church. This distribution is said to have originated with Pope Gregory I, who enjoined St. Augustine thus to divide such voluntary offerings as might be made to his missionary church in England. A canon of Archbishop Ælfric in 970, and an Act of the Witenagemote in 1014, in Ethelred's time, have been quoted in proof of the recognition of this rule by our Saxon fathers. It seems to have been their custom, also, to devote to the repair of each church a portion of the fines paid for offenses committed within the district attached to it; and every bishop was bound to contribute to the repair of his own church from his own means. A third of the tithes thus originally devoted to the repairs of churches continued to be applied to that purpose under the Normans down to the middle of the thirteenth century; and the manner in which this burden came to be shifted to the parishioners has been a subject of much discussion among legal antiquarians. Lord (then Sir John) Campbell, who published a pamphlet on the subject in 1837, is of opinion that the contributions of the parishioners were at first purely voluntary, and that, the custom growing, it at last assumed the form of an obligation and was enforced by ecclesiastical censures. The care of the fabric of the church and the due administration of its offices are laid upon the ministers and the churchwardens conjointly, and the latter may be proceeded against by citation, in the ecclesiastical courts, should they neglect these duties. But there is no legal mode of compelling the parishioners as a body to provide the rate; and this circumstance has occasioned much difficulty in imposing the tax in parishes in which dissent is prevalent and led to many churches falling into a partially ruinous condition. The proper criterion for the amount of church rates is a valuation of the property within the parish, grounded on the rent that a tenant would be willing to pay for it. Glebe land, the possessions of the crown in the actual occupation of the sovereign, and places of public worship, are not liable for church rates; but there is no other exception as regards immovable property, and in some parishes custom even extends it to stock in trade. It has been often decided in the courts that a retrospective church rate—i.e., a rate for expenses previously incurred—cannot be validly imposed. Much difficulty has been experienced in recovering the rates imposed by the parish on individuals refusing to pay. Previous to 53 Geo. III, c. 127, the only mode was by suit in the ecclesiastical court. That statute, however, in all cases under £10, empowered the justices of the peace of the county where the church was situated, on complaint of the churchwardens, to inquire into the merits of the case and order payment. Against the decision of the justices an appeal lies to the quarter sessions. In 1868 an end was put to all parochial contentions by enacting that no suit or proceeding should thereafter be allowed in any court to enforce or compel payment of a church rate, except where a local act authorized this rate. But, except so far as related to the compulsory payment of these rates, the churchwardens might, as before, make, assess, receive, and deal with such rates. In each district parish the inhabitants may treat their own church as if it were their parish church and make and receive rates for the repair of the same. A body of trustees may now be appointed in each parish to receive contributions for ecclesiastical purposes in the parish.

CHURCH, STATES OF THE. See PAPAL STATES.

CHURCH TEMPERANCE SOCIETY. A national organization of the Episcopal church in the United States for the promotion of temperance. It was founded in New York in 1881, on the lines which the Church of England Temperance Society had been pursuing for 10 years previously. Its president is the presiding bishop of the church. The society stands for a policy of high license as opposed to prohibition and has done effective work through legislative channels. It conducts the Squirrel Inn Free Reading Room on the Bowery in New York City and maintains the Longshoreman's Rest. Among other agencies are ice-water fountains, lunch wagons, coffee-houses, workingmen's clubs, and other attractive, wholesome resorts. In connection with the society's work there is a Church Temperance Legion, which provides moral, civic, and military training for boys.

CHURCH TRIUMPHANT, THE. A church founded by George Schweinfurth, who was born in Marion, Ohio, in 1853. He left the ministry of the Methodist Episcopal church soon after entering it and became a follower of a Mrs. Beekman, who professed to be "the spiritual mother of Christ in His second coming." Before her death, in 1883, she declared Schweinfurth to be "the Messiah of the New Dispensation," and her followers adhered to him. He claimed to have received the same spirit as Christ and to be equal with Him and sinless, and to have power to perform miracles, to bestow the spirit upon others, and to free from the curse and save from the commission of sin. The Church Triumphant does not believe that Christ was essentially divine, but that He was a man who had experienced freedom from the power and curse of sin and then received the spirit of God and became divine. The religious services are without rites, ceremonies, or forms of worship, and consist chiefly of the reading of the sermons prepared by Schweinfurth. The principal centre of this church is at a place called Mount Zion, near Rockford, Ill., where it has a special building. According to the latest published enumeration, it has 12 societies, with 384 members, in the States of Colorado, Illinois, Kentucky, Michigan, and Missouri. Consult H. K. Carroll, *The Religious Forces of the United States* (New York, rev. ed., 1912).

CHURCHWARDENS. In England, ecclesiastical officers, elected sometimes by the parishioners and ministers jointly, sometimes by the minister alone, and sometimes by the parishioners alone, for the purpose of protecting the edifice of the church, superintending the celebration of public worship, and to form and execute other parochial regulations. They are generally two in number. (See CHURCH RATES; PARISH; VESTRY.) In the Protestant Episcopal church of the United States wardens are annually elected by each parish in Easter week; their duties, which are regulated by diocesan

and not by general canons, being the same as those of the corresponding English officials, omitting only such as relate to a church established by the state.

CHURCH'YARD, Thomas (?1520–1604). An English author, born at Shrewsbury. He was a servant in the household of the Earl of Surrey, and a soldier of fortune in Ireland, the Low Countries, and France, and from 1560 poured forth an amazing number of broadsides, pamphlets, and other more pretentious works. Disraeli (*Calamities of Authors*) says that "he was frequently employed to supply verses for court masques and pageantry," and he composed such pieces for the entertainment of Queen Elizabeth at Bristol and Norwich. He died in poverty and neglect. His best effort is *The Worthiness of Wales* (1587; reissued in facsimile in 1876 by the Spenser Society), a national poem of some interest to the antiquarian and historian. Consult Collier's edition of *Churchyard's Chippes* (1870) and a memoir by Adnitt (1884).

CHURL. See Ceorl.

CHURN (AS. *cyrin,* Icel. *kirna,* Dan. *kjærne,* churn, dialectic Ger. *Kern,* NIcel. *kjarna,* cream). A machine for agitating milk or cream for the production of butter. The principle of the operation is considered in the article on Butter Making (q.v.). The oldest form of churn was a bag of skins, in which the cream was agitated. The upright or plunger churn was laborious and was superseded by the dash churn, and by a form in which the cream was agitated by means of floats or paddles. There were many kinds of these, with arrangements for cooling or heating the cream. But these injured the texture of the butter, because of the effect of the stirring motion on the grain of the first particles of butter formed. Barrel churns and rectangular churns, hung upon the shorter axis, have come into very general use, and box churns which are oscillated, often called swing churns, are much used, especially in small dairies.

The best churns are entirely hollow vessels of the barrel or box shape, which agitate the cream through concussion of the particles upon the sides of the churn. The churn should not be entirely filled; it should be left half, or preferably only one-third, full. Although the yield of butter is not much diminished by increasing the amount churned at one time, the time required for churning is increased, and the temperature is raised at the end of churning, which is decidedly injurious to the butter, making it softer and more difficult to handle. Too rapid churning gives the cream the motion of the churn, and the particles of butter fat are not brought into contact with each other. The labor of churning has been very greatly decreased in the modern churn, and forms have been made in which dog power, horse power, and steam power are employed. The power churns, of immense size, are usually employed in creameries. The combined churn and butterworker has been described under Butterworker (q.v.). The butter extractor is essentially a cream separator and continuous churn combined. The butter made with this machine is, of course, sweet-cream butter.

CHURN OWL, or **CHURR OWL.** A name in Great Britain for the nightjar (q.v.).

CHUROYA, chōō-rō'yȧ. A tribe living in eastern Colombia. They are of low physical type, very ugly, and go generally naked, decorating their bodies with tattooing, in default of clothing. With several other tribes of the same region, they constitute a distinct linguistic stock, to which belongs also the Guahibo (q.v.), formerly considered independent. Rivet and Chamberlain prefer to term the stock "Guahiban." Consult Chamberlain in *Journ. de la Soc. des Amer.,* N. S., vol. vii, 1910, p. 186, and Rivet in *L'Année Linguistique,* vol. iv (1908–10), 1912, pp. 128–131.

CHURRIGUERESQUE (chụr'rĭ-gȧ-rĕsk') **ARCHITECTURE.** This style derives its name from Don José Churriguera (died 1725), a Spanish architect and sculptor. In 1689 he executed the catafalque for the obsequies of the Queen Maria Louise. After 1690 he was employed on various royal works—a portal for S. Gaetano, a palace for a prince, and various altars and works of sculpture. The Churrigueresque style marks the last stage of the baroque period in Spain. In it the original classic motives have become utterly degenerate, and nothing is considered except picturesqueness of effect in composition and decoration.

The style of Churriguera is one of the most important elements of Mexican architecture, which derived additional picturesqueness from the Indian workmen, who had not lost the Aztec traditions. Many picturesque Mexican portals, altarpieces, and interiors exhibit the style.

CHUR'RUS. See Hemp.

CHURUBUSCO, chōō'rōō-bụs'kō. A village 6 miles south of the city of Mexico, on the river Churubusco, connected with the capital by an elevated paved causeway. Before the conquest by Spain it was the capital of a powerful native kingdom, and is said to have had as many as 50,000 dwellings, and many temples and lofty towers. But by 1642 it had become a miserable village. Here, on Aug. 20, 1847, immediately after the battle of Contreras, occurred one of the most important battles in the war between the United States and Mexico. The Mexicans, under the command of Santa Anna, numbered about 30,000, most of whom were stationed in a strongly fortified *tête-de-pont,* and in the large convent or church of San Pablo. The Americans, numbering about 9000, and commanded by Gen. Winfield Scott, attacked with the greatest gallantry, and finally, after three hours of fighting, drove the Mexicans from their position. The Mexicans lost, in killed, wounded, and prisoners, fully 7000; the Americans, in killed and wounded, about 1100. Consult: Wilcox, *History of the Mexican War* (Washington, 1892); General Scott, *Autobiography* (New York, 1864); and Bancroft, *History of Mexico,* vol. v (San Francisco, 1885).

CHUSAN, chōō'sȧn (Chinese, Boat Island). An archipelago off the coast of China, consisting of the island of the same name and a few smaller islands (Map: China, F 5). The island of Chusan is situated about 40 miles northeast of Ning-po, lat. 30° N., long. 122° E., is of an oblong shape, and about 50 miles in circumference. Its surface is mountainous; but there are many fertile valleys with a plentiful supply of water, and the soil is very carefully cultivated by the hardy and independent people who inhabit the island. The flora is of remarkable richness. Azaleas clothe the mountains; clematis, roses, and honeysuckle grow in great luxuriance. The camphor and tallow tree, and many varieties of bamboo, are found in the valleys. Tea is cultivated to some extent on

the hillsides. Among the minor islands the most interesting is Putu, an islet covered with temples and inhabited by numerous monks, and consecrated entirely to religious purposes. Administratively the group belongs to the Province of Che-kiang. Population is estimated at (1910) 250,000. The chief settlement is Ting-hai, a fortified town, with a population of about 30,000. The island of Chusan was an important commercial entrepôt of the Japanese occupation during the Ming dynasty. It was occupied by the British from 1840 to 1846 and again in 1860.

CHUTIA NAGPUR, chōō′tē-ä nàg-pōōr′. See CHOTA NAGPUR.

CHUT'NEE, or **CHUTNY** (Hind. *chatnī*). An East Indian condiment, a compound of mangoes, chillies or capsicum (q.v.), and lime juice, with other native fruits, such as tamarinds, the flavor being heightened by garlic.

CHUTTA NAGPUR. See CHOTA NAGPUR.

CHUZZLEWIT, MARTIN. The hero of Dickens's novel of the same name. He is, at first, an unsuccessful apprentice to a hypocritical architect named Pecksniff. He leaves the latter in contemptuous anger, goes to America, and, after making various amusing acquaintances there, falls ill, and is brought back by his faithful follower, Mark Tapley. He is finally reconciled with his exacting grandfather, also named Martin, and marries a protégée of the latter, with whom he has long been in love.

CHWI. See SUDAN.

CHWOLSON, kvôl′sôn, DANIEL ABRAMOVITCH (1819–1911). A famous Russian archæologist. Born of Jewish parentage at Vilna, he received his education at Breslau, Vienna, and St. Petersburg, mastering German, French, and Russian, and then devoting himself to the study of Oriental languages, especially Arabic. In 1850 the University of Leipzig conferred the doctor's degree upon him for a scholarly dissertation on Semitic religious history. Five years later, having returned to Russia and embraced Christianity—a thing frequently done by intellectual Jews in Russia as an indispensable means to recognition—he was appointed professor of Oriental languages at St. Petersburg University and of Hebrew and biblical archæology at the ecclesiastical academy in the same city. So great was his scholarship in his special field, that only a year after these appointments (in 1851) the Russian Imperial Academy published his first long work at its own expense—an unusual honor. The publication of this book—an elaboration of his doctor's dissertation already referred to—at once established its author's reputation. The works that followed made him one of the foremost authorities on the history of Oriental religions, and gave him considerable prestige in his defense of the Jews, whose cause he ever championed. Chwolson's principal works, devoted chiefly to Oriental ethnography, are: *Die Ssabier und der Ssabismus* (2 vols., 1856), a source book indispensable to students of religious history; *Concerning Some Mediæval Accusations Against the Jews* (in Russian, 1859); *Ibn Dasta's Accounts of the Kharzars, Burtassi, and Bulgarians* (in Russian, 1867); *Die semitischen Völker* (1872); *The Lord's Last Supper and the Day of the Crucifixion* (in Russian, 2d ed., 1880; German, 2d enlarged ed., 1908), in which he aims to shatter the traditional views concerning Christ's death, etc.; and *Die Blutanklage und sonstige mittelalterliche Beschuldingungen der Juden* (1901), a most scholarly historical study of "ritual-murder" accusations against the Jews.

CHYLE, kīl (from Neo-Lat. *chylus*, from Gk. *χυλός*, *chylos*, juice, from *χεῖν*, *chein*, to pour). A product of the digestion of food in the alimentary canal. On remaining for some time in the stomach, food is partially dissolved, forming a thick, grayish, turbid liquid called *chyme*. The chyme, which passes onward into the small intestine, is acted upon by the bile, pancreatic fluid, and intestinal juice, and separated into *chyle*, which is absorbed or sucked up by the lacteals (q.v.), and into waste matters, which ultimately find their way out of the system through the lower bowel. The manner in which chyle is taken up by vessels distributed over the small intestines, and the changes it undergoes before it is absorbed into the blood, are described in the articles LACTEAL, THORACIC DUCT, and NUTRITION. When obtained from the thoracic duct of an animal during the process of digestion, chyle is a white milky-looking or yellowish fluid, with a faintly alkaline reaction. Like the blood, it coagulates after its abstraction from the body of the animal; and a small but distinct gelatinous clot is separated from the serous fluid of the chyle. On examining chyle under a microscope, we find that it contains numbers of white corpuscles, oil globules of varying sizes, and fatty granules. Each oil droplet is enveloped in an albuminous envelope. The chemical constituents of chyle are neutral fats, some fatty acids, lecithin, cholesterin, serum albumin, globulin, fibrin, sugar, urea, leucin, sodium chloride, phosphates, and traces of iron. See DIGESTION.

CHYME, kīm. See CHYLE; DIGESTION.

CHYTRÄUS, kē-trā′o͝os (Neo-Lat., from Gk. *χυτραίος*, *chytraios*, made of earthenware, from *χύτρα*, *chytra*, pipkin; a translation of his family name *Kochhafe*, lit. cooking pot), DAVID (1531–1600). A Lutheran theologian. He was born at Ingelfingen, Württemberg, studied at Tübingen and Wittenberg; was a pupil of Melanchthon, and became professor of theology at Rostock (1551). His learning and talents gave him a high position, and he was employed by Maximilian II to arrange the affairs of the Evangelical church in Austria. He was the principal author of the statutes of Helmstedt, and one of the authors of the *Formula of Concord*. He left a number of important theological works. His biography has been written by Bressel (1863) and Krabbe (1870).

CIALDINI, chäl-dē′nē, ENRICO, DUKE OF GAETA (1811–92). An Italian general, politician, and diplomat. He was born at Castelvetro, near Modena, and studied in the University of Parma. He took part in the insurrection of 1831, and was forced to escape to Paris. In 1833 he fought in Portugal, and in 1835 joined the Spanish army. At the outbreak of the revolution of 1848 Cialdini took command of a regiment of Piedmontese infantry, and subsequently was captured by the Austrians. In the Crimean War he commanded the third division of the Sardinian contingent, and took a distinguished part at the battle of the Tchernaya. At the beginning of the War of 1859 he was intrusted by Cavour with enlisting the famous corps of sharpshooters known as the Cacciatori delle Alpi ('Hunters of the Alps'), afterward commanded by Garibaldi. The fourth division of the army was led by Cialdini, who won the victory of Palestro, but further progress of the Italians was stopped by the Peace of Villafranca.

In 1860 Cialdini defeated the papal army under General Lamoricière, at Castelfidardo. On Feb. 13, 1861, Gaeta yielded to Cialdini. He was now made general of the army and Duke of Gaeta, and Reggio elected him deputy. He became senator in 1864, and took a prominent part in the campaign against Austria in 1866, replacing Lamarmora as chief of the general staff. In 1876–79 and 1880–81 he was Ambassador to France. Consult Misco, *Cialdini e i suoi tempi* (Naples, 1893).

CIAMICIAN, Giacomo (1857–). An Italian chemist, born at Triest, Austria-Hungary. He was educated at the University of Vienna. In 1880 he became assistant at the Chemical Institute of Rome, in 1887 professor of general chemistry at Padua, and after 1889 was ordinary professor of general chemistry at Bologna University, Italy. In 1910 he became a member of the Italian Senate. Besides his contributions on pyrrols, on plant substance, and on photochemistry, he is author of *I problemi chimici del nuovo secolo* (1903; 2d ed., 1905); *Organico e fisiologico chimica* (1908); *Cooperazione delle scienze* (1911); *Fotochimica nell' avenire* (1912).

CIAMPI, chäm'pē, Ignazio (1824–80). An Italian poet and historian, born in Rome. He studied law there, attained considerable reputation as an attorney, and became a member of the Roman Council of State. From 1874 until his death he was professor of modern history at the University of Rome. Among his poetical works are imitations of Pushkin (1855), *Serena* (1857), the collection *Poesie varie* (1857), the epic *Stella* (1858), and a complete edition entitled *Poesie* (1880). His valuable historical studies include *La città etrusca* (1866), *Innocenzo X e la sua corte* (1878), and, most important, the *Storia moderna della scoperta dell' America alla pace di Westfalia* (2 vols., 1881–83, ed. by Castagnola).

CIAMPI, Sebastiano (1769–1847). An Italian author, born at Pistoja. From 1803 to 1818 he was a professor in the University of Pisa, and from 1818 to 1822 at Warsaw. His publications include *Memorie della vita di Messer Cino da Pistoja* (1808), *De Usu Linguæ Italicæ saltem a Sæculo Quinto* (1817), and a *Bibliografia critica delle antiche reciproche corrispondenze dell' Italia colla Russia, Polonia*, etc. (1834–43). He did much to further the study of art history and translated Pausanias.

CIAMPOLI, chäm'pō-lē, Domenico (1855–). An Italian author, born at Atessa, in the Abruzzi. He was called to the chair of the history of literature in the Lyceum of Ancona, and later became librarian at the Victor Emmanuel Institution in Rome. He wrote chiefly stories of Apennine life. The *Fiabe abruzzesi* (1877) and *Cicuta* (1884) are examples. As a critic of Slavic literature he published *Melodie russe* (1881) and other volumes, including some versions of Dostoyevski. He also wrote *Nuovi studi letterarii e bibliografici* (1899).

CIANCA, thē-än'thä, Andrés de (c.1500–?). A Spanish judge, born at Peñafiel. He went to Peru with Pedro de la Gasca in 1546, became a member of the royal audience, and was president of the audience in 1550–51, from the departure of Gasca for Panama until the arrival from Spain of Don Antonio de Mendoza, the second Viceroy. He was a judge of the court-martial which, after the battle of Sacsahuana, in 1548, condemned to death Gonzalo Pizarro (q.v.) and Francisco de Carbajal (q.v.).

CIARDI, chär'dē, Guglielmo (1844–). An Italian painter. He was born in Treviso and studied at the Academy of Venice under Bresolin and at Florence, Rome, and Naples. After extensive travels in Europe he settled in Venice in 1874. His representations of the Dolomites and mountainous regions about Treviso, his views of Venice and the lagoons, with their remarkable light effects, have gained universal favor and been widely and successfully exhibited. His fine landscape, "Messidoro" (1883, Galleria Moderna, Rome), made him the recognized leader of the Venetian *plein air* painters. Other works are: "Morning in the Alps" (Moriza), "Grand Canal" (Berlin, 1896), "October in the Venetian Campagna" (Glasgow, 1904), "Lake of Weissenfels" (Luxembourg, 1909). Consult Willard, *History of Modern Italian Art* (London, 1902).

CIBAO, sē-bä'ō. A picturesque mountain range of Santo Domingo, Haiti (q.v.), in the central part. It extends 20 miles from northwest to southeast and attains an altitude of over 7000 feet in the highest peaks of the island. The chief rivers of Haiti rise in the range; between the mountains and along the north coast extend the fertile valley and plain of Santiago, watered by the Yaqui. Columbus supposed the range to be part of the Cipango (Japan) of Marco Polo. Gold in considerable quantities has been found here since Ojeda's first expedition of discovery in 1494.

CIBBER, sīb'bēr, Caius Gabriel (1630–1700). A Danish-English sculptor, born at Flensburg, in Schleswig. He was sent to Rome to study, and then went to England with the sculptor Stone. Among his works are the strong and decorative figures of "Melancholy" and "Raving Madness," once over the entrance to the Bethlehem Hospital, but now in the South Kensington Museum; the phœnix above the south door of St. Paul's Cathedral, and one of the bas-reliefs on the monument commemorating the fire of London. His son was Colley Cibber, the actor and dramatist.

CIBBER, Colley (1671–1757). An English actor and dramatist, born in London. In 1682 he was sent to the free school at Grantham, in Lincolnshire. Five years thereafter he returned to London, and in 1688 was a volunteer in the forces raised by the Earl of Devonshire in support of the Prince of Orange. He afterward turned to the stage, and after performing gratuitously for several months, he obtained an engagement at 10s. per week, which was raised to 15s.; and on the commendation of Congreve, who had witnessed his performance of Lord Touchwood, five additional shillings per week were added. Cibber now began to take the leading parts in many comedies, and soon established his reputation as an actor. In the meantime he was writing comedies. *Love's Last Shift* was produced in 1696, and thereafter followed 29 more plays. As a dramatist Cibber claims to have done much towards the reformation of the stage. However immoral individual scenes in his plays may be, the libertines are reclaimed in the last act. As playwright and comedian he was closely connected with Drury Lane Theatre, of which he became manager in 1710. He retired from the stage in 1733, though after that date he occasionally reappeared. Three years before he had been appointed Poet Laureate. The poems he

now wrote were worthless, and exposed him to scathing ridicule. Pope made him the hero of the new *Dunciad* (1742). After retiring from the stage, Cibber began his famous *Apology*, which appeared in 1740 (an edition by Bell-chambers, London, 1822; and another by Lowe, London, 1889). This book is not only an important history of the Queen Anne stage—it is one of the most amusing autobiographies ever written. Cibber died Dec. 12, 1757. His *Dramatic Works* with a biography appeared in 1760; new ed., 1777. Consult Cibber, *Apology*, ed. by Lowe (London, 1888), and the same editor, *Bibliographical Account of English Theatrical Literature* (1895).

CIBBER, Susannah Maria (Arne) (1714–66). An English actress. She received instruction in music from her brother, Dr. T. A. Arne (q.v.); first appeared publicly in 1732, and rose to great public favor in opera and oratorio. She was an especial favorite with Handel and was the first Galatea in his *Acis and Galatea*. He wrote the contralto songs in the *Messiah* and the part of Micah in *Samson* expressly for her. Two years after her marriage to Theophilus, son of the dramatist Colley Cibber, which took place in 1734 and proved very unhappy, she appeared as an actress, especially in tragedy, excelling as Constance of Bretagne in *King John* and as Ophelia in *Hamlet*. She played with Garrick at Drury Lane after 1753.

CIBOL, sĭb'ŏl. See Onion.

CIBO'RIUM (Lat., from Gk. *κιβώριον, kibōrion*, shell, cup). A term used mainly in two distinct senses: (1) for an altar canopy, and (2) for a vase to contain the reserved Sacrament, from which communion is ordinarily given in the Roman Catholic church. From the earliest times after Christianity emerged from the catacombs (fourth century) the high altar in a Christian church or basilica was surmounted by a canopy resting on columns, and made of gold, silver, bronze, or marble. These canopies were among the richest pieces of church furniture and were decorated with reliefs, statues, and a variety of architectural details. The earliest metal ciboria, of which many superb examples were given by the popes to Roman churches, have not survived the melting pot. The marble ones of the sixth century, at Ravenna and Parenzo, are among the earliest. That given by Justinian (sixth century) to St. Sophia, in Constantinople, was the most sumptuous. Of mediæval marble examples, there are many in Rome; of the classic type, at San Lorenzo in Campo Verano and San Giorgio in Velabro; of the Gothic type, at Santa Cecilia and the Lateran, decorated with mosaics and sculpture. A remarkable Lombard example is at Sant' Ambrogio, Milan; another at San Marco, Venice. Many others are in the churches of southern Italy (eleventh to fourteenth century). This custom was abandoned throughout Europe, except in Italy, after the thirteenth century, the altar being left uncovered. Since the sixteenth century the ciborium, in this sense, has been called in Italy a baldachin (q.v.). See Altar; Canopy.

The second meaning, which is now the more usual, designates a closed vase to contain the Host. Such receptacles were originally (fourth to eighth century) in the form of a dove, made of gold, silver, or gilt copper, suspended over the high altar from the ciborium. Sometimes they were inclosed in a tabernacle in the shape of a tower. Then the dove-shaped receptacles were, in the ninth century, replaced by pyxes (q.v.) or small cylindrical boxes of gold, silver, ivory, etc. These were suspended over the altar or placed in a small niche in the wall near the altar, in churches where there was no ciborium over the altar. The primitive connection between the constructive ciborium and this receptacle for the reserved Sacrament caused the name ciborium to be applied to the latter in late mediæval times, when the use of the constructive ciborium had ceased; but the term pyxis is the more correct name. The wall niche in which the ciborium is placed was also called ciborium; it had decorative architectural door-reliefs and a frontispiece; and some of those executed during the Italian Renaissance are exquisitely sculptured.

CIBRARIO, chē-brä'rē-ō, Gianni Antonio Luigi, Count (1802–70). An Italian historian and politician. He was born in Turin, studied at the university of that city, and took his degree of doctor of laws in 1824. King Charles Albert of Sardinia, with whom he was a great favorite, sent him in 1848, when Italy rose against the Austrians, as royal commissioner to Venice. During the same year he was created a senator of the kingdom. When Charles Albert—after the unfortunate issue of the war—went to live in voluntary exile at Oporto, Cibrario was sent by the Sardinian Senate to induce him to return. In 1850 he was appointed Superintendent General of Customs, and negotiated a treaty of commerce with France. In 1852 he was made Minister of Public Instruction by Victor Emmanuel, and in 1855 he became Minister of Foreign Affairs in Cavour's cabinet. He resigned his position in the following year, and he thenceforth devoted himself mainly to historical research. In the capacity of a mediator he negotiated a treaty which guaranteed the liberties of the Republic of San Marino with the Italian government in 1860. He died at Salò, in the Province of Brescia, 10 years later. His fame as an historian rests on the following works: *Notizie sulla storia dei principi di Savoia* (1825); *Delle storie di Chieri* (1827); *Dell' economia politica del medio evo* (1839); *Storia della monarchia di Savoia* (1843); *Storia di Torino* (1847); *Della schiavitù e del servaggio e specialmente dei servi agricoltori* (1868). Consult Odorici, *Il Conte Luigi Cibrario* (Florence, 1872).

CICA'DA. One of the Cicadidæ, a family of homopterous bugs, composed, for the most part, of large insects, very few measuring less than one inch across the opened wings, while many are as large as seven inches. The fore wings are usually transparent, but in some forms are highly pigmented, especially with black and yellow. About 800 species are known, mostly tropical.

Habits, etc.—The life of an adult cicada is noisy and short. These are, indeed, the noisiest insects in the world. Darwin heard them while on the *Beagle*, when it was anchored a quarter of a mile from shore. Only the males give the note. "Happy," said the Greek poet Xenarchus, "the cicadas' lives, for they all have voiceless wives." As no special auditory organs have been detected, it has been suggested that cicadas are capable of feeling rhythmical vibrations only. The sound-making organs which the males possess fully developed, and the females only partly, are peculiar to the cicadas. They consist of

enlargements of the metathoracic epimera, in the form of an opercular covering beneath which there is a very complicated apparatus. The sound is made by the rapid vibration of one of the membranes called the timbal. The other two membranes probably are set in vibration by the first and, in connection with the opercula, the three stigmata, and the whole skeleton of the insect, intensify the sound. The females are provided with powerful ovipositors. The eggs are deposited in the twigs of trees or shrubs or in the stems of herbs. The young hatch out in a few weeks, drop to the ground, and begin there a long subterranean existence. They feed on the sap from the roots of trees. The larvæ may penetrate as deep as 20 feet below the surface of the ground, where it is difficult to make out their life history. The manner of transformation from the larva to the pupa we do not know. The pupa is incased in a hard shell and when about ready to emerge from the ground may construct a chimney of earth several inches in height, but whether this is a purposeful act or not we do not know. When the pupa crawls out of the ground it fastens itself to some firm object, such as a wooden fence or a tree trunk, the skin splits along the dorsal line of the thorax, and through this the adult winged insect emerges. The pupal skin when dried still retains the shape of the pupa, and may be found attached to the support several days after the adult has flown away.

In the United States the two commonest forms are the dogday harvest fly (*Cicada tibicen*) and the periodical cicada or 13 to 17 year locust (*Cicada septendecim*). The harvest fly is the black-and-green one that appears every year in midsummer and gives out its prolonged, shrill, and to many persons nerve-racking, cry from tree tops during the heated hours of the day; this form matures in two years, but since there are two different broods, one appears every year.

The Periodical Cicada.—This species requires from 13 to 17 years for development, according, mainly, to the temperature of the locality in which it breeds. Heat hastens its development, hence the 13-year forms occur in the South; but in each locality there are always some individuals that come out a year or two ahead of the main brood and others that lag a few years behind. This form has the greatest longevity of all insects. The time of its periodicity has been made out by noting its appearance in certain localities for a considerable number of years, 22 broods having thus been determined. Several of these broods, which are dimorphic, may coexist in the same locality. Hence larvæ of different ages, of several generations, may be found in the ground at one and the same time, and they will appear as adults in different years. The sound made by these insects is peculiar, very loud, and closely resembles the humming of a resonant telegraph pole when its wires are vibrating in a strong breeze.

Consult Woodworth, "Synopsis North American Cicadidæ," in *Psyche*, vol. v (Cambridge, Mass., 1888). For the 17-year locust, see "The Periodical Cicada," an illustrated monograph of 148 pages, by C. L. Marlatt, *Bulletin 14 of the United States Department of Agriculture* (Washington, 1898). See LOCUST.

CICADA KILLER. See SAND WASP.

CIC'ATRIZA'TION (from Fr. *cicatrisation*, from *cicatriser*, to scarify, from Lat. *cicatrix*, a scar). The process of healing or skinning over of an ulcer or broken surface in the skin or in a mucous membrane, by which a fibrous material, of a dense, resisting character, is substituted for the lost tissues. The new tissue is called the cicatrix, and consists of fibrous connective tissue, having a tendency to contract, a lack of elasticity, and a white, shining appearance. The glands and other special structures of the original tissue are wanting in the cicatrix. See INFLAMMATION; ULCER.

CICCIONE, chē-chō'nā, ANDREA, properly ANDREA DA FIRENZE, or ANDREA NOFRI (1388–c.1453). A Florentine sculptor and architect of the early Renaissance. He was born in Florence, studied under unimportant masters, and later imitated Donatello. His principal surviving work is in Naples—the large tomb of King Ladislas (1415), the unfinished half-Gothic tomb of Ser Gianni Caracciolo—both in the church of San Giovanni a Carbonare, and the richly decorated tomb of Count Fernando da San Serverino in the convent of Santa Monica. His work is somewhat heavy in character, and his style shows the transition from the Gothic to the Renaissance. He is supposed to have been architect of the monastery and church of Monte Oliveto and the cloisters of San Severino.

CICELY, sĭs'ê-lĭ (corruption of *seseli*, from OF., Lat. *seselis*, from Gk. *σέσελι*, *seseli*, cicely) (*Myrrhis*). A genus of umbelliferous plants, nearly allied to chervil. One species, sweet cicely (*Myrrhis odorata*), is common in the central and southern parts of Europe and in similar climates in Asia, but in Great Britain it appears to have been introduced. It is sometimes called myrrh in Scotland. It is a branching perennial 2 feet high or upward, with large, triply pinnate leaves and pinnatifid leaflets, somewhat downy beneath; the whole plant is powerfully fragrant, the smell resembling that of anise. The seeds, roots, and young leaves are used in Germany and other countries in soups, etc. The plant was formerly much in use as a medicinal aromatic. In the United States sweet cicely is the name given to the species of *Osmorrhia*, a genus closely related to *Myrrhis*.

CICELY. See CHERVIL.

CI'CER. See CHICK-PEA.

CIC'ERO, MARCUS TULLIUS (106–43 B.C.). The greatest orator of Rome, and one of the most illustrious of her statesmen and men of letters. He was born at Arpinum, Jan. 3, 106 B.C., of an ancient family, of the equestrian order. His father, himself a man of culture, and desirous that his son should acquire an eminent position in the state, removed him at an early age to Rome, where, under the direction of the orator Crassus, he was instructed in the language and literature of Greece and in all the other branches of a liberal education. In his sixteenth year he assumed the *toga virilis*, or manly toga, and was introduced to the public life of a Roman citizen. He now acquired a knowledge of law, and underwent a complete course of training in oratory. At the same time he studied philosophy under instructors of the Epicurean, Academic, and Stoic schools, and neglected no mental exercise, however arduous, which might conduce to his future eminence, being thus early of the opinion, which he afterward maintained in his treatise *De Oratore*, that an orator should possess almost universal knowledge. With the exception of a brief campaign under Sulla, in the Social War, he passed his time in these preliminary studies until his twenty-sixth year, when he began to plead in

public. In one of his earliest causes he distinguished himself by defending the rights of Sextus Roscius of Ameria, a private citizen, against one of the favorites of Sulla, who was then dictator.

Soon after, for the benefit of his health, and to pursue his oratorical and philosophical studies, he traveled to the chief seats of learning in Greece and Asia, and on his return was regarded as second to no orator at the Roman bar. Having been elected quæstor (76 B.C.), he was assigned by lot to Sicily, a post which he filled with ability, and to the satisfaction of those whom he governed. Some years after his return he laid the Sicilians under still greater obligation by his successful prosecution of their prætor, Verres, against whom he prepared no fewer than six orations, although the first had the effect of disheartening the accused so effectually that he voluntarily retired into exile. This was Cicero's first great triumph, for Verres had as his counsel and advocate the famous pleader Hortensius, who was at that time the acknowledged head of the Roman bar. In 69 B.C. Cicero filled the office of ædile, and in 66 that of prætor. Supported by Pompeius, whose favor he had gained by his advocacy of the Manilian Law, giving to that general the command of the Mithridatic War, Cicero was at length elected, by an overwhelming majority, to the consulship (63 B.C.). His tenure of office was rendered memorable by the conspiracy of Catiline, which he frustrated with admirable skill and promptitude. (See CATILINE.) The highest praises were showered upon him; he was hailed by Cato and Catullus as the "father of his country"; and public thanksgivings in his name were voted to the gods. But his popularity did not last long after the expiration of his consulship. His enemies charged him with a public crime in having put the Catilinarian conspirators to death without a formal trial, and he found it necessary to leave Rome and to take up his residence in Thessalonica (58 B.C.). A formal edict of banishment was pronounced against him, but he was recalled from exile in about 16 months, and on his return to Rome was received with great enthusiasm. See CLODIUS PULCHER.

His recovered dignity, however, soon excited the envy of the very party in the Senate with which he had desired to make common cause; while Pompeius and Cæsar, the greatest powers in the state, from whose enmity he had most to dread, courted his alliance and coöperation. Thus, while preserving an appearance of independence, he was betrayed into many actions which he could not but regard as humiliating, and which, by increasing the power of the triumvirs, led indirectly to the ruin of the Republic. A remarkable exception to this trimming policy is to be found in his assisting Milo when suing for the consulship. Against the wish of Pompeius, and in spite of the hostile feeling of the populace, he defended him after he had slain Clodius in an accidental encounter. During this period he composed his works *De Oratore, De Republica,* and *De Legibus.* After a year's administration of the Province of Cilicia (51–50 B.C.), he returned to Italy on the eve of the Civil War. With the convictions which he avowed, there was but one course which it would have been honorable for him to pursue—to enlist, at all hazards, on the side of Pompeius and the Republic. But instead of this he hesitated, balanced the claims of duty and of interest, blamed Pompeius for his want of preparation, and criticized the plan of his campaign, even after he had joined the army of the Senate, so that Pompeius found his coöperation more annoying than his opposition. After the battle of Pharsalus had wrecked the Pompeian cause Cicero abruptly quitted his friends and resolved to throw himself upon the generosity of the conqueror. After nine months' miserable suspense at Brundisium he was kindly received by Cæsar, whom he followed to Rome. During the years which ensued he remained in comparative retirement, composing his principal works in philosophy and rhetoric, including those entitled *Orator, Hortensius, De Finibus, Tusculanæ Disputationes, De Natura Deorum, De Senectute, De Amicitia,* and *De Officiis.* On the death of Cæsar he was disposed to unite his interests with those of Brutus and the other conspirators, but was restrained by dictates of prudence. In the civil disturbances which followed he espoused the cause of Octavianus, and composed his denunciatory orations against Antonius, which are known as the Philippics. These orations were the occasion of his death. When Octavianus and Lepidus joined with Antonius in a triumvirate, Cicero was among the proscribed, and his life was relentlessly sought. The soldiers of Antonius overtook him while his attendants were bearing him, now old and in an infirm state of health, from his Formian villa to Caieta, where he intended to embark. Forbidding his attendants to make any resistance, he offered his neck to the sword of his executioners. He died on Dec. 7, 43 B.C.

As a man Cicero was high-minded, generous, and possessed at all times of excellent intentions; yet he was lacking in moral courage; he was intensely egoistic and so unstable that he failed to impress his ideas upon those about him. His very sensitiveness and his high-strung, emotional nature, which made him so successful as an orator and as an interpreter of literary themes, were fatal to his ambition as a statesman. He lacked the intense conviction of a man like Cato, and he lacked also the cool, haughty courage and unshaken nerve of Cæsar. He always saw with fatal facility the strength of each side of every question, so that he was continually wavering between one position and another, swayed by the impulses of the moment and utterly devoid of that grim tenacity of purpose which holds fast to the end. This is the reason why, in the stormy times which attended and followed the death of Cæsar, Cicero hesitated and temporized and so miscalculated the attitude and the intentions of the conflicting parties that, in the end, both of them conceived for him an enmity mingled with contempt. See ANTONIUS; AUGUSTUS; CÆSAR; POMPEIUS.

In his oratory Cicero represents a mean between the Attic simplicity of Demosthenes and the so-called "Asiatic" floridity of his own former rival, Hortensius. Ancient rhetoricians classified him as belonging to the Rhodian school of eloquence. He had, indeed, all the gifts of nature and of training which go to make the perfect orator—an impressionable nature, a vivid imagination, and a mastery of language such as has never been surpassed. The one defect in Cicero's oratory is the defect that has been already noted in his character, and which may be defined as a lack of sincerity, of genuine conviction, of the ring of truth. This strain of insincerity makes him almost always seem to be

the special pleader who praises or denounces, as the case may be, more from a certain sympathetic facility for working up a temporary interest in almost any cause, than from the impelling force of a master mind which takes its stand upon the rock of principle, from which neither self-interest nor flattery nor danger can shake it free. Hence there is nothing in all Cicero's oratorical effort worthy to be set beside the one sublime masterpiece of Demosthenes without appearing by comparison light and hollow and almost trivial. This defect, however, is wholly moral and psychological. On the linguistic side it is impossible to set Cicero's rank too high. The perfect harmony of his periods, the exquisite choice of his words, the delicate balance of his cadences, whose sound keeps up an ever-running accompaniment to sense, and the majestic roll of his wonderful perorations are absolutely without counterpart in Greek, or English, or any other language whatsoever, and they make reasonable and true the judgment of Quintilian, that "Cicero is now less the name of a man than of eloquence itself."

As a man of letters Cicero has also left to posterity a mighty name. He created a prose style which for richness and refinement has never been surpassed, and which became at once the standard by which all other Latin prose is now tested and compared. He added, indeed, very largely to the vocabulary of his own language, giving currency to striking and picturesque words and phrases which had hitherto not entered into the diction of formal literature, but which were exceedingly expressive, and needed only the authority of a genius like Cicero to gain universal currency. Likewise, when necessary, and especially when paraphrasing in Latin the philosophical writings of the Greeks, he struck out new words to express new ideas, and these newly minted words were so thoroughly in accordance with the analogies of the Latin language as to be at once accepted and approved. Cicero was a facile writer, and he dealt with many subjects in many departments of intellectual interest. Nearly all of his philosophical books were borrowed almost wholly from Greek sources and are therefore entirely unoriginal in matter; but the manner is most attractive and has a lucidity and grace such as the Greek philosophical writers seldom attained. They have been of great service to the modern world, because they have preserved much of Greek philosophy otherwise unknown to us or known only imperfectly. His rhetorical works, written in the dialogue form, are of great value, first as being the production of one who was himself an accomplished rhetorician, and in the second place for the richness of the historical material which Cicero scattered through them with a lavish hand. Among the minor works of Cicero two, a treatise on old age (*De Senectute*) and one on friendship (*De Amicitia*), have always been admired, both for their exquisite charm of style and for their urbane and cultivated tone. Highly important among the Ciceronian remains are four collections of letters written by Cicero to various acquaintances and friends, and numbering in all 774 pieces; there are, besides, 90 letters addressed to Cicero. These letters were not collected by Cicero himself, nor did he ever intend that they should be published. They represent, therefore, an unstudied, unconscious, spontaneous self-revelation of their author, and they are, besides, an inexhaustible treasure house of information, often of a very intimate character, concerning Cicero's contemporaries and the political history of his time. This correspondence was preserved and edited by Cicero's amanuensis, Tullius Tiro, and also in part by Cicero's familiar friend, Pomponius Atticus, to whom very many of the letters were addressed. Cicero likewise, in his early years, composed poetry, little of which has survived and none of which was favorably judged by his own countrymen.

The extant orations of Cicero are 57 in number, of which the most famous are the four against Catiline, the 14 so-called Philippics against Antony, the oration on behalf of Archias, and two legal orations, one on behalf of L. Murena and the other on behalf of Marcus Cælius. It should be remembered always in reading these orations that they are not now in the actual form in which they were delivered, but that Cicero edited them freely, as Webster edited his famous speech in reply to Hayne. Some of the Ciceronian orations, in fact, were not delivered at all, and this was especially the case with most of the Philippics, which were in reality political tracts or pamphlets. Of the speeches which have been mentioned above, the first oration against Catiline is the most highly wrought and splendidly rhetorical; the one in behalf of Archias is the most graceful, easy, and refined; the two legal orations are the neatest and wittiest; the second Philippic is the most elaborately violent in the severity and at times the coarseness of its denunciation.

The best complete text edition of Cicero's works is that of Müller (Leipzig, 1878 ff.). A new text is under way in the *Oxford Classical Text Series*. The best edition of the letters with a commentary is that of Tyrrell and Purser (6 vols., London, 1885–99). For excellent editions of other works, consult Reid, *Academica* (London, 1885); Wilkins, *De Oratore* (Oxford, 1888–92); Sandys, *Orator* (Cambridge, 1892); Mayor, *De Natura Deorum* (Cambridge, 1883–1891); Seyffert-Müller, *Laelius* (= *De Amicitia*, Leipzig, 1876). The letters are translated by Shuckburgh (London, 1899) and by Winstedt (London, 1912–14). There are no good translations into English of the rest of Cicero's works. There is a German lexicon to the philosophical writings (1895) and to the orations (1884), both by Merguet. On Cicero's language and style, see especially Norden, *Die Antike Kunstprosa* (Leipzig, 1898); Lebreton, *Etudes sur la langue et la grammaire de Cicéron* (Paris, 1901). For a general discussion of his writings, consult Duff, *A Literary History of Rome*, pp. 349–397 (New York, 1909). For rhythm in Cicero, a subject which he makes much of in his rhetorical writings, consult Th. Zielinski, *Das Clauselgesetz in Ciceros Reden* (Leipzig, 1904); F. W. Shipley, "The Heroic Clausula in Cicero and Quintilian," in *Classical Philology*, vi, 139–156 (1911); Shipley, "The Treatment of Dactylic Words in the Rhythmic Prose of Cicero," in *Transactions of the American Philological Association*, xli, 139–156 (1910); Shipley, "Preferred and Avoided Combinations of the Enclitic *Que* in Cicero," in *Classical Philology* (1913). For an account of Cicero's career, see Middleton, *Life of Cicero* (London, 1741), very old-fashioned and extreme; Forsyth, *Life of Cicero* (London, 1864); Strachan-Davidson, *Life of Cicero* (New York, 1894); and Boissier, *Cicéron et ses amis* (5th ed., Paris, 1895). An uncritical but

interesting book is Trollope, *Life of Cicero* (New York, 1880). For an unfavorable view of Cicero, see Mommsen, Eng. trans., *History of Rome*, vol. iv (New York, 1886), while the strongest plea for Cicero is that of Gerlach (Basel, 1864). On Cicero as a philosopher, consult Levin, *Lectures on the Philosophy of Cicero* (Cambridge, 1871), and the introduction to Reid's edition of the *Academica;* on his legal merits, Gasquy, *Cicéron jurisconsulte* (Paris, 1884); on his rhetorical and oratorical gifts, Causeret, *Sur la langue de la rhétorique dans Cicéron* (Paris, 1886), and the introduction to Wilkins's edition of the *De Oratore* and that to Sandys's edition of the *Orator;* Thiele, *Hermagoras* (Berlin, 1893); and Sears, *History of Oratory* (Chicago, 1896). Regarding the letters of Cicero, consult Nisard, *Notes sur les lettres de Cicéron* (Paris, 1882), and the introduction to Tyrrell and Purser's edition, in vol. i. An important work on Cicero by E. G. Sihler is soon to be published.

CICERO, Quintus Tullius (c.102–43 B.C.). A Roman commander, younger brother of Cicero, the orator. He served as prætor in 62 B.C., and was governor of Asia for three years. As legatus he accompanied Cæsar to Britain in 55 B.C. He commanded a legion in winter quarters in 54 B.C., and showed skill and courage in defending his camp against vast forces of the Gauls under Ambiorix (q.v.). In 51 he served as legate to his brother, Marcus Tullius, in Cilicia. After the battle of Pharsalus, in which he had fought on the side of Pompeius, he was proscribed by the triumvirs and put to death by the emissaries of Antonius. Quintus was perhaps the author of the *Commentariolum Petitionis*, a missive addressed to his brother and usually printed with Cicero's letters to him, and of several tragedies, which have been lost. Eighteen lines by him are printed in Bücheler, *Quinti Ciceronis Reliquiæ* (Leipzig, 1869). Consult "The Commentariolum Petitionis ascribed to Quintus Cicero," in *Chicago University Decennial Publications*, vol. vi (1903).

CICERONE, sĭs′ê-rō′nē, *It. pron.* chē′chȧ-rō′-nȧ (It., from *Cicero*, on account of his learning or eloquence). A guide, usually for the purpose of showing strangers the curiosities and works of art in a town. Ciceroni are of all degrees, from distinguished archæologists, who undertake the office as a favor, to the humble *guide-interprête.*

CICHORIUM, sĭ-kō′rĭ-ŭm. See Chicory.

CICINDELIDÆ, sĭs′ĭn-dĕl′ĭ-dē. See Tiger Beetles.

CICISBEO, chē′chĕs-bā′ō (It., whence Fr. *cicisbée, sigisbée*, probably from Fr. *chic*, Sp. *chico*, small + *beau*, It. *bello*, beautiful; i.e., a minor gallant). A name given in Italy to the professed gallant or constant attendant upon a married lady. In the higher ranks of Italian society it was at one time considered unfashionable for the husband to associate with his wife anywhere save in his own house. In society or at public places of amusement the wife was accompanied by her cicisbeo, who attended at her toilet to receive her commands for the day. This custom, which was once universal and which naturally gave rise to much scandal, has now almost disappeared. Cicisbeo is synonymous with *cavalière servente.* See Byron's poem *Beppo.*

CICOGNARA, chē′kō-nyä′rȧ, Leopoldo, Count (1767–1834). An Italian archæologist, art historian, and painter. He was born in Ferrara, studied in Modena under Vestri and in Rome under Cannucini, and became successively Ambassador of the Cisalpine Republic to Turin and a Councilor of State. In 1808 he left the government service and became president of the Academy of Fine Arts in Venice. He traveled extensively and made valuable collections of art objects and works on art history. His chief publication is the *Storia della scultura dal suo risorgimento in Italia sino al secolo di Napoleone* (3 vols., 1813–18; 2d ed., 7 vols., 1824), a critical study of remarkable completeness and accuracy, which obtained for him a European reputation. Consult: Becchi, *Elogio di Leopoldo Cicognara* (1834); Zanetti, *Cenni biografici di Leopoldo Cicognara* (Venice, 1834); and Callari, *Storia dell' arte contemporanea italiana* (1909).

CICONI, chē-kō′nē, Teobaldo (1824–63). An Italian dramatist, born in San Daniele (Friuli). He studied in Padua, and in 1848 participated in the insurrection in Tuscany, Venice, and Rome. His comedy *Le pecorelle smarrite* (1857) was his first important popular success. Other dramatic works, such as *Le mosche bianche* and *La rivincita*, confirmed his reputation. He was a clever journalist and wrote lyrics with some success.

CID, The, or CID CAMPEADOR, *Sp. pron.* thēd kăm′pȧ-ȧ-dōr′ (Sp., Lord Conqueror). The name given in histories, traditions, and songs to the most celebrated of Spain's national heroes. There is so much of the mythical in the history of this personage that hypercritical writers, such as Masdeu, have doubted his existence; but recent researches, more particularly those of Dozy, and the investigation of newly discovered Arabic sources, have succeeded in separating the historical from the romantic. The following is the result of these inquiries: Rodrigo or Ruy Diaz (Roderic the son of Diego), generally known as Ruy Diaz de Bivar, was descended from one of the proudest families of Castile. His name first appears in a document written in 1064, during the reign of Ferdinand the Great of Leŏn. Under Sancho II, son of Ferdinand, he became standard bearer and commander of the royal troops. In a war between the two brothers, Sancho II and Alfonso VI of León, it was a stratagem of Roderic's—which, according to modern notions, was anything but honorable—that secured the victory of Sancho at Llantada over his brother, who was forced to seek refuge with the Moorish King of Toledo (1071). He appears at this time to have already been called the *Campeador*, a word supposed to answer to our "champion."

Upon the assassination of his friend and patron, King Sancho, he required the next heir, Alfonso, to clear himself by oath of any participation in his brother's murder ere the nobles of León and Castile should do homage to him. By this act he incurred the new monarch's enmity; an enmity which, however, the politic King concealed in the hour of danger, even consenting to Roderic's marriage with his cousin Ximena, daughter of Diego, Count of Oviedo. But when the King thought the services of Roderic no longer necessary to his own safety, he lent a willing ear to the latter's personal enemies, and banished him in 1081. Roderic then joined the Moorish King of Saragossa, in whose service he fought against both Moslems and Christians. He frequently defeated the King of Aragŏn and the Count of Barcelona, the latter of whom, Berenguer Ramŏn II, he took prisoner.

He was again reconciled to the King, but only for a short time, when he was condemned to a

second exile. In order to support his family and numerous followers, he now saw himself forced to carry his sword against the Moors, over whom he gained a victory, and established himself as sovereign or lord of Valencia (1094). He retained possession of Valencia five years, during which time he took many neighboring fortresses. The Cid, with only his own lance and his small band of faithful followers, had made better headway in the reconquest of Spain from the Moors than had Alfonso with the powerful Kingdom of Castile to support him; and not only Spain, but the rest of Christendom knew it. The doughty warrior died of grief in 1099, on learning that his relative and comrade in arms, Alvar Fañez, had been vanquished by the Moors, and that the army which he had sent to his assistance had been defeated near Alcira. After the Cid's death his widow held Valencia till 1102. When at last she was obliged to capitulate to the Almoravides, and flee to Castile, where she died in 1104, she set fire to the city, and took with her the embalmed body of the Cid, mounted on his war horse Babieca. So ran a legend that gained currency some time after the event. As a matter of fact, Ximena, after holding the city for nearly three years, was obliged to call upon her cousin the Emperor for aid. He went with a strong army, but having no man able to hold the city, he set fire to it, took Ximena with him, and carried away the remains of the Cid, surrounded by his former vassals as a guard of honor. Ximena's remains were placed by those of her lord in the monastery of San Pedro de Cardeña, near Burgos. We have no historical evidence in support of the Santiago Genealogía and Crónicas which state that the Cid had a son, who was slain by the Moors in a battle near Consuegra in 1081. But he did leave behind him two daughters, one of whom was married to the Count of Barcelona, the other to the Infante of Navarre, through whom the kings of Spain claim kindred with "*Mio Cid el Campeador*," as do also the British royal family (through Eleanor of Castile), and the French Bourbons and the Hapsburgers. Relics of the "Blessed Cid," as he is still called in Spain, such as his sword, shield, banner, and drinking cup, are still held in great reverence by the populace.

About 1140, hence only about 40 years after the Cid's death, a poem was composed in his honor, the *Poema del Cid*, also called the *Cantar de Mio Cid*. This is the oldest of the great Spanish epics that has reached us practically complete. It has survived in a single manuscript, which is incomplete at the beginning; but from other sources we know practically what the missing part contained and about how long it was. As we have it the *Poema* amounts to 3735 verses, which compares favorably in length with the 4001 verses of the *Chanson de Roland*. It has a unity of composition and spirit which makes it evident that the poem is not a pastiche of many smaller poems more or less dexterously woven into one, but that it is one great composition, carefully thought out and planned so that the various parts balance properly. It represents the Cid as immutably faithful to an unjust sovereign. It has been thought by some that the character of the Cid of the *Poema* is largely antihistorical. This is true only in part. And yet the unknown poet who gave us this masterpiece was dexterous enough to create a type of character which, although in some respects antihistorical, none the less so thoroughly harmonizes with the spirit of the nation that the type which he created, and not the rigidly historical type, has become the universally accepted type for the Spanish national hero. Most epic poems contain a vast amount of the supernatural or the marvelous. The only supernatural incident in the *Poema* is the consoling dream in which the angel Gabriel appears and promises success the night before the Cid leaves Christian territory and enters the land of the enemy; and the incident is related in eight verses. And the marvelous is entirely absent from the account of the deeds of valor of the various knights in the Cid's band. English readers are fortunate in possessing more than one English rendering. John Hookam Frere, sometime British Minister to Spain, made a verse translation of six passages, prefacing each one with a brief synopsis of what leads up to the selection. Later John Ormsby made a condensed translation in prose of the less poetic passages, and a ringing verse translation of all the others. In 1901 Archer Milton Huntington published a complete line for line translation, the merits of which vary in accord with the merits of the original. The numerous Cid romances that were first published in the sixteenth century contain the most romantic improbabilities concerning the life and deeds of the Cid. Consult *Silva de varios romances* (1550) and *Romancero general* (1604). These romances were taken from the ancient *cantares* (national songs) and *poemas*, most of which are entirely lost.

The most important of modern works on this subject are: Dozy, *Recherches sur l'histoire politique et littéraire de l'Espagne pendant le moyen âge* (3d ed., Leyden, 1881); Huber, *Geschichte des Cid*, etc. (Bremen, 1829); Southey, *Chronicle of the Cid* (London, 1808); Willemaers, *Le Cid* (Brussels, 1873); Milá y Fontanals, *De la poesía heróico-popular castellana* (Barcelona, 1874); Menéndez Pidal, *Cantar de Mio Cid: texto, gramática y vocabulario* (3 vols., Madrid, 1908–11); Huntington, *Poem of the Cid* (text, translation, and notes, 3 vols., New York, 1897–1903; popular edition with same contents except for illustrations, 3 vols., New York, 1909); Fitzmaurice-Kelly, *Chapters on Spanish Literature* (London, 1908); B. P. Bourland, *El Cantar de Rodrigo* (in *Revue Hispanique*, 1911, vol. xxiv, pp. 310–357); *El Cantar de Rodrigo* (facsimile reproduction of the MS. in the Bibliothèque Nationale, edited by Archer M. Huntington, New York, 1904); Menéndez Pidal, *L'Epopée castillane à travers la littérature espagnole* (Paris, 1910); Menéndez Pidal, *El Romancero español* (The Hispanic Society of America, 1910); H. Butler Clarke, *The Cid Campeador, and the Waning of the Crescent in the West* (London, 1902); and for the translations, other than Huntington's, mentioned above, John Hookham Frere, *Works* (2d ed., London, 1874), and John Ormsby, *The Poem of the Cid* (London, 1879).

CID, Le. A famous tragedy by Pierre Corneille (q.v.).

CID, Le. An opera by Massenet (q.v.), first produced in Paris, Nov. 30, 1885; in the United States, Feb. 12, 1897 (New York).

CID'ARIS. A genus of sea urchins (q.v.).

CI'DER (from OF. *cidere*, from Lat. *sicera*, from Gk. *σίκερα*, *sikera*, from Heb. *shēkār*, strong drink, from *shākar*, to be intoxicated). The sweet or fermented juice of apples, and some-

times other fruits, as pears (perry cider), oranges, etc., used as a beverage and for making vinegar. The apples are first ground or grated in a mill, and the pulp is then made into a cheese by mixing with straw to hold it in shape, or in some cases is placed in forms made of reed grass. It is then subjected to pressure, and yields a dark-colored sweet liquid. The pomace remaining is sometimes wet and pressed again, yielding an inferior cider. Green or rotten apples should not be used; the former make cider deficient in sugar and turbid from the suspended particles of starch, while rotten fruit is sure to impair the flavor of the cider. Early apples make a much poorer quality of cider than do fall and winter apples, as the latter contain about 2.5 per cent more of sugar. Fresh cider contains 85 to 88 per cent of water, 12 to 15 per cent of total solid matter, consisting mostly of sugar, and a little malic acid, the natural acid of the apple. The "working" or fermentation of cider, by which alcohol is produced, is due to certain kinds of yeasts, which decompose the sugar into alcohol and carbonic acid, the latter passing into the air. In some countries pure cultures of yeasts are, with advantage, now employed for the fermentation. After the first or main fermentation the clear liquid is racked off into clean casks, which are placed in a cool cellar for the second or still fermentation. An acetic fermentation may take place by which acetic acid is produced and the cider becomes "hard," or quite sour, unless properly handled. The fermented cider contains only 2 or 3 per cent of solids (instead of 12 to 15 per cent as in the apple juice) and from 4 to 8 per cent of alcohol. By again racking off the cider, after the second fermentation, and placing it in casks tightly bunged or in closely stoppered bottles, it can be kept for a considerable time without souring.

Cider brandy, or applejack, is a product derived by distillation from fermented cider. It contains very much more alcohol. For cider vinegar, see VINEGAR.

CIÉNEGA, sē-ā′nā-gȧ, *Sp. pron.* thē-. A name used in the Southwest for swamp (q.v.).

CIÉNEGA (lagoon, Sp. form Ciénaga), or SAN JUAN DE LA CIÉNAGA. A town in the Department of Magdalena, Colombia, at the mouth of a lagoon on the northwest coast, 10 miles south of Santa Marta, with which it is connected by rail. Its inhabitants, estimated at 7000, are chiefly engaged in fisheries.

CIENFUEGOS, syĕn-fwā′gōs (Sp., hundred fires), or JAGUA. A city of Cuba, in the Province of Santa Clara, situated on the south coast, about 190 miles southeast of Havana (Map: Cuba, E 4). Cienfuegos has one of the finest harbors in the world, inclosing an area of about 6 square leagues, with a depth of 27 feet at the anchorage. The city's streets are wide and straight, and one of the plazas is considered the finest in the island. Cienfuegos is lighted by gas and electricity, and has a good water supply. Its commerce is largely with the United States, the principal exports being sugar, molasses, cacao, and tobacco. Cienfuegos is connected by rail with Havana and a few other important points. The harbor is supposed to have been visited by Columbus on his first voyage, but the first settlement was made by refugees from Santo Domingo in 1819. During the Spanish-American War the port was blockaded by Admiral Schley, then in search of Cérvera's fleet. Pop., 1899, 30,038; 1907, 30,100; of municipal district in 1907, 70,416.

CIENFUEGOS, NICASIO ÁLVAREZ DE (1764–1809). A Spanish poet and publicist. He was born in Madrid, was educated at Salamanca, and published his first collection of poems in 1798. The editorship of the government journals *El Mercurio* and *La Gaceta* was granted him the same year, and subsequently he obtained an appointment in the Foreign Office. For participation in the popular demonstration against the French at Madrid on May 2, 1808, and an article against Napoleon, he was condemned to death; but on petition of some powerful friends the sentence was changed and he was deported to France, where he died. His dramas are to later taste stilted and ill contrived, on the pseudo-classic French model, and yet he was the most original of the writers who towards the end of the eighteenth century tried to reform the Spanish drama, and it was his *Pítaco* that won him his election to the Royal Academy. His lyric verse, however, is still read. An edition of his *Obras poéticas* appeared at Paris in 1821 (2 vols.). His dramas were collected and issued at Barcelona, 1836. Consult: "Poesías," in *Biblioteca de Autores Españoles*, vol. lxvii; Piñeyro, "Cienfuegos," in *Bulletin Hispanique*, vol. xi (Bordeaux, 1909).

CIESZKOWSKI, tsē′ȧsh-kŏv′skė, AUGUST, COUNT (1814–94). A Polish philosopher and political economist, born at Sucha, Podlachia, and educated at the University of Berlin. He was one of the founders of the *Biblioteka Warszawska*, and in 1848 settled in Posen, whence he was for years sent as a deputy to the Prussian Chamber of Deputies. He was president of the Society of the Friends of Science in Posen, and repeatedly, but vainly, endeavored to bring about the establishment of a university in that city. In 1872 he became a member of the Cracow Academy. In philosophy he was an anti-Hegelian, and wrote against the pantheistic system of that German philosopher, developing his own supernaturalistic theories concerning God, the immortality of the soul, and the divinity of Christ. His works, written in German, French, and Polish, include the following: *Prolegomena zur Historiosophie* (1838); *Gott und Palingenesie* (1842); *De la pairie et de l'aristocratie moderne* (in French, 1844); *Du crédit et de la circulation* (2d ed., 1847); *Ojcze-Nasz* (1848), a philosophical exposition of the Lord's Prayer; *O drogach ducha* (1863 and 1869).

CIEZA, thē-ā′thȧ. A town of Spain, in the Province of Murcia, situated on the left bank of the Segura, 26 miles northwest of Murcia (Map: Spain, E 3). It lies in a fertile region, amid olive groves, and contains several chapels and hermitages, in addition to the parish church. In its vicinity are the ruins of an old Roman fortress. Pop., 1900, 13,590; 1910, 14,393.

CIEZA DE LEÓN, thē-ā′thȧ dȧ lā-ōn′, PEDRO DE (1518–60). A Spanish soldier and historian, born in Llerena. He accompanied Pizarro, and up to 1552 fought much and traveled widely. He wrote a *Crónica del Perú* (in four parts), a valuable authority on the geography and early history of Peru, as well as on Peruvian civilization under the Incas. For this work, imperfectly edited as it is, the Royal Academy included Cieza de León in the official *Catálogo de las autoridades de la lengua.* Parts i and ii of his narrative have been translated

into English by Sir Clements R. Markham for the Hakluyt Society. Cieza wrote two other works: *Libro de las cosas sucedidas en las provincias que confinan con el mar Océano*, and *Historia de la Nueva España*.

CIGAR, CIGARETTE. See TOBACCO.

CIGARETTE BEETLE. A small ptinid beetle (*Lasioderma serricorne*), closely related to the deathwatch, which attacks stored tobacco. It is a great pest in tobacco warehouses in both Europe and America. See TOBACCO PESTS.

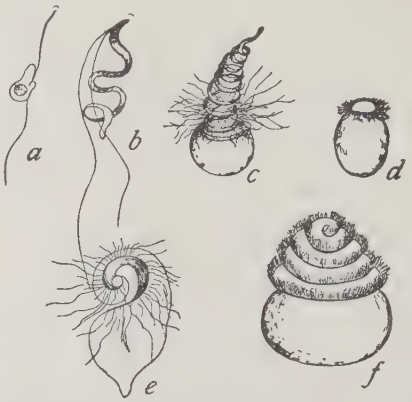
CIGAR FISH. See SCAD.

CIGNANI, chē-nyä'nē, CARLO, COUNT (1628–1719). An Italian painter, born in Bologna. He was the pupil of Francesco Albani, whose influence is visible in such earlier works as the frescoes in the Palazzo Pubblico, Bologna. Later he was influenced by the Carracci, Correggio, and Guido Reni, as may be seen in his frescoes in Rome. His masterpiece is the "Assumption of the Virgin," a fresco in the dome of the cathedral of Forli, on which he worked twenty years; his best oil paintings are "Joseph and Potiphar's Wife" (Dresden), and "Pera and Cimon" (Vienna). Cignani is the most important representative of the later baroque painting in Italy. Consult Frati, *La Familia Cignani* (Rome, 1910), and Riegl, *Die Entstehung der Barockkunst in Rom* (Vienna, 1908).

CIGOLI, chē'gō-lē, LUDOVICO C. DI (1559–1613). A Florentine painter and architect. He was born in Castelvecchio and was a pupil of Allessandro Allori, Buontalenti, and later of Santo di Tito. Cigoli was influenced by the different tendencies which mark a transitional stage of art, and his works vary in style. Good examples of his earlier period are frescoes in the cloisters of Santa Maria Novella, Florence (1581), and the "Martyrdom of St. Stephen" (Florence Academy, 1587). The "Awakening of Lazarus" (1592) and numerous pictures of the life of St. Francis (Museo di San Marco) show much progress, and the "Miracle of St. Anthony" (Cortona, 1597) is entirely free from the traditions of the Mannerists, and in the new baroque style. He was employed by Pope Paul V in various works in Rome and painted for St. Peter's a fresco which is now destroyed and an "Ecce Homo." His best paintings in Rome are "Joseph and Potiphar's Wife" (Borghese Gallery), and the frescoes of "Cupid and Psyche" (Palazzo Rospigliosi, 1613). Cigoli was the originator of baroque (q.v.) painting in Florence. Among his pupils was Christoforo Allori (q.v.). Consult Busse, *Manierismus und Barockstil* (Leipzig, 1912).

CILIA, sĭl'ĭ-ȧ, OF PLANTS (Neo-Lat. nom. pl., from Lat. *cilium*, eyelid). The cilia of plant cells are exceedingly delicate protoplasmic fibrils, whose rapid vibratile movement in the water propels the body. Some of the lowest unicellular algæ (Volvocales, see ALGÆ) are provided with cilia, generally a pair for each cell, throughout the entire vegetative life of the organism. But in the higher algæ and some fungi this motile condition is only present in reproductive cells, as swarm-spores (zoöspores, q.v.), and motile sexual cells (gametes). The ciliated cell is represented in groups above the algæ and fungi (thallophytes) only by the motile sperms, characteristic of the mosses and ferns. It makes its last appearance in the cycads and certain other primitive gymnosperms.

Cilia are developed from cytoplasmic elements in the protoplasm (see CELL), and in some types are known to be formed by a definite protoplasmic body termed a "blepharoplast" (q.v.), which is probably related to the structure generally called a "centrosphere."



CILIA.

a, Sperm of Alga; *b*, sperm of Chara; *c*, sperm of Marsilea; *d*, spore of Œdogonium; *e*, sperm of fern; *f*, sperm of cycad.

CILICIA, sĭ-lĭsh'ĭ-ȧ (Lat., from Gk. Κιλικία, *Kilikia*, Assyr. *Khilakku*). An ancient country occupying the southeastern portion of Asia Minor (Map: Turkey in Asia, C 3). The Taurus Range, which separated it from Cappadocia and Lycaonia, bounded it on the north, the Gulf of Issus and the Cilician Sea on the south, while the Amanus Mountains and Pamphylia bounded it respectively on the east and the west. It was watered by the Pyramus, Sarus, and Calycadnus. The eastern portion of Cilicia was fertile in grain, wine, etc.; while the western and more mountainous portion furnished to the ancients inexhaustible supplies of timber. The passes into Syria are easy of access, but those through the Taurus are very difficult, the easiest being the "Cilician Gates," through which Cyrus the Younger and Alexander the Great entered the country. The chief city was Tarsus.

The early inhabitants of Cilicia appear to have been of Semitic stock. At the time of the rise of the Persian monarchy the country was ruled by a native dynasty bearing a title or name which the Greeks reproduced as Syennesis. These princes became vassals of the Persian kings. In the period of Greek rule in the East Cilicia became the seat of dreaded pirates. When they carried on their depredations too close to the shores of Italy, the Roman arms were turned against them, and they were subdued by Pompeius (67 B.C.), and Cilicia was made a Roman province (64 B.C.), though the mountainous western portion was never thoroughly subjugated.

CILICIAN (sĭ-lĭsh'ȧn) **GATES.** The ancient name of a pass through the Taurus from Cappadocia to Cilicia. The city of Tyana was situated at the northern foot of the Taurus, at the Cappadocian opening of the pass.

CILLI, tsĭl'lē. The capital of a district in Styria, Austria, picturesquely situated amid hilly scenery on the Sann, 38 miles northeast of Laibach (Map: Austria, D 3). The town is of great antiquity, and with the remains of its fortified walls and castle, containing the throne of the counts of Cilli, gabled houses, a Romanesque church, Gothic chapel, and fourteenth-century parish church, retains a mediæval aspect. The municipal museum contains numerous Ro-

man antiquities and relics of the town's early history. It is an increasingly popular summer resort, owing to the warm river baths at Neuhas 10 miles distant. Coal and iron mines, smelting furnaces, chemical works, furniture, leather, and pottery manufactories are among its chief industrial establishments, and there is an extensive trade carried on in coal, iron, zinc, timber, cereals, cattle, leather, and wine. The Roman Colonia Claudia Celeja, mentioned by Pliny the Elder, was taken by the Emperor Claudius 15 B.C. and subsequently formed part of Aquileia. It was the capital of the Slavonian District of Zellia from 1146 to 1331, and from 1339 to 1456 of the County of Cilli. Pop., 1890, 6264; 1900, 6743.

CIMA, chē′mȧ, GIOVANNI BATTISTA, called DA CONEGLIANO (c.1459–1517). A Venetian painter of the Renaissance. He was born in Conegliano and probably studied with Alvise Vivarini, or, according to others, with Giovanni Bellini, who undoubtedly influenced his earlier works. Many of these represent the "Madonna with Saints," good examples of which are in the Museo Civico, Vicenza, the Brera, Milan, the cathedral at Conegliano, and the galleries of Bologna, Venice, Vienna, Munich, and Berlin. "The Healing of Ananias" (Berlin Museum, 1499), "Annunciation" (Hermitage, St. Petersburg), "David and Jonathan" (National Gallery) are also deserving of mention. But Cima's best work corresponds to the great change of style in Venetian painting, induced especially by Giorgione. To this period belong "The Baptist with Four Saints" (Santa Maria dell' Orte, Venice); "Adoration of the Shepherds" (Santa Maria del Carmine, ib.); "Tobias with the Angels" (Venice Academy); "Madonna" (Louvre); and his masterpiece "The Glorification of St. Peter, Martyr" (Brera, Milan). He is represented in the Metropolitan Museum, New York, by "Saints Anthony, Roche, and Lucy." Cima was a conservative, whose art marks the close of an era rather than transition. But while preserving his own individuality he sought to adopt the ideas of the younger generation. His pictures are naïve, fresh, joyous, and free from affectation. Consult: Berenson, *Venetian Painters of the Renaissance* (New York, 1894); the biographies by Botteon e Aliprandi (Conegliano, 1893) and Burckhardt (Leipzig, 1905); Richter, *The Mond Collection* (London, 1910).

CIMABUE, chē′mȧ-bōō′ȧ, GIOVANNI, properly Cenni di Pepo (?–c.1302). A Florentine painter and mosaicist, the greatest of his day, and the first to break the Byzantine tradition. The traditional account of his life, based upon the narrative of Vasari, has been critically analyzed by modern authorities with reference to the sources from which it was drawn, and has proved almost entirely untrustworthy. The name Cimabue is not that of a noble Florentine family (as Vasari thought), but a nickname meaning "bull's head." The only reliable data of his life are gleaned from contemporary documents. It is of course probable that he was born and spent the greater part of his life in Florence, and that he studied there with native or imported masters of the Byzantine school. He was certainly active in Rome where he attested a document in 1272. In Pisan documents he is recorded as chief master of the mosaics of the apse of the cathedral in 1301–02, and as having painted an altarpiece of the Madonnas for Santa Chiara, Pisa. In 1302 he is likewise mentioned in Florentine documents as being a member of a guild in Pisa, and it is probable that he died soon after this. The painting by which he was most widely known was the "Madonna" which, according to Vasari, Charles of Anjou visited in state, and which was carried in triumphal procession to its place in the Rucellai Chapel, Santa Maria Novella, Florence. But recent criticism has shown that this painting is not Florentine but Sienese in manner and was probably the work of Duccio (q.v.), who we know painted a Madonna for Santa Maria Novella in 1485. The well-known Madonna in Paris is probably an atelier piece, and the example in London is not by him, but a Sienese painting of the early fourteenth century. His only work authenticated by documentary evidence is the mosaic figure of St. John in the apse of the Pisa Cathedral; but there are several paintings which authorities are agreed in assigning to him. They are: "The Madonna of Santa Trinità," now in the Academy of Florence; the "Crucifix of Santa Croce"; the frescoes in St. Francis of Assisi. In the decoration of this important church, whose frescoes are a museum of the painting of the later thirteenth and early fourteenth centuries, he took a very important part. He was possibly in charge of the decorations of the Upper Church, in which he painted the frescoes in the choir—five scenes from the life of the Virgin, others depicting St. Michael and the scenes from the Apocalypse, and the Crucifixion—the gallery of the left transept, and the four evangelists in the vaulting where the nave and transept cross. The other decorations of the left transept are either early paintings of Cimabue, or more probably the work of an assistant. He also painted an admirable "Madonna with Angels and St. Francis" in the Lower Church of Assisi. All these frescoes show the influence of the Roman school; they are also by far his best and most important productions.

From the above paintings, as well as from the celebrated contemporary passage of Dante (Purgatorio, xi, 94–96), and the testimony of subsequent Florentine authorities, it is certain that Cimabue was the most important painter of Florence, and the undisputed head of the school before Giotto. His art is a culmination of the tendencies which had been leavening Italian painting since the middle of the thirteenth century, rather than an innovation. Though thoroughly mediæval in their solemn majesty and hieratic splendor, his figures show incipient life and movement. They bear greater resemblance to actuality and are far more expressive than those of his predecessors. Consult: Strzygowski, *Cimabue und Rom* (Vienna, 1888); Thode, in *Repertorium für Kunstwissenschaft* (Stuttgart, 1890); Zimmermann, *Giotto und die Kunst Italiens im Mittelalter* (Leipzig, 1899); Langton Douglas, notes to his edition of Crowe and Cavalcaselle's *History of Painting in Italy* (London, 1903); A. Aubert, *Die malerische dekoration der San Francesco Kirche in Assisi* (Leipzig, 1907); Venturi, *La basilica di Assisi* (Rome, 1908); Frey's notes to his edition of Vasari (Munich, 1911).

CIMAROSA, chē′mȧ-rō′zȧ, DOMENICO (1749–1801). An Italian composer of operas, born as the son of a poor mason, at Aversa, near Naples. He studied music at the Conservatory of Santa Maria di Loreto, under Manna, Sacchini, Fenaroli, and Piccinni. His first opera, *Le stravaganze del conte* (1772), achieved fair

success, and in two years he had a reputation in all the leading theatres of Italy, having composed half a dozen operas, and surpassing in popularity all composers then living, Paisiello and Mozart among them. In 1779 his *L'Italiana in Londra* was given in Rome, and other operas followed in rapid succession. He accepted a call to go to St. Petersburg as composer, and conductor of the Italian opera, but the severe climate compelled him to leave this lucrative post after three years (1789–92). Vienna received him with distinguished honors, and *Il matrimonio segreto*, produced there, had remarkable success. In Naples it had an unprecedented run of 67 nights in 1793. Of the operas written subsequently, the most famous was *Le astuzie feminili* (1794). In 1799 he joined a secret revolutionary society in Naples; the plot was discovered, and Cimarosa was sentenced to death, but this decree was commuted to exile. He died suddenly in Venice, and his friends accused the government of poisoning him. However, an autopsy proved the allegation unfounded. In all, he wrote about 80 operas, of which number *Il matrimonio* has not entirely disappeared from the stage. The greater number are comic operas, which picture the lightheartedness and gayety of life of the last quarter of the eighteenth century. In his serious operas, such as *Gli Orazi e Curiazi* and *Artaserse*, Cimarosa displays some power of characterization, coupled with original orchestral effects, masterly handling of dramatic situations, and tragic force, fully equal to his rich vein of comedy. Besides these operas he also wrote 5 oratorios, 2 requiems, several masses, 10 dramatic cantatas, and numerous smaller vocal pieces. Consult P. Cambiasi, *Notizie sulla vita e sulle opere di Domenico Cimarosa* (Milan, 1901).

CIM'BRI. An ancient tribe of warriors, who, with the Teutones, were the first Germans that forced their way into Roman territory. We hear of them first in 113 B.C., when they moved south through the German forests, joined with other northern tribes, and wandered through Noricum and Illyricum. The Romans sent against them the consul Papirius Carbo, but he met with a signal defeat at Noreia (113 B.C.), and the road to Italy was left open to the enemy. Fortunately for Rome, the Cimbri chose to migrate to the Rhine, which they crossed, and proceeded southward to Gaul. By 109 they were again on the Roman boundaries, and Junius Silanus, who was sent against them, also suffered a defeat. His successors were no more fortunate; at Arausio (Orange), in 105, the Romans lost 80,000 troops. The news of this disaster created a panic in Rome. The constitution was disregarded, and Marius, the successful general in Africa, was made consul for five years, in the hope that he might crush the "Gallic" invaders. While he was gathering great forces, the hordes of Cimbri and Teutones poured into northern Italy. The skillful generalship of Marius now put an end to their depredations. The Teutones were crushed at Aquæ Sextiæ (Aix) in Transalpine Gaul (102 B.C.), and in the following year a fearful battle was fought with the Cimbri in the Campi Raudii, near Vercellæ (Vercelli), and the entire nomad race was annihilated. The men were killed or captured, and the women slew themselves and their children (101 B.C.). The name Cimbric Chersonese was given by the ancients to the peninsula of Jutland, which they regarded as the original home of the Cimbri.

CIMICIDÆ, sī-mĭs'ĭ-dē (Neo-Lat. nom. pl., from Lat. *cimex*, bug). The family of bugs represented by the bedbugs (genus *Cimex*). See BEDBUG.

CIMICIFUGA, sī'mĭ-sĭf'ū-gȧ (Neo-Lat., from Lat. *cimex*, bug + *fugare*, to rout, from *fugere*, to flee), or BUGBANE. An herb of the family Ranunculaceæ. Black snakeroot or black cohosh (*Cimicifuga racemosa*) is found in all the northern United States, and is much used in rural districts as a medicine, chiefly in the form of a decoction. It contains a crystalline principle, two resins and tannin, and has strong alterative and sedative properties. It is sometimes used in cases of dyspepsia, bronchitis, amenorrhœa, and certain other diseases. The medicinal dose of the officinal extract of cimicifuga is from one to five grains. See Plate of BLOODROOT, under SANGUINARIA.

CIMME'RIANS (Gk. Κιμμέριοι, *Kimmerioi*). 1. In Homer, a mythical people, living in the Far West, on the shores of the ocean, where the sun never shines and perpetual darkness reigns. 2. An historical people, whose country lay along the northern shore of the Black Sea, including the Tauric Chersonese. These latter at an early period made inroads into Asia Minor and laid waste the country. There were presumably several such incursions, but the accounts are confused. It was probably in the seventh century B.C. that they were driven from their homes by the Scythians and overran Asia Minor. They on this occasion plundered Sardis and destroyed Magnesia, but failed in an attempt on Ephesus, and were finally driven back by Alyattes of Lydia. See CALLINUS.

CIMOLITE, sĭm'ō-līt. See FULLER'S EARTH.

CIMON, sī'mŏn (Lat., from Gk. Κίμων, *Kimōn*) (c.500–449 B.C.). An Athenian commander, the son of Miltiades, the conqueror at Marathon. His first achievement was the paying of the fine imposed on his father for his proceedings at Paros. In conjunction with Aristides he was placed over the Athenian contingent to the allied fleet, which, under the supreme command of the Spartan Pausanias, continued the war against the Persians (477 B.C.). He effected the important conquest of Eïon, a town on the river Strymon, then garrisoned by the Persians. Later (c.466 B.C.), he encountered a Persian fleet of 350 ships at the river Eurymedon, destroyed or captured 200, and defeated the land forces on the same day. He drove the Persians from Thrace, Caria, and Lycia, and expended much of the money which he had obtained by the recovery of his patrimony in Thrace upon the improvement of Athens. At this period he appears to have been the most influential of the Athenians. The hereditary enemy of Persia, he made it his policy to advocate a close alliance with Sparta; and when the Helots revolted, he led an army upon two occasions to the support of the Spartan troops; but on the second occasion, having lost the confidence of his allies, he was ignominiously dismissed. After his return to Athens his policy was opposed by the democracy, headed by Pericles, who procured his banishment by ostracism (c.461 B.C.). He was presently recalled and was instrumental in obtaining a five years' armistice between the Spartans and the Athenians (c.450). He died in the year 449 B.C., while besieging the Persian garrison of Citium in Cyprus. For a translation of his life by Plutarch, consult Perrin, *Plutarch's Cimon and Pericles* (New York, 1910).

CINCHONA, sĭn-kō'nȧ (Neo-Lat., prop. *Chin-*

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1. CINCHONA TREES. 2. TAKING BARK FROM YOUNG TREE STEMS.

chona, from the Countess del Chinchôn, wife of the Viceroy of Peru). An important genus of trees of the family Rubiaceæ. They yield the bark, so much valued in medicine, known as Peruvian bark, Jesuits' bark, china bark, quina, quinquina, cinchona bark, etc., from which the important alkaloids quinia or quinine and cinchonia or cinchonine are obtained. The properties of the alkaloids are astringent, tonic, antiperiodic, and febrifugal. The species of this genus are sometimes trees of considerable size; but, an aftergrowth springing from their roots when they have been felled, they often appear only as large shrubs, and some of them in the highest mountain regions in which they are found are low trees with stems only 8 or 10 feet in height. They exist naturally only in South America, between latitudes 20° S. and 10° N., and chiefly on the eastern slope of the second range of the Cordilleras. All the cinchonas, of which there are about 50 species, are evergreen trees, with laurel-like, entire, opposite leaves, stipules which soon fall off, and panicles of flowers which, in general appearance, are not unlike those of lilac or privet. The flowers are white, rose colored, or purplish, and very fragrant. The calyx is small and five toothed; the corolla tubular with a salver-shaped five-cleft limb. In the true *cinchona* the capsule splits from the base upward.

Great difficulty has been found in determining the species by which the different varieties of cinchona bark known in commerce are produced. The common commercial names are derived partly from the color of the barks, and partly from the districts in which they are produced, or the ports where they are shipped. It appears that calisaya bark, also called "royal" or "yellow" bark, one of the very best kinds—mostly shipped from Arica, Chile—is chiefly the produce of *Cinchona calisaya*, a large tree growing in hot mountain valleys of Bolivia and the south of Peru. Other kinds met with in the trade are crown, loxa, or pale bark, derived from *Cinchona officinalis* and its varieties; red bark, from *Cinchona succirubra;* Colombia bark, from *Cinchona cordifolia;* and pale bark from *Cinchona nitida* and *Cinchona micrantha.* Yellow bark is also produced by the variety ledgeriana of *Cinchona calisaya.* The varieties of this and *Cinchona succirubra* are the ones most met with in cultivation.

In South America the cutting and peeling of cinchona trees is carried on by Indians, who go in parties and pursue their occupation during the whole of the dry season. The trees were formerly felled as near the root as possible, that none of the bark might be lost. The bark, being stripped off, is carefully dried; the quilled form of the thinner bark is acquired in drying. The bark is made up into packages of various sizes, but averaging about 150 pounds weight, closely wrapped in woolen cloth, and afterwards in hides, to be conveyed on mules' backs to the towns. These packages are called "drums" or "seroons," and are exported in this form. At present less wasteful methods are employed, and the bark is removed so as not to destroy the trees. Strips of bark are sometimes removed and the wounds covered with moss, thus increasing the total yield.

A number of spurious kinds of Peruvian or cinchona bark are either sent into the market separately, or are employed for adulterating the genuine kinds. They are bitter barks and have, in greater or less degree, febrifugal properties, but are chemically and medicinally very different from true cinchona bark. They are produced by trees of genera very closely allied to *Cinchona.* While cinchona trees have been becoming every year more scarce in their native regions, little attempt has been made to cultivate them there, notwithstanding the constantly increasing demand for the bark; the Dutch have recently made extensive plantations of them in Java, and the same has been done in British India, from seeds and plants obtained from South America by Mr. Clements Markham. Cinchona is also cultivated extensively in Jamaica, Japan, Ceylon, etc. For the cultivation of cinchona a good soil and open subsoil are necessary. It seems to thrive best at a considerable elevation above the sea, where the temperature ranges from 55° to 65° F. It will endure slight frost or a temperature of 100° where shaded. In a wild state, the bark often contains 5 per cent or less of total alkaloids; but in cultivation, where only part of the bark is removed and the denuded area covered and kept moist, the young bark yields a much greater percentage of total alkaloids, a large proportion of which is quinine.

The Indians of Peru call the cinchona trees "kina," whence are derived the names "china," "quina," etc. It is not certain that they knew the use of the bark before the arrival of the Spaniards. It is a medicine of great value in the cure of intermittent fevers, etc., and diseases attended with much febrile debility; also in certain forms of neuralgia, and other diseases of the nervous system. It seems to have been first imported into Europe in 1639 by the Countess del Cinchôn or Chinchôn, the wife of the Viceroy of Peru, who had been cured of an obstinate intermittent fever by means of it. The Jesuit missionaries afterward carried it to Rome, and distributed it through their several stations, and thus it acquired the name of "Jesuits' bark." Cardinal Juan de Lugo having been particularly active in recommending and distributing it, it was also known as "Cardinal de Lugo's powder." It attained great celebrity in Spain and Italy, being sold at high prices by the Jesuits, by whom it was lauded as an infallible remedy. Its mode of action not being well understood, and the cases to which it was applicable not well defined, it seems, in the first instance, to have been employed without due discrimination, and to have fallen very much into the hands of empirics. Falling into disuse in Europe, it was again brought into notice by Sir Robert Talbor, or Talbot, an Englishman, who brought it to England in 1671 and acquired great celebrity through the cure of intermittent fevers by means of it, and from whom Louis XIV purchased his secret in 1682. A pound of bark at that time cost 100 louis d'or. Talbor seems to have had the acuteness to discern and systematically to avail himself of the healing virtues of the neglected Jesuits' bark, which he mixed with other substances, so as to conceal its taste and odor. Soon afterward, both Morton and Sydenham, the most celebrated English physicians of their time, adopted the new remedy; and its use, from this period, gradually extended, both in England and France. As it came into general use, it became a most important article of export from Peru; but for a long time the value of the bark to be procured in New Granada (now Colombia) remained unknown, and in order to maintain a commercial

monopoly, extraordinary methods were employed to prevent it from becoming known at a comparatively recent period of Spanish rule in America. The discovery of the alkaloids on which its properties chiefly depend was made early in the nineteenth century.

The chief active principles are the alkaloids, quinine, cinchonine (qq.v.), quinidine, cinchonidine, and quinamine. The relative proportion of the different alkaloids varies widely with the kind of bark and its age when taken from the tree. Some species produce a large amount of quinine and little of other alkaloids, and vice versa. Cinchona bark itself has in later times fallen into comparative disuse, owing to the discovery of the alkaloid quinine, which is now extensively in use in medicine in the form of sulphate or disulphate of quinine, and is given in doses of from 1 to 20 grains in almost all the cases to which the bark was supposed to be applicable. For notes on the production, cultivation, etc., of cinchona, consult: Mueller, *Extra-Tropical Plants* (Melbourne, 1895); Markham, *Peruvian Bark* (London, 1880); King, *Manual of Cinchona Cultivation in India* (Calcutta, 1876); Lambert, *Description of the Genus Cinchona* (London, 1897); Kuntze, *Chinchona; Monographische Studie* (Leipzig, 1878).

CINCHONIDINE, sĭn-kŏn'ĭ-dĭn. See CINCHONINE.

CINCHONINE, sĭn'kō-nĭn (from Neo-Lat. *cinchona*), $C_{19}H_{22}N_2O$. An alkaloid occurring in cinchona bark along with quinine, and having much the same, though by far less powerful, physiological effects as quinine. It is a white crystalline substance, having neither odor nor taste, but leaving a bitter aftertaste in the mouth. It is insoluble in water, and but sparingly soluble in alcohol, ether, or chloroform. It melts at 264.3° C. (507.7° F.). The sulphate of cinchonine, $(C_{19}H_{22}N_2O)_2H_2SO_4 + 2H_2O$, is a crystalline substance with a strong bitter taste, and is moderately soluble in water, alcohol, and chloroform.

The alkaloid cinchonidine, occurring together with cinchonine, has the same chemical composition as the latter, though a much more pronounced physiological effect. It differs from cinchonine in certain of its physical properties, and its sulphate, $(C_{19}H_{22}N_2O)_2H_2SO_4 + 3H_2O$, is much less soluble in alcohol and practically insoluble in chloroform. See ALKALOIDS.

CINCINNATI, sĭn'sĭn-nă'tĭ. The county seat of Hamilton Co., Ohio; in 1910 the second city in the State, and thirteenth in the United States in population, on the right bank of the Ohio River, in lat. 39° 6′ 30″ N. and long. 84° 30′ W. (Map: Ohio, A 7). It lies 116 miles southwest of Columbus, 270 miles southeast of Chicago, 752 miles from New York, and 830 miles by rail from New Orleans, and is the nearest large city to the centre of population.

The city is built upon two plateaus, surrounded by a semicircle of hills which approach the river above and below the inclosed plain, the ends of the semicircle being only 2½ miles apart. The Ohio River, which here forms a grand curve from east to west, is at low-water mark 431.29 feet above sea level. The first plateau varies from about 65 to 120 feet above low water; a more abrupt rise to the hills at the east, north, and west produces an elevation at the second plateau of about 420 feet above low water, which at the highest point reaches 957 feet above sea level. The summits of the hills—Mount Adams, Mount Auburn, Fairview Heights, Price Hill, and College Hill—accessible by roads and by inclined-plane railways, command superb views of the river, of the Kentucky shore, and the rolling country surrounding the city. Pierced by ravines, these thickly wooded highlands give a picturesque aspect to the city and are covered with the beautiful residences of wealthy citizens, the Clifton, Avondale, Rose Hill, Vernonville, and East Walnut Hills districts being especially noteworthy for their scenic beauty and magnificent homes. The climate is equable. The average temperature in summer is 75.63°; in fall, 56.87°; in winter, 34.37°; in spring, 54.07°; the yearly mean being 55.23°.

Cincinnati covers an area of 70 square miles and has a river frontage extending nearly 22 miles. Brick and the freestone found near at hand, and the blue limestone quarried within the city limits, are largely used for building material. The streets and avenues, averaging 66 feet in width, cross each other at right angles in the old portion of the city and conform to the surface conditions in the new. A public landing or levee extends along Front Street, the sloping shore being paved and lined with floating docks and wharf boats. As three terraces constituting the ascent rise one above another from the river level, the streets become more irregular, and the buildings with extensive grounds spread out. The lowest, or "bottom," streets, sometimes inundated by unusual floods of the Ohio River, are mainly devoted to the manufacturing and the wholesale trades; they also contain the few remaining slum quarters. The central and business portion of the city, with numerous fine stores, is compactly built, and almost the whole plain is filled up; numerous former villages have been absorbed by the extending city. There are more than 50 street-railway lines, all of which converge at or near Fountain Square (mentioned below) as a common starting and terminal point. The city has 608 miles of paved and 350 miles of unpaved streets, 321 miles being of macadam, 41 miles of cobblestones, 182 miles of granite, brick, and wood blocks, and 42 miles of asphalt. There are 497 miles of sewers, and the street railways aggregate 226 miles.

Beautiful suburban villages cluster about Cincinnati and are rendered easily accessible by the street and interurban railroads. Covington, Newport, Dayton, Ludlow, Bellevue, Norwood, Latonia (with its well-known race course), Glendale, Wyoming, Milford, Terrace Park, and Fort Mitchell are some of these near-by towns. Norwood and St. Bernard (qq.v.) are entirely surrounded by the larger city. Fort Thomas, a picturesque hill station above Newport, Ky., and one of the most important posts of the United States army, is 40 minutes distant by electric car. The large wire suspension bridge across the Ohio, completed in 1867 at a cost of $1,800,000 and reconstructed in 1895–98 at a cost of $500,000, connects with Covington, Ky. It is 2763 feet long, has a span of 1057 feet, and is 106 feet above low-water mark. Two bridges of wrought iron, resting upon stone piers, connect Cincinnati with Newport, Ky. A fourth bridge, uniting the city with Ludlow, Ky., is that of the Cincinnati Southern Railroad. It cost $3,348,675 and has one of the longest truss spans in the world. A new bridge for this railway is projected. A fifth bridge, the Chesapeake and Ohio, connecting Cincinnati with West Covington, is a cantilever.

Buildings. Among the fine and substantial edifices is the United States Government Building, which contains the post office, customhouse, court rooms, and various offices, erected at a cost of $5,000,000. It is of sawed freestone, three stories high, in the Roman-Corinthian style. The City Hall is equally fine. The county courthouse, with the jail, occupies a whole square; it is built in the Romanesque style. A two million and a half bond issue for a new courthouse to occupy two squares has been authorized by a vote of the people.

The old City Hospital, consisting of eight distinct buildings arranged around a central court, occupies a square of nearly four acres and accommodates 700 patients. The new City Hospital, completed in 1914 at a cost of $4,000,000, and considered to be the largest and most complete municipal hospital in the country, is built upon the ward unit plan and comprises 24 buildings with accommodation for 850 patients. It is located on the suburban hills, occupying a tract of 27 acres. There are also new tuberculosis and contagious hospitals located in open territory. The Chamber of Commerce is located in the new 34-story skyscraper, the tallest in the world outside of New York. The City Workhouse has cells for 700 prisoners, with workshops and grounds for their employment. The new House of Refuge, with separate farms for boys and girls, on the community-cottage plan, located 12 miles from the city, accommodates 225. Longview Asylum for the Insane, at Carthage, 10 miles from the city, is of brick, in the Italian Renaissance style. St. Peter's Roman Catholic Cathedral is an immense structure, in the Grecian style, with a stone spire 224 feet high. The altarpiece is Murillo's original "St. Peter Delivered." St. Paul's Methodist Episcopal Church, the First and Second Presbyterian churches, St. Paul's Protestant Episcopal Pro-Cathedral, the Jewish Synagogue, and St. Frances de Sales Catholic Church on Walnut Hills are all worthy of note. A beautiful structure of classic design is the new Memorial Hall. The numerous newly erected skyscrapers give the city a very striking skyline, while several fine bank buildings are of the highest order of architecture. Cincinnati is the seat of a Roman Catholic archbishop and of a Protestant Episcopal bishop and contains over 300 churches.

Parks. The fine parks, well wooded and picturesque, cover an area of more than 2000 acres. In 1907 a comprehensive plan for a general park, playground, and boulevard system was prepared by George E. Kessler, and since that date over 1500 acres have been added to the parks by purchase and gift, so that the system represents to-day an original investment of $5,000,000 in addition to large donations. The famous Eden Park, or "Garden of Eden," on Mount Adams, has 209 acres inclosed and contains the Art Museum and Art School. The Elsinore Gateway is a striking mediæval reproduction; and from the lofty water tower, a prominent object, the finest view of the surrounding country is obtained. The chief reservoir of the city's water works in the park is a fine, ornamental sheet of water. Burnet Woods, another delightful park, embraces 165 acres. Among the larger of the recent additions are Ault Park (172 acres), Blackly Farm (114 acres), Bloody Run Parkway (84 acres), Mount Airy Forest (800 acres), Mount Echo (51 acres), Mount Storm (67 acres), and Parker's Woods (32 acres), many of them heavily wooded and very hilly. The entire park system is to be connected by parkways and boulevards. The Zoölogical Garden, containing 60 acres of hills, valleys, and ravines, is well stocked with wild animals of all kinds. There are 26 cemeteries; Spring Grove, the best known, has 600 acres of land, lies 6 miles from Fountain Square, and is approached by an avenue 100 feet wide. Among its costly monuments are many private mausoleums, and a bronze statue commemorating the soldiers who died in the Civil War. The most noted piece of ornamentation in the city is the Tyler-Davidson Fountain, on the esplanade of Fountain Square, Fifth Street. It was cast at the Royal Foundry in Munich and cost $200,000. The Garfield statue, at Eighth and Race streets, and the equestrian statue of Gen. W. H. Harrison, first Governor of Ohio, at Eighth and Vine streets, are works of great merit.

Institutions. The educational advantages of the city are unsurpassed. There are four high schools—Hughes, Woodward, Walnut Hills, and Madisonville—and over 60 grammar and intermediate schools. The higher institutions include the municipally owned University of Cincinnati, an outgrowth of McMicken University, with collegiate buildings in Burnet Woods Park and an astronomical department with an observatory at Mount Lookout; Hebrew Union College; St. Joseph's College, and St. Xavier's (Jesuit); the Lane Theological Seminary, at Walnut Hills; the Franklin and University schools; several medical, musical, and commercial colleges; and colleges of law, pharmacy, and dentistry.

The Ohio Mechanic's Institute, housed in a fine new building containing also the Emery Auditorium, is a strong factor in the education of the masses. It has many pupils who attend the day and night classes, where they are instructed in literature, science, manual training, and mathematics. The Art Museum and Art School in Eden Park, founded by the women of Cincinnati, has three large buildings modeled after the South Kensington Museum of England. The museum contains a fine collection of paintings, statues, and works of art; and the school is attended by hundreds of students. There are many libraries, including the Young Men's Mercantile, the Law, the Historical, the Mechanic's, and the Public Library. The last is situated in a commodious building on Vine Street, is well equipped, containing over 300,000 works, with numerous reading and circulating branches in outlying districts. The Cuvier Club and the Museum of the Natural History Society, on lower Broadway, have fine collections which are open to the public. The latter is rich in relics of aboriginal mound dwellers, discovered in the vicinity and especially at Madisonville.

Besides the public charities already mentioned, there are numerous benevolent institutions, embracing almost every conceivable need and supported by private munificence.

Hotels, Theatres, and Pleasure Resorts. The chief hotels are the Sinton, Gibson (entirely rebuilt in 1914), Havlin, Metropole, Lackman, Savoy, Alms, Grand, Burnet House, Emery (with a fine commercial arcade), Palace, Honing, and Dennison. There are several good clubs; the Country Club House, with its well-laid-out grounds, is an elaborate suburban establishment of world-wide fame. Among the social clubs are the Queen City, University, Business Men's, and Phœnix. The Literary Club, dating from 1849, is the oldest club of the character in the coun-

try. Among the buildings devoted to amusement the splendid Music Hall, founded and mainly endowed by Reuben Springer, is justly celebrated. It is used also as an exposition building. It is 300 by 500 feet, will seat 5400 persons, and has one of the largest organs in the United States. The Grand Opera House, Lyric Theatre, Emery Auditorium, Walnut Street Theatre, Keith's Theatre, Greenwood Hall, Houck's Opera House, and Olympic Theatre are also noteworthy structures. Owing to the large number of German residents, the city has become noted for its musical societies, while it is also taking rank as a literary and art centre. The biennial musical festivals are distinctive features of its art life. A permanent symphony orchestra ranks with the best in the country. "Over the Rhine," the designation of that part of the city which lies between the canal and the hills, is inhabited almost exclusively by Germans and is famous for its concert and beer gardens. The elaborately installed summer pleasure resorts include Coney Island, 10 miles up the river, reached by hourly excursion steamers; the Lagoon, on the Kentucky side; and Chester Park, near Spring Grove Cemetery.

Industries and Transportation. The commanding position of Cincinnati permits of admirable commercial relations with the Mississippi and Ohio valleys. The Miami and Erie Canal connects with Lake Erie. The commerce by water has diminished since the advent of railroads, but the damming and deepening of the Ohio River channel is expected to result in a great increase of river traffic. Cincinnati is an important railroad centre. The Central Union Depot is a converging station for the Cleveland, Cincinnati, Chicago, and St. Louis, the Baltimore and Ohio, the Chesapeake and Ohio, the Queen and Crescent, the Louisville and Nashville, and other lines. The Cincinnati, Hamilton, and Dayton, the Pennsylvania, and some minor local railways have separate stations. The Cincinnati Southern, with a length of 338 miles, was built and is owned by the city. It is operated, under lease, by the Queen and Crescent system.

According to the thirteenth census (1910) there were 2184 industrial establishments in the city, employing 72,488 persons and representing a total capital of $150,254,000. The value of the combined output was $194,516,000. Among the leading manufactures are those of men's factory clothing, distilled liquors, malt liquors, foundry and machine-shop products, carriages and wagons, boots and shoes, furniture, tobacco and cigars, soaps and candles. Printing, publishing, and playing cards are also important industries. Slaughtering and pork packing are carried on extensively, the value of the output in 1909 being $19,320,000. The last named was formerly the chief industry, giving the nickname "Porkopolis" to the city. Other products comprise all kinds of tanned and curried leather goods, wirework, scales and balances, brick and tile, bridges, cutlery, hosiery and cotton goods, cheese and butter, compressed yeast, biscuits, brooms, brushes, articles representing the woodturning and wood-carving industries, etc. The Rookwood Pottery, on the crest of Mount Adams, a prominent structure in an Elizabethan style of architecture, produces purely American wares of high artistic merit, which are widely known even beyond the limits of this country.

Government. The city government is organized in accordance with the Ohio Municipal Code of 1902. The council consists of one member from each of the 26 wards of the city, and of six members elected at large. The mayor, auditor, treasurer, solicitor, and council are all elected for two years. The director of public service controls the streets, sewers, water works, markets, public bathhouse, city electrician's and city engineer's departments, and all municipal buildings. The director of public safety is the head of the police and fire departments and a department of charities and corrections. The mayor and his cabinet, composed of the two directors mentioned, form the board of control. The elections are in charge of a bipartisan board of deputy State supervisors and inspectors, appointed by the Secretary of State. The water works completed in 1908 cost over $10,000,000 and are self-supporting.

The city budget for the first half of the year 1914 shows a grand total of $3,162,347.14 to cover the expenses of government. The principal items are: public safety (fire, police, etc.), $930,000; hospitals, health, etc., $242,000; public service (streets, sewers, lighting, etc.), $787,000; water works, $717,000; university and observatory, $150,000 (approximated). Of the above, $1,767,679.32 is provided for by taxation. The bonded debt, Jan. 1, 1914, aggregated $64,775,250.01. Neither the water bonds nor the bonds issued for Southern Railway purposes are a charge upon the taxpayers, and this fact, together with the large and carefully maintained sinking fund of approximately $10,000,000, makes the net amount of bonds taken care of by taxation $25,519,518.36. The Southern Railway income to the city by reason of the rents, sinking fund, and interest paid by the lessee company during the year 1913, was $1,217,750. The sinking-fund levy for redemption and interest purposes for the year 1914 is $1,250,817.

Population. The population in 1810 was 2540; 1850, 115,435; 1870, 216,239; 1880, 255,139; 1890, 296,908; 1900, 325,902; 1910, 363,591; 1914, 402,175; 1920, 401,247. The Cincinnati metropolitan census district approximates 600,000. In 1910 of the total population 15.6 per cent was foreign born, about half being German. The native born of native parentage was 58.7 per cent. There were 19,639 negroes.

History. On his way to attack the Indians at Chillicothe, in 1780, George Rogers Clark stopped at the present site of Cincinnati and erected two small blockhouses, which, however, were soon abandoned. The permanent settlement dates from 1788, when a company from New Jersey and Kentucky settled on part of the land bought from the government in the same year by John Cleves Symmes (q.v.). The village, which early in the following year was laid out by Col. Israel Ludlow, was pedantically called "Losantiville"—a hybrid word, signifying 'the city opposite the mouth of the Licking.' In June, 1789, Fort Washington was built here, and in 1790 the little village was made the capital of the newly erected Hamilton County and was renamed "Cincinnati" by General St. Clair, in honor of the Society of the Cincinnati. For some years it was only a straggling village, inhabited for the most part by typical frontiersmen, and in 1800 it had a population of but 750. In 1802 it was incorporated as a town; and in 1819, with a population of about 7500, it became a city. The opening of steamboat navigation on the Ohio in 1816, the completion of the Miami Canal in 1830, and of the first section of the

Little Miami Railroad in 1843, with the gradual establishment of manufactures, coupled with the advantageous situation for purposes of trade—all tended to make the growth of the city very rapid and gave it the name "The Queen City of the West." Between 1845 and 1860 German immigrants came in considerable numbers. Cincinnati's close commercial and social relations with the South led its citizens for the most part to oppose all antislavery agitation, and the Philanthropist press, established by James G. Birney, was destroyed by mobs in 1836, on the ground that the city's trade with the South could not be maintained if abolitionist papers were tolerated. Cincinnati was, however, the rendezvous for fugitive slaves escaping to Canada, and during the Civil War its sympathies were predominantly with the North. In 1862, during the so-called "siege of Cincinnati," the city was threatened by a Confederate force under Gen. Kirby Smith and for a time was put under martial law. Cincinnati has suffered severely from floods, the most destructive of which occurred in 1832, when the lower part of the city was submerged; in 1883, when more than 150 business houses were inundated; and in 1884 and again in 1913, suffering slightly in a far-reaching disaster. In 1884 (March 28-31) occurred the famous "Cincinnati Riot." A mob, infuriated by the lax administration of the law, broke into the jail and attempted to lynch some murderers who had received light sentences from the courts; but, being frustrated, they burned the courthouse and other buildings. The militia was called out; but before order could be restored, 45 persons had been killed and 148 wounded. The completion (1911) of the Fernbank dam, at a cost of $1,300,000, the largest movable dam in the world at the time of its building, is an important event in the recent history of the city and is expected to increase its commerce very materially.

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CINCINNATI, Society of the. An hereditary patriotic society, organized on May 13, 1783, by the American and foreign officers of the Continental army, assembled in their cantonment on the Hudson River, near Fishkill, N. Y. The original meeting was held in the Verplanck House, then the headquarters of Baron Steuben, where the objects of the society were thus formulated: "To perpetuate as well the remembrance of this vast event [the War of the Revolution] as the mutual friendships which have been formed under the pressure of common danger, and in many instances cemented by the blood of the parties, the officers of the American army do hereby, in the most solemn manner, associate, constitute, and combine themselves into one society of friends, to endure as long as they shall endure, or any of their closest male posterity, and in failure thereof, the collateral branches who may be deemed worthy of becoming its supporters and members." And as the officers of the Revolution were now returning to their farms, which they had left to fight the battles of the Republic, they named their society the Society of the Cincinnati, after their Roman prototype, Lucius Quinctius Cincinnatus. The emblem chosen was an eagle, on which appears as the principal figure Cincinnatus receiving a sword and other military insignia presented by three senators, while in the background his wife is standing at the door of their cottage, near which are a plow and other instruments of husbandry. Surrounding this is the motto, *Omnia Relinquit Servare Rempublicam;* on the reverse is shown a sun rising, a city with open gates, and vessels entering the port, and Fame is represented as crowning Cincinnatus with a wreath bearing the inscription, *Virtutis Præmium;* while below are hands joined supporting a heart with the motto, *Esto Perpetua*—the whole suspended from a light blue ribbon edged with white, suggesting the union of France and America.

Membership was accorded to all Continental officers who had served with honor and resigned after three years' service, or who had been honorably discharged for disability, and in turn to the eldest male posterity of such officers. In failure of direct male descent, the honor passed to male descendants through intervening female descendants, and in failure of all direct descent, the collateral descendants who should be judged worthy of becoming members. The society was organized into 13 State societies. The first general meeting was held in Philadelphia, on May 7, 1784, at which delegates from the original States were present, and an amended constitution was adopted, under which a society was authorized and organized in France. Although General Washington was the first president of the society and held office until his death, the society was immediately and continuously unpopular throughout the country. Many persons claimed that it was the beginning of an hereditary aristocracy, and others discerned the formation of an armed league to seize all the military and civil offices in the new Republic. Even so conservative a statesman as Benjamin Franklin questioned the society's influence; while John Adams, Samuel Adams, and Thomas Jefferson were avowedly hostile towards it. The Massachusetts Legislature declared the society to be "dangerous to the peace, liberty, and safety of the Union"; and Ædamus Burke, an Irishman who was a judge of the Supreme Court in South Carolina, published a pamphlet under the pseudonym of "Cassius," which attained a wide circulation, and in which he endeavored to show that the society was subversive of nearly every principle of human rights for which the War of the Revolution was fought. The fact that many members of the French nobility who had served with the Americans, including the Marquis de Lafayette, were members of the society, gave some reason for the popular impression against the Cincinnati; and opposition did not cease until after the "critical period" of American history had passed and the Union was firmly established. One of the most interesting results of the feeling against the society was the founding of Tammany Hall (q.v.) in New York, on the alleged basis of "pure democracy." The State societies of Georgia, North Carolina, Virginia, Delaware, Connecticut, Rhode Island, and New Hampshire soon ceased to exist, and although a temporary interest in the society was revived by the visit of Lafayette to the United States in 1824, still it was not until 1893 that Connecticut, as the first of the revived State societies, was admitted into the general society,

and one by one the other State societies were restored, until, at the triennial convention held in 1902, Georgia, the last of the original 13, was provisionally readmitted. The State societies meet annually, and the general society once in every three years. The presidents general have been: George Washington, Alexander Hamilton, C. Cotesworth Pinckney, Thomas Pinckney, Aaron Ogden, Morgan Lewis, William Popham, H. A. S. Dearborn, Hamilton Fish, William Wayne, and Winslow Warren. Many of the State societies, such as Delaware, Maryland, Massachusetts, New York, and North Carolina, have published State books, in which is given a history of the society. The living hereditary members number about 980.

CINCINNATI, UNIVERSITY OF. An educational institution in Cincinnati, Ohio, the only municipal university in America. The university was founded on bequests made by Charles McMicken in 1858, and by tax levies subsequently authorized by the city of Cincinnati. By Mr. McMicken's will somewhat over $1,000,000 was given the city to found a college; but the State of Louisiana, in which was situated real estate amounting to nearly one-half of the entire bequest, refused to recognize the validity of the will, and the income from the remainder of the estate was insufficient for the desired purpose. The matter, therefore, lapsed until 1870, when the Legislature passed a special bill under which the University of Cincinnati was organized. Bonds were issued by the city to provide funds for buildings. Later, a special tax of three-tenths of a mill for maintenance was authorized. Instruction was first given in 1873, and in 1874 the academic department was organized. In 1896 the Medical College of Ohio, founded in 1819, was reorganized as the medical department of the university. The departments of the university include liberal arts, engineering, medicine, the college for teachers, graduate school, the Clinical and Pathological School of the Cincinnati Hospital (affiliated), and the College of Commerce and evening academic classes. The buildings, grounds, and equipment are valued at $1,807,039; the endowment aggregates $1,500,000; and the total annual income is, approximately, $299,000. The library collections number approximately 96,600 bound volumes, and 79,000 pamphlets. In 1913 there was a faculty of 186 (excluding the clinical staff), and a student body of 1866.

CINCINNATI GROUP. See ORDOVICIAN SYSTEM.

CINCINNATI MUSICAL FESTIVAL. Established by Theodore Thomas in 1873, the festivals were afterward held biennially, under his direction. Hitherto the festival had lasted five days—from Tuesday till Saturday, inclusive—within which period there were given seven concerts, five in the evenings and two in the afternoon (Thursday and Saturday); but in 1902 the season was reduced to four days and five concerts. The music is supplied by the Chicago Orchestra (q.v.), augmented for the occasion by a local chorus of about 500 voices, and well-known soloists. The festival has been an invariable artistic success, but has frequently entailed considerable financial sacrifice on the part of those responsible for the undertaking. After the death of Mr. Thomas in 1905 the festival was under the direction of Frank van der Stucken (q.v.) until 1912. Beginning in 1914 the orchestral part was furnished by the Cincinnati Symphony Orchestra (q.v.), and its regular conductor, Dr. Ernst Kunwald (q.v.), became the conductor of the festival.

CINCINNATI SYMPHONY ORCHESTRA. One of the great orchestras of the United States. In 1893 the "Cincinnati Orchestra Association," with Mrs. William H. Taft as president, was organized for the purpose of assuring to the music lovers of Cincinnati adequate and regular symphony concerts. Previous to that time an orchestra of 40 musicians under Michael Brand had for some years been giving concerts devoted to serious music. In the spring of 1895 the association engaged this orchestra for nine preliminary concerts directed by Anton Seidl, Frank van der Stucken, and Henry Schradieck, chiefly for the purpose of selecting a regular conductor. As a result, the orchestra was strengthened by the addition of a dozen musicians from New York. Van der Stucken was chosen conductor, and Josef Marien concert master. A guarantee fund of $15,000 was pledged, and in the fall of the same year the first regular season of 10 subscription concerts began. The season extends from November to April. The concerts take place on Saturday nights, preceded by a public rehearsal on Friday afternoon. In 1906 the official name of the association was changed to "Cincinnati Symphony Orchestra Association Company." Friction between the Musical Union and Van der Stucken led, in 1907, to the latter's resignation and the disbanding of the orchestra. Under the auspices of the association a number of symphony concerts were given by visiting orchestras during the season of 1907–08. In the following season no concerts were given, but the association was at work perfecting arrangements for the reëstablishment of the orchestra on a permanent basis. When an annual guarantee fund of $50,000 for five years had been pledged by a number of public-spirited citizens a new orchestra of 80 performers, with Leopold Stokowski as conductor, was organized in 1909. The number of subscription concerts was increased from 10 to 12, and a series of eight concerts at popular prices on Sunday afternoons was added. Under the energetic leadership of Mr. Stokowski the orchestra soon rose to the level of the foremost symphony orchestras in the United States, and greatly extended its activities by frequent concert tours to other cities. When Mr. Stokowski resigned in 1912 Dr. Ernst Kunwald of the Berlin Philharmonic was chosen his successor. The original president of the association, Mrs. William H. Taft, was succeeded in 1900 by Mrs. C. R. Holmes. Since 1913 Mrs. Charles P. Taft has been president.

CIN'CINNA'TUS, LUCIUS QUINCTIUS. A hero of the semilegendary period of Roman history, regarded by the later Romans as the model of antique virtue and simple manners. Cincinnatus appears to have been an uncompromising patrician. About 460 B.C. he was chosen consul, and two years later was made dictator. The story says that when the messengers from Rome came to tell Cincinnatus of his new dignity, they found him plowing on his small farm on the Tiber. He soon rescued the Consul Lucius Minucius, who had been defeated and surrounded by the Æqui. After a dictatorship of 16 days, Cincinnatus returned to his farm. When 80 years old, he was once more made dictator (439 B.C.), and suppressed a threatened plebeian insurrection.

CINCIUS (sĭn'shĭ-ŭs) **AL'IMEN'TUS,** LU-

CIUS. A Roman annalist of some note, prætor in Sicily in 210–208 B.C. He wrote in the Greek tongue a number of works, chief among which is his *Annales*, containing the history of Rome from the earliest times to his own day. During this war he himself was imprisoned by Hannibal, who graciously gave him an account of the Carthaginian march through Gaul and across the Alps. His work was more carefully critical than that of most historical students of his time. Consult: Plüss, *De Cinciis Rerum Romanorum Scriptoribus* (Bonn, 1865); Peter, *Veterum Historicorum Romanorum Reliquiæ* (Leipzig, 1870); Schanz, *Geschichte der Römischen Litteratur* (3d ed., Munich, 1907).

CIN'DERELLA (from *cinder*, with dim. termination *-ella;* cf. Fr. *Cendrillon*, and Ger. *Aschenbrödel*, or *Aschenputtel*, of similar meaning). An old fairy tale of Oriental origin. It existed in Egypt in a legend of Rhodopis and Psammetichus. It appears in German lore in the sixteenth century, and is among the fairy tales of Grimm. Perrault and Madame d'Aulnoy popularized it for seventeenth-century France. It deals with the marriage of a household drudge to a prince who discovers her by finding her marvelously small glass slipper, which excites his curiosity as to the owner, and which no court lady is able to wear. The "glass" slipper is an error, arising from the confusion of *verre*, 'glass,' with the old *vair*, 'fur.'

CIN'EAS (Lat., from Gk. Κινέας, *Kineas*). A Thessalian, the chief adviser of Pyrrhus, King of Epirus. He was an eloquent orator and a skilled diplomatist; Pyrrhus declared that Cineas had won more cities by his words than he himself had won by his arms. He visited Rome to arrange for peace after the defeat of the Romans in 280 B.C. While in Rome he learned in a single day, it is said, the name of every man of importance in the city. He was not successful in securing peace, and when he returned he told Pyrrhus that Rome was a temple, and its Senate an assembly of kings.

CIN'EMAT'OGRAPH. See MOVING PICTURES.

CIN'ERA'RIA (Neo-Lat. nom. pl., from Lat. *cinerarius*, ashy, from *cinis*, ashes). A genus of plants belonging to the family Compositæ, and related to *Senecio* (q.v.), from which the species are separated by some minor characters. As commonly understood, the species are numerous and widely distributed; but as recently limited, there are only about 25 species, all of which are indigenous to South Africa. The other species are mostly grouped with *Senecio*. The most common garden *Cineraria* by this classification becomes a *Senecio*. The plants are annual or perennial herbs, with simple-toothed or sinuate-lobed leaves, and many are notable on account of the ashy appearance of their lower leaves; hence the name (Latin *cinis, -eris*, ashes). The cinerarias are popular greenhouse plants; and on account of the ease of cultivation, free blooming, and lasting qualities they are much grown. There has been much discussion regarding the species most cultivated, *Cineraria cruenta*, many strains of which are known. By some it is claimed as a development from the wild species, while others maintain it is a hybrid between *Cineraria cruenta* and other species, all of which are natives of the Canary Islands. The single-flowered forms are the most popular.

CIN'ERARY URNS. Urns used by the nations of antiquity to contain the ashes of the dead when gathered from the funeral pile. Among both Greeks and Romans the urn was buried as we bury a coffin. Among the Romans it was frequently placed in a niche in the family mausoleum or in one of the great columbaria (q.v.). See BURIAL; CREMATION.

CINGALESE, sĭn'gȧ-lēz', or SINGHALESE. See CEYLON.

CING'ULUM. See GIRDLE.

CIN'NA, GAIUS HELVIUS. See HELVIUS CINNA, GAIUS.

CIN'NA, LUCIUS CORNELIUS. A Roman noble, one of the principal supporters of Marius. Sulla, after driving Marius from Rome, and before setting out on his expedition against Mithridates, allowed Cinna to be elected to the consulship. At once, as consul (87 B.C.), he impeached Sulla, endeavored to advance the political status of the citizens who had been added to Rome after the Social War, and agitated for the recall of Marius. On Marius's return, after a cruel massacre of Roman citizens, in which some of the most eminent statesmen and orators were slain, Marius and Cinna declared themselves consuls. On the death of Marius, which occurred within a few days of his usurpation, Cinna made Valerius Flaccus his colleague for that year and Papirius Carbo his associate for the two succeeding years. In 84 B.C. he prepared to meet Sulla, who was then on his way from the East to take vengeance upon his enemies, but was slain by his disaffected troops at Brundisium. His daughter Cornelia married Julius Cæsar.

CIN'NABAR (Lat. *cinnabaris*, from Gk. κιννάβαρι, *kinnabari*, vermilion, from Pers. *zinjarf*, Hind. *shangarf*). A name originally applied to the red "dragon's blood" that came from India, and subsequently to other substances of a similar color, but now exclusively used to designate the mercuric sulphide that crystallizes in the hexagonal system. The Romans were familiar with it, and both Pliny and Vitruvius described the use of an ore of mercury for amalgamating gold. It is found both crystallized and massive, and is bright red to brown in color. Cinnabar is the most important ore of mercury, and is mined in Almaden, Spain; at Idria, in Carniola, Austria; and at New Almaden and elsewhere in Santa Clara Co., Cal. It is also found in southern Russia, China, Peru, New South Wales, New Zealand, and South Africa. At Sulphur Bank, Cal., and Steamboat Springs, Nev., it is said to be still forming by solfataric action. The native cinnabar is not of sufficient purity to be used directly as a pigment, but the artificial mercuric sulphide constitutes the vermilion of commerce. "Hepatic cinnabar" is a liver-brown granular or compact variety of cinnabar, which is found at Idria, Austria.

CINNAM'IC (from *cinnamon*) **ACID,** C_6H_5. CH:CH.COOH. A chemical compound of carbon, hydrogen, and oxygen. It crystallizes in colorless prisms, which are sparingly soluble in cold water, but dissolve readily in boiling water, alcohol, and ether. It melts at 133° C. and boils, with or without decomposition, according to the manner in which it is heated, at about 300° C. It exists naturally in a free state in liquid storax, in the balsams of Tolu and Peru, and in gum benzoin, and is often deposited in large crystals from old samples of oil of cinnamon (*Cinnamic aldehyde*) and from cinnamon water. It is always formed from oil of cinnamon when the latter is exposed to the action of the air. Cinnamic acid is usually made by heat-

ing 3 parts of benzaldehyde with 10 parts of acetic anhydride and 3 parts of dehydrated sodium acetate, its formation taking place according to the following equation:

$$\underset{\text{Benzaldehyde}}{C_6H_5CHO} + \underset{\text{Sodium acetate}}{CH_3COONa} =$$

$$\underset{\text{Cinnamic acid (Sodium salt)}}{C_6H_5CH:CHCOONa} + \underset{\text{Water}}{H_2O}$$

This method of preparation, known as Perkin's Reaction, is used for the preparation, not only of cinnamic, but of other unsaturated aromatic acids as well, the sodium salt and anhydride of acetic acid being replaced in the process by the sodium salts and anhydrides of other fatty acids. When fused with caustic potash, cinnamic acid breaks up into benzoic and acetic acids. When heated with lime, it splits up into styrolene (a hydrocarbon) and carbonic acid. By the action of nitric acid it may be converted into ortho-nitro-cinnamic acid, which is related to indigo. Being an unsaturated compound, cinnamic acid readily forms additional compounds with bromine, hydrochloric, hydrobromic, and hydriodic acids, etc. (See CARBON COMPOUNDS.) The substance known as allo-cinnamic acid is stereo-isomeric with cinnamic acid and may be readily converted into the latter.

CIN'NAMON. The dried bark of several species of *Cinnamomum*, belonging to the family Lauraceæ. The leading species, *Cinnomomum zeylanicum*, indigenous to Ceylon, where it may be found growing at an altitude of 3000 feet above sea level, has developed seven or eight well-marked varieties, some of which are ranked by botanists as species. From biblical times the forests supplied the market, but its cultivation was commenced by the Dutch. It is now grown in Brazil, the West Indies, Egypt, the district about Tellicherry (Malabar Coast), and Java, which last two places most nearly approach Ceylon in the quality of their cinnamon; but in none of which, owing to differences of soil, climate, methods of cultivation, or of exposure to sunlight, it produces bark of so high a quality as in its home. Cinnamon plantations are in less favor than formerly, coffee culture being in the ascendant. In the wild, the tree attains the height of about 30 feet and a diameter of 12 to 18 inches, but when cultivated it is made to form stools of four or five stems. When the bark begins to turn brown, usually in less than two years, these stems, which may be 8 feet tall and 2 inches in diameter at the base, are harvested and replaced by fresh ones. After being stripped of leaves and twigs, which latter yield "cinnamon chips," they are girdled transversely and slitted longitudinally, and the bark stripped off with a *mama* or knife similar in form to a nurseryman's budding knife. The pieces are then laid flat and the outer bark removed by scraping or planing. As the bark dries it forms rolls called quills, the smaller of which are inserted into the larger, which when fully dry are tied in bundles for shipment. Cassia cinnamon, cultivated in India and southeastern China, is the bark of *Cinnamomum cassia*. Cassia cinnamon, which is exported to America from China and India, is not, as is often supposed, the same as Chinese cinnamon, none of which reaches our ports, because of the steady demand and high prices paid for it in China. The Cassia variety is cultivated; the Chinese is not, but is obtained from old trees growing, not in Chinese forests, but in those of Annam. These trees die, their bark being stripped from trunks and twigs. Saigon cinnamon is derived from an undetermined species of cinnamon which appeared in commerce about 1875 and which has annually increased in importance. Ceylon cinnamon is yellowish brown, has a peculiar, fragrant odor and sweetish, aromatic, pungent taste. In quality it surpasses the bark obtained from the same species grown in other countries, and also that of the other two species imported into America. Cassia cinnamon is reddish brown, and has a less delicate taste and odor than the preceding. The Saigon variety, from which the outer bark is not removed, has a gray or grayish-brown exterior, with whitish blotches, warts, and wrinkles. All three kinds contain a volatile oil (*Oleum cinnamomi*), tannin, sugar, and mannit, and are recognized in the Pharmacopœia of the United States. The oil, which is given in doses of from one to five drops, is credited with aromatic, stomachic, stimulant, and carminative qualities when taken internally, and with rubefacient properties when applied locally. The bark, due to its tannic acid, has some astringent properties, and is commonly used to flavor astringent powders and mixtures which do not contain iron. From very early times cinnamon has been used as a spice in many culinary preparations. For illustration, see Colored Plate of FLAVORING PLANTS.

CINNAMON FERN. See OSMUNDA.

CINNAMON STONE. The yellow variety of grossularite, or calcium aluminum garnet, called *essonite*, or more properly *hessonite*. The best cinnamon stones come from Ceylon; but specimens of a good quality have been found in Oxford Co., Me., and elsewhere in the United States, some of which would cut into gems of over a carat in weight. See GARNET.

CINNA, OU LA CLÉMENCE D'AUGUSTE, sē'nȧ, o͞o lȧ klȧmäNs' dō'gust'. A tragedy by Pierre Corneille, produced in Paris in 1640, and published in the collected edition of his works in 1644. It is supposed to be his masterpiece and deals with the temporary perfidy of a Roman citizen, friend to Augustus, who is drawn into a conspiracy against his Imperial master by his wife and friends. The conspiracy is discovered, and Augustus pardons the offenders.

CINO DA PISTOJA, chē'nō dȧ pēs-tō'yȧ (originally GUITTONCINO SINIBALDI) (1270–1336). An Italian jurist and poet, born at Pistoja. He began the study of law there and then went to Bologna, where his masters were Lamberto di Ramponi and Franciscus Accursius. On his return, he held a civil position in his native city. Being a partisan of the Ghibelline faction, he became involved in the Guelph and Ghibelline disputes; and as the Guelph faction was triumphant, he had to leave Pistoja, and in the course of his travels visited Rome and journeyed in France. When the death of the Emperor Henry VII left the Ghibelline cause in an apparently hopeless state, he withdrew from party strife, studied law, received the degree of doctor at Bologna (1314), and taught jurisprudence at Treviso, Siena, Florence, Perugia, and Naples. He is the author of two books on law, often reprinted, *Lectura in Codicem Justiniani* (1483) and *Lectura in Digestum Vetus* (1527). Among his pupils were the celebrated Bartolus and Joannes Andreæ. Cino is best remembered now for his friendship with Dante, who speaks of him with enthusiasm in *De Vulgari Eloquio*. Like Dante, he had an ideal lady, to whom he

addressed his sonnets—a certain Selvaggia di Vergiolesi; so there is significance in his verses comforting Dante on the loss of Beatrice. Petrarch called him "Nostro Amoroso Messer Cino." By Carducci he is ranked midway between Cavalcanti and Dante. His works were printed in Rome in 1559. Consult: the edition of his poems by Bindi and Fanfani, *Le rime ridotte a miglior lezione* (Pistoja, 1878); Chiappelli, *Vita e opere giuridiche di Cino da Pistoja* (Turin, 1881); Rossetti, *Dante and his Circle* (London, 1874); Corbellini, *Cino da Pistoja, amore ed esilio* (Pavia, 1898).

CINQ-MARS, săn'mär', Henri Coiffier Ruzé d'Effiat, Marquis de (1620–42). A French nobleman and conspirator, the favorite of Louis XIII. He was the son of d'Effiat, marshal of France (1581–1632). Cinq-Mars came to court as a protégé of Richelieu in 1635, receiving a commission in the Royal Guards. In 1637 he became master of the robes to the King, and in 1639 was advanced by Richelieu, for political reasons, to the high office of grand equerry of France. Cinq-Mars, however, was not content to be Richelieu's tool, and had ambitions of his own. He distinguished himself before Arras in 1640 and desired a high military command. Richelieu would advance him no further, and in 1641 Cinq-Mars allied himself with the Orléans faction and became one of the chief opponents of the Cardinal. In 1642 he accompanied the King to the siege of Narbonne, and seemed high in the royal favor; but Richelieu had unearthed particulars of a conspiracy, in which Cinq-Mars was the chief, which included a treaty with Spain, and after the incriminating documents had been laid before the King, Cinq-Mars and his accomplices were arrested. Gaston d'Orléans saved his own life by confessing and implicating others. Cinq-Mars was imprisoned, tried, and executed with De Thou, at Lyons, Sept. 12, 1642. A romantic novel by Alfred de Vigny, *Cinq-Mars, ou une conjuration sous Louis XIII*, is founded on the alleged relations between the conspirator and Maria de Gonzaga, afterward Queen of Poland, and there is an opera by Gounod (1877) based on the story. An English translation of this work has appeared (New York, 1861). For historical accounts, consult Basserie, *La conjuration de Cinq-Mars*, preface by Alfred Mézières (Paris, 1896), and Bazin, *Histoire de France sous Louis XIII* (Paris, 1846).

CINQUECENTO, chĕn'kwâ-chĕn'tô. An Italian technical term, which has been borrowed by other languages, meaning "five hundred," and used to designate the art, literature, or any other form of culture flourishing between 1500 and 1600. Roughly speaking, it is the "Developed Renaissance," "High Renaissance," "The Golden Age," from Leonardo da Vinci to Paolo Veronese, though its second half was almost everywhere, except in Venice, a period of decadence.

CINQUEFOIL, sĭnk'foil'. See Potentilla.

CINQUE (sĭnk) **PORTS** (Fr., five ports). The ancient collective name of the five English Channel ports—Sandwich, Dover, Hythe, Romney, and Hastings—which were enfranchised by Edward the Confessor. William the Conqueror subsequently granted them the privileges of an almost independent state, under command of a warden, with a court at Dover Castle. Winchelsea and Rye were added later. Up to the reign of Henry VII their chief function was the supply of the country's naval contingent. In the time of Edward I they provided 57 fully equipped ships and frequently extended their powers by equipping piratical expeditions. Dating from the revolution of 1688, their privileges were gradually abolished, the Lord Warden's jurisdiction ceasing in 1835. The appointment of Lord Warden with residence, and the ancient privilege of carrying the canopy over the sovereign's head at a coronation, still exists. The official residence, Walmer Castle, near Deal, dates from the time of Henry VIII. There, as Warden, the Duke of Wellington lived each autumn from 1829, and he there died in 1852. Noteworthy wardens of recent date are Earl Granville, the Right Honorable W. H. Smith, the Marquis of Dufferin, and the Marquis of Salisbury. Consult Burrows, *Cinque Ports* (2d ed., London, 1888).

CINTIO, or **CINTHIO,** chēn'tê-ō. See Giraldi, Giovanni Battista.

CINTRA, sēn'trà. A small but picturesquely situated town in Portugal, in the Province of Estremadura, about 15 miles west-northwest of Lisbon (Map: Portugal, A 3). It stands on the declivity of the Sierra de Cintra, and contains a palace of Moorish and Christian architecture, anciently occupied by the Moorish kings, and subsequently a favorite residence of the Christian monarchs. A charming view of the town and of the sea is to be had from the top of a hill crowned with the ruins of a Moorish castle. On another hilltop stands La Pena, once a convent, afterward a residence of the King of Portugal, who restored it and gave it the outward appearance of a feudal castle. In the neighborhood, also, is what is called the Cork Convent, named so on account of its cork-lined cells. Cintra is a favorite summer resort with the residents of Lisbon. It is celebrated for the convention concluded, Aug. 22, 1808, between the British, the Portuguese, and the French, by which the latter were allowed to evacuate Portugal without interference. Pop., 1890, 4846; 1900, 5918.

CIONE, chê-ō'nā, Andrea di. See Orcagna.

CIOTAT, syô'tà', La (Prov. *Cioutat*, from Lat. *civitas*, state, city). A seaport town of France, in the Department of Bouches-du-Rhône, on the west shore of a bay in the Mediterranean, about 15 miles southeast of Marseilles, in the midst of olive, orange, and pomegranate plantations (Map: France, S., K 5). It is well built and has a good and commodious harbor, formed by a mole, and well defended. One of its shipyards alone employs 2000 men. It has a school of maritime instruction, large fisheries, cotton manufactories, and sea baths. There is an active trade in the produce of the district. Pop. (commune), 1901, 11,622; 1911, 9975.

CIPARIU, chê-pä'rĭ, Timoteo (1805–87). A Rumanian ecclesiastic and philologist, born in Transylvania. As professor in the theological seminary of Blasendorf he founded in 1867 the *Organul Luminarei* ('Organ of Light'), the first Rumanian journal to be printed in Latin characters. He was the most celebrated representative of the Latinist school in Transylvania, and was the author of the following important works: *De Latinitate Linguæ Valachicæ* (1855); *De Nomine Valachorum Gentili* (1857); *De Re Litteraria Valachorum* (1858); *Grammatica Limbei-Romîne* (2 vols., 1859–69). The latter work was honored by a prize from the Rumanian Academy.

CI'PHER (from OF. *cifre*, Ger. *Ziffer;* from ML. *cifra, zifera*, Ar. *sifr, safr*, cipher, from *safara*, to be emptied). An ornamental arrangement of the initial letters of a name by which

they become also a private mark, adopted by artists and architects as distinctive of their work. A well-known example is the cipher of Albrecht Dürer (q.v.), reproduced in the article on this artist. That of the American painter Whistler also is well known—a conventionalized yellow butterfly. Any complex arrangement of letters which an individual employs as his signature becomes his own property.

CIPHER. See CRYPTOGRAPHY; SIGNALING AND TELEGRAPHING, MILITARY.

CIPRIANI, chē'prê-ä'nê, GIOVANNI BATTISTA (1727–85). An Italian painter, draftsman, and engraver. He was born in Florence and studied there under Gabiani and Ignatius Hugford, an Englishman. In 1750 he went to Rome, where he met his lifelong friend and coworker, Bartolozzi (q.v.), and English artists who invited him to England. There he spent the remainder of his life. He executed pictures and mural decorations for English private residences and public buildings, and played a leading part in the history of the Royal Academy, of which he was one of the original members. He is chiefly important, however, as a draftsman for Bartolozzi's engravings and mezzotints. By his skillful and elegant drawing he did much to form the style of the English mezzotint engravers of the eighteenth century. The British and South Kensington museums and those of Florence, Lille, and Orléans contain most of his drawings. Cipriani died at Hammersmith, and was buried in the Chelsea burial ground, where Bartolozzi erected a monument to his memory. Consult Tuer, *Bartolozzi and his Works* (London, 1882), and Fincham, *Art of British and American Book Plates* (New York, 1897).

CIRCASSIA, sĭr-kăsh'ĭ-ȧ. A region of the northwestern Caucasus (q.v.) (Map: Russia, F 6), extending approximately from the Taman Peninsula and the Kuban River to the Abkaz district along the eastern coast of the Black Sea. It lies within the Ekaterinodar and Kutais governments and comprises the administrative district known as the "Black Sea Circle." Circassia has been nominally a part of Russia since 1829. It was only after a struggle of 35 years, however, that Russian sway was fully established. The region contains numerous oil fields.

CIRCASSIANS, sĕr-kăsh'ȧnz, or **TCHERKES'SES.** A term applied in general to the northwestern group of peoples inhabiting the region of the Caucasus, and in particular to the Adighe or Tcherkesses (the first is their own name; the second, from which the word *Circassian* comes, is that by which they are known to the Turks and Russians), the most noteworthy of these tribes. Other Circassian tribes are the Abkhasians on the Black Sea, the Kabardians, Shapsukhs, Abadzeh, etc., all related more closely by language than by race; for all are more or less mixed with Tatar, Asiatic, Aryan, and other intrusive elements. Except the Abkhasians (the difference may be due to artificial lateral compression), the Circassian tribes tend to be brachycephalic, and of average rather than tall stature. The Abkhasians are darker skinned, and not so well formed or featured as the Circassians proper; and of the latter those of Kuban are the least attractive. The Kabardians, who formerly laid claim to greater purity of blood, are now less pure than some of the Adighe. The Circassians have produced many men and women of great physical beauty, and Circassian girls, famous for their good looks, have long adorned the harems of Turkish sultans, pashas, and men of wealth, refining to no little extent their Mongolian blood—many of them, indeed, being ready enough to change their mountain home for a Turkish or Persian palace. According to Professor von Luschan, however, the number of such intermarriages has been greatly exaggerated in popular literature. The ethics of the Circassians have always been of a primitive type, and *Cherkess* is said to signify as much as "brigand"; but over against this may be set their hospitality and brave struggle for liberty against the Russians. When the Russian conquest was completed in 1864, more than 300,000 of them left the Caucasus for various parts of Asiatic and European Turkey, and they are said later to have had a share in the Bulgarian massacres. Those who are still in the old habitat number about 150,000, and are losing more and more of their racial purity. The higher classes of the Circassians have adopted Islam, while among the lower exists a certain kind of Christianity or Islamism in combination with survivals of ancient heathenism. The languages of the Circassian tribes are thought by some authorities to be incorporating rather than agglutinative. Since Neumann's *Russland und die Tscherkessen* (1840), the literature about the Circassians has grown considerably. Especial reference may be made to R. von Erckert's *Der Kaukasus und seine Völker* (Leipzig, 1887), and the fourth volume of Chantre's comprehensive *Recherches anthropologiques dans le Caucase* (Lyons, 1885–87).

CIRCE, sĕr'sē (Lat., from Gk. Κίρκη, *Kirkē*). In Homer, the sister of Aeëtes, and daughter of Helios and the ocean nymph Perse. She lived in a valley of the island of Ææa, surrounded by human beings whom she had transformed into wolves and lions. Here she transformed into swine the companions of Odysseus, and when the hero came to her palace she sought to exercise the same enchantment upon him. Protected by the magic herb, *moly* (q.v.), which Hermes had given him, he withstood her sorceries, and forced her to disenchant his followers. He then remained with her a year, and learned from her how to converse with Tiresias (q.v.) in the land of shades about his future, and how to avoid the dangers that still beset his homeward way. A Cyclic epic told of Telegonus, the son of Circe and Odysseus, who, landing in Ithaca, unwittingly killed his father in battle. Later writers, possibly even Hesiod, placed the island of Circe in the Tyrrhenian Sea, and still later it was identified with the Circean promontory (see CIRCEI). In the Alexandrian writers Circe also appears in the story of the Argonauts, and to the same period belongs the story that, in jealousy of Scylla, she transformed her into a monster, by pouring her magic drugs into the water where Scylla bathed. See PICUS.

CIRCE'I, or **CIRCEI'I.** A town of ancient Latium, situated on the commanding promontory known as Mons Circeius (Monte Circeo), about 80 miles southeast of Rome. Though of ancient date, Circei was never very famous, though Tiberius and Domitian had villas there. The oysters of Circei were much esteemed by the Romans. On the hill, about 3 miles from the sea, are remains of early walls of polygonal masonry, part of an ancient acropolis. Consult Ashby, "Monte Circeo," in *Mélanges de l'école française de Rome*, xxv, pp. 157 ff. (1905). See CIRCE.

CIRCENSIAN (sĕr-sĕn′shan) **GAMES.** See CIRCUS.

CIR′CINATE (Lat. *circinnus*, pair of compasses, from Gk. *κίρκος*, *kirkos*, circle). A name given to the peculiar vernation (leaf-bud condition) of ferns. When a fern leaf unfolds it resembles a crozier or shepherd's crook, as if it had been rolled from the tip. This characteristic vernation of ferns is also observed among the Cycads, the most fernlike of living gymnosperms.

CIR′CLE (from Lat. *circulus*, dim. of *circus*, Gk. *κίρκος*, *kirkos*, *κρίκος*, *krikos*, circle). The locus (q.v.) of all points in a plane at an equal finite distance from a fixed point in that plane. The fixed point is called the centre, and the space inclosed, or, more properly, its measure, the area of the circle. The segment of any straight line intercepted by the circle (*AB* in Fig. 1) is called a chord. Any chord passing through the centre, *O*, is called a diameter, as *A′B′*. The centre bisects any diameter, and the halves are called radii. Any line drawn from an external point cutting the circle in two points, as *PQ*, is called a secant; and any line which has contact with the circle, but does not intersect it when produced, as *B′T*, is called a tangent. Any portion of the area limited by two radii, as *OA* and *OB*, is called a sector; and any portion of the circle, *BA′A*, is called an arc. A chord is said to divide the area into segments; the segments are equal if the chord is a diameter. A plane passing through the centre of a sphere cuts the surface in a circle called a great circle of the sphere. Circles of longitude are great circles. Other circles of a sphere are called small circles. Ancient writers usually called the circle, as above defined, a circumference, the word "circle" being applied to the space inclosed. In modern geometry, at least above the elements, the word "circumference" is not used, and the word "circle" applies to the curve.

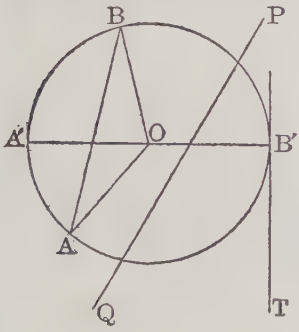


FIG. 1.

In coördinate geometry (see ANALYTIC GEOMETRY), the circle ranks as a curve of the second order (see CURVE) and belongs to the conic sections; the section of a right circular cone, perpendicular to the axis of the cone, being a circle. The Cartesian equation of the circle, taking its centre as the origin, is $x^2 + y^2 = r^2$. The constructions of Euclidean geometry being limited to the use of two instruments, the straightedge and the compasses, the circle and the straight line are the two basal elements of plane geometry. A few of the leading properties of the circle are:

1. The ratio of the circumference to the diameter is a constant; this is designated by the symbol π. This ratio is approximately 3.141592; 3.1416 and even $3\frac{1}{7}$ are sufficiently accurate for ordinary purposes; thus the area of a circle of radius 5 inches is 3.1416×5^2 square inches, or 78.54 square inches. The ratio π has an interesting history. The papyrus of Ahmes (q.v.), dating from before 1700 B.C., contains the value $(\frac{16}{9})^2$ or 3.1605; Archimedes (287–212 B.C.) described it as lying between $3\frac{1}{7}$ and $3\frac{10}{71}$; the Almagest (q.v.) gives it as

$$3 + \frac{8}{60} + \frac{30}{60 \cdot 60} = 3.14166;$$

the Romans often used $3\frac{1}{8}$; Aryabhatta (q.v.) gave 3.1416; Bhaskara (q.v.), 3.14166; and the Chinese of the sixth century A.D., $\frac{355}{113}$. Ludolph van Ceulen (q.v.) about 1586 computed π to 35 decimal places, and in recent times it has been carried to over 700 places. In 1794 Legendre proved that π is an irrational number. Furthermore, it is not only incommensurable—that is, not expressible as the quotient of two integers—but it has been proved by Lindemann (1882) to be transcendental. This means that π cannot be a root of an algebraic equation with integral coefficients. Certain irrational (incommensurable) numbers may be represented by elementary geometric lines; e.g. $\sqrt{2}$ is represented by the diagonal of a square of side 1; but π, being transcendental, cannot be represented by any construction depending solely upon the straightedge and compasses. It requires a transcendental curve, such as the integraph of Abdank-Abakanowicz.

Thus, through labors like those of Gauss, Hermite, and Lindemann, the true nature of π has been determined, and efforts at circle squaring by the instruments of elementary geometry have been proved futile. Modern analysis has shown π to be expressible by certain infinite series; e.g.,

$$\pi = 4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \ldots\right) \text{ (Leibnitz);}$$

or in the form of a continued fraction, as in

$$\pi = \cfrac{4}{1 + \cfrac{1^2}{2 + \cfrac{9}{2 + \cfrac{25}{2 + \cfrac{49}{2 + \ldots}}}}} \quad \text{(Brouncker)}$$

or of a continued product, as

$$\frac{\pi}{2} = \frac{2 \cdot 2 \cdot 4 \cdot 4 \cdot 6 \cdot 6 \cdot 8 \cdots}{1 \cdot 3 \cdot 3 \cdot 5 \cdot 5 \cdot 7 \cdot 7 \cdots} \text{ (Wallis).}$$

The method of approximating this ratio commonly used before the introduction of calculus (q.v.) consisted in computing the perimeters of the circumscribed and inscribed polygons of a circle of diameter 1. For, since the length of the circumference in this case is the desired ratio, the value of π lies between the values of the perimeters of the given polygons. A history of the development of this important problem of geometry will be found in Rudio, *Archimedes, Huygens, Lambert, Legendre: vier Abhandlungen über die Kreismessung* (Leipzig, 1892).

2. The centre of the circle is a centre of symmetry, and any diameter is an axis of symmetry (q.v.).

3. The perimeter of a circle of radius r is $2\pi r$, and its area πr^2. The area is greater than that of any plane figure of the same perimeter.

4. Concentric circles—that is, those having the same centre—never intersect.

5. Circles are similar figures (see SIMILARITY), and their areas are proportional to the squares of their radii or diameters.

6. Arcs of a circle are proportional to the angles subtended at the centre, and conversely. This property forms the basis of angular measure.

Circular Measure. The supposed number of days in the year early led to the division of the circle into 360 equal parts, for use in astronomical instruments. A knowledge of the regular hexagon probably led to the further division of 360 degrees into six parts of 60 degrees each. The Babylonians divided each degree into 60 equal parts, and each subdivision into 60 equal parts, thus producing the sexagesimal scale. (See NOTATION.) Thus the circumference of a circle is divided into 360 equal parts, called degrees; each degree into 60 equal parts, called minutes; and each minute into 60 equal parts, called seconds. Further divisions are better represented by decimal fractions. The circle is also commonly divided into four equal parts of 90 degrees each, called quadrants. By connecting the centre of a circle with the points of equal division on the circumference, equal angles are formed, whose magnitude is independent of the length of the radius; thus producing an angle measure, the basis of the protractor (q.v.). For scientific purposes, however, it would be more convenient to divide a quadrant into 100 equal parts, called grades, and each of these into 100 equal parts, called centesimal minutes, and each of these into 100 equal parts, called centesimal seconds. This plan, attempted in France as part of the metric system, is known as the centesimal division of the circle. For example, 3^g, 45′ 17″ (read 3 grades, 45 centesimal minutes, and 17 centesimal seconds) may be written 3.4517. To translate this into sexagesimal notation, 3^g equals $3 \times \frac{90}{100}° = 2.7°$, 45 centesimal minutes $45 \times \frac{90}{10000}° = 0.405'$ or 0.00675°; and so on. The sexagesimal system is, however, so well established that the centesimal has only very recently, in France, come to take important rank.

Radian Measure. In higher mathematics, especially in the calculus, another unit of angular measure, called the *radian*, is in general use. This is defined as the angle subtended at the centre of a circle by an arc equal in length to the radius (Fig. 2). The relation of the radian to other angular units is as follows:

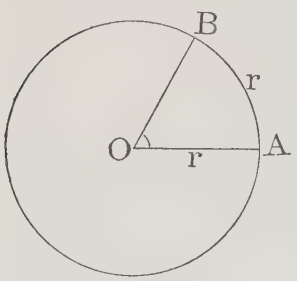


FIG. 2.

$$\frac{\text{The radian } AOB}{4 \text{ right angles}} = \frac{\text{arc } AB}{\text{circumference}} = \frac{r}{2\pi r} = \frac{1}{2\pi}.$$

Therefore, the radian equals $\frac{1}{2\pi} \times 4$ right angles $= \frac{2}{\pi} \times 1$ right angle. In degrees one radian is

$$2 \cdot \frac{90°}{\pi} = 57.29°+,$$

or, more nearly,

$$57° \; 17' \; 44.6666''+.$$

$\frac{\pi}{2}$ radians = a quadrant; π radians = 180°, and

$$2\pi \text{ radians} = 360°.$$

Since 1 radian $= \frac{180°}{\pi}$, $1° = \frac{\pi \text{ radians}}{180}$ and

$$n° = \frac{n\pi}{180} \text{ radians}.$$

The word "radian" is commonly omitted in discussions of angles; e.g., π radians = 180° is expressed $\pi = 180°$.

A few of the modern theories concerning the circle are suggested by the following:

1. *Coaxal Circles.*—The radical axis XX_1 (Fig. 3) of two circles of radii r_1, r_2 is the line perpendicular to their centre line C_1C_2, and dividing

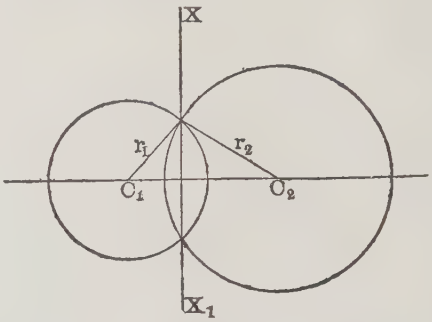


FIG. 3.

this line so that the difference of the squares on the segments equals the difference of the squares on the radii. The common chord of two intersecting circles is a segment of their radical axis. All circles having a common radical axis pass through two real or two imaginary points, and such a group of circles is called a coaxal system. If two circles are concentric, their radical axis is the line at infinity. The radical axis of two circles is also the locus of points from which tangents to the two circles are equal. If a variable polygon inscribed in a circle of a coaxal system moves so that all the sides but one touch fixed circles of the system, the last side also touches, in every position, a fixed circle of the system (Poncelet's theorem).

In analytic geometry, all circles must be regarded as having in common two infinitely distant imaginary points called the circular points at infinity. A system of coaxal circles has then really four common points, counting imaginary as well as real intersections.

2. *Inversion.*—Let O (Fig. 4) be the centre of a circle of radius r, and P, Q two points on

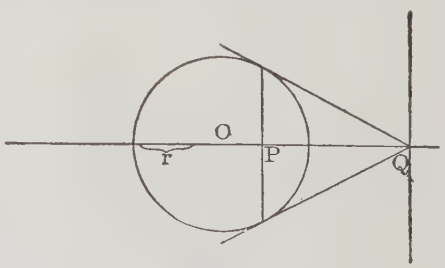


FIG. 4.

a line through O, such that $OP \cdot OQ = r^2$. P and Q are called inverse points with respect to the circle. Either point is said to be the inverse of the other. The circle and its centre are called the circle and centre of inversion, and r the constant of inversion. If every point of a plane figure be inverted with respect to a circle, or every point of a space figure with respect to a sphere, the resulting figure is called the inverse image of the given one. The inverse of a circle is either a straight line or a circle, according as

the centre of inversion is or is not on the given circle. The centre of inversion is then the centre of similitude of the original circle and its inverse; and the circle, its inverse, and the circle of inversion are coaxal. The theory of inversion was invented by Stubbs and Ingram in 1842, and has been made use of by Lord Kelvin in several important propositions of mathematical physics.

3. *Pole and Polar.*—The polar of any point P, with respect to a circle, is the perpendicular to the diameter OP drawn through the inverse point. Hence the polar of a point exterior to a circle is the chord joining the points of contact of the tangents drawn from the external point. Any point P lying on the polar of a point Q has its own polar passing through Q. The polars of any two points, and the line joining the points, form a triangle called the *self-reciprocal* triangle with respect to the circle, the three vertices being the poles of the opposite sides.

4. *Involution.*—Pairs of inverse points, P, P'; Q, Q'; etc., on the same straight line, form a system in involution, when the relation between them is $OP \cdot OP' = OQ \cdot OQ' = \ldots = r^2$. Here the inverse points are usually called *conjugate points*. Any four points whatever of a system in involution on a straight line have their anharmonic ratio (q.v.) equal to that of their four conjugates.

5. *Nine-Points Circle.*—The intersection of the three altitudes of a triangle is called the orthocentre. The mid-points of the segments from the orthocentre to the vertices constitute three points, the feet of the altitudes three more, and the mid-points of the sides of the triangle three more—all nine lying on the circumference of a circle, called the *nine-points circle*.

In Fig. 5, O is the orthocentre and K, L, G, D, M, E, H, N, F are the nine points.

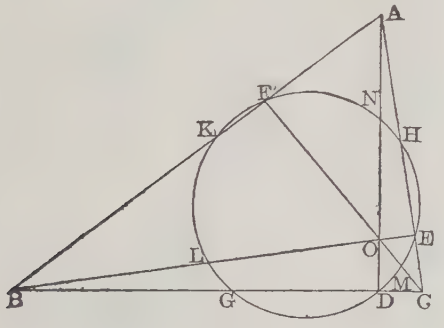


Fig. 5.

6. *Seven-Points Circle* (Brocard circle).—Point S in Fig. 6, so placed that its distances from the sides of the triangle ABC are proportional to the lengths of the respective sides, is called the symmedian point of the triangle. Lines through this point parallel to the sides cut them in six points, D, E', E, F', F, D', which lie on a circle called the triplicate-ratio or Tucker circle. If lines were drawn through A, B, C, parallel to the sides of the triangles DEF, $D'E'F'$, they would intersect one another and $F'E$, DE', FD' in P, P', L, M, N. These five points, together with S and the circumcentre of the triangle, lie on a circle called the seven-points or Brocard circle. P, P' are called the Brocard points.

Consult: McClelland, *Geometry of the Circle* (London, 1891); Casey, *Sequel to Euclid* (Dublin, 1888); Catalan, *Théorèmes et problèmes de géométrie élémentaire* (Paris, 1870); D. E. Smith, "The History and Transcendance of π," in Young, *Monographs on Topics in Modern Mathematics* (New York, 1911); Beman and Smith,

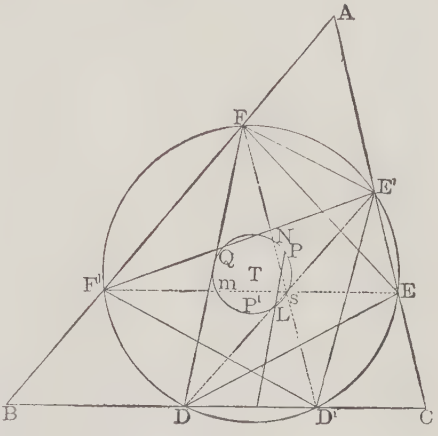


Fig. 6.

Famous Problems of Elementary Geometry (Boston, 1897), translation of Klein, *Vorträge über ausgewählte Fragen der Elementargeometrie;* Beutel, *Die Quadratur des Kreises* (Leipzig, 1913).

CIRCLE, Magic. A space in which sorcerers were wont, according to the ancient popular belief, to protect themselves from the fury of the evil spirits they had raised. This circle was usually formed on a piece of ground from 7 to 9 feet square, in the midst of some dark forest, in a churchyard, vault, or other lonely and dismal spot. The circle was described at midnight in certain conditions of the moon and weather. Inside the outer circle was another somewhat less, in the centre of which the sorcerer had his seat. The spaces between the circles, as well as between the parallel lines that inclosed the larger one, were filled "with all the holy names of God," and a variety of other characters supposed to be potent against the powers of evil. Without the protection of this circle, the magician, it was believed, would have been carried off by the spirits, as he would have been had he by chance got out of the charmed space.

CIRCLE, Meridian. See Meridian Circle.

CIRCLE, Mural. See Mural Circle.

CIR'CLEVILLE. A city and the county seat of Pickaway Co., Ohio, 25 miles (direct) south of Columbus; on the Scioto River, the Ohio and Erie Canal, and the Cincinnati and Muskingum Valley and the Norfolk and Western railroads (Map: Ohio, E 6). It was laid out in 1810, on the site of a prehistoric circular fortification (described in Howe's *History of Ohio*), from which the name is taken. Circleville contains a county infirmary, a children's home, and a home and hospital for old ladies. The surrounding country is very fertile, and the city has extensive strawboard works, canneries, and flour and corn-meal mills. Settled in 1806, Circleville was incorporated as a village in 1814, and as a city in 1853. It is now governed, under the Ohio Municipal Code of 1902, by a mayor, elected biennially, and a council. One of the city's historic places is the Logan Elm, where John Logan

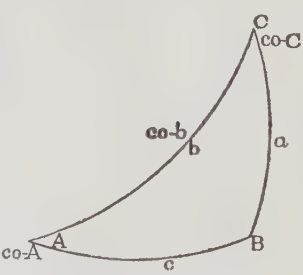
(q.v.), the Indian chief, made his celebrated speech. A park has been laid out at the place. Pop., 1890, 6556; 1900, 6991; 1910, 6744.

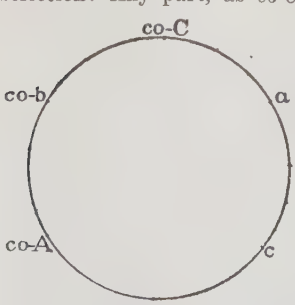
CIR'CUIT (Fr. *circuit*, from Lat. *circuitus*, from *circuire*, *circumire*, to go around; from *circum*, around + *ire*, to go). A territorial division, within which a court of justice is held at stated times and places. The practice of dividing England into circuits, and assigning to each division judges whose duty it is to hold court therein at prescribed places and terms, became settled during the reign of Edward I. As early as the first Magna Charta, in 1215, it was provided that certain *assizes* (q.v.) for the recovery of lands should always be taken in the counties in which the lands were situated, and that two justices of the King should be sent to each county four times a year for that purpose. But the evils arising from the remote and irregular sittings of the King's court (*curia regis*) were not obviated until the end of that century. This early arrangement of circuits has been modified from time to time, and it is now regulated by the Judicature Act of 1875 and an order in council of 1876. In the United States there are two classes of circuits—one belonging to the judicial system of the Federal government, the other to that of the State. For a description of the several courts designated as circuit courts, see COURT.

CIR'CULAR NOTES. See CREDIT, LETTERS OF.

CIRCULAR NUMBERS. Numbers whose powers end with the same figure as do the numbers themselves: thus, the numbers ending with 0, 1, 5, 6; for any power of any one of these also ends with 0, 1, 5, 6 respectively.

CIRCULAR PARTS. The five elements involved in a rule for solving right-angled spherical triangles, formulated by John Napier (q.v.). The five parts, *c*, *a*, complement of *A*, complement of *C*, and complement of *b*, as indicated in the triangle, when arranged on the circumference of a circle, admit of the following selection: Any part, as *co-C*, has two adjacent parts, as *co-b*, *a*, and two opposite parts, as *co-A*, *c*. The rules of Napier connect these by the following mnemonic: The sine of the middle part equals the product of the tangents of the adjacent parts, and the sine of the middle part equals the product of the cosines of the opposite parts.





CIR'CULAT'ING DECIMALS. Decimals in which one or more figures are continually repeated in the same order, e.g., 0.333 . . . ., 0.25666 . . . . , 0.3172172 . . . . , are circulating decimals. These are sometimes called repeating decimals, and the figure or set of figures repeated is called the *repetend*. If the repetend begins at the decimal point, the decimal is called a pure circulate; otherwise the decimal is called a mixed circulate; e.g., 0.2727 . . . . is a pure circulate, but 0.25999 . . . . is mixed. If the repetend contains but one figure, it is called simple—otherwise, compound. If the first figures of repetends are of the same order, the repetends are said to be similar; and if they end with figures of the same order, they are said to be conterminous; e.g., 0.639292 . . . . and 0.253232 . . . . are both similar and conterminous. Periods over the first and last figures of the repetend serve to indicate that a decimal is a circulate; thus, $0.27\dot{3}=0.27373\ldots$. Operations with circulating decimals may be performed in the usual way, or the circulates may be reduced to common fractions. This is usually done by applying the formula for the sum of an infinite geometric progression. (See SERIES.) Thus, $0.\dot{3}\dot{5}$ is the same as $0.35 + 0.0035 + 0.000035 + \ldots$, in which the first term is 0.35 and the rate 0.01; hence, the sum is

$$\frac{0.35}{1-0.01}=\frac{0.35}{0.99}=\frac{35}{99}.$$

That this fraction is the same as the decimal 0.35 may be seen by division.

CIRCULATING LIBRARY. See LIBRARIES.

CIRCULATING MEDIUM. See MONEY.

CIR'CULA'TION (Lat. *circulatio*, circular course, from *circulus*, circle, dim. of *circus*, circle). A term used in anatomy and physiology to designate the course of the blood through the blood vessels. A knowledge of the heart, arteries, capillaries, and veins is essential to a complete understanding of the subject of circulation; but by means of a diagram (Fig. 1) we can indicate the circulation of the blood in a general way. The shaded part of Fig. 1 represents the vessels carrying the venous blood, which has given up its oxygen to the body and taken in exchange carbonic-acid gas. The unshaded diagram represents the vessels filled with oxygenated or arterial blood. The heart is shown here as composed of four chambers, of which the two right belong to the circulation of venous blood and the two left to that of arterial blood. The blood from the whole body is brought to the right auricle of the heart (*c*) by two large veins, the superior vena cava and the inferior vena cava, both represented by *d*. By the contraction of this chamber the blood is forced through the right auriculo-ventricular opening into the second chamber of the right side of the heart, the right ventricle (*v*), and this by its contrac-

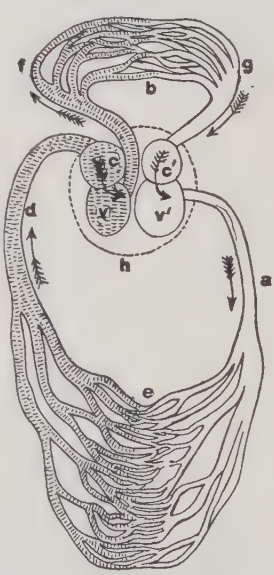


FIG. 1. Circulation of the blood: *h*, heart; *v*, right ventricle; *v'*, left ventricle; *c*, right auricle; *c'*, left auricle; *a*, aorta; *d*, vena cava; *e*, greater circulation; *b*, smaller circulation; *f*, pulmonary artery; *g*, pulmonary veins.

tion drives the blood to the lungs in the direction of the arrow pointing to *f*. The blood is prevented from returning into the auricle by the tricuspid valve, which completely closes the auriculo-ventricular opening during the contraction of the ventricle. In its passage through the lungs the blood is purified and oxygenated, and then is brought back to the heart by the four pulmonary veins, entering the auricle on the left side. When this contracts, the blood is forced into the left ventricle, and then by ventricular contraction into the aorta. The mitral valve prevents regurgitation into the left auricle, and the semilunar valve at the beginning of the aorta stops any reflux into the ventricle. Similar valves are present in the pulmonary artery. The aorta divides into branches, and these in turn into smaller ones, until the

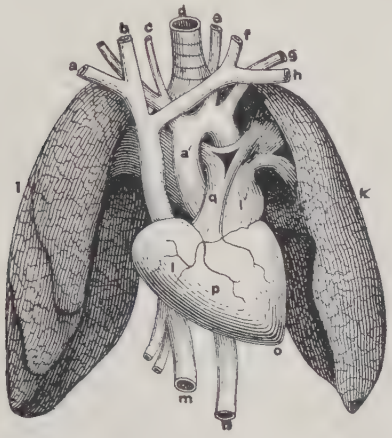


FIG. 2. The lungs, heart, and principal blood vessels in man: *a*, *h*, veins from right and left arms; *b*, *f*, right and left jugular veins, returning the blood from head and neck. These four veins unite to form a single trunk, the superior vena cava, which enters the right auricle, *l*; *c*, *e*, the right and left carotid arteries, the latter rising directly from the arch of the aorta, *a'*; the former from a short trunk called the arteria innominata; *g*, the left subclavian artery, rising directly from the aorta, while the right subclavian artery rises from the arteria innominata; *d*, the trachea or windpipe; *i*, *k*, right and left lungs; *l*, *l*, the right and left auricles; *p*, the right ventricle; *o*, the apex of the ventricle; *m*, the inferior or ascending vena cava; *n*, the descending aorta, emerging from behind the heart; *q*, the pulmonary artery.

whole body is supplied by a minute arterial plexus, or network; the smallest arteries divide into a finer network of still more minute vessels, the capillaries, which have extremely delicate walls, so that the blood can come into the closest relation with the cells of the body tissues. It is in these capillaries that the oxygen is given off, the nourishment furnished to the body elements, and the waste products taken up into the blood. The capillaries then unite to form a venous plexus, and later small veins which unite with each other to form larger ones, until all the blood is finally collected into the superior and inferior venæ cavæ, and thus brought to the heart again.

Thus there are in reality two circulations—one, a short circuit, from the right side of the heart through the lungs to the left side of the heart; and the second, a longer circuit, from the left side of the heart through the body back to the right side of the heart. In the heart the two circulations connect with each other and become continuous. In addition to the *pulmonary* and *systemic* circulations, described above, we have another subsidiary to the venous system, and known as the *portal circulation*. This is not indicated in the diagram. A certain amount of the blood of the intestines is collected into the portal vein and carried to the liver, where it traverses a capillary network in intimate relation with the liver cells. Bile is formed and other important changes are effected in the blood, which is highly charged with foodstuffs recently absorbed in its passage through the intestinal capillaries. The blood is collected a second time into veins, and carried to the inferior vena cava, where it again joins the general circulation. In its passage through other special organs the blood undergoes further modifications. See BLOOD PRESSURE; KIDNEY; SPLEEN; ETC.

The anatomy of the organs concerned is given elsewhere; they are here considered only in their mechanical relation to the circulation. The heart is situated in the anterior part of the chest, lying between the right and left lungs, and inclosed in a membranous sac (the pericardium), which consists of an outer fibrous layer and an inner serous lining. The fibrous layer is continuous with the outer coat of the large vessels, which enter and leave the heart; but the serous layer is reflected from these vessels on to the heart itself, which it entirely envelops. We thus have two sacs, the one within the other, but continuous with each other at their necks, and between the two sacs a closed cavity, secreting just enough fluid to lubricate its walls. Within this cavity the heart moves freely and with the minimum of friction. The shape of the heart is pyramidal; it is suspended nearly in the midline by the large vessels at its base, which firmly fix this portion; but otherwise the organ lies wholly free in the pericardium in a direction obliquely downward and to the left. The walls of the heart are almost entirely muscular, and the fibres are so arranged that by their contraction they diminish each cavity in all dimensions and drive the blood forward with great force. The work accomplished by each contraction of the two ventricles together is estimated at about 4.5 foot pounds. On this basis Houghton computes the total work of the heart in 24 hours at approximately 124 foot tons, or over 7.5 horse power.

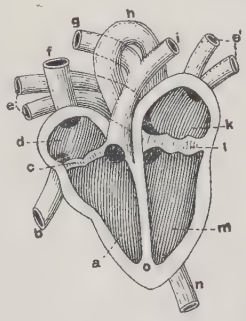


FIG. 3. Section of the human heart: *f*, *b*, the two vena cava opening into *d*, the right auricle; *a*, the right ventricle, from which proceeds the pulmonary artery, dividing into branches *g* and *i*, going to the right and left lungs respectively; *e*, *e'*, the pulmonary veins (two from each lung) entering into the left auricle, *k*; *l*, the mitral valve; *m*, the left ventricle, from which proceeds the aorta, whose arch is indicated by *h* and the descending portion by *n*, none of its branches being shown in this figure; *o*, the partition or septum between right and left hearts; *c*, the tricuspid valve.

In our outline of the circulation we have seen how the direction of the blood current in the heart is rendered constant by means of the cardiac valves. The heart's action consists in successive alternate contraction (systole) and re-

laxation (diastole) of the muscular walls of the auricles and ventricles. During the period of relaxation the blood flows into the two auricles from the veins, and they are gradually distended, while a certain amount of blood passes on into the ventricles through the auriculo-ventricular openings, which are patent during the entire diastole. At the end of this period the auricles are completely dilated, and their muscular walls contract and force nearly the entire contents into the ventricles. This action is very sudden, and occurs in both auricles at the same moment.

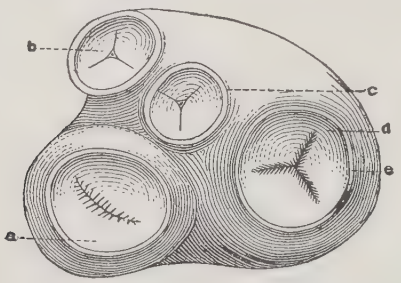


Fig. 4. Upper surface of the heart, the auricles having been removed.

The contraction begins near the entrance of the large veins and extends onward towards the auriculo-ventricular openings; in this way the reflux of blood into the veins is guarded against, and any tendency is still further counteracted by the mass of blood in the veins and by the valves which are present in the veins near their opening into the heart. The force of the blood flowing into the ventricles is insufficient to open the semilunar valves, but distends the ventricles themselves, which are still in a condition of relaxation. The tricuspid and mitral valves float upward on the blood current, and are in a position to close readily at the commencement of ventricular contraction. The ventricular systole follows immediately on the auricular systole. The contraction is slower, but far more forcible, and entirely empties the ventricular chambers at each systole. The apex of the heart is thrown forward and upward with a slight rotatory motion, and this impulse (the apex beat) is detected between the fifth and sixth ribs, slightly to the right of the left nipple. For a short time following the ventricular systole the whole heart is at rest. The entire cycle, therefore, can be divided into three periods, in the first of which the auricles contract, in the second the ventricles contract, and in the third both auricles and ventricles remain relaxed and at rest.

When we listen to the heart we hear two sounds with every beat, and these are followed by a short pause. We can roughly express their relative quality by speaking the words "lŭbb-dŭp." The first sound is dull and protracted, occurring at the same time as the apex beat, and coinciding, therefore, with the ventricular systole. This sound is supposed to be due to the vibration of the auriculo-ventricular valves and their fibrous attachments, and also, to a less extent, to the stretching of the ventricular walls and the coats of the large arteries by the tension at the moment of contraction. The contraction of the mass of ventricular muscular tissue is possibly a minor factor. The second sound is shorter and much sharper in character; it is probably dependent on the sudden closure of the semilunar valves. Diseases of the heart valves modify these sounds and enable one to detect the abnormal condition. In the healthy adult the heartbeats number about 72 per minute; but many circumstances, e.g., exercise, cause wide variations, even in health.

The arteries contain a considerable amount of elastic tissue which, by yielding, breaks the shock of ventricular systole, and thus protects the vessels from sudden pressure. This tissue also equalizes the blood current by its elastic recoil during cardiac diastole and forces the blood forward in a steady stream. It does not originate force, however, but simply restores the force expended on it by the contraction of the ventricles. Because of their elastic character, the arteries readily dilate and contract according to the total amount of blood in the body; the muscular tissue of the arteries is an additional factor here. The arteries also tend to regain their normal calibre under all circumstances, because of this same elasticity, and easily adapt themselves to the different movements of the body.

The most important function of the muscular tissue in the arteries is to adjust the size of the vessels to the amount of blood which each part of the body requires, and also to adapt the calibre to the quantity of blood that the arteries contain at any moment. The force of the muscular contraction in the arteries is probably a very slight factor in propelling the blood. The impulse of the blood, when it enters the arteries at the moment of ventricular contraction, can be felt in all the superficial arteries of any considerable size; and we designate this as the pulse. For clinical purposes it is usually felt in the radial artery at the outer side of the wrist.

In the mesentery of the frog we can trace the circulation in the capillaries by means of the microscope, and our observations here can probably, without error, be applied to the condition in man. The red blood corpuscles are seen moving along with considerable rapidity in the middle of the blood current, while the white corpuscles advance more sluggishly along the walls of the capillaries. The capillaries present a far larger surface with which the blood comes in contact than the other blood vessels, and therefore offer the greatest resistance to the progress of the blood. This resistance largely depends on the vital capillary force, so that the capillaries of themselves greatly influence the circulation. On the other hand, the condition of the arteries and veins exerts a decided control over the circulation in the capillaries which connect them. The propelling force in the veins is due to the impulse from the ventricles and, to some extent, to the pressure exerted upon the veins by the muscular movements of the body. The suction action of the heart is also a factor. The presence of valves along the veins enables them to take advantage of all the force applied. It is estimated that a portion of the blood can traverse the entire circuit of the circulation in half a minute. The circulation begins at a very early period in fœtal life and presents important modifications, which will be described under Fœtus (q.v.). See also Embryology, Human.

Our present knowledge of the circulation is of comparatively recent date. It was first described by Harvey, in his celebrated work, *Exercitatio de Motu Cordis et Sanguinis*, published in 1628.

CIRCULATION OF SAP. See SAP.

CIR'CULATO'RY SYSTEM, EVOLUTION OF. The organs by which fluids and sometimes gases and solids, suspended in the fluids, are transported from one part of the body to another. A circulatory system first becomes necessary when the organism gets to be of some size and a specialization of structure has taken place, so that the nutrient regions where fluid and gaseous food are supplied are far removed from the muscles, glands, and other organs which require that food, and where the excretory organs are distant from the great centres of metabolism. The circulatory system fulfills the function of transportation between the muscles and glands on the one hand, and the alimentary tract, respiratory organs, and kidneys on the other.

Lowest Forms.—In the Protozoa the body is so small that no special circulatory apparatus is necessary. The cell structure with its water spaces provides for carrying food in solution to the remotest plasm films. In the sponges the body often attains great size, but by the system of water canals penetrating all parts of the mass, food and oxygen are directly brought, as it were, to the door of every cell. Even in the Cnidaria the body wall is typically only two cells thick, so that between the external fluids and those of the cavity every cell is brought into direct contact with oxygenated water. In the Scolecida, where a true body cavity between the alimentary tract and the body wall makes its appearance, the fluids of this cavity serve to carry nutritive fluids and excreted products. The fluids of the body cavity are often set in motion by the cilia of the lining cells. In the Mollusca the body is so large and the muscular system so well developed that a more effective transporting system is necessary. This is gained by the separation of special tracts of the body cavity. In the dorsal part of the animal is a space that has gained thick muscular walls and constitutes a propelling organ or heart. The alimentary tract usually perforates the heart so that nutritive fluids by passing through the wall of the gut may reach the circulating fluid. From the heart a tubular space carries the circulating fluid to the spaces of the mantle and of the muscles and glands. These spaces are parts of the body cavity and, as in the case of the foot, some of them connect even with the outside world. The fluids in these spaces and in the gills make their way, in many cases at least, by the aid of cilia, to the heart. Oxygen is obtained both in the thin-walled mantle and in the gills. The Mollusca show thus a great advance in the specialization of a definite system of blood vessels. The echinoderms have acquired much the same or a less perfect system of blood spaces.

Annulosa.—Among segmented animals we find that many of the Polychæta have a well-defined system of blood vessels, which they have perhaps derived from the nemerteans. The system shows an advance over that of nemerteans, however; for in the latter group there is no regular circulation, whereas in the Polychæta such a circulation is established. They have a main dorsal vessel and a median ventral vessel, and a circular transverse vessel running in the body wall between the two. Vessels going to the alimentary tract get nutritive fluids, and those going to the body wall, parapodia, and gills bring back oxygen. The blood vessels contain corpuscles and often hæmoglobin. The dorsal-vessel "heart" contracts peristaltically. Not all Polychæta have a complete (closed) blood system, and in some cases the body fluid is the only circulating medium. The earthworms also have a well-developed system of vessels.

Arthropoda.—In the Crustacea there is a dorsal vessel, or "heart," but arteries and veins are often lacking, the heart pumping the general fluids of the body cavity. However, in the higher Crustacea, as, e.g., the lobster, definite vessels to the brain, muscles, gills, and alimentary tract appear, from which organs the blood is returned to the heart by blood spaces. In insects the respiratory functions of the circulatory system are largely replaced by respiratory tubes which ramify even to the muscles. There is always a heart, however, and in Arachnoidea a number of well-defined blood vessels.

In *Vertebrates* the organs of circulation are the heart, arteries, veins, and lymphatics. The heart is the central organ of the circulatory system. To it the blood is drawn by suction and is again forced out from it. The heart, as well as the rest of the vascular system, is of mesoblastic origin and appears close behind the gill clefts. Like the other large blood vessels, it is composed of layers: the outer (serous), the middle (muscular), and the inner (epithelium). Hence in origin the heart is a strongly developed blood vessel. Its complicated structure, such as occurs in the higher vertebrates, is the result of folding and swellings. The heart in the lowest of the vertebrates and in embryonic life is at first divided into two chambers with valves between them to prevent the blood from flowing backward again. One chamber, the auricle, receives the blood. The other, the ventricle, expels it to the body again. By further modification the sinus venosus develops at the venous end and the bulbus arteriosus at the arterial end. Such a condition of heart occurs at some time in the embryonic development of all vertebrates, and it is the permanent condition in many fishes. With the development of lungs, and consequently of the pulmonary artery and veins, the primitive heart is much changed. This change from gilled to lung-bearing condition may be studied in the embryonic development of all lung-bearing vertebrates. The heart of fishes is simple and, in structure, like the primitive heart described. It receives venous blood only, which it forces to the gills. In Dipnoi, where both gills and lungs exist side by side, the heart is halfway between that of fishes and amphibia. In amphibia the ventricle is single, and hence the blood in it is mixed. In many of the amphibia the ventricle is continued into a conus arteriosus, which is spirally twisted and contains a transverse row of valves. Among reptiles an incomplete ventricular septum exists in lizards, snakes, and turtles, but there is a complete one in crocodiles. The blood from the right ventricle passes into the pulmonary artery and into the left aortic arch. There are fewer valves in the heart and only one row at the beginning of the aorta and pulmonary artery. In birds and mammals there are two auricles and ventricles—that is to say, auricular and ventricular septa are complete. The ventricles are the larger and have more strongly developed walls. The blood from the head, heart, and body passes into the right auricle. In birds and mammals there is only one aortic arch. In birds it is the fourth right arch which persists, and in mammals the fourth

left. In the embryological development of birds and mammals the auricles are, for a time, in communication through the foramen ovale. Much variation exists among mammals in the mode of origin of the carotids and subclavians from the arch of the aorta. In branchial vertebrates the dorsal aorta is formed by the union above the gills of the branchial vessels. The allantois vein, which plays so important a part in reptiles and amphibia, is functional in birds and mammals only for a time in embryonic life, and from birds onward the hepatic-portal system supplants the renal portal.

The veins of vertebrates are provided with valves to prevent a back flowing of the blood.

The lymphatic system of elasmobranchs, amphibia, and, to some extent, of birds and reptiles, is provided with lymph hearts. In fishes and amphibia there are large lymph spaces, but from birds onward lymph vessels with well-defined trunks are present. The main lymph vessel is the thoracic duct, which empties in mammals into the left and in the Sauropsida into both the right and left branchio-cephalic veins. The lymph vessels, like the veins, are provided with valves which prevent a reflux of the lymph fluid. The lymph, like the blood, is composed of fluid and corpuscles. Lymphatic tissue occurs in fishes and amphibia, but lymph glands proper appear along the course of the lymph vessels, probably first in birds. In lymphatic tissue or glands the leucocytes, or white corpuscles of the blood, and lymph develop.

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CIR'CUMCEL'LIO'NES (Lat. nom. pl., from *circum*, around + *cella*, cell; also called in Med. Lat. *circelliones*, by popular etymology with Lat. *circellus*, circlet, dim. of *circulus*, circle). Fanatical Donatists of the fourth century, who got their name from their habits of wandering. They rambled over the country, plundering, burning houses, and murdering those who made resistance, saying that by such means they sought the crown of martyrdom. They styled themselves *agonistæ*, wrestlers, or soldiers of Christ, and called their chiefs the leaders of the sons of the Holy One. Constantine treated them with forbearance; but his successors, Constans and Constantius, put them down with a strong hand. The name was also applied in the thirteenth century to a sect of fanatical heretics in Swabia, partisans of the Emperor Frederick II.

CIR'CUMCIS'ION (Lat. *circumcisio*, from *circumcidere*, to cut around, from *circum*, around + *cædere*, to cut). The cutting away of the foreskin, a religious ceremony practiced by many peoples in different parts of the world, and going back to a very early period of human history. It is probably a substitute for an original phallic sacrifice. Among many races the custom of cutting off the phallus of their enemies has prevailed. It is significant that the ancient Egyptians performed this mutilation only in the case of enemies who were circumcised. In order to be cut off, the phallus must be clean, i.e., fit to be offered. The purpose of such an offering, presumably to some god of fertility, would naturally be to increase the fruitfulness of those making the sacrifice. Just as the sacrifice of the first-born was intended to insure the life of those born later, so the offering of the phallus of some youth was no doubt intended to increase the fertility of the tribe. The first modification of this rite seems to have been the substitution of gelding for the removal of the phallus, the object of emasculation being attained without the loss of life. The next step, at least in some cases, appears to have been such a painful mutilation as that which Niebuhr (*Beschreibung von Arabien*, 1772, p. 1269) learned to know between Hejaz and Abu-Arish, on the Arabian coast, consisting of an incision in the skin on the upper side of the penis, extending the entire length of the organ. While very dangerous, this operation offered a chance of both life and virility. To the same stage belongs, probably, the *arilthа*, or *mika*, practiced among the Australians, which consists of a subincision of the penis, so that the penile urethra is laid open from the meatus back to the junction with the scrotum. (Consult Spencer and Gillen, *The Native Tribes of Central Australia*, 1899, p. 263 and W. E. Roth, *Ethnological Studies among the Northwest Central Queensland Aborigines*, 1897, p. 178.) Finally, the removal of the prepuce was all that was required. In this form the mutilation was perpetuated either as a sign of the devotee, as a badge of priestly rank, or as a tribal mark. In the latter case it was generally administered as a sign of puberty and of capacity for participating in the cult, admitting the young man to the rights of cohabitation and of presenting sacrifices to the ancestors and the tribal gods. The rite retained somewhat of its sacrificial character even after it had been transferred to infancy, as was the case with some peoples. Generally the simple abolition of the prepuce was deemed sufficient. But after the Hellenized Jews had attempted to conceal their circumcision through the operation of epispasm, by which a plastic covering was effected (see 1 Macc. i. 15; 1 Cor. vii. 18; Josephus, *Ant.*, xii, 241, ed. Niese. Celsus, xxv, 1), the complete exposure of the glans was made an indispensable requisite to a valid circumcision. It is now universally recognized that this rite originated in religious considerations. Its value as a sanitary and prophylactic measure was probably not thought of as a reason for its observance until it was found necessary to defend it against the charge that it was a barbarous mutilation of the body. It chiefly consists in preventing masturbation and the carrying of disease through the retention of the smegma behind the glans.

From the representations of themselves on the walls of their caves it may be safely inferred that the men of the Magdalenian period of the Paleolithic age were not circumcised. But circumcision unquestionably

goes back to a period when the ancestors of the earliest civilized nations still walked about naked. (Stade, *Biblische Theologie des A. T.*, 1905, p. 147.) It seems to have been practiced already among the aborigines of the Nile valley, who probably belonged to the same race as the Libyans. A man belonging to this race, gored by a bull, on one of the oldest monuments is manifestly circumcised. (Consult *Bulletin des correspondances helléniques*, 1892, and Steindorff, in *Ægyptiaca*, 1897, p. 129.) The dynastic Egyptians were from the first familiar with the custom. Whether the rite was limited to the priestly classes or generally practiced among the Egyptians in earlier times is still an open question. As the poor could not afford to be mummified, we are dependent upon pictorial representations, and when naked fishermen, hunters, sailors, or shepherds are represented as circumcised, it may be maintained that they are temple slaves. On the other hand, the nobles and members of the middle classes did not, as a rule, allow themselves to be represented nude. There is, however, a statue of the priest Anisakha, shown nude and circumcised (see *Guide au Musée du Caire*, 1908, p. 30), from the sixth dynasty, and there is a statue of a king of the thirteenth dynasty, also showing him nude and apparently circumcised. (Consult Bissing, in *Sphinx*, 1908, vol. xii, p. 29.) In the case of the royal mummies there is only one clear exception to the rule that they are circumcised, so far as it is possible to examine them, and that is Thothmes II. The actual performance of the operation is set forth in a bas-relief from the twenty-first dynasty in a Theban temple (consult Chabas, in *Revue Archéologique*, 1861, p. 298) and on a sculptured doorpost in the necropolis of Saqqara from the sixth dynasty (consult W. Max Müller, *Egyptological Researches*, 1906, pp. 60 f., plate 106). Those operated on in the sixth-dynasty representation are evidently youths at the age of puberty. Naville and Wiedemann infér from the evidence that circumcision was neither widespread nor religiously important, while Wilcken holds that it was practiced by the whole people, and this view is supported by Bissing, Wendland, and Elliot Smith, at least so far as the mummified classes are concerned. Foucart also regards it as having had a marked religious significance and as having probably been obligatory on the priestly classes. It is intrinsically probable that the custom was in early times generally observed among all classes. If it were not so, it would be difficult to explain how, in Josh. v. 9, the Egyptians can be supposed to have reproached their Hebrew slaves with being uncircumcised, or why Herodotus (ii, 104) should not have mentioned that, in distinction from the custom in Syria, it was limited to the priesthood in Egypt, if he found it to be so. In recent years papyri have been discovered from the Græco-Roman period showing that in the second century A.D. the Roman government sought in every way to discourage the practice and was willing to issue a license only where it was absolutely necessary, as in the case of the priesthood. It seems to be through contact with Egypt, as Herodotus maintained, that Canaanites and Hebrews came to adopt the custom. Babylonians and Assyrians do not appear to have practiced the rite. It cannot be proved that the Moabites, Ammonites, and Edomites did so before their invasion of Syria. The Philistines were not circumcised. But they were Cretans (see Caphtor), and, according to Egyptian representations, the Mycenæan peoples were not circumcised. From the fact that this peculiarity of the Philistines is strongly emphasized by the Hebrews, it may be inferred that the Canaanites practiced circumcision. They may have derived the custom from some aborigines akin to the proto-Egyptians and the Libyans, or from Egypt in a later time. It is quite uncertain whether the clans that afterward formed the people of Israel knew the custom before they entered Palestine. The story in Ex. iv retains the memory that the Moses clan considered itself saved from threatening destruction by the adoption of this rite from their Midianite or Kenite neighbors. Yahwe seeks the life of Moses, but spares him when his Midianitish wife Zipporah circumcises their son and touches with the foreskin the genitals of Moses, exclaiming, "Thou art to me a bloody bridegroom." The sign of Cain (the Kenite) in Gen. iv has been thought by some scholars to be circumcision. (See Cain.) This chapter seems to reflect an earlier attempt on the part of the Kenites to settle in Palestine. The people to which the Moses clan belonged do not seem originally to have had the custom. This apparently is also suggested in the story in Josh. v. Here all Israel is circumcised at Gilgal, upon "the hill of the foreskins," to remove "the reproach of Egypt" (verse 9), which seems to imply both a consciousness of the fact that Israel did not practice circumcision before settling in Palestine and knowledge of this as an Egyptian custom. That the youth of Benjamin were brought to the sanctuary called "the hill of the foreskins" to be circumcised there can be little doubt. But the shrine and the custom are likely to have been taken over from the Canaanites. No conclusion can be drawn from Gen. xvii, except that the fact that Ishmaelites practiced circumcision in the thirteenth year was traced back to the mythical ancestors of both Ishmaelites and Israelites. The story of Dinah in Gen. xxxiv suggests that the Hivites in Shechem were forced to accept circumcision by Israelitish tribes; but this may in reality show that the custom existed among the Hivites and had to be accounted for. It prevailed in some parts of Arabia before Mohammed, and, though not mentioned in the Koran, it has been retained by the nations accepting Islam. There is no serious objection to the assumption that everywhere in the Semitic world it goes back to Egyptian, and ultimately Libyan, influence. Whether the Colchians (Karki, Kashki) originally practiced circumcision—and this might be taken as an indication of its prevalence among kindred Asianic peoples—or it was brought to them in later times by colonists from Syria or Egypt cannot be determined. It still prevails among the Mandingos, Gallas, Falashas, and many Bantu tribes in Africa, where it cannot be traced back to Moslem influence. In Central America, and among the Aztecs of ancient Mexico, circumcision, or a somewhat similar mutilation, was practiced. It is still in use among the Teamas and Manaos on the Amazon. The Otaheitans and Tongas, some Melanesians in Polynesia, and nearly all tribes in Australia have this custom. In the present state of our knowledge a transmission of the rite through historic contact cannot be affirmed, and an independent development from the same social and religious considerations is most safely assumed.

Circumcision of females, consisting of mutilation of the clitoris, is practiced in Egypt, Abyssinia, West Africa, Arabia, and other countries. It was already known to Strabo, and it is referred to as a custom in Egypt in a Greek papyrus now in the British Museum. (Consult Müller, *l. c.*). As it is very generally found where male circumcision prevails, it is probably analogous in its history and development to the latter. The opposition to circumcision began with some of the Hebrew prophets (Jer. iv. 4; ix. 25-26). But it was the struggle reflected in the Pauline literature that eliminated this religious rite from the Christian usage, except in isolated instances, such as the Abyssinian church. Consult: R. Andree, "Die Beschneidung," in *Archiv für Anthropologie*, vol. xiii, pp. 53 ff. (1880); Ploss, Geschichtliches und Ethnologisches über die Knaben-Beschneidung," in *Archiv für die Geschichte der Medicin*, vol. viii (1885); Tomes, *Della circumcisione*, pp. 37–71 (1895); Salomon, *Die Beschneidung* (Brunswick, 1844); Glassberg, *Die Beschneidung* (Berlin, 1896); Zaborowski, in *Bulletin de la Société d'Anthropologie de Paris* (1893); Ploss-Bartels, *Das Weib* (9th ed., 1908, vol. i, pp. 261 ff.); Lewis Spence, *The Mythologies of Ancient Mexico and Peru* (1907); Wellhausen, *Reste arabischen Heidentums*, pp. 174 ff. (2d ed., 1897); Barton, *Semitic Origins*, pp. 98 ff. (1902); Lagrange, *Etudes sur les religions semitiques*, pp. 242 ff. (2d ed., 1905); Jaussen, *Coutumes des Arabes au pays de Moab*, pp. 363 ff. (1908); Wylde, *Modern Abyssinia*, p. 161 (1901); Risa, *Studie über die rituale Beschneidung* (1906); Reitzenstein, *Zwei religionsgeschichtliche Fragen*, pp. 1–46 (1901); Wilcken, Gunkel, and Wendland, in *Archiv für Papyrusforschung*, pp. 4 ff. (1902); Wiedemann, in *Orientalistische Litteraturzeitung*, vol. vi, p. 97 (1903), vol. x, pp. 375 f. (1907); Naville, in *Sphinx*, vol. xiii, p. 220 (1909); Spiegelberg, *Tebtunis Papyri*, vol. ii, pp. 59, 63 (1907); Nicole, *Textes grecs inédits de la collection papyrologique de Genève*, p. 23 (1909); Kohler, "Circumcision," in *The Jewish Encyclopædia* (1903); Gray and Foucart, articles on "Circumcision," in *Encyclopædia of Religion and Ethics* (1911).

CIRCUM'FERENCE. See CIRCLE.

CIR'CUMFLEX (Fr. *circonflexe*, Lat. *circumflexus*, p.p. of *circumflectere*, to bend round, from *circum*, around + *flectere*, to bend). A mark used to denote an original rising and falling in the pronunciation of a long vowel. In Greek the signs used are ~ ^; in Latin the sign is ^. The last sign is sometimes used instead of the macron to denote simple length. As a sign of Greek accentuation it is used in certain cases to indicate the long vowel of the last syllable or of the penult of a word. The presence of a circumflex accent in a French word generally indicates that the vowel has been lengthened due to a contraction, a consonant, often an *s*, having originally stood between the vowel and the succeeding consonant; e.g., fête (feste), abîme (abisme), âpre (aspre), âme (anme). Hence the circumflex, or contracted, verbs, so called because of the circumflex accent which, in these French verbs, surmounts most usually, after the contraction, the last syllable of the first person of the present indicative.

CIR'CUMNUTA'TION (from *circumnutate*, from Lat. *circum*, around + *nutare*, to nod). A special case of NUTATION (q.v.).

CIR'CUMPO'LAR STAR (Lat. *circum*, around + *polus*, pole, axis). Any star which, in the apparent daily revolution of the sky, does not pass below the horizon of the observer; or, in familiar language, does not set. It will be remembered that the apparent daily motion of the stars is in reality the result of the actual rotation of the earth upon an axis which passes through the centre of the earth and a point in the sky, near the north or polar star, and that the lines in which the stars seem to move—called lines of diurnal motion—are the circumferences of circles perpendicular to this axis. If an observer is at the equator, the axis lies in the observer's horizon, the circles of diurnal motion are all perpendicular to the horizon, and all stars seem to rise and set. If the observer is at a distance from the equator—for example, in latitude 10° N.—the northern end of the celestial axis is raised 10 degrees above the horizon, and any star which is within 10 degrees of the north pole of the sky will not pass below the horizon in its apparent motion about the pole. The largest circle of the sky that can be drawn about the pole without passing below the horizon of the observer is called the circle of perpetual apparition. A similar circle drawn about the opposite pole, without coming above the horizon, is called the circle of perpetual occultation, and the stars within that circle are never visible to the observer.

CIRCUMSCRIBED AND INSCRIBED FIGURES. In plane geometry a curve is said to be circumscribed about a polygon when it passes through all the vertices of the polygon, and in that case the polygon is said to be inscribed in the curve. A polygon is said to be circumscribed about a curve when all of its sides are tangents to the curve, and in that case the curve is said to be inscribed in the polygon. Thus, a circle can be circumscribed about or inscribed in any regular polygon. Surfaces, too, may be circumscribed and inscribed; e.g., a pyramid whose lateral faces are tangent to the surface of a cone is a circumscribed pyramid, the cone being then inscribed in the pyramid. The mensuration of the circle, sphere, cone, and cylinder may be effected by means of circumscribed and inscribed figures, with the aid of the theory of limits (q.v.). Thus, the perimeters of the circumscribed and inscribed regular polygons of a circle may be computed, and the circumference be taken, as the limit of either as the number of sides is indefinitely increased. When the diameter is 1 unit, this circumference becomes 3.14159 .... units, which number expresses an approximation of π. See CIRCLE.

CIR'CUMSTAN'TIAL EVIDENCE. Evidence of facts and circumstances which surround, and are connected with, the particular facts to be proved, and which, taken together, the court and jury may reasonably consider as tending to prove or negative the particular facts sought to be established in the case before them. Circumstantial evidence is most frequently called for in criminal cases; especially where the crime is secretly committed, as murder by poison sent by mail, in which case there is generally little positive and direct evidence that the accused committed the act with which he is charged. The circumstances precedent to and connected with a crime may so associate the accused with the crime that an inference of guilt would be the only one that could reasonably be drawn from such circumstances; in which case there

may be a conviction, even though there is no one who can testify, from actual knowledge, that the accused committed the act. See EVIDENCE.

CIR'CUS (Lat. *circus*, ring, circle). The name given by the Romans to the space in which they held horse races, chariot races, and, later, athletic contests and conflicts of wild beasts with one another or with men; they derived the name from the circuit made by the horses and the chariots as they raced. Many sports originally held in the Forum were afterward held in the Circus; in the Forum or in the Circus, for about two centuries, the contests took place which after the time of Julius Cæsar were held in the amphitheatre (q.v.). The Circensian games proper (i.e., horse and chariot races) were alleged by tradition to have originated in the time of Romulus, in honor of a Latin god Consus, identified, as a deity of horses, with Neptune. At these games, tradition further said, occurred the Rape of the Sabine Women. For these and similar games, later, a space was marked out in the long, narrow, level valley, between the Aventine and the Palatine hills, known as the Vallis Murcia; the horses and the chariots raced round an altar of Consus, which, save during the period of the games, was buried in the ground. This altar to Consus still existed in the time of Tacitus. Tarquinius Priscus, after capturing the Latin town of Apiolæ, gave Circensian games; at these for the first time, tradition said, wooden seats for spectators were constructed. Presently the games were held annually, and the tiers of wooden seats were made permanent and were periodically renewed. In 221 B.C. a second circus, the Circus Flaminius was built in the Campus Martius; henceforth the circus in the Vallis Murcia (see above) was known as the Circus Maximus. The wooden seats in the Circus Maximus were frequently burned and as often rebuilt; in the time of Julius Cæsar the lower seats were built of stone. Down to the time of Trajan, under whom this circus reached its greatest magnificence, the structure was several times rebuilt and the number of stone seats enlarged; the topmost portion, however, seems, even after this, to have been of wood. The masonry portions were covered inside and out by marble. In its final form, when the space for the spectators had been enlarged by additions on the slopes of the Aventine and the Palatine, the Circus Maximus, in its external dimensions, was about 2000 feet long by 625 feet wide; the arena was about 1850 feet long by 280 feet wide. In external appearance, as in the arrangements for ingress and egress of spectators, this circus finally resembled the Coliseum (see AMPHITHEATRE). There were three stories; the two lower stories had arches and engaged columns. The seats were in at least three groups, called *mœniana*, rising one above the other and receding from the arena; the *mœniana* were separated from one another by broad passages called *ambulacra* (walks) or *præcinctiones* (girdles). The front of each *mœnianum* was a high perpendicular wall; this was pierced by doors called *vomitoria*, which gave entrance from staircases and crypts, or corridors beneath the seats, upon the *ambulacra*. As in the amphitheatre (q.v.), the spectators were seated according to their rank; nearest the arena was a *podium*, as in the amphitheatre. Between the *podium* and the arena was a water channel, about 10 feet wide and 10 feet deep, called the Euripus, which was meant to protect the spectators from the attacks of wild beasts. At the western end, towards the Tiber, the Circus Maximus towered high, in several stories; this part was known as the *oppidum* (town). The *oppidum* was curved, forming the arc of a circle whose centre was on the starting line of the chariot races; in its lowest story were the barriers (*carceres*) within which the chariots were kept till the trumpet gave the starting signal. The chariots were thus equidistant from the starting line; there were no handicaps. The other end of the *cavea*, or auditorium, formed a wide arc with a short radius; here was the Porta Triumphalis, by which processions entered the circus. Above the *carceres* were two boxes, one for the judges, the other for the presiding magistrate (*editor*). From the time of Augustus there was on the Palatine side a box (*pulvinar*) from which the Imperial household could view the games.

Each *mœnianum* was cut into *cunei* (wedges) by numbered flights of steps, as in the amphitheatre and the theatre; each line of seats (*gradus*) was numbered. The amount of space granted to each spectator on the *gradus* was marked off by lines. According to one ancient authority the Circus Maximus contained, in Julius Cæsar's time, 150,000 seats; according to another it finally had 385,000 *loca*. Some modern authorities have interpreted the latter statement to mean 385,000 seats. An explanation accepted by many, however, is that there were 385,000 running feet of seats, which would give room comfortably for 250,000 spectators.

Through the major part of the arena ran the *spina* (backbone), a long, broad, wall which marked the arena off into two tracks for the races. On the *spina* stood two obelisks (one erected by Augustus, the other by Constantius; that erected by Augustus still stands in Rome, in the Piazza del Popolo, near the northern wall of the city). There was also on the *spina* an altar of Consus and other shrines. At each end was a shrine on which seven marble eggs were set at the beginning of the race; as a lap was run, one egg at each end was removed. Beyond each end of the *spina* stood three *metæ*, or conical pillars, of marble, which constituted the turning posts; each charioteer strove to reach the inside course and, to save distance and time, to turn as close as possible to the *metæ* (see Horace, *Odes*, 1, 1, 4).

In 221 B.C., as said above, the Circus Flaminius was built on the Campus Martius; this structure, which was much used, measured about 1000 by 400 feet. There was a circus of Caligula and Nero across the Tiber, near the Vatican; a circus of Hadrian, also across the Tiber, near his mausoleum; a circus in the gardens of Heliogabalus; and a circus of Maxentius on the Appia Via, about two miles south of the city. All these, at least in their final form, closely resembled the Circus Maximus. They all served as stone quarries down to the close of the Renaissance, so that few traces are left of any of them, except that of Maxentius. Drawings made of the Circus Maximus in the sixteenth century, when the structure was still well preserved, help to an understanding of its plan and general construction. Part of the exterior of the Circus Maximus is represented in a great oil painting, giving a bird's-eye view

of Rome in the fifteenth century; this painting, now in the museum at Mantua, is reproduced in facsimile in De Rossi's *Pianta di Roma Anteriore al XVImo Secolo* (Rome, 1879).

The circus was especially adapted for chariot races, an amusement of which the Romans became passionately fond, so much so that Juvenal (q.v.) declared that the Romans of his day cared only for *panis et circenses*, that is, free bread given by the government and the Circensian games (Juvenal, 10, 81). The race comprised seven circuits about the *spina;* from 10 to 20 races might be run in a day. The number of chariots (usually *quadrigæ*, four-horse chariots) was commonly four. Accidents were common; they are often represented on ancient monuments which portray the circus and its sports. The risk was increased by the fact that the charioteer (*auriga*) drove with the reins looped about his waist; that he might have some chance to cut himself loose he wore, within the loops of the reins, a curved knife. The charioteers were divided into four factions, or squadrons, named (*factio*) *albata, prasina, russata,* and *veneta,* from the white, green, red or blue colors worn by the charioteers, on cap or jacket. Bets and party spirit ran high, and the victor received a substantial pecuniary reward. Athletic exercises, when given in the circus, may well have been held in the large open space between the *carceres* and the *spina.* The *ludus Troiæ* was a mock conflict between young men on horseback. A regular battle was sometimes represented (*pugna equestris et pedestris*). By the formation of canals and the introduction of vessels, a *naumachia* or sea fight was occasionally exhibited; but under the Empire this form of exhibition as well as the *venatio* (contests of beast against beast, or of men against wild beasts) was gradually transferred to the amphitheatre (q.v.). (See also NAUMACHIA.) In providing for the *venatio,* vast sums of money were expended. Animals were procured from every available part of the Empire, including Africa and Asia. The exhibition afforded not only an opportunity for a display of private munificence and ostentation, but attained the importance of a political engine which none who aspired to popularity overlooked. When Pompey opened his new theatre, in 55 B.C., he is said to have given public exhibitions in the Circus for five days, during which time 500 lions and 20 elephants were destroyed.

Consult Friedländer, in Marquardt's *Römische Staatsverwaltung,* vol. iii (2d ed., Leipzig, 1885); the well-illustrated article "Circus," in Smith's *Dictionary of Antiquities,* vol. i (3d ed., London, 1890); the article "Circus" in Pauly-Wissowa's *Real-Encyclopädie der classischen Altertumswissenschaft* (Stuttgart, 1899); Lanciani, *Ancient Rome in the Light of Recent Discoveries,* 213 ff. (New York, 1889); Platner, *The Topography and Monuments of Ancient Rome* (2d ed., New York, 1911); Friedländer, *Roman Life and Manners under the Early Empire,* vol. ii (London, n. d.), a translation of Friedländer's *Darstellungen aus der Sittengeschichte des Roms* (7th ed., Leipzig).

CIR'CUS FLAMIN'IUS. A circus built about 221 B.C. in a part of the Campus Martius, called Prata Flaminia, by the Censor Gaius Flaminius Nepos, who was killed in 217 B.C. at Lake Trasimenus. Its central position made it the frequent scene of public meetings and fairs; and in it, according to Sallust, took place Sulla's massacre of 4000 prisoners in 82 B.C. The open space of the circus was used as a ropewalk in the Middle Ages, and the arcades as lime burner's kilns. All the remains have disappeared.

CIRENCESTER, sĭz'e-tĕr, sĭs'e-tĕr, *and* sĭs'ĭ-tĕr (AS. *Cirenceaster, Cyrenceastere*). A market town in Gloucestershire, England, on the Churn, a branch of the Thames, and on the Thames and Severn Canal, 17 miles southeast of Gloucester (Map: England, E 5). It has a large trade in agricultural produce, and is an important wool market. There are also two breweries. In the neighborhood are the well-known Royal Agricultural College, with a farm of 500 acres, 450 of which are arable, and Oakley Park, the seat of Earl Bathurst. Cirencester was the Roman *Corineum,* at the junction of the Fossway with branches of the Icnield and Ermin roads, and has traces of ancient walls two miles in circuit. Roman relics found here, such as coins, urns, etc., form an interesting collection in the local museum. Rupert stormed Cirencester in 1642, but in 1646 it was given up to the Parliament. Pop., 1901, 7500; 1911, 7631.

CIRILLO, chē-rēl'lō, DOMENICO (1739–99). An Italian naturalist and patriot, born in Grumo. He was early called to a chair of botany in Naples, afterward accompanied Lady Walpole to France and England, and on his return to Naples was appointed professor of medicine. He enjoyed the friendship of Buffon, Diderot, D'Alembert, and Franklin. When the French established the Parthenopean Republic in Naples, in 1799, he was chosen a representative and became president of the Legislative Commission. After the reëstablishment of the royal government he was sentenced to death, and, stubbornly refusing to ask for mercy, was hanged Oct. 29, 1799. His works on botany (1787) and entomology (1787) are no longer valuable. Consult Giglioli, *Naples in 1799* (London, 1903).

CIRL BUNTING, sĕrl bŭn'tĭng (Neo-Lat. *cirlus,* from It. *zirlo,* whistling, *zirlare,* to whistle, Sp. *chirlar,* to twitter). A small and very handsome European bunting (*Emberiza cirlus*), rare and local in England, often kept as a cage bird, though its song is slight.

CIRPAN, chĭr-pän'. A town of eastern Rumelia, Bulgaria, on the tributary of the Maritza, 30 miles east of Philippopolis (Map: Turkey in Europe, E 3). It is situated in a fertile fruit-producing region, and is noted for its mineral springs. Pop., 1900, 11,760; 1910, 11,863.

CIRQUE, sĕrk (Fr., circle). The name applied to basins occurring in mountainous regions at the head of narrow stream valleys and gorges. They are characterized by precipitous walls, which curve around in a semicircle, forming a natural amphitheatre. Their origin may be traced to the erosive action of converging glaciers and streamlets. See CORRY.

CIRRHO'SIS (Neo-Lat., from Gk. κιρρός, *kirrhos,* tawny). A pathological change of tissues, consisting of hardening due to increase of connective tissue. It may occur in lung, spleen, ovary, heart, stomach, and peritoneum, but is oftener found in kidney or liver. *Cirrhosis of the kidney* (chronic diffuse inflammation of the kidney, or chronic interstitial nephritis) is a chronic inflammation of the connective-tissue elements of the kidney. In any animal tissue

subject to long-continued irritation and congestion, there is an escape of connective-tissue cells into the surrounding tissues (termed round-cell infiltration). These cells grow into connective-tissue fibres, which, as they multiply, crowd out the parenchymatous or functional elements of the organ, a process furthered by the inherent tendency of connective tissue to contract. This is the essential pathological change where cirrhosis takes place, whether in the lungs, spleen, ovary, kidney, or liver. Cirrhosis of the kidney, or chronic interstitial nephritis, is such a pathological process, resulting in a gradual substitution of fibrous tissue for the functionating elements. (See BRIGHT'S DISEASE.) *Cirrhosis of the liver*, or chronic interstitial hepatitis, consists in an overgrowth of the connective-tissue elements of the liver, at the expense of the true hepatic cells. The new tissue usually follows the line of the old connective tissue, but may penetrate the lobules. It is often irregular in its distribution. During the early stages the liver tends to enlarge, sometimes weighing 8 to 10 pounds (hypertrophic cirrhosis). Later, the connective tissue tends to contract, and the liver becomes smaller than normal (atrophic cirrhosis). The surfaces of the large livers are usually smooth, while the irregular contraction of the connective tissue in the atrophic livers squeezes the lobules, and usually results in nodular surfaces. The new connective tissue, besides causing atrophy of the liver cells, often compresses branches of the portal or hepatic veins and of the gall ducts, thus interfering with the nutrition of the liver cells, and causing stoppage of the bile current. Dependent upon the condition in the liver and the consequent disturbance of the portal circulation, various secondary lesions occur, such as dilatation of the veins, dropsy, œdema of the feet and legs, etc. Cirrhosis of the kidney and arteriosclerosis (q.v.) are frequently associated with cirrhosis of the liver, probably dependent upon the same obscure cause. See LIVER; ALCOHOLISM; DROPSY.

CIR'RHUS. A tendril (q.v.).

CIR'RIPE'DIA (Neo-Lat. nom. pl., from Lat. *cirrus*, a lock, curl + *pes*, foot). An order of small marine crustaceans (barnacles), characterized by their fixed life. The body is indistinctly segmented, attached by the head end, and surrounded by a mantle. The limbs of the trunk, six pairs (rarely less or more), are biramous, long, and tendril-like, and the circulatory system is wanting. The species are mostly hermaphroditic. The Cirripedia are closely allied to the Entomostraca. See BARNACLE, and Plate of BARNACLES. For a description of fossil forms, see CRUSTACEA.

CIR'RUS. See CLOUD.

CIRTA, sĭr'tà (Lat., from Gk. Κίρτα, *Kirta*, Phœn. *kereth*, Heb. *qiryat*, city). A city of northern Africa, the capital of the Numidian Prince Syphax, and an important fortress of Masinissa and his successors. Later it became a flourishing Roman colony, and the centre of Roman military roads in Numidia. It was much injured by the troops of Maxentius in 310 A.D., but was restored by Constantine and named Constantina. The modern Constantine occupies its site.

CISAL'PINE REPUBLIC (Lat. *cisalpinus*, from *cis*, on this side + *Alpes*, Alps). The name given to the state constituted in 1797 by the union of the Cispadane and Transpadane republics (respectively south and north of the Po, Lat. *Padus*), which had been established by Bonaparte in May, 1796, after the battle of Lodi. The Cisalpine Republic embraced Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona, and Rovigo, the Duchy of Modena, the Principality of Massa and Carrara, and the three legations of Bologna, Ferrara, and the Romagna. The Republic had a territory of more than 16,000 square miles and a population of 3,500,000. Milan was the seat of the government, or directory. The Legislative Assembly was composed of a Senate of 80 members, and a Great Council of 160. The army consisted of 20,000 French troops, paid by the Republic. A more intimate connection was formed in 1798 between the new Republic and France, by an offensive and defensive alliance. The Republic was dissolved for a time in 1799 by the victories of the Russians and Austrians, but was restored by Bonaparte, after the victory of Marengo (1800), with some constitutional modifications and an increase of territory. In 1802 it took the name of the "Italian Republic," and chose Bonaparte for its President. A deputation from the Republic, in 1805, conferred on the Emperor Napoleon the title of King of Italy—after which it formed the Kingdom of Italy till 1814. See ITALY; NAPOLEON I.

CIS'CO. The name of two separate species of whitefish: (1) the lake moon-eye (*Argyrosomus hoyi*) of the Great Lakes—the smallest and most brightly colored of the whitefish; (2) the lake or Michigan herring (*Argyrosomus artedi*), occupying lakes in shallow places from Wisconsin to Alaska. Both are excellent food fish. See WHITEFISH.

CIS'IUM. See CARRIAGE.

CISLEITHANIA, sĭs'lī-thā'nĭ-à *or* -tà'nē-à (Neo-Lat., from *cis*, on this side + Ger. *Leitha*, a little river which forms part of the boundary between Austria and Hungary), or CISLEITHAN AUSTRIA. A name applied to that portion of the Austro-Hungarian monarchy represented in the Reichsrat in Vienna. It contains nearly 116,000 square miles and had a population of 26,150,708 in 1900 and 28,571,934 in 1910, or considerably more than half of the total population of Austria-Hungary.

CISPADANE (sĭs-pā'dān) **REPUBLIC.** A republican state of Italy, which comprised Modena, Reggio, Ferrara, and Bologna. It was merged in the Cisalpine Republic (q.v.) in 1797. It took its name from the Padus, or Po, which divided it from the Transpadane Republic. It was established in 1796 by Napoleon I after the battle of Lodi.

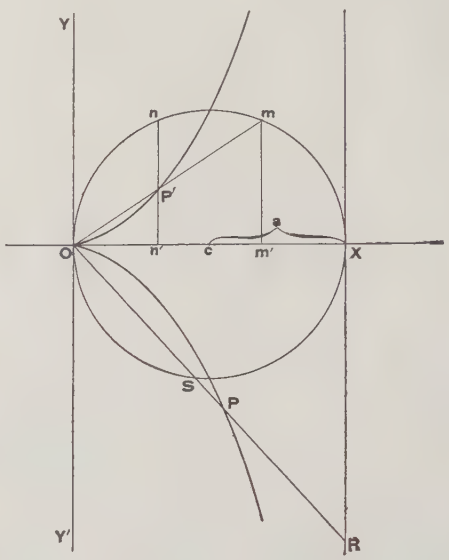
CISPLATINE (sĭs-plā'tĭn) **REPUBLIC** (Sp. *República Cisplatina*, from Lat. *cis*, on this side + Sp. *Plata*, the river dividing Uruguay from the Argentine Republic). The name of the Republic of Uruguay from 1828 to 1831. It had previously belonged to Brazil and had borne the name of the Cisplatine Province.

CISSAM'PELOS (Gk. κισσάμπελος, *kissampelos*, from κισσός, *kissos*, ivy + ἄμπελος, *ampelos*, vine). A genus of plants of the family Menispermaceæ, of which some of the species possess valuable medicinal properties, particularly *Cissampelos pareira*, a native of the West Indies and South America, the root of which was formerly thought to be that called Pareira brava. The plant is called "velvetleaf" in the West Indies, from the peculiar and beautiful appearance of the leaves. It is a climbing shrub, with round leaves, racemes of small yellow flowers, and

small, hairy, scarlet berries. The root of *Cissampelos* appears in commerce in pieces of 2 or 3 feet long, varying ½ to ¾ inch in diameter, tough, but so porous that air can be blown from end to end of it. It is dark brown externally and light yellow within. It has a sweetish, afterward nauseous, taste; is used as a tonic and diuretic, appears to exercise a specific influence over the mucous membrane of the urinary passages, and is administered with advantage in chronic inflammation of the bladder. Formerly this plant was supposed to yield all of the Pareira brava on the market; but now it is rare, its place being supplied by the roots of *Chonodendron tomentosum*, a plant of the same family found in Brazil, Peru, and elsewhere in South America. The root of this species, as found in the market, is of a grayish color, pale brown within, and with a waxy appearance when freshly cut. The roots vary from ½ inch to 3 inches in diameter, are longitudinally furrowed, and in sections show concentric markings. Another kind is also found in the American market, which greatly resembles *Cissampelos pareira*, but its exact botanical origin is not known. The properties of all are the same. They contain a bitter extractive and an alkaloid, pelosine or cissampeline, said to be identical with berberine and buxine. Pareira brava was introduced into European medicine in the latter part of the seventeenth century. In Brazil, in addition to its other uses, it is employed as a remedy for snake bites, a vinous infusion being taken internally, while the bruised leaves are bound over the wound.

CISSEY, sē'sā', Ernest Louis Octave Courtot (1811–82). A French general. He was born in Paris and was educated at the school of Saint-Cyr. Having served with distinction in Algeria and the Crimea, he was promoted in 1863 to be general of a division. He fought in the Franco-German War and in the contest against the Commune of 1871. He was elected to the National Assembly in 1871, was Minister of War from 1871 to 1873, in 1874–75 and in 1875–76, and was elected life senator in 1875. In 1880 he was accused of intimacy with a German spy, but was acquitted in 1881.

CIS'SOID (Gk. κισσοειδής, *kissoeidēs*, like ivy, from κισσός, *kissos*, ivy + εἶδος, *eidos*, shape, form). An ivy-like curve, first studied by Diocles, about 180 B.C. The commentary of Diocles sets forth the definition of the cissoid, which in modern notation will be understood from the figure. The ordinates mm', nn' are equidistant from the centre c, and the line Om cuts nn' in P', a point on the cissoid. A more general construction is the following: Draw any line OR from O to XR, and take $RP=OS$. Then P will be a point on the curve. The Cartesian equation of this curve is $y^2=\frac{x^3}{2a-x}$, and the polar equation is $r = 2a \tan \theta \sin \theta$. (See Analytic Geometry.) The curve passes through the points (a, a) and $(a, -a)$, is symmetric with respect to the X-axis, and lies between the Y-axis ($x = 0$) and the asymptote XR, whose equation is $x = 2a$; the origin is a cusp of the first species. (See Curve.) Huygens expressed the lengths (rectified it) of an arc of this curve limited by any two points in 1651. The area of the space included between the two branches and their asymptote was first given by Fermat (1661); it is equal to three times the area of the generating circle. If, instead of the circle, any other curve is taken as the generatrix, the resulting curve is called cissoidal. The cissoid is the pedal (see Curve) of a parabola with respect to the vertex. This curve has been used in solving two



famous problems of antiquity—the construction of two geometric means between two segments, and the duplication of the cube (q.v.). Consult: Klein, *Vorträge über ausgewählte Fragen der Elementargeometrie* (Leipzig, 1895); translated by Beman and Smith, *Famous Problems of Elementary Geometry* (Boston, 1894); Gow, *History of Greek Mathematics* (Cambridge, 1884).

CIST, Henry Martyn (1839–1902). An American lawyer and soldier, born in Cincinnati, Ohio, of Russian descent, son of Charles Cist (1793–1868), a Cincinnati journalist. In 1858 he graduated at Farmer's (afterward Belmont) College. He joined the Sixth Ohio Volunteers upon the outbreak of the Civil War and advanced to the rank of assistant adjutant in the Department of the Cumberland, being on the staff of Generals Rosecrans and Thomas. He was corresponding secretary of the Society of the Army of the Cumberland from 1869 to 1892 and practiced law in Cincinnati. In addition to 20 annual reports of the society, and numerous articles in periodicals, he wrote *Life of General George H. Thomas* (in collaboration with Donn Piatt) and *The Army of the Cumberland* (1882), in the "Campaigns of the Civil War Series."

CIST BURIAL (Welsh *cist*, from Lat. *cista*, Gk. κίστη, *kistē*, chest). A mode of disposing of the dead among various peoples, chief among whom are certain American aborigines. A cell or box of stone slabs was placed in a shallow grave, and in this the remains were placed, usually folded into the smallest possible compass, sometimes denuded of flesh, together with the mortuary sacrifices; over these a broad slab was laid, and earth was spread above, sometimes in a mound. See Archæology, American; Mortuary Customs.

CISTER'CIANS. A branch of the Benedictine Order; also known as Bernardines, from their most famous member. It takes its name

from the mother house of Cîteaux (Lat. *Cistercium*), near Dijon, which was founded in 1098 by St. Robert, abbot of Molesme. He transferred 20 of his most zealous monks from the latter house, on account of the unhealthfulness of its site, and established a small and poor monastery at Cîteaux. Robert's successor, Alberic, obtained from Pope Paschal II a confirmation of the new foundation and drew up statutes which insisted on a strict observance of the Benedictine rule. A brown habit was at first worn; soon, however, perhaps to mark a contrast with the Cluniac Congregation, this was changed to white, with a brown, and later a black, scapular. Alberic died in 1109 and was succeeded by Stephen Harding, an Englishman. He pressed the rule of poverty to the utmost, applying it to the community as much as to the individual members. This extreme strictness diminished the number of postulants, so that the future looked unpromising, when in 1112 St. Bernard, with 30 companions, joined the struggling community. The numbers now began to increase, and Stephen was enabled within two years to found four other abbeys—La Ferté, Pontigny, Clairvaux, and Morimond. Fifty years later the order numbered 343 abbeys, and by the middle of the fourteenth century more than 700 —in France, Germany, England, Ireland, Spain, Portugal, Norway, and Sweden. The austere and holy life of the early Cistercians won them universal respect and a vast influence throughout Christendom. They produced few great writers, but were indefatigable in collecting and copying manuscripts for their libraries. Practical matters, however, were not neglected in their zeal for literature and art; in England the order was a main cause of the growth of the wool industry.

After this golden age followed a period of decline. The rule was less strictly observed; many disorders crept in towards the end of the fourteenth century, and by the middle of the fifteenth the order had split into several congregations. The growth of luxury, the spread of the mendicant orders, and the practice of granting abbeys *in commendam* (see ABBOT) all contributed to its decay. Among the more noteworthy offshoots of the Cistercians were the Feuillants and the Trappists, and the Nuns of Port Royal in France. Before the Reformation England had 75 Cistercian monasteries and 25 nunneries. Among the English abbeys were Furness, Fountains, Woburn, Tintern, Kirkstall, and Rievaulx. Between internal decline and the hostility of various governments in modern times, the great majority of the Cistercian houses have ceased to exist. They are represented by a few in Italy, Switzerland, Belgium, and Austria, one in England (at Mount St. Bernard, near Leicester), and two in Ireland.

The influence of the Cistercians in art is sufficiently important to call for a separate treatment. When St. Bernard directed the policy of the order, he used it to carry out, among other things, his ideas as to the function of the fine arts. He wrote and preached against the current artistic extravagances in the construction, decoration, and furnishing of churches. As the order spread throughout the world during the twelfth century, it carried with it these ideas, some of which (for example, the invention of a single, low, wooden bell tower) were even expressed in the constitutions of the order. Cistercian artists, therefore, were architects, and of the constructive rather than of the decorative school. This is the only order that can boast of having consistently carried out an æsthetic ideal and had a style of its own, similar in whatever land it appears, and little affected by local art. Everywhere the order exercised a strong influence. The Dominicans and Franciscans borrowed from it many of the peculiar traits of their churches. The Cistercians adopted at once the vaulted type and were the pioneers of the Gothic revolution, carrying its germs, in Burgundian form, to nearly every civilized country. It was not until the middle of the thirteenth century that the order had largely yielded its simplicity to the advance of the rich and harmonious style of cathedral Gothic, though before that it had begun to change in minor ways, as in allowing the use of stone in place of wooden towers. When the special mission of the order was finished, its monasteries, being in remote country districts, were often allowed to go to ruin; but many of the most notable architectural monuments of its golden period remain worthy to stand by the side of the great cathedrals. Such are the abbeys of Maulbronn, Heiligen-kreuz, Lilienfeld, and Tischnowitz, in Germany and Austria; of Chiaravalle, Fossanova, and Casamari, in Italy; of Pontigny in France; Batalha in Portugal; Veruela in Spain, and those named above in England.

For the history of the order, consult: Janauschek, *Origines Cistercienses* (Vienna, 1877); Guignard, *Monuments primitifs de la règle cistercienne* (Dijon, 1877); D'Arbois de Jubainville and Pigeotte, *Etude sur l'état intérieur des abbayes cisterciennes aux XIIe et XIIIe siècles* (Paris, 1858); Tuite, *Cistercian Order* (New York, 1906). For the architectural side of the subject, Sharpe, *The Architecture of the Cistercians* (London, 1874); Eulart, *Origines de l'architecture gothique en Italie* (Paris, 1893); and the works named in the article on MONASTIC ART.

CIS'TERN (OF. *cisterne*, Lat. *cisterna*, reservoir, from *cista*, chest). An artificial reservoir, usually of masonry or woodwork, and located either above the ground, or, more commonly, in an excavation. In places where the supply of water is intermittent, or where rain water is used, every house requires a cistern, tank, or other receptacle for storing water. Where mosquitoes abound, especially the kinds which spread malaria and yellow fever, cisterns should be carefully screened or otherwise protected so that mosquitoes cannot deposit their eggs in the water. For comparatively large supplies of water, such as are required for manufacturing and railway service, receptacles for storing water are now almost universally termed reservoirs, tanks, or standpipes. See WATER WORKS; DAMS AND RESERVOIRS.

CIT'ADEL (Fr. *citadelle*, It. *cittadella*, dim. of *città*, a city, especially a fortified city). The fortified stronghold of a city or town; hence also the strongest part of any extensive fortification. Its function in ancient systems of fortification was akin to that of the donjon or keep of a castle; it provided a refuge of last resort for a garrison driven from the other works, in which they might hold out for a while longer against the enemy while awaiting succor from the outside. The mediæval citadel was accordingly situated, as a rule, at the most commanding and externally inaccessible angle of the city walls, with one gate opening towards the town and a

sally port towards the country. Modern warfare, with its long-range artillery and external lines of defense by earthworks and masked batteries, has rendered these old-time devices obsolete.

The term "citadel" is applied not only as above, to special portions of a system of fortifications, but also to any commanding and strongly defended castle or fort dominating a town, at once for defense and refuge. The acropolises of ancient Greece (as at Athens, Corinth, Tiryns, etc.) constituted the citadels of those towns. (See ACROPOLIS.) Edinburgh Castle, the ruined citadel castle of Smyrna, and the historic fortress of Antonia at Jerusalem (not extant) are examples of citadel castles in this sense. The fortified prison of the Bastile, in Paris, deemed impregnable until the Revolution of 1789, was the citadel of that royal capital. The fortified heights of Quebec are still called the Citadel. See CASTLE.

CITA'TION (ML. *citatio*, from Lat. *citare*, to call). A mandate of a court of competent jurisdiction, commanding the person or persons named therein to appear in that court for some purpose specified briefly in the citation.

It was originally the process by which a suit was begun in the English ecclesiastical courts, which formerly had jurisdiction over orphans, decedents' estates, and matrimonial causes.

In the United States the term is most frequently used to designate the process of surrogates', orphans', probate, and admiralty courts, commanding persons interested in a proceeding in such court to appear and show cause, if they have any, why the relief demanded by the party bringing the proceeding should not be granted, or for the purpose of receiving instructions, to make an explanation, or to show cause why they should not be punished for disobedience of some order, rule, or decree of the court.

The failure to obey a personal citation—that is, one for instructions or discipline—may render a party guilty of contempt of court; but if it is merely formal, notifying a party to appear and protect any interest he may have in a certain proceeding, appearance is not insisted upon, and the party failing to appear merely waives any right to object to the proceedings in which he is cited.

In Scotch practice, the act of an officer in summoning a party to an action under a proper warrant is called "citation." The term is also employed in the civil law.

The word "citation" is also used in law in the sense of the naming of an authority; as, the citation of a reported case or a passage in a legal treatise. See SUMMONS; SUBPŒNA; PROCEDURE.

CITHÆ'RON (Lat., from Gk. Κιθαιρών, *Kithairōn*). A mountain range in Greece, between Bœotia and Attica. The highest peak is a little over 4600 feet above sea level. It is now called Elatea, i.e., 'Pine Mountain.' It was famous in Greek mythology: on Cithæron Actæon and Pentheus met their fates, and Œdipus was exposed. Platæa lay at its foot.

CITH'ARA (Lat., from Gk. κιθάρα, *kithara*, a kind of lyre or lute). A musical instrument, somewhat resembling a guitar, much used by the Greeks and Romans, who attributed its invention to Apollo. In some respects it resembled a lyre; but it was played resting on the knees, whereas the lyre stood upright between them. The cithara had a hollow body, made sometimes of tortoise shell, from which two horns branched upward, supporting a crosspiece. The strings were stretched from this crosspiece to the body of the instrument, where they were supported by a bridge. Sounds on the lower strings were produced by the fingers of the left hand; on the upper, by the plectrum. From the cithara were derived the mediæval cither, and our modern

NUBIAN KISSAR, OR CITHARA.

zither and guitar. The modern instrument most nearly allied to the cithara is the Nubian kissar. See LYRE.

CITIES OF THE PLAIN. An appellation of the cities of Sodom and Gomorrah, which were situated in the plain about the Jordan and were destroyed because of their wickedness.

CITIUM. See LARNACA.

CIT'IZEN (OF. *citeain*, from Lat. *civitas*, state, from *civis*, citizen). In its most general sense, an individual member of a political society, or state; one who owes allegiance to, and may lawfully demand protection from, the government. The original meaning of the term, as denoting a person endowed with certain rights and privileges as a native or naturalized resident in a city, a free and lawful member of a civic community, has in America become its secondary signification; its Roman meaning, as a member of a free, self-governing commonwealth, having superseded it. It is in this latter sense, also, that it is employed in the French and Swiss republics. In England, however, it is properly employed only in the narrower sense, as equivalent to *municeps;* and this is its meaning, generally, in the law of modern monarchical states, in which the relation of the citizen to the state is expressed by the term "subject." In Imperial, as well as in Republican Rome, the state continued legally to be regarded as a commonwealth of free citizens, bound together by the tie of common membership of one body. The modern relation of sovereign and subject, which has been substituted for that of commonwealth and citizen, is of feudal origin, the oath of allegiance, on which it is based, being in its essence the creation of the

feudal obligation of fidelity and obedience due from a vassal to his lord.

It will be observed, then, that the more general sense of the term "citizen"—that in which it is employed in the United States and in other modern republics—is more closely in accordance with the original and historical meaning of the word. In the free republics of classical antiquity, the term "citizen" signified, not a resident of a town, but a free, governing member of the state, just as the term *civitas*, from which we derive our "city," signified, not merely a local municipality (*urbs*), but the state at large. The confusion is doubtless due to the importance of the rôle which several of these city states—as Athens and Rome—have played in history. In the ancient cities not all the inhabitants, perhaps not all the free inhabitants, were citizens, but these constituted a class entitled to special privileges and immunities; and as these cities formed the type of free government in the ancient world, the term "citizen" soon came to mean one who possessed full civil and political rights. The Greek idea of citizenship is expressed by Aristotle, who declared a citizen to be one to whom belonged the right of participating both in the deliberative or legislative and the judicial functions of the political community of which he was a member. The right was jealously guarded, and was rarely conferred on those of foreign birth. In Rome there were two classes of citizens—one that had a share in the sovereign power, i.e., were capable of attaining the highest offices of state; the other possessing only the private rights of citizenship. These, however, included the privilege of voting in the public assembly. There, as in the United States of America and some other modern states, citizenship, though usually acquired by birth, might be attained by naturalization or special grant of the state. In the later period of the Empire Roman citizenship, so highly valued under the Republic and early Empire, largely lost its distinctive character in consequence of the gradual disappearance of the political and legal privileges which formerly attended it. In the third century of our era the constitution, or decree, of Caracalla extended it to all persons, except slaves, freedmen, and their children, under the sway of the Empire, and Justinian completed the work by extending it to all free persons.

In the United States, as has been said before, the word "citizen" is used in its broadest sense, as defined at the beginning of this article. Perhaps as simple a statement as any is that made by an attorney-general of the United States, when he said: "The phrase, 'a citizen of the United States,' without addition or qualification, means neither more nor less than a member of the nation." The same person may be, and usually is, a citizen of the United States and of the State in which he resides. The two things are not, however, necessarily coexistent; for an inhabitant of one of the Territories or of the District of Columbia is a citizen of the United States without being a citizen of a State. The converse, however, is not true; no man who is not a citizen of the United States can be a citizen of one of the States. The idea of citizenship does not necessarily involve the right of voting or of other participation in political activity, as in the Greek conception of the term, for women and minors may be citizens, although excluded from all direct political activity. The question of race does not now enter into the definition of citizenship; previous to the adoption of the Fourteenth Amendment, this could not be stated, as the possession of negro blood was before that distinctly a disqualification from citizenship; yet even before the passage of the Fourteenth Amendment this position was doubted. The decisions denying the citizenship of Indians were founded not on race distinction, but on the existence of tribal relations, which were inconsistent with full allegiance to the United States.

A citizen of the United States may be either native-born or naturalized. Among native-born citizens are included all persons born in the United States and not subject to any foreign power, including even the children of alien parents, unless the latter be ambassadors of a foreign power, but excluding untaxed Indians still in tribal relations; children born in foreign countries of fathers who were citizens of the United States at the time of birth; freedmen not recognized as citizens before the Act of Emancipation, but so recognized by that act and by the ensuing Fourteenth Amendment; Indians born in the country who have abandoned tribal relations, have entered into civilized life, and have by paying taxes recognized their allegiance; and Indians who have accepted allotments of land in severalty under the Dawes Act of 1887.

We have already said that minors and women are citizens in the meaning of the term found in the United States Constitution; it is also true that wives of naturalized citizens become citizens by their marriage, if they were not legally incapable of naturalization. A naturalized citizen is one who was originally a subject of a foreign state, but who has been received by the United States as a citizen under the acts of Congress bearing on that subject. Theoretically, treatises on international law have always doubted the power of the subject to throw off his natural allegiance, and of a state to accept the allegiance of the subject of a foreign country. But these rights have been exercised very generally; and the right of naturalization is now recognized by treaties between the United States and many foreign powers. A person who is naturalized is admitted to all the privileges and duties of citizenship; and his naturalization includes that of any minor, but not of adult, children resident at the time in the United States.

In regard to the dual relation of citizenship in the general government and in the State in which a person resides, it may be said that a citizen of the United States owes his first and highest allegiance to the general government. The relations of the two forms of allegiance have been defined as follows by the United States Supreme Court: "There is in our political system a government of each of the several States, and a government of the United States. Each is distinct from the other, and has citizens of its own, who owe it allegiance, and whose rights, within its jurisdiction, it must protect. The same person may be at the same time a citizen of the United States and a citizen of a State; but his rights of citizenship under one of these governments will be different from those he has under the other. The government of the United States, although it is, within the scope of its powers, supreme and beyond the States, can neither grant nor secure to its citizens rights or privileges which are not expressly or by implication placed under its jurisdiction. All that cannot be so granted or secured are left to the exclusive pro-

tection of the States. A citizen of the United States owes his first and highest allegiance to the general government, and not to the State of which he may be a citizen." The word "citizen" is often loosely used as synonymous with resident or inhabitant. State laws conferring the franchise upon aliens who have filed declarations of intention to become citizens are often regarded as conferring citizenship. Where a law passed for a particular purpose makes such loose use of the word, and where no question of constitutional rights is involved, the courts will interpret the word. See ALIEN; ALLEGIANCE; NATURALIZATION; SUBJECT. Consult: F. Van Dyne, *Citizenship of the United States* (Rochester, 1904); J. S. Wise, *A Treatise on Citizenship* (Northport, 1906); W. L. Sheldon, *Citizenship* (Chicago, 1905).

CITIZEN, THE. A comedy by Arthur Murphy, performed July 2, 1761, at the Drury Lane Theatre, London, and printed (as a farce) in 1763. It is founded in part on Destouches's *Fausse Agnès.*

CITIZEN. See KASZTA AFFAIR.

CITIZEN KING, THE (Fr. *le roi citoyen*). An appellation bestowed upon Louis Philippe, King of France from 1830 to 1848. He had favored the revolutionary movement in his younger days and continued, even after he had mounted the throne, to sympathize with the people, though only in a half-hearted way.

CITIZENS INDUSTRIAL ASSOCIATION OF AMERICA. An organization founded on the belief that labor unionism has taken on certain features which operate injuriously to the general interest. The association vowed itself not opposed to labor unions, but opposed many of their practices, including the closed shop, limitation of output, boycott, sympathetic strikes, compulsory use of the union label, etc. There are over 500 local associations throughout the United States. The organ of the association is *The Square Deal.*

CIT'RIC ACID (Fr. *citrique,* Lat. *citricus,* from *citrus,* citron), $C_3H_4(OH)(COOH)_3 + H_2O$. A crystalline organic substance found in various plants, especially in the fruits of the lime (*Citrus bergamia*) and the lemon (*Citrus lemonum*). The citric acid of commerce is obtained from the lemon's juice, which is made in large quantities in southern Italy, in northern Africa, in the West Indies, etc. To obtain citric acid, lemon juice is boiled (to coagulate all proteid matter) and neutralized with chalk and lime; the precipitate of calcium citrate thus obtained is decomposed by boiling with dilute sulphuric acid; on filtering, and evaporating the filtrate, citric acid crystallizes out in the form of colorless rhombic prisms, freely soluble in water, and having an agreeable acid taste. Citric acid has the property of preventing the precipitation by potash or ammonia of the hydroxides of iron and certain other metals. This property is utilized in calico printing, citric acid being employed to prevent the formation of certain colors where they are not called for. Ammonium citrate, added to solutions of ferric salts, helps produce a smooth deposit of pure metallic iron by electrolysis. Citric acid is also used in making refreshing effervescent drinks; the pure acid, or preferably lemon juice (or orange juice), is very beneficial in scurvy; formerly it was popularly believed to be an excellent remedy for rheumatism; it is also used to increase the secretion of saliva and to allay thirst in fever. It is often used in medicine in combination with iron, magnesium, lithium, quinine, etc. Chemically, as its constitutional formula shows, it is a monoxy-tribasic acid, and is therefore capable of forming three series of salts, in which one, two, or all the three of the acid hydrogens are replaced by metals. It is somewhat similar to tartaric acid, from which it may, however, be readily distinguished by testing the solubility of its calcium salt, $(C_6H_5O_7)_2Ca_3+4H_2O$, which is insoluble in potash and is more soluble in cold than in hot water. Citric acid melts at 100° C. in its water of crystallization, which it loses at 130°. If heated further to 175° C., citric acid loses the elements of water, and is transformed into aconitic acid—an unsaturated tribasic acid, having the formula $C_3H_3(COOH)_3$. Citric acid was discovered by Scheele, in 1784; its properties were investigated by Berzelius and Liebig.

CIT'RIL, or CITRONENFINK (probably corrupted from *citrine,* Neo-Lat. *citrinella,* from ML. *citrinus,* citron colored, from Lat. *citrus,* citron; so called from the color of its breast). A small, canary-like finch (*Carduelis* or *Chrysomitris citrinella*), of southern Europe, related to the American goldfinch, and a favorite cage bird in Europe for the sake of its song.

CIT'RON (Lat. *citrus,* Gk. *κίτρον, kitron,* citron; possibly of Semitic origin; cf. Heb. *qātar,* Ar. *qatara,* to be fragrant), *Citrus medica,* var. *genuina.* (See CITRUS.) A tree, allied to the orange and lemon, cultivated in the south of Europe, and to some extent in Florida and California. It is a native of the forests of the north of India. The citron has oblong toothed leaves; the flowers are externally of a violet color; the fruit is large, warted, and furrowed; the rind is very thick and tender; the pulp is subacid. The part chiefly valued is the rind, which is candied, preserved, and used in confectionery and for culinary purposes. The juice is sometimes employed to make a syrup; or, with sugar and water, for a beverage and for flavoring liquors. The name "citron" is also applied, in the United States, to a variety of melon resembling in appearance the watermelon, but having a firm, white, inedible core. The rind of this melon is used for preserves, like that of the true citron. See CITRUS; ORANGE; LEMON. For illustration, see Colored Plate of CITRUS FRUITS.

CIT'RONEL'LA (Neo-Lat., dim. of ML. *citro,* citron, from Lat. *citrus,* citron). The name of a fragrant ethereal oil imported from Ceylon, and used by perfumers. Under the name of *Idris Jaghi* it is often employed as an adulterant of certain aromatic oils. The application of citronella oil to the skin is recommended for keeping away mosquitoes and other insects.

CITRONELLE, sĭt'rō-nĕl'. A village and health resort in Mobile Co., Ala., 32 miles north by west of Mobile, on the Mobile and Ohio Railroad (Map: Alabama, A 4). Here, on May 4, 1865, Gen. Richard Taylor surrendered to Gen. E. R. S. Canby the last Confederate army east of the Mississippi. The Citronelle Chautauqua meets here. Pop., in 1900, 696; in 1910, 935.

CIT'RON MEL'ON. See WATERMELON.

CITRON WOOD, or **CITRUS WOOD.** The most costly furniture of Roman antiquity was made from this wood, which is probably the *Callitris quadrivalvis*—a tree of the pine family, still employed in cabinetmaking on account of

CITRUS FRUITS

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1 KUMQUAT NEARLY NATURAL SIZE CITRUS JAPONICA
2 CITRON ½ NATURAL SIZE CITRUS MEDICA
3 LIME NATURAL SIZE CITRUS MEDICA VAR. ACIDA
4 ORANGE ⅔ NATURAL SIZE CITRUS AURANTIUM VAR. SINENSIS
5 POMELO ½ NATURAL SIZE CITRUS DECUMANA
6 MANDARIN ¾ NATURAL SIZE CITRUS AURANTIUM VAR. NOBILIS
7 LEMON ⅚ DIAMETER CITRUS MEDICA VAR LIMON.

its beautiful grain. It grows in Algeria and has large and gnarled roots from which the pieces used for ornamental purposes are taken.

CIT'RUS (Lat., citron tree). A genus of plants of the family Rutaceæ, consisting of 30 or more species of trees and shrubs, most of which bear spines or thorns and are natives of India and other warm parts of Asia, but many of which are now commonly cultivated in all warm climates on account of their fruit. This genus includes the orange, citron, lemon, lime, bergamot, shaddock, pomelo, and forbidden fruit. Citrus trees are distinguished by numerous stamens, irregularly united in bundles by their filaments, a pulpy fruit with a spongy or leathery rind, and smooth seeds. The leaves and the rind of the fruit abound in volatile oil. The flowers also contain volatile oil and emit a peculiar fragrance.

CITRUS DISEASES. See ORANGE, *Diseases*.

CITTADELLA, chĕt'tà-dĕl'lå (It., little city, dim. of *città*, city). A city in the Province of Padua, north Italy, situated 14 miles northeast of Vicenza (Map: Italy, F 2). It has a beautiful church and botanical gardens, and manufactures cotton and woolen goods. It was founded in 1220, as a protection against Treviso, and has still retained its walls, tower, and moat. Pop., 1901, 9886; 1911, 11,332.

CITTÀ DI CASTELLO, chĕt-tä' dē kàs-tĕl'lō (It., City of the Castle). A city in the Province of Perugia, central Italy, situated near the left bank of the Tiber, 20 miles east of Arezzo (Map: Italy, G 4). It is surrounded by walls of the sixteenth century, and contains several fine palaces, a cathedral of the sixteenth century, and beautiful town hall of the fourteenth century, containing a fine art collection. Although some of the first church pictures of Raphael were painted for Città di Castello, the town does not possess any originals of the master in its public collections. The chief manufactured products are silk and nails. Its commerce is of some importance. Città di Castello is the seat of a bishop, and occupies the site of Tifernum Tiberinum, destroyed by Totila. Pop., 1901, 26,439; 1911, 27,713.

CITTANOVA, chĕt'tä-nō'vå. A town in the Province of Reggio, Calabria, Italy, 31 miles northeast of Reggio (Map: Italy, L 9). It arose from the ruins of Casalnuovo, which was destroyed by an earthquake in 1783. Its present name dates from 1852. The cultivation of olives and manufacture of olive oil constitute its chief industry. Pop., 1901 (commune), 11,713; 1911, 15,145.

CITTÀ VECCHIA, chĕt-tä' vĕk'yå. Former capital of Malta, seven miles west of Valetta. It is more often known as Città Notabile. The palace of San Antonio, residence of the English governor, is near the town. Pop., 4000.

CITY (Fr. *cité*, Lat. *civitas*). In the United States, a chartered municipal corporation whose chief executive officer is usually known as the mayor. The legislatures of the various States have prescribed different requisites for the granting of city charters, the principal condition being that in respect to population. City charters vary in the degree of power they confer on the municipal authorities, the measure of local autonomy being usually, though not always, regulated by the number of inhabitants. Besides the mayor, there are, as a rule, a board of aldermen and a common council. In Great Britain the term "city" is generally applied to an incorporated cathedral town—i.e., one which is, or has been, the seat of a bishop or the capital of his see. In the sense in which it was first used in the Romance languages of modern Europe, the word "city," like its Latin original and the Greek πόλις, was probably equivalent to State (*respublica*), rather than to town or borough (*urbs*, *municipium*); and while the latter signified a collection of hearths and households, governed by municipal laws internally, but subject externally to the laws of the country of which it formed a part, the former was applied only to such towns as, with their surrounding districts, were independent of any external authority. The only cities in this sense now are the free towns of Germany and such of the cantons of Switzerland as consist chiefly of a town and its surroundings, as Geneva. The ancient Gauls, though composing one nation, were divided into tribes, living in different cantons, each with its town, to which the term "*civitas*" was applied; and as they also acknowledged a species of central authority, several cities sending delegates to a central one of greater extent and importance to discuss their common affairs, there is reason to believe that the term "city" was applied, par excellence, to those central places of meeting, and thus, from a very early period, signified a capital or metropolis, though not independent. See CITIZEN.

Political and Commercial Aspects. The city has always been the centre of commercial and industrial development, but its origin is to be found among agricultural peoples who possessed the fertile lands and built themselves walled towns, or took possession of some naturally fortified places, such as the Acropolis of Athens, in order to protect themselves from the attacks of the predatory tribes. Within the city, handicraft, exchange, and various industries grew up. Babylon and Egypt were full of these small communities, now buried beneath the sand. They were situated on rivers and the seacoast, and soon became centres of commerce. Large cities were a prominent feature of the ancient world; Thebes, Memphis, Babylon, Nineveh, Susa, Tyre, Carthage, and Jerusalem were great centres. Greece, for its extent and population, had many large cities. Alexandria is said to have contained over 500,000, and Rome was still larger. As capital of the Empire of the East, Constantinople succeeded Rome as the principal city in Europe. Civilization was associated with city life, as was illustrated by the use of the word "pagan" (Lat. *paganus*, dweller in a country district, where heathenism often survived much longer than in the city). In the Mohammedan East, during part of the Middle Ages, Bagdad, Damascus, and Cairo led in population, while Cordova was the greatest city of the Mohammedan West and for a time of all Europe. Compact cities grew up in the Middle Ages in nearly every European country. At the beginning of the sixteenth century, Europe had six or seven cities numbering 100,000; at the end, 13 or 14. During the seventeenth century, while civil war prevailed, although the population of Europe remained stationary, the cities increased.

A remarkable fact of the nineteenth century has been the constant increase in urban life at the expense of the rural districts. Cities have grown absolutely and proportionally in respect to the total population. This is true not only

of the countries in which industry is highly developed, like England, Germany, and the Eastern and Northern States of the American Union, but also of agricultural countries like western Canada, Australia, and Argentina. The movement towards the city made its earliest appearance in England. In 1851, 50.08 per cent of England's population was urban; in 1911, 78 per cent of the population of England and Wales lived in cities and towns. In Germany 54.3 per cent of the population lived in towns of 2000 and upward. In France over 40 per cent of the population dwell in cities. Approximately 40 per cent of the population of Belgium and Holland is found in cities; and even in Australasia, where the importance of agricultural and pastoral pursuits might be expected to lead to a dispersion of population, one third of the population dwells in cities and towns. In the United States a diffusion of the population would have seemed natural; but urban tendencies are becoming stronger, as this table shows:

YEAR	Total Population	Urban population—Cities of 2500+	Per cent of urban total
1880	50,155,783	14,772,438	29.5
1890	62,947,714	22,720,223	36.1
1900	75,994,575	30,797,185	40.5
1910	91,972,266	42,623,883	46.3

The most striking urban development naturally appears in the Eastern States. In 1910, 96.7 per cent of the population of Rhode Island lived in cities of 2500 and over; 92.8 per cent of the population of Massachusetts; 78.8 per cent of that of New York; 89.7 per cent of that of Connecticut.

The percentage of population living in cities and towns is least in the South—25.4 per cent for the South Atlantic States, 18.7 per cent for the East South Central, and 22.3 per cent for the West South Central. Even here, however, the tendency is unmistakable. The corresponding percentages for 1890 were 19.5, 12.7, and 15.1 respectively.

Another notable fact is that the population of the large cities is increasing even more rapidly than that of cities in general. In 1890 15.4 per cent of the population lived in cities of 100,000 and over. In 1900 the percentage was 18.8; in 1910, 22.1. Nearly one-tenth of the population of the United States is found in the three cities New York, Chicago, and Philadelphia.

Throughout the world the remarkable growth of great cities is of special significance, and also the manner of growth. There is great difficulty in comparing statistics because of the failure to distinguish the economic from the political unit. It is the territory economically dependent upon the large centre which continues to grow rapidly. The important point to be noted is, that the increased size of these cities is due to suburban extensions. The older portions of the city have the population displaced by business and improvements; rapid-transit facilities remove the residential portions to outlying districts, where better conditions are possible, and the congested wards do not grow except where a low class of immigrants appear. However, the incomers to the slums are largely balanced by the outgoers. Certain forms of industry are also moving to the suburbs.

The principal cause of modern urban growth is the development of mechanical industry, which gives the large city a technical advantage over the small. Conditions making urban growth possible have been the epoch-making improvements in transportation and the increased productivity of agricultural labor resulting from the application of machinery to agriculture.

A few of the effects of this agglomeration of population may be enumerated. (1) *Economic.* Great extremes of wealth are found in the cities, but the possibilities of greater production raise the average of prosperity and the standard of living. Increased taxation and municipal indebtedness make heavy demands upon the social purse. The cost of living is high, especially in rents, resulting in the horrors of overcrowding. Staples, however, are lower, and consumption can be greatly varied. The existence of an unemployed class is probably due to the immigration of a low class. Association is an aid to labor, in that it favors organization. (2) *Political.* Urban growth has meant national greatness. National stability was considered to depend upon the conservatism accompanying land tenure. As urban life increases, tenancy becomes more general; but the new forms of wealth have simply expanded property interests. Municipal government (q.v.) presents difficult problems. The population contains floating, nontaxpaying, and foreign elements; the opportunities for corruption are many, and the needs of administration require an expansion in governmental functions. (3) *Social.* Among the evils of city life are those of disease, infection, dirt, high death rate, infant mortality, overcrowding, lack of light and air, poor water, the fostering of daring criminals, the nervous tension of the life and the lack of provision for education and recreation, as well as the dangers of class antagonism. Industrial competition has weakened the tendency of cities to be the centres of radicalism, but association unconsciously strengthens social solidarity. A humanitarian movement is apparent, as instanced in philanthropic associations, while common interests have developed municipal activities broadly social in their nature. The cities are necessarily the centres of thought, culture, and progress. Urban life must be accepted as a prominent factor of civilization, whose evils are temporary and remediable. The old cities are in process of remaking; the solution of the problem is not a return to rural life, but a better adjustment to the urban environment. See MUNICIPAL GOVERNMENT.

Bibliography. Consult: The Law Commentaries of Blackstone, Kent, and Stephen; also Jhering, *Evolution of the Aryan* (Eng. trans., New York, 1897); Howe, *The City* (New York, 1905); F. J. Goodnow, *City Government in the United States* (New York, 1905); Fustel de Coulanges, *La cité antique* (15th ed., Paris, 1895; Eng. trans., Boston, 1877); Weber, "The growth of Cities in the Nineteenth Century," in *Columbia University Studies in History, Economics, and Public Law*, vol. xi (New York, 1901), where there is an extensive treatment of the subject, with bibliographical notes; Shaw, *Municipal Government in Great Britain* (New York, 1895); James, "The Growth of Great Cities in Area and Population," in *Annals of American Academy of Political and Social Science*, vol. xiii (Philadelphia, 1899); "Bibliography of Municipal Administration and City Conditions," issued by *Municipal Affairs*, vol. i (New York, 1897, United States Census Reports); Bar-

thold, *Geschichte der deutschen Städte und der deutschen Bürgerthums* (Leipzig, 1852–53); Friedländer, *Town Life in Ancient Italy* (Boston, 1906); Levasseur, *Les populations urbaines en France* (Paris, 1890); Kuczynsky, *Der Zug nach der Stadt* (Stuttgart, 1897); Weber, *The Growth of Cities in the Nineteenth Century* (New York, 1901); Meuriot, *Des Agglomerations urbaines dans l'Europe contemporaine* (Paris, 1897); Wilcox, *The American City* (New York, 1904); Howe, *European Cities at Work* (New York, 1913).

CITY HEIRESS, THE. A comedy by Mrs. Aphra Behn (1682), based upon Middleton's *A Mad World, My Masters*. The prologue was written by Otway.

CITY MADAM, THE. A comedy by Philip Massinger, licensed May 25, 1632, and printed in 1658. It was revived at Drury Lane, April 29, 1783. The doubt which has been raised as to its entire authenticity is unfounded.

CITY MATCH, THE. A comedy by Jasper Mayne, printed at Oxford in 1639 and produced the same year, first at Whitehall, London, before the King and Queen, and then at Blackfriars. It was republished in 1659 and was revised for the stage by Bromfield, in 1755, under the title of *The Schemers*, and by Planche, in 1828, under the title of *The Merchant's Wedding*. It is a clever though rather involved piece, criticized by Pepys as "silly."

CITY MOUSE AND COUNTRY MOUSE, THE. An old fable of a country mouse invited to the home of a mouse in the city, where, while feasting on unaccustomed dainties, she is terrified by the onslaught of a cat, and is led to esteem the security of her frugal life in the fields more highly than the town luxuries with their attendant perils. The fable is a satire by Matthew Prior (1687) on Dryden's *Hind and Panther*.

CITY NIGHTCAP, THE. A play by Robert Davenport, licensed for the stage in 1624, though not printed until 1661. Ten years later, an adaptation of the play, by Mrs. Aphra Behn, appeared under the title, *The Amorous Prince*. It is included in Dodsley's *Old Plays* (1740).

CITY OF A HUNDRED TOWERS. An appellation of Pavia, Italy, from its many towers and steeples.

CITY OF BROTHERLY LOVE. A nickname given to the city of Philadelphia, Pa. The name of Philadelphia in Asia Minor, whence William Penn derived the name for his city, was itself derived from that of Attalus Philadelphus; its Greek form was *Φιλαδέλφεια*. The nickname is due to an erroneous assumption that the original Greek name was *Φιλαδελφία* and was originally a common noun meaning "brotherly love" (compare Gk. *φίλος, philos*, dear + *ἀδελφός, adelphos*, brother).

CITY OF DAVID. Jerusalem, which David took from the Jebusites and made the capital of his kingdom. The term is applied also to Bethlehem, where David is supposed to have been born.

CITY OF DESTRUCTION, THE. The city from which Christian begins his journey to the Celestial City, in Bunyan's *Pilgrim's Progress*. It represents the state of worldliness.

CITY OF GOD (Lat. *De Civitate Dei*). See AUGUSTINE, SAINT.

CITY OF HOMES. An appellation of Philadelphia, from its large number of dwelling houses.

CITY OF MAGNIFICENT DISTANCES, THE. A term applied once somewhat derisively, but now proudly, to Washington, D. C. The city was laid out at the end of the eighteenth century on so grand a scale that the belief was strong that it would never realize the ideal of its founders.

CITY OF REFUGE (Heb. *'īr miglat*). A town reserved as a temporary asylum for homicides fleeing from the vengeance of the avenger of blood. The phrase refers particularly to the Jewish form of the right of asylum, which has existed, in most primitive societies, as a device for mitigating the excesses of private vengeance and for securing some form of legal inquiry into the offense charged. Such asylum, sanctioned and protected by law, is clearly a survival from the protection which the man slayer sought and found in his own family or tribe, early law permitting the *lex talionis*, or right of retaliation, on behalf of the injured family or tribe, so long as the malefactor was at large. Asylum once having been gained, the responsibility for the crime was transferred to the community protecting the wrongdoer, the compensation due being a money payment, the amount of which was regulated by law.

According to biblical law, there were six cities in which any one who committed murder unintentionally could find an asylum (Num. xxxv.). Three of these cities—Bezer, Ramoth in Gilead, and Golan in Bashan—were east of the Jordan; the other three—Kedesh in Galilee, Shechem, and Hebron—were to the west. If the murderer reached any of these cities, he was safe from the blood avenger (Num. xxxv. 12; Deut. iv. 41–43; Josh. xx. 2–9; Ex. xxi. 13; Deut. xix. 4–10). There are certain features of the law in Numbers which are unquestionably very old. The three refuge cities to the west of the Jordan are all ancient sanctuaries, and were probably, from a much earlier period even than the Hebrew conquest of Palestine, asylums under the protection of the deities worshiped in the places named. The city of refuge is thus an institution growing out of the ancient custom, widely prevalent, which made every sacred spot, every altar as the resting place of a deity, a place of refuge, within whose domain even animals were safe from the attacks of man. The oldest Hebrew legislation (Ex. xxi. 12–14) recognizes this law of asylum, while excluding from its protection the willful murderer, who is to be seized even at the altar of Yahwe (Ex. xxi. 14). Since it was the purpose of the religious reforms instituted by King Josiah (q.v.) to recognize the sanctity of only one sanctuary—that of Jerusalem—the asylums connected with the numerous sacred places naturally lost their force. Accordingly, to overcome the difficulty involved in obliging a murderer in any part of the country to flee to Jerusalem, the six cities above mentioned were recognized as places of refuge, with eventual provision of three more in Philistia, Phœnicia, and Cœle-Syria (Deut. xix. 8–10). In the legislation in Numbers (chap. xxxv), which is supposed by many scholars to be in its present form later than Deuteronomy, further provision is made: (1) The murderer is not to go unpunished, but is to be taken from his asylum to be tried in public, in order to check lawlessness, which prevailed through the survival of the blood-feud customs to a late day; (2) the manslayer who had been acquitted was safe, upon the death of the high priest in whose time

the murder was committed, to return to his home. All privileges of the blood avenger ceased with the death of the high priest, and any violence on the part of the blood avenger would be regarded as willful murder; whereas, previous to the death of the high priest, the manslayer, even after acquittal, had to be on his guard, and, if slain by the blood avenger, his death could not be punished. In the days of Greek and Roman supremacy many cities of Syria enjoyed special privileges as asylums. Among these were Gaza, Ashkelon, Dora, Ptolemais, and in the Decapolis, Hippus, Gadara, Abila, and Scythopolis. According to Josephus (*Ant.* xiii, 2, 3) Jerusalem was included in the number. The title ἄσυλος, *asylos*, implied above everything else freedom from the duty of extraditing fugitives who had sought refuge in these cities. Consult: Schürer, *Geschichte des jüdischen Volkes*, vol. ii, p. 105 (4th ed., 1907); Benzinger, *Hebräische Archäologie*, pp. 279 ff. (2d ed., 1907). See also Asylum, Right of; Blood Feud; Blood Money.

CITY OF THE PROPHET (Ar. *Madīnat an-Nabī*). An appellation of Medina, Arabia, where Mohammed took refuge in the year 622, fleeing from Mecca.

CITY OF THE SUN, The. A name given to Baalbec, which was built on the ruins of Heliopolis ('The Sun City').

CITY OF THE VIOLET CROWN, The. A name applied to Athens.

CITY PLANNING is the designing and laying out of cities and towns to meet the manifold common public needs, including not only various physical necessities, comforts, and conveniences, but also the demands of the higher life. More specifically, the object of city planning is to arrange in one harmonious whole the streets, public buildings, parks, playgrounds, and amusement and recreation centres of a given city, and at the same time to provide adequate transportation facilities by land and water, proper water and light supplies, and sewerage and drainage systems. In its broader aspects city planning also includes a consideration of the proper housing of those classes of citizens who are unable to care for their own interests, as well as the division of the city into residential, industrial, and business districts. It should also take into account what the British town planners term the "amenities of city life."

The fundamental basis of city planning is utility. The greatest utility rests on fitness of form to purpose or function, and it is out of this adaptation that the æsthetic in city planning is developed. Adornment has a place in city planning, but it should be used chiefly to accentuate the beauty and dignity of natural form and to stimulate the civic spirit by well-designed and well-placed monuments, to commemorate epochal events and illustrious persons in the history of the city. The city plan should always express the individuality of the city, as regards both its topography and the life and spirit of its people.

It is apparent, from this survey of the scope of city planning, that its successful practice calls for the services of the landscape architect, the surveyor, the engineer, the architect, the sociologist, and the financier, as well as the real-estate developer. Unfortunately most of the city planning of to-day begins and ends with the speculator in real estate, who invokes the assistance of these other agencies only so far as to him seems necessary to realize the greatest immediate personal profit from his schemes for real-estate development. Such operations are directly opposed to the spirit of city planning. Real city planning looks to the interest of the public rather than the profit of the individual, to the development of the city as a whole, instead of the mere "improving" of isolated plots, to the needs of the future as well as the present good. It is not a matter of cutting up vacant tracts into the largest possible number of lots to sell as quickly as possible at the highest possible price. Indeed, one of the objects of the city plan is to regulate and restrain a practice so detrimental to homogeneous city growth.

It is only within the past few decades—indeed, outside of Germany, it might almost be said that it is only within the present century—that there has been any approach to a well-defined art, much less a science of city planning. This is explained by the relatively slow growth, small size, and simple needs of cities up to about the middle of the nineteenth century.

In olden times cities grew subject to little rule, save natural topography and the possible fancy or rather good judgment of some powerful ruler. When there was conscious planning, there was little to be provided for except streets of light traffic, largely pedestrian, a few open spaces and public buildings for civil and religious assembly, and, quite often, walls and other military defenses.

The marvelous growth of cities in the nineteenth century was so sudden and, through the advance of the arts and sciences, the needs of city dwellers became, simultaneously with this growth, so many and complex, that there was little time and less experience to direct its development. Street space became overtaxed at the surface and above and below it, by the advent of street railways, water, gas, and sewer pipes, and telegraph, telephone, and electric light and power wires. The tall office building with the consequent crowding of people during work hours introduced new problems of transportation. All these things, combined with a score of modern city conditions, made it necessary to plan or replan streets on a different scale, corresponding to the volume and character of the traffic they bear. Congestion of population made it imperative that parks, playgrounds, and breathing spaces, adequate and accessible, become an essential part and not a decorative afterthought of the city plan. With all this many legal and financial problems arose, not all of which are yet solved. In fact, while many of the elements of city planning, like the laying out and improvement of streets, water supply and sewerage, the utilitarian and æsthetic phases of park development, and the provision of rapid means of communication, have been put on a scientific basis, many others have not, and much remains to be done to correlate the elements of city planning with each other and bring all into a harmonious whole.

Since city planning as now conceived is so largely in the formative stage, and most of its elements are treated separately in other articles, the remainder of the present article will be devoted to an outline of city planning. For the better understanding of the subject the main types of city street plans will be described, since until quite recently city planning was confined chiefly to the laying out or remodeling of street systems and open spaces. The three main types of street plans are (1) the rectan-

gular, gridiron, or checkerboard; (2) the radial or diagonal, which sometimes may more properly be called the radial and circular or polygonal; and (3) a combination of the first two. To these there may be added the designedly irregular plan.

Obviously the simplest street plan is the rectangular, since it is easily laid out and mapped or otherwise recorded and lends itself readily to the transfer of property, besides making for directness of travel, as compared with winding streets. Radial street plans facilitate the movement of street traffic to and from central points, but give many awkward-shaped lots and make it necessary to turn many corners to get to points not on the radial streets. The radial or diagonal plan, superimposed on the rectangular plan, has some advantages over either, but is still liable to leave many awkward-shaped parcels of land. The designedly irregular type of street plan, largely a modern innovation and not widely used as yet, but admirably adapted to the local conditions of some cities, has the streets laid out quite irregularly, on curves following contour lines. The curved streets so formed avoid or reduce grades and often afford a pleasing variety of street views. Diagonal streets, or streets on curves whose general direction is diagonal, may prevent overirregularity. Streets on contour lines are particularly suited for residence districts. The streets of most cities of both ancient and modern times follow the rectangular plan, if any plan at all, except where some topographical feature, such as steep hills or curved water fronts, made this impossible.

Historical Outline. According to Unwin, the earliest-known town laid out on a definite plan was built about 3000 B.C. and was the semipermanent construction camp (called Kahun) for the pyramid of Illahun. (Consult Flinders Petrie's *Illahun.*) This town had a rectangular street plan, with drains or gutters in the centre of the street, instead of at the side as in ancient Pompeii.

The earliest-known city planner of note appears to have been Hippodamus, an architect of Miletus, a follower of Pythagoras, and probably a contemporary of Pericles. Hippodamus is credited with the plans of the Piræus (the fortified seaport of Athens), Thurii, and Rhodes (the last in 408 B.C.), and has been called "the Greek Haussmann of the fifth century B.C." The Piræus was a fortified city which had a system of broad, straight streets, crossing each other at right angles, broken at frequent intervals by open squares, and adorned with temples and monuments, and provided with an agora similar to the later Roman Forum. In its best days the Piræus was connected with Athens by the "Long Walls," which made the two cities virtually one and impregnable so long as Athens was mistress of the seas. (Gardner, *Ancient Athens*, New York, 1903.) A modern reproduction of the Piræus and the strip inclosed by the Long Walls is the territory annexed in 1909 to Los Angeles to give that California city a seaport. Another notable ancient Greek city, laid out on the rectangular plan, was Selinus, in southern Sicily, founded by the Dorians about 628 B.C. and said to have been systematically laid out by the architect Hermocrates. Its acropolis appears to date from 575 to 560 B.C. and has been the subject of recent survey, study, and conjectural restoration by Gustave Fongères and Jean Hulot. (Consult a paper by Fongères, translated by J. W. Simpson for the 1908 exhibit of the Royal Institute of British Architects, *R. I. B. A. Journal*, 3d series, vol. xv. No. 4.)

The Romans, like the Greeks, laid out cities on the rectangular plan, also taking advantage of natural features; but whereas the Greeks were ever ready to modify or abandon the regularity of their plans, in order to use hillsides or rocky eminences to give grandeur and emphasis to their public buildings, the Romans often went to great labor and expense to level the sites of their cities. (Consult Anderson and Spiers, *The Architecture of Greece and Rome.*) The plan of the typical Roman city followed the lines of the Roman military camp, with two main thoroughfares at right angles to each other, and with a forum at or near the centre. An English example of this type is the old walled town of Chester. An interesting American copy of a Roman camp is the Dutch stockaded settlement of Bergen, N. J., laid out in 1660 and now the Bergen square section of Jersey City. (Consult *Engineering News*, Feb. 8, 1912, for history and for comparative plans of Roman camp and property around Bergen Square; Vitruvius, *De Architectura*, bk. ii, chap. iv, for Roman and Greek ideas of laying out a city.)

Although it is commonly believed that the mediæval towns of Europe were almost invariably irregular in plan, Triggs states that such cities as were really planned de novo in the Middle Ages were more regular than most modern towns. In the thirteenth century 50 towns were laid out in as many years by the English in Aquitaine and Guienne. Where practicable, these were laid out on a definite rectangular system, with wide, medium, and narrow streets and a large central market place with a church at one of its corners. "The most perfect example of these English towns of Edward I," says Triggs, "is Montpazier, founded in 1284 in Aquitaine; while the best example of the sort in England is Winchester, which was founded by Edward I on a new site."

The Renaissance led Italian towns in the sixteenth century to straighten and widen their streets and lay out public places. Rome was rebuilt at this time. The movement extended to France. Bernard Palissy wrote a treatise on town planning in which he urged that the streets be laid out squarely and regularly. In Germany, also under the influence of the Renaissance, the irregular city development of the Gothic period began to give way to more regular street plans. Notable examples are Mannheim and Karlsruhe. In the former the streets are mostly rectangular with a few diagonal and one which forms a part of a ring; in the latter, founded in 1715, the streets radiate from the castle of the founder. In Scotland the newer portion of Edinburgh, dating about 1768, affords a fine example of systematic and impressive city planning.

Among the lost opportunities of replanning a poorly planned or no-planned city, London takes the lead chronologically. After the fire of 1666 the great architect, Sir Christopher Wren, laid out a new city plan for London which has aroused the admiration of city planners ever since. A combined radial and rectangular street plan, with St. Paul's Cathedral as the main focal point, was proposed. The plan was sanctioned by Parliament, but the opposition of merchants and others anxious to rebuild immediately and opposed to the delays and troubles of reparceling the land, prevented the execution

of this plan. Somewhat like this was the experience of San Francisco after the earthquake and fire of 1906. The eminent architect and leader of American city planners, D. H. Burnham, had reported on a city plan just before the catastrophe occurred, but in rebuilding the city his plan was almost wholly ignored. In like manner Baltimore after its great fire of 1904 made but slight use of the opportunity this afforded to rebuild the city on a better plan. Considerably earlier the same lack of foresight was shown by Boston after the fire of 1872.

Philadelphia, founded in 1682 by William Penn, was laid out on the rectangular plan, with a large open space at the intersection of the two broad central streets and four smaller squares in each of the quarters of the city. From that day to this the rectangular plan has been followed so generally in the United States, where any considerable area has been laid out in advance of building operations, that it has become known abroad as the American or checkerboard plan. In a city of any size the result of this plan is an unspeakably dreary monotony. A notable American example of city planning, but one which unfortunately had no great influence upon subsequent city building for over a century, is the city of Washington. The national capital was planned in 1791 by Pierre Charles L'Enfant (q.v.), under the direction of George Washington and after a study of the plans of many European cities. The base plan of Washington is rectangular, but superimposed upon it is a network of diagonal streets, with numerous parks, open spaces, and commanding sites for Federal buildings. The main focal point is of course the Capitol. In grandeur of conception and in fitness of both general plan and detail, the layout of Washington was worthy of the capital of a future great nation. With such an example before it, it might have been expected that the commission which laid out the northward extension of New York City in 1807 would have avoided the rigid checkerboard plan, unrelieved by any break except that afforded by the already located Broadway. It is said that Thomas Jefferson, who also had a hand in the planning of Washington, favored a purely rectangular street system, and it is suggested that Washington was largely responsible for the radial streets, since he was familiar with the city of Annapolis, Md., laid out on a limited scale after Wren's plan for rebuilding London, and also that, when Washington was a young surveyor, he laid out a small town near Connellsville, Pa., with radiating streets. To L'Enfant is credited the plan of the radial avenues of Buffalo.

A bold reconstruction of the plan of Paris, under the direction of Georges Eugène Haussmann, Prefect of the Seine, and after the design of M. Dechamps, architect, was carried out in 1852–70. It made use of diagonal streets and a great central parked and monumented way to open up ample means of communication through a crowded and haphazard network of streets; at the same time supplying noble vistas, closed with notable public buildings and historic monuments. A large part of the success of this great scheme, and of its continuance from its inception to the present time, is due to the creation and perpetuation of a city-planning or art commission.

Berlin, since 1862, has also followed a systematic street-plan scheme. Some of the larger Italian cities have had similar commissions for a number of decades.

RECENT CITY PLANNING TO 1913

Germany. The examples of city planning which have been mentioned thus far were isolated and sporadic and followed no well-defined and generally accepted principles. It is to the scientific and artistic spirit of the Germans, stimulated by the national and municipal growth of the last few decades of the nineteenth century, that we are indebted for the beginnings of the modern art of city planning. As early as 1876 Prof. R. Baumeister of Karlsruhe wrote a book on the planning of suburbs (*Stadteerweiterungen*), and this was followed by many other books by the same author on various phases of city planning. A great impetus was given to the movement by *Der Städtebau*, a small book first published in 1889 from the pen of Camillo Sitte, of Vienna, emphasizing the æsthetic side of city planning. About the same time appeared the larger and more comprehensive *Der Städtebau* by J. Steuben, city architect of Cologne. In 1904 there was established, by Theodor Gaecke and Camillo Sitte, an important German monthly, *Der Städtebau*. According to Unwin, the Germans followed the geometrical system until 1889. Since then, influenced in part by Sitte, they have been in danger of going too far with the irregular and picturesque. Unwin mentions Cologne as an example of the transition planning and Nuremberg, a town plan for which was completed in 1907, as one of the most beautiful of German cities. It is important to note that Sitte's studies of mediæval towns led him to conclude that their irregularity was a matter of well-considered design rather than of chance.

England. In England city planning (or town planning, as it is called) was given the serious attention of the Seventh International Congress of Architects, London, 1906. In 1909 Parliament passed the Housing and Town Planning Act, which gives local authorities broad city-planning powers, subject to control by the Local Government Board. Many local authorities have proceeded under this act, chiefly in laying out vacant or scantily populated areas. The garden city movement, or small-town and suburban development for wage earners and other people of small means, has also made marked progress in England in the last few years. Notable examples are at Bourneville, Port Sunlight, and Hampstead Garden Suburb. The *Town Planning Review* (Department of Civic Design, School of Architecture, University of Liverpool) was started in 1910 and is a valuable quarterly exponent of British and foreign ideas and practice.

United States. The inspiration for the recent city-planning movement in the United States came largely from the World's Columbian Exposition of 1893. The well-ordered disposition of buildings, land and water spaces, monuments and other features of accentuation and adornment of the "White City," made an impression upon the minds of visitors which rapidly bore fruit. Its conception, as a whole, and some of its greater parts, were due to the late Daniel H. Burnham. The awakening caused by the World's Columbian Exposition, and subsequent European visits of American architects and students of municipal problems, led to the

presentation of many papers on various phases of city planning before such societies as the American Institute of Architects. In 1900 that body listened to a number of papers on *Future Grouping of Government Buildings and Park Treatment of Washington.* The interest thus awakened led to the appointment of a Federal commission on the plan of Washington, which pointed out how largely the L'Enfant plan had been ignored for many decades and recommended that the main outlines of the plan be followed in the future. Congress subsequently authorized a number of public buildings and other improvements in accordance with the revived and revised plan. The commission was headed by D. H. Burnham, and included F. L. Olmsted, Jr., and Charles F. McKim, with whom there was soon associated Augustus Saint-Gaudens.

All this discussion and its fruition at Washington added materially to the interest in city planning the country over. Various civic organizations and more rarely cities themselves have engaged landscape architects or engineers to prepare reports. Up to the close of 1913 such reports had been made for perhaps 100 cities and towns of the United States. These reports ranged from plans affecting the general layout of the whole city to suggestions for grouping public buildings at civic centers. At the close of 1913 but little had been done to carry out the recommendations made in the several reports. Perhaps the greatest progress was on the Cleveland civic-center group and mall, a plan for which was proposed by a commission some years before, of which D. H. Burnham was chairman. The most elaborate plans, both as to scope and method of presentation, were those worked out for Chicago in 1906 to 1908 by D. H. Burnham and Edward H. Bennett, under the direction of the Commercial Club of that city and published in 1909. Some progress in accordance with these plans had been made in 1913.

In 1907 the City Plan Commission of Hartford, Conn., was created. Somewhat similar official bodies were subsequently created in Milwaukee, Chicago, Detroit, Jersey City, Newark, St. Louis, Cleveland, Pittsburgh, Philadelphia, Cincinnati, and in smaller cities. In May, 1913, there were reported 18 city-plan commissions, with many more to follow under mandatory legislation in Massachusetts and permissive legislation in Pennsylvania and New York. A Massachusetts Act of 1913 directs all cities and all towns of 10,000 population and upward (of which there are many) to create city-planning boards. In the same year New York cities and villages and Pennsylvania cities of the third class were authorized to appoint planning commissions.

Canada. In 1913 city-planning commissions existed in Calgary, Winnipeg, Regina, Edmonton, Saskatoon, and Lethbridge, and the Province of Alberta passed a Town Planning Act in 1913. The same year Calgary and Victoria called a British expert to their aid, and St. John, N. B., was engaged in wholesale modernization work.

Prince Rupert, British Columbia, described by the *Review of Reviews* (April, 1910) as a city made to order by a railway, was laid out by the Grand Trunk Pacific Railway as its western terminus. The town covers 2000 acres of hilly land at the head of a bay some 14 miles long. The site was chosen because of its excellence for a deep-water harbor on the Pacific coast. In "The Real Prince Rupert" (*Architectural Record,* July, 1913) the population was given as 4000, and it was stated that large sums of money must be expended before the city can attain the standard set by other cities in the Canadian Northwest. Prince Rupert, however, has the advantage of a definite plan to follow, which can be said of but few cities.

Australia. The Australian Commonwealth received competitive plans for a new capital in 1912, to be built on an unoccupied site in Yass-Canberra, New South Wales, in a federal district 900 square miles in area. The first prize, £1750, or nearly $8500, was awarded to Walter Burley Griffin, architect and landscape architect of Chicago, Ill. Subsequently all the designs presented were referred to a departmental commission which decided to take the best features of each and combine them into a new plan. Both this procedure and the result were severely criticized. In 1913 Mr. Griffin was invited to go to Australia to assist in further deliberations over the plans for the new capital, and early in 1914 it was announced that the government had adopted his own modification of his original premiated design. Later, it appears that Mr. Griffin's connection with the work was terminated, due to what he regarded as departmental interference with his control over the project.

Other Countries. Besides the countries mentioned, other parts of the world are taking a part in the city-planning movement. To mention only two cities: Dalny, a seaport terminal for the trans-Siberian railway, has been built on a combined rectangular and radial plan. Delhi is being replanned as the new capital of India.

CITY PLANNING AND ZONING SINCE 1913

The outbreak of the war in the middle of 1914 brought a sudden check to city-planning activities in England and on the continent of Europe. In the United States this check did not come until several years later and its effect there was not so much upon city-planning activities as upon the execution of expensive street widening and extensions and other public improvements. Even before the war was over city and town planning for the devastated regions of France and Belgium was taken up with great activity and this has continued since. The British Parliament in 1919 made important amendments or supplements to its notable Housing and Town Planning Act of 1909. Many of these were designed to meet the great housing shortage, but others were intended to give municipalities broader planning authority than they had possessed under the 1909 Act, besides requiring them to enter upon certain projects which before had been left to their option. In 1919, also, France enacted its first city-planning law (see *The American City,* November, 1919). This law provided that within three years of the time it became effective, city-planning schemes must be in force, in accordance with a statutory schedule that includes various public services and amenities. The mandate applies to every city of 10,000 population and over, all communes in the Department of the Seine, and all cities with populations of 5000 to 10,000 which show growth of 10 per cent in population between two successive quinquennial censuses. Provision is made for a French national planning commission and for departmental (district) advisory commissions. Planning projects are re-

viewed in succession by several authorities, and when finally approved each plan is declared to be a public utility. In Canada model town planning legislation designed for adoption by the several provinces was framed by the town-planning division of the Dominion Conservation Commission. By 1921 all or nearly all the Canadian provinces had passed city-planning acts applying to their municipalities and some of them had created departments to supervise the work done under the act. Early in 1922 more than thirty American State Legislatures had enacted laws having to do with some phase of city planning. By 1922 the majority of the 100 largest cities of the country had done some city-planning work and well toward 100 cities and towns had placed the matter in charge of planning commissions or of the engineering or some other branch of the city government. Immediately after the entrance of the United States into the war in 1917, engineers, architects and other city planners were pressed into service in connection with the laying out of the several cantonments. Later on, to provide housing facilities for men and women engaged in various war supply activities, the United States Housing Corporation was formed under the United States Department of Labor, with a town-planning division headed by F. L. Olmsted, a landscape architect and city planner of Brookline, Mass. The Emergency Fleet Corporation had a division of housing and transportation. Under these two federal agencies a considerable number of industrial town planning and housing schemes were carried out in accordance with the most approved modern ideas. In 1921, under Secretary Hoover of the Department of Commerce, a division of building and housing was created for purposes of investigation and advice. Zoning work was also undertaken under Secretary Hoover. In India the first city-planning legislation is the Bombay Province Town-Planning Act of 1915, under which within four years ten town-planning schemes have already been presented to the authorities.

Work Executed. At present except for the occasional creation de novo of industrial towns and garden cities and the frequent laying out of additions to old cities and towns most of the city-planning work done throughout the world is in the nature of replanning. Most of the expenditure for replanning has been for widening streets and opening up main thoroughfares or arterial highways. St. Louis, Cleveland, and various other cities through their planning commissions have made extensive studies of their need for wider and more continuous streets, along both radial or diagonal and also circumferential lines, and as a result major street plans have been adopted or proposed. In Chicago, during the ten years 1909–20, twelve major city-planning improvements, some of which were for main thoroughfares, were promoted by the City-Planning Commission and got under way. The estimated cost of these improvements totals $230,000,000. Included in this sum is bonds to the amount of $61,500,000 voted by the people, $8,000,000 of special assessments on property directly benefited, $162,000,000 to be provided by various railways for electrification, terminal and related improvements. In England and Scotland main thoroughfares or arterial roads designed for the double purpose of improving the city plan and for giving unemployment relief were being carried out in Birmingham, Bradford, Bristol, Dundee, Glasgow, Leeds, Liverpool, Norwich, Portsmouth (see *Town Planning Review*, July and December, 1921).

Education and Publicity. A number of universities offer more or less extensive courses in city planning, including the School of Landscape Architecture of Harvard, the University of Illinois, the universities of California and of Southern California. In 1921 short courses in city planning were given at Sacramento, San Francisco, and Los Angeles by the Extension Division of the University of California, with the coöperation of the California Real Estate Association. In recent years the realtors have coöperated in many other ways than the one just indicated in the city-planning movement.

Regional Planning. An extension of city planning to include two or more municipalities in one project, has been extensively advocated, but as yet has not been adopted on any large scale — except for the joint construction by groups of municipalities—of a single class of improvement, like water-works, sewers, or parks. Metropolitan and county park districts come more within the ordinary conception of regional planning than do the other classes of improvement just mentioned. The Metropolitan Park District for Boston and vicinity was a leader in this respect in the nineties and was subsequently followed by the work of the Essex County Park Commission and other like commissions in New Jersey.

Zoning. Intelligent city planning, as well as the best economy in the construction and operation of the various public works that enter into a city plan, requires a knowledge of the kinds of buildings, the purposes to which they are devoted, their height and the percentage of the area of the lots upon which they are built. In fact, it is highly desirable that all these things should be known in advance of the making of a city plan, but in the older cities the best must be made of existing conditions which have arisen in most cases without any intelligent planning whatever. To provide for the future, restrictions as to the use and height of buildings and the area of the lots built upon began to be adopted in the United States in 1916, and have become more and more common as the years have passed. Indeed, they have been the first and chief city-planning activity in many cities, particularly during the war and post-war periods when funds for the execution of city-planning work involving heavy expenditures were not readily obtainable. Zoning requires comparatively little expense, being almost wholly a matter of close study of existing and probable future conditions of city populations and industries by districts and the adoption of zoning plans and ordinances. Legal authority for zoning is based on the police power. Early in 1922 some fifty cities and towns in the United States had adopted zoning plans and probably more than a hundred had plans in progress. States that have specifically authorized their municipalities to take up zoning numbered twenty-two. The pioneer work in zoning was done by New York City (as stated more in detail below), but Neenah, Wis., is credited as having adopted a zoning ordinance before New York City, in 1915. The general scheme of the zoning plan is to divide the city into two or more each of the following districts: *Use* to which the buildings in a district may be put; *height* to which they may be carried in relation

generally to street width, but often with specific limitation except for fires in towers; the percentage of *area* of the lot which may be built upon, with which is associated limitations as to width of side yards and depth of front and rear yards.

New York City adopted zoning regulations on July 25, 1916, which became effective immediately. They were the results of three years of study by two special bodies; (1) A Heights of Buildings Commission which made a 295-page report in 1914 covering the subject both locally and generally, and (2) a Commission on Building Districts and Restrictions, Edward M. Bassett, chairman, created in 1914. The second commission made a report in June, 1916, that included the zoning regulations officially adopted the next month. These regulations were based on block-to-block studies of the entire city and were made the subject of public hearings in various parts of the city before their submission to the Board of Estimate. The New York *use districts* include residence, business and unrestricted areas. In the residence districts, new buildings for business or manufacturing purposes are permitted. In the business districts, manufacturing (except certain unobjectionable types) is prohibited, but residences may be built. *Height* of buildings is governed chiefly by street widths, but there are variations in different parts of the city. The general relation between heights of buildings and street widths is 2½ times in the financial district, twice in Central Manhattan, 1½ in the rest of Manhattan, and in some small areas elsewhere down to building heights equal to street widths. These limits are materially modified by permitting towers covering not more than one-fourth of a lot to be carried to any height and by allowing setbacks for parts of the area. *Area* limitations vary from permitting 100 per cent of the lot to be built on in warehouse districts down through other grades for various uses until in villa residential sections a house may occupy only 30 per cent of the lot and must be well separated from other houses on at least one side. The administration of the New York zoning regulations is vested in specified officers, whose rulings may be taken to a Board of Appeals. The New York zoning regulations have been upheld by the New York State Court of Appeals.

Other Cities. Other and smaller cities have followed largely the general principles involved in the New York City zoning scheme, but naturally with many variations. Some of the cities go into rather minute sub-divisions of the use, height and area districts. For instance, in an almost wholly residential suburb of a large city, great stress may be laid upon the protection of residence sections from encroachments of business and particularly of manufacturing and the residence districts may sometimes be many in number. A zoning ordinance adopted in 1921 by *Montclair, N. J.*, establishes eight use zones, of which six are for residences, one for business, and one is an industrial zone. The six residence zones are classified as villa, suburban, two-family detached houses, two-family semi-detached, and apartment house districts Nos. 1 and 2. By combining with the use restrictions limitations as to height of buildings, percentage of lot area built upon, front, rear and side yards, sizes of courts if any, the Montclair ordinance aims to control the number of families per acre that may be housed in the various residence districts.

Civic Centers. The grouping of public buildings has been one of the chief concerns of American city planners, and perhaps affords, next after street widenings and extensions, the largest number of notable instances of the execution or partial execution of city plans in this country. Cities that have led in this respect have been *Washington* and *Cleveland* (already mentioned), *San Francisco* and *Denver*. At *Springfield, Mass.*, the "municipal group" includes a campanile flanked on either side by a city hall and auditorium.

Bibliography. Consult the *New International Year Book* 1912 to date, for further details of the modern city-planning movement and articles on leading American and foreign cities in this ENCYCLOPÆDIA, as well as the various travelers' guidebooks, atlases, etc., and the books cited below for plan of cities. For some 600 titles, consult *Select List of Works Relating to City Planning and Allied Subjects*, prepared by the New York Public Library for the City Planning Exhibit held in New York City in 1913. This list includes earlier bibliographies, periodicals, general works, American and foreign, city and town planning reports, garden cities, parks, water supply, sanitation, etc. AMERICAN books are: Robinson, *The Improvement of Towns and Cities* (New York, 1901); Robinson, *Modern Civic Art* (New York, 1903, illus. ed., 1904); Nolen, *Replanning Small Cities* (New York, 1912); Wacker's *Manual of the Plan of Chicago, especially designed for Study in the Schools of Chicago* (Chicago, 1912). Particularly valuable from an economic viewpoint and for its many typical city-street plans is Hurd's *Principles of City Land Values* (New York, 1905); from another viewpoint see chapters 2, 8, and 9 of Weber, *The Growth of Cities in the Nineteenth Century* (New York, 1899). BRITISH: Triggs, *Town Planning, Past, Present and Possible* (London, 1909); Unwin, *Town Planning in Theory and Practice* (London, 1911); Mawson, *Civic Art* (London, 1912); Bentley and Taylor, *Housing, Town Planning, etc., Act, 1909* (text and exposition of the British Town Planning Act, London, 1911). GERMAN: Baumeister, *Stadterweiterungen* (Berlin, 1876); Sitte, *Der Städtebau nach seinen kunsterlischen Wundsatzen* (Vienna, 1889); Steuben, *Der Städtebau* (Darmstadt, 1890). Some of the new reference works since 1913 are: Koester, *Modern City Planning and Maintenance* (New York, 1914); Shurtleff and Olmsted, *Carrying Out the City Plan* (New York, 1914); Julian, *An Introduction to Town Planning* (London, 1914); Geddes, *Cities in Evolution* (London, 1915); Nolen, *City Planning* (New York, 1914); Lewis, *The Planning of a Modern City* (New York, 1916) from the engineering viewpoint; Robinson, *City Planning* (New York, 1916); Burnap, *Parks* (Philadelphia, 1916); Lyle, *Parks and Park Engineering* (New York, 1916); Adams, *Rural Planning and Development* (Ottawa, Canada, 1917); Bird, *Town Planning for Small Communities* (New York, 1919); Evans, *Town Improvement* (New York, 1919); *Garden Cities and Back to the Land* (London, 1919); Moody's, *What of the City* (dealing largely with the Chicago Plan) (Chicago, 1919); Knowles, *Industrial Housing* (New York, 1920), is largely on town planning: The London Society's, *London of the Future* (London, 1921); and Miss Kimball's "Review of City Plan-

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CITY POINT. A village in Prince George Co., Va., 10 miles northeast of Petersburg, on the James River and on the Norfolk and Western Railroad (Map: Virginia, G 4). It has a gunpowder plant and is of considerable historical interest. Here, in 1864, General Grant made his headquarters, and in his subsequent operations the city was used by the Federal army as its principal landing place and depot for supplies. One mile from the village a national cemetery is situated. Pop., 1914 (est.), 400.

CITY POLITIQUES, pŏl'ĭ-tēks'. A satirical comedy, probably printed for the first time in 1683, and produced at the King's Theatre, London, the same year. It is a sharp attack on the contemporary Whig faction, especially on Oates, in the character of Dr. Pauchy. Only the King's protection kept it from being suppressed by the victims of the satire. Some authorities place the date of publication as early as 1675.

CITY RAMBLE, THE; or, THE PLAYHOUSE WEDDING. A play by Elkanah Settle, printed in London in 1711 and produced at the Drury Lane Theatre, Aug. 17, 1711. It is partly founded on Beaumont and Fletcher's *Knight of the Burning Pestle* and *The Coxcomb*.

CITY WIT, THE; or, THE WOMAN WEARS THE BREECHES. A comedy by Richard Brome (q.v.).

CIUDAD BOLÍVAR, sē'o͞o-dädh' bō-lē'vär (Sp., city of Bolívar). The capital of the State of Bolívar, Venezuela, on the right bank of the Orinoco, about 240 miles from its mouth (Map: Venezuela, E 2). It is situated at a narrow point of the river, only 185 feet above sea level, and is well built, having spacious, handsome buildings. Of these the more notable are the palace of the governor, the college, the market, the cathedral, and the theatre. There are several fine monuments in the plazas Bolívar and Guzmán Blanco and in the cemetery. The city is the seat of a bishop. Owing to its position on the Orinoco, Ciudad Bolívar is an important commercial centre, and although certain restrictions have somewhat hurt its trade it long ranked as fourth among the large ports of Venezuela. Its chief export is coffee; but rubber, cattle, hides, sugar, and asphalt also are exported in considerable quantities. Population, 11,686. Ciudad Bolívar was founded in 1764 as San Tomás de la Nueva Guayana, but because of its location at a narrow part of the river it was known as Angostura until 1819, when the Congress met which, under the inspiration of Simón Bolívar, formed the new Republic of Colombia out of the states of Venezuela and New Granada. Since then the city has borne his name.

CIUDAD DE LAS CASAS, dä läs kä'säs. See SAN CRISTÓBAL DE LOS LLANOS.

CIUDAD DE LOS REYES, dä lōs rā'yās (Sp., city of the kings). The name given by Pizarro to the present city of Lima, Peru, when he founded it, in 1535, on the banks of the river called, by the Quichuan (Peruvian) Indians, "Rimac," which became first "Limac" and finally "Lima."

CIUDADELA, thē'o͞o-dä-dā'lä (Sp., little city, dim. of *ciudad*, city). A seaport town of the Spanish island of Minorca, situated on the west coast. Pop., 1887, 8447; 1900, 8645; 1910, 9369.

CIUDAD GUZMÁN, go͞os-män'. A city of Mexico, in the southern part of the State of Jalisco, 60 miles northeast of Colima. In 1891 it had a population of 23,025, but that number declined to 17,596 in 1900.

CIUDAD JUÁREZ, hwä'räs (Sp., city of Juarez). A city in the State of Chihuahua, Mexico, on the Rio Grande, opposite El Paso, Tex., and on the Mexican Central Railroad (Map: Mexico, F 2). It is situated at an altitude of 3800 feet above sea level, in a fertile district, devoted to agriculture, stock raising, and fruit and vine cultivation. The city has a Mexican army post, customhouse, and a statue of Juárez. It is the residence of a United States Consul. Ciudad Juárez was formerly known as El Paso del Norte. Pop., about 7000.

CIUDAD PORFÍRIO DIAZ, pôr-fē'rē-ō dē'äs. A town in the State of Coahuila, Mexico, on the Rio Grande, opposite Eagle Pass, Tex., and on the Mexican International Railroad (Map: Mexico, H 3). It is the Mexican terminus of the international bridge across the Rio Grande, and has a Mexican army post and a customhouse. It is the residence of a United States Consul. The town is the centre of an agricultural, stock-raising, and fruit-growing region, and carries on an extensive international trade. Coal is found in the vicinity. Ciudad Porfírio Diaz was founded in 1849, and derives its present name from the former President of the Republic. The town was formerly called Piedras Negras. Pop., about 5000 (est. of 1900).

CIUDAD REAL, thē'o͞o-dädh' rā-äl' (Sp., royal city). A town of Spain, capital of the province of the same name, in New Castile, situated in a fertile plain between the rivers Guadiana and Jabalón, about 100 miles south of Madrid (Map: Spain, D 3). It is surrounded by walls, is the seat of a bishopric, and has some notable edifices, including the municipal building, the parish church of Santa María del Prado—a massive Gothic structure, with a fine interior—and several monasteries and hospitals. There are manufactures of coarse woolens, linen, olive oil, flour, leather, etc.; also a trade in the agricultural produce of the district, which is engaged in raising stock, particularly mules, and bulls for the ring. An annual fair is held. Pop., 1900, 15,327; 1910, 16,372.

Ciudad Real was founded by Alphonso X, after the middle of the thirteenth century, as a fortress against the Moors, and soon attained considerable importance from the privileges granted by its founder. In 1809 the town was the scene of a Spanish defeat by the French, under Sebastiani.

CIUDAD RODRIGO, rō-drē'gō (Sp., city of Rodrigo). A fortified town of Spain, in the Province of Salamanca, near the Portuguese frontier (Map: Spain, B 2). It is situated on

an elevation above the river Agueda, which is here crossed by a fine bridge, and has a cathedral of considerable architectural interest, the earliest portion of which dates from the close of the twelfth century, three Roman columns, and remains of an aqueduct. The city was founded in the twelfth century by Count Rodrigo González, whence its name. The manufactures include soap, leather, linen, woolens, etc. The town is the seat of a bishop. Pop., in 1900, 8007.

In the War of the Spanish Succession, Ciudad Rodrigo was taken by the English in 1706, and recaptured by the French in the following year. During the Peninsular War it was captured by the French under Marshal Ney in July, 1810; but in January, 1812, it was retaken by the British, under Wellington, who thereby won his titles of Earl of Wellington in the peerage of Great Britain, Duque de Ciudad Rodrigo and Grande de España (First Class) in the peerage of Spain, and Marquéz de Torres Vedras in the peerage of Portugal.

CIUDAD VICTORIA, thē'o͞o-däd' vīk-tō'rē-ä (Sp., city of victory). The capital of the State of Tamaulipas, Mexico, 160 miles southeast of Monterey (Map: Mexico, J 6). It is finely situated on the east slope of the great plateau and is the centre of a sugar-growing district. It is the see of a bishop and the residence of a United States consular agent. Ciudad Victoria dates from 1750, under the name of Santa María del Refugio de Aguayo, and not until 1825 was its present name adopted. Pop., 1900, 10,086.

CIV'ET (Fr. *civette*, from MGk. *ζαπέτιον*, *zapetion*, from Ar. *zabad*, *zubad*, civet, from Pers. *zadab*, froth of water). A genus (*Viverra*) of carnivores of the Old World family Viverridæ, connecting the cats with the hyenas, and having the body elongated in some of the species as much as in the weasel tribe; the head is also long and the muzzle sharp. The ears are short, broad, and rounded. The feet have five toes, and the claws are only semi-retractile. There is a more or less conspicuous erectile mane along the back, as in hyenas. Near the sexual organs, in both sexes, there is a large double pouch, in which is secreted an odoriferous, fatty substance, called "civet," much used in compounding perfumes. There are several species of civet, of which the best known is the common or African civet (*Viverra civetta*) of northern Africa, from 2 to 3 feet long, brownish gray, with numerous black bands and spots. The civet preys on birds, small quadrupeds, and reptiles, and is regarded as a benefactor along the Nile on account of its appetite for crocodile's eggs. It is very commonly kept in confinement for the sake of its perfume, which is removed from the bag about twice a week by means of a small spatula and is obtained most abundantly from the male, especially after he has been irritated. A dram is a large quantity to obtain at a time. After being cleaned of hairs, washed, and dried, civet is ready for the market, and is worth from $10 to $12 an ounce, if pure. About 20,000 ounces are imported into London annually, and this represents a large part of the total product. The civets kept for the purpose of providing perfume are fed on raw flesh; the young partly on farinaceous food. The principal source of supply of commercial civet is northern Africa, especially Abyssinia. Several other species of civet occur in southeastern Asia and in the East Indies, all handsomely striped or spotted. The linsang and the binturong are most prominent among these. The American civet cat is the cacomistle (q.v.). Compare ICHNEUMON; MUNGOOS.

Fossil remains of the genus *Viverra* have been found in those deposits of the Tertiary era that lie above the Middle Eocene. They show no considerable variation from their modern descendants. The remains of other extinct allied genera from the Tertiary show interesting relations between the early members of the family Viverridæ and the hyenas. See VIVERRIDÆ.

CIVETTA. See CHEVECHE.

CIVIALE, sē'vē-äl' JEAN (1792–1867). A French surgeon, born at Thiézac, Cantal. He is remembered for his discovery (1826) of the operation of "lithotrity" for the removal of stone from the bladder without the loss of blood. For this he was awarded a prize of 6000 francs by the Academy. Sir Henry Thompson (q.v.) was one of his pupils and followers. Civiale's important writings are all on operation for stone and on diseases of the genito-urinary organs.

CIVIC ASSOCIATION, AMERICAN. An organization founded in 1904, for the "cultivation of higher ideals of civic life and beauty in America, the promotion of city, town, and neighborhood improvement, the preservation and development of landscape, and the advancement of outdoor art." The association carries on its work on national lines by its varied activities for the physical improvement and development of the communities. It has directed special attention to the importance and comprehension of city planning, and such other activities as the creation, development, and maintenance of parks and boulevards, the wise planting of trees, the elimination of the smoke, billboard, and housefly nuisances, and the organization of adults and children into working groups for civic improvement. During 1913 a group of members of the association visited European countries for the purpose of studying civic advance and the methods adopted in these countries for efficient administration. One of the most important movements undertaken by the society was the protection of the scenic beauty of Niagara Falls. The association has also led in the movement for the protection of national parks. The president in 1914 was J. Horace McFarland. Its headquarters are in Washington, D. C.

CIV'IC CROWN (Lat. *corona civica*). One of the most highly valued honors that a Roman could obtain. It was given for saving the life of a citizen in battle, provided that in so doing the rescuer slew the opponent and maintained the ground on which the fight had taken place. It was voted by the Senate to the Emperor Augustus as *servator civium*. It was merely a wreath of oak leaves, with pendant acorns. The one to whom it was given had the right to wear it always. When he appeared at the games, all rose to do him honor, and he was entitled to a seat next to the senators; he was also excused from all troublesome duties and services, with the same immunities for his father and his father's father.

CIVIDALE DEL FRIULI, chē'vē-dä'lā dĕl frē-o͞o'lē (probably from ML. **civitalis*, from *civitas*, town). A city in the northeastern part of Italy, in the Province of Udine, near the Austrian border, about 10 miles east by north of the city of that name, with which it is connected by rail (Map: Italy, H 1). The Natisone, which flows through the city, is crossed

by a fifteenth-century bridge. There are many relics of the eighth and tenth centuries, and the cathedral, which is of the fifteenth century, contains many valuable MSS. and art treasures. Cividale was for many years the residence of Lombard dukes. The modernized city has a military training college, and silk, cotton, and linen factories. Pop., 1901, 9061; 1911, 10,031.

CIVIL ACTION (Lat. *civilis*, from *civis*, citizen). Any judicial proceeding involving a controversy between individuals in regard to their private matters, distinguished from proceedings where public interests are concerned, as in a criminal prosecution. Civil actions include the procedure in a court of chancery or equity, and also those cases in which the state submits to an action instituted by an individual. See ACTION; PROSECUTION.

CIVIL ADMINISTRATION. In the most general sense, public administration—the conduct of the affairs of the state, or government, or of any subordinate division thereof. In a more restricted sense, the term is frequently employed to describe the management of the municipal or nonmilitary concerns of the state; and sometimes, more narrowly, as referring to the executive and judicial departments of the government, as distinguished from the legislative. See ADMINISTRATION; ADMINISTRATIVE LAW.

The principles and the methods of civil administration vary greatly, from the simplicity and flexibility of patriarchal government or other personal autocracy, to the rigidity of a modern bureaucratic system, like that of France and Russia, and the complexity of a highly developed political system, like that of Great Britain and the United States. There is a general similarity among modern civilized states in the organization and working of the central administration. The great departments of state—those having to do with foreign affairs, with the army and navy, with the collection and disbursement of national revenue, with commerce and industry, and with the post office—present no great diversity, either in functions or in organization. The chiefs of these departments are ministers of state, the principal and authorized advisers of the executive, or, as in Great Britain, constitute the real executive. (See CABINET.) Usually these chiefs are political and therefore temporary officers, who may come and go without greatly modifying the organization and methods of their departments. Their influence is great while it lasts, but is short-lived; the permanent policy of the administration, as well as its methods and *personnel*, being for the most part determined by permanent officials of great experience, known as undersecretaries, assistant secretaries, bureau chiefs, etc. As these permanent officials are the persons who really conduct the work of administration, so they are, in everything but the political sense of the term, responsible for the proper conduct of the affairs of their respective departments, and, being so, they are usually unfettered in the choice of their subordinates.

In other matters, however, especially in those of purely domestic concern—as the administration of justice; the maintenance of the public peace; the supervision and control of religion, of morals, and of public education; the levying and collection of taxes, direct and indirect; the conduct of elections, and the "internal affairs" generally of the community—there is as great diversity in the organization and methods of administration as there is in the political character and ideals of the several states. In those countries in which the feudal and monarchical tradition is strongest, whatever the form of the government may be, not only is the civil administration most highly centralized, but it is much further-reaching, more searching and obtrusive, than in those countries which have more completely emancipated themselves from that tradition. This is as true of republican France as of monarchical Germany and autocratic Russia. In the free governments, on the other hand —as in the United States, Great Britain and her self-governing colonies—not only is the administration decentralized, and left, as largely as possible, in the hands of local self-governing groups, but the general administration is rigidly confined to matters of general or national concern, and is not permitted to trench upon the local concerns of the subordinate political groups of the state. In these countries, accordingly, such matters as the building and repair of roads and bridges, and the maintenance of an adequate constabulary or police force, are dealt with by the borough, parish, town, or city, and not by the state; while, in the United States, even the matter of public education, which is conceded to be an affair of state, and is usually governed by State statutes, is, for the most part, turned over to the locality concerned—the city or school district— for administration.

While in no modern civilized state is the administration wholly centralized, or, on the other hand, wholly decentralized, the two systems are, in their principles and methods, if not in their actual embodiment in practice, so sharply discriminated as to call for a few words of comparison. Doubtless a centralized administration is capable of a much higher degree of efficiency than is attainable under the other system. For matters of great moment, requiring time for their maturing, and, when ripe, calling for prompt and decisive action, it is indispensable. No government would think of employing any other system in its military and international affairs. Then, too, it achieves a certain uniformity and regularity of action, and thus tends to strengthen the established government by giving its administration an impersonal effect of permanence and solidity. On the other hand, these very qualities of regularity and uniformity of action tend to harden into the inflexibility and routine of bureaucratic system, which, being lifted above public opinion and free from any effective criticism, crystallizes its abuses in the form of hallowed customs, and lends itself too easily to oppression.

The virtues of the system of decentralization are political rather than administrative. It is only under this system that a free government has free play for its varied activities and experiments. And, though its potential efficiency is not to be compared with that of the system of centralization, it has much to recommend it even from the purely administrative point of view. While not adapted to the regulation of international relations, or the carrying out of far-reaching measures of policy, its responsiveness to public opinion makes it an efficient agency for supervising and controlling the far more numerous and important private and local interests of the community. Being local and familiar, it is vigilant and sympathetic; and

though some of the affairs committed to it may be badly administered, it is probable that the sum total of its achievement is greater than that of a centralized administration, with its limited knowledge and its indifference to criticism.

The character of the public administration—whether efficient or inefficient, economical or wasteful, pure or corrupt—depends fundamentally on the conception of the proper aim and purpose of government which prevails. Extravagance and corruption, and, with them, the inefficiency they engender, flourish under any government, whether popular or autocratic in form, which is maintained for the benefit of the ruler, whether that be a king, an aristocracy, or a political party. And, on the other hand, the honest acceptance of the principle that government is instituted for the benefit of the governed tends to produce clean and efficient administration, whatever the external form of the state. It is doubtless to the persistence of the feudal conception of the state that we owe the long era of corrupt and, upon the whole, inefficient administration of public affairs which has marked the history of modern states. So long as the executive head of the state is at once the supreme landowner and the lord paramount, from whom all honor and protection are derived, so long will the offices of administration be regarded as his perquisites, and the treasure derived from taxation of the people be expended for the gratification of his ambitions and those of his favorites. He may, of his favor, or for his own purposes, grant a certain measure of efficient administration; but the extravagance and corruption which are inseparable from that system will destroy the efficiency of the government as well.

The profound modification of the theory of government effected by the democratic movement of the eighteenth and nineteenth centuries, in substituting the welfare of the people at large for that of the governing classes as the end and aim of government, has brought about a corresponding revolution in its administration. This change became apparent in England upon the accession of William of Orange to the throne in 1689, and in France a hundred years later, in the Revolution; but owing to the development of party government in the former country, and the excesses to which that system led, it did not become effective there until the middle of the last century. It is true that more than one administrative reform had been accomplished in Great Britain—as in the provision of Magna Charta, requiring all justices, constables, sheriffs, and bailiffs to have knowledge of the laws of the realm; the statute of Edward VI (1552) forbidding the sale of offices (except the higher judicial offices); and the extraordinary law enacted in the twelfth year of Richard II (1388), declaring that "none shall obtain office by suit, or for reward, but upon desert"; yet as late as the period of the American Revolution the "spoils system" of the distribution of public office as the reward of party service flourished unchecked. In the United States that vicious system did not come into existence until the administration of President Jackson, and it is only now giving place to the system prefigured in the statute of Richard II, above referred to. (See CIVIL-SERVICE REFORM; MERIT SYSTEM.) The more recent development of party government in France has lately fastened the spoils system on the administration of that country; but, upon the whole, in Europe as well as in America, civil administration has been enormously improved, in purity and economy as well as in efficiency, during the last hundred years; while in England and many of the English colonies, and in considerable portions of the administrative system of the United States, it has completely emancipated itself from the taint of corruption and extravagance. (See GOVERNMENT.) For a comparison of administrative systems and methods of controlling officers of administration, see Goodnow, *Comparative Administrative Law* (2 vols., New York, 1893). Consult also Goodnow, *Administrative Law of the United States* (New York, 1905), and Bryce, *The American Commonwealth* (London and New York, 1888, 1913).

CIVIL CHURCH LAW, AMERICAN. The body of law which defines the ecclesiastical function of the State, and maintains the civil status of the religious bodies within the United States. The status of the American churches is without a parallel in Christendom, in that in no other state do all organizations for the purposes of religion bear exactly the same legal relation to the civil authority. This body of law has been developing during the life of the American people as a nation, and has become one of the fundamental principles of their political philosophy. It is to be found (1) in provisions of the Federal and State constitutions; (2) in statute legislation; (3) in the decisions of the State and Federal courts, which now include about 1000 leading cases in these matters.

The Ecclesiastical Function of the American State. Although there is within the United States no church or churches by law established, yet the American State has an ecclesiastical function to perform. Formulated in its briefest terms, this ecclesiastical function is to cause it to be legally possible and also convenient for all residents, whether citizens, subjects, or aliens within the jurisdiction of the American governments, to sustain voluntary ecclesiastical relations. In other states it is regarded as a proper function of the civil power to provide for definite ecclesiastical relations; and the aggregate of those relations so specifically provided for is regarded as constituting an ecclesiastical establishment. In either case the civil power has an ecclesiastical function; but the difference in the two concepts is this, that the development of the individual's sphere of speech and action has in the American State completely included the sphere of speech and action for all purposes of religion, and has correspondingly altered the nature of the ecclesiastical function of the State, which, however, is none the less real because of such alteration. Such a function of the government is no mere philosophical abstraction, but is a working institution, which has been in successful operation for more than a century. It has been carried wherever there has been an expansion of American sovereignty, and has been made to meet new conditions among new peoples, and has been so applied as to maintain its principles intact, and has everywhere produced substantially the same civil status for the churches.

History of Civil Church Law. Like other successful systems, the separation of church and state, and the equal status of churches, were not planned in detail and put into operation, but developed gradually under the force of pub-

lic opinion. At the outbreak of the American Revolution the Colonies were divided ecclesiastically into three groups. In one group, consisting of New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia, the direct establishment of the communion of the Church of England was more or less complete in law. In the second group of Colonies, consisting of Massachusetts, New Hampshire, and Connecticut, the Congregational form of ecclesiastical organization, on the basis of the town and "poll" parish, was established in law and in fact. In the third group of Colonies, consisting of Rhode Island and Pennsylvania, no ecclesiastical establishments had been developed, either in law or in fact. As a result of political revolution, the direct establishments by royal authority were nullified in law. The indirect establishments in the New England commonwealths, built upon provincial legislation and local administration, remained undisturbed for some years. There remained, as survivals of the direct establishments, a number of incorporated parishes in New York and Virginia, and a few in other States; and, as remains of a still earlier establishment in New York, there were three or four incorporated Reformed Dutch churches that had received special protection by the Treaty of Breda, transferring the Province of New Netherlands to the British in 1667. During the Colonial period religious dissent had, with more or less vigor, resisted the legal church establishments, and especially the system of compulsory taxation for the support of the clergy; and the overthrow of British sovereignty brought its opportunity. A demand developed very generally, even in the New England commonwealths, but with stronger political backing in other sections, for a complete divorcement of political and church affairs. There is evidence that the conditions were such that the politicians could not disregard this demand. At the formation of the Federal government religious liberty was secured to the people of the United States, so far as the action of the Congress was concerned, by the provisions of Chapter III, Article 4, of the Constitution, and the First Amendment. Both of these provisions were limitations upon the powers of Congress only; and neither the original Constitution nor any of the early amendments undertook to protect the religious liberties of the people against the action of their respective State governments. Religious affairs were included within the sphere of domestic relations, and were so left to the States to deal with. There were then inserted in the early constitutions of the several States the guarantees of religious liberty generally in the forms that we are familiar with. The development of the local peculiarities in the ecclesiastical institutions of the several States and sections of the country continued without interruption. The Colonial legislatures had granted a few charters of incorporation to local churches, and this practice was continued for some years by the State legislatures. It was, however, abandoned in time, because of the objection made by the political minorities, that the granting of such particular charters was special legislation, secured by political influence. At this period the American churches were beginning to revive from the exhaustion caused by the war, and were becoming the legal and equitable owners of property. Legal means for securing property to pious and charitable uses were sorely needed. Hence, a demand arose in several of the Middle States for a uniform procedure by which the local organizations of all religious bodies could secure a corporate form, with full control of their property. To meet this demand there were enacted a series of general statutes, beginning with that of New York of April 6, 1784. An act of similar intent and of like provisions was passed, in 1793, by the State of New Jersey; and these two statutes became the models for similar laws in many of the Northern States. The provisions of these statutes were very meagre. No reference was made to particular ecclesiastical polities, except in the case of the Protestant Episcopal churches. The powers conferred upon the religious corporations so created were very limited, and nowhere were such corporations allowed to be self-perpetuating. Partiality to certain religious bodies was dreaded, and there was a very real fear that something might be done towards recreating an ecclesiastical establishment. The prevailing policy in legislation during the period extending through the third decade of the nineteenth century was based upon the idea that the civil power should treat all organizations alike, by doing as little as possible for any of them. The method of providing for the incorporation of religious societies by general statute has developed unequally in different sections of the country. As late as the year 1866, the States of Rhode Island, Virginia, and South Carolina had no such statute; and 30 years later, in 1896, a general statute of incorporation was still forbidden in the States of Virginia and West Virginia.

The third stage in the development of American civil church law has been the result of specializing legislation in two directions. One form has been the discrimination between religious organizations proper and other social, educational, and philanthropic organizations. The second form of specialization has consisted in supplementing the general provisions of the statutes with optional provisions for corporations of particular denominations and polities. Through these supplemental provisions there has been wrought into the statute law the recognition of purely ecclesiastical functionaries; and this is done most effectively by the creation of ecclesiastical corporations sole. This form of corporation is used by the Roman Catholic church, in which body in certain of the States archbishops and bishops are vested with the legal attributes of the corporation, with power to hold real and personal property and to sue and be sued. The Methodist Episcopal church also uses the ecclesiastical corporation sole. There has developed a marked legislative cordiality towards the churches. At the present time the policy is to treat all interests alike, by giving to each all that is asked. The early concept of religious organization in American law was naturally that of a simple and completely autonomous local society. To denominations whose type of polity corresponds to this concept the legislation of the general statute era was satisfactory. The special optional provisions have, therefore, been enacted as a rule for the benefit of churches having polities by which the local bodies sustain definite relations to some more general authority, such as synodical and episcopal churches. At the present time 25 distinct denominations have been thus specially legislated for. American religious corporations are not ecclesiastical corporations in

the sense of the English law, but are merely private corporations not for profit. The constituent elements of these corporations vary all the way from the total number of church members to the corporation sole; as, e.g., a presiding elder, bishop, or archbishop.

The Principles of Civil Church Law. In the course of the adjudication of the many causes that have arisen from ecclesiastical matters, the civil courts have developed the following as the basic principles of American civil church law: 1. All ecclesiastical relations are voluntary, both in their inception and continuation. 2. The freedom of action for the purposes of religion is guaranteed to every one by the organic law, and is limited by the same law by the civil rights of others, and by all that is necessary for the purpose and good order of the State and for the protection of public morals. 3. No civil right can, in the eyes of the law, be impaired by an ecclesiastical relation. 4. The law of the land is a part of the law of the churches. 5. No law of the churches, when it is found to be in conflict with the law of the land, has any validity. 6. The civil courts are open for the adjudication of ecclesiastical causes when civil rights are involved. 7. The civil courts, when they assume jurisdiction of a cause, will accept the decisions of ecclesiastical tribunals, if such tribunals act according to the church law, and do not exceed their jurisdiction. 8. The authority of the civil courts over all religious organizations is secured by the same means as in the case of private persons and secular organizations; judgments, decrees, and the issue of the writs of mandamus, information in the nature of quo warranto, prohibition, and injunction. 9. The principles of the law of charitable uses and of trusts, as modified by statute, are applied to property devoted to the purposes of religion. 10. The American clergyman, from the standpoint of the law, is a voluntary member of the association to which he belongs. The station is not forced upon him; he seeks it. He accepts it with all its consequences, and with all the rules and laws and canons then enacted or to be made by competent authority. Such laws cannot, in any event, endanger his life or liberty, impair any of his personal rights, deprive him of property acquired under the laws, or interfere with the free exercise and enjoyment of religious profession and worship; for these are protected by the constitutions and laws.

The results of American civil church law may be summed up in the language of the Supreme Court of the United States, in the case of Watson *vs.* Jones, 13 Wall. U. S., 639, as follows: "In this country, the full and free right to entertain any religious belief, to practice any religious principle, and to teach any religious doctrine, which does not violate the laws of morality and property, and which does not infringe personal rights, is conceded to all. The law knows no heresy, is committed to the support of no dogma, the establishment of no sect."

It is these principles of civil church law that are to govern in all the relations of the civil power and the churches beyond the confines of the United States—in the insular possessions of the Hawaiian Islands, Porto Rico, and the Philippines. Consult Tyler, *American Church Law;* Bayles, *Civil Church Law.*

CIVIL-DAMAGE ACTS. Statutes which have been passed in many of the United States, giving to those who sustain an actual injury by or through any intoxicated person, as a result of the intoxication, a right of action against the person who sold or gave away the liquor which caused the intoxication. In some States this liability has been extended to the owner of the premises where the liquor was dispensed; and it is immaterial whether the liquor business is lawful in the particular jurisdiction or not. While these statutes vary more or less in the different States, they generally provide for compensation for injuries to person or property of any one, and for loss of support by the wife or child of a drunkard. Exemplary or punitive damages are allowed in some cases, but actual injury must also be proved. Where one in any way helps to bring about the intoxication, he cannot recover.

These statutes have been held constitutional, being within the "police power" of the States under which the liquor traffic is regulated. See TEMPERANCE; POLICE POWER; PROHIBITION.

CIVIL DEATH (Lat. *mors civilis*). The status of a living person who is deprived by law of his legal and civil rights.

The term is of feudal origin, and was introduced into the English law after the Norman Conquest. At that time civil death was one of the consequences of conviction of treason, banishment from the realm, abjuration of the realm (by which a criminal escaped other punishment by leaving the country forever), conviction of felony, and the act of entering upon a monastic life as a monk or nun; and in all of these cases there was a total extinction of all civil rights, including loss of real and personal property, as if the person were physically dead. Treason, felony, and abjuration of the realm involved forfeiture of property to the crown as a penalty; but one taking monastic vows could make a will and appoint an executor to administer his estate.

In the United States, generally, civil death can occur only as the result of a sentence of imprisonment for life; but the doctrine is modified, so that there is only a partial extinction of the convict's rights, as in the New York statute providing that a sentence of life imprisonment shall operate as an absolute divorce of the felon from wife or husband; and in no case is his property forfeited to the State, as under the early law of England.

The English law has also been greatly modified by statutes and decisions. For an annotation on civil death in the United States, consult Davis *vs.* Laning, 18 Law. Rep. Annot., 82.

In some of the countries of Europe the ancient doctrine is still applied in cases of persons entering a monastic life. See ATTAINDER; FORFEITURE; OUTLAWRY.

CIVIL ENGINEER. See ENGINEER; ENGINEERING.

CIVILIAN. In a popular sense, a person whose pursuits are civil, i.e., neither military nor clerical. In a legal sense, the term may signify a person who is versed in the principles and rules in accordance with which civil rights may be vindicated in society generally, or in the particular state in which he belongs, or one who has made a special study of these rules and principles as exhibited in the laws and government of Rome (the Roman civil law). The civil law of Rome exercised such an influence upon the formation of the municipal systems of almost all the states of modern Europe that

those who devoted themselves to its study were regarded as "civil" or municipal lawyers par excellence. From the more learned training which this study demanded, civilian came often to be used as synonymous with professor or doctor of law, as opposed to practitioner of law, the former being generally more deeply versed in the Roman law than the latter; and this in its turn led to its being loosely applied to the great international lawyers of the seventeenth century (Grotius, Pufendorf, etc.). At present, in the United States, from having no class of persons who prosecute law as a *science* as opposed to an *art*, the term "civilian" has reverted to its narrower mediæval sense of student or teacher of the Roman civil law; and thus we speak of Savigny as a civilian, but not of Story.

CIVI'LIS, JULIUS (or CLAUDIUS). A chief of the Batavi, for 25 years connected with the army of Rome. Alienated by unjust treatment and by the execution of his brother, Julius Paulus, he headed an insurrection in Gaul in 69 A.D., but in 70 A.D. was subdued by an army under Cerealis. Having arranged with Cerealis a treaty advantageous to the Batavi, Civilis resumed friendly relations with Rome. Tacitus extols his patriotism and heroic acts.

CIV'ILIZA'TION. In general, the condition of more advanced peoples in contradistinction to those classed as barbaric and savage. See CULTURE.

CIVIL LAW. 1. The law applicable to the citizens (*cives*) of a particular state (*civitas*). The Romans used the term *jus civile* in this sense, distinguishing it from the law observed by all nations (*jus gentium*) and from the ideal law of nature (*jus naturale*). 2. The Romans also described their ordinary law, established by custom and by legislation, as their civil law, distinguishing it from the law introduced by the edicts of their magistrates very much as we distinguish common law from equity. 3. In the Middle Ages, civil law meant Roman law as set forth in the law books of Justinian, in distinction from the ecclesiastical or canon law. In England, at the same period, civil law meant Roman law as distinguished from English law. 4. Because the part of the Roman law which has most influenced European legal development is that part which deals with the ordinary relations of private persons, civil law has come, in modern European usage, to mean private law in general, without regard to its origin, as distinguished from public law. 5. In modern English usage, civil law includes and designates all the existing systems of private law that are in the main based on the Roman law. Civil law in this sense is a blend of Roman, Teutonic, ecclesiastical, and purely modern institutions and rules, fitted into a framework which is still substantially Roman. It prevails not only upon the continent of Europe and in the dependencies of the continental European states, but also in Scotland and in many parts of the world that were first colonized and civilized by the Portuguese, Spanish, Dutch, or French, and which to-day are independent (Central American and South American republics), or are under the rule of Great Britain (e.g., South Africa, some of the West Indian Islands, the Province of Quebec), or are now included in, or belong to, the United States (e.g., Louisiana, Porto Rico, and the Philippines). It is also finding its way, in some measure, into non-Christian portions of the world (e.g., Turkey and Japan).

HISTORY OF THE CIVIL LAW

I. *The Roman City Law* (*jus civile*), during the Royal period (down to about 500 B.C.), was largely religious in its character. The patricians had *"sacral,"* or religious, customs which controlled the public law of the city and regulated their own family relations. The so-called Royal Laws (*Leges Regiæ*), of which some fragments have been preserved, were obviously priestly formulations of these customs. The plebeians apparently had no share in this religious law, and they certainly had special forms of marriage and of testament. The customs regulating property and debt were the same for both orders and were secular in their character. The interpretation of all law, however, whether religious or secular, rested with patrician priests; and after the expulsion of the kings the enforcement of the law was in the hands of patrician magistrates. In consequence of plebeian complaints and agitation, the nonpolitical custom of the city was reduced to writing; and the Law of the Twelve Tables, thus drafted, was submitted to and accepted by the popular assembly (c.451–450 B.C.). This code, of which numerous fragments have come down to us, set forth simple rules suitable to an agricultural community, in a remarkably clear and terse fashion. It established equal law for both orders, except in the matter of marriage; and a few years later (c.445 B.C.) even this inequality was removed. This law was prized by the Romans as a charter of liberties, and they were reluctant to amend its provisions by legislation. The necessary development of the law was therefore obtained during the following three centuries by interpretation. For two centuries the priestly order remained the authoritative interpreters; but after 252 B.C., when a plebeian became *pontifex maximus*, the legal system lost its predominantly religious character. With the expansion of Rome, its law was extended over Latium; but the Roman city law was not applicable to the Italian allies (*socii*), unless expressly made so by treaty. The best reconstruction of the Royal Laws is that of Voigt; of the Twelve Tables, that of Dirksen and Schöll. Both may conveniently be consulted in Bruns, *Fontes Iuris Romani Antiqui, Leges et Negotia* (6th ed., Mommsen and Gradenwitz, editors, Leipzig, 1893).

II. *Roman Mediterranean Law* (*jus gentium*).—The extension of Roman rule over the Mediterranean basin compelled the Romans to work out a new system of law. The Roman city law was not, in theory, applicable to the provincials, since these were not citizens, but subjects; and it would have been ill suited to the needs of Mediterranean commerce. Between the years 250 and 150 B.C. the new law required was developed: (1) in the edict of the prætor of the foreigners (*prætor peregrinorum*), who administered justice in Rome in all controversies except those in which both parties were citizens; and (2) in the edicts of the provincial governors (proconsuls and proprætors). In matters of purely local interest (e.g., family relations and inheritance) the provincial edicts apparently preserved local usages; but in matters of commercial interest the provincial edicts were patterned after the edict of the foreign

prætor in Rome. A common law of property, of contracts, and of judicial procedure was thus established for the entire Mediterranean basin. The sources of this law, according to the Romans, were the usages of all the ancient peoples (*jus gentium*) and natural reason. During the last century of the Republic the rules of the new system were gradually made applicable to controversies between Roman citizens. This was accomplished in the edict of the city prætor. In this edict, moreover, the Roman law of inheritance was modified and made more equitable. Of the city edict in its final form, much has been preserved. The best reconstruction is that of Lenel, *Das Edictum Perpetuum* (Leipzig, 1883).

III. *Roman Imperial Law.*—At the close of the Republican period Roman citizenship had been extended throughout Italy. Under the Empire it was gradually extended through the provinces, until, early in the third century, Caracalla made all the free inhabitants of the Empire Roman citizens. With this change the city law of Rome became, in theory, the law of the Empire. The prætor of the foreigners and his edict disappeared, but the city edict and the provincial edicts remained in force. These, however, had ceased to develop; the city edict received its final revision in the reign of Hadrian (117–138 A.D.). During the first three centuries of the Empire the law was developed partly by legislation, proceeding from the Emperor and the Senate, partly by juristic interpretation. Legislation gradually effaced provincial diversities; interpretation fused the city law and the prætorian law into a harmonious system. In this period the leading jurists were drawn more directly than before into the administration of justice. Three of the most famous, Papinian, Paul, and Ulpian, were successively chief justices of the Roman Empire. The juristic literature of the late Republic and early Empire (100 B.C. to 250 A.D.) was very extensive and of the highest order of excellence. It consisted largely of the collection and criticism of recorded decisions (*responsa*) and the scientific formulation of the principles on which they were based; that is, it was substantially a progressive digesting of case law. Little of this literature has been preserved, except in the *Digest* of Justinian. Of the works which have survived—which may conveniently be consulted in Huschke, *Jurisprudentiæ Antejustinianeæ quæ supersunt* (5th ed., Leipzig, 1886)—the most important are the *Institutes* of Gaius and fragments of Paul's *Sentences* and Ulpian's *Rules*. (Gaius has been translated by Poste, Oxford, 1871, 3d ed., 1890; Gaius and Ulpian by Abdy and Walker, Cambridge, Eng., 1876, 3d ed., 1885; and by Muirhead, Edinburgh, 1880, 2d ed., 1895.)

IV. *Codification.*—After the middle of the third century the law was developed solely by Imperial constitutions, viz., decisions (*rescripta*) and enactments (*leges*). The first attempts at codification were systematic arrangements of these constitutions. Such were the *Codex Gregorianus* (about 295 A.D.) and a supplementary *Codex Hermogenianus*, published in the following century. These were private compilations. The first official revision of the Imperial laws was made under the direction of the Byzantine Emperor Theodosius II. The *Codex Theodosianus* was published 438 A.D., not only in Constantinople, but also, by arrangement with Valentinian III, in Rome. The greater part of this code has come down to us. The fullest edition is by Hänel (1842). Some additional fragments have been edited by Krüger (1880). Theodosius had entertained, but did not carry out, a broader plan, involving an official digest of the older law, as set forth in the juristic literature. This plan was taken up by the Byzantine Emperor Justinian, and carried out under the direction of his minister, Tribonian. The law books published by Justinian were: 1. *Institutes* (Nov. 21, 533 A.D.). This book, which sets forth the elements of the law, is based on the *Institutes* of Gaius. It was intended primarily for law students, but it was published with statutory force. 2. *Digest* or *Pandects* (Dec. 16, 533), a full exposition of the older law, civil and prætorian. It is composed of excerpts from the juristic literature of four centuries (c.100 B.C. to c.300 A.D.)—chiefly, however, from the literature produced between 150 A.D. and 250 A.D. The greater part of the excerpts seem to have been reproduced without change; but antiquated terms were replaced by those current in the sixth century, and in some cases the passages quoted were condensed or amplified. Like the literature from which it was compiled, the *Digest* is substantially a collection of case law. 3. *Codex* (April 7, 529; "second reading," Dec. 17, 534), a revised collection of Imperial constitutions, based on the earlier codes and replacing them. The language of these law books is Latin, although some passages in the *Digest* and many of the constitutions in the *Code* are in Greek. During the remaining years of his reign Justinian issued many new constitutions (*novellæ*), mostly in Greek; but of these no official compilation was made. The combination of these "Novels" with the other law books of Justinian, under the general title *Corpus Juris Civilis*, dates from the twelfth century. The best edition is that by Mommsen and Krüger. There are complete French and German translations of the *Corpus Juris*, but only the *Institutes* have been translated into English (Moyle's *Institutes*, 2d ed., 1890). For the history of Roman law to Justinian, the best English work is by Muirhead, *Historical Introduction to the Private Law of Rome* (2d ed., Edinburgh, 1899).

V. *Roman and Teutonic Law in the Middle Ages.*—The law books of Justinian remained in force in the Byzantine Empire until the end of the ninth century, when they were condensed into a single Greek code, the *Basilica*. This, in its turn, remained nominally in force until the capture of Constantinople, by the Turks, in 1453; but, in fact, briefer private compilations were more generally used. One of these, the *Hexabiblos*, made in Thessalonica (Saloniki) in 1345, had legal authority in Greece as late as the nineteenth century. In the Teutonic kingdoms established on the ruins of the Western Roman Empire, the conquered Romans continued to live (at least in their relations with one another) by the Roman law; and in some cases official compilations of Roman law (antedating those of Justinian) were made for their use. The most important of these was the *Lex Romana Visigothorum*, compiled at Aire, in Gascony, under the authority of Alaric II and published 506 A.D., and commonly known as the "Breviary of Alaric" (q.v.). It included Imperial constitutions, a condensation of the *Institutes* of Gaius, and passages from Paul's *Sentences*. Until the eleventh century it was the principal source

from which Roman law was drawn in western Europe. Even earlier, in the reign of Euric (466–84), the Visigoths had begun to reduce their own law to written form, and their example was followed by other Teutonic tribes. So came into existence the *Leges Barbarorum* (as they were termed afterward), written in Latin, and exhibiting more or less Roman influence. The most important of these are: The *Lex Antiqua* of the Visigoths, the law of the Burgundians (*Lex Gundobada*), and the law of the Salian Franks (*Lex Salica*), all dating from the close of the fifth century; the law of the Ripuarian Franks, dating from the close of the sixth century; and the law of the Longobards, compiled in the seventh century. In Spain Visigothic legislation developed, in the course of the seventh century, into an elaborate code, the *Lex Visigothorum* (later known as the *Forum Judicum* or *Fuero Juzgo*). It is a blend of Teutonic, Roman, and ecclesiastical law, and it bound Goths and Romans alike. In the eighth century this national development was arrested by the Moorish conquest of the Iberian Peninsula. In the Frankish Empire (which, in the course of the eighth century, came to include all Christian Europe, except Great Britain and Ireland and the Byzantine Empire) the system of the "personal statute" prevailed; each German tribe lived by its own law, and the people representing the Roman element in Gaul, Burgundy, and Italy lived by Roman law. Here also, as in Spain, new law (in this case European law) was in process of creation by Imperial legislation (*capitularies*) and the decisions of the Imperial courts; but in the ninth century this development also was arrested by the disruption of the Empire. In the new nations in process of formation the royal authority was too slight either to enforce the old Frankish laws or to develop new national law. With the gradual disappearance of racial distinctions the *Leges Barbarorum* became obsolete, and the "personal statute" was supplanted by local law, largely customary in character. In southern France and in central and southern Italy, where the Roman element was strongest, the local laws were mainly Roman; in Germany and in northern France they were mainly Teutonic; in northern Italy and in Spain, Roman and Teutonic rules were more equally blended; but each local system, in the absence of any appellate jurisdiction, developed independently. Across these local differences ran class distinctions; there were separate courts and different laws for the nobles, the peasants, and the townsmen. In most of these courts judgments were rendered by men familiar with the customs of their locality or their class (*scabini, échevins, Schöffen*), but without other legal training. The most important body of written law produced in this period (except the canon law) was a twelfth-century Lombard code of feudal law (*Libri Feudorum*), which obtained great authority throughout Europe. Many city laws, and not a few territorial and local customs, were also put into written form, usually by private persons. Among the more important are the so-called *Etablissements de St. Louis* (1272 or 1273), the *Grand Coutumier de Normandie* (1270–75), and the *Mirror of the Saxons* (*Sachsenspiegel*, about 1230).

VI. *Canon Law.*—Throughout the Middle Ages there existed still another set of courts—viz., the ecclesiastical courts—applying a law which was not local, but European, and which bound all Christians. From the ordinary judge (*judex ordinarius*), the bishop, or his surrogate, appeals ran to Rome, and the interpretation of the canon law was kept uniform by the decisions of the papal Curia. In the Pope and the General Council the Church possessed also effective legislative organs. Canon law profoundly affected the development of European law in many matters; in particular, it gave Europe a common law of marriage and of family relations and rational forms of judicial procedure. For the development of the ecclesiastical law as a whole, and for its codification, see CANON LAW.

VII. *Reception of the Law Books of Justinian.*—Till the eleventh century, the only texts of Roman law that were much used in western Europe were the "Breviary of Alaric" and similar scanty compilations. In the eleventh century, however, the law books of Justinian were studied and used in Lombardy, in southern France, and in Barcelona; and there was a regular law school in which the laws of Justinian were taught at Pavia. Early in the twelfth century a more thorough and minute study of these texts, particularly of the *Digest*, was inaugurated at Bologna by Irnerius; the canon law was taught with equal thoroughness; and by the close of the century the University of Bologna had 10,000 students, drawn from all parts of Europe. Before the end of the thirteenth century law schools were established in 12 other Italian cities. From Italy the systematic study of the civil and canon laws spread through Europe. In Italy the text of Justinian was "glossed"—i.e., furnished with a running marginal commentary; and in the thirteenth century one Accursius digested the glosses of his predecessors and produced what came to be recognized as the standard commentary. The revival of the study of the law books of Justinian was followed, in many parts of Europe, by the "reception" of these books as authoritative law. Where, as in Italy and southern France, Roman law of a sort was already in use, the substitution of fuller and better texts was a simple matter, and here the reception came early. In Germany and the Netherlands it came late; it was not completed until the beginning of the sixteenth century. The reception was facilitated, especially in Germany and Italy, by the theory of "continuous empire," which viewed the Roman emperors as legal predecessors of the mediæval kings and princes. The reception, further, was in part the result, and in part the cause, of a gradual change in the organization of the courts, judges learned in the civil and canon laws taking the place of the *scabini*, or lay judges. The fundamental cause, however, of the reception of ancient Roman law was the inadequacy of mediæval law. The revival of commerce, in the twelfth and following centuries, and the social changes which ensued, necessitated a more highly developed law. The first result of the revival of commerce was the reception, throughout Europe, of the ancient law merchant, which had survived in the eastern Mediterranean region; but this law was applicable only to traders, and its reception did not solve the problems that were raised by the increasing importance of personal property. Hence the subsequent reception of the entire Roman private law. In those parts of Europe where economic conditions changed more slowly and local customs longer remained adequate—e.g., in

Switzerland, in the Scandinavian kingdoms, and in Russia—the law books of Justinian were not received. These countries became civil-law countries later, partly through the influence of the universities, partly by borrowing or imitating French and German legislation. A second and negative cause of the reception was the inability of the mediæval state to work out the new law that was required. In those countries in which central legislative power existed, or in which appeals were running to a supreme court, the law books of Justinian were not received. They were not received in England, nor in northern France, nor in Aragon; and in Castile the Roman law, as taught in the universities, was received only indirectly, in the form of an independent Spanish code—viz., the law of the "Seven Parts" (*Las Siete Partidas*), prepared under the auspices of Alfonso X (1252–82). Even in those countries in which the Imperial Roman law was not received in gross there was, nevertheless, more or less reception in detail; that is, special institutions and rules were borrowed. Where the law books of Justinian were received, they were applied: (1) as modified by the canon law; (2) as interpreted by the Italian commentators; (3) as subsidiary law, not overriding, but only supplementing, local laws. The judges trained in the Roman law were, however, not friendly to local laws. They insisted that such laws must be proved to be in force; and where the local law was unwritten, it was not easy to convince them of its validity.

VIII. *Modern Codification.*—In Spain and in France the earlier modern codes were collections of provincial and local laws—viz., the laws (*fueros*) of the different Spanish provinces and cities and the revisions of the same, dating from the thirteenth century to the nineteenth; and the customs (*coutumes*) of the French provinces, published under royal authority in the fifteenth and following centuries. In Germany and in Italy the earlier modern codes were state codes—e.g., those of Bavaria (1756), Prussia (1794), Baden (a translation of the Code Napoléon, 1809), and Saxony (1863); and those of the Two Sicilies (1819), Parma (1820), Piedmont-Sardinia (1837), and Modena (1851).

The principal civil codes now in force in Europe are national codes. The oldest of these is the French Civil Code, commonly known as the Code Napoléon, promulgated in 1804. It is still in force in Belgium, and it has served as a model for much subsequent codification, especially in Latin countries. The Austrian Civil Code dates from 1811. The Italian Civil Code was published in 1865; the Spanish Civil Code, in 1888–89; both of these are based upon the French Code. The German Civil Code was published in 1896, and has been in force since 1900. All of these codes, except the Spanish, have supplanted the older provincial and state codes; indeed, the chief object with which they were framed was to create common national law. Nearly all of the smaller European states have civil codes. In Switzerland, where cantonal codes are still in force, there is already a federal code of obligations, and a general civil code is in preparation.

In America, French law has been codified in Lower Canada (now the Province of Quebec; Code of 1865) and in Louisiana (Code of 1808, amended 1824, and since from time to time revised). In nearly all the Spanish-American states the civil law has been codified, with the Code Napoléon as the chief model. The more important of these codes are those of Bolivia (1831), Peru (1851), Chile (1855), Uruguay (1868), Argentina (1869), Mexico (1870, revised 1884), Colombia (1873, revised 1887) Identical with the Chilean Code, or based upon it, are the codes of Nicaragua (1867), Guatemala (1882), Salvador, Honduras, Venezuela (1880), Costa Rica (1884), Ecuador (1890). The Argentine Code was adopted by Paraguay in 1889. The Spanish Civil Code of 1889 is in force in Cuba, Porto Rico, and the Philippines. To this list of civil-law codes should be added the new Civil Code of Japan (1898), since its provisions, except as regards the family, are largely drawn from modern European codes. A general history of European law is yet to be written, although there are good histories of the law of Germany, Italy, France, Spain, etc. Consult Savigny, *Geschichte des römischen Rechts im Mittelalter* (2d ed., Heidelberg, 1834–51), which is still the most important general work. There are special works on the reception of Roman law by Schmidt (Göttingen, 1868) and Modderman (Groningen, 1874). See Howe, *Studies in Civil Law* (Boston, 1905).

CIVIL LIST. An annual allowance granted to the sovereign and the members of the royal family in constitutional monarchies, where the Parliament has obtained control of the purse. In England, down to 1660, the entire expenses of government, civil and military, were defrayed out of what was called the "Royal Revenue." This revenue, which arose partly from crownlands and partly from other sources, remained for a long period after the Conquest at the disposal of the crown; and even after supplies were voted by Parliament, the specific mode of their expenditure continued to be free from parliamentary control. After the accession of William III a distinction was drawn between the military and naval expenditure, which was henceforth voted by Parliament annually, and the Civil List proper, which included the maintenance of the royal household, the salaries of the judges, ambassadors, and such great officers of state, and such miscellaneous disbursements as the secret-service money and pensions. The Civil List was fixed at £600,000. Under William IV all salaries were transferred from the Civil List to the National Budget, and the royal grant placed at £510,000. Upon the accession of Victoria, the hereditary revenues of the crown were consolidated with the national domains, in lieu of which the sovereign was allowed an annual stipend of £385,000, to be devoted solely to the support of the royal household and the honor and dignity of the crown. Under the Act of 1901 the Civil List of the King was fixed at £470,000. The Act also provided for an annuity of £20,000 for the Prince of Wales and £10,000 for the Princess of Wales; also £6000 to each of the three daughters of the King. Under Act of 1910 the Civil List of the reigning King was fixed at the same figure as that of his predecessor. The British monarch also enjoys the income from the Duchy of Lancaster, varying from £50,000 to £60,000 annually. Of the sum represented by the King's Civil List, £110,000 is appropriated to the privy purse of the King and Queen; £125,800 for salaries of the royal household, etc.; £193,000 for household expenses. In all the countries of continental Europe, with the exception of Russia and Turkey, the sovereign

and the members of the royal family are provided for by a civil list, generally in proportion to the value of the royal possessions which they may have ceded to the nation. The income of European monarchs ranges from £250,000 in the case of the King of Denmark to £800,000, which represents the allowance made the King of Prussia.

CIVIL PROCEDURE. Legal procedure—the process whereby legal rights are protected and enforced, and violations of private or public rights punished. As commonly employed in English and American law, however, the term "civil" refers to private as distinguished from public rights, and civil procedure would not include the processes of the tribunals in protecting the peace and vindicating the dignity of the state, i.e., criminal procedure. Neither does it cover any administrative process of the state, nor diplomatic or other action for the purpose of protecting the interests of citizens or subjects in foreign lands. See PROCEDURE; INTERNATIONAL LAW.

CIVIL RIGHTS. See RIGHTS, CIVIL.

CIVIL RIGHTS BILL. In American history, a bill passed by Congress in 1866, as one of the Reconstruction measures of that body, for the purpose of securing an equality of civil rights to all citizens of the United States, and particularly for the purpose of placing the freedmen in the South on an equal political footing with the whites. Its main provision was as follows: "All persons born in the United States and not subject to any foreign power, excluding Indians not taxed, are hereby declared to be citizens of the United States; and such citizens of every race and color, without regard to any previous condition of slavery or involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall have the same right, in every State and Territory of the United States, to make and enforce contracts, to sue, be parties, and give evidence, to inherit, purchase, lease, sell, hold, and convey real and personal property, and to the full and equal benefit of all laws and proceedings for the security of person and property, as is enjoyed by white citizens, and shall be subject to like punishment, pains, and penalties, and to none other, any law, statute, ordinance, regulation, or custom to the contrary notwithstanding." The other sections of the bill merely provided for the carrying out of this provision and fixed penalties for its infraction. The bill passed the Senate on February 2 by a vote of 33 to 12, and the House on March 13 by a vote of 111 to 38; was vetoed by President Johnson on March 27, and was passed over the veto by the Senate on April 6, and by the House on April 9. It was the subject of an animated debate both in and out of Congress, and the challenging of its constitutionality led to the passage and adoption of the Fourteenth Amendment. Another bill, of March 1, 1875, provided further for the rights of the blacks, prescribing that blacks should not be distinguished from whites by innkeepers, teachers or officers of schools, theatre managers, and common carriers; that Federal courts should have exclusive jurisdiction over infractions of the bill; and that negroes should not be excluded from juries. This law was declared unconstitutional in 1883 on the ground that it dealt with social and not civil rights. See RECONSTRUCTION.

CIVIL SERVICE. The civil service of a state is, properly speaking, the entire body of public officials charged with the duty of conducting its civil administration. As commonly employed, however, the term does not include members of the military and naval establishments, nor members of the legislative branch of the government; nor, generally, other elective officers. Indeed, in the popular connotation of the phrase, the direct representatives of the sovereignty, whether elective or appointive, are not usually included. Thus, neither the appointed members of the British cabinet nor the elected President of the United States would usually be described as civil servants; while there is no doubt that the Viceroy of India and the Civil Governor of the Philippine Islands, as well as the members of the President's cabinet, come under that designation. On the other hand, it is not usual to include within the description of the civil service mere laborers, though the method of their employment, their terms of office, and sometimes the nature of their duties, render it difficult to distinguish them from their coemployees of the state, who are undeniably within the common acceptation of the term.

The civil service of a modern civilized state is a very complex affair, consisting of a multitude of officers and civil servants of various grades, performing a great variety of highly differentiated functions, and grouped in various administrative departments. Some of the more important of these are modern additions to the functions of the state, while others are of great antiquity. Thus, the officers of the royal household in England, many of the officers of the courts of justice in Great Britain and the United States, can trace their offices back to the very beginnings of English history, while such great administrative departments as the post office, the British Board of Trade, the United States departments of agriculture, of commerce, and of labor, and the Interstate Commerce Commission are of recent origin. It is to the modern additions, especially to the institution of a postal service, that we owe the enormous increase in the number of public servants in the latter half of the nineteenth century. To this should be added, however, as contributing causes, the large increase in the number and size of cities in recent times, with the growing necessity for police protection, together with the assumption, by municipalities and by the state, of a variety of services and functions that were previously left to private enterprise; such as the cleaning of streets, the removal of waste, and the furnishing of a water supply in cities, and, in some countries, the building and management of telegraph lines, railways, and canals, and of irrigation works on a large scale, by the general government.

At the head of the British civil service stand the officers of the royal household, under several departments; then come the officers of the House of Lords and the House of Commons; then a vast number of offices or departments, of which the following are the more important: treasury, home office, foreign office, colonial office, India office, war office, admiralty, board of trade, post office, customs, inland revenue (including stamps, taxes, and excise), exchequer and audit office, office of woods and forests, office of works and buildings, Duchy of Lancaster, public-record office, local government board, education department, civil-service commission, registrar-general's office, stationery

office, ecclesiastical commission, charity commission, patent office, emigration office, Trinity House, herald's college, law and equity courts, ecclesiastical and admiralty courts, prisons department, British Museum, science and art department, diplomatic and consular corps. Several departments peculiar to Scotland and Ireland form distinct lists, not included in the above. The heads of most of the departments are political officers, changing with the ministry. Others, such as the head of the exchequer and audit department, or the commissioners of customs and of inland revenue, are permanent officials. Excluding the judicial offices, and a few departments where special knowledge is required, the civil service is open to the public generally, the principle of open competition being in force as regards most of the departments. See GREAT BRITAIN, *Government.*

The civil administration of the Federal government of the United States is confided to a body of upward of 300,000 officials. These are all included within the 10 general departments of the national government—the departments of state, justice, interior, war, navy, treasury, post office, agriculture, commerce, and labor—and Congress, though some of these contain a large number and variety of bureaus dealing with a great diversity of interests not logically related to the main business of the department. As examples of this incongruity, it is only necessary to mention the National Observatory, under the jurisdiction of the Navy Department, and the National Library, under that of Congress. The President is the great source of power in the American Federal system, all the officers of the government, excepting the Vice President, the members of the two Houses of Congress, and the employees of the latter, owing their offices to his appointment.

The curious identity of the governmental and administrative forms which have been adopted in the several States of the American Union is treated in the article UNITED STATES, section on *State Government.* The result of this identity is, of course, a great similarity in the civil service of the States. In most of the States the principal judicial officers and the heads of the great departments of administration, as well as the Governor and Lieutenant Governor, are chosen by popular vote. Generally, each elective officer has the power to name his own subordinates, the Governor's appointing power being limited to his own clerks and secretaries and to the officials of certain bureaus or commissions, which do not come under the jurisdiction of the constitutional departments of administration. The restricted character of the functions of the States in our Federal system has thus far furnished no occasion for an extensive civil service, and, accordingly, the number of persons employed in that service in the State governments is very small compared with the number employed in the Federal service. The establishment of a State constabulary, or police system, or the assumption by the Commonwealth of the ownership and operation of telegraphs, railroads, or other great industrial enterprises, would of course enormously increase the civil service of the State.

In the modern city, on the other hand, by reason of the great diversity and extent of the functions of municipal government in our day, the number of civil servants is very great and tends constantly to increase. Not only the purely governmental operations of a city government, as the maintenance of a police force and efficient local tribunals; not only its quasi-governmental functions, as the regulation and administration of a system of public instruction, the cleaning of streets, and the removal of waste; not only its gigantic business enterprises, as in supplying its citizens with water and gas, and the building and operation of bridges, systems of transportation, etc.; but also its administration of the property interests committed to its charge, as the docks, parks, streets, etc., call for a vast and complicated machinery of administration and an army of civil servants. American cities have generally reproduced, with great fidelity and uniformity, the type of municipal government brought over by our earliest city builders from England. The head of the administration is a mayor, elected by popular vote, and with him are usually chosen a treasurer, comptroller, or other financial officer, and sometimes other heads of departments. But generally the power of appointment vested in the mayor is a large one, and often it extends to the appointment of most if not all of the chiefs of the several administrative departments of the local government. See CITY; MUNICIPAL GOVERNMENT.

Local political divisions, such as counties, towns, parishes, and school districts, present a greater diversity of governmental form and administration; but in the United States the number of appointive officers in those divisions is small, and in a general view of the subject of civil service they do not call for special consideration.

The method of appointment to the public service and the tenure of the civil servant vary greatly in England, according to the historical character of the service; in the United States, according to the jurisdiction and the rank of the official. High officers of state are appointed in Great Britain by royal warrant; in the United States, by commission. In the former country the complexity of the service is great, many public officers deriving their status from long usage, and being attended with privileges and immunities of immemorial force. Many of them are for life, many have the personal quality associated with the feudal tenure of land, and some are hereditary. Indeed, by the common law of England, public office was a species of real property, held by a tenure, like land, and vesting in the incumbent an estate, either for life or in fee. Even as late as the middle of the eighteenth century, offices are enumerated by Blackstone in his classification of real property as one of the class of incorporeal hereditaments. (See OFFICE.) To-day, however, most of the positions in the public service in England and all offices in the United States are, in law, regarded as held in trust for the public benefit; and though an appointment to office usually vests in the incumbent a certain definite right to perform its duties and enjoy its emoluments, it no longer entitles him to make merchandise of it, to alienate it, or to transmit it to his heirs. All public offices in the United States being of comparatively recent origin and created by statute, there is much greater simplicity and uniformity in the mode of their creation and in the incidents of their tenure than in Great Britain. Comparatively few positions in the public service are held by a life tenure—the principal exceptions being high judicial positions in the Federal service and

in a few of the States. In many cases an office is held at the will of the appointing power, and by statute a large proportion of the positions in the Federal service are held by a four years' tenure. See TENURE-OF-OFFICE ACT.

The power of appointment to the public service, even when, as is usually the case, unrestricted in theory, may be practically limited by custom, by the despotism of political party control, or, as in the case of the President of the United States, by the operation of self-imposed rules. The British Parliament, and many of the United States, have enacted laws restricting the exercise of the power of appointments, and prescribing the qualifications for the civil service, and providing for an impartial method of selection among the candidates for office; and in several States these provisions have been embodied in the constitution. The object of these laws being to raise the moral tone and improve the efficiency of the civil service by eliminating, so far as possible, political motives for appointments, and by securing to the incumbents of public office independence of external control, whether personal or political, some form of the so-called "merit system" (q.v.) has generally been adopted. Similar boards exist in New York and in many other cities to govern appointments to municipal office. This system will be fully described under that title; but it may be noticed, here, that it is based on the principle of competitive examinations, conducted by a board of administrative officers known usually as "Civil-Service Commissioners." The results of the examinations and the rating of the candidates are reported by the Civil-Service Board to the appointing officer, who makes his selection from among the names so certified to him, as the law may direct.

The power of appointment being vested in the President of the United States by the Federal Constitution, it is not within the power of Congress to fetter his action by the enactment of similar laws. The merit system has, however, been extensively applied by the voluntary action of the President, most of the great departments of the government being now wholly or in large part under its operation.

In many of the States by law, and in some departments of the Federal administration by executive order, the independence of civil servants has been further secured by provisions restricting the power of removal from office, in many cases by providing for a definite tenure, and in others by requiring the removing officer to file his reasons for making the proposed removal, and to give the accused official an opportunity to be heard in his own defense. In still other cases, where the tenure is for life, or "during good behavior," the action of the removing officer may be reviewed by the courts, and the removed official reinstated if the grounds for the removal are deemed by the court to be insufficient. Generally, however, where the tenure is not permanent, the provisions above described operate solely as a check on hasty and inconsiderate action, and as securing to the civil servant reasonable notice and the consideration of his claims upon the office, and vest no power of review in the courts. It has been judicially determined that the civil-service rules promulgated by the President of the United States do not have the force of general law, and confer upon members of the service no right to invoke the aid of the courts to protect them against violation thereof. They are the President's law, and he alone can enforce them. The general effect of the adoption of the merit system and of the legislation last referred to has been most salutary. The evils at which these laws were aimed, and the history of the popular movement which resulted in their general adoption, will be found set forth in the article on CIVIL-SERVICE REFORM. See Ashley, *The American Federal State* (New York, 1902); Anson, *Law and Custom of the Constitution* (Oxford, 1892); Eaton, *Civil Service in Great Britain* (New York, 1880); Goodnow, *Comparative Administrative Law* (New York, 1893); Fairlie, *The National Administration of the United States* (New York, 1905); and the authorities referred to under CIVIL-SERVICE REFORM.

CIVIL-SERVICE REFORM. In the most general sense, the adoption, by legislation or executive action, of rules for improving the civil service of the state by prescribing the qualifications of candidates for public office, and for the good behavior of public servants and their independence of external control. Specifically, and as commonly employed in the United States, the expression refers to the movement of the last hundred years in Great Britain and the United States for the elimination from the public administration of the corrupting influences of party politics.

Owing to the power which has usually attended the possession of public office and the lack of any effective supervision or criticism, public administration has in all stages of political development been affected with corruption and inefficiency and extravagance. The various forms of autocratic government, which preceded the more popular governments of our day, furnished a peculiarly favorable soil for the growth of these evils. (See CIVIL ADMINISTRATION.) It was a disappointing result of the first effective appearance of government "by the people" in modern times, that it should not only have failed to correct these tendencies of the earlier régime, but should have intensified them and given them new and more enduring vitality. It is to the excessive and vicious development of the party system in its earlier stages that we owe this condition of affairs. Human nature is much the same under all forms of government; and it is, therefore, not to be wondered at that great party leaders, like Bolingbroke and Walpole, having great patronage at their command, should employ it to consolidate their power or that of their party. The "spoils system," as it is called in the United States, had its inception with the real beginning of popular government, in the reign of William III. William III was himself a great administrator, and his first efforts were directed to a reform in the public service. But the only permanent "reform" effected was the substitution of Parliament for the crown as the source of office and official corruption. At the accession of Anne in 1702 the party system had enveloped the whole civil service of Great Britain. All of the offices of state and all employments under them, from the highest to the meanest, were the assets of the party in power and were available for party purposes. The results of the system were in the highest degree demoralizing to the public administration and to the public spirit of the nation. As has been well said of this period in England, "the partisan system of appointments and promotions aggravated the evils of parlia-

mentary patronage, made administration costly and feeble, spread corruption from the departments to cities, boroughs, and elections, while it disgusted the better class of citizens, alarmed statesmen, and exasperated and debased all political contests." Matters grew steadily worse through the early part of George III's long reign, the efforts of Rockingham, Burke, Pitt, and other patriots to stay the tide of corrupt practices being neutralized by the stubborn resistance of the King. The tide turned, however, with the coming in of the second Rockingham ministry in 1782, and when George IV ascended the throne, in 1820, though the partisan system still existed, its worst abuses had been driven out by the growth of a better public sentiment. The great Reform movement which culminated in 1832 had no direct concern with administration and produced no immediate effect on the movement for administrative reform: but the "merit system" of selecting candidates for office was tried on a small scale as early as 1834 and slowly but steadily made its way. It was probably the demoralization of the Indian service which opened the eyes of British statesmen to the necessity for more sweeping methods of reform; and after securing the passage of the India Act of 1853, the government of Lord Aberdeen appointed a commission, consisting of Sir Stafford Northcote and Sir Charles Trevelyan, to make an inquiry into the condition of the public service and to suggest improvements therein. This commission having in the same year reported, recommending a uniform system of competitive examinations to test personal fitness for the public service, in 1855 such a system was established by the ministry of Lord Palmerston, through an order of the Queen in Council. This sweeping reform, which has proved to be as permanent as it has been salutary, was brought about by the wisdom and experience of the administration, in the face of a hostile majority in Parliament and an apathetic public opinion. The beneficial effects of the new system quickly became apparent, and in the extremely short space of four years had roused a strong public sentiment in its favor and won the unanimous support of Parliament, and in 1859 was fully legalized by statute. The last step in the reform of the British civil service was taken in 1870, when the competition, previously somewhat restricted, was thrown open by an order in Council to all persons of requisite age, health, and character.

The "spoils system" and its reform have had a shorter and a more recent history in the United States. It was instituted by President Jackson in 1829, as an incident of his bitter and proscriptive campaign for the presidency, at a time when it was already on the wane in Great Britain. The doctrine enunciated in the notorious declaration of Senator Marcy, that "to the victor belong the spoils of the enemy," rapidly became the accepted principle of political action in the United States, and represents a more thoroughgoing and vicious form of the system than ever existed in England. In England, as in the United States, office was the reward of party service; but the principle of the "clean sweep," whereby an incoming administration makes room for its supporters by the wholesale removal of the incumbents of the public service, was the exclusive possession of the American Republic. So well adapted did this principle prove itself to the American party system, that it spread rapidly from the national government to the several States until it permeated the entire public life of the country. So firmly did it become intrenched in the civic life of the American people, that it has been affectionately described and defended by its supporters as the "American system." Its essentially artificial character is evidenced by the fact that in the 40 years from the beginning of Washington's administration to that of Jackson, not a single subordinate officer of the government was removed without cause, while in Jackson's first term the number of such removals rose to thousands.

This was not accomplished without protest, however. The new principle was vigorously combated in the Senate of the United States by Clay, Webster, Calhoun, and other leaders—the first of whom denounced it as "a detestable system, drawn from the worst periods of the Roman Republic." But nothing availed to stay the tide, and for 40 years more no President raised his voice against the system or failed to act upon it. But the sentiment in favor of reform was slowly gathering force, and in 1867 it found its first effective expression in a report to the House of Representatives, made by Mr. Thomas A. Jenckes of Rhode Island, recommending the establishment of a merit system, based upon competitive examinations. A second report, recommending similar action, was made by Mr. Jenckes the next year, but it was not until 1871 that the growing force of public opinion compelled Congress to take action upon the subject. In that year a clause in the general appropriation bill authorized the President to prescribe rules for admission to the civil service and to appoint a commission for that purpose. President Grant thereupon appointed the first Civil-Service Commission, with George William Curtis as chairman, and in December of the same year the commission reported, recommending a set of rules and regulations. This report was adopted and the rules and regulations of the commission put into effect, and thus the first victory for Civil-Service Reform was won. These rules, with certain additions to them recommended by the commission in the spring of 1872, remained in force until the winter of 1875, when the growing opposition of the politicians induced Congress to withhold the annual appropriation for the working of the system, and the President yielded to party pressure and suspended the operation of the Civil-Service Rules.

The most memorable event in the long struggle for the reform of the civil service in the United States was the organization of the Civil-Service Reform Association in New York in May, 1877. This organization, and the National Civil-Service Reform League into which it developed, under the presidency of Mr. Curtis, instituted an active propaganda for the creation of a public sentiment in favor of the reform, and by its meetings and public addresses, and by the high and disinterested character of the men who were prominent in its work, powerfully stimulated the movement. After this the triumph of the reform was not long delayed. In January, 1883, the bill introduced by Senator Pendleton, of Ohio, which, in the language of the National Civil-Service Reform League, provided "a constitutional, practical, and effective measure for the remedy of the abuse known as the spoils system," was adopted by overwhelming majori-

ties of both Houses of Congress, and the "merit system" was an established fact. The Civil-Service Law, which went into effect in July, 1883, prohibited the vicious practice of levying assessments for partisan purposes upon members of the civil service of the government, authorized the appointment of a commission to frame rules and regulations for the civil service, and empowered the President, from time to time, to determine by executive order what classes of the public services should come under the operation of such rules. In the same year a similar bill, applying the same principles to the civil service of the State of New York, was passed by the Legislature and became a law, and in the following year the system was extended by statute to the 23 incorporated cities of that State. In 1884, also, the new system was adopted in Massachusetts. The reform of the civil service was now secure, but still far from complete. The President (Arthur), who had himself, as a New York politician, been a devoted adherent of the old system, nevertheless administered the new one faithfully; but it was deemed expedient to proceed slowly in its application, and only 14,000 employees of the government were at first brought within the "classified service." It must be said that the high tide of public feeling which resulted in these sweeping victories for the movement has never been reached again, and that the active hostility of party leaders has greatly retarded its progress. The new system has made gains; it has been adopted in whole or in part in a few more States, and it has been extended by executive order of the President to classes of public servants not previously affected by it, but in many of the United States the political "machine" has been strong enough to maintain the old system unimpaired, and in many others there is a complete absence of popular feeling on the subject. In other words, the political development of the American people has not yet reached the point, attained by the English electorate a generation ago, of recognizing the supreme importance of clean and efficient administration to the welfare of the State. Much of the progress of the past 30 years has been due to the cautious initiative of enlightened presidents, especially of Cleveland, Harrison, and Roosevelt, the last of whom has long been known as a devoted friend of the reform movement, and, as Civil-Service Commissioner under President Harrison, did much to commend the new system to the American people. President Taft, at the close of his administration, transferred the fourth-class postmasterships to the classified service; an act accepted by the administration of President Wilson with the qualification that all persons in that service, not appointed originally under a merit system, should be required to establish their right to their positions through competitive examinations. The nature of the "merit system" and its operation will be described under that title. The character of the partisan system will be found discussed in the article on the SPOILS SYSTEM. See also CIVIL SERVICE; and consult: Eaton, *Civil Service in Great Britain: A History of Abuses and Reforms and their Bearing upon American Politics* (New York, 1880); George William Curtis, *Orations and Addresses*, vol. ii (New York, 1894); Theodore Roosevelt, *American Ideals*, part ii (New York, 1900); Bain, *Practical Essays* (London); Clarke, *Civil-Service Law* (3d ed., New York, 1897); Fish, *The Civil Service and the Patronage* (New York, 1905); and the reports of the American Civil-Service Reform Association; *Annual Reports of the United States Civil-Service Commission* (Washington, 1884–).

CIVIL WAR IN AMERICA. The conflict between the Northern and Southern States of the Union, in 1861–65, ostensibly and immediately occasioned by disagreement between the two sections on the subject of the control of slavery, but perhaps not less the result of long-standing differences in political and economic theories. The public agitation of the Abolitionists; the nomination of antislavery candidates for the presidency, at each election, from 1840; the introduction in Congress of the "Wilmot Proviso" (q.v.) in 1846; the passage of the Fugitive Slave Law in 1850, and the incidents connected with its enforcement; the repeal of the Missouri Compromise in 1854; the "Dred Scott" case (q.v.) in the United States Supreme Court in 1857; the adoption of the Lecompton Constitution for Kansas in 1858; the John Brown raid at Harper's Ferry in 1859—served to force slavery into conspicuous notice as the leading political issue, to accentuate the irreconcilable divergence of beliefs relative thereto, and to intensify the bitterness which rendered a peaceful settlement of the problem still more difficult. The projection into politics of a sectional issue served to divide the only party that still retained a following both North and South—the Democratic—and to bring about the nomination of four presidential candidates in 1860; Stephen A. Douglas, of Illinois, and John C. Breckenridge, of Kentucky, who were nominated by the two wings of the Democratic party; John Bell, of Tennessee, who was nominated by the so-called Constitutional Union party; and Abraham Lincoln, of Illinois, who was nominated by the Republican party. Abraham Lincoln was elected President, exclusively by the votes of the North; and the immediate effect of his election was to precipitate the secessionist movement. A State convention met at Charleston, December 17, and on the 20th passed an ordinance declaring that "the union now existing between South Carolina and other States, under the name of the United States of America, is hereby dissolved." This example was followed by acts, similarly phrased, passed by conventions of 10 other Southern States, in the following order: Mississippi, Jan. 9, 1861; Florida, January 10; Alabama, January 11; Georgia, January 19; Louisiana, January 26; Texas, February 1; Virginia, April 17; Arkansas, May 6; North Carolina, May 20; Tennessee, June 8. The States of Missouri, Maryland, and Kentucky were divided in sentiment on the question of secession, and in the ensuing war had representatives in the governments and armies of both sections. The western counties of Virginia remained loyal to the Union and separated themselves from the rest of the State. On Feb. 4, 1861, a Congress met at Montgomery, Ala., in which were represented all the States that had passed ordinances of secession previous to that date. This Congress adopted for the new organization a Provisional Federal Constitution, which was later ratified, and the title "Confederate States of America." Jefferson Davis, of Mississippi, was elected President, and Alexander H. Stephens, of Georgia, Vice President, of the new Confederacy. In the meantime the State forces of South Carolina had seized the

United States Customhouse, Post Office, and Arsenal in Charleston, and had taken possession of Forts Pinckney and Moultrie in the harbor of that city; Major Robert Anderson, in command of Fort Moultrie, with a force of only 128 men, many of whom were noncombatants, having withdrawn to Fort Sumter, which he considered more defensible. On April 12, 1861, hostilities began with the bombardment of Fort Sumter, which, after a brave defense, although several times set on fire by shells, was surrendered on the 14th by Major Anderson—the small garrison withdrawing with the honors of war. There were no casualties on either side. On the day following this event, President Lincoln issued a proclamation calling for 75,000 volunteers for three months; this was followed by a proclamation declaring the blockade of the Southern ports; and on May 3 a second call was issued for 64,000 men for the army and 18,000 for the navy, to serve "during the war." The United States regular army consisted, Jan. 1, 1861, of 16,402 officers and men; but these had been dispersed by John B. Floyd, Secretary of War under Buchanan, to distant parts of the country. Under his directions, also, quantities of arms and ammunition had been transferred from Northern to Southern arsenals during 1860; and the ships of the United States navy were mostly absent at foreign stations by direction of the Secretary of the Navy, Toucey. A very large proportion of the Southern army officers resigned and entered the Confederate service, though this course was by no means so general on the part of Southern officers in the navy. In the Southern States preparations for war were carried on with great energy. Gen. Robert E. Lee was appointed commander in chief of the Confederate forces in Virginia, their main body being concentrated at Manassas Junction. On June 10 a Union force was repulsed by the Confederates at Big Bethel, Va. (q.v.), and on July 21 was fought the first battle of Bull Run (q.v.), when the Confederates, under Generals Johnston and Beauregard, completely defeated the Federals, under General McDowell, and threatened the capital. This was the first important battle of the war, and its effect was to rouse both sides to what now promised to be a long and bloody struggle. Meanwhile General McClellan (q.v.) had succeeded in wresting the western portion of Virginia from the Confederates; and immediately after the disastrous defeat at Bull Run he was appointed commander in chief of the Army of the Potomac. His skill in organizing and disciplining large bodies of men, and making valuable soldiers out of raw and inexperienced recruits, doubtless qualified that army for the magnificent part it afterward took in the war.

The Congress of the United States met in extra session July 4, 1861, and, in response to the President's call, voted 500,000 men and $500,000,000. The Northern States, in their individual capacity, had before this time drawn upon their own resources in behalf of the Union cause—New York and Pennsylvania each voting $3,000,000 for the prosecution of the war; Massachusetts and other New England States sending regiments into the field fully armed and equipped; while in every city, town, and village volunteers were gathering and forming themselves into companies and regiments, to be afterward offered to the governors of the respective States, and through these officials to the country. The latter half of the year 1861 was devoted mainly to organization, and the engagements that occurred were generally without great importance. At the South the enlistment of 400,000 men was going on under a call from the Confederate Congress. The Confederates also had possession of the United States Arsenal at Harper's Ferry and of the Navy Yard at Norfolk, Va., where they had seized 2000 cannon and the steam frigate *Merrimac*, one of the finest in the United States navy. General Lyon succeeded in securing Missouri for the Union by a series of engagements, which terminated, however, in the defeat at Wilson's Creek (near Springfield), August 10, in which he fell. On October 21 the Confederates gained a success by almost annihilating the Federal force of 1500 to 1700 men which had been sent to Ball's Bluff (q.v.) on the Potomac and left there unsupported. Gen. U. S. Grant, after having seized Paducah, at the mouth of the Tennessee River, and another important strategic point at the mouth of the Cumberland, captured, on November 7, the Confederate camp at Belmont, Mo., though he was soon driven back by the Confederate General Pillow, acting under orders from General Polk. On the same date a United States naval force under Admiral Dupont captured Forts Walker and Beauregard at Port Royal, S. C. On the following day the Confederate commissioners, Mason and Slidell, were taken, by Captain Wilkes of the United States frigate *San Jacinto*, from the British mail steamer *Trent*, while on their way to their respective missions to England and France. Complications with England were averted by the prompt disavowal of Captain Wilkes's act by the United States government. The Federal force in the field in the beginning of 1862 was about 450,000 men; the Confederate force about 350,000. During January some successes were gained in Kentucky, at Prestonburg and Mill Springs, by the Federals, under Colonel Garfield and General Thomas. General Grant, aided by a naval force under Commodore Foote, captured Fort Henry, on the Tennessee River, February 6; and 10 days later General Grant attacked Fort Donelson, on the Cumberland, which surrendered with nearly 15,000 prisoners and 40 cannon. A naval expedition under General Burnside and Commodore Goldsborough captured Roanoke Island, Newbern, N. C., on February 8. On March 7–8 occurred the battle of Pea Ridge, in western Arkansas, in which the Federals under Gen. S. R. Curtis defeated the Confederates under Gen. Earl Van Dorn. On March 9 the Confederate ironclad *Virginia* (formerly the *Merrimac*), after having on the preceding day inflicted great loss on the wooden vessels of the Union squadron in Hampton Roads, was herself defeated in a remarkable naval engagement by the newly constructed *Monitor*, under Worden. In the West the Northern campaign was directed towards opening the Mississippi, and towards cutting the Memphis-Charleston railroad line. In the course of the southward movement for the latter purpose, General Grant fought the great two days' battle of Shiloh (or of Pittsburg Landing), on the Tennessee River, April 6–7. On the first day the attack of the Confederates, under Generals A. S. Johnston (who fell) and Beauregard, threatened the destruction of the Union force, but on the second day Grant, reënforced by Buell, drove the enemy from the field. In this theatre of the

war, at the close of the following month, the Federals, under Halleck, compelled the evacuation by Beauregard of the important strategic point of Corinth, Miss. On April 8 General Pope and Commodore Foote captured Island No. 10 (q.v.), in the Mississippi River. Fort Pulaski, near Savannah, Ga., was bombarded and captured by Major Gillmore, April 11; and at the close of this month New Orleans was captured by Farragut and occupied by Northern forces. The Army of the Potomac, which had devoted its time during the winter of 1861–62 to organization, moved early in the spring to the peninsula formed by the James and York rivers, and gained an equivocal success at Williamsburg, Va., May 5. The army then advanced up the peninsula to the Chickahominy, and won the battle of Fair Oaks (Seven Pines), on May 31–June 1, against Gen. Joseph E. Johnston, but the approach of "Stonewall" Jackson, with a force fresh from a victorious advance through the Shenandoah valley, to coöperate with Lee, made it necessary, in the judgment of McClellan, to effect a change of base to the James River; and this hazardous movement was accomplished at the expense of some of the hardest-fought engagements of the war, known collectively as the Seven Days' Battles —those of Oak Grove, June 25; Mechanicsville, June 26; Gaines's Mill, June 27; Savage's Station, June 29; Frazier's Farm, June 30; and Malvern Hill, July 1. In July, Halleck was appointed commander in chief of the Union armies, but he did not assume personal command. As a result of the peninsula movement and the "change of base," the advantage remained with the Confederates, who had successfully defeated the original plan for the capture of Richmond by this route. The scene of the Eastern campaign was thus again shifted to northern Virginia, and on August 29–30 occurred the second battle of Bull Run (q.v.), between the Federal forces commanded by Gen. John Pope and the Confederates under Lee, Jackson, and Longstreet. Pope was utterly defeated, and his broken and dispirited columns were driven back upon Washington. Lee now undertook the invasion of the Union territory, and crossed the Potomac into Maryland. McClellan encountered him successfully at South Mountain, September 14, and definitively checked his progress in the severe battle of Antietam, September 16–17, forcing him to retreat across the Potomac. Harper's Ferry, which had been evacuated by the Confederates in June, 1861, was recaptured by Stonewall Jackson (q.v.), Sept. 15, 1862, when 11,583 men and a great quantity of munitions of war fell into the hands of the Confederates. On September 22 President Lincoln issued a proclamation decreeing the emancipation on Jan. 1, 1863, of all slaves in the States which should till then continue in a state of rebellion. This was followed on January 1 by a proclamation definitively emancipating the slaves in the rebellious States. On Nov. 7, 1862, General McClellan was superseded in the command of the Army of the Potomac by General Burnside, against the wish of the latter, who was defeated disastrously at Fredericksburg, Va., December 13. (See FREDERICKSBURG.) On Jan. 26, 1863, General Burnside was relieved by General Hooker, who was defeated by Lee in a great battle at Chancellorsville (q.v.) on May 2–4. The death of Stonewall Jackson made the victory a dearly bought one for the Confederates. Lee followed up this success by invading Maryland again, and early in June entered Pennsylvania. On June 28 Hooker was relieved from the command of the Army of the Potomac by Gen. George G. Meade (q.v.), and the latter at once pursued the Confederates with such celerity and determination that Lee was forced to stop and give battle. The two armies met in the great battle of Gettysburg, which lasted July 1–3. General Reynolds was killed during the first day's fight, and on the last day General Hancock was dangerously wounded. The result of the three days' battle was a most complete Federal victory. Lee, having recrossed the Potomac, now retreated to a position on the Rapidan, and strategic movements on the part of the two armies, accompanied by occasional heavy skirmishing, occupied the time until winter. In the southwest, since the close of 1862, the main operations had centred about Vicksburg, converted by the Confederates into a great stronghold. After various attempts at its capture had failed, General Grant, by a series of brilliant strategic movements, succeeded in May, 1863, in closely investing the city, and on July 4, almost at the moment of the victory of Gettysburg, General Pemberton was forced by famine to surrender the place with his army of 30,000 men. The fall of Port Hudson, July 8, secured the complete control of the Mississippi by the Union forces and thus separated the two sections of the Confederacy. The struggle for the middle ground of Kentucky and Tennessee was marked by the battles of Perryville, Oct. 8, 1862, and of Murfreesboro, Dec. 31, 1862, and Jan. 2, 1863, with a result favorable to the Federals. On Sept. 9, 1863, General Rosecrans occupied Chattanooga. On September 19–20 he fought a bloody battle at Chickamauga and was defeated, the heroic stand made by General Thomas alone saving the Union army from destruction. This reverse was more than redeemed by the great victory of Grant over Bragg at Chattanooga (November 23–25—storming of Lookout Mountain, November 24, and of Missionary Ridge, November 25). This made it possible for Sherman to raise the siege of Knoxville, where General Burnside had been hard pressed by the Confederates under Longstreet. At the close of the year the Federal forces held Missouri, Arkansas, Kentucky, Tennessee, a large part of Louisiana, Mississippi, and Florida, and the Rio Grande frontier of Texas, and had control of the Mississippi River. A draft in the Northern States for 300,000 men, with an exemption clause, had added 50,000 men to the Federal armies.

In the early part of 1864 General Banks, assisted by Gen. A. J. Smith and a fleet under Admiral Porter, undertook an expedition up the Red River. A defeat at the hands of Generals Kirby Smith and Richard Taylor at Sabine Cross Roads, April 8, ruined the prospects of the expedition, which ended in complete failure.

General Grant was made lieutenant general and commander in chief in March, 1864. He turned over his command in the West and South to Sherman and took personal command of the armies of the East. A combined movement against the two remaining armies of the Confederates, those of Lee and Johnston, was now to be made under the personal direction of these two great generals. Sherman's army was in

SEAT OF OPERATIONS
during the
CIVIL WAR,
1861-1865.
SCALE
0 50 100 150 200
ENGLISH STATUTE MILES
M.-N. ENG.
Longitude
West
from
Greenwich
ATLANTIC OCEAN
GULF OF MEXICO
INDIANA TERRITORY
KANSAS TERRITORY
ILLINOIS
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSOURI
ARKANSAS
MISSISSIPPI
ALABAMA
GEORGIA
LOUISIANA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENN.
N. J.
MARYLAND
DELAWARE
Washington
Richmond
Raleigh
Columbia
Montgomery
Tallahassee
New Orleans
Springfield
Indianapolis
Nashville
Frankfort
Jefferson City
St. Louis
Little Rock
Jackson
Atlanta
Charleston
Wilmington
Cape Fear
Ft. Fisher
Ft. Sumter
Ft. Pulaski
Savannah
Hilton Head
Ft. McAllister
Brunswick
Jacksonville
St. Augustine
Pensacola
Mobile
Vicksburg
Natchez
Baton Rouge
Galveston
Ft. Jackson
Ft. St. Philip
Cape Hatteras
Cape Lookout
Cape May
C. Henlopen
Roanoke Is
New Inlet
Ft. Monroe
Norfolk
Harpers Ferry
Cumberland
Wheeling
Pittsburg
Cincinnati
Louisville
Memphis
Cairo
Chattanooga
Knoxville
Richmond
Petersburg
Lynchburg
Alexandria
Fredericksburg
Manassas
Winchester
Annapolis
Baltimore
Philadelphia
Camden
Lancaster
Harrisburg
Gettysburg
Wilmington
Dover
Bulls B.
Wingaw B.
Long Bay
Santee R.
Pamlico Sound
Albemarle Sd.
Currituck Sd.
Chesapeake Bay
Delaware Bay
Potomac R.
James R.
Roanoke R.
Tennessee R.
Cumberland R.
Ohio R.
Mississippi R.
Missouri R.
Red R.
Arkansas R.
Yazoo R.
Tombigbee R.
Alabama R.
Chattahoochee R.
Flint R.
Apalachicola R.
Suwannee R.
St. Johns R.
Pearl River
Pascagoula R.
Pearl R.
Neches R.
Trinity R.
Sabine Pass
Sabine City
Galveston
Caddo Lake
Marshall
Shreveport
Natchitoches
Jasper
Belgrade
Beaumont
Houston
Vinita
Humboldt
Parsons
Cartridge
Dug Spr.
Neosho
Cassville
Hollows
Fayetteville
Dover
Fort Smith
Perryville
Lebanon
Bentonville
Springfield
Marshfield
Wilsons Cr.
Poplar Bluff
Pocahontas
Smithville
Mt. Olive
Batesville
Scarcy
Brownsville
Mt. Vernon
Mound Cy.
Memphis
Ducrals Bluff
Clarendon
Grand Junc.
Corinth
Holly Sprs.
Iuka
Panola
Okolona
Hot Springs
Rockport
Arkadelphia
Paraclifta
Princeton
Napoleon
Hampton
De Witt
Lewisville
El Dorado
Columbia
Hamburg
Providence
Monroe
Vernon
Winfield
Columbia
Harrisonburg
Gran'd Gulf
Milan
Marksville
Ferry
Pt. Coupee
Pt. Hudson
Opelousas
Plaquemine
Donaldsonville
Vermillionville
Lafayette
New Orleans
Ft. Jackson
Ft. St. Philip
Pass at outre
Jackson
Meridian
Vicksburg
Natchez
Grenada
Columbus
Tuscaloosa
Elyton
Talladega
Weedo
Jasper
Decatur
Guntersville
Chickamauga
Resaca
Dalton
Rome
Kingston
Cleveland
Chattanooga
Spartanborg
Greenville
Yorkville
Belton
Newberry
Cokesbury
Chester
Chenaw
Winnsboro
Alston
Camden
Florence
Sumterville
Columbia
Blackville
Orangeburg
Branchville
Augusta
Millen
Beaufort
Ft. Moultrie
Charleston
Ft. Sumter
Ft. Royal Entrance
Hilton Head
Ft. Pulaski
Trbee Is.
Ft. McAllister
Darien
Savannah
Hawkinsville
Milledgeville
Macon
Fort Valley
Griffin
Covington
Newnan
Atlanta
Athens
Union Pt.
Augusta
Branchville
Millen
Beaufort
Ft. Moultrie
Ft. Sumter
Ft. Royal Entrance
Hilton Head
Ft. Pulaski
Trbee Is.
Ft. McAllister
Darien
Brunswick
Jacksonville
St. Augustine
Palatka
Gainesville
Cedar Keys
Baldwin
Fernandina
St. Marys
Magnolia
McDonald
Tallahassee
Thomasville
Quincy
Iola
St. Marks
Columbus
Cuthbert
Irwinville
Smithville
Andersonville
Sparta
Greenville
Selma
Montgomery
Wetumpka
Clinton
Gainesville

motion from Chattanooga by May 7, and forced General Johnston through Georgia as far as Atlanta, defeating the Confederates at almost every point in a series of vigorous engagements, including those at Dalton, Rome, and Resaca, though he met with a severe defeat at Kenesaw Mountain. General Hood, who now replaced General Johnston, made repeated but disastrous attacks upon Sherman's forces (July 20, 22, 28) and, after being beleaguered in Atlanta, evacuated the city, which was occupied by Sherman on September 2. In the meantime the Army of the Potomac, with General Meade in immediate command, had broken camp on the Rapidan and undertaken the tremendous campaign of the Wilderness, with the design of forcing the fighting straight to Richmond. During this campaign of 43 days, fully 130,000 men on the Federal side and about 70,000 men on the Confederate side, with constant reenforcements, were engaged almost continuously. On May 5–6 was fought the battle of the Wilderness, which was followed by the battles of Spottsylvania Courthouse, the sharp engagement on the North Anna, and the terrible repulse of the Federal army at Cold Harbor on June 3. Finally, on the night of June 12, the Army of the Potomac crossed the Chickahominy and took position on the south side of the James River. The design of this movement was to threaten Richmond by way of Petersburg; and, to thwart it, Lee at once threw a large portion of his army within the defenses of the latter city, which proved to be impregnable to assault, and only to be reduced by regular approaches and a skillful siege. The regular investment of Petersburg was begun on June 19. While this protracted siege was in progress, the Confederate General Early made a rapid movement across the Potomac, achieving a success on the Monocacy, July 9, and threatening Washington itself. He then withdrew into the Shenandoah valley, and engaged in a vigorous campaign against General Sheridan, which ended, after a defeat near Winchester on September 19, in General Early's utter rout at Cedar Creek October 19. On June 19 the *Kearsarge* ended the destructive career of the Confederate cruiser *Alabama*, by sinking her off Cherbourg, France. In the month of August Admiral Farragut forced his way into Mobile Bay and defeated the Confederate squadron. General Sherman set out from Atlanta on his famous "March to the Sea" on November 15, carrying his compact army of 60,000 men through the heart of Georgia, and occupied Savannah on December 21, after carrying Fort McAllister by assault on the 13th. While Sherman was thus successful, General Hood had invaded Tennessee, driving the Federal forces before him. His movement ended in the battle of Nashville, December 15–16, where his army was destroyed by General Thomas. Thus at the close of the year the Federal forces were in possession of a large portion of the South, and Sherman was in a position to have the coöperation of the navy, and thus to move northward securely, so that he and Grant might hold between their two armies the weakened forces of both Lee and Johnston. In 1864 Abraham Lincoln was renominated by the Republicans, and General McClellan was nominated by the Democrats, who put forth a platform declaring the war a failure. Twenty-five States took part in this election; the electoral vote was 233, of which Lincoln received 212; the popular vote of Lincoln and Andrew Johnson, of Tennessee, was 2,223,035, and that of McClellan and Pendleton 1,811,714. During the latter part of December and January, General Sherman had remained in Savannah, resting his troops; but on Feb. 1, 1865, he again took the field. Marching through South Carolina, he took possession of Columbia on February 17, and on the following day Charleston, which had been besieged since 1863, was occupied by the Federals. Sherman now pushed on into North Carolina, where, on January 15, Fort Fisher, near Wilmington, had been captured, and where now two other Federal armies—under Schofield from Newbern, and Terry from Wilmington—coöperated with him, the three armies meeting at Goldsboro, N. C. Gen. J. E. Johnston, with the main army of the Confederates in that region, made an ineffectual attempt to check Sherman's advance at Bentonville, N. C. On March 24 General Grant issued an order for a combined movement of the armies operating against Richmond, to take place on the 29th. But on the 25th General Lee made a desperate attempt to break through the Federal line on the Appomattox River, and Fort Stedman was captured by the Confederates, only to be immediately retaken. On March 31–April 1 General Sheridan defeated the Confederates at Five Forks, which protected the South-Side Railroad, and thereby Lee's connections with Richmond, and captured 6000 prisoners. This was the final and irretrievable blow to the Confederate army. On the following day, April 2, General Grant attacked along the whole line in front of Petersburg, and on the evening of that day both Petersburg and Richmond were abandoned. General Lee retreated towards Lynchburg, but was intercepted by Sheridan, and on April 9 surrendered his army to General Grant at Appomattox Courthouse. General Johnston finally surrendered his army on April 26, although he had practically surrendered eight days earlier. On May 4 General Taylor surrendered the Confederate forces in Alabama to General Canby. The last fight of the war took place, May 13, 1865, on the Rio Grande. The last Confederate army in the field—the trans-Mississippi—was surrendered by Kirby Smith, on May 26. At the moment of final victory occurred the assassination of President Lincoln, on April 14.

The number of Federal soldiers in the field during the war was 2,666,999, the number drafted and held to service being 43,347; furnished substitutes, 73,607; paid commutation, 86,724; total drafted, 206,678, to which should be added 87,588 credited to the States under the draft of 1862; making in all, drafted, 294,266. The amount of commutation moneys received by the government was $26,366,316.78; the amount of bounties paid by the United States government was $300,223,500; by State and local authorities, $285,941,036. The casualties in the Federal army numbered 359,528; 110,070 men were killed in action or died of wounds; and 249,458 men died from disease, accident, or other causes. The entire available force capable of active service in the field, enrolled in the Confederate armies, was about 500,000 men, the number of enlistments being estimated from 1,239,000 to 1,400,000. Their entire loss in killed and wounded during the war was about 95,000 men; that from disease, accident, and other causes probably amounted

to 164,000. During the war Confederate cruisers, fitted out mostly in British ports, scoured the ocean, doing irreparable damage to the commerce of the United States. (See ALABAMA CLAIMS.) After the evacuation of Richmond, Jefferson Davis, President of the Confederacy, fled south, and was captured May 10, 1865, at Irwinville, Ga., by General Wilson's forces, as he was attempting to make his escape farther south. In company with certain others of the prominent leaders of the Confederacy, he was imprisoned for a time, but was not eventually punished. See NULLIFICATION; RECONSTRUCTION; UNITED STATES; LINCOLN; GRANT.

Bibliography. Three brief general works are: *A Short History of the War of Secession*, by Johnston (Boston, 1889); T. A. Dodge, *Bird's-Eye View of our Civil War* (Boston, 1883; rev. ed., 1897), and Formby, *The American Civil War* (New York, 1910). A more detailed work is the *History of the American Civil War*, by Draper (3 vols., New York, 1867–70). An important though unfinished military history is that by J. C. Ropes, *Story of the Civil War* (2 vols., New York, 1899, continued by Livermore, *The Campaigns of 1863 to July 10th* (2 vols., New York, 1913). A series of valuable monographs on various campaigns of the war is Scribner's *Campaigns of the Civil War* (13 vols., New York, 1881); and a noteworthy collection of essays, largely by participants in the events described, is *The Battles and Leaders of the Civil War*, ed. by Johnson and Buel (4 vols., New York, 1887–89). The original material bearing on the war has been published by the United States War Department, in an extensive series, begun in 1880 and completed in 1901, entitled *War of the Rebellion: Compilation of Official Records of the Union and Confederate Armies* (Washington). Numerous volumes of military memoirs have been written by officers of the two armies; and some of them, notably Grant's *Memoirs*, are of great value. There is also a *History of the Civil War in America*, by the Comte de Paris (trans., 4 vols., Philadelphia, 1875–88). More recent is Eggleston, *History of the Confederate War* (2 vols., New York, 1910). For particular phases of the conflict, consult: J. Bigelow, *France and the Confederate Navy* (New York, 1888); J. D. Bulloch, *Secret Service of the Confederate States* (London, 1883); and J. Fiske, *The Mississippi Valley in the Civil War* (Boston, 1900). With reference more particularly to the political aspects of the war, consult: Jefferson Davis, *Rise and Fall of the Confederate Government* (2 vols., New York, 1881); Giddings, *History of the Rebellion* (New York, 1864), incomplete; Greeley, *The American Conflict* (2 vols., Hartford, 1864–66); Logan, *The Great Conspiracy* (New York, 1886); Pollard, *The Lost Cause* (New York, 1868), not entirely reliable; and vol. i of Blaine, *Twenty Years in Congress* (2 vols., Norwich, 1884–93). See also Moore, *Rebellion Record* (11 vols., New York, 1861–71); and McPherson, *Political History of the Great Rebellion* (Washington, 1864). Recent works of value are: *The Civil War and the Constitution*, by Burgess (2 vols., New York, 1901); vol. vi of Schouler, *History of the United States under the Constitution* (New York, 1899); and Rhodes, *History of the United States from the Compromise of 1850* (5 vols., New York, 1893–1904); Hosmer, *The Appeal to Arms, 1861–63; Outcome of the Civil War, 1863–65* (New York, 1907). This work contains a select bibliography. MILITARY MAPS. Comte de Paris, *Atlas to the History of the Civil War; War of the Rebellion; Official Records, Atlas* (official and very elaborate).

CIVIL WARS IN FRANCE. A play by Dekker and Drayton, produced in 1598.

CIVIL-WAR VETERANS, SOCIETIES OF. Associations of veterans of the United States Civil War or their descendants. The predominant purpose of these associations is social; occasionally, however, political aims have been added, as in the case of the Grand Army of the Republic, which has striven successfully for the increase of the pension list and rate, and has become recognized as a considerable factor in national politics. The oldest of the Civil War associations is the Military Order of the Loyal Legion. (See LOYAL LEGION.) Membership in this society is restricted to officers of the army, navy, and marine corps, and to their oldest male lineal descendants; thus following closely, in organization, the Society of the Cincinnati. The most influential as well as the largest of the societies of the Civil War is the Grand Army of the Republic (q.v.). This organization admits to membership any soldier or sailor of the army, navy, or marine corps who was honorably discharged. It has two auxiliary organizations, known as the Woman's Relief Corps, which admits to membership mothers, wives, daughters, and sisters of Union soldiers, and the Sons of Veterans, which is composed of lineal descendants of those who served in the Civil War. Similar to the Grand Army is the Union Veteran Union (see VETERAN UNION, UNION), the membership clause of which, however, is more exacting, requiring service for a term of three years. This society also has an auxiliary society, known as the Ladies of the Union Veteran Union, and the Loyal Guard, for its junior male members. The Union Veteran Legion (see VETERAN LEGION, UNION) admits to membership only participants in some battle who possess an honorable discharge from the army. In addition to the foregoing, there are three special organizations, whose character is indicated by their names. They are: The Society of the Army of the Tennessee, organized on April 14, 1865; the Society of the Army of the Cumberland, organized Feb. 6, 1868; and the Society of the Army of the Potomac, organized Sept. 2, 1868. There was formerly a Society of the Army of the James, but that was merged, in 1876, into the Society of the Army of the Potomac. There are also numerous corps societies, such as that of the Eleventh Army Corps and the Sixth Army Corps, which hold annual meetings, and whose work has consisted largely in the erection of monuments on various battlefields and in other places to the memory of their leaders. The National Association of Naval Veterans (q.v.) admits to membership any appointed or enlisted man who served in the navy during the period of the Civil War. The Union Society of the Civil War was founded in 1907 to perpetuate the memory of those who, outside the regular service of the army and navy, rendered aid to the Union during the war. The memory of the Civil War is preserved in the Southern States through the instrumentality of three flourishing organizations, known as the United Confederate Veterans (see CONFEDERATE VETERANS, UNITED), which admits

to membership actual participants in the Civil War; the United Sons of Confederate Veterans (see CONFEDERATE VETERANS, UNITED SONS OF), which was organized by the male descendants of the Confederates; and the United Daughters of the Confederacy (see CONFEDERACY, UNITED DAUGHTERS OF THE), which admits to membership the widows, wives, mothers, sisters, and lineal female descendants of those who served in the Confederate armies. There are various other societies which, while they do not restrict their membership to participants in the Civil War, admit to membership participators in that conflict or their descendants. Of this character are the Military Order of Foreign Wars (see FOREIGN WARS, MILITARY ORDER OF), the Naval Order of the United States (q.v.), and the Medal of Honor Legion (q.v.).

CIVITÀ CASTELLANA, chē'vē-tä' käs'tĕl-lä'nä (It., castle city). A city in central Italy, about 27 miles north by west of Rome, in the province of that name (Map: Italy, G 5). It is situated on an elevation above the Rio Maggiore. The town is near the site of the ancient Etruscan city of Falerii, and the surrounding ravines contain many interesting relics and remains of that place. There are also ruins of a Roman theatre, and the twelfth-century Abbey of Santa Maria. The Neapolitans, led by Mack, were here defeated by the French under Macdonald, Dec. 4, 1798. Pop., 1901, 5265; 1911, 5383.

CIVITALI, chē'vē-tä'lē, MATTEO (1436–1501). One of the foremost Tuscan sculptors of the early Renaissance; also an architect and engineer. He was born at Lucca, June 5, 1436, of a family identified with the arts. From the style of his sculpture it is evident that he studied in Florence, probably in the workshop of the Rossellini; he was also influenced by Desiderio da Settignano. (See these titles.) Most of his life was passed in or near his native town, where he married, and reared a numerous family. In 1495 he removed to Carrara, the site of the famous marble quarries, to facilitate the execution of commissions for Genoa and Sarzana. He died on a visit to Lucca, Oct. 12, 1501, and lies buried in the church of San Cristoforo. Civitali's art is best represented in the cathedral of Lucca. His principal works there are: the bust of the humanist Pietro di Avenza; the tomb of Pietro da Noceto (1472), a papal secretary, resembling the Florentine monuments, but more severely architectural; two beautiful angels belonging to the former Altar of the Sacrament (1473–76; the shrine itself is in South Kensington Museum, London); the tomb of his friend and patron Domenico Bertini (1479), who also commissioned the chapel of the Volto Santo (c.1481)—a miniature octagon temple, vaulted with a dome and wonderfully decorated; the statue of St. Sebastian; the two-storied altar of St. Regulus (1484–85), with the recumbent image of the martyr, besides six statues and several reliefs; and, lastly, the simple but highly decorative pulpit of the cathedral (1498). Among his other works at Lucca are statues of the Madonna, in the choir of San Michele and Santa Trinità; an "Annunciation" and the "Redeemer" in the Museum, and the tomb of St. Romanus (1490) in the church of that name. The Museo Nationale, Florence, possesses a marble relief of "Faith," the most beautiful representation of the subject in the Renaissance, and another of the Saviour; South Kensington Museum, a relief with a powerful masculine portrait; the Metropolitan Museum of New York, a charming painted terra-cotta "Angel of the Annunciation." The productivity of Civitali's workshop may be judged from the fact that in 1480 he is said to have furnished no less than 22 altars for the cathedral of Pisa, of which interesting fragments remain. His last surviving work is the six statues in the chapel of St. John Baptist in the cathedral of Genoa, in the style of the high Renaissance, and less charming and sincere than his earlier work. As an architect and engineer he constructed a bridge near Lucca and, in 1491–92, the fortifications of his native town.

Civitali is one of the most able and attractive sculptors of the later fifteenth century. He is best classed with the Florentine school, from which he learned his subtle treatment of marble surfaces and acquired decorative skill. But he soon developed an individual style, simple and more rugged than the Florentine. In the expression of sincere religious feeling he is without a peer among the sculptors of his day. His son and pupil NICCOLAO (1482–c.1560) was a sculptor and architect of local importance at Lucca, as was also his grandson VINCENZO (1523–97). Several of his nephews followed their uncle's profession. The best monograph on Civitali is by Yriati, an authoritative work; others are by Roselli (Lucca, 1891), Cappelletti (ib., 1892), and Volpi (ib., 1893).

CIVITAVECCHIA, chē'vē-tä-vĕk'kē-ä (It., old city). A fortified seaport in the Province of Rome, central Italy, situated on the Tyrrhenian Sea, 37 miles northwest of Rome (Map: Italy, F 5). It is the chief port of Rome, and its harbor is protected by two curving moles and a breakwater with a lighthouse. There are extensive dry docks, a magazine, an arsenal built by Bernini, and a citadel constructed from plans by Michelangelo. The fortifications date from the sixteenth and seventeenth centuries. The city has an aqueduct 18 miles long. Civitavecchia is of considerable commercial importance, and has regular steam communication with England and France. It is the seat of a bishop and of a number of foreign consuls, including one from the United States. In the vicinity of the town are situated sulphur springs, with remains of ancient baths. There are manufactories of cement and calcium carbide and the principal imports are coal, cattle, and fire bricks. Civitavecchia is the ancient Centum Cellæ, sometimes called Portus Trajani in honor of Trajan. It was destroyed by the Saracens in 828, but its exiled inhabitants returned in 854, when it received the name of Civitavecchia (old city). It was fortified by Urban VIII, and declared a free port by Innocent XII in 1696. The French held it from 1849 to 1870. Pop., 1901, 17,589; 1911, 17,930.

CIVOLI, chē'vō-lē, LUDOVICO. See CIGOLI, LUDOVICO CARDI DA.

CLAAR, klär, EMIL (1842–). A German stage manager and author. He was born at Lemberg and made his first appearance as an actor at the Burgtheater, Vienna. After holding engagements at Gratz, Brünn, Innsbruck, and at the Court Theatre, Berlin, he successively became stage manager of the Stadttheater, Leipzig (1864–70), and of the Court Theatre, Weimar (1870–71), and was subse-

quently appointed director of the Landestheater, Prague, and the Residenztheater, Berlin (1876–79). From 1879 to 1900 he was associated as director with the two principal theatres of Frankfort-on-the-Main, but afterward he confined himself solely to the management of the Schauspielhaus in that city. Among lyrical poems and dramas written by him are the following: *Gedichte* (1868 and 1885); *Neue Gedichte* (1894); *Weltliche Legenden* (1898); *Samson und Delila*, a comedy (1872); *Shelley*, a tragedy (1876); *Die Schwestern*, a melodrama (1892); *Königsleid*, a tragedy (1895).

CLACKMAN'NAN (Gael. Clachan Mannan). The county town of Clackmannanshire, Scotland, on the north bank of the Forth, 9 miles east of Stirling (Map: Scotland, E 3). The neighborhood is rich in coal, iron, and limestone. On a hill above the town is the ruined tower of a castle once belonging to a descendant of the Bruces. Pop., 1901, 2501; 1911, 2203.

CLACKMANNANSHIRE. The smallest county of Scotland, in the East Midland Division, at the head of the Firth of Forth, and bounded by the counties of Perth, Fife, and Stirling (Map: Scotland, E 3). Area, 55 square miles. It is an agricultural and coal-mining county; oats, barley, wheat, and potatoes are the chief crops. The leading towns are Clackmannan, the county town, Alloa, and Dollar. Pop., 1901, 32,000; 1911, 31,121.

CLAD'ODUS. See CLADOSELACHE.

CLADOPH'ORA (Gk. κλάδος, *clados*, sprout + φόρος, *phoros*, one that bears). A genus of green algæ (Chlorophyceæ), belonging to the Confervales. This is one of the most common of the green algæ, being a profusely branching and anchored filamentous form, and occurring in masses in most fresh waters, attached to various kinds of supports. It is particularly interesting because it is a partial cœnocyte (q.v.); that is, it has cross walls and all of its cells are cœnocytic. For this reason it is a transition type between the ordinary Confervales, which are completely septate, and the Siphonales, which are completely cœnocytic.

CLADOPHYLL. See PHYLLOCLAD.

CLADOSELACHE, klăd'ō-sĕl'a-kē (Neo-Lat., from Gk. κλάδος, *klados*, branch + σέλαχος, *selachos*, shark). The most primitive genus of sharklike elasmobranch fishes, found fossil in the concretions of the Lower Carboniferous shales of Ohio and elsewhere. The fish had an elongated, round, tapering body, with a short, blunt head, and eyes situated far in front. The fins, of which there are a pair each of pectoral and pelvic, and two low dorsal, are triangular, with broad bases and without spines, the middle rays of the fins being the longest. The heterocercal tail fin is peculiar in its strongly upturned notochordal axis, with the neural arches continued to the top of the upper lobe; its vertical straight posterior margin and long lower lobe is supported by cartilaginous rays, so that it nearly equals in size the upper lobe. The best-known species are *Cladoselache fyleri*, with a length of 22 inches, and *Cladoselache kepleri*, which attained a length of 6 feet. Both of these are from the Cleveland shale of Ohio. Many of the tricuspid teeth from the Upper Devonian and Carboniferous rocks of Europe and America, described under the generic name of *Cladodus*, seem to be teeth of *Cladoselache*. Consult Dean, "Contributions to the Morphology of Cladoselache (Cladodus)," in *Journal of Morphology*, vol. ix, No. 1 (Boston, 1894). See also ELASMOBRANCHII; SELACHII; SHARK.

CLADRAS'TIS (Neo-Lat., from κλάδος, *klados*, branch + θραυστός, *thraustos*, brittle) (*Cladrastis lutea*). A small leguminous tree, resembling the common locust, having a yellow bark, with cathartic properties. It is variously called yellow wood, yellow ash, yellow locust, and fustic. The tree is native of Kentucky, Tennessee, North Carolina, and adjoining regions, growing in rich soils. It is also common in cultivation.

CLAF'LIN, HORACE BRIGHAM (1811–85). An American merchant, born in Milford, Mass. He established himself in business in Worcester, Mass., where, within a few years, he built up one of the largest mercantile establishments in New England. In 1843 he removed to New York, where he established the firm of Bulkley and Claflin, a business which was conducted after the retirement of William Bulkley, in 1851, under the name of Claflin, Mellin and Company. Although the business interests of Mr. Claflin were seriously endangered by his strong anti-slavery attitude, he steadfastly adhered to his opinions, which he did not hesitate to express in public meetings. Upon the outbreak of the Civil War the house was seriously affected, because of its large business in the South. In consequence of Mr. Claflin's integrity and business ability, however, the volume of trade greatly increased during the war, and reached the enormous sum of more than $72,000,000 in 1865. From this time until his death the transactions of the firm probably exceeded those of any other mercantile house in America. Mr. Claflin was noted for his liberality and his numerous charities.

CLAFLIN, JOHN (1850–). An American merchant, born in Brooklyn, N. Y. He graduated from the College of the City of New York in 1869, and in the year following traveled in Europe and in the East. In 1870 he entered his father's firm, H. B. Claflin and Company, one of the largest wholesale dry-goods houses in New York, and in 1873 he became a member of the firm. He organized The H. B. Claflin Company in 1890, and in the years following formed into a combination several of the large retail dry-goods houses in New York as an outlet for his wholesale business, which became the most important of its kind in the United States. He was chosen a trustee of many financial and charitable corporations.

CLAFLIN, WILLIAM (1818–1905). An American merchant and politician, born in Milford, Mass., son of Lee Claflin (1791–1871), a benefactor of Wesleyan College and Boston University. He succeeded his father in a successful wholesale boot and shoe business. He was in the State House of Representatives from 1849 to 1852, State Senator in 1859–60, and President of the Senate in 1861. He became a member of the Republican Executive Committee in 1864, and was its chairman from 1868 until 1872. He was Lieutenant Governor of Massachusetts (1866–68), Governor (1869–71), and a Republican Representative in the Congress in 1877–81.

CLAIBORNE, klā'bôrn, or **CLAYBORNE,** WILLIAM (c.1589–c.1676). An American colonist, prominent in the early history of Virginia and Maryland. He was born in Westmoreland,

England, went to Virginia as surveyor in 1621, and in 1625 was appointed Secretary of State for that Colony. In 1627 and 1628 he explored Chesapeake Bay. He founded a trading post on Kent Island in 1631, which became a flourishing community, and was represented in the General Assembly of Virginia. Afterward the island was included in the grant to George Calvert, first Lord Baltimore, whom Claiborne had bitterly opposed in London. He resorted to arms to maintain his claim, and in 1645 made a descent upon the island, from which, however, he was soon driven. Its possession remained a subject of animated controversy between Maryland and Virginia until 1776. After the execution of Charles I, when Virginia and Maryland had decided in favor of Charles II, Claiborne obtained an appointment on the commission chosen by Cromwell to reduce them to submission (1651). This was soon accomplished; Governor William Berkeley, of Virginia, was removed from office, and Claiborne became Secretary of State of Virginia, under the new Governor, Richard Bennett. In Maryland all Catholics were promptly removed from office—an act which caused considerable friction until 1658, when the province was restored to Lord Baltimore. After the Restoration, in 1660, Claiborne naturally ceased to have influence at court, and about 1676 he died in obscurity. W. H. Carpenter's novel *Claiborne the Rebel* (1845) is based on his career. See Mereness, *Maryland as a Proprietary Province* (New York, 1901).

CLAIBORNE, William Charles Cole (1775–1817). An American politician, first Governor of the State of Louisiana. He was born in Sussex Co., Va.; was educated at William and Mary College; went to New York when he was 15; was employed there in the office of the clerk of Congress; studied law in Richmond, Va.; removed to Tennessee, where he was a protégé of John Sevier; and in 1796 was a member of the State constitutional convention. Though technically ineligible on account of his age, he was elected to succeed Andrew Jackson as a member of Congress in 1797, and served until 1801, when he was appointed to succeed Winthrop Sargent as Governor of Mississippi Territory. In 1803, with Gen. James Wilkinson, he was delegated to accept the transfer of Louisiana to the United States, and in 1804 became first Governor-General of the Territory of Orleans—that part of the Louisiana Purchase lying south of Mississippi Territory and of the thirty-third parallel. His administration of office made him none too popular with the French and Spanish element; but upon the admission of Louisiana, in 1812, he was elected the first Governor of the State, which position he held until 1816. At New Orleans, during the War of 1812, he coöperated with Jackson in repelling the attack of the British. In 1816 he was elected to the United States Senate, but did not live long enough to take his seat.

CLAIBORNE STAGE (from *Claiborne*, in Alabama). A subdivision of the Eocene Tertiary in American geology. The rocks of this stage are found along the Alabama and Tombigbee rivers, in Alabama and in Arkansas. See Tertiary System.

CLAIM (OF. *claim*, demand, from Lat. *clamare*, to call out). A demand of a right; sometimes used of the legal right asserted, as a creditor's claim to be paid the amount due him, sometimes of the amount alleged to be due. In both these senses the term is commonly employed in bankruptcy and other creditors' proceedings against an insolvent debtor, and in the administration of the estates of deceased persons. In all such cases the claim must be proved—i.e., verified by oath—in order to share in the distribution of the assets; the duty of the trustee in the former case, and of the executor or administrator in the latter, being limited to the payment of duly authenticated claims against the estate.

At the common law, a claim was a formal assertion of title to, or of interest in, property, real or personal, which was in the possession of another. It was not a mere protest against an unlawful seisin or detainer of property, but was a recognized process for preserving the rights of the claimant against extinction by reason of lapse of time or other cause. It had, therefore, much of the effect of an actual entry upon land, and was available to one who, by reason of his interest being a future and not a present one (as a remainder or reversion), was not entitled to make an immediate entry; or, as Coke explains, "when a person dares not make an entry on land for fear of being beaten or other injury, he may approach as near as he can to the land and claim the same, and that shall be sufficient to vest the seisin in him." In other cases, however, in which the claimant's right depended on possession, it seems to have been considered that, to make a claim to an estate effective, there must be an actual entry into some part of the lands claimed.

Continual claim was the process whereby one who had been disseised of lands prevented his claim from lapsing by reason of the death of his disseisor and the transmission of the lands to the latter's heir by descent. In order to avoid this consequence, it was necessary to make claim within a year and a day of the disseisor's death, and to insure this to repeat the formality *continually* within that interval until the descent took place. See Adverse Possession; Disseisin.

In the United States the term "claim" has acquired a distinctive sense as applied to the initial or prima-facie title acquired by settlers to government lands, and by prospectors to mineral lands, under United States statutes. The term is also applied to the land so secured. These claims may, upon the performance of the terms of sale, ripen into complete and valid titles; but, in the meantime, they confer on the claimant or holder a recognized though defeasible property right, which may be bought and sold and administered upon, like any other property. Because of its precarious nature, it is generally considered personal rather than real property. See Government Lands; Preemption.

In admiralty proceedings the statement of rights of the defendant or other party to property attached under process of the court is called the "claim."

Statement of claim is the pleading in which the plaintiff sets forth the facts constituting his cause of action. It supersedes the declaration in England, and corresponds to the complaint in the code practice of most of the United States. The facts are alleged in it in a plain, concise, and natural way, avoiding the arbitrary forms that characterized the declaration in common-law pleading. The phrase is used

in some jurisdictions to designate any narrative of facts that is made the basis of a judicial of official proceeding. See DECLARATION; PLEADING.

Claim of liberty, in English law, is a petition to the sovereign, filed in the Court of Exchequer, claiming a privilege or immunity, as freedom from jury duty, by virtue of custom or the petitioner's rank. The claim was made under an actual or supposed grant, as these "liberties or franchises" (q.v.) were said to have originally been a part of the crown's prerogative, which could only be enjoyed by a subject by virtue of a grant from the sovereign.

CLAIMS, COURT OF. In the United States, a tribunal created by act of Congress, or by the Legislature of a State, to entertain and adjudicate claims against the general government or against the State so authorizing them. A State, being sovereign, can of course not be sued, or subjected to legal process. It is perfectly obvious that, under ordinary circumstances, the tribunals that are instituted by the sovereign power for the adjudication of controversies and the punishment of offenses against itself cannot be employed, either by a citizen or by another sovereignty, to enforce claims against such power. Indeed, in the legal sense of the term, there can be no such thing as a "claim" against a sovereign State. In recent times, however, it has become customary for governments voluntarily to submit alleged claims of a civil nature —such, i.e., as involve a demand for a money compensation—to tribunals of limited powers for consideration and determination. Where the controversies are international, the tribunal may be a board or commission of arbitration. Where the claim is that of an individual citizen, the State may either authorize the ordinary tribunals to hear and determine the question at issue, or may create separate tribunals for that purpose. The latter method is the one that has been generally adopted in the United States, both by the Federal government and the several States. The tribunal so created is variously termed a "court of claims" or a "board of claims." It must be borne in mind, however, that the State does not abdicate its sovereign authority to these courts, and that no process lies for enforcing their decrees. The judgments of a court of claims are in the nature of recommendations only, certifying that the adjudicated claim is, or is not, under the rules established by the statute, a valid and proper claim. If the judgment is in favor of the claimant and against the State, the payment thereof is, like the payment of an award made in an international arbitration, a voluntary act. Under the American system, such payment calls for an appropriation by Congress or the Legislature of the State affected by the decision.

The Court of Claims of the United States (which has served as a model for those of the several States) was created by Act of Congress, Feb. 24, 1855, and consisted originally of three judges appointed by the President and Senate, to hold office during good behavior, and to have jurisdiction to hear and determine all claims founded on any act of Congress, or on any regulation of any executive department, or on any contract, express or implied, with the government of the United States; and all claims which might be referred to it by either House of Congress. The government was to be represented before it by a solicitor and assistant solicitor appointed by the President; and the compensation of all members of the court was fixed by law. By the Act of March 3, 1863, two additional judges were to be appointed by the President, and a chief justice from the whole number of judges (five). By this act the court was also authorized to take jurisdiction of all set-offs, counterclaims, claims for damages, liquidated or unliquidated, or other demands whatsoever on the part of the government against any person making claim against the government in said court. If the judgment of the court be in favor of the government, it shall be filed in the office of the clerk of the proper district or circuit court of the United States, and shall ipso facto become and be a judgment of such district or circuit court, and shall be enforced the same as other judgments. If the judgment be in favor of the claimant, it is provided that the sum thereby found due to the claimant shall be paid out of any general appropriation made by law for the payment of private claims, on presentation to the Secretary of the Treasury of a duly certified copy of such judgment. In cases where the amount in controversy exceeds $3000, an appeal may be taken to the Supreme Court of the United States at any time within 90 days after judgment. Where the judgment or decree may affect a constitutional question, or furnish a precedent affecting a class of cases, the United States may take an appeal without regard to the amount in controversy. Claims must be filed within six years after the claim accrues, except in cases of disability. The court is required to hold one session annually, commencing on the first Monday in October.

The jurisdiction of the court is not to extend to any claim growing out of any treaty with foreign nations or Indian tribes, unless such claim was pending in said court Dec. 1, 1862; nor shall the jurisdiction of the court extend to any claim against the United States for the destruction, appropriation, or damage of any property by the army or navy engaged in the suppression of the Civil War, from the commencement to the close thereof. The general principle characterizing all the legislation relating to this court is that its jurisdiction is confined to claims arising out of contract or for damages in cases not sounding in tort. Accordingly, the Supreme Court of the United States has held that a person injured by the tort—that is, by the wrongful act—of a government officer or agent, cannot obtain redress in the Court of Claims, but must apply to Congress for relief. It has also been held, by the same court, that in order to obtain a recovery upon an implied contract, the claimant must show that the United States received a consideration for the claim presented, or that they received money or property with a duty to turn it over to the claimant, or that the claimant had a lawful right to it when the United States received and appropriated it. The statutes provided that claims of the character above described may be recovered whether or not they are such as would be prosecuted in a court of law, of equity, or of admiralty if the United States were suable; but the actions in this court are not actions at common law, and therefore the claimant has no right to a jury trial; nor does this court possess the jurisdiction and powers of an equity tribunal. The court has declared that it has never felt itself bound

by the strict rules of common law or of equity pleading and practice, but that its aim is to administer justice between the claimant and the government in a simple and expeditious manner. Proceedings originate in the court by petition filed; and testimony used in the hearing and determination of claims is taken by commissioners who are appointed for the purpose by the court. Consult, for full information, the United States statutes and the digests. For the organization and jurisdiction of similar tribunals constituted by them, the statutes of the several States must be consulted.

CLAIRAC, klâ'răk'. A town in the Department of Lot-et-Garonne, France, situated in a fertile country on the Lot, 16 miles northwest of Agen. It has a large trade in white wines. Clairac was built about an abbey in the eighth century. It was the first place in the south of France which, in 1527, embraced the doctrines of the Reformation. It was the scene of frequent contests between Roman Catholics and Huguenots. Théophile Viaud, the French poet, was born here in 1626. Pop. (commune), 1891, 3562; 1901, 2880; 1911, 2824.

CLAIRAUT, klâ'rô', Alexis Claude (1713–65). A prominent French mathematician, physicist, and astronomer, born in Paris. He showed a precocity analogous to that of Pascal. At the age of 10 he read l'Hôpital's works on infinitesimal analysis and conic sections; before he was 13 he presented a memoir on curves to the French Academy of Sciences; at 16 he published his first work, on curves of double curvature, and at 18 he was elected a member of the Academy. In 1736 he was appointed to accompany Maupertuis on an expedition to Lapland, for the purpose of measuring a degree of the meridian—a work which proved, contrary to the opinion of Cassini, the flattening of the earth towards the poles. Shortly after his return, in 1743, appeared his *Théorie de la figure de la terre,* based on Newton's law of gravitation, and on Maclaurin's results concerning homogeneous ellipsoids. In the field of mathematics Clairaut studied curves of the third order, tortuous curves, and projections, and was the first to find the *singular* solution of a differential equation of the first degree in x and y. The equation used by Clairaut, often called Clairaut's form, is $y = px + f(p)$, in which $p = \frac{dy}{dx}$. In physics he first showed the necessity of considering the attraction between the parts of the fluid itself, in order to explain the phenomenon of capillary action; computed the change in gravity at high latitudes, and so fully demonstrated the figure of the earth that little essentially new has since been added. At least, according to Todhunter, "The splendid analysis which Laplace supplied, adorned but did not really alter the theory which started from the creative hands of Clairaut." In the field of astronomy he solved the famous problem of three bodies in the case of the sun, earth, and moon; explained the motion of the lunar apsides, and constructed lunar tables, later supplanted by those of Mayer. Clairaut also predicted the return of Halley's comet for about April 15, 1759; although the degree of accuracy was remarkable for the time, and the approximation closer than Halley's, it failed by a month, and subjected its author to the ridicule of his rival, D'Alembert. During his last years fondness for society and desire for luxury hindered his scientific work. His leading works (published in Paris) are: *Recherches sur les courbes à double courbure* (1731); *Traité de la figure de la terre* (1743 and 1808); *Théorie de la lune* (1752 and 1765); *Eléments de géométrie* (1741 and 1765); *Eléments d'algèbre* (1746 and 1760); and *Théorie du mouvement des comètes* (1760).

CLAIRFAIT, Charles D. See Clerfayt.

CLAIRIN, klâ'răn', Jules Georges Victor (1843–1919). A French painter and illustrator. He was born in Paris, studied with Picot and Pils, and afterward traveled in Spain and Morocco with Henri Regnault, a journey which strongly influenced his choice of subjects. Like Regnault, he may be classed as one of the last Romanticists. (See Painting, *History.*) His paintings are fine in color, effective in composition, and have always aroused wide interest. Among them are: "The Benediction of the Swords," "Allah! Allah!," "The two Hostile Tribes," "After the Victory," "The Massacre of the Abencerrages" (Rouen), "A Moorish Sentinel" (Metropolitan Museum, New York), "Entering the Harem" (Walters Gallery, Baltimore). His portraits include those of Mounet-Sully as Hamlet (1889), Sarah Bernhardt, and Madame Krauss. He also executed a number of effective decorative paintings in the Paris Opera, the Bourse, and in the Salle-des-jeux at Monte Carlo.

CLAIRON, klâ'rôn', Mlle. (1723–1803). A French actress, commonly known as "La Clairon," whose real name was Claire Josèphe Hippolyte Léris. She was born near Condé, in Flanders, and had played for several years at Rouen, Lille, and elsewhere before she appeared at the Paris Opéra, and a little later, in September, 1743, made her first appearance at the Théâtre Français. This was in *Phèdre.* Her success was immediate and brilliant, and she became the rival of Mlle. Dumesnil, then at the height of her popularity. Mlle. Clairon was of small stature, but with a beauty which was both vivacious and dignified, and she was gifted with a remarkable voice. She and her colleague Lekain were known as innovators, for endeavoring to bring about a more rational mode of costuming than was at that time conventional upon the stage. Some of her greatest achievements were in the *Zelmire* and *Le siège de Calais* of Belloy, and in the tragedies of Voltaire, *Zulime, Sémiramis, Olympie, Tancrède, Oreste,* and *L'Orphelin de la Chine.*

In 1765, as the result of a scandal of which she was a victim, she abandoned the stage. For a number of years she resided at the court of Ansbach. The *Mémoires d'Hippolyte Clairon et réflexions sur la déclamation théâtrale,* which she wrote in old age, were published in Paris in 1799. The book gives many interesting details concerning her art and is full of lively anecdotes.

CLAIRVAUX, klâr'vô' (from Lat. *clara vallis,* fair vale; from *clarus,* clear, and *vallis,* valley). A village in the Department of Aube, France, about 10 miles southeast of Bar-sur-Aube, on the left bank of the river Aube (Map: France, N., K 4). It is the site of the famous Cistercian abbey (*Clara Vallis*) founded in 1115 by St. Bernard, who presided over it until his death, in 1153. His body still lies in the church. The abbey was raised to a central prison during the French Revolution and at one time

held nearly 1500 prisoners. The extensive buildings are still used as a penitentiary. See Arbois de Judainville, *Etudes sur l'état intérieur des abbayes cisterciennes et principalement de Clairvaux*. The chief industries are lumbering in the neighboring forests and agriculture.

CLAIRVILLE, klâr'vēl', Louis François (1811–79). A French dramatic author, whose real name was Nicolaie. He was born Jan. 28, 1811, in Lyons, but went early to Paris, and in youth had a varied practical experience with theatrical life. About 1837 he began his long series of dramatic productions, which he wrote generally in collaboration with other playwrights. Some of the more noted are the comedies *La propriété, c'est le vol* (1848), *Les tentations d'Antoinette* (1850), *Quinze heures de fiacre* (1867), and the librettos to the operas *Daphnis et Chloë*, by Offenbach (1849), and *La fille de Madame Angot*, by Lecocq (1873).

CLAIRVOY'ANCE (Fr. *clairvoyant*, clear-seeing, from *clair*, Lat. *clarus*, clear + *voir*, Lat. *videre*, to see). An alleged ability to see, in a trance state, objects and occurrences which are not discernible in the normal state. Belief in the clairvoyance of the hypnotic trance is as old as history. Socrates, Apollonius, Cicero, Pliny, Tertullian, all furnish records of the prophetic dreams and utterances of clairvoyants. In later times the visions of Swedenborg and Davis have become widely known.

Of the existence of the somnambulistic state of hypnosis, in which clairvoyance is said to occur most often, there can be no doubt. Suggestion (q.v.), whether it be from without (the words, passes, or other artifices of an operator), or from within (autosuggestion, q.v.), suffices in most people to induce this state. Certain other conditions (fasting, drugs, disease, general emotional excitability) may induce an apparently spontaneous and indeterminate appearance of somnambulism. Every one is familiar with the epidemic catalepsy of the religious revival, best exhibited, perhaps, by the negroes of the South.

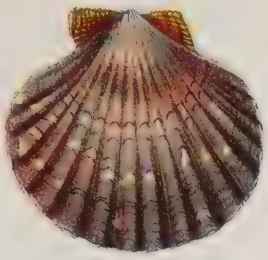
As to the existence of clairvoyance in somnambulism, opinions are divided. Some, with Tuttle, consider clairvoyance "an inherent faculty, a foregleam in this life of the next spiritual life." They esteem the clairvoyant as a peculiarly sensitive person, whose mind is, for the time being, directed by some departed spirit, and whose lips speak with an intelligence not his own. Others consider that the clairvoyant is able, without such direction, to see objects and occurrences beyond the ken of normal vision. Still others take a middle ground, and consider that the results are to be explained by telepathic communication, not between departed spirits and the medium, but between the minds of one or more living persons and that of the 'percipient' (*télépathie-à-trois*). Finally, many deny the presence of supernormal agencies; indeed, scientific psychology has neither found satisfactory evidence of such agencies, nor has it been able to accept the evidence adduced by the votaries of "psychical research." Consult: Flournoy, *From India to the Planet Mars* (New York, 1900); Podmore, *Apparitions and Thought Transference* (London, 1895); Hyslop, *Enigmas of Psychical Research* (Boston, 1906).

CLAKAMA, klâ-kä'mâ, **CLOCKAMA,** klô-kä'mâ, or **KLOKAMA.** An Indian tribe of the Chinookan stock. See Chinook.

CLAL'LAM, Sklalam, or Nusklala. A Salishan tribe, formerly of considerable importance, occupying the greater part of the coast extending west from Puget Sound, in Clallam Co., Wash. They still number 398, attached to the Puyallup Agency.

CLAM (older form also *clamp*, from the firm clamp of the shell, AS. *clam*, bond, OHG. *clamma*, narrow pass; cf. also Dutch *klamp*, cleat). The popular name of many widely various bivalve mollusks, especially those good to eat. In the United States it commonly designates either the quahog (*Venus mercenaria*), distinguished as the hard or round clam, or else the manninose (*Mya arenaria*), called long or soft clam. The former is a heavy, globose shell, allied to the cockles, which plows its way along sandy bottoms, standing erect upon its thin edge, and is obtained wholly by raking, in water from 10 to 40 feet in depth. It abounds from Cope Cod to Florida, and also near Shediac, New Brunswick, and is the common "clam" of New York markets, where small ones (young) are much esteemed under the name of "little necks," according to some authorities after Little Neck, Long Island. In Boston and New England the Indian name "quahog" attaches to this, and "clam" usually means the *Mya*, called "soft clams" elsewhere. These are of a very different character, having comparatively thin, smooth, elongated shells, a protrusile, bladelike foot, adapted to digging, and siphons that may be longer than the shell. They remain sunken in the sand of the shore, between tide marks, their siphon mouths just at the surface, and when disturbed they eject a spurt of water as they withdraw to safer depths. These clams are obtained by digging at low tide; and they are cultivated by the protection of certain favorable areas of seabeach, where they soon lie almost as thick as paving stones. Formerly enormous quantities of both these clams, with razor clams, etc., were gathered and salted in New England as bait for the cod fisheries, but this demand has diminished. Great Britain has the "gaper," a closely allied species, but it is not so popular. On the New England coast two other large mollusks of deep water are eaten when obtainable, under the name of beach, sea, or surf clams—especially *Spisula solidissima*. The Southern States have a large edible species, also, in the painted clam (*Callista gigantea*). On the Pacific coast—to which Eastern clams have been transplanted with some success, and are constantly sent, refrigerated, for immediate consumption—several edible bivalves are used, for some of which the term has been borrowed. Thus, the California "flat clam" is a species of Semele, and others are of the genera *Tapes*, *Saxidomus*, and *Glycymeris*. The "geoduck," gathered for food by the Indians of the Northwest coast, is *Glycymeris generosa*. The shells of most of these were formerly used by the natives in manufacturing the various beads and shell ornaments which passed as money among them. (See Shell Money.) Inland, the word "clam" refers to some of the many fresh-water mussels. (See Mussel.) The "giant" clam of the East Indies (*Tridacna gigas*) is the greatest of living mollusca, its soft part amounting to 20 pounds of edible flesh, while the deeply hollowed shells may weigh 500 pounds. "In some churches of France they are employed to hold the holy water—a use which well accords with the beautiful white of the inner surface of the shell. . . . In many of the islands, stones

CLAMS AND EDIBLE MUSSELS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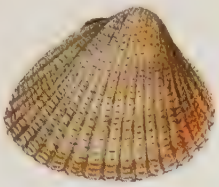
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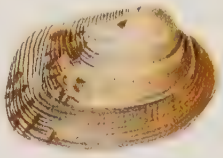
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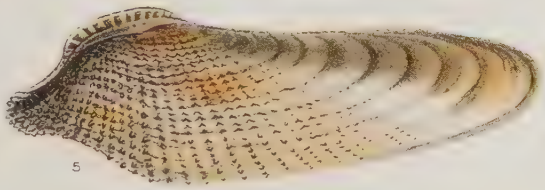
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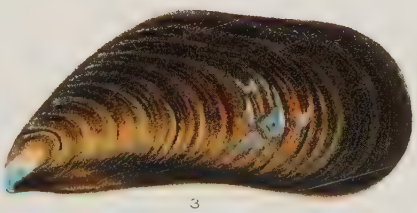
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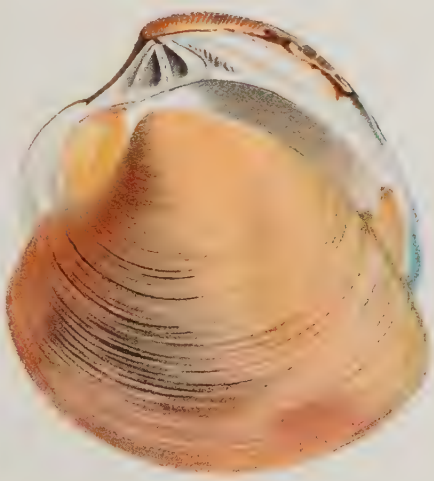
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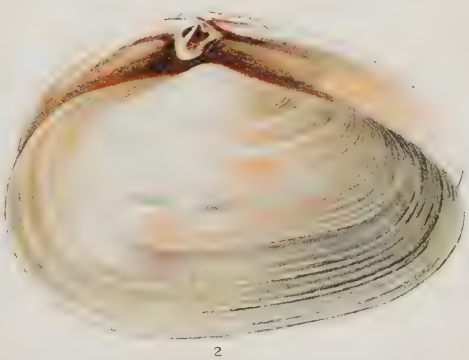
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1 AMERICAN HARD CLAM OR QUOHOG - (VENUS MERCENARIA)
2 AMERICAN SOFT OR LONG CLAM - (MYA ARENARIA) SEE FIG. 4
3 EDIBLE MUSSEL - (MYTILUS EDULIS)
4 BRITISH SOFT OR GAPER, CLAM - (MYA TRUNCATA); SHOWING EXTENDED SIPHONS
5 PIDDOCK OR DATE-FISH - (PHOLAS DACTYLUS)
6 RAZOR-CLAM, - (SOLEN ENSIS)
7 SCALLOP - (PECTEN IRRADIANS)
8 COCKLE - (CARDIUM EDULE)
9 PULLET - (TAPES PULLASTRA)

are unknown; but, as a substitute, the natives make their knives and axes from the fragments of this shell." See Colored Plate of CLAMS AND EDIBLE MUSSELS.

Fossil Forms. The genus *Mya* ("soft" or "long" clam) appeared in Tertiary time, with species that show little difference from those now living. So with the genus *Mactra*. The family Veneridæ, to which the little-neck clam (*Venus mercenaria*) belongs, is an old one; it began in the Middle Jurassic, with small species of rounded form, which can often with difficulty be distinguished from the accompanying species of Cyprinidæ. The genera *Tapes*, *Cytherea*, and *Cyprimeria* are abundant in Cretaceous rocks, *Cytherea* in the Eocene, and *Venus* in the Miocene. Shells of several species of Venus are extremely common, and finely preserved in the Miocene sands and marls of some localities in Virginia and southern Europe. For American clams of all sorts, consult: Goode, *Fishery Industries*, sec. i. (Washington, 1884); Lovell, *Edible Mollusks of Great Britain*, etc. (London, 1884). For fossil forms, see TERTIARY; MIOCENE.

CLAM. In heraldry, a term for an escalop or cockleshell. It is supposed to indicate that the bearer has been a crusader or has made long voyages by sea. See HERALDRY.

CLAMART, klä'mär'. A town in the Department of Seine, France, 4½ miles southwest of Paris at the foot of the Chatillon plateau (Map: Paris). It is a favorite residential suburb of Parisians, and is the seat of the Hospice Ferrari, an asylum for aged men. The Bois de Clamart, which is part of the Bois de Meudon, is a popular picnic resort of the Parisian bourgeoisie. It has an old Gothic church. Pop. (commune), 1901, 7391; 1911, 11,376.

CLAM CRACKER. A sting ray. See RAY.

CLAMECY, klä'me-sē'. The capital of an arrondissement in the Department of Nièvre, France, at the confluence of the Yonne and the Beuvron, 46 miles northeast of Nevers (Map: France, N., J 5). It is also situated on the Canal du Nivernais. Its parish church of St. Martin, surmounted by a fine square tower, has interesting architectural features of the thirteenth, fifteenth, and sixteenth centuries. The twelfth-century church of Bethlehem is now the annex of a hotel. The modern Château of Vauvert is a handsome building in fine grounds. There are manufactures of cloth, paper, leather, pottery, boots, shoes, and chemicals, and a considerable timber trade by river with Paris; a thriving trade also flourishes in cattle and wine. A bronze bust, by Angers, of Jean Rouvet, the native who in 1549 invented the wood raft for supplying Paris with timber, stands on a bridge spanning the river. Pop. (commune), 1901, 5426; 1911, 4869.

CLAM-GALLAS, kläm'gäl'läs, EDUARD, COUNT (1805–91). An Austrian general, born at Prague. He entered the army in 1823, and became a major general at the age of 44. In 1848 he served with distinction in the Italian and Hungarian campaigns and in the latter commanded the Transylvanian corps which effected the union with the Russians, and thus led to the defeat of General Bem at Sepsi-Saint György and Kaszon-Ujfalu. In 1850 he was placed at the head of the First Division of Bohemian Regulars, and in 1859 fought with distinction at Magenta and Solferino, but during the disastrous campaign of 1866 he was defeated by the Prussians at Hühnerwasser, Podol, Münchengrätz, and Gitschin; was relieved of his command and brought before a military tribunal, by which, however, he was acquitted. While he was known to have committed strategical errors, the chief responsibility for the disasters was probably traceable to his superior officers.

CLAMPING SCREW. A tool used by carpenters and joiners for holding work on a table, or for securing two or more pieces together. Two sorts are generally found: One consists of two straight bars of wood or metal, to which are fitted two screws parallel to each other and at right angles to the bars. The one screw passes through both bars and is threaded in the second one, with an abutting shoulder which bears on the outside of the first. This adjusts the distance between the bars to the thickness of the work to be clamped. The second screw is threaded in the second bar, but its end abuts against the outer end of the first. When it is tightened to refusal, a powerful combination of lever and screw forces the opposite ends of the bars to grip with great power. The second type is a device shaped like the letter G, through the upper end of which the screw passes, and holds between its point and the lower end the portions to be clamped, generally for gluing together.

CLAN (Gael. *clann*, Ir. *clann*, *cland*, offspring, tribe, Welsh *plant*, offspring, children, Lat. *planta*, connected with Skt. *kula*, Lith. *kiltis*, family). A collection of families united under a chieftain, all claiming descent from a common stock, and possessed of a common surname. The word "clan" has been adopted as the ethnological generic term. Synonyms and parallels have been sought in the Arabic *hayy*, the Greek *γένος*, *genos*, the Roman *gens*, the Russian *mir*, the German *Gemeinde*, the Swiss *almend*, the Irish *sept*, and the North American *otem* (totem). It is now well established, however, that in the primitive Indo-European organization of society several families, presumably kindred, united in a brotherhood (Greek *φρατρία*, *phratria;* South Slavonic *bratstvo;* Latin *curia*, house); several brotherhoods in a tribe (Greek *φυλή*, *phylē*, South Slavonic *pleme*, Latin *tribus*); and finally several tribes in a folk, or nation (Greek *ἔθνος*, *ethnos*, Latin *populus*). Higher than the folk were loose federations merely of nations—*Völker*, or *populi*. From this scheme it is clear that the primitive "clan" is to be identified with the brotherhood rather than with the *γένος*, *genos*, or gens. In fact, the Greek *γένος* is post-Homeric, and therefore comparatively late; doubtless it became politically important with the rise of the aristocracy. The typical Greek *γένος* was but a powerful family under a single leader; most probably in early Attica the chief of every noble *γένος* had a seat in the great aristocratic council (of the Areopagus). But some Attic *γένη*, *genē*, were mere guilds of coppersmiths, of heralds, etc. The typical Latin *gens* likewise developed from the family, as is indicated by the derivation of the gentile name from the personal name, and was also a comparatively late institution. Probably every patrician *gens* was once represented by its chief in the Senate. Whereas the *γένος* and *gens* are thus seen to have been monarchial, the *φρατρία*, *phratria*, and the *curiæ* were aristocratic; the nobles held the offices and priesthoods, and doubtless controlled the votes of the commons,

many of whom were clients. In all essentials the *bratstvo* resembles the *gens* (*γένος, genos*) of the Greeks and Romans. The general principles of clanship were common rights and duties, with obligations to avenge one another's wrongs. The members were bound together, not only by the sentiment of common origin and blood, but also by the common worship of a protecting deity, from whom all claimed descent. After the introduction of Christianity among the Southern Slavs, a patron saint took the place of the ancestral deity, who is still celebrated in song, though shorn of his divine qualities. Much confusion has arisen from identifying the clan with the village. The basis of the clan, tribe, and folk is kinship, real, or assumed; the basis of the village, *pagus*, and *civitas* is in some degree territorial—the idea of neighbor partly supplanting that of kin. In simpler words, all the villagers were not even presumably kinsmen. Thus the village was the first step in the development of political society from tribal life. No theory of exogamy, metronymy, or of patriarchal government will apply to all clans; there are indications of a great variety of primitive usage. Apart from the Southern Slavs and from sections of India, the Indo-European clan has continued most vital among the Celts, especially in the Highlands of Scotland. The feuds of the clans and the struggle between these autonomous societies, on the one hand, and the central government on the other, made up a large part of the history of Scotland to the suppression of the Rebellion of 1745, after which the British Parliament enacted laws for the abolition of the hereditary jurisdiction of the Scottish chieftains, and for the disarming of the clans. The influence of the system still lingers, however, in remote and sparsely populated districts.

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CLANDESTINE MARRIAGE, THE. A comedy by Colman and Garrick (1766), worked over from the Rev. James Townley's farce *The False Concord.*

CLANG TINT, EXPLANATION OF. No one who is at all familiar with music has any difficulty in naming the instrument or class of instruments from which a given tone proceeds. "The same note" may be sounded, e.g., on piano, organ, violin, and harp. We recognize it as "the same" in every case; and yet it "sounds different," so that we can say, "This is the note of a pipe, this of a struck, or bowed, or plucked string." The criterion of difference, in such cases, is termed clang tint, or clang color, or timbre. The note of a musical instrument is not a pure tone (see AUDITION), but a mixture of tones. Strongest of the "partial" tones is the fundamental, the lowest constituent tone; this dominates and gives name to the whole tonal mass, so that the a^1 of the above-named instruments is named a^1 and sounds as a^1 in virtue of its fundamental—a pure tone of (say) 440 vibrations in the one second. Besides the fundamental, the note contains a number of higher partials or overtones. If we represent the pitch number of the fundamental by 1, then the pitch numbers of the overtones stand to it in the ratios 2, 3, 4, etc.; hence a perfect musical note would contain the vibration ratios 1: 2: 3: 4: 5: 6: 7 . . . , the overtones decreasing in intensity with their height, until they finally became inaudible. The primary reason that differences of clang tint obtain is that the various musical instruments favor certain overtones, and suppress others (Helmholtz); in some cases, e.g., the resonance chamber of the instrument reënforces only the odd-numbered partials, 3, 5, etc. (clarinet); in others, a particular overtone is killed by the striking of a string at a certain fraction of its length (in most modern pianos, the sixth overtone or seventh partial is thus suppressed); in others, again, the low overtones are weak and the high are strong (bassoon, harmonium). A practiced ear is sensible of these differences as such, and can analyze the note into its tonal components. For most hearers, however, the differences exist merely as differences in the "coloring" of the fundamental.

There are two further constituents of clang tint: 1. Different musical tones are accompanied by characteristic noises in wind instruments, by the rush or hiss of the air; in string instruments, by a scrape or thud or pluck. 2. Different musical tones begin and end in characteristic ways; the clangs of the zither are dry and short, those of the organ full and sustained; the oboe is flexible, the bombardon or bass tuba lumbers into the orchestral complex, etc. Finally, there are many secondary criteria for the recognition of musical tones: the range within which the fundamental falls, the intensity of the clang, the peculiar melodic task set to a sequence of tones, etc.

Clang Tint of Vowels. It was formerly believed that the vowel sounds of the human voice owe their clang tint to a regular series of overtones, and that vowel qualities differ from the tones of musical instruments in that the loudness of their overtones depends not solely upon numerical order, but principally upon absolute pitch. At the present time the evidence of experiments is against this view, and the following new theories have been proposed. 1. The vowel sounds owe their timbre to certain concomitant tones whose pitch remains relatively constant whatever the fundamental may be upon which the vowel is spoken or sung. These tones are called "formants"; they apparently represent the proper tones of the buccal resonance chambers; they are usually inharmonic both to the fundamental and to one another; and they may attain to a high degree of intensity. 2. Pure tones, without partials or formants, have in themselves vowel qualities. For example, low tones immediately suggest the sound of *oo* as in *moon;* if we ascend the scale, the *oo* gradually becomes more like *o* as in *hole,* until a tone is

reached that seems to be a pure *o;* if we continue up the scale, we find other tones which are like *a* as in *father,* then *e* as in *prey,* and finally *i* as in *machine.* 3. Finally, it is held that vowels are not tones at all; that, on the contrary, they are modes of noise; and that, if we attempt to classify them, we must regard them as qualities of noise.

Consult: Helmholtz, *Sensation of Tone* (Eng. trans., London, 1895); Stumpf, *Tonpsychologie* (Leipzig, 1890); Titchener, *Experimental Psychology* (New York, 1901); See INSTRUMENTATION.

CLAN-NA-GAEL. An Irish secret society, founded by fanatical Irishmen in the United States, for the purpose of intimidating the British government by violence and forcing compliance with Irish demands for home rule. It was responsible for the dynamite outrages of 1883 in London.

CLA'OSAU'RUS. See THESPESIUS.

CLAP, ROGER (1609–91). An English colonist in America; one of the founders of Dorchester, Mass. He was born in Salcomb, Devonshire, England; emigrated to New England, where he became one of the first settlers in Dorchester, in 1630, and was captain of the fort or "castle" on Castle Island from 1665 to 1686, after which, until his death, he lived in Boston. He is best remembered for his *Memoirs,* which he prepared about 1676, but which were not published until 1731, when they were edited by Thomas Prince. Six subsequent editions were published, the last appearing in 1844, as vol. i of the *Collections of the Dorchester Antiquarian and Historical Society.* The book is of slight historical value.

CLAP, THOMAS (1703–67). An American Congregational clergyman. He was born at Scituate, Mass., June 26, 1703; graduated at Harvard, 1722; was minister at Windham, Conn., from 1726 to 1740; president of Yale College from 1740 to 1766, rendering valuable service to the institution. Through his efforts, a college building and chapel were erected. His resignation was the result of his opposition to the revival movement headed by Jonathan Edwards and George Whitefield. His ingenuity and scientific attainments are attested by his construction of the first orrery or planetarium used in America. He published sermons, letters, and tracts; *Religious Constitution of Colleges, Especially of Yale College* (1754); *History and Vindication of the Doctrines Received and Established in the Chronicles of New England* (1755); and *Annals or History of Yale College* (1766). He died in New Haven, Conn., Jan. 7, 1767.

CLAPHAM, klăp'*a*m. A Parliamentary district of London (q.v.), England, 4½ miles southwest of St. Paul's Cathedral (Map: London, F 6). It is noted as one of the busiest railway centres in the world.

CLAPP, CORNELIA MARIA (1849–). An American zoölogist, born at Montague, Mass. She was educated at Mount Holyoke College, Syracuse University, and the University of Chicago, and in 1896 became professor of zoölogy at Mount Holyoke. During the summers of 1888–1902 she carried on investigations at the marine biological laboratory at Woods Hole, Mass. Her writings comprise articles on biology and morphology in technical journals.

CLAPP, MOSES EDWIN (1851–). An American legislator, born in Delphi, Ind. He graduated from the Wisconsin Law School in 1873, was county attorney of St. Croix Co., Wis., in 1878–80, and attorney-general of Minnesota in 1887, 1889, and 1891. He then removed to St. Paul. In 1901 he was elected to the United States Senate to fill a vacancy, and was reëlected in 1905, and again in 1911 for the term ending 1917. Senator Clapp identified himself with the progressive wing of the Republican party, and strongly supported the candidacy of Theodore Roosevelt for President in 1912. In the Sixty-third Congress he was chairman of the Committee on Standards, Weights, and Measures, and was a member besides of various important committees.

CLAPPER RAIL, or MUD HEN. See RAIL.

CLAP'PERTON, HUGH (1788–1827). A British explorer of Africa, born at Annan, Dumfriesshire, Scotland. He went to sea at 13, was impressed in the navy, served in the East Indies and on the Great Lakes (in the War of 1812 and immediately afterward), and returned to England as lieutenant in 1817. In 1822, with Oudney and Denham, he set out from the Mediterranean to explore the interior of Africa. The expedition was the first from Europe to reach Lake Chad (1823). Thence Clapperton and Oudney struck westward to find the source of the Niger; but on the way Oudney died (1824), and Clapperton was detained at Sokoto by the Sultan. He returned to England in 1825, was promoted to be commander, and was placed in charge of a second expedition for the exploration of the Niger. He set out from the coast of the Gulf of Guinea, his party this time consisting of Richard Lander (q.v.), who published an account of his chief's experiences, and three others, who died soon after leaving the Bight of Benin. Crossing the Niger to Bussang, the two survivors reached Sokoto, where Clapperton was detained for the second time, on account of civil war, and, worn out by hardships and failure, succumbed to disease. For his explorations, consult *Narrative of Travels and Discoveries in Northern and Central Africa, in the Years 1822, 1823, and 1824, by Major Denham, Captain Clapperton and the Late Dr. Oudney* (London, 1826), and Lander, *Records of Captain Clapperton's Last Expedition to Africa* (London, 1830).

CLAQUE, klăk (Fr., handclapping). A body of persons, individually known as "claquers," engaged to promote the success of a public performance by bestowing upon it preconcerted applause, and thus giving the public a false notion of the impression it has made. In principle, the claque has existed from time immemorial, since the friends of authors and actors would naturally be expected to assist with their appreciation; and tears and laughter in an audience are well known to be infectious. As a paid institution, it is traditionally counted an invention of Nero's time. According to Suetonius, the actor emperor had a body of 5000 stalwart applauders, whose example the public were expected to follow.

It was in Paris, however, that the claque was first regularly organized into a trade. It is said to have owed its suggestion to a trick of the poet Dorat, who distributed free tickets to his dependents upon condition that they applaud. About 1820 two men named Porcher and Santon regularly established the business of insuring dramatic success (*l'assurance des succès dramatiques*) by supplying the theatres with

as many "claqueurs" as the authors or managers thought each piece would require. Since their day various *chefs de claque* have gained importance in a position which required discrimination and tact. They have relations directly with the management of the theatres, and commonly attend the last rehearsals of a piece, in order to study it in advance and receive instructions as to the points where demonstrations are expected. Their assistants are, as a rule, picked up merely for each occasion. The main body of the claque sits generally near the rear of the middle of the parterre, beneath the chandelier, from which they have been called *chevaliers du lustre*. Others are distributed in different parts of the house, according to their particular functions, which illustrates how minutely the art is organized. Thus, the connoisseur is bound to learn the play by heart, and call the attention of the audience about him to the fine points; the *rieur* or *rigolard* must laugh at every jest; the *pleureur* ("weeper") has to manifest sensibility at the moving passages. This last part is generally assigned to women, in whom the frequent use of the handkerchief seems most natural. The *chatouilleur* ("tickler"), on the other hand, endeavors, by distributing bonbons, theatre bills, etc., and by lively conversation, to keep his neighbors in good humor; and, lastly, the *bisseur* calls *"bis!"* with the utmost enthusiasm, at the conclusion of the specified pieces of music.

The following incident, which found its way into the newspapers on the occasion of the death of the famous French actress Rachel, shows the ludicrous seriousness with which the members of the claque view their singular profession: Mademoiselle Rachel had just created a new character in a modern piece, and during the first evening was loudly applauded. The next, however, she thought her reception by no means so warm, and she complained that the claque did not do its duty. Its leader, on hearing of Rachel's dissatisfaction, wrote to her as follows: "Mademoiselle—I cannot remain under the obloquy of a reproach from such lips as yours! The following is an authentic statement of what really took place: At the first representation, I led the attack in person not less than 33 times. We had three acclamations, four hilarities, two thrilling movements, four renewals of applause, and two indefinite explosions. In fact, to such an extent did we carry our applause, that the occupants of the stalls were scandalized, and cried out *A la porte!* My men were positively exhausted with fatigue, and even intimated to me that they could not again go through such an evening. Seeing such to be the case, I applied for the manuscript, and, after having profoundly studied the piece, I was obliged to make up my mind for the second representation to certain curtailments in the service of my men. I applied them, however, only to MM. ——, and if the *ad interim* office I hold affords me the opportunity, I will make them ample amends. In such a situation as that which I have just depicted, I have only to request you to believe firmly in my profound admiration and respectful zeal; and I venture to entreat you to have some consideration for the difficulties which environ me." In spite of the comic side of the business, the public is generally hostile, and there have been actual riots owing to ill-timed efforts of the claque to overcome popular disapproval of a play. Occasional efforts have been made, with partial success, for the abolition of the claque; but it still commonly prevails, and plausible arguments are urged in its justification.

The allegation that, in London, theatrical artists and managers are obliged to endeavor to insure success by means of a similar institution is strenuously denied, although there, and in Germany and the United States, similar artifices, not so publicly organized, are practiced to some extent.

CLARA, Saint. See Clare, Saint.

CLARAC, klȧ′rȧk′, Charles Othon Frédéric Jean Baptiste, Comte de (1777–1847). A French painter and antiquarian. He superintended for a time the excavation at Pompeii, of which he gave an account in *Fouilles faites à Pompéi* (1813); was a member of the French Embassy in Brazil; and on returning to Paris was made keeper of the Museum of Antiquities in the Louvre, of which he published a catalogue. Others of his works are *Manuel de l'histoire de l'art chez les anciens* (1847), and *Musée de sculpture antique et moderne* (1826–52). The latter, an inventory of all the principal monuments in marble and bronze preserved in the various museums of Europe, is still consulted by archæologists and has been valuable for its promotion of the study of antique art in France.

CLARA VALLIS. See Clairvaux.

CLÄRCHEN, klĕrK′en. A country maiden in love with Egmont, in Goethe's *Egmont*. After his death she poisons herself.

CLARE (Ir., plain; Welsh *clawr;* connected with Gk. κλῆρος, *klēros,* lot). A maritime county in the Province of Munster, Ireland, bounded north by Galway and Galway Bay; east and south by the Shannon and its expansion, Lough Derg, separating it from Tipperary, Limerick, and Kerry; west by the Atlantic (Map: Ireland, C 4). Area, 1332 square miles—more than half being arable, and only a small part in wood. The surface is mostly hilly, with some mountains, bogs, marshes, and rugged pastures. The southwest third of the county forms part of the Munster coal field. Less than one-fifth of the county is under cultivation, but fine sheep and cattle are raised on the pastures. There are fishing interests and manufactures of frieze and hosiery. The chief town is Ennis, the county town. Pop. (which has decreased steadily since 1841), 1901, 112,334; 1911, 104,232. Consult Frost, *History and Topography of the County of Clare* (Dublin, 1893).

CLARE, John (1793–1864). An English peasant poet, born July 13, 1793, near Peterborough. He was taken from school at seven and employed on a farm, paying for such education as his meagre wages would allow. He became a servant in a public house, was apprenticed to a gardener, ran away, enlisted in the militia, lived among the gypsies, worked at a lime burner, and at one time was compelled to seek parish relief. In 1820 he published *Poems Descriptive of Rural Life and Scenery,* and later in the same year, his *Village Minstrel and Other Poems.* He became famous, was patronized and flattered, fell into dangerous habits, and, becoming insane, died in a private asylum, May 20, 1864. Though helped much by his friends, Clare was always poor. When very young he learned old songs, which first led him to verse making. Afterward he came across Thomson's *Seasons,* which he read constantly. His poems deal with rustic scenes and the incidents of village life. They are spontaneous and musical, but lack

vigor. For his life, consult: Martin (London, 1865); Cherry, *Life and Remains* (London, 1873); and A. Symons's introduction to *Poems* (London, 1908) of Clare, for a critical study.

CLARE, or **CLARA,** SAINT (1191–1253). The founder of the Order of Poor Clares, the Franciscan Order for women. She was a member of a rich and noble family of Assisi, in the Duchy of Spoleto. Attracted by the eloquence and piety of St. Francis of Assisi, she abandoned the pleasures of social life, in which she had previously indulged, and betook herself to solitude, prayer, and mystic meditation. With the advice of St. Francis she founded her Order in 1212, and, after obtaining a great reputation for sanctity, died at Assisi, Aug. 11, 1253. Two years afterward she was canonized by Pope Alexander IV. (See CLARES, POOR.) Consult Demore, *Vie de Sainte Claire d'Assisi* (Paris, 1856).

CLARE COLLEGE. One of the colleges of the University of Cambridge. It was founded as "University Hall" by the university in 1326. Ten years later its advowson or patronage was made over to Elizabeth de Burgh, Countess of Clare, by the chancellor of the university, Richard de Baden. Part of the great estates she had inherited by the death of her brother at Bannockburn she devoted to refounding this hall, first as Clare Hall, with the particular object of educating clergy to take the place of those swept off by the plague. In later generations the college departed from this pious purpose somewhat, though it was especially noted in the sixteenth and seventeenth centuries for its divines, who were learned, if somewhat too liberal-minded for their times. Bishop Latimer was a fellow of the college, as was Archbishop Tillotson; Cudworth was master, and among the other members of the seventeenth century may be noted William Whiston and Thomas Burnet. Wheelock, the Anglo-Saxon scholar, and Maseres, the mathematician, were also members of Clare. The buildings of the college have suffered very frequently from fire. The present quadrangle, one of the most beautiful in Cambridge, was begun in the seventeenth century; but the work was interrupted by the Civil War, and it was not completed till 1715. The present foundation consists of a master, 15 fellows, 31 scholars, besides undergraduates who in 1913 numbered 238. Consult J. R. Wardale, *Clare College* (London, 1899).

CLARE ISLAND. An island off the west coast of Mayo, Ireland, at the entrance of Clew Bay (Map: Ireland, A 3). It has a length of 4½ miles, with a breadth of 2 miles. On its northeast extremity there is a lighthouse at an elevation of 487 feet above the sea. Pop., 1000.

CLARE'MONT (Fr., fair mount). A mansion at Esher, in Surrey, England, 15 miles southwest of London. It was the home of Prince Leopold of Saxe-Coburg (later King of the Belgians) in the early part of the nineteenth century, and from 1848 to 1850 the residence of the exiled Louis Philippe, King of the French, who died there. In consequence, Claremont became the headquarters of the Orléans party.

CLAREMONT. A city in Los Angeles Co., Cal., 37 miles east of Los Angeles; on the Atchison, Topeka, and Santa Fe Railroad. It is the seat of Pomona College, established in 1888. Fruit growing, especially the raising of oranges and lemons, is the principal industry. Pop., 1910, 1114.

CLAREMONT. A town in Sullivan Co., N. H., 55 miles northwest of Concord; on the Boston and Maine Railroad (Map: New Hampshire, D 6). It is also on the Sugar River, which furnishes abundant water power. The town has manufactures of cotton and woolen goods, paper, diamond drills, machinery, machinery supplies, shoes, and lumber; and there are granite and marble yards. Claremont contains a Carnegie library, and owns its water works. Pop., 1900, 6498; 1910, 7529.

CLAREMORE. A city and the county seat of Rogers Co., Okla., 25 miles northeast of Tulsa, on the St. Louis and San Francisco and the St. Louis, Iron Mountain, and Southern railroads (Map: Oklahoma, F 2). Springs with medicinal properties, discovered in 1903, have made Claremore a popular health resort. The city contains also a fine State preparatory school. There are oil and stock-raising interests and manufactories of brick. The water works and electric light and power plant are owned by the municipality. Pop., 1900, 2064; 1910, 2866.

CLAR'ENCE, DUKE OF. A title occasionally given to a younger member of the British royal family. It was first bestowed on Lionel, the second son of Edward III. In recent years it was held by Albert Victor Christian Edward (1864–92), the eldest son of King Edward VII, then Prince of Wales.

CLARENCIEUX, klâr'en-shōō *or* -sū. An English heraldic officer, the first of the two provincial kings-of-arms, the second being Norroy. The jurisdiction of Clarencieux extends over all England south of the Trent, that of Norroy comprehending the portion north of that river. Clarencieux is named after the Duke of Clarence, third son of King Edward III. It is his duty to visit his province, to survey the arms of all persons bearing coat armor within it, to register descents and marriages, and to marshal the funerals of all persons who are not under the direction of Garter. He also grants arms within his province, with the approval of the Earl Marshal. See GARTER KING-AT-ARMS; HERALDS' COLLEGE; KING-AT-ARMS.

CLAR'ENDON. A lodge in Wiltshire, near Salisbury, England, where the "Constitutions of Clarendon," fixing the limits of the jurisdiction of the civil and ecclesiastical courts, were drawn up in 1164.

CLARENDON. A city and the county seat of Monroe Co., Ark., 60 miles (direct) east of Little Rock; on the White River and on the St. Louis Southwestern and the St. Louis, Iron Mountain and Southern railroads (Map: Arkansas, D 3). It is in a rich cotton-growing region and has lumber mills, boat-oar, barrel, button, plow-beam, wagon-material, telegraph and telephone supply, and shoe-last factories; a foundry, cotton gins, saw and planing mills, and bottling works. Pop., 1900, 1840; 1910, 2037.

CLARENDON. A town in Rutland Co., Vt., 6 miles south of Rutland; on the Rutland Railroad (Map: Vermont, B 5). The principal industries are dairying, fruit raising, and maple-sugar making. The locality is visited for its mineral springs, the waters of which are of considerable medicinal value. It is governed by an annual town meeting. Pop., 1910, 857.

CLARENDON, ASSIZE OF. A series of decrees issued by Henry II of England in 1166. By these he ordered (1) that in each county juries consisting of 12 men from each hundred, and four men from each vill should present

for trial before his justices all who were accused, or publicly suspected, of robbery or murder, or of harboring robbers or murderers; (2) that the system of frankpledge (q.v.) should be carried out more fully. Section 21 treated of the heretics who had recently appeared in England and was the first secular legislation against heresy in the west of Europe since the days of the Roman Empire. Consult Stubbs, *Select Charters Illustrative of English Constitutional History* (7th ed., Oxford, 1890). A translation can be found in Adams and Stephens, *Select Documents of English Constitutional History* (New York, 1901).

CLARENDON, CONSTITUTIONS OF. A body of laws defining the spheres of ecclesiastical and secular jurisdiction in the courts of England, adopted in 1164. In that year Henry II summoned the whole body of bishops and barons to a council at Clarendon, and some of the oldest members of the council were ordered to set down in writing the customs in use under Henry I. The report was to be made the basis for the definite determination of the disputes between the King and the clergy. The document known as the "Constitutions of Clarendon" was presented as the result of the inquiry. The constitutions were 16 in number. The substance of the most important articles was as follows: Members of the clergy accused of crime should be sent to the ecclesiastical courts for trial, and, if there convicted, were to be turned over to the law courts for further punishment. There was to be no appeal to Rome without the consent of the King. No beneficed clergyman might leave the realm without the King's consent. No villein could be ordained without the consent of his lord, and no tenant in chief of the King could be excommunicated without the King's knowledge. In addition to these subjects, the "constitutions" decided that questions of advowson and presentation should be tried in the King's court; that election to bishoprics and abbacies should be in the King's presence; and that the King had a right to the goods of felons deposited under the protection of the Church. Finally, the questions of titles to ecclesiastical estates, the trial of laymen for spiritual offenses, and the bestowal of churches in the King's gift were determined.

A great authority upon the "Constitutions of Clarendon" says: "They are no mere engine of tyranny, or secular spite, against a churchman; they are really a part of a great scheme of administrative reform, by which the debatable ground between the spiritual and temporal powers can be brought within the reach of common justice, and the lawlessness arising from professional jealousies abolished." The enactment of the "Constitutions of Clarendon" brought to a crisis the dispute between Henry II and Thomas à Becket, who made himself the champion of the ecclesiastical power, siding with Pope Alexander III when the latter rejected the "constitutions." Though the King had to undergo penance after the murder of Becket, some of the provisions of the "Constitutions of Clarendon" remained permanent gains to the civil power. Consult: Stubbs, *The Constitutional History of England*, vol. i (Oxford, 1896); Pauli, *Geschichte von England* (Gotha, 1853–58); and for the text of the "Constitutions," Stubbs, *Select Charters Illustrative of English Constitutional History* (7th ed., Oxford, 1890).

CLARENDON, EDWARD HYDE, EARL OF (1609–74). An English historian, and Chancellor of Charles II. The son of Henry Hyde, a private gentleman, he was born at Dinton, Wiltshire, Feb. 18, 1609. Destined for the church, he proceeded to Magdalen College, Oxford, where he was graduated Bachelor of Arts, Feb. 14, 1626. But instead of the clerical profession, he entered the Middle Temple, under his uncle, Chief Justice Sir Nicholas Hyde, treasurer of the society, and was called to the bar Nov. 22, 1633. His intimate friends were the brilliant *literati* of the period—Ben Jonson, Waller, Selden, Carew, Chillingworth, Hales, Falkland, and others. To them in after years he attributed much of his knowledge and worldly experience. He was twice married—his first wife dying after six months—and by both alliances gained wealth and political influence. In 1634 he became Keeper of the Writs and Rolls of the Common Pleas, and by some brilliant defense work acquired an extensive law practice. He came into high favor with Laud and was frequently consulted by him. He entered the "Short Parliament" of 1640 for Wootton Bassett and distinguished himself as a supporter of the Popular party. He represented Saltash in the "Long Parliament," but as an Episcopalian he eventually seceded from the Popular party on ecclesiastical questions, and thereby gained the King's favor. He headed the Royalist party in the Commons and counseled conciliation by a persistent appeal to the "known laws of the land." He was the author of most of the King's answers to the parliamentary manifestoes. At the outbreak of the Civil War he attached himself to the royal cause and in 1643 was knighted and made Chancellor of the Exchequer and Privy Councilor. After viewing the battle of Edgehill he joined Prince Charles (Charles II) in the West, and accompanied him in his flight to Jersey. He remained in that island for two years and began his *History of the Rebellion*. In June, 1648, after capture and spoliation by an Ostend pirate, he rejoined Prince Charles at The Hague. He exerted himself to save the life of Charles I, and after that monarch's execution was retained as counselor by Charles II, in 1649, going to Spain on an unsuccessful mission for assistance. At Charles's request he rejoined him in Paris, and as the King's most trusted adviser there, as also in Cologne and Bruges, spent the next nine years, frequently in abject poverty. Charles formally declared him Lord Chancellor in 1658. At the Restoration in 1660 Charles confirmed this appointment and in November of this year created him Baron Hyde. He also became chancellor of Oxford University and in April, 1661, he was created Viscount Cornbury and Earl of Clarendon. In September, 1660, his daughter Anne formed a secret marriage with the Duke of York, afterward James II, and subsequently became the mother of Mary and Anne, the future English queens. The King and Clarendon were wroth; but Clarendon's indignation was somewhat overacted, and excited an aftersuspicion that he deliberately proposed the barren Catharine of Braganza as Charles II's consort, to provide for his posterity's succession to the throne. During his premiership the settlement of Scotland and Ireland owed much to him, and he took a leading part in colonial extension. He was one of the eight proprietors to whom the first Carolina Charter was granted in 1663, the Cape Fear establishment being named "Clarendon

County" after him. He also helped the Presbyterian Baxter, to whom he offered a bishopric, in the incorporation of a company for the propagation of the gospel in New England. The ill success of the Dutch War and the sale of Dunkirk to the French aroused public indignation, and he became exceedingly unpopular. In 1663 the Earl of Bristol unsuccessfully accused him of bribery in the House of Lords, but in 1667 he fell a victim to court intrigue; and having offended the King by opposing his divorce, that he might marry Fanny Stewart, whom Clarendon induced the Duke of Richmond to wed, Charles deprived him of his offices and indirectly advised him to withdraw to Calais. Clarendon sent a vindication to the Lords, which both houses of Parliament ordered to be burned by the common hangman. After being almost murdered by some English sailors at Evreux, he lived in exile for six years, sending humble appeals to be allowed to pass his remaining years on English soil. He died in Rouen, Dec. 9, 1674, and was buried in Westminster Abbey.

In a generally profligate court he was almost the only moral man, and was distinguished for his unswerving fidelity to the Episcopal church and his determined maintenance of what he considered the true and ideal English constitution. He was a ready debater and pleasing speaker, but it is for his literary productions that he is best remembered. The first edition of his great *History of the Rebellion* (Oxford, 1702–04) was not printed from the original manuscript, and some passages were slightly altered by the editors. A complete edition, by Dr. Bandinel, first appeared in 1826; while the best edition, in 6 vols., was published at Oxford in 1888. He wrote also a *Life of Edward Hyde, Earl of Clarendon*, with a *Continuation of the History of the Grand Rebellion from the Restoration to his Banishment in 1667* (1759); and a *History of the Rebellion and Civil War in Ireland* (1720). Consult: Agar-Ellis, *Historical Inquiry Respecting the Character of Edward Hyde, Earl of Clarendon* (London, 1827); Lister, *Life and Administration of Edward Hyde, First Earl of Clarendon* (London, 1837–38); Lewis, *Lives of the Friends and Contemporaries of Clarendon* (3 vols., London, 1852); Campbell, *Lives of the Lords Chancellors*, vol. iii (London, 1869); Oldmixon, *Clarendon and Whitelocke Compared* (2d ed., London, 1787); Craik, *Life of Edward, Earl of Clarendon* (New York, 1911); Firth, *Edward Hyde, Earl of Clarendon* (Oxford, 1909); and the histories of Green, Ranke, and Gardiner.

CLARENDON, George William Frederick Villiers, fourth Earl of (1800–70). An English diplomat and statesman, the eldest son of George Villiers and grandson of Thomas Villiers, who in 1752 married the heiress of the last Lord Clarendon of the Hyde branch, and was created Baron Hyde, 1756, and Earl of Clarendon, 1776. He was born in London, Jan. 12, 1800. He entered St. John's College, Cambridge, in his sixteenth year, and by titular privilege attained the M.A. degree in 1820. The same year he entered the diplomatic service as an attaché to the British Embassy at St. Petersburg, and at 23 years of age had acquired practical experience that was of particular value in his subsequent career. He was an accomplished linguist and writer. Appointed Commissioner of Customs in 1823, in 1827–29 he gained administrative knowledge in arranging the union of the English and Irish excise boards, and an insight into Irish character and affairs which made him an authority with Lord Lieutenant Paget, Marquis of Anglesey. In 1831, as coadjutor to Sir John Bowring, he successfully negotiated a commercial treaty with France, and in 1833 was sent as envoy extraordinary and minister plenipotentiary to Madrid, where he acquired great influence and a lifelong popularity. He was rewarded with the Grand Cross of the Bath in 1837, and at his uncle's death, Dec. 22, 1838, succeeding to the Clarendon peerage as fourth Earl, he returned to England to take his seat in the House of Lords. He entered Lord Melbourne's administration as Lord Privy Seal in 1840, and also became chancellor of the Duchy of Lancaster. When the ministry fell, in 1841, he became an active member of the Opposition, but, as a stanch free trader, warmly supported Sir Robert Peel's measures for the repeal of the Corn Laws. Under Lord Russell he became President of the Board of Trade in 1846, and in the following year was appointed Lord Lieutenant of Ireland. The insurrectionary follies of Smith O'Brien and his followers were agitating the country; but Clarendon's prompt and decisive measures soon restored tranquillity, while his tact and impartiality allayed party feeling. In 1852, under Lord Aberdeen, and in 1855–58, under Lord Palmerston, Clarendon was Foreign Secretary. Upon him fell the burden of the Crimean War; he personally attended the Congress of Paris, and the peace of 1856, with its beneficial results to European politics, testifies to his foresight and ability. He retired with the ministry in 1858; resumed the Foreign Secretaryship in 1865–66, and held it again under Gladstone from 1868 until his sudden death, June 27, 1870. Consult Thornton, "Life of George William Frederick Villiers, Fourth Earl of Clarendon," in *Foreign Secretaries of the Nineteenth Century*, vol. iii (London, 1881–82).

CLARENDON PRESS. A printing and publishing establishment connected with Oxford University (England). It was founded in 1672, and named Clarendon, because the printing house was paid for by the profits on the sale of Lord Clarendon's *History of the Rebellion*, of which work the university has a perpetual copyright. It now has an American branch.

CLARENS, klȧ'răN'. One of a number of villages in the Canton of Vaud, Switzerland, scattered along the shores of Lake Geneva. It is 3½ miles southeast of Vevey, and 1200 feet above sea level (Map: Switzerland, A 2). The town is charmingly situated, has a mild climate, and is a favorite resort for invalids. It is known as the scene of Rousseau's *La Nouvelle Hélöise.*

CLARES, klâr, Poor, or Clarisses. A religious order founded by St. Clare, with the counsel and help of St. Francis of Assisi, in 1212. At first the nuns observed the rule of St. Benedict, but in 1224 the austerity of this rule was mitigated by St. Francis, and again modified by Urban IV in 1263. The order rapidly increased, and by the end of the sixteenth century numbered nearly 50,000. The nuns devote themselves chiefly to the education of the young. They are under the jurisdiction of the General and Provincials of the Friars Minor. In 1875 two sisters came to the United States from Rome; in 1877 others came from Germany. They had in 1911, in the United States, 7 convents and 204 professed sisters; in England, 11

convents; in Scotland, 1; and in Ireland, 9. The English follow the reform of St. Colette, who in 1436 brought back many French, Belgian, and German converts to the strict Franciscan rule.

CLARET. See WINE.

CLARETIE, klär'tē', JULES (properly ARSÈNE ARNAUD) (1840–1913). A French author and theatrical manager, born at Limoges (Haute-Vienne). He studied at the Lycée Bonaparte of Paris, and became known as a feuilletonist and dramatic critic. During the Franco-Prussian War he acted as correspondent for Paris papers for a brief period. His first play won but moderate success (*La famille des Gueux*, 1869), but subsequently dramatizations of several of his own works of fiction, such as *Les Muscadins* (2 vols., 1874, and presented as a play in that year) and *Le Prince Zilah* (1884; presented in 1885), established him upon the French stage. In 1907 he wrote and had produced the drama *Thérèse*. In 1885 he became director of the *Comédie française*, whose traditional excellence he sought to maintain. He is best known, however, for his novels and historical and critical works. Among the former are, in addition to the two already named, *L'Assassin* (1866), *Monsieur le Ministre* (1882), *Puyjoli* (1890), and *L'Accusateur* (1897). From the latter may be cited *Histoire de la révolution de 1870–71* (new ed., 5 vols., 1875–76); *Cinq ans après* (1876), a study of postbellum conditions in Alsace-Lorraine; *Les Prussiens chez eux* (1872). Among his critical works may be mentioned *La vie moderne au théâtre* (1868–69); *Molière* (1871); and *Histoire de la littérature française* (2d ed., 1905). In 1888 Claretie was elected to the Académie Française.

CLARI, klä'rē, **THE MAID OF MILAN.** An opera by Sir Henry Bishop (1823), introducing John Howard Payne's "Home, Sweet Home," which was written expressly for it.

CLARIFICATION. See FINING.

CLARIN'DA. A city and the county seat of Page Co., Iowa, 79 miles by rail southeast of Council Bluffs; on the Nodaway River, and on the Chicago, Burlington, and Quincy Railroad (Map: Iowa, B 4). It is in an agricultural and stock-raising region, which has also some coal deposits. The city exports live stock, poultry, butter, eggs, seeds, grain, and coal; and there are flour mills, carriage works, brickyards, lawn-mower and well-boring machine factories, a foundry, a creamery, a cold-storage plant, an ice plant, etc. Clarinda contains a public library, and owns its water works. The State Asylum for the Insane is a short distance from the city. Pop., 1890, 3262; 1900, 3276; 1910, 3832.

CLAR'INET' (Fr. *clarinette*, from It. *clarinetto*, dim. of *clarino*, clarion, from *claro*, Lat. *clarus*, clear), or CLARIONET. A wood-wind instrument of the reed kind, developed by Joseph Christopher Denner, in Nuremberg, in 1690, from the chalumeau, a primitive wind instrument, by the addition at the nodal point of a small hole and key, which gave an additional register, one-twelfth higher. Its tone is produced by a thin piece of Spanish reed nicely flattened and tied, or otherwise fixed to the mouthpiece. On the body of the instrument there are 18 holes, 13 of them with keys for the fingers of the performer, by which the notes are produced. In extent (3½ octaves, from e to c^4), fullness, and variety of tone, the clarinet is the most perfect of wind instruments. Its construction, however, does not admit of every key in music being played on the same instrument; for which reason clarinets of different pitch, generally A, B♭, and C, also a bass clarinet (usually in B♭) are used in orchestra music. Mozart's familiar E♭ major symphony is the first work of its kind in which clarinets were employed. Consult W. Altenburg, *Die Klarinette* (Heilbronn, 1904). See ORCHESTRA.

CLAR'ION. A borough and the county seat of Clarion Co., Pa., about 100 miles (direct) north-northeast of Pittsburgh, on the Pennsylvania Southern Railroad, and on the Clarion River, here spanned by a State bridge (Map: Pennsylvania, B 3). It is the seat of a State Normal School and has an attractive courthouse. The surrounding region produces natural gas, oil, and lumber, and there are coal works and cigar and glass-bottle factories. Clarion was settled in 1839 and was incorporated in 1841. The government is administered by a burgess, elected every three years, and a unicameral council. Pop., 1900, 2004; 1910, 2864.

CLARIS'SA HAR'LOWE. A novel, by Samuel Richardson, published in 1748. See HARLOWE, CLARISSA.

CLARISSES, klä'res'. See CLARES, POOR.

CLARK, ABRAHAM (1726–94). An American patriot, a signer of the Declaration of Independence. He was born near Elizabeth, N. J.; practiced law for a time, and was called the "poor man's councillor"; and, on the approach of the Revolutionary War, identified himself with the patriot cause. He was elected to the Provincial Congress in 1775; was a member of the Continental Congress in 1776–78, 1780–83, and 1785–88; was a delegate to the Annapolis Convention (q.v.) in 1786, and from 1791 to 1794 was a member of Congress.

CLARK, ALBERT CURTIS. An English classical scholar. He was educated at Oxford, graduated at Queen's (1882) and became (1884) fellow and tutor of Queen's College and (1909) university reader in Latin. His great work was as an editor of the Oxford *Cicero*, and as an investigator, after Zielinski, of rhythmic *clausulæ* in Cicero's prose and in other authors. He edited *Asconius* (1907) and *Fontes Prosæ Numerosæ* (1909); wrote *The Cursus in Mediæval and Vulgar Latin* (1910), and *Prose Rhythm in English* (1913).

CLARK, ALONZO (1807–87). An American physician. He was born in Chester, Mass., and graduated in 1828 at Williams, and in 1835 at the New York College of Physicians and Surgeons, where he was professor of physiology and pathology from 1848 to 1855, and of pathology and practical medicine from 1855 to 1885, and dean and president of the faculty in 1875–85. Possibly his most important publication was *Lectures on Diseases of the Heart* (1889).

CLARK, ALONZO HOWARD (1850–). An American ichthyologist, born in Boston. He studied at Wesleyan University; in 1883 was a member of the United States Commission at the International Fisheries Exhibition, London, and in 1889 was sent as expert commissioner to the Paris Exposition of that year. From 1889 to 1908 he was assistant secretary of the American Historical Association. His publications include: *Statistics of Fisheries of Massachusetts* (1882); *History of the Mackerel Fishery* (1883); and *A National Register of the Society of the Sons of the American Revolution* (1902).

CLARK, Alvan (1808–87). An American optician, born at Ashfield, Mass. The son of a farmer, he became a self-taught engraver, portrait painter, and optician, and was employed as an engraver in a calico-print manufactory at Lowell, Mass. After being a portrait painter in Boston, he began the manufacture of telescopes at Cambridgeport, Mass., about 1844, and completed the first achromatic lenses made in the United States. He also devised an ingenious eyepiece for measuring celestial arcs of lesser magnitudes. The chief telescopes of recent times have been the work of his establishment. *The Proceedings of the Royal Astronomical Society*, vol. xvii (London, 1857), contains the list of his own discoveries with his telescopes. See Telescope.

CLARK, Alvan Graham (1832–97). An American optician and astronomer, born at Fall River, Mass., son of Alvan Clark, with whom he was associated in the manufacture of telescopes. Among the great telescope lenses made by him are those in the Lick Observatory in California (36 inches in diameter), and in the Naval Observatory at Washington (26 inches); the 30-inch refractor for the Nicholas Central Observatory of Pulkowa; and the great 40-inch lens, the largest in actual use, for the Yerkes Observatory (at Williams Bay, Wis.) of the University of Chicago. He was also active as an astronomical observer, and made many discoveries of double stars, including that of the companion of Sirius (January, 1862; after Safford's determination of its position), for which he received the Lalande gold medal of the French Academy. See Telescope.

CLARK, Sir Andrew (1826–93). A British physician, born in Aberdeen, Scotland, and educated at the University of Aberdeen and in Edinburgh. He joined the medical department of the navy in 1848 and was appointed pathologist to the Haslar Hospital (1849), curator of the museum of the London Hospital (1853), and assistant physician of this hospital (1854). After 1854 he was connected with the College of Physicians, as member, fellow, and officer—from 1888 to his death he was president. Meanwhile he built up a large practice in London, and counted among his patients many of the notable persons of his day. He wrote on various subjects, especially tuberculosis, a tendency to which he himself had had all his life.

CLARK, Champ (1850–1921). An American politician, born in Anderson Co., Ky., and educated at Kentucky University, at Bethany College, and at the Cincinnati Law School. In 1873–74 he was president of Marshall College, W. Va. He was city attorney of Louisiana, Mo., and afterward of Bowling Green, Mo., and was prosecuting attorney of Pike County, in that State. In 1904 he was chairman of the National Democratic Convention, at St. Louis, and chairman of the committee which notified Judge Parker of his nomination to be the Democratic candidate for the presidency. He was elected Democratic Representative from the Ninth District of Missouri in 1893, and from 1897 was reëlected to the three succeeding congresses. He was chosen Speaker of the House in the Sixty-second Congress partly as a reward for the ability he had displayed as minority leader in the preceding Congress. Mr. Clark brought impartiality and dignity to the speakership, and was notably successful in perfecting the organization of the House and in establishing absolute discipline; and among those of his own party at Washington his council came to have much weight. Speaker Clark was one of the leading candidates for the presidential nomination at the National Democratic Convention, Baltimore, 1912; and it was only on the forty-sixth ballot that his chief competitor, Woodrow Wilson, obtained the nomination. This result was hastened by W. J. Bryan, who threw his support over to Wilson, alleging that Mr. Clark was allied with Tammany Hall. The charge, vehemently denied by Mr. Clark, aroused the most bitter feeling among the latter's supporters against Bryan. But the defeated nominee himself loyally supported the Democratic ticket in the ensuing campaign.

CLARK, Charles Edgar (1840–1922). An American naval officer, born at Bradford, Vt. He entered the United States Naval Academy in 1860 and in 1863 was made an ensign. Subsequently he served on the steam sloop *Ossipee*, of the Western Gulf Blockading Squadron in 1863–65; took part in the battle of Mobile Bay and in the bombardment of Fort Morgan (1864); was commissioned a lieutenant commander in 1868, and in that year was serving on the *Suwanee* when she was wrecked off Vancouver Island. He was stationed at the Naval Academy in 1870–73, became a commander in 1881, was lighthouse inspector in 1887–91, and was stationed at the Mare Island Navy Yard in 1891–93. Promoted to captain in 1896, he was transferred from the *Monterey* at the Mare Island Navy Yard, San Francisco, to the command of the battleship *Oregon*. In this vessel he sailed from San Francisco on March 19, 1898, and covered the 13,000 miles around Cape Horn to Key West in 65 days, thereby establishing a new record for a sea voyage under such conditions. Under command of Captain Clark, the *Oregon* at once joined Admiral Sampson's squadron, and bore an important part in the destruction of Admiral Cervera's fleet. He was advanced to rear admiral in 1902, was afterward governor of the United States Naval Home at Philadelphia, and retired in August, 1905.

CLARK, Charles Hopkins (1848–1926). An American newspaper editor, born in Hartford, Conn. He graduated from Yale in 1871 and in the same year became connected with the Hartford *Courant*, the oldest newspaper continuously published in America. After 1890 he was editor in chief of this paper. He was president and director of many important financial institutions and companies, and from 1909 to 1913 was treasurer and member of the commission on the State Reformatory. In 1910 he received the degree of L.H.D. from Trinity College.

CLARK, Charles Kirk (1857–). A Canadian physician and alienist. He was born at Elora, Ontario, and graduated at Toronto University in 1878. In 1880 he was appointed assistant medical superintendent of the Hamilton Insane Asylum, and for 20 years after 1885 he was medical superintendent of the Rockwood Asylum for the Insane at Kingston, while at this post serving also as professor of mental diseases at Queen's University. In connection with the asylum he founded a home for nurses and convalescents. Of the *American Journal of Insanity* he became coeditor in 1904. He was appointed medical superintendent of the Toronto Asylum for the Insane in 1905, professor of psychiatry in Toronto University in

1907, and dean of that institution's medical faculty in the following year. In 1907 he was also a member of the royal commission for the study of methods of treatment of the insane in Europe. His contributions on alienistic subjects to various journals gained him a high reputation.

CLARK, Clarence Don (1851–). An American legislator, born at Sandy Creek, N. Y. He was educated at Iowa State University, practiced law in Delaware Co., Iowa, and at Evanston, Wyo., and was a member of the constitutional convention of Wyoming, and a delegate to a number of Republican national conventions. Upon the admission of Wyoming as a State he was elected to the Fifty-first and Fifty-second Congresses; in 1895 was elected to the United States Senate to fill a vacancy, and in 1899 and 1905 was reëlected, and again in 1911 for the term ending 1917. In the Sixty-third Congress he was chairman of the Committee on Geological Survey, and was also a member of other important committees.

CLARK, Daniel (1836–1912). A Canadian physician. He was born at Granton, Inverness-shire, Scotland; went to Canada in 1841, and graduated at Victoria University in 1858. He subsequently received from the University of Toronto the degree of M.D., studied at Edinburgh, and practiced at Princeton, Ontario. During the Civil War he was for a short time attached as volunteer surgeon to the Army of the Potomac, and in 1872 was elected a member of the Ontario Medical Council. He was afterward connected with various educational and charitable institutions, and in 1875 was appointed superintendent of the Provincial Lunatic Asylum, Toronto. He wrote *Pen Photographs* (1873); *Josiah Garth,* a novel; and other works.

CLARK, Edward (1822–1902). An American architect, born in Philadelphia, Pa. He studied architecture with Thomas U. Walter, and succeeded him as architect of the United States Capitol extension in 1865. He was appointed by Congress on the commission for the completion of the Washington Monument, and on the commission for the construction of the Congressional Library, and did other governmental work. He was a member of the American Institute of Architects, fellow of the Clarendon Historical Society of Edinburgh, and trustee of the Corcoran Art Gallery in Washington.

CLARK, Edwin Charles (1835–). An English legal writer and teacher. He graduated at Trinity College, Cambridge, became a scholar and fellow of Trinity, and subsequently was appointed professorial fellow of St. John's, and was then regius professor of civil law in the university until 1914. He published: *Early Roman Law: Regal Period* (1872); *An Analysis of Criminal Liability* (1880); *Practical Jurisprudence* (1883); and *Cambridge Legal Studies* (1888); *Practical Jurisprudence: A Comment on Austin* (1888); *History of Roman Private Law* (1906).

CLARK, Francis Edward (1851–1927). An American Congregational clergyman. He was born at Aylmer, Canada, Sept. 12, 1851; graduated at Dartmouth College in 1873, and at Andover Theological Seminary in 1876. He held a Congregational pastorate at Portland, Me., from 1876 to 1883, and was a pastor of Phillips Church, South Boston, in 1883–87. In 1881 he organized the Williston Young People's Society of Christian Endeavor in his church at Portland, and in 1887 became president of the United Society of Christian Endeavor, which sprang from it, and editor of its official organ, the *Golden Rule.* (See Christian Endeavor, Society of.) He published: *The Children of the Church, and the Y. P. S. C. E. as a Means of Bringing them Together* (1888); *World-wide Endeavor, the Story of the Y. P. S. C. E. from the Beginning and in all Lands* (1896); *Fellow Travelers: A Personally Conducted Journey in Three Continents; A New Way Around the World* (1901), an account of experiences on the Trans-Siberian Railway; *The Continent of Opportunity* (South America) (1909); and other works in the interest of the society.

CLARK, Galen (1814–1910). An American naturalist, born at Dublin, N. H. In 1853 he went to California and worked in placer mines, but within four years was serving as guide to parties of tourists to Yosemite Valley. In 1857 he discovered the great redwood growth at Mariposa, in 1864 he opened a small hotel at Wawona, and in 1865 was appointed commissioner and guardian of the newly created Yosemite Valley Park. He was succeeded by another, but for the last 20 years of his life was again guardian of the park. He was an intimate friend of John Burroughs, John Muir, and Joseph Le Conte, who considered him a high authority on the geology and natural wonders of the Sierra Nevada Mountains. He published *The Indians of Yosemite Valley* (1904); *The Big Trees of California* (1907); *The Yosemite Valley, its History, Characteristic Features, and Theories Regarding its Origin* (1910).

CLARK, George Rogers (1752–1818). An American soldier and frontiersman, who rendered valuable services to the United States during the Revolutionary War. He was born near Monticello, in Albemarle Co., Va.; received a common-school education; made a tour west of the Alleghanies in 1772; became a land surveyor, and in 1774 served against the Indians in Lord Dunmore's War (q.v.). He spent some months in Kentucky in 1775; removed thither early in 1776, and soon became the recognized leader of the backwoodsmen. In June, 1776, he was chosen one of two delegates to represent Kentucky, then a district of Virginia, in the Virginia Legislature, and in this capacity not only brought about the organization of Kentucky as a separate county, but secured a large supply of much-needed powder for the use of the backwoodsmen. After his return he conceived a plan for the conquest of the "Illinois Country," and having won the support of Patrick Henry, then Governor of Virginia (to lay his plans before whom he had traveled on foot from Harrodsburg, Ky., to Williamsburg, Va.), he was appointed lieutenant colonel, raised the necessary troops, and proceeded to the site of Louisville, Ky. Starting from this point on June 28, 1778, he captured Kaskaskia (q.v.) on July 4, and by deputy secured the surrender of the other French villages, Cahokia and Vincennes. General Hamilton, the English commander at Detroit, recaptured Vincennes, then held by Captain Helm, in December; and Clark, upon hearing the news at Kaskaskia, put himself at the head of 170 men, and after an arduous march in the depth of winter, through swamps and dense forests, forced Hamilton to surrender on Feb. 24, 1779. (A monument to Clark, commemorating these feats, was erected at Vincennes in 1905.)

Early in 1780 he built Fort Jefferson, on the left bank of the Mississippi, a short distance below the mouth of the Ohio. From this time until the close of the war he was engaged almost constantly in warfare against the British and Indians, totally defeating the Shawnees, destroying the Indian villages along the Big Miami, and rising to the rank of brigadier general of Virginia militia. After the close of the war he led an unsuccessful expedition against the Wabash Indians in 1786, came into conflict with the Spanish authorities in the West, and seems to have advocated an expedition, which he was to lead, for the capture of Natchez and St. Louis and the opening of the Mississippi to unrestricted navigation. In 1793, during the pro-French agitation in the United States, he was commissioned a general by the French government, and issued a call for volunteers for the purpose of reconquering the Spanish possessions along the Mississippi on behalf of the French. He passed the latter part of his life in poverty at Clarksville, in Indiana, near Louisville, Ky., on part of the land granted him by the Virginia Legislature.

Clark's services during the Revolutionary War were of the utmost value to the United States government, inasmuch as the virtual conquest of the Northwest served as, perhaps, the chief basis of the American claim, in the peace negotiations of 1782–83, to the territory between the Mississippi and the Alleghanies. But for this conquest, according to many historians, the western territory would probably have passed either to England or to Spain. In recognition of his services, the Virginia Legislature, in 1783, granted him a tract of 8049 acres—140,000 more being granted to his officers and men—in the present State of Indiana, and on two occasions presented him with a sword. Clark wrote two accounts of his expedition—one of which, his *Letter to George Mason, of Virginia*, was first published in Cincinnati in 1869; and the other, entitled his *Memoir*, and written probably in his old age, at the request, it is said, of Presidents Jefferson and Madison, was first published in part in Dillon's *Indiana* (1843). Consult: English, *The Conquest of the Country Northwest of the Ohio River, 1778–83, and Life of George Rogers Clark* (Indianapolis, 1896); and Roosevelt, *Winning of the West*, vols. i and ii (New York, 1889); Butterfield, *History of G. R. Clark's Conquest of the Illinois and the Wabash Towns* (Columbus, 1904). Many documents relating to Clark and the conquest of the Illinois country are to be found among the Draper Manuscripts, in the Library of the Wisconsin Historical Society, Madison, Wis.

CLARK, Henry James (1826–73). An American naturalist, born at Easton, Mass. He graduated at New York University in 1848; then studied botany under Asa Gray at the Cambridge Garden, and later under Agassiz at Harvard. On graduating from the Lawrence Scientific School (1854), he remained with Agassiz in the capacity of private assistant until 1863. With Agassiz he did important work on the embryology of the turtle (1857). In 1860 he was made adjunct professor of zoölogy at the Lawrence School. In 1864 he delivered a course of lectures, *Mind in Nature* (published 1865), at the Lowell Institute, and from 1866 to 1869 was professor of the natural sciences at the Pennsylvania Agricultural College. From 1869 to 1872 he held a similar post at the University of Kentucky, and during the last year of his life was professor of veterinary science at the Massachusetts Agricultural College, in Amherst. Consult Packard's "Memoir" in *Biographical Memoirs of the National Academy of Sciences* (Washington, 1877).

CLARK, Hubert Lyman (1870–). An American zoölogist, born at Amherst, Mass., and educated at Amherst College and Johns Hopkins University. He was professor of biology at Olivet (Mich.) College from 1899 until 1905, when he became an assistant in invertebrate zoölogy in the Museum of Comparative Zoölogy, Harvard. Scientific investigations, leading to the publication of numerous papers, were carried on by him in Jamaica and Bermuda. He was a contributor to the New International Encyclopædia in 1900–03. His publications include: *The Birds of Amherst and Vicinity* (1887); *The Echinoderms of Porto Rico* (1901); *A New Ophiuran from the West Indies* (1910); *North Pacific Ophiurans in the Collection of the United States National Museum* (1911).

CLARK, Isaac (1833–1918). An American theologian, born at Canterbury, Conn. He was educated at Yale University, Union Theological Seminary, and Andover Theological Seminary, and was ordained at Elmira, N. Y. (1861–68); Aurora, Ill. (1868–72); Brooklyn (Elm Place Church, 1872–74); Rondout, N. Y. (1874–82); and the Edwards Church (Congregational), Northampton, Mass. (1882–91). In 1891 he became professor of theology, homiletics, and English exegesis at Howard University (Washington, D. C.), and after 1901 was in addition dean of that institution's theological school.

CLARK, Sir James (1788–1870). An English physician. He studied law and then medicine, practiced in Rome in 1819–26 and then in London, and on the accession of Victoria, was appointed physician in ordinary to her Majesty, and attended the Queen on most of her journeys to Scotland and the Continent. He was made a baronet in 1838. He wrote *The Influence of Climate in the Prevention and Cure of Disease* (1829), and *A Treatise on Pulmonary Consumption* (1835).

CLARK, John Bates (1847–). An American economist, born at Providence, R. I., Jan. 26, 1847, and educated at Brown University, Amherst College, and at the universities of Heidelberg and Zurich. He was appointed professor of political economy and history in Carleton College, Minn., 1877; professor of history and political science in Smith College, 1881; professor of political economy in Amherst College, 1892; and in Columbia University, 1895. For three years (1892–94) he was lecturer on economics in the Johns Hopkins University, and (1893–95) was president of the American Economic Association. In 1911 he was appointed director of the division of economics and history of the Carnegie Endowment for International Peace. Besides numerous articles in scientific periodicals, he has published the following works: *The Philosophy of Wealth* (1885); *Capital and its Earnings* (1888); *Wages* (1889); *The Distribution of Wealth* (1901); *The Control of Trusts* (1901); *The Problem of Monopoly* (1904; revised, in collaboration with John Morris Clark, 1912); *Essentials of Economic Theory* (1907). Since the death of Francis A. Walker, Professor Clark has occupied the first place among American economists. The distinguishing features of Professor

Clark's economic theory are his distinction between the static and dynamic forces in economic life; his derivation of value from effective utility; and his explanation of interest in terms of the productivity of capital. In his social political teachings Professor Clark defends the essential justice and beneficence of an economic system based upon free enterprise. The chief defects in the existing economic system are, in his view, an outgrowth of monopoly, and can be removed by appropriate legislative measures. Professor Clark does not limit the economic sphere of the state to the protection of property and the restraint of monopoly, but offers a qualified defense, on dynamic grounds, of protection and other measures usually regarded by economists as paternalistic.

CLARK, JOHN WILLIS (1833–1910). An English zoölogist. He was educated at Eton and at Trinity College, Cambridge, where in various capacities he spent more than three quarters of a century. As superintendent of the museum of zoölogy for 25 years he did much to promote the study of natural sciences at Cambridge. He became registrar of the university in 1891. Besides his papers on the anatomy and habits of the narwhal, and on the dolphins and on the extinct rhytina his publications include: *Old Friends at Cambridge and Elsewhere* (1900); *The Care of Books* (1901; 3d ed., 1909); *Cambridge, a Concise Guide of the Town and University* (1902; 3d ed., 1906); *Endowments of the University of Cambridge* (1904).

CLARK, JONAS GILMAN (1815–1900). An American philanthropist, born at Hubbardston, Mass. After a term of service as a carriage maker's apprentice, he began the manufacture of tinware, with shops at Milford and Lowell. In 1853 he went to California, where he developed a successful business. He invested largely in real estate, and subsequently added to his fortune by banking operations in the East. About 1880 he removed from New York City to Worcester, Mass. There, in 1887, he obtained a charter for an institution of higher education, and in 1889 founded Clark University for postgraduate study such as could not well be carried on up to that time in the United States. He provided an endowment fund of $1,000,000, and by the terms of his will secured to the university a further endowment of $2,500,000. (See CLARK UNIVERSITY.) He also established an endowed public library at Hubbardston.

CLARK, KATE UPSON (1851–). An American author, born at Camden, Ala. She graduated from Wheaton Seminary in 1869 and from the Westfield (Mass.) Normal School three years later. In 1874 she was married to Edward Perkins Clark, who died in 1903. For several years she taught school in Cleveland, Ohio, in 1882–87 was editor of *Good Cheer*, at the same time conducting a department in the Philadelphia *Press*, and from 1892 to 1895 edited *Romance*. In 1907 she became an editorial writer on the *Brooklyn Eagle*, also acting as literary editor of the *Christian Herald*, and contributing to many magazines and religious weeklies. She also became known as a lecturer on literary, educational, and domestic topics. Her writings in book form include: *Bringing Up Boys* (1900); *White Butterflies* (1900); *Move Upward* (1902); *The Dole Twins* (1906); *The Adventures of Spotty* (1907); *Art and Citizenship* (1907).

CLARK (JOSIAH), LATIMER (1822–98). An English electrician and engineer, born at Great Marlow, brother of Edwin Clark (1814–94), an engineer, with whom he was associated. He invented the gutta-percha coating for inclosing underground wires, the "double-cap invert" insulator and the "Clark cell," and made valuable investigations concerning the action of electric currents in submarine cables. He also invented a submarine cable covering of asphalt, hemp, and silica, and had a part in laying many submarine cables, including the first in the South Atlantic Ocean between Pernambuco and St. Louis, Senegal. He was interested in other forms of engineering as well, including the construction of pneumatic tubes, canals, and floating docks. In 1861–68 he was a partner of Sir Charles Tilston Bright (q.v.). He published *An Elementary Treatise on Electrical Measurement* (1868); *Electrical Tables and Formulæ* (1871); *Dictionary of Metric and Other Useful Measures* (1891), and a *Memoir of Sir W. F. Cooke* (1895).

CLARK, LEWIS GAYLORD (1810–73). An American editor, born in Otisco, N. Y. For 25 years (1834–59) he edited, in New York City, the *Knickerbocker Magazine*, which, by contributions from such writers as Irving, Bryant, Willis, and Longfellow, and by his own departments, the "Editor's Table" and "Gossip with Readers and Correspondents," he made the leading American literary publication of the time. Pecuniary distress caused its discontinuance in 1859, and Clark removed to Piermont, N. Y., where he lived in a residence presented by former contributors to his magazine, who raised the necessary funds in part by publishing a volume of their contributions, under the title *The Knickerbocker Gallery*. He held a place for some time in the New York Customhouse, but still contributed regularly to most of the leading periodicals. His work was marked by a pleasant humor. He published the *Knickerbocker Sketch-Book* (1850), including some of his own essays, *Knick-Knacks from an Editor's Table* (1852).

CLARK, THOMAS MARCH (1812–1903). An American Episcopal prelate. He was born at Newburyport, Mass.; graduated at Yale in 1831; studied theology at Princeton, and was licensed to preach as a Presbyterian in 1835. He became an Episcopalian in the following year, and was rector of Grace Church, Boston, for seven years, afterward holding charges in Philadelphia, Hartford, and Providence. In 1854 he was consecrated Bishop of Rhode Island, and in 1899, on the death of Bishop Williams, of Connecticut, became presiding Bishop of the Episcopal church in America. His *Reminiscences* appeared in 1895; among his other works are *Early Discipline and Culture* (1852), and *Primary Truths of Religion* (1869).

CLARK, VICTOR SELDEN (1868–). An American economist, born at Portageville, N. Y. He was educated at the universities of Minnesota and Chicago, and at Göttingen, Bern, and Columbia. After serving as principal and superintendent of schools in Minnesota (1893–97), he became superintendent of public instruction and President of the Insular Board of Education of Porto Rico under the military government. From 1902 to 1909 he investigated labor conditions in foreign countries and insular possessions for the United States. In 1910 he had charge of the census of Hawaii and in the same year he was appointed commissioner of immigration, labor, and statistics for that territory. His publications include: *Movement in Australasia* (1906);

Women and Children Wage Earners in Great Britain (1908); *The Canadian Industrial Disputes Act of 1907* (1909), and also bulletins of the Bureau of Labor on the labor conditions in Cuba, Hawaii, New Zealand, the Philippines, Java, and Mexico.

CLARK, Walter Eli (1869–). An American public official, born at Ashford, Conn., and educated at the Connecticut Normal School, Williston Seminary, and Wesleyan University. He was for many years engaged in journalistic work, chiefly as Washington correspondent for several important newspapers. In 1907 he was appointed Governor of Alaska by President Taft, and this office he held until 1913. Previous to his appointment as Governor, he had been engaged in gold mining in Alaska. He contributed articles to magazines and weekly periodicals.

CLARK, William (1770–1838). An American soldier and explorer, brother of George Rogers Clark (q.v.), and the associate of Meriwether Lewis on the famous Lewis and Clark expedition (q.v.). He was born near Charlottesville, Va.; removed with his family to the site of Louisville, Ky., in 1784; entered the army in 1791; and served as a lieutenant of infantry, under General Wayne, against the Indians, in 1794. He resigned, owing to ill health, in 1796; but in 1803 was recommissioned as a second lieutenant, and from 1804 to 1806 shared with his friend Meriwether Lewis the command of an exploring party which, leaving St. Louis in May, 1804, crossed the continent, reaching the mouth of the Columbia River in November, 1805, and arrived at St. Louis on its return in September, 1806. He was commissioned brigadier general of militia in 1807, served as Indian agent for the Territory of Upper Louisiana, was Governor of Missouri Territory from 1813 to 1821, and acted as Superintendent of Indian Affairs at St. Louis from 1822 until his death. In 1828 he laid out Paducah, Ky., and in 1830 negotiated the Treaty of Prairie du Chien. Consult the biographical sketch by Coues in vol. i of his *History of the Expedition Under the Command of Lewis and Clark* (New York, 1893), and the other authorities referred to under Lewis and Clark Expedition, The.

CLARK, William Andrews (1839–1925). An American capitalist and politician, born near Connellsville, Pa. He settled in Iowa in 1856, studied law at Mount Pleasant (Iowa) University, but never practiced; drove an ox team from Colorado to Montana in 1863, and by manufacturing, mercantile pursuits, mining, and banking, acquired a large fortune. It is said that he became the largest owner of copper mines in the world. In 1884 and 1889 he was president of the Montana Constitutional Convention. He was Democratic nominee for United States Senator in 1890, but although he claimed the election, did not secure a seat. In 1889 he was elected by the State Legislature to succeed Lee Mantle as United States Senator. Thereupon, at the instance of Marcus Daly, the Anaconda mine owner, and his political rival, there was begun, before the Senate Committee on Elections and Privileges, an investigation which resulted in the recommendation by the committee that the Senate adopt a resolution to the effect that Clark "was not duly and legally elected to a seat in the Senate." Clark, in an address to the Senate, reviewed the report of the committee, and resigned. Almost immediately thereafter he was appointed by the acting Governor of Montana to fill the vacancy caused by his resignation. This appointment was subsequently declared by the Governor to be invalid. Clark was elected to the United States Senate by the Montana Legislature for the term 1901–07. In 1900–05 he built in New York City, at Fifth Avenue and 77th Street, an elaborate house—one of the show places of the city—and there housed a magnificent collection of art masterpieces.

CLARK, William Bullock (1860–1917). An American geologist, born at Brattleboro, Vt. He was educated at Amherst College, and studied geology at Munich. In 1887 he was made instructor in geology at Johns Hopkins University, and in 1888 became connected with the United States Geological Survey. In 1891 he was appointed director of the Maryland Weather Service; from 1892 to 1894 was associate professor of geology at Johns Hopkins University, and in the latter year was placed at the head of the geological laboratory. In 1896 he was made State geologist of Maryland, in 1900 was appointed commissioner for the State of Maryland on the resurvey of Mason and Dixon's line, and in 1908 was made a member of the Maryland State Conservation Commission. His publications include a number of interesting papers and reports dealing with subjects of American geology, contributed more especially to the volumes of the Maryland Geological Survey.

CLARK, William George (1821–78). An English scholar, born in 1821. He passed his boyhood in Yorkshire and in 1844 was graduated from Trinity College, Cambridge, with great distinction, being elected fellow of his college. He was subsequently elected a tutor, and then public orator of the university (1857). In 1849 he visited Spain, and in 1856 he made a tour of Greece. Sketches of these travels were published under the titles *Gazpacho* (1850) and *Peloponnesus* (1858). In 1853 he took orders, but in 1869 he asked his Bishop to be relieved, stating his reasons for the step in a pamphlet entitled *The Present Dangers of the Church of England* (1870). He edited the first series of *Cambridge Essays* (1855); contributed to *Fraser's Magazine;* and was one of the founders of the *Journal of Philology* (1868), of which he was an editor; but he is chiefly known for the *Cambridge Shakespeare* (9 vols., 1863–66), in which, though it was planned by himself, he was aided by W. A. Wright (q.v.). It furnishes one of the best texts yet published. The two editors also prepared the *Globe Shakespeare* (1864) and single plays for students. Owing to ill health, Clark retired from Cambridge in 1873 and passed his last years at York, where he died, Nov. 6, 1878. In 1883 the Clark Lectureship in English Literature was founded, at Trinity, from property left by him to the college.

CLARK, William Thomas (1831–1905). An American soldier, born in Norwalk, Conn. At the beginning of the Civil War he became a lieutenant and adjutant of an Iowa regiment. He rose to the rank of brigadier general of volunteers (1865), and was made a major general at the close of the same year for gallant and meritorious services during the war. He was chief of staff of General Grant's Army of the Tennessee. After the war he made his home in Galveston, Tex., where he organized the first

negro school and befriended negroes at the risk of his life; founded the First National Bank and was its first cashier, and also served as postmaster. He was a Republican. As a representative from Texas in Congress in 1869–72, he obtained the first appropriation for the harbor of Galveston ($100,000), making possible the completion of the jetties there.

CLARK, Willis Gaylord (1810–41). An American poet, born at Otisco, N. Y. He became proprietor and editor of the *Philadelphia Gazette,* and was long a contributor to the *Knickerbocker Magazine,* edited by his twin brother, Lewis Gaylord Clark (q.v.), by whom were prepared his *Literary Remains* (1844), with a memoir, and a complete edition of his poems (1847). The former of these was made up chiefly of the *Ollapodiana Papers,* a series of prose sketches that had first appeared in the *Knickerbocker.* His poetry is contemplative and serious, his prose marked by humorous fancy, and both have the facility of the group to which he belonged.

CLARK COLLEGE. An institution for higher education, founded in 1902 at Worcester, Mass. The college was endowed by Jonas G. Clark with $1,300,000, and was granted equal rights in the already existing campaign and buildings of its sister institution, Clark University (q.v.). Clark College is legally "the collegiate department of Clark University," but owing to peculiarities in the will of the founder, it is a completely independent organization of a separate endowment, and is autonomous in all its activities. The students in 1913 numbered 161, and the instructors, not counting assistants, 24. All students, though pursuing a variety of groups of study, are candidates for the degree of A.B. The library of the college contains upward of 65,000 volumes, of which about 10,000 are specifically set apart for college use in a special college library. The productive funds amount to about $1,500,000, and the net income from all sources to about $73,000. The president is Edmund C. Sandford.

CLARKE, Adam (c.1762–1832). A British Methodist clergyman and biblical scholar, born in County Londonderry, Ireland. He studied at John Wesley's School, at Kingswood, near Bristol; adopted the career of a Methodist preacher; was sent out by Wesley, in 1782, and was president of the conferences of 1806, 1814, and 1822. He was a thorough student of the classics, natural science, Church history and Oriental languages and literature, and published works in all of these branches. He assisted in the preparation of the Bible Society's Arabic Bible and wrote: A *Bibliographical Dictionary* (6 vols., 1803–04); *Memoirs of the Wesley Family* (1823); and, most important of all, *Commentary on the Bible* (8 vols., 1810–26). He was engaged in editing Rymer's *Fœdera,* from 1808 to 1818, when exhaustion compelled him to give up the task. For his *Life,* consult Etheridge (London, 1858).

CLARKE, Alexander Ross (1828–1914). An English geodesist and astronomer. He was commissioned second lieutenant in the Corps of Royal Engineers in 1847 and was transferred to the Ordnance Survey in 1850, retiring in 1881 with the rank of lieutenant colonel. The results of his first investigation on the figure of the earth were published in 1858 and those of his second investigation in 1866. Colonel Clarke was a delegate to the International Geodetic Congress in Rome in 1883. In 1887 he was awarded the Royal medal of the Royal Society, of which he was a fellow. He published, besides the abovementioned reports: *Comparisons of the Standards of Length of England, France, Belgium, Prussia, Russia, India, Australia* (1866); *Determination of the Position of Feaghmain and Haverfordwest* (1867); *Comparisons of Standards and Lengths of Cubits* (1873); *Geodesy* (1880), which was translated into several foreign languages.

CLARKE, Benjamin Franklin (1831–1908). An American engineer and educator, born at Newport, Maine. He graduated in 1863 at Brown University, and afterward became connected with the university as instructor (1863–68), professor of mathematics (1868–93), professor of mechanical engineering (from 1893), and acting president (1896–97 and 1898–99). In 1884 he published a biography and eulogy of Prof. Samuel S. Greene.

CLARKE, Sir Caspar Purdon (1846–1911). A British American art connoisseur. He was born at Richmond, County Dublin, Ireland. In 1862 he entered the National Art Training School at South Kensington, London. He assisted in the construction of the Houses of Parliament and the South Kensington Museum in 1865 and 1867. In 1879 he was appointed architect to the English Legation in Persia. In 1880 Clarke was appointed to direct the reorganization of the Eastern collections in the South Kensington Museum. He was made director of the Museum in 1896, and was knighted in 1902. In 1905 he was appointed director of the Metropolitan Museum in New York, in which capacity he served until failing health caused his retirement in 1910. Under his administration the Museum was reorganized and many acquisitions were made, especially in the decorative arts. He published many papers on architectural subjects. He was a fellow of the Royal Institute of British Architects, and a member of many important societies.

CLARKE, Charles Cowden (1787–1877). An English author and lecturer, born in Enfield, Middlesex. He was an intimate friend of Shelley, Keats (whose schoolmaster was Clarke's father), Leigh Hunt, and Lamb. He was a music publisher. With his wife, Mary Cowden Clarke (q.v.), he annotated an edition of Shakespeare (1869), and compiled *The Shakespeare Key* (1879). His brilliant lectures on Shakespeare and other poets, delivered in London (1834–54), did much to arouse a wider interest in the higher drama. He published: *Tales from Chaucer* (1833); *Shakespeare Characters* (1863); *Molière Characters* (1865); *Recollections of Writers* (1878); and periodical articles on the drama and fine arts. Consult the *Biography,* by his wife (London, 1887).

CLARKE, Edward Daniel (1769–1822). An English traveler and mineralogist. He was born at Willingdon, in Sussex; graduated at Cambridge in 1790; and then traveled, as tutor to different young men, through the greater part of Europe, Egypt, and Asia Minor, remaining away from England most of the time until 1802. In 1807 he began a course of lectures on mineralogy at Cambridge, and the university established a professorship of that science for him, and made him University librarian in 1817. He presented to the library a number of valuable marbles; among others, the colossal statue called the Eleusinian Ceres, but really a Cistophorus, discovered by Wheler in 1676, and now in the

Fitzwilliam Museum. His *Travels* (6 vols., 1810–23) were received with extraordinary favor. Besides numerous publications bearing on mineralogy, he also wrote *Greek Marbles Brought from the Shores of the Euxine, Archipelago, and Mediterranean* (1809), and *The Tomb of Alexander* (1805). His collection of minerals was purchased by Cambridge, and his MSS. by Oxford University. For his *Life*, consult Otter (London, 1825).

CLARKE, Sir Edward George (1841–). A British lawyer and public official, born in London. He was educated at the College House of Edmonton, at the City of London College, and in King's College evening classes. He was called to the bar in 1864, and won a great name through his brilliant handling as counsel of the Penge and Detective cases (1877), the Bartlett Case (1886), the Baccarat Case (1891), and the Jameson Case (1896). In 1886–92 he was solicitor-general under the Conservative administration. He was a member of Parliament for Southwark (1880), for Plymouth (1880–1900), and for the City of London (1906). His publications include: *Treatise on the Law of Extradition* (1866; 4th ed., 1903); *Easy Shorthand* (1907); *Selected Speeches* (1908); *Swifthand* (1909); *The Epistles of St. Paul* (1912).

CLARKE, Frances Elizabeth. See Grand, Sarah.

CLARKE, Frank Wigglesworth (1847–). An American chemist, born in Boston and educated at the Lawrence Scientific School, Harvard University. He was an instructor at Cornell University in 1869, professor of chemistry at Howard University in 1873–74, and professor of chemistry and physics at the University of Cincinnati from then until 1883, when he was appointed chief chemist of the United States Geological Survey and honorary curator of minerals in the National Museum. In 1900 he was a member of the Paris Exposition international jury of awards; in 1901 he was president of the American Chemical Society; and his distinction was recognized in various other ways. He is joint author with Louis M. Dennis of *Elementary Chemistry* (1902) and *Laboratory Manual of Elementary Chemistry* (1902), and author of *The Constants of Nature* (5 vols., 1873–82; vol. v, "A Recalculation of the Atomic Weights," 3d ed., 1910), and of various bulletins of the Geological Survey and many papers.

CLARKE, Sir George Sydenham (1848–). An English soldier and military writer, born in Lincolnshire. He was educated at the Royal Military College at Woolwich, and from 1871 to 1880 was on the staff of the Royal Engineering College, Cooper's Hill. He saw active service in the Egyptian expedition of 1882 and in the Sudan in 1885, was in the War Office until 1892, then on special duty abroad, and in 1894–1901 superintendent of the royal carriage factory. From 1901 to 1904 he served as Governor of Victoria, Australia, and in 1907 as Governor of Bombay. He was made Knight Commander of St. Michael and St. George in 1893. His principal writings are: *Fortification, Past, Present, and Future* (1890); *The Navy and the Nation* (1897); *Imperial Defense* (1897); *Russia's Sea-Power, Past and Present* (1898).

CLARKE, Helen Archibald. An American editor and critic, born in Philadelphia. She graduated, in 1884, at the music department of the University of Pennsylvania; in 1889, with Charlotte Porter founded *Poet-Lore*, a quarterly magazine of letters. With Miss Porter also she edited, notably, *Robert Browning's Complete Poetical Works*, 12 vols. (1898); *Mrs. Browning's Complete Works*, 6 vols. (1900); and *The First Folio Edition of Shakespeare*, 40 vols. (1903). Among books of her own writing are *Browning's Italy* (1907); *Browning's England* (1908); *Longfellow's Country* (1909); *Hawthorne's Country* (1910); *Poet's New England* (1911); *Browning and his Century* (1913).

CLARKE, Henri Jacques Guillaume, Comte d'Hunebourg and Duc de Feltre (1765–1818). A French general, born at Landrecies (Nord). He studied at the Ecole Militaire, Paris, entered the cavalry, and having become lieutenant colonel, so distinguished himself at Landau as to be promoted to be brigadier general. In 1793 he was deprived of his command, as a suspect, but in 1795 was reinstated in the service as a general of division, and made by Carnot chief of the topographical bureau of the War Ministry. Sent by the Directory to Italy to observe the movements of Napoleon, then commanding the French army there, he entered into the spirit of that general's plans, and was later rewarded by being appointed his private secretary. In 1805 he was Governor of Vienna, in 1806 of Berlin, and in 1807–13 Minister of War. Upon the entry of the allies into Paris, he declared himself a Royalist; during the Hundred Days accompanied Louis XVIII into exile to Ghent, and from 1815 to 1817 was again Minister of War.

CLARKE, Jacob Augustus Lockhart (1817–80). An English physician, born in London. He was brought up in France, but studied medicine in England, at Guy's and St. Thomas's hospitals. He divided his attention between private medical practice and original research in microscopic anatomy and pathology, giving most of his time to research. A group of ganglion cells in the spinal column was named after him, "the posterior vesicular column of Clarke." The results of his investigations were published in the form of special papers, a list of which is in the *Catalogue of the Library of the Medico-Chirurgical Society* (1879).

CLARKE, James Freeman (1810–88). An American Unitarian clergyman. He was born in Hanover, N. H., and graduated at Harvard in 1829, and at the Cambridge Divinity School in 1833. He was pastor of a Unitarian church in Louisville, Ky., until 1839. In 1841 he assisted in founding the Church of the Disciples, Boston, of which he was pastor from 1841 to 1850, and from 1854 until his death. He was a friend of Emerson and Channing—with whom he edited the *Memoirs of Margaret Fuller Ossoli* (1869), and wrote for the *Dial*—a supporter of the antislavery movement, and secretary of the American Unitarian Association in 1859–62. He was one of the overseers of Harvard, where he was professor of natural religion and Christian doctrine (1867–71), and lectured on ethnic religions (1876–77). Besides a vast number of articles contributed to current journals and magazines—many collected in *Nineteenth Century Questions* (1898)—Dr. Clarke published many works, including: *Theodore* (1841), a translation from the German of De Wette; *Campaign of 1812* (1848); *Eleven Weeks in Europe* (1852); *Christian Doctrine of Prayer* (1854, new ed., 1874); *The Hour Which Cometh and Now Is*, a volume of sermons (1864, 3d ed.

1877); *Orthodoxy: Its Truths and Errors* (1866; reprinted often); *Steps of Belief* (1870); *The Ten Great Religions* (2 vols., 1871–83; vol. i, 22d ed. 1886; vol. ii, 5th ed. 1886); *Common Sense in Religion* (1874); *Essentials and Non-Essentials in Religion* (1878); *The Legend of Thomas Didymus, the Jewish Skeptic* (1881); *Manual of Unitarian Belief* (1884); *Anti-Slavery Days* (1884); *Vexed Questions* (1886); and *Sermons on the Lord's Prayer* (1888). Consult E. E. Hale's edition of Clarke's *Autobiography, Diary, and Correspondence* (Boston, 1891).

CLARKE, James P. (1854–1916). An American public official and legislator, born at Yazoo City, Miss. After graduating from the University of Virginia he was admitted to the bar in 1878, and in the following year he moved to Helena, Ark. He was a member of the Arkansas House of Representatives in 1886–87, and of the Arkansas Senate in 1888–92, and was President of the latter in 1891. In 1893–94 he was Attorney-General of Arkansas, during the following two years was Governor of the State, and after serving as United States Senator in 1903–09 was reëlected to that office for the term 1909–15. In 1913 he was elected President pro tem of the Senate.

CLARKE, John (1609–76). An English physician, one of the founders of Rhode Island, in America. He emigrated to Boston in 1637; as one of the friends of Anne Hutchinson there, he was driven out of the Colony. Roger Williams received him, and Clarke became one of the settlers of Aquidneck, R. I. He founded at Newport, probably in 1640, a Baptist church, which, next to the one founded by Roger Williams at Providence in 1636, was the earliest in America. In 1651 he was arrested, fined, and imprisoned for holding a Baptist meeting in Lynn, Mass. In the same year he went with Williams to England, as an agent for the Colony, and there published *Ill News from New England; or, a Narrative of New England Persecution* (1652). After remaining for 12 years in England, he obtained from Charles II a second charter for Rhode Island, which secured the right of personal liberty in matters of religion. On his return he resumed the care of the Newport church, and kept the pulpit until his death. He was a member of the General Assembly from 1664 to 1669; was Deputy Governor in 1669 and 1671, and afterward codified the Rhode Island laws. He has been called "the Father of American Baptists." Consult Richman, *Rhode Island* (New York, 2 vols., 1902).

CLARKE, John Mason (1857–1925). An American geologist and paleontologist, born at Canandaigua, N. Y. He studied at Amherst and the University of Göttingen, and in 1881–84 was professor of geology and mineralogy at Smith College. In 1885 and 1886 he was lecturer on geology at the Massachusetts State Agricultural College, in Amherst. In 1894 he was appointed professor of geology in the Rensselaer Polytechnic Institute at Troy, and in 1898 State paleontologist of New York, becoming State geologist and director of the Museum in 1904. His publications include: *New Devonian Crustacea* (1882); *Cirriped Crustacea from the Devonian* (1883); *Ueber deutsche oberdevonische Crustaceen* (1884); *On Devonian Spores* (1885); *On the Higher Devonian Faunas of Ontario County, New York* (1886); *Early Devonic History of New York and Eastern North America* (1908); *The Eurypterida of New York,* by Clarke and Ruedemann (1912); and *The Heart of Gaspé: Sketches in the Gulf of St. Lawrence* (1913).

CLARKE, John Sleeper (1833–99). An American comedian, after 1867 a resident of England. He was born at Baltimore, and in his boyhood was a schoolmate of Edwin Booth, with whom he engaged in amateur dramatic readings. Giving up the study of law in order to go upon the stage, he made his first professional appearance in Boston, as Frank Hardy in *Paul Pry,* at the Howard Athenæum, in 1851. The next year he went to Philadelphia. In 1859 he married Asia Booth, the sister of his old schoolmate. He made his appearance in New York, in 1861, as Diggory in *The Spectre Bridegroom.* From 1864 to 1867 he was associated with Booth in the management of the Winter Garden, New York; they also had theatres in Philadelphia and Boston. Clarke's popularity was very great, among his favorite parts being Dromio of Syracuse, Paul Pry, Bob Brierly in the *Ticket-of-Leave Man,* and especially Major Wellington de Boots in *Everybody's Friend,* and Toodles. Having gone to London in 1867, he made his English début in the rôle of Major de Boots. His success was such that he decided to remain in England, though he afterward made several visits to the United States (1870, 1871, 1879, and 1884), where he was warmly welcomed. Some of his later parts were Salem Scudder in *The Octoroon,* Dr. Pangloss in *The Heir at Law,* Ollapod in *The Poor Gentleman,* Babbington Jones in *Among the Breakers,* and Bob Acres in *The Rivals;* but Toodles remained the favorite. Its first run at the Strand Theatre, where Clarke was long engaged, was for 200 nights. He managed several London theatres, including the Haymarket, which the Bancrofts took after he gave it up. In 1889 he retired and spent the last 10 years of his life in leisure, near London. Consult Bell, in Matthews and Hutton, *Actors and Actresses of Great Britain and the United States,* vol. ii (New York, 1886), and Clapp and Edgett, *Players of the Present* (New York, 1899).

CLARKE, MacDonald (1798–1842). An American writer, known as "The Mad Poet." He was a native of Bath, Me., but was for many years a conspicuous figure in New York City, where he married an actress and wrote with much freedom and little taste of the belles of the city. In spite of his conceit and eccentricities he endeared himself to his contemporaries, notably Fitz-Greene Halleck, who made him the hero of a poem, "Discarded." He considered himself the greatest poet of America, and, besides a mass of trash, wrote some things that are tender and lovable. Among his conceits the best known is "Now Twilight lets her curtain down, And pins it with a star." Among his publications, most of which are now rare, are: *A Review of the Eve of Eternity* (1820); *The Elixir of Moonshine, by the Mad Poet* (1822); *Afara, or, The Belles of Broadway* (1833); *Death in Disguise*—a temperance poem (1833); *A Cross and a Coronet* (1841).

CLARKE, Marcus. See Australian Literature.

CLARKE, Mary Victoria Cowden (Novello) (1809–98). An English Shakespearean scholar and author. She was the pupil and associate of Mary Lamb. At the age of 19

she was married to Charles Cowden Clark (q.v.), her brother's partner in the music publishing business, and soon afterward began the great work of her life, the *Concordance to Shakespeare*, which was published in London in 1845. She wrote: *The Girlhood of Shakespeare's Heroines* (1850); *The Iron Cousin* (1854); *World-Noted Women* (1850); *My Long Life: An Autobiography* (1896); and *Letters to an Enthusiast: Being a Series of Letters addressed to Robert Balmanno, Esq., of New York, 1850–61*, edited by A. U. Nettleton (Chicago, 1902).

CLARKE, Rebecca Sophia (1833–1906). An American author, born at Norridgewock, Me. Under the pseudonym of "Sophie May," she published such juvenile books as the *Little Prudy Stories* (6 vols., 1864–65); *Dotty Dimple Stories* (6 vols., 1867–69); and one or two novels.

CLARKE, Samuel (1675–1729). An English clergyman, born at Norwich and educated at Caius College, Cambridge. He was a disciple of Newton, and attempted to modify the theories of Descartes. In 1698 he became chaplain to Bishop Moore, of Norwich, and undertook the study of divinity, publishing in 1699 *Three Practical Essays on Baptism, Confirmation, and Repentance*. In 1704–05 Clarke delivered the Boyle lectures, out of which was developed his *Demonstration of the Being and Attributes of God*, and after the death of Locke, in 1704, he was considered as the leading English metaphysician. Queen Anne made him one of her chaplains and presented him to the rectory of St. James, Westminster. In 1708 he published *A Discourse Concerning the Unalterable Obligations of Natural Religion and the Truth and Certainty of Christian Revelation*, and in 1712 *The Scripture Doctrine of the Trinity*, in which his denial of the belief of the primitive Church in the Trinity brought upon him the attacks of theologians. In 1714 the Lower House of Convocation complained of his teachings and sent the matter to the Upper House. Clarke evaded the difficulty, and promised to be silent on the subject of the Trinity. His views were considered to be semi-Arian (see Arius), and involved him not only with the authorities of the Established church, but with the free-thinkers of his time. In 1715 appeared his *Philosophical Inquiry Concerning Human Liberty*. The Princess of Wales, afterward Queen Caroline, requested him to discuss with Leibnitz the questions of time and space and their relations to God. The correspondence to which this gave rise is to be found in the collection of papers which passed between Clarke and Leibnitz (1717). His works include an edition of Cæsar (1712); Homer's *Iliad*, in Greek and Latin (1729); and *An Exposition of the Church Catechism* (1729). His most important work was done in the sphere of ethics, where he maintained that morality is "incumbent on men, from the very nature and reason of things themselves." "The fitness of things" requires that every object be treated according to its own nature, and therefore that man be treated by man with due respect to his freedom of choice. The laws of morality are as reasonable as those of mathematics, and are independent of the consequences of moral acts; but God has so constituted the world that morality is finally rewarded. He was thus an ethical rationalist. See his *Life*, by his friend Hoadly, prefixed to his collected works, published in 1738; and consult L. Stephen, *History of English Thought in the Eighteenth Century* (London, 1876).

CLARKE, Samuel Fessenden (1851–). An American naturalist, born at Geneva, Ill. He graduated from the Sheffield Scientific School (Yale) in 1878 and received his doctor's degree from Johns Hopkins University in 1879. He served as assistant to the United States Fish Commission (1874–75), was a fellow at Johns Hopkins (1879–81), lectured at Smith College, and in 1881 became professor of natural history at Williams College. He was elected a fellow of the American Association for the Advancement of Science and of the American Academy of Arts and Sciences, and was president of the American Society of Naturalists in 1914.

CLARKE, Thomas Shields (1860–1920). An American sculptor and painter. He was born in Pittsburgh and studied at the Art Students' League, New York, and under Lefebvre and Dagnan-Bouveret in Paris. Among his paintings "A Fool's Fool" (1887, Pennsylvania Academy), and "A Night at Morocco" (Philadelphia Art Club), which received a medal at Berlin in 1891, deserve special mention. He later studied modeling under Chapu, and thereafter devoted himself almost entirely to sculpture. His fountain the "Cider Press" (1893), in Golden Gate Park, San Francisco, is vigorously handled but lacking in decorative conception. Better examples of his work are the caryatids of the "Four Seasons" on the Appellate Court building, New York, and "Alma Mater" on the campus at Princeton University, which are decorative as well as graceful and dignified. He was elected an associate of the National Academy of Design and received several medals.

CLARKE, William Eagle (1853–). An English naturalist, born at Leeds. He was educated at Yorkshire College. In 1884 he became curator of the Leeds Museum, four years later an assistant in the Edinburgh Museum, and in 1906 keeper of the natural history department of the Royal Scottish Museum, Edinburgh. He was for a time acting editor of the *Annals of Scottish Natural History* and the *Naturalist*, and became joint editor of the *Scottish Naturalist*. His publications include *Handbook of Yorkshire Vertebrata* (1881) and *Studies in Bird Migration*, 2 vols. (1912).

CLARKE, William Horatio (1840–1913). An American organist and musical author. He was born at Newton, Mass.; held positions as organist at Norwood, Dedham, Boston, and Woburn, and subsequently removed to Dayton, Ohio, where he was appointed superintendent of public schools. From 1878 to 1887 he was organist at the Tremont Temple, Boston. After his retirement, he became established at Reading, Mass. Clarigold Hall, a well-known chapel of music in that town, with its excellent four-manual organ, was built by him. His *New Method for Reed Organs* is justly celebrated, and he also published, besides collections of anthems and voluntaries, *Short Service Preludes* (1903); *Valuable Organ Information* (1904); *Artistic Information for Reed Organs* (1905); *How to Use Organ Stops and Pedals* (1908); *Standard Organ Building* (1909).

CLARKE, William Newton (1841–1912). An American Baptist theologian. He was born at Cazenovia, N. Y., and graduated at what is now Colgate University in 1861, and from Hamilton Theological Seminary in 1863. After serving as a pastor, he was professor in Toronto Baptist

College from 1883 to 1887, and from 1890 to 1908, of Christian theology, from 1908 to his death, of ethics, in Colgate University, Hamilton, N. Y. He published: *Commentary on the Gospel of Mark* (1881); *The Circle of Theology: An Introduction to Theological Study* (1897); *Outline of Christian Theology* (1898); *What Shall We Think of Christianity?* (1899); *Can I Believe in God the Father?* (1899); *A Study of Christian Missions* (1900); *The Use of the Scriptures in Theology* (1905); *The Christian Doctrine of God* (New York, 1909); *Sixty Years with the Bible* (New York, 1909).

CLARKE, William Robinson (1829–1912). A Canadian Anglican clergyman and educator. He was born at Inverurie, Scotland, and was educated at Aberdeen and at Hertford College, Oxford. He was ordained a priest in 1858, and after filling several minor appointments became prebendary of Wells in 1870. Coming to Canada in 1882, he was in the same year appointed professor of mental and moral philosophy in Trinity University. During the term of his professorship, from which he retired in 1908, he was widely known in Canada and the United States as a preacher, writer, and lecturer. In 1887 he was Baldwin lecturer, and in 1899 Slocum lecturer, at the University of Michigan. He was frequently a delegate to the provincial and general Anglican synods, and in 1895 a delegate to the Pan-American Congress of Religion and Education at Toronto. In 1891 he was elected a fellow of the Royal Society of Canada and in 1900 president of that institution. For some years he was editor of the *Canadian Churchman.* His principal publications were: *The Redeemer* (1863); *The Comforter* (1864); *The Four Temperaments* (1874); *Witnesses to Christ* (Baldwin lectures, 1888); *Savonarola: His Life and Times* (1892); *The Anglican Reformation* (1896); *The Paraclete* (Slocum lectures, 1900); *Pascal and the Port Royalists* (1902). In 1886 he translated and edited Hefele's *History of the Councils,* and later, Hagenbach's *History of Christian Doctrine.*

CLARK FORK. One of the most important forks of the Columbia River, formed by the junction of the Flathead and Missoula rivers, Montana (Map: Montana, A 2). It flows northwest, through Lake Pend Oreille, in Idaho, continuing in a northwest course thence across the northeast corner of Washington, and empties into the Columbia River (q.v.) on the Canadian frontier. It has a total length of about 650 miles, from the source of either tributary, and possesses abundant water power.

CLARKS'BURG. A city and the county seat of Harrison Co., W. Va., 82 miles by rail east of Parkersburg, on the Monongahela River, and on the Baltimore and Ohio and the Monongahela Traction Company railroads (Map: West Virginia, D 2). The city contains three hospitals and an Elks Home. It is in a country rich in coal, oil, and natural gas, has important shipping interests, and manufactures chemicals, fire brick, window glass, glass bottles, fruit jars, decorated tableware, iron and tin plate, enamelware, shaft pulleys, etc. It was the birthplace of Stonewall Jackson. Settled in 1772, Clarksburg was incorporated in 1849, and is governed at present under a charter of 1897, which provides for a mayor, elected annually, and a city council chosen by wards. The water works, including a large plant on the west fork of the Monongahela, are owned and operated by the municipality. Pop., 1890, 3008; 1900, 4050; 1910, 9201; 1920, 27,869.

CLARKSDALE. A city and the county seat of Coahoma Co., Miss., 77 miles south of Memphis, Tenn., on the Yazoo and Mississippi Valley Railroad (Map: Mississippi, D 2). It contains a Carnegie library and an Elks Home. Clarksdale is situated in an alluvial delta, known for the richness of its soil, and carries on a trade in agricultural products and lumber. The water works and electric-light plant are owned by the city. Commission government has been adopted. Pop., 1890, 781; 1900, 1773; 1910, 4079.

CLARK'SON, Matthew (1758–1825). An American soldier and philanthropist, born in New York City. At the outbreak of the Revolutionary War he enlisted as a private, and in 1777 took part in the Saratoga campaign. He afterward served as aid-de-camp, with the rank of major, to Gen. Benedict Arnold (August, 1778–March, 1779) and to Gen. Benjamin Lincoln (1779 and 1781–July, 1782); was taken prisoner at Charleston on May 12, 1780, and in 1783 was brevetted lieutenant colonel. After the war he returned to New York, served several terms in the State Legislature, was president for many years of the bank of New York, was governor of the New York Hospital for 30 years, and did much for prison reform and the establishment of public schools. Consult *The Clarksons of New York* (New York, 1875–76).

CLARKSON, Ralph Elmer (1861–). An American portrait and figure painter. He was born at Amesbury, Mass., studied in the schools of the Boston Museum of Fine Arts, and from 1884 to 1887 under Lefebvre and Boulanger in the Académie Julian, Paris. After practicing portrait painting in New York, he again went abroad in 1892, remaining until 1896, when he took up his permanent residence in Chicago. He took a prominent part in the movement for municipal improvement, and was elected president of the Municipal Art Commission of Chicago; a member of the Chicago Society of Artists and of the Society of American Artists; was a member of the American Art Jury at the Paris Exposition in 1900, and of the International Jury of Awards at the St. Louis Exposition in 1904. He devotes himself chiefly to portraiture, but also exhibited figure subjects, characterized by refinement and tonal effects. Good examples are "Twilight Harmony" (Art Institute, Chicago) and "Studio Corner."

CLARKSON, Thomas (1760–1846). An English philanthropist and antislavery agitator, born in Cambridge. He studied at Cambridge University, and early gave evidence of his antagonism to slavery in a Latin prize essay, which he wrote in 1785, on the question, "Is it right to make slaves of others against their will?" An English translation (1786) had an extensive circulation, and Clarkson resolved to devote his life to a crusade against African slavery. Associations were formed, and Clarkson, besides visiting the principal cities of England and going to Paris in the cause, published numerous essays, pamphlets, and reports on the subject. Wilberforce, whose coöperation he had secured, took the lead in the antislavery agitation, and in 1787 brought the subject before Parliament; but he afterward quarreled with Clarkson and claimed for himself priority in the antislavery movement. On March 25, 1807, the bill for the suppression of the slave trade became a law, and Clarkson, whose health had

failed in 1794, wrote *A History of the Rise, Progress, and Accomplishment of the Abolition of the African Slave Trade* (1808). At the Congress of Aix-la-Chapelle (1818) he presented an address to the Czar of Russia for concerted action by the Powers for the abolition of the slave trade; but nothing was accomplished at that time. On the formation of the Anti-slavery Society, in 1823, for the abolition of slavery in the West Indies, Clarkson became one of its leading members. His other works include: a valuable *Portraiture of Quakerism* (1806); *Memoirs of the Private and Public Life of William Penn* (1813); *Thoughts on the Necessity of Improving the Condition of the Slaves in the British Colonies* (1823). Consult: Taylor, *Biographical Sketch of Thomas Clarkson* (1839), and Elmes, *Thomas Clarkson* (1876).

CLARKS'VILLE. A city and the county seat of Montgomery Co., Tenn., 45 miles (direct) northwest of Nashville, near the junction of the Cumberland and Red rivers, and on the Louisville and Nashville and the Tennessee Central railroads (Map: Tennessee, C 1). It is the seat of the Southwestern Presbyterian University, founded in 1875, and of a Methodist seminary for young ladies, and has a public library. It is one of the great tobacco markets of the United States, and has manufactures of iron, agricultural implements, lumber, flour, snuff, etc., and valuable iron-ore deposits in the vicinity. Settled in 1780, Clarksville was incorporated some five years later, and is at present governed under a charter of 1850, revised in 1891. The mayor is elected every two years, and the city council controls all appointments to municipal offices. The city owns and operates its water works. Pop., 1890, 7924; 1900, 9431; 1910, 8548.

CLARKSVILLE. A city and the county seat of Red River Co., Tex., 61 miles west by north of Texarkana, on the Texas and Pacific Railroad (Map: Texas, E 3). The centre of a fertile agricultural region, it carries on a large trade in cotton, live stock, grain, and hides. The industrial establishments include a cotton compress, cottonseed-oil mill, etc. Pop., 1890, 1588; 1900, 2069; 1910, 2065.

CLARK UNIVERSITY. An institution of higher education, founded in 1887 at Worcester, Mass., by Jonas Gilman Clark. The university was originally planned to afford opportunity for full and free research along advanced lines; to add as materially as might be to the ascertained truths of science; to equip educators and specialists of the highest qualifications. It was especially stipulated that the best academic standards should forever be maintained, and as the original endowment was insufficient to equip courses in all subjects, but few courses were at first equipped, and those completely. These comprised postgraduate courses and the fundamental sciences of physics, chemistry, biology, psychology, and education. Only accredited college graduates are admitted as candidates for the Ph.D. degree, and students are thrown largely upon their own resources, the instructors acting as far as possible as "guides" and counselors. Ten scholarships and 20 fellowships have been established. Instruction is intrusted in some degree to the fellows and also to the docents (see DOCENTS), the latter representing the highest academic university appointments. Upon the death of Mr. Clark in 1900 the university received a bequest of additional funds for research—$600,000 for a library fund and $150,000 for a library building, $100,000 for an art department, and $1,300,000 for the establishment of an undergraduate department. (See CLARK COLLEGE.) In 1913 the number of students enrolled in the university was 90, while the faculty numbered 25. The productive funds amounted to about $2,400,000, and the income to about $96,000. The library contained 65,000 volumes. The university publishes several journals, including the *American Journal of Psychology*. Its president from its beginning has been Granville Stanley Hall (q.v.). Consult *Clark University 1889 to 1899* and the annual catalogues.

CLASSICAL PHILOLOGY. See GREEK LANGUAGE; ITALIC LANGUAGE.

CLAS'SICS (Lat. *classicus*, from *classis*, class, from *calare*, Gk. καλεῖν, *kalein*, to call). The term *classici* was originally applied to those citizens of Rome that belonged to the first and most influential of the six classes into which Servius Tullius divided the population. As early as the second century A.D. it is applied figuratively by Aulus Gellius, xix, 8, 15, to writers of the highest rank; this mode of designation has since been very generally adopted in both literature and art. Most nations style the best period of their literature the classical period, and its most distinguished writers their classics. But since the great productions of the writers and artists of antiquity have continued to be looked upon by moderns as models of perfection, the word "classic" has come to designate, in a narrower sense, the best writers of Greece and Rome, and "classical" to mean much the same as "ancient."

CLASSIFICATION. A term used in ore dressing to denote the separation of crushed ore into several products or sizes, the grains of which fall with the same maximum velocity. The coarser sizes in a product consist of light minerals or gangue rock and the finer sizes of heavy minerals. The values or minerals of a classified product are later separated from the gangue or barren rock by some method of sizing. Consult Richards, *Ore Dressing* (New York, 1903–09).

CLASSIFICATION OF ANIMALS. Classification is the act of sorting out and putting into groups kindred ideas, observations, or objects. As many classifications, then, are possible as are the categories which different persons may erect; for no two persons see things in the same light, nor have the same thoughts. Besides, there are many aspects that the one observer may take in viewing the same thing. Thus, we may classify plants and animals according to their anatomical structure, the method of their embryological development, their food or habitats. All classifications, then, are arbitrary; are the attempts of man to arrange, in an orderly fashion, his conceptions and observations. Classification in biology is, consequently, to be regarded as a subjective process. Nevertheless, the constant attempt of all modern naturalists is to conform, in the formation of their groups, as closely as possible to the facts of nature, and thereby express the natural kinship or blood relationship of animals, as learned through the investigation of their structure and phylogeny. A natural and true classification, then, is a statement of near or remote relationships, according to the degree of differentiation the forms sought to be classified have undergone in their descent from a more or less remote common ancestor. If a complete classification of animals is ever made, it will be a

complete genealogy of the animal kingdom. In this sense, classification is neither arbitrary nor artificial, but only tentative; and it will be permanent in so far as it conforms to the facts of kinship in descent. Hence, a nearer and nearer approach to a natural and real classification has been made with each forward step of knowledge in embryology, morphology, and paleontology.

"There is no question in natural history," said Louis Agassiz, in his classic *Essay on Classification*, "on which more diversified opinions are entertained than on that of classification—not that naturalists disagree as to the necessity of some sort of arrangement in describing animals or plants, for since nature has become the object of special studies, it has been the universal aim of all naturalists to arrange the objects of their investigations in the most natural order possible. Even Buffon, who began the publication of his great Natural History by denying the existence in nature of anything like a system, closed his work by grouping the birds according to certain general features exhibited in common by many of them. It is true, authors have differed in their estimation of the characters on which their different arrangements are founded; and it is equally true that they have not viewed their arrangements in the same light, some having plainly acknowledged the artificial character of their systems, while others have urged theirs as the true expression of the natural relations which exist between the objects themselves."

By collaboration and by common consent certain categories have been agreed upon, and these we generally have in mind when we speak of the classification of the animal or vegetable kingdom. These categories are founded mainly on anatomical and embryological relationships and differences; and in zoölogical classification, e.g., animals that resemble one another in structure, development, or both, are grouped closely together, or are more distantly associated, according to the nearness or remoteness of the kinship as evidenced by the facts of structure or development, whether in existing or in extinct forms. These grades or degrees of kinship we speak of as species, genera, families, orders, classes, etc. Species are more nearly related than genera, genera than families, etc.

The total number of the kinds of animals, or species, that are recognized is well over 500,000. We may roughly estimate 7000 mammals, 20,000 birds, 5500 reptiles, 2000 amphibians, 13,000 fishes, 60,000 mollusks, 360,000 insects, besides a host of the lower invertebrates. In order to think of all of these, it is necessary that they should be grouped into categories of larger size than species, and these, in turn, into still larger ones. This is rendered possible by the fact that animals show nearer and remoter affinities. The ordinary lowest category is *species;* but this may be subdivided into *races* or *subspecies;* several similar species are grouped into a *genus;* related genera constitute a *family;* several families may make up an *order.* Orders constitute a *class;* classes, a *phylum.* For example, see table below.

A particular species receives a composite name, embracing, first, that of the genus and, second, that of the species; thus, the common cat is *Felis domesticus.*

Scientific Nomenclature.—The custom, above stated, of giving to each animal a double name, that of its genus and its species, arose with Linnæus, and is called "binomial nomenclature." It answers to a man's family and individual or "Christian" name, as Smith, John. It always consists of Greek or Latin words, or of words put into Latinized form, partly because of a traditional custom descended from the early authors, who wrote only in Latin, but mainly because it is thus made comprehensible to readers in all languages. Furthermore, great confusion would follow the attempted use of vernacular names alone, since many different animals are given the same name in popular speech, while the same animal is known by various names in different localities. "Robin" means several very diverse birds to persons living in America, Great Britain, India, or Australia, but *Turdus migratorius*, is unmistakably the American thrush, locally called the robin. Theoretically, these names are supposed to be suitably applied. Thus, *turdus* is the old Latin term for a thrushlike bird, and *migratorius* the Latin adjective "migratory." It often happens, however, through the misapprehension or ignorance of the person who first applies the name, that unsuitable or positively erroneous appellations have been given, or wrong collocations have been made. A subsequent student, discovering this error, or taking a different view of the animal's relationship, endeavors to correct it by giving it a new and, in his opinion, better name; or he may transfer it to another genus, but retain the specific name. A third writer, not knowing that the same animal has been previously described and named, may name it something entirely different. These changes and duplications went on almost unchecked until the middle of the nineteenth century, when the British Association for the Advancement of Science and other influential bodies of naturalists devised means of

INDIVIDUAL	Race, breed, or subspecies	Species	Genus	Family	Order	Class
House Cat	Manx Angora Tabby Tortoise-shell	*domesticus*				
		lion tiger leopard	*Felis*	*Felidæ*		
			lynxes hunting cats		*Carnivora*	
				dogs hyenas bears		*Mammalia*
					whales bats apes, etc.	

regulating the matter, which resulted in certain now generally accepted rules, the substance of which is as follows: A name for a new species is not recognized in science unless it is in the customary binomial form (the two parts agreeing in number and gender) and has been accompanied by a description by which the animal may be satisfactorily identified, and which is published in some book or periodical accessible to students in general; and when this has been done, no other person may give the animal a different *specific* name. This is called the rule of priority—that is, the first name legally applied must remain (as a mere label), whether it is subsequently found to have been well chosen or not. A limit, however, was found necessary to this rule, and it is therefore agreed that no name previous to the one made or sanctioned by Linnæus in the tenth edition of his *Systema Naturæ* (1758) shall be recognized. Certain minor limitations are also made for local needs —as, for example, with reference to Rafinesque in the United States. In zoölogical or botanical nomenclature, a generic name can be applied only to one group of organisms. If it is subsequently given to something else, the new application will not hold. According to one code, at least, a generic name that has disappeared by fusion of genera or the splitting of a genus cannot be used again. In scientific works, the technical name of an animal is often followed by the name (usually abbreviated) of the man who named it as a whole, as *Turdus migratorius*, Linn.; but if the generic name was made by one man and the specific by another, this is indicated by inclosing the name of the author of the specific name in parentheses, thus: Bluebird, *Sialia sialis* (Linn.). Latterly, the recognition of subdivisions within species, called subspecies, races, or varieties, has led to the addition of a third name in many cases, forming a trinomial; e.g., *Falco peregrinus anatum* means the (American) subspecies *anatum* of the European peregrine falcon, or our duck hawk. Another custom is that all specific and subspecific names shall begin with a small letter, even when "proper" adjectives or nouns. Similar rules and explanations apply to the names of the higher groups, which are capitalized, always in the plural, and, in the case of the family, take the termination *idæ*, which in zoölogy invariably indicates a group of family rank.

Categories of Classification. The number of known species of living animals is well over 500,000, to which must be added over 50,000 fossil-described species, making over 550,000 in all. To contain all these forms it is necessary to provide a complicated system of categories of varying ranks. We recognize the fact that, in beast as well as in man, no two individuals are exactly alike. But just as the various members of the B. Smith family more nearly resemble each other than they do the Jones or Brown families, so certain other animals, while showing slight individual differences, possess so many common, constant qualities that we put them in the same species. Likewise, several species have certain qualities in common, while they differ in other respects so markedly from all other species that we class them together in one genus. In the same way, a number of related genera fall naturally into the same family.

Species.—A term applied in biology to the unit of classification—that is, the lowest group that receives a name. (For the exceptional usage in respect to "subspecies," see below.) Although the term "species" is almost universally employed by biologists to-day, a precise definition cannot be applied to it; for there is absolutely no criterion by which a species may be distinguished from a variety, on the one hand, or a genus on the other. Whether a lot of organisms under consideration showing certain differences shall be considered two subspecies, two species, or two genera, depends upon the personal characteristics of the classifier. If he be conservative, and has studied extensively the systems of the past, he will draw his ideals from them, and call those groups "species" which show about that difference accorded to other related species by equally conservative classifiers in the past. If he be radical, he will disregard the ideals of his predecessors and, according to his personal bent, "lump" the diverse forms into one species, or possibly into one subspecies, or "split" them into distinct species. Indeed, a radical may take occasion to "revise" the grouping of a conservative in accordance with his peculiar ideals—in consequence of which, numbers of species may disappear by inclusion into old ones, or new ones may be added by division of old ones; or, finally, the grouping may be thoroughly reorganized or disarranged. At the present time naturalists have hit upon no method of avoiding this intolerable condition of affairs, which is rapidly bringing chaos into what was supposed to be a "system." A century ago, before so extensive collections had been made and studies were so critical, it was generally believed that "species" were perfectly distinct as well as immutable things. Even many of the scientific workers regarded the mythology of the first chapters of Genesis as a scientific record, and admitted that there were only so many "species" as were created in the beginning; that each species received its name from Adam, and that one pair of each (except parthenogenetic species) was preserved in the ark, to become the progenitors (or progenitor) of all the members of the species which have existed since. The worthlessness, for scientific purposes, of this literary account of the creation appears when we try to enumerate the "species" that were thus created. We then realize that "species" are not natural phenomena, but human devices of convenience, like the ward boundaries of a city. The boundary lines between species may, in some cases, be in part determined by natural phenomena, as ward boundaries may be limited by a stream or a bluff.

The history of the ideas entertained concerning species is an epitome of the most profound biological thought. In the development of any large idea, three stages may be recognized—first, the speculative suggestion of it; second, the clear statement of it as a working hypothesis; and, third, the demonstration. Such has been the history of the development of the modern idea of species as part of a continuous stream of life. The early Greeks were not troubled with the idea of species; they sought only a satisfactory speculative account of the origin of organisms. The early Christians interpreted the "Mosaic" account of the creation liberally, regarding the creation not so much as the forming of completed organisms as the forming of the *seed* out of which they were to arise. During the Middle Ages, however, and especially from the middle of the sixteenth to the middle of the nineteenth century, the doctrine of "special

creation" was universally taught by the Church. Milton's epics popularized the idea of creation ready made, with adult animals of the different species; and the rigid conceptions of species which the early botanists and zoölogists had invented seemed to support the teachings of the churchmen. With the founding of universities in the twelfth and thirteenth centuries, science began to awaken, and one of the first products of the Renaissance was the natural philosophers. Such men as Francis Bacon, Descartes, Leibnitz, and Spinoza did not limit their ideas to the teachings of the Church; they taught the necessary principle of continuity, to which the natural development of "species" was a necessary corollary. The more speculative naturalists, or philosopher naturalists, next applied the doctrine of continuity, as an hypothesis, to the facts of organisms. Such were Bonnet, who recognized that all life was continuous, and Oken, who conceived that all organisms have developed out of a primitive slime. Finally came the great naturalists, putting forth the idea of the mutation of species tentatively at first, then with greater vigor, until Darwin came, at the fullness of time, to precipitate the revolution. See EVOLUTION; DARWIN; LAMARCK.

The view that species are wholly arbitrary groups is not accepted by all naturalists. De Vries especially lays stress on the point that species are objective. Every species, he believes, is made up of a number of specific characters, each of which depends upon a certain chemical particle or aggregation of molecules, which perpetuates itself and multiplies by self-division. So long as the descendant chemical particles remain like the parental ones, so long the species persists. These particles may, however, suddenly change through some cause, not precisely known, but probably environmental; and with a change in one of these particles goes a change in the adult specific quality that it controls, and also of the "correlated" qualities. The consequence is that a form with many new qualities suddenly arises, and this form we may call a new species. De Vries has studied (*Die Mutationstheorie*, 1901) variable species in the field —e.g., the evening primrose—and finds that new forms, clearly marked off from the original, typical ones, are constantly arising. They are, from the beginning, distinct and fully formed species. There are, however, other theories to account for that "distinctness" or isolation which is not infrequently found. One is that species originated in isolated situations.

A group of land animals, getting by accident upon an island and varying normally, will in time come to be quite dissimilar from the forms on the mainland, because, being isolated, any peculiarities that may crop out among them will not be swamped by intercrossing with the main mass of the species. Thus, we find in the Galapagos Islands that each island has a peculiar species of lizard of a particular genus, and only one species occurs on each island. The same is true of certain sparrows on these islands. Even on islands nearer the mainland, like Nantucket or Fire Island, on the south side of Long Island, there are peculiar forms—incipient species. It is the isolation which has permitted them to arise; even a less degree of isolation may permit a difference to grow up. Thus, Darwin tells this story: "The two flocks of Leicester sheep kept by Mr. Buckley and Mr. Burgess have been purely bred from the original stock of Mr. Bakewell for upward of 50 years. There is not a suspicion existing in the mind of any one at all acquainted with the subject that the owner of either of them has deviated in any one instance from the pure blood of Mr. Bakewell's flock; and yet the difference between the sheep possessed by these two gentlemen is so great that they have the appearance of being quite different varieties." Darwin's explanation of the lack of intergrades between many species differs from the foregoing, and depends on the assumption that, of the descendants of any species, those that are most unlike are most apt to survive; so that where the number of forms (varieties or subspecies) is very great, the intermediate ones (the intergrades) are pushed to the wall and are extinguished. In Darwin's words: "As in each fully stocked country natural selection necessarily acts by the selected form having some advantage in the struggle for life over other forms, there will be a constant tendency in the improved descendants of any one species to supplant and exterminate, in each stage of descent, their predecessors and their original progenitor. For it should be remembered that the competition will generally be most severe between those forms which are most nearly related to each other in habits, constitution, and structure. Hence all the intermediate forms between the earlier and later states—that is, between the less and more improved states of the same species—as well as the original parent species itself, will generally tend to become extinct. So it probably will be with many whole collateral lines of descent, which will be conquered by later and improved lines." This striking passage of Darwin deserves an experimental or statistical test. Until that is had, it can only stand as an excellent illustration of Darwin's logical treatment of special difficulties in his theory.

Another important attribute of a species is that its members are frequently sterile, with even closely related species. It would, however, be a mistake to assume that, on the one hand, all species, or even the hybrid offspring of crossed species, are always sterile. It is likewise an error to suppose that, on the other hand, sterility is confined to crosses between species. Breeders of animals are accustomed to find a considerable percentage of sterility between members of the same species; and when the members are close blood relations, the percentage becomes very high. Nevertheless, the sterility of hybrids (crosses between species) is so common that Cuvier gave it as the sure criterion of species. For further facts and explanations of this question, see HYBRIDITY.

Finally, species are adapted to the conditions in which they live. By many this characteristic is considered a fundamental one; so that, when we have explained how their adaptations arise, we have explained how the species arose. It may be worth while, here, to state that there is a lack of unanimity in respect to the adaptive nature of all specific characters. Those who assert such adaptation insist that it cannot be denied that any given apparently useless organ may not be useful, or may not have been useful in some period of the animal's life, or that of its ancestors. See EVOLUTION; NATURAL SELECTION; and similar titles, and the books mentioned thereunder.

Subspecies (or *variety*), in natural history, is the designation of a group subordinate to

species, distinguished from a race or breed chiefly by the circumstance that the latter two are artificial. Subspecies are regarded as the first step in the formation of species. They are not to be confused with variations, since, like species, they are groups of similar individuals. The question of when to call two differing lots of animals species and when subspecies is not capable of satisfactory solution, except by erecting an artificial and arbitrary bar separating them. In the absence of any such arbitrary rule, we find some naturalists "splitting" one species into many by elevating the subspecies to specific rank; while another naturalist will "lump" several species, reducing them to the rank of subspecies of one species. Many authors would consider subspecies to be founded on differences due to environment—differences that will disappear with changing environment. Those who are radical in recognizing by name minute and transitory differences of this kind confess that they cannot recognize with certainty their own subspecies, unless they know the habitat of the specimen. Other authors regard the difference between subspecies and species to be solely one of degree of divergence in characters. As subspecies became recognized, the custom was formed of adding a subspecific name to the specific name, as has already been explained.

Genus.—A category having a rank between species and family, and consisting of a group of species deemed to be more closely related to each other than to anything else. There is absolutely no criterion by which we can distinguish between a genus and a species, on the one hand, and a family on the other; but it is often a fact that, when a collection of related species is arranged in an orderly fashion, more or less sharp breaks occur, which enable naturalists to draw lines. Consequently, the boundaries of genera are being constantly widened or restricted; and generic names change and disappear as a result of fusion of genera or of splitting up of a genus. Since the genus is that under which species are usually indexed, this instability of generic names is highly regrettable. What is needed is a recognition of the subjectiveness of generic names and of the prime necessity of the stability of nomenclature; no changes in generic names should be made without the best of reasons. The name of the genus (always written with a capital initial) is combined with that of the species. The name of the cat genus, for example, is *Felis;* and *Felis leo, Felis tigris, Felis catus* are the names of the lion, tiger, and wildcat species. These cats are more alike to one another than any one of them is to the dogs. The latter belong to the genus *Canis.* The size of a genus varies with the number of species it contains; some genera containing a hundred species or more, while others contain only one. Darwin believed that the species of a large genus are more variable than those of a small one. In any case, the species within a genus are not regarded as having diverged very widely from their common stock, and the criteria for generic distinctions are largely superficial characteristics.

Family.—A group of genera having a certain resemblance to one another, which indicates common descent, or "family connection." Features of structure more or less external, and belonging to parts, as limbs, wings, teeth, horns, etc., characteristic of methods of life, are of the kind of characters used in judging of family limits. Thus, the prime family distinction of the cats (Felidæ) is the arrangement for retracting the claws, which sharply defines them as a group from the dogs, on the one hand, and the civets on the other; but the cheeta is able to retract its claws only partly, and this fact, in connection with other distinctive features, causes the animal to be placed in a genus separate from *Felis.*

Order.—Several related families may fall together, by the possession in common of characters denied to others, into a larger category known as an order. A familiar example is the order Carnivora, embracing the families of cats, dogs, civets, weasels, bears, etc., because all these exhibit an organization developed along lines of differentiation from other mammals, tending to fit them to prey upon other animals and digest a flesh diet. The various lines and degrees of specialization are recognized by subordinate groupings in families and genera.

Class.—Groups of orders are found to agree in certain very general and fundamental characteristics of organization, such as having six legs or eight legs; the production, by the skin, of hair, feathers, or scales; the integument being leathery or calcareous—and so on; and such groups form the next larger category, called a class. Even here, however, there is large room for difference of opinion as to limits; and, in some classes, an intermediate category called subclass seems necessary, as in the case of the prime division of the class Mammalia into monodelphic and didelphic, or of the class Cephalopoda into dibranchiate and tetrabranchiate. The same difficulty has led to naming groups of intermediate rank elsewhere—such as superfamilies, subfamilies, subgenera, etc.

Phylum.—Classes combine into several grand divisions of the animal kingdom, called subkingdoms, or phyla, by having in common a single or a few characteristics so broad and ancestral that they are spoken of as "plan of structure." Thus, all the mammals, birds, reptiles, amphibians, and fishes, together with several lowly representatives, such as the ascidians, are united by a single characteristic of structure possessed by no other animals—the presence of a backbone, or its essential equivalent, the notochord. This character is so wide-reaching and fundamental that it springs from the very root of the phylogenetic tree, and is of prime importance. By similar broad and fundamental "plans of structure" are the other phyla of the 12 now recognized by most zoölogists characterized. Their origin is lost to view in the mists of primeval time, but even here two divisions may be recognized—the Protozoa and the Metazoa—the former embracing the single phylum Protozoa, or one-celled animals; the latter, all the rest which agree in consisting of many cells, having a two-layered embryonic development.

Historical Sketch of Classification. The Greeks had considerable knowledge concerning animals, which Aristotle recorded, added to, and arranged, for the first time of which we have any knowledge, in an orderly fashion. Aristotle had some conception of genera and species. It is true that his *γένος* (*genos*) was a rather elastic term, since it was applied both to small and large groups of animals. Aristotle also conceived a difference between vertebrates and invertebrates, although he made the distinction by means of an erroneous definition. The following are the eight groups of animals as defined by Aristotle:

Animals with Blood—Vertebrates:

1. Viviparous animals (four-footed), and in a special *γένος* (*genos*) of this the whale was placed. 2. Birds. 3. Oviparous, four-footed animals. 4. Fishes.

Animals without (red) Blood—Invertebrates:

5. Soft animals (*μαλάκια, malakia,* i.e., Cephalopoda). 6. Animals with soft shells (*μαλακόστρακα, malakostraka,* i.e., Crustacea). 7. Insects. 8. Shelled animals (sea urchins, snails, mussels).

The elder Pliny added little to our knowledge of animals. He was simply a compiler, who copied freely from Aristotle, whom he sometimes misunderstood, and he admitted much of the error and superstition of his time to rank with fact. It was not until the seventeenth century that any very great addition to our knowledge of the structure, development, and relations of animals was made.

Linnæus to Cuvier.—Ray wrote a *Synopsis of Mammalia and Reptilia* (London, 1693), which was used by the master systematizer, Linnæus (1707–78), in his *Systema Naturæ,* as the foundation upon which he built that part of his classification that had to do with vertebrates. Linnæus did not add much to our knowledge as an investigator; but he sifted and sorted, rejected and retained, from the accumulations of his predecessors, and out of this more or less chaotic mass he erected his orderly system—the first great classification of animals. His *Systema Naturæ* went through 13 editions, 12 of which were published during his lifetime, and 5 of these were revisions by his own hand. The arrangement by Linnæus was into "classes," as follows: 1. Mammalia. 2. Aves. 3. Amphibia (including reptiles). 4. Pisces. 5. Insects (including insects proper, myriapods, arachnids, and crustaceans). 6. Vermes (radiates, mollusks, worms, cirripeds, and a fish, myxine).

This classification was based mainly on external appearance and some internal anatomy; and, though imperfect and incomplete, it gave a great impulse to the study of zoölogy and to more orderly arrangements of animals, based on anatomical characters. It was Linnæus who introduced binary nomenclature, since he first gave every animal a generic and a specific name of Latin origin.

The next great systematist was Cuvier (1769–1832). "Cuvier did not," says Claus, "as most zoötomists have done, look upon anatomical discoveries and facts as in themselves the aim of his researches; but he contemplated them from a comparative point of view, which led him to the establishment of general principles." Moreover, Cuvier appreciated fully the idea of "correlation." "The organism," he declared, "consists of a single and complete whole, in which single parts cannot be changed without causing changes in all the other parts." Cuvier became convinced, from a study of the nervous system and the arrangement of the systems of organs, that the animal kingdom is divided into four great branches (*Tableau élémentaire de l'histoire naturelle des animaux,* Paris, 1798) as follows:

Branch 1. *Animalia Vertebrata.* Classes: 1. Mammalia. 2. Aves. 3. Reptilia. 4. Pisces.

Branch 2. *Animalia Mollusca.* Classes: 1. Cephalopoda (not subdivided). 2. Pteropoda (not subdivided). 3. Gastropoda. (Orders: Pulmonata, Nudibranchia, Inferobranchia, Tectibranchia, Heteropoda, Pectinibranchia, Tubulibranchia, Scutibranchia, Cyclobranchia.) 4. Acephala. (Orders: Testacea, Tunicata.) 5. Brachiopoda (no subdivisions). 6. Cirrhopoda.

Branch 3. *Animalia Articulata.* Classes: 1. Annelides. (Orders: Tubicolæ, Dorsibranchiæ, Abranchiæ.) 2. Crustacea. (Section 1: Malacostraca. Orders: Decapoda, Stomatopoda, Amphipoda, Læmodipoda, Isopoda. Section 2: Entomostraca. Orders: Brachiopoda, Pœciloposa, Trilobitæ.) 3. Arachnides. (Orders: Pulmonariæ, Trachearіæ.) 4. Insects. (Orders: Myriapoda, Thysanura, Parasita, Suctoria, Coleoptera, Orthoptera, Hemiptera, Neuroptera, Hymenoptera, Rhipiptera, Diptera.)

Branch 4. *Animalia Radiata.* Classes: 1. Echinoderms. (Orders: Pedicellata, Apoda.) 2. Intestinal Worms. (Orders: Nematoidea, Parenchymatosa.) 3. Acalephæ. (Orders: Simplices, Hydrostaticæ.) 4. Polypi (Anthozoa, Hydroida, Bryozoa, Corallinæ, Spongiæ). (Orders: Carnosi, Gelatinosi, Polypiarii.) 5. Infusoria. (Orders: Rotifera, Homogenea.)

Lamarck to Leuckart.—Probably to Lamarck, more than to any other systematist, we are indebted for the term "Invertebrata" and to the arrangement of groups in an ascending series. In his *Histoire naturelle des animaux sans vertèbres* (Paris, 1801), he classifies the invertebrates as follows (accepting the vertebrates as arranged by Cuvier):

I. *Apathetic Animals.* Do not feel; no brain, no senses; rarely articulated.

Class 1. Infusoria. Orders: Nuda, Appendiculata.

Class 2. Polypi. Orders: Ciliata (Rotifera), Denudati (hydroids), Vaginati (Anthozoa and Bryozoa), and Natantes (crinoids and some halcyonoids).

Class 3. Radiaria. Orders: Mollia (Acalephæ), echinoderms (including Holothuriæ and Actiniæ).

Class 4. Tunicata. Orders: Botryllaria (compound ascidians), Ascidia (simple ascidians).

Class 5. Vermes. Orders: Molles and Rigiduli (intestinal worms and gordius), Hispiduli (Nais), Epizoariæ (epizoa and lernæans).

II. *Sensitive Animals.*

Class 6. Insects (hexapods). Orders: Aptera, Diptera, Hemiptera, Lepidoptera, Hymenoptera, Neuroptera, Orthoptera, Coleoptera.

Class 7. Arachnids. Orders: Antennatotracheales (Thysanura and Myriapoda), Exantennatotracheales and Exantennatobrancheales (Arachnida proper).

Class 8. Crustacea. Orders: Heterobranchia (Branchiopoda, Isopoda, Amphipoda, Stomapoda) and Homobranchia (Decapoda).

Class 9. Annelids. Orders: Apoda, Antennata, Sedentaria.

Class 10. Cirripeds. Orders: Sessilia and Pedunculata.

Class 11. Conchifera. Orders: Dimyaria, Monomyaria.

Class 12. Mollusks. Orders: Pteropoda, Gastropoda, Trachelipoda, Cephalopoda, Heteropoda.

Siebold and Stannius (1845) also divided the animal kingdom into vertebrates and invertebrates; and among the invertebrates the Protozoa were recognized as a separate type, and Vermes came to have very much the significance that it has in our modern classifications.

The classification of Leuckart is interesting, because it comes near to our present conceptions of the relationship of animals, and because of the fact that its author was a great teacher of zoölogy; and, hence, his classification has had

great influence in education. Leuckart, *Die Morphologie und die Verwandtschaftsverhältnisse der wirbellosen Thiere* (Brunswick, 1848), divides animals above Protozoa (to which he paid no attention) into six "types," as follows:

Type I. *Cœlenterata.*
Class 1. Polypi. (Orders: Anthozoa and Cylicozoa.)
Class 2. Acalephæ. (Orders: Discophoræ and Ctenophoræ.)
Type II. *Echinodermata.*
Class 3. Pelmatozoa. (Orders: Cystidea and Crinoidea.)
Class 4. Actinozoa. (Orders: Echinida and Asterida.)
Class 5. Scytodermata. (Orders: Holothuriæ and Sipunculida.)
Type III. *Vermes.*
Class 6. Anenterati. (Orders: Cestodes and Acanthocephali.)
Class 7. Apodes. (Orders: Nemertini, Turbellarii, Trematodes, and Hirudinei.)
Class 8. Ciliati. (Orders: Bryozoa and Rotiferi.)
Class 9. Annelides. (Orders: Nematodes, Lumbricini, and Branchiati.)
Type IV. *Arthropoda.*
Class 10. Crustacea. (Orders: Entomostraca and Malacostraca.)
Class 11. Insecta. (Orders: Myriapoda, Arachnida, and Hexapoda.)
Type V. *Mollusca.*
Class 12. Tunicata. (Orders: Ascidiæ and Salpæ.)
Class 13. Acephala. (Orders: Lamellibranchiata and Brachiopoda.)
Class 14. Gastropoda. (Orders: Heterobranchiata, Dermatobranchia, Heteropoda, Ctenobranchia, Pulmonata, and Cyclobranchia.)
Class 15. Cephalopoda.
Type VI. *Vertebrata* (according to Cuvier).

Oken, Von Baer, and Agassiz.—The foregoing and certain other classifications had been developed in England, France, and Germany, under the guidance of anatomy; but, in many of them, the idea of the complexity of structure of animals seemed to outweigh the idea of unity of structure. During the early part of the nineteenth century another school developed in Germany, under the leadership of Schelling—the School of Natural Philosophy—which has extended its influence to all the physical sciences. Of its doctrines such men as Geoffroy Saint Hilaire in France, and Goethe and Oken in Germany, became expounders, and taught that unity prevailed everywhere; hence, the animal kingdom was composed of an unbroken series of animals. The most important system of classification evolved by this school is that of Oken. Corresponding with the invertebrates is Oken's intestinal body, or touch animals, as he called them (*Lehrbuch der Naturphilosophie,* Jena, 1810).

Grade I. Intestinal Animals.

Cycle I. *Digestive Animals* (Radiata).
Class 1. Infusoria (Stomach Animals).
Class 2. Polypi (Intestine Animals).
Class 3. Acalephæ (Lacteal Animals).
Cycle II. *Circulative Animals* (Mollusks).
Class 4. Acephala (Biauriculate Animals).
Class 5. Gastropoda (Uniauriculate Animals).
Class 6. Cephalopoda (Bicardial Animals).
Cycle III. *Respirative Animals* (Articulata).
Class 7. Worms (Skin Animals).
Class 8. Crustacea (Branchial Animals).
Class 9. Insects (Tracheal Animals).

At the time that the School of Natural Philosophy was thriving, another school had arisen in Germany, which was rapidly accumulating a new set of facts. This was the School of Embryologists, which seems to have arisen under the influence of Döllinger and such men as Rathke, Van Beneden, Von Baer, Kölliker, and Vogt as disciples. Von Baer early got the idea that the ontogenetic development of animals is a recapitulation of their phylogenetic history; and, in conformity with his embryological investigations, he proposed the following classification of animals:

I. Peripheral Type (Radiata).
II. Massive Type (Mollusca).
III. Longitudinal Type (Articulata).
IV. Doubly Symmetrical Type (Vertebrata).

Thus, Von Baer, with his classification based on embryological principles, and Cuvier, with his founded on comparative anatomy, arrived at very similar general conclusions; viz., that animals are built on four general plans, fall into four general types. In the end the system of Cuvier triumphed over that of the Natural Philosophers. The later advances in the classification of animals have been mainly made in filling gaps and correcting errors. The number of types has been increased. The Protozoa have become a distinct type, Cœlenterata and Echinodermata have been separated; likewise Arthropoda and Annelida, and the old group Mollusca has been broken up. The earlier classifications, founded mainly on external resemblances and grosser anatomical likenesses, were then greatly improved by the refinement of anatomical technique—by the use of the microscope, by the study of embryology, by the distinction between analogy and homology, by a knowledge of the fertility of animals in cross breeding, and by the study of fossil forms. With the discovery of so many intermediate forms we are coming back towards the views of the Natural Philosophers, who maintained that unity rules throughout the animal kingdom, as well as in all others; that intermediate forms connect the various types, and that there is no sharp line of demarcation to be drawn between the various groups of animals.

Two systems which have had great influence, especially in directing the study of the different invertebrates, were those of Louis Agassiz and Huxley. Agassiz retained the four types of Cuvier. Most of the Protozoa he considered to be algæ, and such forms as the Vorticella he thought would be found to be closely related to the Bryozoa. Following is an outline of Agassiz's arrangement, from his *Essay on Classification* (Boston, 1859):

I. *Radiata.*
1. Polypi: Actinoids and Halcyonoids.
2. Acalephæ: Hydroids, Discophoræ, and Ctenophoræ.
3. Echinoderms: Crinoids, Asteroids, Echinoids, Holothurioids.
II. *Mollusca.*
1. Acephala: Bryozoa, Brachiopods, Tunicata, Lamellibranchiata.
2. Gastropoda: Pteropoda, Heteropoda, and Gastropoda.
3. Cephalopoda: Tetrabranchiata and Dibranchiata.
III. *Articulata.*
1. Worms: Trematodes, Nematodes, Annelids.

2. Crustacea: Rotifera, Entomostraca, Tetradecapods, and Decapods.
3. Insecta: Myriapods, Arachnids, and Insects proper.

Huxley arranges the invertebrates in nine sections, as follows:

Section I. Monera (Foraminifera; Heliozoa); Radiolaria, Protoplasta, Gregarinidæ, Catallacta, Infusoria (Opalinina, Ciliata, Flagellata, Tentaculifera).

Section II. Porifera, Hydrozoa, Coralligena (Ctenophora).

Section III. Turbellaria, Rotifera (Nematorhyncha), Trematoda, Cestoidea.

Section IV. Hirudinea, Oligochæta, Polychæta, Gephyrea.

Section V. Crustacea, Arachnida (Pycnogonida, Tardigrada, Pentastomida), Myriapoda, Insecta.

Section VI. Polyzoa, Brachiopoda, Lamellibranchiata, Odontophora.

Section VII. Echinodermata.

Section VIII. Tunicata.

Section IX. Groups of uncertain place: Peripatidea, Myzostomata, Enteropneusta, Chætognatha, Nematoidea, Physemaria, Acanthocephala, Dicyemida.

"Our knowledge," says Huxley, "of the anatomy, and especially of the development of the Invertebrata, is increasing with such prodigious rapidity, that the views of taxonomists in regard to the proper manner of expressing that knowledge by classification are undergoing, and, for some time to come, are likely to undergo, incessant modification. To the beginner, who is apt to make the mistake of looking upon classification as the foundation and essence of morphology, instead of what it really is, the superstructure and outcome thereof, this state of things is distressing. Every handbook presents him with a different system of classification; and he may, not unnaturally, despair of finding any stability in science, the most general results of which are capable of being stated in such different ways. If, however, the student will attend to the facts which constitute the subject matter of classification, rather than to the modes of generalizing them which are expressed in taxonomic systems, he will find that, however apparently divergent these systems may be, they have a great deal in common."

It has seemed desirable to dwell somewhat on the history of the classification of the Invertebrata, because invertebrates have been the battling ground, the bone of contention, with systematists since the time of Linnæus. The classification of vertebrates was early agreed upon; indeed, four of the six classes now accepted have come down to us from Aristotle's time.

Classification of Vertebrates. *Fishes.*—Ichthyology began as a science with Artedi, who made a division into five classes, in a useful but very artificial manner. This continued substantially unchanged until the gigantic labors of Cuvier resulted in a revised classification, much nearer nature, recognizing clearly the distinction between the fishes with bony skeletons and those with cartilaginous skeletons. Agassiz followed with a classification based upon the forms of the scales, the most important feature of which was the recognition of the group Ganoidei. The next great generalization in this direction of systematic arrangement was that of J. Müller, who developed the distinctness of Amphioxus and the lampreys from other cartilaginous fishes, and so established the new groups Cyclostomi and Leptocardii; he also proposed the group Dipnoi for Lepidosiren. Huxley's studies and new material threw new light upon the subject, and aided Gunther to form a classification of fishes which, with one important exception, is still held by ichthyologists. For details, see FISH.

Amphibia.—The Amphibia were for a long time confused with the Reptilia. Thus Linnæus, 1767, who first used the term Amphibia as a group name, included under it: 1. *Reptiles pedati*, including turtles (Testudo); Draco Lacerta (including crocodiles, lizards, and newts); and Rana. 2. *Serpentes apodi.* 3. *Nantes pinnati*, including certain fishes. Brongniart, 1800, classifies reptiles as: Chelonia, Saurii, Ophidii, and Batrachii (the last including frogs, toads, and newts). Latreille, 1804; Duméril, 1806; and Oppel, 1811, while more sharply discerning the true subdivisions of amphibians, still retain them under the head of reptiles. First, De Blainville, writing in 1816, makes Reptilia and Amphibia coördinate, but subdivisions of the "Amphibiens"; so likewise Stannius, as late as 1856. Latreille, 1821, however, proposes a classification which is essentially the same as that we now accept.

Reptiles.—Reptiles were put by Linnæus under the class Amphibia, and it was not until Brongniart separated them that herpetology began upon a philosophic basis. It was further advanced by Duméril (1807) and Oppel (1811), who placed Cæcilia with the amphibians. Cuvier and other writers did little to establish a rational system within this group; and even Duméril and Bibron, in their great *Erpétologie générale* (1834–54), cling to the idea that the batrachians are only separable as an order from reptiles. Although De Blainville, Leuckart, and others had advocated a much deeper separation, it was not until Huxley's investigations demonstrated the necessity of regarding the Amphibia and Reptilia as distinct classes that they were so set apart. See REPTILE.

Huxley, in his *Anatomy of Vertebrated Animals* (1871), divided the Vertebrata into Ichthyopsida (fishes, leptocardians, marsipobranchs, and Amphibia), Sauropsida (birds and reptiles), and Mammalia.

Mammals and Birds.—Birds were too easily distinguished and too compact a class to have been much confounded with anything else, though mediæval writers often put bats, bees, etc., under the name. The history of their classification, therefore, falls within lines agreed upon from the first, and belongs to the article BIRD. The same may be said of the class Mammalia, where the only confusion arose from the foolishness of a few mediæval authors, who classed bats among birds, and whales with fishes; the history of its classification will be found under MAMMALIA.

Outline of Modern Classification. The earlier writers always classified the animal kingdom in a linear series; usually beginning with mankind, and "descending" to the creatures deemed most inferior. This was not with them, as it is with us, a mere matter of convenience in making a list of the groups, but expressed their belief in the doctrine, unchallenged from antiquity to the time of Lamarck and Cuvier, that there existed what they called a *scala naturæ*. They meant by that their belief that all animals could be arranged in an ascending

scale of organization—the infusorians being succeeded by polyps, these by radiated forms, these by worms, and so on to fishes, reptiles, birds, and mammals. The orders within each class, the genera within each family, conformed to the same scale of increasing complexity; so that a linear classification, from the lower invertebrates to the highest vertebrates, was the expression of their belief in an even progress of structure. Cuvier broke into this by his arrangement of the animal kingdom, into four groups, unrelated to each other—Radiata, Articulata, Mollusca, and Vertebrata—to be classified in parallel columns, if at all; and this, again, has been superseded by the conception of a form of classification which simulates a branching tree, and tries to express a true genetic arrangement (see PHYLOGENY), the first attempt at which was made by Lamarck. It is, however, impracticable in the present work to attempt such an expression of the classification of animals, except for restricted groups; and, in general, the linear arrangement must be used, bearing in mind that it is a convenient, not a scientific, expression.

The classification outlined below, and followed throughout this ENCYCLOPÆDIA, is that made by Profs. T. Jeffrey Parker and William A. Haswell (*Text-Book of Zoölogy*, London and New York, 1910). It is one of the most satisfactory formulations of scientific conclusions, has a wide acceptance, and is generally accessible to students and readers. These considerations outweigh, for the purposes of a popular encyclopædia, any objections likely to be urged against these authorities by specialists. The advantage of taking and keeping a uniform standard of classification and nomenclature throughout a work of this kind is too evident to require argument; and should there be good reason to differ from it, here and there, these exceptions and divergences may easily be treated as they arise. It is a fact that in many ways any scientific work such as the one mentioned is out of date as soon as published, so rapid is the advance of knowledge and discovery in the scientific field, but some general standard is necessary. In paleontology this scheme is supplemented by the substantially identical classification of Zittel-Eastman (Karl A. Von Zittel, *Grundzüge der Paläontologie*, Munich, 1895; translated and modified by C. R. Eastman, as *Text-Book of Paleontology*, New York and London, 1900).

It is needful here only to sketch the arrangement of the larger groups, leaving the treatment of orders, families, and lesser divisions to be given in the descriptive articles under the titles of groups, as BIRD, FISH, PROTOZOA, ETC.

CLASSIFICATION OF ANIMALS

LIST OF PHYLA, CLASSES, AND SUBCLASSES

SUBDIVISION PROTOZOA

(*Unicellular Animals*).

Phylum I. PROTOZOA (Protozoans). Animals composed of a single cell; or, if of several cells, these are of one kind.

- Class 1. RHIZOPODA. Protozoa with retractile pseudopodia (Amœba, etc.).
- Class 2. MYCETOZOA. Terrestrial protozoa, plasmodial, and forming large and complex cysts (Slimes).
- Class 3. MASTIGOPHORA. Protozoa without cilia, but with one or more flagella.
- Class 4. SPOROZOA. Protozoa, without appendages; internal parasites.
- Class 5. INFUSORIA. Protozoa with cilia, or sucking tentacles.

SUBDIVISION METAZOA

(*Multicellular Animals*).

Phylum II. PORIFERA (Sponges). Fixed aquatic Metazoa, whose body wall is perforated by incurrent pores.

- Class PORIFERA. Equivalent to the Phylum.
  - Subclass 1. *Calcarea.* Sponges with skeleton of calcareous spicules.
  - Subclass 2. *Non-Calcarea.* Skeleton, when present, composed of siliceous spicules or of spongin fibres.

Phylum III. CŒLENTERATA (Polyps, etc.). Animals of radial structure, whose digestive cavity is lined by the body wall, and which have nettling organs.

- Class 1. HYDROZOA. Cœlenterates, whose body is composed of more than two rays, and contains a single cavity (Hydroids, Siphonophores, etc.).
- Class 2. SCYPHOZOA. Cœlenterates with many radii, and with radial partitions in the cavity of the body (Jellyfishes).
- Class 3. ACTINOZOA. Attached individuals or colonies.
  - Subclass 1. *Zoantharia.* Tentacles numerous, and usually in multiples of five (Sea Anemones, Madrepores, and Corals).
  - Subclass 2. *Alcyonaria.* Tentacles, eight only (Red Corals, Sea Fans, etc.).
- Class 4. CTENOPHORA. Cœlenterates with only two radii, and rows of cilia plates.

Phylum IV. PLATYHELMINTHES (Flatworms). Bilaterally symmetrical, soft-bodied animals, without true segmentation of the body; flattened in a dorso ventral direction, and having the body cavity filled with a loose meshwork of cells.

- Class 1. TURBELLARIA. Free-living flatworms, whose body is covered by cilia; alimentary tract with only one opening to the exterior (Planarians).
- Class 2. TREMATODA. Parasitic, unsegmented, without cilia in the adult, and with a well-developed digestive apparatus (Flukes).
- Class 3. CESTODA. Elongated, usually unsegmented hermaphrodite endoparasites, without mouth or alimentary canal (Tapeworms, etc.).
- Class 4. NEMERTINEA. Body more or less flattened; food canal with mouth and arms; aquatic, carnivorous.
  - Subclass 1. *Palæonemertinea.*
  - Subclass 2. *Schizonemertea.*
  - Subclass 3. *Hoplonemertea.*

Phylum V. NEMATHELMINTHES (Roundworms). Bilateral, unsegmented, round-bodied; usually with alimentary tract, mouth, and arms.

- Class 1. NEMATODA. With intestinal canal; without proboscis; free-living in fresh or salt water, or parasitic (Threadworms).
- Class 2. ACANTHOCEPHALA. Mouth and intestines wanting; parasitic.
- Class 3. CHÆTOGNATHA. Pelagic "arrow worms"; spiny, and with a well-developed nervous system.

Phylum VI. TROCHELMINTHES (Wheel Animalcules). Characterized by having the larva in the form of a trochosphere.

Class 1. ROTIFERA. Microscopic wheel animalcules, with a ciliated band around the mouth, and a special organ for attachment.

Class 2. DINOPHILEA. Minute, wormlike, having five to eight segments, usually ciliated; and nephridia in pairs; marine.

Class 3. GASTROTRICHA. Minute, spindle-shaped, flattened and ciliated on the ventral surface; fresh waters.

Phylum VII. MOLLUSCOIDA (Sea Mats and Brachiopods). Small aquatic animals, having a true body cavity (except in Endoprocta) and suspended alimentary canal; dorsal region abbreviated and surmounted by lophophore.

Class 1. POLYZOA. Molluscoida that form colonies connected by one organic substance; the ciliated band of the lophophore is drawn out into tentacles (Bryozoans).

Subclass 1. *Ectoprocta.* Anus outside tentacular corona.

Subclass 2. *Endoprocta.* Anus internal; form colonies by budding.

Class 2. PHORONIDA. Wormlike polyzoans, living in associations of individuals born from ova, not by buds.

Class 3. BRACHIOPODA. Polyzoa with the body inclosed in a shell of two valves; body usually attached by a stalk (Lamp Shells).

Phylum VIII. ECHINODERMATA (Echinoderms). Animals of prevailingly radical structure, with intestinal wall distinct from body wall, and with calcareous plates in the skin.

Class 1. ASTEROIDEA. Star-shaped echinoderms, with a furrow (ambulacrum) along the underside of the arms (Starfish).

Class 2. OPHIUROIDEA. Star-shaped echinoderms, with the arms sharply marked off from the body, and not grooved (Brittle Stars).

Class 3. ECHINOIDEA. Echinoderms with the body globular or disk-shaped, and armless (Sea Urchins).

Class 4. HOLOTHUROIDEA. Echinoderms elongated, wormlike, usually soft, and with tentacles about the mouth (Trepangs).

Class 5. CRINOIDEA. Sessile, and having a cup-shaped body (Crinoids).

Class 6. CYSTOIDEA. Globular, sessile, or stalked (Fossil).

Class 7. BLASTOIDEA. Ovate, stalked (Fossil).

Phylum IX. ANNULATA (Worms). Bilateral segmented worms without jointed legs.

Class 1. CHÆTOPODA. Worms made up of a series of metameres, each bearing parapodia and cirri (Annelids).

Subclass 1. *Polychæta.* Sexes distinct; ovaries and testes simple and metamerically repeated (Marine Annelids).

Subclass 2. *Oligochæta.* Sexes united; ovaries and testes few and compact (Terrestrial and freshwater).

Class 2. MYZOSTOMIDA. Disk-shaped, unsegmented (Parasites of Crinoids).

Class 3. GEPHYREA. Sessile annelids, without external segmentation in the adult (Marine).

Class 4. ARCHI-ANNELIDA. Minute marine annelids, faintly segmented, often parasitic.

Class 5. HIRUDINEA. Annelids with short rings or none at all, and with ventral suckers (Leeches).

Phylum X. ARTHROPODA (Insects, Crustaceans, etc.). Symmetrical segmented animals, with jointed appendages.

Class 1. CRUSTACEA. Typically aquatic and gill-bearing; usually two pairs of antennæ (Crustaceans).

Subclass 1. *Entomostraca.* Usually small, and with a varied number of appendages (Water Fleas, etc.).

Subclass 2. *Malacostraca.* Crustacea with nineteen pairs of appendages (Crabs, Crayfish, etc.).

Class 2. TRILOBITA. Body depressed, oval, and divided into head, thorax, and abdomen (Extinct Trilobites).

Class 3. ONYCHOPHORA. Cylindrical, unsegmented, papillose, and with a series of short walking appendages (Peripatus).

Class 4. MYRIAPODA. Tracheate arthropods, consisting of several segments, each bearing one or two pairs of legs (Centipedes and Millipedes).

Class 5. INSECTA. Arthropods with the body in three divisions—head, thorax, and abdomen—with six thoracic legs, and usually with wings (Insects).

Class 6. ARACHNIDA. Air-breathing arthropods, without antennæ (Spiders, Scorpions, etc.).

Phylum XI. MOLLUSCA (Mollusks). Animals with unsegmented body, and without jointed appendages; usually with a shell, and with a muscular organ of locomotion (the foot).

Class 1. PELECYPODA. Mollusks with a nearly symmetrical body, leaf-like gills, and a two-valved shell (Bivalves).

Class 2. AMPHINEURA. Bilaterally symmetrical; anus at end of body (Chitons).

Class 3. GASTROPODA. Body unsymmetrical, with head, feelers, eyes, and unpaired foot; shell (when present) univalve (Gastropods).

Subclass 1. *Streptoneura.* Visceral commissures twisted into a figure-of-8; sexes distinct (Limpets, Whelks, etc.).

Subclass 2. *Euthyneura.* Visceral commissures not twisted into a figure-of-8; sexes united (Pulmonates, Nudibranchs, etc.).

Class 4. SCAPHOPODA. Head rudimentary; mouth lobes formed into a tube, inclosing the delicate shell (Marine).

NOTE. The *Pycnogonida, Linguatulida,* and *Tardigrada,* "though not in any way related to one another, and of doubtful relationships to the Arachnida, are, as a matter of convenience, mentioned together here."—*Parker and Haswell.*

Subclass 1. *Scaphopoda.* As above (Tusk Shells).

Subclass 2. *Rhodope.* Minute, ciliated; no shell.

Class 5. CEPHALOPODA. Head large; mouth surrounded by arms; foot funnel-shaped (Cuttlefish).

Subclass 1. *Dibranchiata.* Two symmetrical branchiæ; funnel tubular (Squids and Octopods).

Subclass 2. *Tetrabranchiata.* Four branchiæ; shell multilocular (Nautilus and Ammonites).

Phylum XII. CHORDATA (Chordates). Animals having a notochord, which may (Subphylum C) persist from birth, and become "in the adult replaced more or less completely by a segmented bony or cartilaginous axis—the spinal or vertebral column."

Subphylum and Class A. ADELOCHORDA. Marine wormlike animals, having a notochord as larvæ (Balanoglossus, etc.).

Subphylum and Class B. UROCHORDA. Animals, simple or compound, marine, inclosed in a coriaceous test, composed largely of cellulose, and having a notochord when larvæ (Ascidians).

Subphylum C. VERTEBRATA. Animals bilaterally symmetrical, and having a backbone (Vertebrates).

SEC. I. ACRANIA. *Without a head* (includes only the family Branchiostomidæ, Amphioxus, etc.).

SEC. II. CRANIATA. *With a head* (Fishes, Reptiles, Birds, Mammals).

Class 1. CYCLOSTOMATA. Eel-like vertebrates, without a lower jaw; mouth suctorial, and armed with horny teeth (Lampreys).

Class 2. PISCES. Aquatic vertebrates, with persistent gills and paired fins (Fishes).

Subclass 1. *Elasmobranchii.* Fishes with a cartilaginous skeleton, in which the cranium is never ossified, nor contains membrane bones; gill openings usually in five pairs (Sharks and Rays).

Subclass 2. *Holocephali.* Cartilaginous fishes with four pairs of gill slits, nearly concealed by a fold of skin (Chimæras).

Subclass 3. *Teleostomi.* Fishes with the skeleton complicated by membrane bones and ossifications, or completely bony (Sturgeons and ordinary Fish).

Subclass 4. *Dipnoi.* Fishlike animals, having an apparatus for breathing atmospheric air (Lungfishes).

Subclass 5. *Ostracodermi.* Paleozoic fishes, with an exoskeleton extraordinarily developed about the head, and apparently with no endoskeleton (Cephalaspis, etc.).

Class 3. AMPHIBIA. Amphibious vertebrates, breathing by gills in the larval condition, and (usually) by lungs when adult, and having legs and five-toed feet (Amphibians).

Class 4. REPTILIA. Elongated, air-breathing vertebrates, with a horny epidermal skeleton of scales and one occipital condyle (Reptiles).

Class 5. AVES. Vertebrates clothed with feathers (Birds).

Subclass 1. *Archæornithes.* Birds having a prolonged tail of many vertebræ (Archæopteryx).

Subclass 2. *Neornithes.* Birds having the tail vertebræ compacted into a pygostyle (Modern Birds).

Class 6. MAMMALIA. Vertebrates which suckle their young, and are more or less clothed with hair (Mammals).

Subclass 1. *Prototheria.* Mammals with oviducts separated (Didelphia).

Subclass 2. *Theria.* Mammals with oviducts united for a longer or shorter part of their length (Monodelphia).

A. *Metatheria.* Young born in rudimentary condition, and sheltered in a pouch (Marsupials).

B. *Eutheria.* Young born in a uterus; no pouch present (Higher Mammals).

Bibliography. In addition to works mentioned above, consult: Bronn (editor), *Klassen und Ordnungen des Thierreichs* (Leipzig and Heidelberg, 1859 et seq.); Haeckel, *Natürliche Schöpfungsgeschichte* (Jena, 1868); Lankester, *Notes on Embryology and Classification* (London, 1877); Leunis, *Synopsis der Thierkunde* (Hanover, 1883–86); Huxley, *Anatomy of Vertebrates* (New York, 1878), and *Anatomy of Invertebrated Animals* (New York, 1888); *Standard Natural History* (Boston, 1885); Lang, *Text-Book of Comparative Anatomy* (London, 1891–96); Newton, *Dictionary of Birds* (London and New York, 1893–96); Sharpe, *Hand-List of Birds* (London, 1899–1909); *A. O. U. Checklist of North American Birds* (New York, 1910); *Royal Natural History* (London, 1895); *Cambridge Natural History* (Cambridge, Eng., 1895–1909); Lankester's *Treatise on Zoölogy* (London, 1900–1909); Parker and Haswell, *Text-Book of Zoölogy* (London and New York, 1910); Davenport, *Introduction to Zoölogy* (New York, 1900); Volumes in the *American Nature Series* (New York); Gregory, *The Orders of Mammals* (New York, 1910). See also books mentioned under EVOLUTION; EMBRYOLOGY; and such titles as BIRD, FISH, INSECT, etc., and under biographies of the naturalists above mentioned.

CLASSIFICATION OF PLANTS. See TAXONOMY.

CLASSIFICATION OF SHIPS. See A1; and LLOYDS.

CLAS'SIS (Lat., assembly). In the Reformed church of Holland and America, the name of an ecclesiastical body, made up of ministers and elders representative of churches, corresponding to a presbytery. The classis hears appeals from the consistories, which are the official boards of local churches, and the synod hears appeals from the classis. The classis also confirms and dissolves pastoral connections, ordains and deposes ministers, and sends delegates to the local and general synods. See REFORMED CHURCH IN AMERICA, THE.

CLAS'TIC ROCKS (Fr. *clastique*, from Gk. κλαστός, *klastos*, broken, from κλᾶν, *klan*, to break), or FRAGMENTAL ROCKS. A petrographic division which includes all rocks composed of

fragmental materials. See ÆOLIAN ACCUMULATIONS; AQUEOUS ROCKS; BRECCIA.

CLAT'SOP. An Indian tribe of the Chinookan stock. See CHINOOK.

CLAUDE, klôd, JEAN (1619–87). A French Protestant preacher and controversialist. He was born at La Sauvetat-du-Dropt, southwest France (ancient District of Agenais). He studied at Montauban, became pastor at Nîmes in 1654, and was also professor of theology in the Protestant college there, where in 1661 he was forbidden to preach, on account of his opposition to the proposed union with the Roman Catholics. In the next year he obtained a post at Montauban, but was removed from it also. He then went to Paris and was pastor at Charenton from 1666 until 1685. On the revocation of the Edict of Nantes (1685), he was ordered to leave France within 24 hours, and, being welcomed by William of Orange, preached at The Hague until his death, Jan. 13, 1687. He was the greatest leader of the French Reformed churches, their ablest disputant, their favorite preacher, and their truest representative. He is especially notable for the polemic he carried on against the school of Port Royal. His works include: *A Defense of the Reformation* (1671; Eng. trans., 1815), written in reply to an attack on the Calvinistic faith by Pierre Nicole, the celebrated Jansenist writer; *Complaints and Cruel Prosecutions of the Protestants* (1686; Eng. trans., 1707); and especially, as more familiar to English readers, *Essay on the Composition of a Sermon* (2 vols., 1778–79)—a much-used manual of homiletics, frequently reprinted from the edition of Charles Siméon. His son published *Œuvres posthumes de Jean Claude* (5 vols., Amsterdam, 1688). Consult *La Devèze* (Amsterdam, 1687).

CLAUDE LORRAIN, klôd lôr'răN'. See GELÉE, CLAUDE.

CLAU'DIA GENS (Lat., Claudian clan). A clan at Rome, of Sabine origin, the families of which were in part patrician, in part plebeian. The clan was established at Rome, about 504 B.C., by Appius Sabinus Regillensis, who came to Rome from Regillum, a town in the Sabine territory. He was consul in 495. His severity in enforcing the laws relating to debt was largely responsible for the secession of the plebs to the Sacred Mount. (See under ROME, *History of Rome during the Earliest or Regal Period.*) The names (see COGNOMEN) of the patrician families, distinguished for their arrogance and pride, are Cæcus, Caudex, Centho, Crassus, Pulcher, Regillensis, and Sabinus. The plebeian *cognomina* are Asellus, Canina, Centumalus, Cicero, Flamen, and Marcellus. Consult Mommsen, "Die patricischen Claudier," in *Römische Forschungen* (Berlin, 1865). See APPIUS CLAUDIUS CRASSUS; CLAUDIUS CÆCUS, APPIUS; MARCELLUS, MARCUS CLAUDIUS.

CLAU'DIAN AQUEDUCT. See AQUEDUCT; CLAUDIUS I.

CLAU'DIAN HARBOR. A harbor at the mouth of the Tiber, 2 miles west of Ostia, constructed in the face of great natural difficulties by the Emperor Claudius. Its area exceeded 6,000,000 square feet, with a depth of 15 to 18 feet; it was inclosed by two curving jetties, each 2400 feet long. An artificial island was constructed between the jetties by filling with concrete the great ship which had transported the Vatican obelisk from Egypt, sinking her, and from this foundation building above the level of the water. On the island rose a lighthouse 200 feet high, built in imitation of the Pharos of Alexandria. In time the Claudian harbor became inadequate to the needs of the city, and an inner harbor was constructed by Trajan, now 2 miles inland. The Claudian harbor, now inaccessible on account of marshes, is depicted on a bas-relief discovered in 1863. Consult Lanciani, *Ancient Rome in the Light of Recent Discoveries* (New York, 1889).

CLAU'DIA'NUS, CLAUDIUS. A Latin poet, born at Alexandria, who lived at the end of the fourth and the beginning of the fifth century. He came to Rome in 395 and there secured the patronage of Stilicho and, through him, of the Emperor Honorius. His love and admiration for Stilicho are voiced in a number of his minor poems. As Gibbon says, he "assumed in his mature age the familiar use and absolute command of the Latin language, soared above the heads of his feeble contemporaries, and placed himself, after an interval of 300 years, among the poets of ancient Rome." At the request of the Senate, the emperors Arcadius and Honorius erected a statue in his honor in the Forum of Trajan. The productions of Claudianus that have come down to us consist of three epic poems—*The Rape of Proserpine*, the incomplete *Battle of the Giants*, and a poem on the downfall of Rufinus, Minister of Arcadius at Constantinople, besides panegyrics on Honorius and Stilicho, idyls, epigrams, and occasional poems. Claudianus displays a brilliant fancy and rich coloring, with variety and distinctness in his pictures, especially in those pieces which deal with contemporary affairs. The best editions are by Birt (Berlin, 1892), in *Monumenta Germaniæ Historica*, x, and Koch (Leipzig, 1893). A poor English translation was executed by Hawkins (London, 1817). Consult: Hodgkin, *Claudian: The Last of the Roman Poets* (London, 1875); Crees, *Claudian as an Historian* (1908); C. H. Moore, "Rome's Past in the Poems of Claudian," in *The Classical Journal*, vol. vi, pp. 108–115 (1910).

CLAUDIANUS MAMER'TUS (c.425–c.474). A Christian poet and philosopher. A younger brother of St. Mamertus, Bishop of Vienna, he was consecrated by the latter to the priesthood and became his assistant. He systematized the liturgy and wrote the hymns known as the *Small Liturgies*, sometimes heard in Catholic churches during the services preceding Ascension Day. The hymns "Contra Poetas Varios" and "Pange lingua gloriosi lauream certaminis" have been ascribed to him. In his famous philosophical treatise, *De Statu Animæ* (published by Mosellanus, Basel, 1520, and, with notes, by C. Barth, Zwickau, 1655), he shows that "thought is inseparable from the essence of the soul, and that its spiritual activity is indestructible" (Neander, *History of Dogmas*), and urges the dualism of soul and body. He was highly praised by the poet Sidonius Apollinaris. His complete works were edited by Engelbrecht and published in *Corpus Scriptorum Ecclesiasticorum Latinorum*, vol. xi (Vienna, 1885). Consult Engelbrecht, *Untersuchungen über die Sprache des Claudianus Mamertus* (ib., 1885).

CLAU'DIA QUIN'TA. A Roman woman who strikingly disproved the charge of unchasteness brought against her. When the ship carrying the image of Cybele to Rome from Pessinus, in 204 B.C., grounded on a shoal at the mouth

of the Tiber, the soothsayers declared that it could be moved only by a pure woman; Claudia, seizing the rope, towed the ship to Rome.

CLAU'DIO. 1. In Shakespeare's *Much Ado About Nothing*, a young Florentine lord. 2. In Shakespeare's *Measure for Measure*, the lover of Juliet.

CLAU'DIUS. In Shakespeare's *Hamlet*, the King of Denmark, who poisons his brother, Hamlet's father, and marries the widow.

CLAUDIUS I (TIBERIUS CLAUDIUS NERO DRUSUS; officially TI. CLAUDIUS CÆSAR AUGUSTUS GERMANICUS) (10 B.C.–54 A.D.). Roman Emperor (41–54 A.D.). Youngest son of Nero Claudius Drusus, stepson of the Emperor Augustus, born at Lugdunum (Lyons). Since he was sickly and infirm, his education was neglected, or left to women and freedmen. His supposed imbecility saved him from the cruelty of Caligula; but Claudius in his privacy had made considerable progress in the study of history and wrote in Latin and Greek several extensive historical works now lost, on Rome, Carthage, and Etruria. After the assassination of Caligula the Pretorians, having found Claudius hiding in the palace, carried him forth, proclaimed him Emperor, and compelled his recognition by the Senate. By his payment of the troops, who had raised him to the throne, he inaugurated a baneful practice which, under the succeeding emperors, subjected Rome to a military despotism. The first acts of his reign gave promise of mild and just government; but in 42, when a conspiracy against his life was detected, his timidity led him to yield himself entirely to the guidance of his wife Messalina (q.v.), who, with the freedmen Pallas and Narcissus, practiced cruelties and extortions without restraint. Claudius lived in retirement, partly occupied in studies, and expended enormous sums in building, especially in the construction of the famous Claudian Aqueduct. This great work occupied 30,000 laborers during 11 years. He sought, too, to drain the Lacinus Fucinus. (See AVEZZANO. See also CLAUDIAN HARBOR.) He sought to introduce three new letters into the Latin alphabet. He showed himself also an able administrator, anxious for the good of his people. Abroad the armies of Claudius were victorious. Mauretania was made a Roman province, the conquest of Britain was commenced under the personal command of the Emperor, and some progress was made in Germany. After the execution of Messalina Claudius married his niece, Agrippina (q.v.), under whose influence he deprived his son Britannicus of the succession to the Imperial power and adopted Nero, son of Agrippina. When Claudius showed some inclination to deprive Nero of the succession, Agrippina caused him to be poisoned with a dish of mushrooms. After his death Claudius was deified, giving occasion to the bitter satire of Seneca, *Apocolocyntosis, Gourdification*, or *Pumpkinification*.

CLAUDIUS II (MARCUS AURELIUS CLAUDIUS, better known as CLAUDIUS GOTHICUS) (214–270), Roman Emperor (268–270). He had been Governor of Illyria and after the death of Gallienus, in 268, was proclaimed Emperor by the soldiers. In 268 he overthrew his rival, Aureolus, and conquered the Alemanni (q.v.); in 269 he defeated the Goths that menaced Mœsia, and 50,000 of them perished in battle. From this victory he gained the title *Gothicus*. Claudius died of the pest at Sirmium.

CLAUDIUS, ARCH OF. A triumphal arch at Rome, erected on the Via Lata in the Campus Martius, to commemorate the victories won by Claudius in Britain in 51–52 A.D. It was in ruins already in the eighth century.

CLAUDIUS, klou'dē-us, MATTHIAS (1740–1815). A German poet and author, associated with the *Göttingen Hainbund*, and known as "Asmus," or "Der Wandsbecker Bote." He was born at Reinfeld, Holstein; studied from 1759 to 1763 at the University of Jena; from 1771 to 1775 was editor, under the name of "Asmus," of the newly established *Wandsbecker Bote* (whence his surnames), and in 1776 of the *Landzeitung*, at Darmstadt. In the following year he returned to Wandsbeck, where he henceforth lived. He was appointed in 1788 auditor of the provincial bank of Altona, by the Crown Prince Frederick of Denmark, who had also, in 1785, granted him a small annuity. His collected works, published in 1775–1812 (eight parts), with the quaint title *Asmus Omnia Sua Secum Portans*, were in great part taken from his contributions to the *Wandsbecker Bote*. His prose is shrewd, aphoristic, with a certain naïve humor; his verse, now buoyantly merry, now patriotic, now in the best sense religious, is always fresh, simple, and sincere. Many of his lyrics, such as "Der Mond ist aufgegangen" and the "Rheinweinlied" beginning "Bekränzt mit Laub," and "Das Kartoffellied" have continued to be popular favorites throughout Germany. He also translated into German Fénelon and other writers, French and English. The collected works have been excellently edited by Redlich (12th ed., Gotha, 1882). For his biography, consult Herbst (Gotha, 1878) and Gerok (Darmstadt, 1881).

CLAUDIUS CÆ'CUS, APPIUS. A Roman patrician of the fourth and third centuries B.C. When censor, in 312 B.C., he gained many adherents by invading the traditional rights of the patricians and admitting men of low birth to senatorial rank; but his nominations were quickly set aside. At the same time he constructed the great Appian Way from Rome to Capua, and also the first aqueduct (Aqua Appia) to bring a supply of water into the city. To complete these works, he arbitrarily continued his censorship for five years, though the legal period was 18 months. (See CENSOR.) He was consul in 307 and 296 B.C., and met with success in several campaigns against the Samnites and the Etruscans. When Pyrrhus of Epirus sent Cineas to Rome with terms of peace unfavorable to Rome, it was only the eloquence of the aged Claudius that prevented the Senate from accepting them. His speech on this occasion was extant in Cicero's time. By this speech, as well as by a collection of aphorisms, and a work *De Usurpationibus*, he laid the foundations of Latin prose. In his old age Claudius is said to have become blind, whence his cognomen "Cæcus."

CLAUDIUS CRAS'SUS, APPIUS. See APPIUS CLAUDIUS CRASSUS.

CLAUDIUS NERO. See NERO.

CLAUDIUS OF TU'RIN (Lat. *Claudius Turinensis*) (?–c.830). A Spanish-Italian bishop. At first a preacher at the court of Louis the Pious, he became Bishop of Turin in 820. He was one of the most radical iconoclasts of his time and protested against the use of images, the invocation of saints, and the veneration of relics. His attitude kept him in constant controversy with Pope Paschal I. Claudius wrote

an *Apologeticum*, directed against the Abbot Theodemir, of the convent of Psalmody, near Nîmes. The abbot's part was taken by Dungall, an Irish scholar and teacher. Jonas of Orléans, at the request of the Emperor, also wrote against Claudius, but both Louis and Claudius died before the publication of his work. Claudius opposed the growing power of the Bishop of Rome. Consult a dissertation by Rudelbach (Copenhagen, 1824).

CLAUDIUS PULCHER, Appius. A Roman author, orator, administrator, and brother-in-law of Lucullus, under whom he served in Asia against Tigranes and Mithridates, in 72–71 B.C. In 57 he was prætor, in 54 proprætor in Spain; in 54 he was consul. In 53, while he was governor of Cilicia, he corresponded with Cicero (consult Cicero's *Ad Familiares*, iii). After his return to Rome, he was impeached on charges of having exceeded his authority, as governor of Cilicia, but was acquitted. In 50, as censor, he won fame by the severity with which he expelled many from the Senate; he ejected, for instance, Sallust, on charges of immorality. He favored Pompey against Cæsar and went with Pompey to Greece; he died in Eubœa, about 48 B.C. The first book of his work on augury he dedicated to Cicero, who rated him highly as an orator and respected his knowledge of augury and Roman history (*Brutus*, 267).

CLAUDIUS PULCHER, Publius. Son of Appius Claudius Cæcus, best known for a story told to explain his defeat, in 249 B.C., by the Carthaginians in a naval battle in the harbor of Drepanum. When, before the battle, he sought the *auspicia ex tripudiis* (see Auguries and Auspices), the sacred chickens refused to eat. Undeterred by this evil omen, he flung the chickens into the sea, crying, "Let them drink then." He died before 246 B.C.

CLAUS, klous, Karl Friedrich Wilhelm (1835–99). A German zoölogist, born in Cassel. He studied the natural sciences in Giessen, under Leuckart; in 1863 became professor of zoölogy in Marburg, in 1870 in Göttingen, and in 1873 in Vienna. He was also director of the zoölogical station at Triest. He was very active in the investigation of the Crustacea and is also widely known because of his *Text-Book of Zoölogy*. Of his numerous works the following are important: *Die freilebenden Copepoden* (1863); *Beiträge zur Kenntnis der Ostracoden* (1868); *Grundzüge der Zoölogie* (1868); *Ueber den Bau und die Entwicklung der Cumaceen* (1870); *Die Metamorphose der Squilliden* (1872); *Ueber die Entwicklung, Organisation und systematische Stellung der Arguliden* (1875); *Lehrbuch der Zoölogie* (6th ed., 1897; trans. into English, under the title of *Text-Book of Zoölogy*, by Claus and Sedgwick, London, 1897).

CLAUSEL, klô'zĕl', Bertrand (1772–1842). A French marshal, born at Mirepoix, in the Department of Ariège, Dec. 12, 1772. He entered the army at an early age and commanded a brigade in the Italian campaign of 1799. He was made a general of division of the Army of the North in 1802, distinguished himself in the campaign of 1809 against Austria and subsequently in the war in Spain, where, after the battle of Salamanca, July 22, 1812, he succeeded Marmont in the chief command. He conducted the very difficult retreat from Portugal with the greatest circumspection, fighting a succession of battles. Although he stood by Napoleon to the last, Louis XVIII, in 1814, named him inspector general of infantry. When Napoleon returned to France in 1815, Clausel immediately declared for him, was made a peer, and received the command of the Army of the Pyrenees. On the return of the Bourbons he was declared a traitor. He escaped to the United States and lived several years at Mobile, where he wrote his *Exposé justificatif*. During his absence he was condemned to death, but was subsequently permitted to return to France, was elected deputy in 1827 and 1830, and after the July revolution was put in command of the troops in Algeria. For his services in that capacity he was made marshal of France in 1831, but was soon afterward recalled. He was appointed Governor-General of Algeria in 1835 and once more recalled in 1837. He returned to France and defended himself, though not quite successfully, both through the press and from the tribune, against the attacks made upon him. He died at Secourrieu (Haute-Garonne), near Toulouse, April 21, 1842. Consult Clausel, *Explications du Maréchal Clausel* (Paris, 1837). See Algeria.

CLAUSEN, George (1852–). An English genre, landscape, and portrait painter. He was born in London of Danish parents, studied at the South Kensington Art Schools, was assistant to the painter Edwin Long, and afterward worked under Bouguereau and Fleury at Paris. His early pictures show the influence of various models—"La Pensee" (1880, Glasgow Museum) for instance, that of Whistler—but after a visit to Paris in 1883 he adopted the plein-air methods of Bastien-Lepage, and gradually developed an individual style with peculiarly beautiful atmospheric effects, which has placed him in the front rank of English painters with Impressionistic tendencies. His pictures usually depict the life of the English country laborer with a style of poetic conception closely approaching Millet's. Among the best known are: "The Ploughboy" (1888); "The Girl at the Gate" (1889, Tate Gallery, London); "The Mowers" (1892, Sharpley-Bainbridge collection, Lincoln); "The Ploughman's Breakfast" (1905, Melbourne Gallery); "The Gleaners Returning" (1908, Tate Gallery); "Twilight" (1909). He became known also as a painter of portraits and still life. Clausen received many medals, was elected a member and served for a time as professor in the Royal Academy. His lectures were published under the titles *Six Lectures on Painting* (1904), and *Aims and Ideals in Art* (1906).

CLAUSEN, klou'zen, Thomas (1801–85). A German astronomer, born at Nübel, in Schleswig. He early devoted himself to the study of astronomy, was for several years assistant at the observatory of Altona, and from 1842 to 1872 was connected with the observatory of Dorpat (now Yuryev), first in the capacity of observer, later as director. During his scientific career Clausen made many important contributions to astronomy and carried out elaborate calculations of the paths of comets.

CLAUSENBURG, klou'zen-burk. See Klausenburg.

CLAUSEWITZ, klou'ze-vĭts, Karl von (1780–1831). A Prussian general and military writer, born at Burg. He entered the army in 1792, took part in the campaigns on the Rhine in 1793–94, and in 1801–03 attended the Berlin Academy for young officers, where he attracted the attention and won the favor of Scharnhorst.

He was adjutant to Prince Augustus in 1803–06, was captured with him by the French at Prenzlau, and, after being exchanged, served until 1812 as major in the Prussian General Staff, being employed after 1809 in the Ministry of War, under Scharnhorst. In 1810–12 he was military instructor to the Crown Prince of Prussia and to Prince Frederick of the Netherlands. At the outbreak of the Russian War in 1812 he entered the Russian service and aided Diebitsch in concluding the convention of Tauroggen. He accompanied Blücher as Russian staff officer during the campaign of 1813, the history of which he wrote, at the instance of Gneisenau. He reëntered the service of Prussia in 1814, was appointed chief of staff under Thielmann in the following year, and remained in that position at Coblenz until 1818, when he was made major general and director of the Allgemeine Kriegsschule. Finally, he was appointed, in 1831, chief of staff to Field Marshal Gneisenau and served first in Berlin, then on the Polish frontier. His writings are marked by keen analytic power, e.g., in his famous analogy between war and unrestricted competition in business. They were published after his death as *Hinterlassene Werke über Krieg und Kriegführung* (10 vols., 1832–37), of which the most noteworthy are: *Vom Kriege* (3 vols., Eng. trans. by Graham, *On War*, London, 1873); *Der Feldzug von 1796 in Italien; Uebersicht des Feldzuges von 1813; Der Feldzug von 1815; Ueber das Leben und den Charakter von Scharnhorst.* Consult Schwartz's biography (2 vols., Berlin, 1877).

CLAUSIUS, klou'zê-us, Rudolf Julius Emanuel (1822–88). A German physicist, born at Köslin. In 1855 he became professor in the Polytechnic Institute of Zurich, in 1867 professor in the University of Würzburg, and in 1869 professor at Bonn. Clausius is one of the founders of the modern science of thermodynamics (q.v.), and in a paper before the Berlin Academy of Sciences (1850) stated the second law of thermodynamics, that "heat cannot of itself pass from a colder to a hotter body." The theory of electrolysis advanced by Clausius has also played a conspicuous part in electricity. He assumed that the ions are not in complete union, but that a part of them are free to unite with other ions. These uncombined ions, accordingly, are brought together under the action of the current at the anode and cathode. Clausius was one of the most celebrated mathematical physicists of the nineteenth century, and his researches and writings in heat, electricity, and molecular physics were of the greatest value. His most important works are: *Die mechanische Wärmetheorie* (1876); *Die Potentialfunktion und das Potential* (1859); and *Ueber das Wesen der Wärme, verglichen mit Licht und Schall* (1857). For a biography of Clausius, consult Riecke, *Rudolf Clausius* (Göttingen, 1889).

CLAUSON-KAAS, klou'zôn-käs', Adolf von (1826–1906). A Danish promoter of manual training. He was born near Altona, Holstein, and, after serving in the Danish cavalry, devoted himself entirely to the advancement of education. In 1870 he founded the Danish Clubs for Home Industry. On the occasion of the international expositions of 1873 and 1878, he gave a series of public lectures on manual training in several cities of Germany, Holland, Russia, France and elsewhere, and also established a series of teachers' courses. In this way he encouraged the revival of working schools for boys, his primary aim being the mechanical development of the hand and of the eye in association with mental training. He conducted a number of training schools in Saxony and introduced a course of modeling and drawing in the institution for the blind at Dresden.

CLAUSS-SZAVARDY, Wilhelmina (1834–1907). One of the great pianists of the last century. She received her entire musical education at the Proksch Institute in her native city, Prague. When only 15 years old, she made her first tour of Germany and attracted considerable attention. In spite of the interest Berlioz showed in her she did not immediately succeed in Paris; but when the singer Madame Ungher-Sabastier took her under her special protection, she conquered Paris and from there in a short time France, Germany, and England. She was especially great as an interpreter of Bach and Beethoven. In 1857 she was married to the author Frederick Szavardy, who died in 1882. After 1852 her home was in Paris.

CLAUSTHAL, klous'tâl (Ger., closed valley, from Lat. *clausum*, p.p. of *cludere*, to close + Ger. *Thal*, valley). An important mining town in the Prussian Province of Hanover, situated on a plateau of the Upper Harz Mountains, about 1800 feet above sea level, and 25 miles northeast of Göttingen (Map: Prussia, D 3). It forms practically one town with Zellerfeld, which contains the Upper Harz Museum. Among its public buildings the most noteworthy is the church of the Holy Ghost, the largest wooden church in the world. The mines of Clausthal yield silver, lead, copper, iron, and zinc, and are among the most valuable and productive in Germany. They are owned and operated by the Prussian government, which has established in connection therewith a mining academy, with an experimental laboratory, model workshop, and a library of over 40,000 volumes; the number of its students in 1913 was 138. The greater portion of the male population finds employment in the mines and smelting works, while the women are occupied in the knitting mills. Pop., 1900, 8565; 1905, 8632; 1910, 8266. Clausthal was founded in the twelfth century, and a new settlement was established there by the dukes of Brunswick in the sixteenth century.

CLAVA'RIA (Neo-Lat. nom. pl., from Lat. *clava*, club). A genus of fungi belonging to the Hymenomycetes. They are known in general as the coral fungi, their fleshy sporophores often simulating branching coral in form. The spores are produced over the whole surface of the branches. There are also forms with unbranched, club-shaped sporophores. Some of the forms are edible and seem to be used in Germany more than in other countries. *Clavaria botrytis*, a species common in oak and beech woods, growing on the ground among moss, grass, heath, etc., is gathered when young, and used as food, having a very agreeable sweetish taste. Another German species, *Clavaria flava*, which grows on sandy ground in fir woods, is used in the same way. Other species appear to possess similar properties, and Liebig found them to contain the saccharine substance called "mannite." *Clavaria botrytis* is the *Keulenpilz*, and *Clavaria flava* the *Ziegenbart* (goat's beard) of the Germans. See Colored Plate of Edible Fungi accompanying the article Fungi.

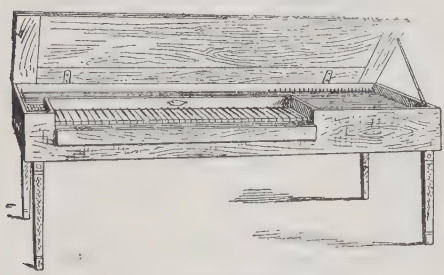
CLAVENNA. See Chiavenna.

CLAVERACK, klāv'ēr-ak. A town in Co-

lumbia Co., N. Y., including Philmont village, 30 miles south of Albany, and 3 miles east-southeast of Hudson, its banking point, on the Boston and Albany Railroad (Map: New York, G 6). Among the points of interest are a Dutch Reformed Church, built in 1767, an old court-house, erected in 1784, a home for crippled children, public library, and *Tribune* Fresh Air Home, for children. The chief industries are agriculture and the manufacture of flour and farm implements. Settled as early as 1660, Claverack (named "Klauver Rachen," 'clover reaches,' by the Dutch) was organized as a town in 1778 and was the county seat from 1786 to 1806. The government is administered by town meetings, held every two years. Pop., 1900, 4416; 1910, 4114.

CLA'VERHOUSE. See GRAHAM, JOHN.

CLAVICHORD, klăv'ĭ-kôrd (Fr. *clavicorde*, ML. *clavichordium*, from Lat. *clavis*, key + *chorda*, string). An instrument of the harpsichord family and an important step in the evolution of the pianoforte. Its history previous to the fifteenth century is unknown, but it is generally believed that the instrument originated by applying to the monochord (q.v.) the keyboard of the organ. The clavichord was shaped like the square pianoforte, having a keyboard of



CLAVICHORD.

four octaves and strings of brass wire set in vibration by the action of tangents or "jacks" covered with metal. Its tone, though weak, was delicate, and, unlike the harpsichord, or spinet, in which the strings were plucked or twanged by quills or pieces of hard leather, it responded in a measure to the gradations of the player's touch. The clavichord was used in Germany until the beginning of the nineteenth century. Bach preferred it to the pianoforte of his day and wrote an essay for his son, *Versuch über die wahre Art Klavier zu spielen*, for this instrument. Mozart used the clavichord in composition, and Beethoven preferred it to other keyed instruments, for upon it, he said, "one could best control tone and expressive interpretation." As recently as 1896 Mr. Arnold Dolmetsch of Boston had several clavichords built after old models for use in his concerts of ancient music. Consult: A. J. Hopkins, *Old Keyboard Instruments* (London, 1887); K. Krebs, *Die besaiteten Klavierinstrumente bis zum Anfang des 17 Jahrhunderts* (Leipzig, 1892); F. A. Goehlinger, *Geschichte des Klavichords* (Basel, 1910). See HARPSICHORD; SPINET.

CLAV'ICLE (Lat. *clavicula*, a little key, dim. of *clavis*, key), or COLLAR BONE. A long bone, curved somewhat like the italic letter *f*, and placed at the upper and anterior part of the thorax, in a nearly horizontal position. In connection with the scapula or shoulder blade, the clavicle forms the shoulder and is the only bony connection between the upper extremity and the trunk. The inner extremity of the clavicle articulates with the sternum (breastbone) and the cartilage of the first rib, while the outer extremity articulates with the scapula. The range of motion in the clavicle is extensive—especially in a vertical direction—and the various movements of the arm are in this way readily accommodated. In the female the clavicle is smoother, slenderer, and presents a less marked curve than that of the male. The length, also, is slightly less, and the position more nearly horizontal. Manual labor, which brings the shoulder into constant exercise, renders the clavicle thicker and tougher, and therefore in right-handed people the right clavicle shows greater development.

Since the clavicle favors the lateral movements of the upper extremities, we do not find it in animals whose fore limbs are used only for progression; but it is present in almost all animals whose anterior extremities are clawed and used for prehension.

The clavicle is frequently fractured by direct violence and also by indirect force, as in falling upon the hand. Dislocations are of less frequent occurrence.

Ossification of the clavicle begins very early—even as soon as the thirtieth day, according to Béclard—and at birth this process is almost complete.

CLAVIER, klă-vēr' (from Lat. *clavis*, key). The German name for the pianoforte, and the prototype of the clavichord (q.v.). In French, "clavier" designates the keyboard of an organ or pianoforte. For the practice clavier, see PIANOFORTE.

CLAVIGO, *Span. pron.* klä-vē'gō. A play by Goethe (1774), based on an episode in the life of José Clavijo y Fajardo, a Spanish official and journalist.

CLAVIJERO, or **CLAVIGERO,** klä'vē-hā'rō, FRANCISCO XAVIER (1731–87). A Mexican historian, born in Vera Cruz. He early entered the Order of the Jesuits and became a teacher of rhetoric and philosophy. He lived among the Indians in various parts of Mexico as a missionary for many years and made himself fully acquainted with the languages, traditions, and antiquities of the aboriginal tribes. On the expulsion of the Mexican Jesuits by Spain, in 1767, he sailed for Italy, and with others of his order settled in Ferrara, passing later to Bologna, where he founded an academy. He wrote, in Spanish, a work on early Mexican history; but, in order to publish it, he was obliged to translate it into Italian. The work finally appeared as *Storia antica del Messico* (1780); it is a comprehensive and valuable history of the Aztec period. An English translation was made by C. Cullen (London, 1787; 2d ed., ib., 1807). Clavijero also wrote works on physics and philosophy, and the *Storia della California* (1789), which was translated into Spanish by Nicolás García de San Vicente, as *Historia de la Antigua ó Baja California* (Mexico, 1852).

CLAVIJO, RUY GONZÁLEZ DE (?–1412). A Spanish traveler in the Orient. He was born in Madrid and in 1403 was sent by Henry III of Castile as Ambassador to Tamerlane. The route followed by him from his point of departure, Cadiz, took him to Trebizond, Armenia, Persia, and Khorasan. He arrived at Samarkand in 1404 and was well received at the court of Tamerlane. The return journey was accom-

plished (partly after the death of Tamerlane) amid the greatest dangers and difficulties. Upon his arrival in Spain in 1406 he reported at once to the King, whose court was then at Alcalá de Henares, and served thereafter as chamberlain, until the King's death in 1407. The "journal" of Clavijo was published under the title *Historia del gran Tamerlán é itinerario y narración del viaje*, etc. (1582; reprinted in 1782). It is valuable, not only because of its high literary merit, but also for its historical importance. There are editions, equipped with dissertations and notes, by Gonzalo Argote de Molina (Sevilla, 1582) and Antonio de Sancha (Madrid, 1782). An English version by Sir Clements Markham bore the title *Narrative of the Embassy of R . . . G . . . de Clavijo to the Court of Timour* (Hakluyt Society, 1859).

CLAVILEÑO, *Sp. pron.* klä′vē-lā′nyō, EL ALIGERO. The wooden horse, said to have been constructed by Merlin, which was managed by a wooden pin in its forehead; whence its name, "the winged pin timber."

CLAXTON, KATE (MRS. CHARLES A. STEVENSON) (1850–1924). An American actress, born at Somerville, N. J. She made her first appearance on the stage in Chicago with Miss Lotta in 1870, and in the same year joined Augustin Daly's Fifth Avenue Theatre in New York. In 1872 she became a member of A. M. Palmer's Union Square Theatre, playing largely comedy rôles. She created the part of Louise in *The Two Orphans* and then became known as one of the best emotional actresses of her time. Her first starring tour was in 1876. In 1878 she was married to Charles A. Stevenson.

CLAXTON, PHILANDER PRIESTLY (1862–). An American educator, born in Bedford Co., Tenn. He was educated at the University of Tennessee and at Johns Hopkins. From 1883 to 1893 he was a superintendent of schools in North Carolina. In the latter year he became professor of pedagogy and German at the North Carolina State Normal and Industrial College, and in 1896 director of that institution's Practice and Observation School. From 1902 to 1911 he was professor of education, and from 1906 to 1911 also professor of secondary education and inspector of high schools at the University of Tennessee. He was also editor of the *North Carolina Journal of Education* (1897–1901) and of the *Atlantic Educational Journal* (1901–03), and was superintendent of the Summer School of the South from 1902 to 1911. In the latter year he was appointed United States Commissioner of Education.

CLAXTON, THOMAS FOLKES (1874–). An English astronomer, born in London. In 1890 he became an assistant at the Royal Observatory, Greenwich, and after one year (1895) as assistant director of the Royal Alfred Observatory, Mauritius, he served as director until in 1912 he went to Hongkong to be director of the Royal Observatory there. His publications include: *Annual Magnetic and Meteorological Observations, Mauritius* (1896–1910); *Seismological Observations* (1898–1910); "Magnetic Survey, Pamplemousses," in the *Proceedings of the Royal Society*, vol. lxxvi (1905).

CLAY (AS. *clæg*, Ger. *Klei;* ultimately connected with Lat. *glus, gluten*, glue, Gk. γλοιός, *gloios*, gum, OCh. Slav. *glĕnŭ*, slime). A term applied to earthy material or soil which shows plasticity when wet, thus permitting it to be molded into any desired form, which it retains when dry. Its distinguishing character is a physical one; for clay varies widely in other respects, being made up of fine mineral fragments, the most prominent of which may be the mineral kaolinite, a hydrated silicate of alumina. Clay is formed primarily by the decomposition of feldspathic or other silicate rocks in situ; such a clay is said to be *residual* in its nature and shows a gradation into the parent rock below. Residual clays from limestone are formed by a leaching out of the lime carbonate, the clayey impurities of the rock being left behind, and in these there is no transition zone. The residual material is often washed down into the lakes or ocean by the surface waters and there spread out over the bottom as an aluminous sediment; such a clay deposit being known as a *sedimentary* one, which is not only stratified, but may also be more extensive than a residual. Sedimentary clay sometimes becomes consolidated by the pressure of other sediments which have been deposited on top of it, and it is then termed shale. These shales, on grinding and mixing with water, develop the same plasticity as does soft clay. Glacial clays, while of transported character like the other sedimentary ones, consist of a variable mixture of ground-up rock flour and residual material gathered up by the ice.

The chief chemical constituents of clay are silica and alumina; but, in addition to these, variable quantities of iron oxide, lime, magnesia, alkalies, water, and even rarer substances are often present. These ingredients affect the physical properties of the clay; such as its color when burned, air and fire shrinkage, refractoriness, plasticity, and thus indirectly its uses. The lime, magnesia, iron oxide, and alkalies exert a fluxing action in burning, and the greater their quantity the lower the fusing point of the clay. Silica decreases the air and fire shrinkage of a clay, while alumina and water have the reverse effect.

The property of plasticity, together with that of hardening under fire, makes clay an article of great value in the plastic arts. Those clays which are low in plasticity are said to be "lean," while the highly plastic varieties are "fat." It is now believed that the plasticity depends in part on the fineness of grain and in part on the amount of colloidal substances present. Clay does not fuse suddenly, but softens gradually under the influence of heat. In very fusible clays this sintering may begin at 1500° or 1700° F., while in very refractory kinds it does not take place until a temperature of 3000° F. or more is reached. The red color of a burned clay is due to considerable iron oxide, while buff is produced by a small quantity of iron or by an excess of lime. The following table gives the composition of several grades of clay:

	1	2	3	4	5	6
	%	%	%	%	%	%
SiO_2	62.40	45.78	54.23	68.54	63.31	60.59
Al_2O_3	26.51	36.46	32.80	18.49	16.57	12.46
Fe_2O_3	1.14	1.08	.21	3.38	4.06	5.79
CaO	.86	.50	....	1.03	1.11	6.84
MgO	.01	.04	....	.88	1.10	3.28
Alkalies	.10	.25	....	2.37	3.16	4.39
H_2O	13.35	13.40	11.24	4.62	6.89	4.36
Moisture	....	2.05	....	1.52	3.76	1.46

(1) Crude kaolin, Webster, N. C.; (2) Washed kaolin, Webster, N. C.; (3) Fire clay, Wymp's Gap, Pa.; (4) Paving-brick shale, Kansas City, Mo.; (5) Brick clay, Indianola, Iowa; (6) Calcareous slip clay, Albany, N. Y.

Clay is used in the manufacture of common, pressed, and paving brick; terra cotta, fireproofing, terra cotta lumber; roofing, floor, and glazed tile; fire brick, retorts, crucibles, muffles, and other refractory goods; all grades of pottery, stoves, sewer pipe, door knobs, electrical insulators, turbine wheels, closets, bathtubs, and washtubs; filters, mineral paint, food adulterants, Portland cement, paper fillers, emery wheels (as a cement therein), ultramarine, modeling, soap, etc.

Clay is widely distributed geographically, and also geologically, i.e., in the formations of different ages. In the United States deposits are found at a great number of localities. The Cretaceous clays of New Jersey are much used in the manufacture of refractory goods, while the Carboniferous clays of Pennsylvania and Ohio are extensively employed for making fire brick. In Colorado and California the Cretaceous and Tertiary formations are worked at many points for fire clays. Kaolin is quarried at several points in North Carolina and Georgia; much white ball clay is found in Florida, Tennessee, and Kentucky, and stoneware clay in Illinois and Missouri. Clays suitable for brick, terra cotta, and sewer pipe occur at many points all over the United States. In the Central States clays suitable for the manufacture of vitrified paving brick are actively worked. With all this supply, however, much ball clay and kaolin is imported, the material coming chiefly from England. Over $172,000,000 worth of clay products are produced annually in the United States alone.

The different varieties of clay are as follows:

Kaolin (q.v.) or China Clay. A white-burning clay, used in the manufacture of porcelain and white earthenware. It is of residual origin and often occurs in the form of veins.

Fire Clays (q.v.). Clays containing a low percentage of fluxes and hence capable of resisting high temperatures. They are used in the manufacture of all classes of refractory goods and sometimes also for making pressed brick and terra cotta.

Flint Clay. A dense, hard, nonplastic fire clay, found chiefly in the Carboniferous formations of Pennsylvania, Ohio, and Kentucky.

Pipe Clay. A term applied to many smooth, highly plastic clays.

Brick Clay. A term including almost any impure clay which can be molded into bricks.

Terra-Cotta Clay. A grade of clay used for making terra cotta (q.v.). It includes many varieties.

Slip Clay. An easily fusible clay, which melts to a translucent glass and is used for glazing the cheaper grades of pottery.

Pottery Clay. A term applied to any clay used in the manufacture of pottery.

Saggar Clay. A grade of fire clay used for making saggars, or vessels in which fine pottery is placed during baking in the kiln.

Alum Clay. A clay containing a large amount of alum.

Marly Clay. A clay containing from 20 to 30 per cent of lime carbonate.

Gumbo Clay. A very plastic, sticky clay, found in many localities in the Central States and often used in the manufacture of railroad ballast.

Ball Clay. A plastic, white-burning clay, used as a bonding ingredient in white ware and porcelain bodies.

Paper Clay. One of very fine texture and white color, used for filling paper.

Adobe. A sandy, often calcareous, clay used in the West and Southwest for making sun-dried brick.

Clay Mining and Working. Deposits of clay and shales lying at or near the surface are worked as open pits. The surface dirt is first removed by digging, scrapers, steam shovels, or hydraulicking. The clay, if hard, is loosened by blasting and then dug by any of the methods (except hydraulicking) mentioned above. Beds of clay or shale lying under heavy overburden are worked by underground methods if the clay is of sufficient value to make such wares as fine brick, sewer pipe, or face brick.

Kaolins and some ball clays are put through a washing process to remove sandy impurities. This consists in dumping the clay with plenty of water into a disintegrating machine, from which the water and suspended clay traverse a great length of troughing, in which the sand settles out and finally reaches the settling tanks. Here in quiet water the clay settles to the bottom of the vat. The supernatant water is drawn off, and the creamy mixture of clay and water in bottom is forced by means of pumps into filter presses, where the water is squeezed out. The clay is then dried and shipped to market.

Clay working or tempering of some sort is generally required before clay can be used, and particularly before it can be molded into brick, pottery, sewer pipe, or tiles. Reduction to a plastic state may be effected by wet or dry grinding, screening, pugging, washing, or by the more natural process of weathering; or a combination of two or more of these methods may be employed. The screening and washing may be so arranged as to remove foreign material. It must be understood that the term "clay working," as here used, is limited to the preparation of the raw material for molding or forming, the other processes being treated separately, under the various clay products, as will be the matter of drying; while burning, for the most part, will be discussed under Kiln.

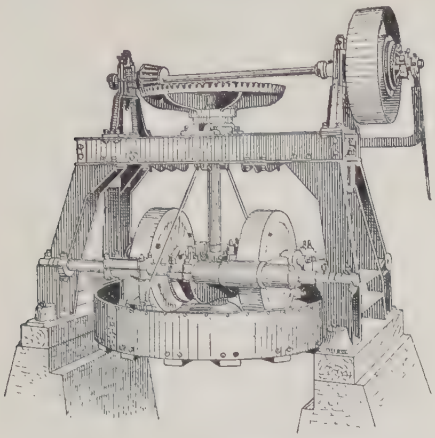
Weathering is a self-explanatory term. The time involved may range from months to years, but is more often the shorter period. With improvements in machinery and methods, less dependence is placed on this process than formerly.

Soaking, like weathering, is a natural process, but it is now used only under primitive conditions, and where the clay is molded in a soft form, without other working. The clay is simply shoveled into pits, say 4 × 6 feet in extent, and soaked in water over night.

Ring pits are 25 to 30 feet in diameter, 3 feet deep, lined with brick or boards. An iron wheel is passed over or through the clay, back and forth, mixing in the sand, in case any is used. Clay for some 30,000 bricks may be tempered in six hours.

Grinding is accomplished by passing the clay between rolls, or in dry pans, the former process being particularly applicable to shales. The pans are 7 to 9 feet in diameter, with perforated floors, through which the material falls as soon as it has reached the desired fineness. The pan revolves horizontally and by means of friction motion is imparted to two iron wheels, mounted

in the pan, 6 to 14 inches wide, weighing 2000 to 6500 pounds each. A pan with one-eighth-inch holes has an average capacity of 100 tons of clay per day of 10 hours.

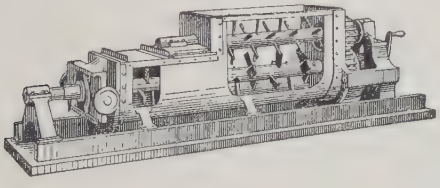


DRY-PAN CLAY-GRINDING MACHINE.

Screening is sometimes employed for clay which has passed the dry pan. Screens may be inclined sieves, either fixed or shaking, and rotary cylindrical or octagonal in form. Some demand much attention to prevent clogging, and require heavy repairs, but nevertheless are cheap and simple in operation.

Wet pans are much like dry pans, only their bottoms are not perforated, and scrapers are placed in front of the wheels, to throw up the clay. They may be discharged through a trap-door or by means of an automatic shovel. One of their chief advantages is rapidity, only two or three minutes being required to temper a charge for brick and four or five minutes for sewer pipe.

Pug mills appear to be used more than other classes of tempering machines. They are either vertical or horizontal, but in either case they have a central revolving shaft, fitted with radial knives extending nearly to the surrounding cylinder in which the clay is placed. The knives



PUG MILL FOR MIXING CLAY.

force the clay forward, as well as work it thoroughly, and by changing the angle of the adjustable knives the speed of the passing clay may be regulated. Water is admitted as desired and needed. Pug mills are compact and require less power than ring pits.

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CLAY, ALBERT TOBIAS (1866–1925). An American Semitic archæologist, born in Hanover, Pa. He graduated at Franklin and Marshall College in 1889 and at the Lutheran Theological Seminary in 1892; was ordained to the Lutheran ministry in the latter year; was fellow in Assyrian and instructor in Hebrew at the University of Pennsylvania, to which, after being instructor in Old Testament theology at the Chicago Lutheran Seminary in 1895–99, he returned as lecturer in Semitic archæology. He was assistant professor of Semitic philology and archæology there in 1903–09, and full professor for one year; and in 1910 became Laffan professor of Assyriology and Babylonian literature. His most important publications were Babylonian business and legal documents, especially *Business Documents of Murashû Sons of Nippur* (1898 et seq.). Clay also wrote "Personal Names," an article in *Studies in Memory of W. R. Harper from Cuneiform Inscriptions of the Cassite Period* (1912), and in an article (1908) on Aramaic indorsements on these documents he points out the value of Aramaic transliterations of Babylonian proper names. His *Amurru, the Home of the Northern Semites* (1909) shows the non-Babylonian origin of Israelite culture and religion.

CLAY, BERTHA M. The pen name of THOMAS W. HANSHEW (q.v.).

CLAY, CASSIUS MARCELLUS (1810–1903). An American abolitionist and politician, born in Madison Co., Ky. He graduated at Yale in 1832, returned to Kentucky to practice law, and was elected to the State Legislature in 1835, in 1837, and in 1840, but in 1841 failed of reëlection on account of his strong antislavery opinions. In 1844 he made speeches in the Northern States in advocacy of the election of Henry Clay to the presidency, and in the following year opposed the annexation of Texas and established at Lexington, Ky., the *True American*, a vigorous antislavery paper, which, however, was suppressed by a mob, but was revived by Clay and was published thereafter in Cincinnati. He volunteered for service in the Mexican War in 1846 and was taken prisoner. In 1850 he left the Whig party and was the antislavery candidate for Governor. In 1860 he supported Lincoln and in 1861 was appointed Minister to Russia, but returned to the United States in 1862 and was made major general of volunteers. In 1863, however, he resigned and was again appointed Minister to Russia, where he remained until 1869. He supported Greeley in 1872 and Tilden in 1876, but went over to the Republican party to vote for Blaine in 1884. In the campaign of 1896 he was in the gold-standard wing of the Democratic party. Consult Greeley, *The*

Life, Memoirs, Writings, and Speeches of Cassius Marcellus Clay (2 vols., Cincinnati, 1886).

CLAY, CLEMENT CLAIBORNE (1819–82). An American politician, born at Huntsville, Ala. He graduated at the University of Alabama in 1835 and was admitted to the bar in 1840. From 1842 to 1845 he was a member of the State Legislature, from 1846 to 1848 was judge of the Madison County Court, and in 1853 was elected to the United States Senate. Upon the secession of his State he withdrew from the Senate and was forthwith elected to the Confederate Congress. Having taken refuge in Canada at the overthrow of the Confederacy, he later gave himself up, and in 1865–66 was imprisoned at Fortress Monroe with Jefferson Davis.

CLAY, GREEN (1757–1826). An American soldier. He was born in Powhatan Co., Va., became a pioneer settler in Kentucky, then a part of Virginia, about 1776, represented the district for some time in the Virginia Legislature, and was a member of the State Constitutional Convention of 1799. In 1813 he led the force of 3000 which relieved General Harrison, then besieged by the British and Indians at Fort Meigs, and afterward defended that fort against General Proctor and Tecumseh. He was the father of Cassius Marcellus Clay and a cousin of Henry Clay. See FORT MEIGS.

CLAY, HENRY (1777–1852). A noted American statesman and party leader, born on April 12, 1777, in a district known as the "Slashes," in Hanover Co., Va., whence he derived his first popular nickname of "The Mill Boy of the Slashes." His father was a Baptist clergyman, who died when young Clay was only four years old. His mother soon after married again, and her second husband, one Henry Watkins, placed Clay in a retail business house in Richmond, where he remained for four years (1791–95). He showed much diligence in his daily work, but read assiduously during his leisure hours. He was one of seven sons, but he alone manifested, at an early age, qualities of mind which attracted the notice of all who met him. Consequently he was employed by Chancellor George Wythe of the High Court as an amanuensis, and his quick intelligence led his accomplished employer to recognize great possibilities in the youth. His intercourse with Wythe did a great deal to stimulate Clay's natural ambition and to lay the foundation of his subsequent career as a party leader. Clay's personality was, even at this time, remarkable. With no physical attractions, he nevertheless possessed that indescribable quality called magnetism, and this was destined to win for him the intense devotion of a great party and the liking of a host of his countrymen. In Richmond he pursued some desultory studies and a special course of one year in the office of Attorney-General Brooke. He mastered so readily the principles of law that he was admitted to the bar at the age of 20, when he left Richmond and began practice in Lexington, Ky., at that time a frontier "city." Clay afterward regretted what he called his "neglected education" and the lack of systematic instruction. However, among the pioneers and frontiersmen these defects were not perceptible, and, compared with associates, Clay was well read. His boldness, ardor, and frankness soon won him a host of friends, and he soon attained more than a local reputation as a jury lawyer. Naturally enough, he entered politics and in 1799 was a member of the convention which revised the constitution of the State. It is to be noted that here he first took a definite stand, with some loss of personal prestige, in opposing the perpetuation of slavery. He soon regained his popularity, however, by his effective attacks upon the much-hated alien and sedition laws (q.v.). In the year last mentioned he married Miss Lucretia Hart, whose father was a man of some wealth and social standing, and this marriage gave him a certain independence as well as domestic happiness. By his wife he had 11 children, to whom he showed himself always a devoted father. About the year 1800 he purchased an estate of 600 acres near Lexington, to which he gave the name of Ashland, and which for 50 years was destined to be a sort of Mecca to political pilgrims on every kind of errand. Here he kept open house, gained more and more reputation as an orator and a lawyer, and finally gave up criminal practice, which was always distasteful to him, the more so because of his success in defending persons accused of murder, not one of whom was ever convicted as soon as Clay appeared in his behalf. As Clay once said himself, "I fear that I have saved too many who ought to be hanged."

From defending criminals, Clay became the public prosecutor; but in 1803 he was sent to the Kentucky Legislature. In 1806 he was appointed to fill an unexpired term in the United States Senate, where at once he became a national figure, showing great ability in debates and as a member of important committees. He advocated internal improvements at the national expense, the construction of great roads, the application of surplus revenue to promote public education and for the improvement and facilitation of every means of intercourse throughout the rapidly growing Republic. At this time Clay was described, by William Plumer of New Hampshire, as "intelligent, frank, and candid," "a man of talents," and also as "a man of pleasure—fond of amusements." Mr. Plumer's summing up is also interesting: "He declaims more than he reasons. He is a gentlemanly and pleasant companion, a man of honor and integrity." Clay's term lasted for only a few months; and he declined to be a candidate for the next Congress, preferring to continue his practice of law in Kentucky. He had already appeared before the Supreme Court of the United States and was now widely known. In 1808 he was reëlected to the State Legislature, where he became Speaker. It was in no spirit of localism, however, that the body over which he presided was now to act. American feeling had been deeply stirred by the impressment and blockade policy of Great Britain; and in the South and West this feeling flamed out intensely. The Kentucky Legislature sought to pass a law providing that no decision of any British court nor any elementary British work on law should thereafter be cited as an authority. This resolution would certainly have been passed by an immense majority, had not Clay left the Speaker's chair and delivered an impassioned appeal which was never reported, but which has become traditional as an oration of remarkable power. Carl Schurz describes it as "saving for Kentucky the treasures of English jurisprudence." Nevertheless, Clay took the lead among those who favored a war with Great Britain, and he, with John C. Calhoun (q.v.), soon became known as "the War Hawks." He was personally involved in the first of several duels which he

was destined to fight, the most notable of them being his affair with the brilliant and irascible John Randolph (q.v.) of Roanoke. In 1809 Clay was again appointed to fill a vacancy in the United States Senate, where he continued his former policy and championed the protection of American industry, though he opposed the plan for chartering a United States Bank on the ground that such a measure was corrupt and unconstitutional—an opinion which he afterward reversed and thereby made himself much criticized for inconsistency.

In 1811 Clay was sent to the national House of Representatives, where he was immediately chosen Speaker. His bold and vigorous course did much to precipitate the War of 1812, for the prosecution of which he advocated an increase in the army and of other measures which greatly enhanced his popularity throughout the country. In 1814 he was one of the commissioners sent to negotiate a treaty of peace with Great Britain, being associated with John Quincy Adams, Bayard, Jonathan Russell, and Albert Gallatin. This commission succeeded in arranging the Treaty of Ghent (q.v.). Upon Clay's return in 1815 he received a magnificent reception from his countrymen, to whom peace was now as grateful as war had once seemed to be inspiring. Clay received the offer of a mission to Russia, but declined it so that he might enter once more the House of Representatives, to which he had been reëlected in his absence and of which he once more became Speaker. This office he preferred to a cabinet position which was tendered him, on the ground that it gave him a wider field as a party leader and for the advocacy of great measures which he viewed as essential to the future welfare of the United States. Clay, indeed, was one of the few statesmen of that time who had sufficient imagination to see the coming greatness of his country; and in this respect his political sagacity was even in advance of that of Daniel Webster (q.v.), whose intense nationalism was of slower, if of more steady and substantial, growth than Clay's. In 1816 Clay urged the passage of a moderately protective tariff bill and the resumption of specie payments; while with Calhoun he helped pass an act providing for internal improvements and succeeded in having it made a law over the veto of President Madison. When the Fifteenth Congress met in 1817, Clay was again chosen Speaker. He now ardently advocated the recognition by the United States of the South American republics which had declared their independence of Spain and of whose interest Clay remained consistently a vigorous champion. He continued to act as Speaker in the following Congress, where he was one of the few prominent statesmen who sharply criticized the administration of President Monroe during what was popularly known as "the Era of Good Feeling." In 1820 there was brought about the famous Missouri Compromise (q.v.), which for the time insured fairly harmonious relations between the North and the South. In 1821 Clay effected an arrangement by which Missouri might be admitted as a slave State, but on the understanding that citizens of other States should be permitted to settle in Missouri. These arrangements gave Clay a third popular nickname, "The Great Pacificator." Two years later, Clay refused a further reëlection to Congress and for a time engaged in highly profitable legal practice, being retained as permanent counsel for the Bank of the United States in Ohio and Kentucky. It was impossible, however, for Clay to remain long outside the sphere of national politics. In 1823 he was once more elected to the national House and was again chosen Speaker. He had long been regarded as an eligible candidate for the presidency, and in 1824 he became such a candidate, his competitors being Andrew Jackson (q.v.), William H. Crawford of Georgia, and John Quincy Adams. In the election no candidate received a majority of the electoral votes, Clay standing fourth upon the list. Therefore, when the election was thrown into the House, Clay's name could not be presented according to the Constitution, and he gave his personal support to Adams, who was chosen. Clay thereby gained the title of "President Maker." When Adams subsequently appointed Clay to be Secretary of State, a great outcry arose to the effect that Clay's appointment was the result of a corrupt bargain between himself and Adams—a charge which the character of the two men ought to have been sufficient to refute, but which, nevertheless, long cast a blight upon Clay's reputation for political integrity. It was then that John Randolph spoke of Clay's association with Adams as "a combination of the Puritan with the blackleg," a bitter denunciation which led to the duel between Clay and Randolph. This duel was fought with pistols, and at the first discharge neither combatant was wounded. Randolph refused to fire a second time, thus ending the encounter.

The secretaryship of state, formerly regarded as a stepping stone to the presidency, proved an obstacle to Clay, and though he made an excellent official, he regretted his long absence from Congress, where he could always lead. A strong opponent of General Jackson as a candidate for the presidency, he retired with Mr. Adams after the latter's defeat in 1829. Two years later, he was elected to the Senate. Here, in the difficult rôle of Senator and presidential candidate, he was prominent in his advocacy of the protective system, which he dubbed unreasonably, but successfully, the "American system." Unanimously nominated by the Whigs, Clay was overwhelmingly defeated by Jackson (1832), largely on account of his tariff theories, and his unwise choice, as a party issue, of the defense of the National Bank. When the Nullification (q.v.) controversy arose, Clay's compromise of 1833 prevented a resort to arms by satisfying South Carolina with regard to the reduction of the obnoxious tariff and rendering the Force Bill unnecessary. In the subsequent antislavery agitation he occupied a moderate position, but lost few opportunities of opposing the administration of Jackson. Throughout this period of his career Clay shared the honors of the Senate in its time of meridian glory with Daniel Webster, John C. Calhoun, and Thomas H. Benton (qq.v.).

During the Democratic administration of Martin Van Buren (q.v.) Clay led the opposition to an independent treasury system, though his opposition was unsuccessful. In 1840, much to his chagrin, he failed to receive the Whig nomination for the presidency, but loyally supported General Harrison, after whose election Clay endeavored successfully to repeal the subtreasury act, but was unsuccessful in his endeavor to have a new United States Bank incorporated. A law incorporating such a bank was passed by Congress, but was vetoed by President Tyler, who had succeeded Harrison on the latter's death.

Clay quite unwisely succeeded in forcing through both houses of Congress (1841) a bill providing for the distribution among the several States of the proceeds from the sale of public lands. When Tyler broke away from the Whig party which had elected him, Clay showed himself to be a great master of men; and he headed the Whigs in their bitter opposition to a President who was popularly regarded as a "renegade." He resigned his seat in the Senate (1842), and two years later was nominated for the presidency against James K. Polk of Tennessee. The presidency was lost to Clay because he had hesitated to take firm ground against the annexation of Texas. He was therefore opposed by the abolition party ("Liberty Party"), which supported James G. Birney (q.v.). Clay's defeat was extremely bitter to him and was absolutely crushing to those who had followed him so loyally and with so much ardent devotion for many years. Never again was there any real chance of his securing the one great prize for which he had contended; and, like Daniel Webster, he was doomed to disappointment in the Convention of 1848 which nominated General Taylor. In that year, however, he was reëlected to the Senate and did everything in his power to allay the increasing friction between the Northern and the Southern States, which grew fiercer and more intense after the close of the war with Mexico. Clay now showed himself a genuine patriot and lover of his country. He himself once said, "If any one desires to know the leading and paramount object of my public life, the preservation of this Union will furnish him the key." This sentence was strictly true; and his series of resolutions, which became known as the Compromise of 1850 (see COMPROMISE MEASURES), undoubtedly postponed for at least a decade the outbreak of a civil war. Clay, like Webster, was censured as showing weakness in his willingness to compromise; but time made clear the wisdom of his action. The country was not yet ready to pass through the storm and stress which came in 1861 and with which Abraham Lincoln had to deal. The 10 years which followed the great Compromise so strengthened the feeling of nationality which both Clay and Webster had done their best to foster and to stimulate as to make possible the preservation of the Union and the transformation of the United States into a compact and permanent political entity. By his eloquence and his grasp upon the imagination of his countrymen Clay stood forth as the embodiment of national unity, and for this he must always be remembered as one of the greatest of American party leaders. The principle for which he contended was positive and not negative, and he fought for it with all the ardor and brilliancy of his nature. His last speech in the Senate was on the subject of a revision of the tariff of 1846. Unable to occupy his seat for more than a few days of the session of 1851–52, owing to his failing health, he continued to the end to manifest an interest in public affairs. The last incident of importance in his career was his interview with Kossuth, when, a short time before his death, he warned the Hungarian patriot of the futility of soliciting the interference of the United States in the internal affairs of Europe and declared the true policy of this country in dealing with foreign nations to be that set forth by Washington in his Farewell Address. Sinking rapidly after this, he died in Washington, June 29, 1852, in the seventy-sixth year of his age.

Perhaps no American statesman has ever possessed so attractive a personality as Henry Clay. He lacked the grim determination of Andrew Jackson. He had not the depth nor the incisive logic of Webster. He must be held inferior to Lincoln in a certain indescribable instinct for the absolute right, even though he himself was the author of the famous saying that he would rather be right than be President. But there was about him a chivalrous gallantry, a fire, and an intensely magnetic quality that are very rare in men. His love of country cannot be questioned. His personal integrity was without a blemish. If he was not a strict moralist, he was at least a man of honor; and he was loved with a devotion that few men in American public life have ever won. Carl Schurz ranks him above Webster as an orator, yet this estimate is incorrect. Clay's speeches, so far as they have been preserved, do not explain the extraordinary effect which they produced in those who heard them. This effect must be ascribed less to the substance of what he said than to the power of his personality, whereas Webster both impressed his auditors by his presence and swayed them by a remarkable combination of clear thought and magnificence of diction. Clay never spoke such sentences as those which continue to thrill the reader of Webster's great reply to Hayne. He must therefore be set in the second rate of orators rather than in the first; yet the impression that he made on his contemporaries is described in Lincoln's dictum that Clay was "the *beau idéal* of a statesman."

Bibliography. For Clay's speeches and writings, see Colton, *The Life and Times of Henry Clay* in the revised edition (6 vols., New York, 1864). The standard biography is that of Schurz in the *American Statesmen Series* (2 vols., Boston and New York, 1887). For an estimate of his oratory, see H. T. Peck, "Some Notes on Political Oratory," in *The Personal Equation* (New York, 1898); and id., in G. R. Carpenter's *American Prose*, pp. 101 et seq. (last reprint, ib., 1913). On Clay in general, consult also: C. H. Peck, *The Jacksonian Epoch* (ib., 1906); Orth, *Five American Politicians* (Cleveland, 1906); the histories of Schouler and J. F. Rhodes; and H. T. Peck, *American Party Leaders*, chap. ii (New York, 1914).

CLAY'BORNE, WILLIAM. See CLAIBORNE, WILLIAM.

CLAY CENTER. A city and the county seat of Clay Co., Kans., about 80 miles (direct) west-northwest of Topeka; on the Republican River, and on the Union Pacific and the Chicago, Rock Island, and Pacific railroads (Map: Kansas, E 4). It contains two private hospitals, a Carnegie library, and a fine courthouse. The principal industrial establishments are flour mills, cigar, steel-tank, broom, and cement-block factories and brickworks. The city has good water power, which is utilized by the electric light and power plants, both of which are owned by the municipality. There are two large greenhouses, which make extensive shipments to all parts of the State. Pop., 1910, 3438.

CLAY IRONSTONE. The name applied to compact, argillaceous varieties of siderite, the carbonate of iron. It frequently occurs in the form of concretions, which may be so close to-

gether in some particular layer as to form a continuous band. They are especially abundant in some beds of the Carboniferous and at times serve as a low grade of iron ore. See IRON; BLACKBAND IRONSTONE.

CLAY MARL. A calcareous variety of clay, containing from 40 to 60 per cent of carbonate of lime. It is used as a fertilizer and also in the manufacture of Portland cement. Clay marls are found in many parts of New York, New Jersey, Michigan, Illinois, Indiana, and other northern States, and in the West. They grade into true marls. See MARL; SOILS.

CLAY PLANTS. The early stages of vegetation on clay soil resemble those on rock areas, and are treated under the head of ROCK PLANTS. The late stages are Mesophytic (q.v.). See FORESTS; GRASS LANDS.

CLAY'POLE, NOAH. A character in Dickens's *Oliver Twist.*

CLAYS, klās, PAUL JEAN (1819–1900). A Belgian marine painter. He was born at Bruges, and studied in Paris under Horace Vernet and Gudin. On his return to Belgium he exhibited in Antwerp and Brussels, but had no success until, under the influence of the French Realists, he adopted a broader style of painting. His favorite subjects were the waters of Holland and Belgium, and he showed a remarkable knowledge and comprehension of the sea in all its phases, but preferred to depict it in the sunlight. His drawing is sometimes defective, but his color is luminous and delicate, and his work is full of simplicity and charm. His pictures are to be found in most of the important modern galleries. Among the best are "Calm on the Escant" (Antwerp), "The Bay of Ostende" (Brussels), "Shipwreck on the Shetland Islands" (ib.), two Dutch marine views (National Gallery, London), "Open Sea" (Munich), and "Celebration of the Freedom of the Port of Antwerp" (Metropolitan Museum, New York).

CLAY SLATE. See SHALE.

CLAY'TON, AUGUSTINE SMITH (1783–1839). An American jurist, born at Fredericksburg, Va. He graduated at the University of Georgia in 1804, and in 1819 was elected judge of the Superior Court of the Western Circuit in Georgia. While holding that office he supported the State authorities in their occupation of territory of the Cherokee Nation, but the United States Supreme Court decided against the legality of the State's action. For differing with the Legislature on one point of the controversy, however, he was removed from office. He was elected to Congress in 1831, served two terms, took an active part in the opposition to the tariff and to the United States Bank. He was reputed to be the author of *Crockett's Life of Van Buren.*

CLAYTON, ESTELLE. An American actress and dramatic writer, whose family name was Evesson. She went on the stage in 1878 and attracted favorable notice in a number of popular plays, some of which she wrote or adapted herself. She is also the author of the texts of the operas *Paulita* (1890) and *The Viking* (1895).

CLAYTON, HENRY DELAMAR (1857–). An American political leader, born in Barbour Co., Ala. He was educated at the University of Alabama. In 1878–80 he practiced law at Clayton, Ala., and after that time at Eufaula, Ala. In 1880–84 he was register in chancery for Barbour County, and in 1890–91 was a member of the Alabama General Assembly. He was also United States district attorney in 1893–96, member of the Democratic National Committee after 1888, and permanent chairman of the Democratic National Convention at Denver in 1908. From 1897 to 1913 he was a member of Congress. In the latter year he was named United States Senator by Governor O'Neal of Alabama, but his appointment was declared illegal by the other Senators, and he finally withdrew his candidacy.

CLAYTON, JAMES BENJAMIN (1867–). An American clergyman and writer on ethnology, born at Washington, D. C. He was educated at Columbian (now George Washington) University, Southern Baptist Theological Seminary, and Potomac University. From 1887 to 1898 he was in evangelistic work. He was also pastor at Norfolk and Falls Church, Va. (1890–91); Hannibal, Mo. (1897–98); Hynesboro Park, Md. (1898–99); Anacostia, D. C. (1900–01), and First and Immanuel churches, Washington, D. C. (1909, 1910). In 1903–09 he was chief clerk of the Bureau of American Ethnology, and in 1911 he became dean of the theological department of Potomac University. His writings on folklore, symbolism, and comparative religion have appeared in periodicals.

CLAYTON, JOHN (1686–1773). An American botanist. He was born in Fulham, London, but in 1705 emigrated to Virginia, where for 51 years he was clerk of Gloucester County. Two great volumes and a *hortus siccus* of Virginia plants were left by him; but the manuscripts were destroyed by fire, together with the records of Gloucester, at the beginning of the Revolution. See CLAYTONIA.

CLAYTON, JOHN MIDDLETON (1796–1856). An American jurist and politician, born in Dagsboro, Del. He graduated at Yale in 1815, was admitted to the bar in 1818, and became a leading lawyer in his State. He was for many years (1829–37, 1845–49, and 1851–57) a leading member of the United States Senate and in 1849 became Secretary of State in the cabinet of President Taylor. In 1850 he negotiated with the British government the famous Clayton-Bulwer Treaty (q.v.). Consult the "Memoir" by J. P. Comegys, No. 4 in the *Papers of the Historical Society of Delaware* (Wilmington, 1882).

CLAYTON, POWELL (1833–1914). An American soldier and politician, born in Bethel, Pa. He followed his profession of civil engineering at Leavenworth, Kans., and at the outbreak of the Civil War became captain in the First Kansas Infantry in the Federal army. He rose to the rank of brigadier general during the struggle and at its close became a planter in Arkansas, becoming Governor of the State in 1868. He was a member of the United States Senate from 1871 to 1877 and was a member of every National Republican Convention from 1872 to 1896. In 1897–1905 he was Minister and Ambassador to Mexico.

CLAYTON-BULWER TREATY. A treaty between the United States and Great Britain, signed, after prolonged negotiations between Secretary of State John M. Clayton (q.v.), on the one side, and Sir Henry Bulwer, special Ambassador of Great Britain, on the other, on April 19, 1850, the ratifications being exchanged on July 4. Its aim was, mainly, to facilitate the construction of an interoceanic canal across the American Isthmus, and incidentally to pre-

vent the encroachment of either contracting power upon the territory of the Central American States; and its main provisions were as follows: 1. Neither power was ever to "obtain or maintain for itself any exclusive control over the said ship canal," or to "occupy, or fortify, or colonize, or assume or exercise any dominion over Nicaragua, . . . or any part of Central America." 2. The two powers formally agreed to guarantee the protection and neutrality of the canal. 3. They further agreed to invite friendly powers "to enter into stipulations with them similar to those they had entered into with each other," and also to enter into treaties with the Central American States "for the purpose of more effectually carrying out the great design of this convention." 4. Vessels of the two powers were, while traversing the canal in time of war, to be exempt from detention, blockade, or capture. 5. The protection of the two powers was extended to any other practicable communications across the Isthmus, whether by railroad or canal, the intention being "to establish a general principle," as well as to settle one particular object. At the time the ratifications were exchanged both powers issued explanatory declarations, Great Britain announcing that "her Majesty's government do not understand the engagements of that convention as applying to her Majesty's settlement at Honduras, or its dependencies"; the United States, that the treaty was not understood "to include the British settlement in Honduras, commonly called 'British Honduras,' as distinct from the State of Honduras, nor the small islands in the neighborhood of that settlement, which may be known as its dependencies." Disputes arose over the territorial claims of Great Britain in Central America, and her assumption of a protectorate over the Mosquito Indians, conflicting interpretations being placed on various provisions of the treaty by the two powers. Another treaty, the Dallas-Clarendon Treaty, designed to settle the pending disputes, was signed in October, 1856, and was ratified by the Senate soon afterward, with the addition of various amendments, which, however, the British government refused to accept. Disputes continued almost up to the time of the Civil War; but in 1860 Great Britain concluded treaties with Honduras and Nicaragua, which provided for the cession to the former of the Bay Islands, and the relinquishment of the British protectorate over the Mosquito Indians. President Buchanan thereupon announced, in his message for 1860, that "the discordant constructions of the Clayton-Bulwer Treaty between the two governments . . . have resulted in a final settlement, entirely satisfactory to this government." Nevertheless, after the close of the war, controversies again arose, and in 1881 the treaty was the subject of a compromise between Lord Granville and Secretary of State Blaine, the latter contending that any interoceanic canal across the American Isthmus should be under the political control of the United States; that the United States would view with grave concern the interference of European powers; and that the treaty should be so modified as to make it conform to conditions which had materially changed since 1850. Secretary of State Frelinghuysen, who succeeded Blaine, in December, 1881, went further, and contended that the treaty had become obsolete and was in reality no longer binding on either power; while, on the other hand, Lord Granville asserted that the treaty had never been abrogated and was still in force. Finally, by the Hay-Pauncefote Treaty, which was ratified by the United States Senate in December, 1901, the Clayton-Bulwer Treaty was formally annulled. Consult Travis, "The History of the Clayton-Bulwer Treaty" (Ann Arbor, Mich., 1900)—vol. iii of the *Publications of the Michigan Political Science Association.* The question of the various treaties with Great Britain affecting the opening of an interoceanic canal across the American Isthmus assumed an international importance in 1912, when Great Britain protested against the passing of an act by Congress admitting American ships engaged in coastwise traffic to free use of the canal. It was generally held in America that the terms of the treaties were being observed, or that circumstances were so different from those contemplated by the treaties that the treaties should be held to have lapsed. This phase of the question will be found more fully explained in the article PANAMA CANAL.

CLAYTO'NIA (after John *Clayton*, a Virginian botanist), or SPRING BEAUTY. One of the most beautiful of the early spring flowers of the United States. The plants are low, succulent herbs, growing in rich ground of bottom lands. The delicate, rose-colored flowers are striped with pink veins, and the leaves are linear or oblong. Two species, *Claytonia virginica* and *Claytonia caroliniana*, are common in the United States. *Claytonia perfoliata* is found on the Pacific coast and in Mexico and Cuba. Other species of this genus are known in Europe and Asia, one of them, *Claytonia tuberosa*, affording tubers which are eaten by the peasants of Siberia. For illustration see article GEOPHYTE.

CLAZOMENÆ, klă-zŏm'ĕ-nē (Lat., from Gk. Κλαζομεναί, *Klazomenai*). One of the twelve cities of Ionia, on the west coast of Asia Minor. It was situated at first on the south shore of the Hermæan Gulf, west of Smyrna. Later, the inhabitants seem to have moved to an island near the coast. Alexander the Great connected the island with the mainland by a dike, and the city subsequently extended over the peninsula thus formed. It was famous as the birthplace of the philosopher Anaxagoras (q.v.). The site has furnished a number of terra-cotta sarcophagi, which supply the best existing examples of Ionic ceramic painting. Consult Fowler-Wheeler, *Greek Archæology* (New York, 1909).

CLEAN'THE. In Fletcher's *Mad Lover*, the sister of Siphax of Paphos.

CLEANTHES, klē-ăn'thēz (Lat., from Gk. Κλεάνθης, *Kleanthēs*) (c.300–220 B.C.). A Stoic philosopher, born at Assos, in Troas. His poverty was such that he had to work all night at drawing water, to obtain money for his support and to pay his class fee while attending the lectures of Zeno, whom he succeeded as head of the Stoic school about 263 B.C. He died of voluntary starvation.

Of his many writings none is extant, except a "Hymn to Zeus," much admired, preserved by Stobæus (Ecl. i, 2, 12). It is an admirable union of religious feeling and philosophic thought. The fragments of Cleanthes have been collected by Wachsmuth, *Commentatio de Zenone et Cleanthe* (1874), and by Pearson (Cam-

bridge, 1891). Consult: Ritter and Preller, *Historia Philosophiæ Græcæ* (Gotha, 1888); Zeller, *Philosophie der Griechen* (Leipzig, 1869–82); Zeller, *The Stoics, Epicureans and Sceptics*, trans. by Reichel (London, 1892); Hicks, *Stoic and Epicurean* (New York, 1910); Adam, *The Religious Teachers of Greece* (Edinburgh, 1908), and for a good translation of the "Hymn to Zeus," id., *The Vitality of Platonism* (Cambridge, 1911).

CLEANTHES. 1. In Dryden's *Cleomenes*, the friend of Cleomenes. 2. In Massinger, Middleton, and Rowley's play, *The Old Law*, the son of Leonides.

CLEAR, Cape. See Cape Clear.

CLEARANCE. In the mercantile marine, a permission from the customhouse officers, or the emigration officers, or both, for the departure of a ship from a port, showing that all the formalities have been observed, and all dues, etc., paid. If a foreign vessel, she must also be certified by the consul of the nation to which she belongs. Hence the expression "cleared out" originally used in reference to the departure of a particular ship.

CLEARCHUS, klē-är'kŭs (Lat., from Gk. Κλέαρχος, *Klearchos*). A Spartan commander of the fifth century B.C., the son of Ramphias. After serving in the Hellespont he became Governor of Byzantium, 411 B.C., where he ruled with tyrannical harshness. During his absence in Asia the town was surrendered to the Athenians (409), and Clearchus was punished by a fine. He was afterward sent back to Byzantium to settle political dissensions there and to protect the Greek colonies against the Thracians; but, having set himself up as tyrant, he was condemned to death by the Ephors. He joined the younger Cyrus, for whom he levied an army of Greek mercenaries, and whom he accompanied on the famous "March of the Ten Thousand." He alone, of the Greeks, knew the real intentions of Cyrus; but it was not until they had proceeded too far to retire with safety that he disclosed them. At the battle of Cunaxa (401 B.C.) he commanded the right wing of the Greeks and was tacitly recognized as commander in chief when the retreat had begun. He was, however, treacherously seized by the Persian general, Tissaphernes, and put to death.

CLEAR'FIELD. A borough and the county seat of Clearfield Co., Pa., 90 miles (direct) east-northeast of Pittsburgh; on the west branch of the Susquehanna River, and on the Pennsylvania, the New York Central and Hudson River, and the Buffalo, Rochester, and Pittsburgh railroads (Map: Pennsylvania, D 4). It is situated in a region containing large deposits of coal and fire clay, and has several novelty works, lumber mills, flouring mills, planing mills, brickyards, and a steel plant, and has manufactories of sewer pipe, clay-working machinery, refrigerators, cut glass, silk velvet, knitting machines, wagons, swings, foundry products, tanned leather, etc. Clearfield was settled in 1805, and in 1840 was incorporated as a borough. Pop., 1900, 5081; 1910, 6851.

CLEARING HOUSE. Clearing-house associations are unions of banks, for the purpose of securing a speedy settlement of the claims of banks against one another. The oldest of these is the London Clearing House, which appears to have been established about 1775. The most important clearing house in the United States is that of the city of New York, which was established in 1853. Before the establishment of clearing houses the process of settling the mutual claims of banks upon one another was cumbersome and tardy. Each bank was forced to send out runners, carrying to every other bank the checks and claims that it had upon them. As each bank settled periodically its bills with every other bank, there was a continual interchange of money between them. All this has been obviated by the establishment of clearing houses, in which representatives of the several banks meet daily, for the purpose of adjusting the claims of the banks upon one another.

An insight into the workings of clearing houses can best be obtained by a brief description of the methods pursued in the New York Clearing House, which may be taken as typical of all the rest. The banks represented send daily to the clearing house at least two clerks —a delivery clerk and a settling clerk. At the clearing house each bank has a desk at which the settling clerk or clerks are seated. They bring to the clearing house in bundles the checks, drafts, and other obligations due them from other banks, each bank being represented by a separate package. They bring also a list of the amounts due them from each of the banks in question. Before clearing begins, transcriptions of these lists are handed to the inspector. The sum total represents the aggregate amount to be settled for the day. Promptly at 10 o'clock the delivery clerks begin passing from one desk to another, delivering to each the package of claims of all sorts that their banks have against other banks. These claims are accepted in bulk, without examination of the items. As soon as all of the packages have been delivered, they are carried back to the banks, where an examination of the items takes place; and if there are any that are not valid, the adjustment takes place between the bank which has received them and that which presented them, without intervention of the clearing house or rectification of the accounts drawn up there. When all of the packages have been received by the settling clerks at the clearing house, the latter draw up a statement of the demands made upon them. As these never balance the claims made by their banks, it is obvious that at the close of each day's business some of the banks will be entitled to receive money and others obliged to make payments, to settle the accounts. When each clerk has made up his account, he forwards a statement of the aggregates, with the amount of the balance to be paid or to be received. When all have forwarded their accounts to the manager, and the accounts are proved by the equality of the debit and credit aggregates and balances, the manager certifies the amounts which each bank owes to the associated banks or is entitled to receive from them.

In the London Clearing House for the settlement of balances a different rule prevails. Debit balances are settled by checks on the Bank of England in favor of the associated banks, and credit balances by similar checks drawn by the associated banks in favor of the creditor banks. In New York the amounts due by debtor banks are paid in cash to the clearing-house manager, who in turn pays the creditor banks. For this purpose gold certificates issued by the United States government are used, and also clearing-

house gold certificates, which represent gold coin deposited with the clearing house, and which are valid only in the settlement of clearing-house balances.

By the aid of the clearing house, each bank can settle all of its relations to the banks of the city by a single payment, instead of adjusting its relations with each bank separately. Furthermore, settlements are effected by the transfer of a much smaller quantity of cash than would be otherwise required. Thus, in the first year of the New York Clearing House, average daily clearings of $19,104,594.94 were effected by average daily payments of $988,078.06—but 5.17 per cent. In some years the percentage of balances paid in money has fallen as low as 3 per cent, and during the entire history of the New York Clearing House has never reached so much as 7 per cent. The aggregate New York clearings were $5,750,455,987 in 1854, and $103,754,100,091 in 1906—the year of maximum exchanges. The aggregate exchanges reflect not only the growth of the city in importance as a commercial centre, but also the business conditions throughout the country—rising in times of notable prosperity and sinking in eras of depression. Thus, we may contrast the clearings of $35,461,052,826 in 1873, $48,565,818,212 in 1881, and $37,660,686,572 in 1890, with clearings of $22,000,000,000 in 1874, $25,250,791,440 in 1885, and $24,230,145,368 in 1894. In the depression following 1906 clearings declined to $95,315,421,238 in 1907 and to $73,630,971,913 in 1908. In 1910 they had risen again to very near the level of 1906—$102,553,959,069.

The New York Clearing House is by far the most important in the United States. The excellence of the system embodied in it and the facilities which it affords to banks have been so generally appreciated that the institution has been widely copied, even in some of the smaller cities. On Jan. 1, 1914, there were in the United States not less than 120 clearing organizations which had transacted clearings in the year ending with that date in excess of $170,000,000,000. It must be said, however, that one-half of the aggregate belonged to New York City. The London Clearing House in 1912 transacted clearings to the extent of £15,961,773,000. Clearing houses exist on the continent of Europe, though the use of checks in daily life is far less frequent there than in England and in the United States, and the clearings are not so important. On the other hand, the institution is widely known in Canada, Australia, and other English colonies.

In the United States the clearing-house associations not only furnish the facilities for settlements among banks which have been described, but also enable the banks to act as units in matters of banking policy. They establish rules of banking practice in the interest of the banks, as a whole, which individual banks would not be strong enough to maintain. Thus, many associations fix the rates to be charged for the collection of out-of-town checks. Certain associations prohibit the issue of certified checks by the members. Many details of practice are thus regulated by clearing-house rules. These associations, too, foster among the banks a feeling of solidarity of interest and furnish an organ through which this can find expression. In times of financial distress it may be a matter of supreme importance to all the banks that none go to the wall; for such an occurrence may cause a run upon all the banks and a general catastrophe. The stronger banks, under such circumstances, come to the aid of their weaker brethren.

Nowhere is the function of the clearing house in sustaining the interests of the banks, and the general credit of the community, more apparent than in the issue of clearing-house loan certificates. The ordinary clearing-house gold certificate differs from a government gold certificate only in the fact that the clearing house, and not the government, is the custodian of the gold. It is preferred over the government certificate because it can be issued in denominations better suited to the needs of the banks. With these certificates the loan certificates have nothing in common. They are issued only in times of panic, to meet temporary emergencies, and are called in and canceled as soon as their work is done. In times of panic there is an unusual demand for means of payment. Under the national banking system of reserves, which permits the country banks to deposit a portion of their legal reserves in the commercial centres, this strain is felt quite severely in the money centres. It is only to a limited extent that such emergencies can be met by restricting discounts. In preparation for a demand which can be foreseen, this usually takes place; but at the moment of the crisis credits must be expanded and loans discounted freely, if the storm is to be weathered. Where free banking exists, this is usually done through increased note issues; but the banking system of the United States does not admit of such an increase. The clearing-house loan certificate relieves the situation by substituting certificates based, not on cash, but on securities for the cash ordinarily used in clearing-house operations —thereby placing this cash at the disposal of the banks for the use of their customers.

The clearing house requires a deposit of securities with a committee and issues certificates bearing a relatively high interest—in New York City, 6 per cent—up to a certain per cent of the securities deposited, generally 75 per cent. It generally provides that any loss arising from the issue of the certificates shall be assessed pro rata, either upon the capital and surplus or upon the average clearings of the banks. Thus the entire credit of the associated banks is pledged for the redemption of the certificates. The interest charge makes it to the advantage of the banks to redeem as soon as possible the certificates issued to them, and they rarely last more than a few months. This expedient was first tried by the New York Clearing House in 1860 and has been repeated in 1862, 1863, 1873, 1884, 1890, 1893, and 1907–08. In the panic of 1907–08 the first issue of certificates took place on October 26 and amounted to $11,235,000. Since this issue failed to bring relief, further issues were made, until the aggregate of issues was $101,060,000, although the maximum outstanding at any one date was $88,420,000 (Dec. 16, 1907). March 28, 1908, the certificates were finally canceled. Simultaneously with the action of the New York Clearing House, the Chicago Clearing House, for the first time in its history, resorted to a similar device. Further, the Chicago Clearing House authorized its members to surrender such certificates to the Clearing House Committee and receive in lieu thereof checks in denominations of $2, $5, and $10 (noninterest-

bearing) which might be used in general circulation. This action was widely copied by clearing houses throughout the country. It is conservatively estimated that $250,000,000 of such instruments were issued. In a few cases such issues were unsupported by adequate collateral, but all were retired without loss to the holder. In effect, the action of the clearing houses overcame the inelasticity of the American currency through the issue of a circulating medium resting upon the combined resources of the banks. The device of clearing is also employed in the stock and produce exchanges. See STOCK EXCHANGE.

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CLEARING NUT. See STRYCHNOS.

CLEAR LAKE. A body of water in Lake Co., Cal., about 90 miles north of San Francisco (Map: California, C 3). It is about 20 miles long by from 2 to 6 miles wide; there is a contraction in its southern part, which is known as "Lower Lake," and has an outlet into Cache Creek. Lakeport is on the west shore, Lower Lake at the southeastern end, and Upper Lake at the northern end.

CLEAR LAKE INDIANS. See POMO.

CLEARNESS. A quality in painting, in which light and shade (see CHIAROSCURO) are successfully achieved without a sacrifice of purity of color.

CLEAR'STO'RY, or **CLERE'STO'RY.** A wall pierced with windows, which rises above the roof of a lower adjacent portion of the building, intervening between it and the roof of the higher central part, which it serves to light. Thus in most churches the central aisle or nave is lighted by a clearstory from above the side-aisle roofs, but the device may occur in any type of building having a lofty central hall. The earliest known is that of the great Hypostyle Hall at Karnak (q.v.). The Romans lighted their lofty bath halls by huge semicircular windows above the roofs of the lateral chambers, and the same arrangement is seen in the basilica of Maxentius and in modern halls of the same type, e.g., the Pennsylvania Railway Station in New York. The clearstory was an essential feature of the Christian basilicas; occurs also in Hagia Sophia (q.v.) and Byzantine churches; was developed into a magnificent feature of Gothic architecture, especially in France, in connection with groin-ribbed vaulting and the flying buttress, though used also in Romanesque churches; and is frequent though of less importance in Renaissance buildings. The drum of a dome is really a form of clearstory. See ARCHITECTURE; CHRISTIAN ART; CHURCH; GOTHIC ARCHITECTURE.

CLEARWING. Any of the small moths of the family Sesiidæ or Ægeriidæ, with transparent wings, the caterpillars of which bore into the stems of trees or plants and hibernate there. Many of the clearwings are so small, brilliantly colored, and unlike moths, that they are easily mistaken for wasps or flies. The most common is the currant borer (*Sesia tipuliformis*), imported to America from Europe, and sometimes highly destructive to currant and gooseberry bushes. The peach borer (*Sanninoidea exitiosa*) is a pest in peach orchards.

CLEAVAGE (from *cleave*, AS. *clēofan*, Ger. *klieben*, to cleave, Lat. *glubere*, to peel, Gk. *γλύφειν, glyphein*, to hollow out). In geology, a property induced, under certain conditions, during deformation in a rock by virtue of which the rock may be readily split into parallel layers or rods, i.e., parallel to a plane or line. In a strict sense it is a secondary feature and therefore distinct from the property possessed by many sediments of parting along their planes of stratification. Cleavage, in rare cases, may be parallel to planes of bedding that may be present in the rock mass. The essential condition of rock cleavage is a parallel dimensional arrangement of the constituent mineral particles of the rock. In certain minerals, such as mica, parallel dimensional arrangement carries with it a parallelism of the mineral cleavage. The cleavage of a rock may be observed to occur parallel to the greater diameters of the mineral particles or to the parallel mineral cleavages. When the two coincide, as in the case of mica, the rock cleavage produced is parallel to one plane. Where they do not coincide, two rock cleavages may be produced at angles to each other, as in the case of feldspar, although one may be conspicuous and the other obscure. The property of rock cleavage is observed in rocks that have yielded to pressure by deformation without conspicuous fracture. This deformation can be induced only where the rock is under such great pressure from all sides that it flows rather than fractures. The planes or lines of rock cleavage are further observed to be nórmal to the directions in which the rock masses have been most shortened.

A number of processes probably coöperate to induce the parallel arrangement of mineral particles during the shortening of the rock mass. Chief among these is the recrystallization of old mineral particles and the crystallization of new particles through the agency of contained water. This process results in the elongation of the mineral particles of the rock in the plane or line of greatest elongation of the rock mass as a whole, and in shortening normal to this direction; in other words, it results in the flattening of the mineral particles through solution and deposition of mineral material. Other processes which produce rock cleavage are the rotation into parallel position of previously existing particles whose axes have unequal length, and the flattening in situ of original mineral particles through the process known as gliding, i.e., differential movement along certain definite planes and crystals without fracture. Cleavage is particularly characteristic of the finer-grained rocks like slates and shales. The coarsely textured rocks under pressure metamorphism develop a parallel arrangement, but do not split so readily or smoothly; such structure is known as foliation, or schistosity.

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(Basel, 1878); Tyndall, "Comparative View of the Cleavage of Crystals and Slate-Rocks," in *Philosophical Magazine*, 4th series, vol. xii (London, 1856); Daubrée, *Géologie expérimentale*, vol. i (Paris, 1879); Van Hise, "Principles of North American Pre-Cambrian Geology," in *Sixteenth Annual Report of the United States Geological Survey* (Washington, 1896); Becker, "Current Theories of Slaty Cleavage," in *American Journal of Science*, 4th series, vol. xxiv (New Haven, 1907).

CLEAVAGE OF CRYSTALS. Most crystals, owing to the regular arrangement of the molecules, possess directions along which cohesion is at a minimum. They therefore tend to fracture along planes normal to these directions, which are called "planes of cleavage." The tendency of a crystal to cleave is necessarily the same for any plane as for any other parallel plane; in other words, cleavage planes have direction rather than position. Cleavage planes, in their relative perfection and number, conform to the symmetry of the crystal in which they occur and are usually parallel to the faces of some crystal form of fundamental or very simple crystallographic relation. Tendency to cleave along special planes determined in position as well as in direction is described as "parting." See CRYSTALLOGRAPHY; MINERALOGY.

CLEAVE'LAND, MOSES (1754–1806). An American pioneer, the founder of Cleveland, Ohio. He was born in Canterbury, Conn.; practiced law, served in the Revolutionary War, and became brigadier general of militia in 1796. In 1795 he joined a number of others in purchasing from Connecticut, for $1,200,000, the tract in Ohio known as the "Connecticut Western Reserve." He directed the surveyors who laid out the site of the present Cleveland, which was named after him. The form of the name was altered, in 1831, to Cleveland by the editor of the *Cleveland Advertiser*, who wished to economize space for a headline.

CLEAVELAND, PARKER (1780–1858). An American geologist and mineralogist, identified with the early progress of the natural sciences. He was born in Rowley, Mass., graduated at Harvard in 1799, was tutor in mathematics there from 1803 to 1805, was chosen professor of mathematics and natural philosophy and lecturer on chemistry and mineralogy in Bowdoin College—a position which he retained until his death, although many professorships in other colleges and the presidency of his own were offered to him. He gathered a valuable collection of minerals and published a treatise on *Mineralogy and Geology* (1816; 3d ed., 1856), which earned for him the title of "Father of American Mineralogy."

CLEAVERS. See GOOSE GRASS.

CLEBSCH, klāpsh, RUDOLF FRIEDRICH ALFRED (1833–72). A German mathematician, born at Königsberg, Prussia. He studied at Königsberg, where he was a pupil of Hesse, Richelot, and F. Neumann. He held the chair of theoretical mechanics at the polytechnic school in Karlsruhe from 1858 to 1863; was made professor of mathematics at Giessen in 1863 and at Göttingen in 1868. His attention was drawn to algebra and geometry by the study of Salmon's works. In 1868 he founded, with Neumann, the *Mathematische Annalen*. His vast contributions to the theory of invariants; his use of the notion of the deficiency of a curve; his applications of the theory of elliptic and Abelian functions to geometry and to the study of rational and elliptic curves, have secured for him a preeminent place among those who have advanced the science of geometry. His works upon the general theory of algebraic curves and surfaces began with the determination of those points upon an algebraic surface at which a straight line has four-point contact. Clebsch undertook to render the notion of "deficiency" fruitful for geometry—a notion found first in Riemann's *Theorie der Abelschen Functionen* (1857). By "deficiency" of a curve is meant the difference between the number of its double points and the maximum number possible in such a curve. (See CURVE.) Clebsch and Cremona studied the representation of cubic surfaces on a plane through a one-to-one correspondence—a notion that has led to the study of higher correspondences between surfaces by Cayley (q.v.) and Nöther. Clebsch solved, by aid of the addition theorem of elliptic functions (see FUNCTION), the generalized form of Malfatti's Problem. He also solved (1862) the so-called "Pfaffian Problem" of differential equations, by making it depend upon a system of simultaneous linear, partial differential equations whose statement is possible without integration. Clebsch took a leading part in showing the great significance of the theory of invariants for the theory of hyperelliptic and Abelian functions; and to him is due the transformation of the theory of binary to that of ternary forms. (See FORMS.) He died at Göttingen, Nov. 7, 1872. Vol. vii of the *Mathematische Annalen* contains an excellent article on Clebsch, in which the value of his works is estimated by Brill, Gordan, Klein, Mayer, Nöther, and other contemporaries. His *Vorlesungen über Geometrie* were edited by Lindemann (Leipzig, vol. i, 1875–76; vol. ii, 1891; new ed., 1906).

CLE'BURNE. A city and the county seat of Johnson Co., Tex., 54 miles southwest of Dallas, on the Gulf, Colorado, and Santa Fe, the Trinity and Brazos Valley, and the Missouri, Kansas, and Texas railroads (Map: Texas, D 3). It carries on a large trade in grain, live stock, cotton, wool, hides, and produce, and has cotton compresses, cottonseed-oil mills, flour mills, foundry and machine shop, and shops of the Gulf, Colorado, and Santa Fe Railroad and of the Trinity and Brazos Valley Railroad. The courthouse, Carnegie library, and high school are the notable features. There are municipal water works. Pop., 1890, 3278; 1900, 7493; 1910, 10,364; 1920, 12,820.

CLEBURNE, PATRICK RONAYNE (1828–64). An American soldier. He was born in County Cork, Ireland; studied medicine for a time at Trinity College, Dublin; ran away from home and served for several years in the British army. In 1855 he emigrated to the United States and settled in Helena, Ark., where he studied law, was admitted to the bar, and practiced with considerable success. On the outbreak of the Civil War he enlisted in the Confederate army as a private, but by March, 1862, rose to the rank of brigadier general. He commanded a brigade at the battle of Shiloh; was wounded in the battle of Perryville, Ky., on Oct. 8, 1862; was promoted to be major general in December of that year; was distinguished for gallantry at Murfreesboro, and at Chickamauga led a brilliant charge and earned the title "The Stonewall of the West." In the battle of Missionary Ridge he commanded the right wing of the

Confederate army; subsequently took an important part, as division commander under Johnston, against Sherman, and as a corps commander under Hood, in the Atlanta campaign against Sherman, and later in the Tennessee campaign against Thomas and Schofield; and at the battle of Franklin, on Nov. 30, 1864, he was killed while leading a charge on the Federal works. He was an organizer of the "Order of the Southern Cross" and was one of the first men in the Confederacy to advocate the use of colored troops. Consult the biographical sketch, by General Gordon, in *Southern Historical Society Papers*, vol., xviii (Richmond, 1889).

CLECKHEATON, klĕk'ê-tŭn. A town in the West Riding of Yorkshire, England, 5½ miles southwest of Bradford (Map: England, E 3). It has manufactures of woolens, worsteds, blankets, chemicals, wire cord, and machinery. Pop., 1901, 12,524; 1911, 12,866.

CLEDON'ISMAN'CY. See SUPERSTITION.

CLE ELUM. A city in Kittitas Co., Wash., 100 miles southeast of Seattle, on the Northern Pacific and the Chicago, Milwaukee, and St. Paul railroads, and on the Yakima River (Map: Washington, E 3). It is in a coal-mining and agricultural region, and has dairying, fruit-growing, and lumbering interests. There are municipal water works and a hospital. Cle Elum was founded in 1887 and was incorporated as a city in 1905. Pop., 1910, 2749.

CLEETHORPES, klē'thôrps. A town and watering place in Lincolnshire, England, 3 miles east-southeast of Great Grimsby (Map: England, F 3). It owns a new market and recreation pier. There is an electric-lighting plant. Pop., 1901, 12,578; 1911, 21,417.

CLEF. See MUSICAL NOTATION, *The Clefs.*

CLEFT PALATE. See PALATE.

CLEISHBOTHAM, klēsh'bŏTH-*am*, JEDEDIAH. The imaginary "collector" in Scott's series of novels, *Tales of my Landlord.*

CLEISTHENES, klīs'thê-nēz. See CLISTHENES.

CLEISTOG'AMOUS FLOWERS (Gk. κλειστός, *kleistos*, that which may be closed, from κλείειν, *kleiein*, to close + γάμος, *gamos*, marriage). Relatively inconspicuous and never-open flowers, which occur, along with the ordinary flowers, in many plants, representing all of the principal groups of the flowering plants. Cleistogamous flowers are seldom in a conspicuous position. One of the best-known illustrations is in the stemless species of violets. In these, in addition to the well-known conspicuous flowers, cleistogamous flowers occur more or less concealed near the base of the cluster of leaves and flower stalks. Since these flowers are never open, they are necessarily self-pollinated; but they are very fertile and produce an abundance of seed. The significance of this dimorphism in the flowers of so many plants is not clear. It has been suggested that, in case cross-pollination is not secured by the showy flowers, the presence of self-pollinating cleistogamous flowers makes seed production secure. However, some plants with cleistogamous flowers, as grasses and rushes, are anemophilous (wind-pollinated), so that it is not a habit entirely related to the uncertainties of pollination by insects. In comparing the development of the cleistogamous and ordinary flowers it is discovered that the former are like the latter at various stages of development.

The following quotation from Darwin's *Different Forms of Flowers* presents some detailed differences: "In cleistogamous flowers the petals are rudimentary or quite aborted; their stamens are often reduced in number, with anthers of very small size, containing few pollen grains, which have remarkably thin, transparent coats, and generally emit their tubes while still inclosed within the anther cells; and, lastly, the

CLEISTOGAMY.

A plant of *Polygala polygama*, showing ordinary flowers of erect aërial stems, and numerous cleistogamous flowers on underground stems.

pistil is much reduced in size, with the stigma in some cases hardly at all developed. These flowers do not secrete nectar or emit any odor; from their small size, as well as from the corolla being rudimentary, they are singularly inconspicuous. Consequently, insects do not visit them; nor, if they did, could they find an entrance. Such flowers are, therefore, invariably self-fertilized; yet they produce an abundance of seed. In several cases the young capsules bury themselves beneath the ground, and the seeds are there matured. These flowers are developed before, or after, or simultaneously with the perfect ones." See authorities cited under BOTANY.

CLEISTOG'AMY. See POLLINATION.

CLEIVELAND, JOHN. See CLEVELAND, J.

CLE'LAND, WILLIAM (c.1661–89). A Scottish Covenanting poet. He is supposed to have been born in Lanarkshire, Scotland. After leaving St. Andrews University he joined the Covenanters and at Bothwell Bridge acted as captain. He twice escaped to Holland, returning to Scotland in 1685 and 1688, the last time as agent of William of Orange, and was made lieutenant colonel of the Cameronian Regiment, under Lord Angus Cameron, which was sent to put down the uprising that followed the fall of Claverhouse at Killiecrankie. The Cameronians held out after a whole day's fighting at Dunkeld (Aug. 21, 1689) against heavy odds; but in the action Cleland was killed. He wrote *Several Poems and Verses*, which appeared posthumously in 1697, but he is better known through his connection with the Cameronian Regiment.

CLÉLIE, klâ'lē'. The heroine of a romance

of the same name, by Mademoiselle de Scudéry, originally issued under her brother's name (1656).

CLÉMANGES, klā'mänzh', Nicolas de (c.1360–c.1434). A French theologian—one of the ablest Roman Catholic theologians of the Middle Ages. He was educated in Paris, where he studied theology under Pierre d'Ailly. He was rector of the university from 1393 to 1395 and was esteemed, with his teacher and Gerson, the glory of the institution. He was an ardent advocate of reform in the church, wrote strongly against the immoral lives of many of the higher clergy, and labored with great pertinacity to heal the schism then existing—especially by preventing the election of another Antipope in place of the so-called Clement VII. But when Pedro de Luna (q.v.) was elected by the Avignon cardinals in 1394, taking the name of Benedict XIII, Clémanges became his secretary, thinking that in this position he could render a service to the divided church. When, in 1407, a breach came between Benedict and the French court, Clémanges, unjustly suspected of being the author of the bull of excommunication launched by Benedict against the King, left Avignon, and went first to his canonry at Langres, and then into the retirement of the Carthusian monasteries at Valprofonds and Fontaine-du-Bosc. Here he pursued his studies and produced several important works upon the study of the Bible and upon the corruptions then existing in the church. In 1415 he exercised a great influence on the Council of Constance and made a strong plea for church unity and purity, and in 1421 defended the liberties of the Gallician church at the Council of Chartres. In 1425 he returned to Paris and lectured on rhetoric and theology in the College of Navarre and there died, probably in 1434. His collected works, with a life by J. M. Lydius, appeared at Leyden in 1613. The often-quoted *De Ruina Ecclesiæ seu de Corrupto Ecclesiæ Statu,* while frequently attributed to Clémanges, is demonstrably not his. Consult Müntz, *Nicolas de Clémanges, sa vie et ses écrits* (Strassburg, 1846), and Creighton, *A History of the Papacy* (London, 1882).

CLEM'ATIS (Gk. κληματις, *klēmatis,* brushwood, from κλῆμα, *klēma,* vine shoot, from κλᾶν, *klan,* to break). A genus of plants of the family Ranunculaceæ, having 4–6 colored sepals, petals small or none, and numerous one-seeded achenes, with long, generally feathery, awns. The species, which number about 150, are herbs or shrubs, generally with climbing stems, mostly natives of temperate climates, and much scattered over the world. They possess more or less active properties. The long awns of some species give the plants a beautiful appearance even in winter. The flowers of many species are also beautiful. *Clematis vitalba,* the common traveler's joy, is the only native of Great Britain, where it is common in the south, but becomes rarer towards the north and is scarcely found in Scotland. The stems are capable of being made into baskets. It rapidly covers walls or unsightly objects. The fruit and leaves are acrid and vesicant; the leaves are used as a rubefacient in rheumatism, and those of other species are also employed in the same way. About 20 species are indigenous to North America, and of these *Clematis virginiana,* or virgin's bower, is very widely distributed, making a very showy appearance with its graceful sprays of white flowers. Its fertile flowers are succeeded by fruit with conspicuous feathery tails. *Clematis verticillaris,* with peduncles bearing large, single, bluish-purple, and drooping flowers, is a rare species, found in rocky woods, from Maine to western New England and thence to Virginia, Wisconsin, and northwestward. *Clematis viorna,* popularly called "leather flower," grows in rich soils in the Middle and Southern States. *Clematis pitcheri,* a species found along the Mississippi from Illinois southward, has a bell-shaped calyx, dull, purplish sepals, and noticeably reticulated leaves. *Clematis paniculata,* a native of Japan, is one of the most popular climbers for porches, etc. It resembles the virgin's bower, but its flowers are quite fragrant. Among the many species seen in our gardens are *Clematis viticella,* with its solitary, bell-shaped blossoms, and *Clematis florida* and *Clematis patens,* with large blue and purple flowers, natives of Japan. One of the most pleasing, an evergreen, with large white flowers, is *Clematis indivisa,* a native of New Zealand. Some species, as *Clematis flammula,* are found in southern Europe and in the mountainous parts of northern Africa. The colors of the blossoms in this genus vary from pure white to yellow, deep purple, and ruby or scarlet. A serious disease affecting clematis is due to attacks of nematode worms on the roots. Fresh soil, or soil in which the worms are killed by heat or cold, is about the only remedy. See authorities cited under Botany.

CLEMENCEAU, klā'mäN'sō', Georges Benjamin Eugene (1841–). A French politician and journalist, born at Mouillerou-en-Pareds in Vendée. He was educated to be a physician, but soon drifted into politics and was elected maire of the district of Montmartre in Paris. In 1876 he was chosen as Republican member for the Chamber of Deputies and became a bitter opponent of the Royalist Broglie ministry. From the very outset of his parliamentary career he attracted public attention by his pithy utterances and independent action. His political influence was made greater by his journalistic activities; for in 1880 he founded the daily paper, *La Justice,* of which he became chief editor. When General Boulanger appeared on the political horizon, Clemenceau espoused his cause; but when he discovered that the general was plotting to destroy the Republic, he promptly deserted him. In 1893 Clemenceau lost his seat in the Chamber because of suspicions that he was concerned in the Panama scandal; later, in 1902, he was elected Senator from the Department of the Var, an office which he still held in 1914. During the Dreyfus affair he was a strong believer in the innocence of the accused captain and founded a new daily, *L'Aurore,* to champion his cause. It was in this paper that Zola published the famous letter, *J'accuse.* In 1906 Clemenceau became Minister of the Interior in the Sarrien cabinet, and shortly succeeded to the premiership, which he held till 1909, when he was defeated as a result of a debate on the condition of the navy. This did not end Clemenceau's political activities; he continued in power if not in office and was instrumental in overthrowing the Briand ministry (July 12, 1913) on the issue of proportional representation. He became the editor of a paper called *L'Homme Libre,* which is widely read in Paris.

M. Clemenceau has been, and still is, the stormy petrel of French politics. He is a type

of journalist politician that is quite common in France, brilliant, irresponsible, and influential in attack. Many cabinets have been overthrown by him, and he is popularly known as the Destroyer of Ministries. In politics he has been a consistent Radical and faithful to the tradition of Gambetta. As Prime Minister, he proved himself to be a bitter enemy of the church and carried out the law separating church and state with great firmness. The most important event that happened while he was in office was the great miners' strike organized by the Socialists. Clemenceau personally went down to the mining districts to investigate the complaints of the workmen, who, knowing his revolutionary temperament, expected his sympathy. "We are not fighting on the same side of the barricades now," was the reply of Clemenceau. When the miners became riotous, they were sternly put down by the military, and the strike was lost. For this the ministry was bitterly attacked by the Socialists, and a great debate took place between Jean Jaures, the Socialist leader, and Clemenceau, which attracted wide attention because the fundamental principles of Socialism were attacked and defended with unusual brilliancy. To the charge of Jaures that the ministry had used the government to crush the working class, Clemenceau replied that he had crushed no class, but only individuals who were rioting. He then asked Jaures whether he would have acted differently had he been in office. To this Jaures made no answer. "You do not reply!" exclaimed Clemenceau triumphantly, "and in failing to reply, you do reply." Although strongly opposed to Socialism, Clemenceau is no individualist, but a believer in radical social legislation and government ownership of monopolies. In 1907 there occurred the uprising of the wine growers in the south of France against the wine merchants who were adulterating their wares. This came near being a revolution; it was avoided mainly through the prompt action of Premier Clemenceau, who sternly put down all attempts at rioting. For later career see VOLUME XXIV.

M. Clemenceau is a brilliant speaker and writer. His style is clear, incisive, and forcible. No man in France has a sharper tongue or readier pen. He is very witty, and ministries fear his epigrams as much as his arguments. Like many other French public men, his intellectual interests are not limited to politics only; he is very versatile and has written plays, novels, philosophic essays, and sociological studies.

CLEMENS, klĕm′enz, JEREMIAH (1814–65). An American lawyer and politician. He was born at Huntsville, Ala., and graduated at the University of Alabama in 1833. He was admitted to the bar in 1834, served for several terms in the State Legislature, and distinguished himself in the Mexican War. He was United States Senator from 1849 to 1853, was presidential elector in 1856, and during the Civil War accepted office under the Confederacy, though he never favored secession. In 1864 he became a Unionist and advocated the reëlection of Lincoln. He was the author of several novels, including: *Bernard Lyle* (1853); *Mustang Gray* (1857); *The Rivals: A Tale of the Times of Aaron Burr and Alexander Hamilton* (1859; 1900); *Tobias Wilson: A Tale of the Great Rebellion* (1865).

CLEMENS, SAMUEL LANGHORNE (1835–1910). An American novelist and humorist, better known as "Mark Twain"—a name derived from calls used in taking soundings on the Mississippi, and first employed by Mr. Clemens in newspaper work in 1863. It had previously been taken as a pen name by Capt. Isaiah Sellers in the New Orleans *Picayune*. Mr. Clemens was born at Florida, Mo., Nov. 30, 1835. He received the common-school education of a frontier town and, becoming an expert compositor, worked at this trade in St. Louis, New York, and other cities. In 1851 he gave up printing and became a steamboat pilot on the Mississippi, accumulating a fund of experience that he was later to turn to unique literary account in his *Life on the Mississippi* and other books. The Civil War closed this livelihood to him. He joined a volunteer squad of Confederate sympathizers, remaining with the command for a few weeks, but seeing no active service. Then he went to Nevada with his brother, who had received a political appointment there, and at Virginia City became a reporter and staff writer for the *Territorial Enterprise*, revealing here first to the public his powers of humorously exaggerated description and sarcastic wit. From Nevada he followed the trend to San Francisco, tried mining in Calaveras County, made a voyage to the Sandwich Islands, and attracted attention as a humorous lecturer and writer of localized fiction. The success of his lectures and a book called by the name of the first story, *The Jumping Frog of Calaveras County* (1867), led to his participating, with journalistic intent, in an excursion to the Orient. His letters about his trip, in revised form, became the well-known *Innocents Abroad* (1869), which won him fame on both continents. Then for two years (1869–71) Clemens edited the Buffalo *Express*. In the last-named year he married Miss Olivia L. Langdon, and established himself in Hartford, Conn. In 1872 he gathered reminiscences of Far-Western life in *Roughing It*, and became a frequent contributor to magazines and journals, chiefly in a vein of exaggerated humor. His next book was *The Gilded Age* (1873), written in collaboration with Charles Dudley Warner, and afterward successfully dramatized. Then came *The Adventures of Tom Sawyer* (1876). A second trip to Europe furnished material for *A Tramp Abroad* (1880); then followed *The Stolen White Elephant* (1882); *The Prince and the Pauper* (1882), an historical romance; *Life on the Mississippi* (1883); and *Huckleberry Finn* (1885). In 1884 he engaged in the publishing enterprise of Charles L. Webster and Company, the failure of which, about a decade later, led him to make a lecture tour around the world (1895–96), by means of which he reëstablished his fortune and more than cleared his commercial honor. For 10 years after 1889 Mr. Clemens lived chiefly in Europe. During this period he published: *A Connecticut Yankee at King Arthur's Court* (1889); *The American Claimant* (1892); *Merry Tales* (1892); *The £1,000,000 Bank Note* (1893); *The Tragedy of Pudd'nhead Wilson* (1894); *Tom Sawyer Abroad* (1894); *Personal Recollections of Joan of Arc* (1896); *Following the Equator* (1897), known in England as *More Tramps Abroad; The Man that Corrupted Hadleyburg* (1900), a collection of sketches; and after his return to America, *A Double-Barreled Detective Story* (1902), *Christian Science* (1903), *A Dog's Tale* (1904), *Eve's Diary* (1906), and *The $30,000 Bequest* (1906). In 1907 he made a sojourn in England, which was a long ovation to him. Everywhere

he was received with the warmest regard and esteem, and Oxford honored him with the degree of Litt.D. Although best known, and rightly so, as a humorist, Mr. Clemens had a thoroughly serious side to his character, as shown in later years by his public discussion in articles or speeches of various questions that aroused his sympathy or indignation. But his best, and perhaps his most permanent work, was done as a picaresque novelist in the *Adventures of Tom Sawyer* and the *Adventures of Huckleberry Finn*, stories which preserve, as only works of genius can, frontier types that now have vanished forever or survive only in remote corners of the land, and which are peopled with characters, old and young, that well deserve literary immortality. No other writer has so vividly portrayed the irresponsible American boy, or given his readers so adequate an impression of the large, homely, spontaneous life led by native Americans in the great valley of the Mississippi, as has Samuel Clemens.

His humor, like Lincoln's, characteristically American, has its coarser side, to be sure. "Mark Twain's" fun often sins against good taste and is irreverent and flippant at wrong times and places. But his comic force and fertility offset all defects; and beneath what seems reckless levity there is sound morality as well as clear-eyed shrewdness and hard common sense. The predilection which he vaunts in much of his work for exploiting the mean aspect of things venerable or impressive betrays a touch of the spirit of American philistinism. Of this the *Innocents Abroad* is an instance. But not so *Huckleberry Finn* and *Tom Sawyer;* in those, his best books, he appears as a master of humor and pathetic suggestion, and a truly creative genius.

An edition of Mark Twain's collected writings, *Writings of Mark Twain*, was published in 25 vols. (New York, 1910). *Mark Twain's Speeches*, ed. by W. D. Howells, also was first published in New York in the year of the author's death. For biography, consult A. B. Paine, *Mark Twain: A Biography* (New York, 1912); for bibliography, see M. Johnson, *Bibliography of Mark Twain* (ib., 1910). Among the many books concerned with this author may be mentioned: A. Henderson, *Mark Twain* (New York, 1911); H. Sedgwick, "Mark Twain," in *The New American Type* (Boston, 1908); W. D. Howells, *My Mark Twain* (New York, 1910); J. Macy, "Mark Twain," in *The Spirit of American Literature* (ib., 1913).

CLEMENS, klē'mĕnz, TITUS FLAVIUS. See CLEMENT OF ALEXANDRIA.

CLEM'ENT (Lat. *clemens*, merciful, Gk. κλήμης, *klēmēs*). The name of 14 popes.—CLEMENT I, commonly known, in historical theology, as "Clement of Rome" and listed among the "Apostolic Fathers," is probably not identical with the Clement mentioned in Phil. iv. 3. After the Apostles, however, no one stood in higher honor among the early Christians; in fact, he is sometimes, as by Clement of Alexandria, called an "apostle." In the lists of bishops which began to be produced in the latter half of the second century Clement stands third from Peter in the Roman succession—the best order being Linus, Anacletus, Clement. The provisional dates assigned to him by the best modern historians are 88–97 A.D.; but there is much uncertainty about them. According to Jerome, Clement lived until the third year of Trajan (101 A.D.). His Epistle may be dated with high probability in the year 95 or 96. It was written in the name of the church in Rome to that in Corinth and contains fraternal advice and counsel in view of disturbances which had arisen in the latter church. It is an important source for the history of primitive Christianity. It was for a long time honored as "Scripture" and read in public worship as late as the fourth century. The other documents which bear Clement's name are not from him. What is known as II Clement appears to be a second-century homily, of unknown origin. Several spurious epistles are attributed to him, besides the pseudo-Clementine "Recognitions and Homilies," on which see CLEMENTINA. Consult: J. B. Lightfoot, *The Apostolic Fathers*, part i; *St. Clement of Rome* (London, 1890); Knopf, *Der erste Clemensbrief* (Leipzig, 1899); Gregg, *The Epistle of St. Clement, Bishop of Rome* (London, 1899); Krüger, *History of Early Christian Literature* (New York, 1897); Harnack, *Chronologie der altchristlichen Litteratur* (Leipzig, 1897); Wrede, *Untersuchungen zum ersten Clemensbrief* (Göttingen, 1891).—CLEMENT II, Pope 1046–47. He was a Saxon, Suidger by name, and Bishop of Bamberg. The Emperor Henry III, whose chancellor he had been, made him Pope on the setting aside of the three rival claimants, Benedict IX, Gregory VI, and Sylvester III; and he crowned Henry the next day. He was a determined opponent of simony, against which he held a synod a few months before his death.—CLEMENT III, Pope 1187–91. He was a Roman by birth, and Cardinal Bishop of Palestrina. He settled some of the troubles between the popes and the Roman people, incited Philip Augustus and Henry II of England to undertake the Third Crusade, and in 1188 made the Scottish church directly dependent upon Rome, removing it from the jurisdiction of the archbishops of York. The title of CLEMENT III was also assumed by Wibert (Guibert), Antipope from 1080 to 1099 (died 1100).—CLEMENT IV, Pope 1265–68. Gui Foulquois le Gros, born at Saint-Gilles, on the Rhône, of a noble Provençal family, at first a soldier, later Archbishop of Narbonne and Cardinal Bishop of Sabina. He supported Charles of Anjou in his claim to the crown of the Two Sicilies, against Manfred, the natural son of the Emperor Frederick II. He was a man of austere piety and set his face steadfastly against nepotism. He encouraged and protected Roger Bacon.—CLEMENT V, Pope 1305–14. Bertrand d'Agoust, or de Goth, Archbishop of Bordeaux. He was strongly under the influence of Philip the Fair, at whose bidding he suppressed the Order of Templars (see TEMPLARS, KNIGHTS), and was the first of the popes to reside at Avignon, which continued to be the seat of the papacy for nearly 70 years. Consult: Rabanis, *Clément V et Philippe le Bel* (Paris, 1858); Lacoste, *Nouvelles études sur Clément V* (Bordeaux, 1896).—CLEMENT VI, Pope 1342–52. Pierre Roger, Archbishop of Rouen, and, like his three predecessors, a Frenchman. He, too, was entirely under French influence and refused to return from Avignon to Rome, in spite of a formal invitation delivered by a delegation headed by Petrarch. He excommunicated the Emperor Louis of Bavaria and compelled him to submit to the most humiliating conditions. As suzerain of the Kingdom of Naples, he acquitted Queen Joanna of the murder of her hus-

band and purchased the territory of Avignon from her for 80,000 crowns. He maintained the ecclesiastical jurisdiction against the encroachments of Edward III of England and made some negotiations for a reunion with the Eastern church. He lived in great splendor and contributed largely to the beautifying of the Avignon residence.—CLEMENT VII, Pope 1523–34. Giulio de' Medici, born about 1475. Before his elevation he had acquired some reputation for capacity in affairs which the unfortunate events of his pontificate showed to have been ill-founded. His worldliness and lack of insight into the tendencies of the age disqualified him from comprehending the great upheaval which threatened the Church, while his timidity and indecision no less disabled him from following a consistent policy in secular affairs. He was at first attached to the Imperial interest, but by the overwhelming success of the Emperor Charles V in the battle of Pavia was terrified into joining the other Italian powers in a league with France. But his zeal was soon cooled, and by want of foresight and unreasonable economy he laid himself open to an attack from the turbulent Roman nobles, which obliged him to invoke the mediation of the Emperor. When this danger seemed past, he veered back to his former engagements, and ended by drawing upon himself the army of the Constable de Bourbon. On May 6, 1527, followed the memorable and terrible sack of Rome by the Imperial troops. The Pope retired to the castle of Sant' Angelo, where he was kept a prisoner for over six months. He was released upon very onerous conditions and fled immediately to Orvieto. The following year he returned to Rome, and in 1529 he made his peace with Charles V, who undertook to assist in the restoration of the Medici in Florence, and whom the Pope crowned at Bologna in 1530. For several years Clement followed a policy of subserviency to the Emperor, on the one hand endeavoring to induce him to act with severity against the Lutherans of Germany, and on the other striving to elude his demand for a general council. The loss of half of Germany to the Church and the breach with England, occasioned by the Pope's refusal to sanction the divorce of Henry VIII, made this a most unfortunate pontificate. Consult: Creighton, *History of the Papacy during the Reformation* (London, 1882); Vaughan, *The Medici Popes* (ib., 1908). The title of CLEMENT VII was also assumed by Robert of Geneva, Antipope (see ANTIPOPE), 1378–94.—CLEMENT VIII, Pope 1592–1605. Ippolito Aldobrandini, born about 1536. He brought about the reconciliation of Henry IV of France with the Church (1593), and, on the extinction of the male line of the house of Este, annexed Ferrara, the last addition of importance to the States of the Church. He acted as mediator in the negotiations which resulted in the Peace of Vervins. The last years of his pontificate were occupied, among other important questions, by the controversy between the Jesuits and Dominicans on the question of grace, which led him to establish in 1597 the celebrated *Congregatio de Auxiliis Divinæ Gratiæ*. He was a man of marked piety; he confessed daily to Philip Neri, and after the latter's death to his successor in the headship of the Oratorians, Cardinal Baronius. His love for letters was shown by his promotion of a number of learned scholars to the purple, and the issue of revised editions of the Vulgate, the breviary, and the liturgical books. The title CLEMENT VIII was also assumed by Ægidius Muñoz, Antipope, 1425–29.—CLEMENT IX, Pope 1667–69. Giulio Rospigliosi. He was born in 1600 and studied in the Roman Seminary. As nuncio to Spain, he acquired an insight into political affairs and an influence which enabled him, after his elevation to the papal throne, to bring about the Peace of Aix-la-Chapelle (1668) between France and Spain. He endeavored to adjust the Jansenist (q.v.) difficulties in France, but his efforts failed to bring about a permanent peace. —CLEMENT X, Pope 1670–76. Emilio Altieri, born 1590. He was the immediate successor of Clement IX, who had made him Cardinal but a few months before his death, and with his last breath designated him as his choice for the papal throne. In consequence of his advanced age he left much of the government to his nephew, Cardinal Paluzzo Paluzzi.—CLEMENT XI, Pope 1700–21. Giovanni Francesco Albani, born 1649. He was employed in many important diplomatic affairs and made Cardinal a few months before his election to the papacy. His pontificate was troubled by many disputes, with Prussia, with the Empire, and with the recalcitrant Jansenists in France, against whom he launched the famous constitutions *Vineam Domini Sabaoth* (1705) and *Unigenitus* (1713). Another important decision by this Pope forbade the Jesuit missionaries in China to employ certain pagan customs which they had adopted to overcome native prejudices.—CLEMENT XII, Pope 1730–40. Lorenzo Corsini, born 1652, made Cardinal 1706. He was distinguished as a wise and kind-hearted temporal sovereign, who did much for both art and industry in his dominions, and who labored for union with the Greek church. In 1738 he condemned the Freemasons. —CLEMENT XIII, Pope 1758–69. Carlo Rezzonico, born 1693; made Cardinal 1737, on the recommendation of Venice, his native state. His reign was occupied with unceasing struggles for the rights of the Church and for the preservation of their ardent champions, the Jesuits, against the liberalizing governments of his day, such as those controlled by Pombal in Portugal and Choiseul and Madame de Pompadour in France. He witnessed, however, the expulsion of the Jesuits from Portugal, France, and Spain. It was believed that he was about to yield to the demand for the suppression of the order, when he died, leaving these thorny questions to his successor, Clement XIV.—CLEMENT XIV, Pope 1769–74. Giovanni Vincenzio Antonio Ganganelli, born 1705 at Sant' Arcangelo, near Rimini, where his father was a physician. At the age of 18 he entered the Order of Minorites and studied philosophy and theology, which he afterward successfully taught. His merits were appreciated by the keen-sighted Benedict XIV, who appointed him to the important post of counselor to the Inquisition, and under Clement XIII he was made Cardinal. No Pope had ever confronted greater difficulties on his accession. The kings of Portugal, France, Spain, and Naples were at variance with him, chiefly on account of his support of the Jesuits; Venice wished to reform the religious orders without his interference; Poland was seeking to diminish his influence; the Romans themselves were discontented. He first set about reconciling the monarchs; he sent a nuncio to Lisbon, suspended the bull *In Cena Domini*, and entered into negotiations with Spain and France. After several

years of negotiation he signed, much against his will, on July 21, 1773, the famous brief *Dominus ac Redemptor noster*, suppressing the Society of the Jesuits. The motive assigned in the brief is, "regard to the peace of the Church." Soon after, his health gave way, it was rumored on account of his disquietude of conscience. He died of a scorbutic disease, Sept. 22, 1774. Clement XIV was remarkable for liberality of mind, address as a statesman, sound learning, and mildness of character. He cherished the arts and sciences and was the founder of the Clementine Museum, which, by the additions of Pius VI and Pius VII, became the chief ornament of the Vatican. Consult: A. Theiner, *Geschichte des Pontificats Clement XIV* (Paris, 1853); Von Reumont, *Ganganelli (Papst Clement XIV), seine Briefe und seine Zeit* (Berlin, 1847); Ravignan, *Clément XIII et Clément XIV* (Paris, 1854).

CLÉMENT, klā'mäN', (Frédéric Jean) Edmond (1867–). A French dramatic tenor, born in Paris. He was educated at the Institution Nôtre-Dame de Chartres and at the Conservatory in Paris. He made his début at the Opéra Comique in *Mereille*. Later he appeared in *Mignon, La fille du régiment, Fra Diavolo, Lakmé, Don Juan, L'Eclair, Haydée, Don Pasquale, Proserpine*. He also created important rôles in *Benvenuto, Phryné, Falstaff, Xavière, L'Amour à la Bastille, L'Ile du rêve, Beaucoup de bruit pour rien, Le Juif polonais*, and *La petite maison*.

CLEM'ENT, Ernest Wilson (1860–). An American educator and writer on Japan. He was born in Dubuque, Iowa; graduated at the University of Chicago in 1880; taught in secondary schools in the United States until 1887, and then for four years in the Mito High School in Japan. He was teaching in America again until 1894, was principal of the Duncan Academy in Tokio until 1911, and then became a teacher in the First Higher School in that city. He was acting interpreter of the American legation, librarian and recording secretary of the Asiatic Society of Japan, editor of the *Japanese Evangelist* (1899–1909) and of the *Christian Movement in Japan* (1907–09), and a contributor to American and Japanese periodicals. He published: *A Handbook of Modern Japan* (1903; 9th ed., 1913); *Japanese Floral Calendar* (1904; 2d ed., 1911); *Christianity in Modern Japan* (1905); a revision of Hildreth's *Japan as It Was and Is* (1906); *Japanese Chronology* (1910).

CLÉMENT, klā'mäN', Jacques (1567–89). The assassin of Henry III of France. He was born at Sorbon, in the Department of Ardennes, and in early life seems to have been a soldier. Later he entered a Dominican convent in Paris. Ignorant, passionate, and probably also demented, Clément became a fanatic partisan of the League in its struggle against the French King and Henry of Navarre. After the murder of the Duke of Guise and his brother, at Blois, in 1588, Clément began to think of himself as the instrument selected by Heaven to overthrow the "tyrant," i.e., Henry of Valois, and to avenge the death of the two great leaders of the League. He is said to have confided his plan to assassinate the King to Bourgoing, the prior of his convent, and to have received the latter's approbation. It is asserted also by historians friendly to the cause of Henry of Navarre that the plan was brought to the knowledge of the Cardinal of Mayenne and his sister, the Duchesse de Montpensier, and that it was, in fact, carried out with their assistance; but historians friendly to the League deny that its leaders had any previous knowledge whatever of Clément's murderous scheme. Letters of introduction to the King were obtained for Clément from the president, Harlay, and the Count de Brienne, who were then prisoners of the League in Paris. On July 31, 1589, Clément set out for Saint-Cloud, from where Henry III was directing the operations against the capital. On the morning of August 1 he was admitted to the presence of the King as the bearer of an important letter and, while the King was reading it, stabbed him. Henry threw the knife into the assassin's face, exclaiming: "Oh! the wicked monk; he has killed me! Put him to death!" Clément was immediately cut down, and his body was subsequently quartered and burned. The King died the next day. By the zealots among the Leaguers the deed was received with undisguised rejoicing, and according to Daubigné, a Protestant, the act of Clément was praised from the pulpit, and the monk declared a martyr. De Thou, a partisan of Henry IV, asserts that Pope Sixtus V lauded Clément, but both Daubigné's and De Thou's statements have no authority beyond their own assertion. For a defense of the assassination of Henry III, consult Pinselet, *Le martyre du frère Jacques Clément* (Paris, 1589). Consult also Baird, *The Huguenots and Henry of Navarre*, vol. ii, chap. 10 (New York, 1886), and authorities cited under Henry III.

CLÉMENT, Jean Pierre (1809–70). A French political economist and historian, born at Draguignan. He was in the Ministry of Finance and a member of the Institute and wrote, with the aid of original documents, works on French financial administration, particularly in the epoch of Colbert, including: *Histoire de la vie et de l'administration de Colbert* (1846); *Histoire du système protecteur en France depuis Colbert jusqu'à la révolution de 1848* (1854); *Etudes financières et d'économie sociale* (1859); and *Lettres, instructions, et mémoires de Colbert* (7 vols., 1861–82). Clément's prefaces to the last work were collected and edited by his widow under the title *Histoire de Colbert et de son administration* (1874; 3d ed., 1892).

CLEM'ENT, Justice. An "old merry magistrate" in Jonson's *Every Man in his Humour*.

CLEMENTI, klā-mĕn'tê, Jacopo di, da Empoli (often called Chimenti) (1554–1640). An Italian painter of the Florentine school, born in Florence. He was a pupil of Tommaso di San Friano (or Tridano) and was influenced by the works of Andrea del Sarto and Pontormo. Clementi's art marks the transition from the style of the Mannerists to the baroque. His manner is severe to rigidity, his treatment often realistic. His two principal works are "St. Ives in the Midst of the Widows and Orphans" (Uffizi), and the altarpiece of "San Borromeo with Members of the Rospigliosi Family," in San Domenico, Pistoia. Others are "Christ in Gethsemane" (Prado Museum, Madrid) and the "Sacrifice of Isaac" in the Serragli Church, Florence. He also painted excellent portraits. His only fresco is on the staircase of the Certosa, near Florence. Consult Giglioli, *Empoli artistica* (Rome, 1906).

CLEMENTI, klā-mĕn′tē, Muzio (1752–1832). An Italian piano virtuoso and composer, born in Rome. His father, a goldsmith and fervent music lover, placed him under a relative, Buroni, for lessons in piano and harmony, and in 1761 Clementi became an organist. Later on, Carpani taught him counterpoint; and Sartarelli, singing. In 1766 an Englishman, Beckford, delighted with his playing, took him to England, where he continued his musical studies until 1770. He was now a finished virtuoso and published three piano sonatas (Op. 2)—the first works of this kind that bear the modern form. His success as a performer in London was extraordinary, and in 1777–80 he was cembalist (conductor) at the Italian opera there. His first tour (1781) included Strassburg, Munich, and Vienna, where his public contest with Mozart became an historic event, though the palm was awarded to neither. He aroused great enthusiasm in Paris (1785), but, in spite of it, decided to enter business. He returned to London, secured an interest in the publishing and piano-manufacturing firm of Longman and Broderip, and after its failure formed a partnership with Collard. The mechanical perfection of the piano absorbed most of his energies, yet he found time to write theoretical works and to give instruction—a field in which he had no rival. His concert tours in Russia (1802) and afterward in Germany and Italy were wonderfully successful; but his enterprises in London, by which he amassed a fortune, claimed most of his attention. He retired in old age to his estate at Evesham, outside London, and died there March 10, 1832. Among Clementi's pupils, Field, Cramer, Moscheles, Kalkbrenner, and Meyerbeer are the most noteworthy. Even Beethoven owes much to Clementi in his works for the piano. His style as a performer was that of a virtuoso, characterized by polish, vigor, and brilliancy, and a beautiful singing tone; and he especially excelled in improvisation. Of his works the sonatas, 106 in number, are brilliant and melodious, while his series of exercises, *Gradus ad Parnassum* (1817), remains an indispensable work in every pianist's equipment. Consult: Ferris, *Great Violinists and Pianists* (New York, 1894); Shedlock, *The Pianoforte Sonata* (London, 1895); Frojo, *Muzio Clementi, la sua vita, le sue opere e la sua influenza sul progresso dell' arte* (Milan, 1878).

CLEM′ENTI′NA, or **PSEUDO-CLEMENTINE** (sū′dō-klĕm′en-tīn) **WRITINGS** (Lat. nom. pl., from Gk. Κλημέντια, *Klēmentia*, from Lat. *Clemens*, Clement). 1. The "Second Epistle of Clement," a homily, perhaps originating in the East between 120 and 140 (see Clement I). 2. Two Epistles to Virgins, discussing certain problems which had arisen in the growing practice of celibacy in the Church, of Syrian origin, dating from the third century. 3. The most important are the *Homilies*, *Recognitions*, and *Epitomes*, a collection of discourses and stories, bearing the name of Clement of Rome, of uncertain authorship and date, but in their present form not earlier than the beginning of the third century. The first external testimony to their existence is found in the *History* of Eusebius. The groundwork upon which the compilation rests may, perhaps, date from the second century. The pseudo-Clementine literature includes 20 *Homilies*, 10 *Recognitions*, and an *Epitome*, which were all written in Greek. The last is relatively unimportant. In the *Homilies* and *Recognitions* we have what purports to be the story of Clement's career, in company with his teacher, the Apostle Peter. The bulk of the narrative consists of an unsystematic and frequently interrupted account of the experiences of Peter with the archheretic Simon Magus, with whom he carries on doctrinal and ethical discussions, and whom he victoriously follows from place to place, founding churches on the way.

The theological position of the writer is clearly discernible. He is a Jewish Christian Gnostic, perhaps of the sect of Elkesaites (q.v.). He ignores (some would say, opposes) Paul and exalts the person of James, "the Lord's brother." The *Homilies* were compiled for the sake of the teaching contained, rather than for the sake of any historical narration. The *Recognitions* traverse the same general ground, but with variation of treatment and with greater attention to the story. Historical criticism has not yet reached definite conclusions on all the problems presented by these curious writings. That there has been more or less working over of earlier material is generally conceded. They seem to be based on a common source. Recent opinion inclines towards Syria as the probable home of the work on which the writings are based (Uhlhorn) and towards Rome as a possible source for the books in their present form (Harnack). But we have thus far no means of constructing even a plausible hypothesis as to the person or persons by whom they were recast.

Bibliography. Among editions of the pseudo-Clementine writings may be mentioned: the edition of the *Homilies* by Lagarde (Leipzig, 1865); of the *Recognitions* by Gersdorf (ib., 1838); of the *Epitome* by Dressel (ib., 1859); Eng. trans. in the *Ante-Nicene Fathers*, ed. by A. C. Coxe, vol. viii. Consult, in general: G. Krüger, *History of Early Christian Literature* (Eng. trans., New York, 1897); Harnack, *Geschichte der altchristlichen Litteratur*, vol. i (Leipzig, 1893); C. Bigg, "The Clementine Homilies," in *Studia Biblica et Ecclesiastica*, vol. ii (Oxford, 1890); Hort, *Notes Introductory to the Study of Clementina Recognitions* (London, 1901); Waitz, "Die Pseudo-Klementinen," in *Text und Untersuchungen zur Geschichte der altchristlichen Litteratur*, vol. x, p. 4 (Leipzig, 1904).

CLEMENTINA, klā′mĕn-tē′nȧ, Lady. A character in Richardson's novel *Sir Charles Grandison*.

CLEM′ENTINES (Lat. *Clementinæ*, sc. *leges*, laws, from *Clemens*, Clement). A collection of decrees and constitutions published by Pope Clement V in 1313. They constitute five books and 52 titles in the *Corpus Juris Canonici* and were edited and published by the Benedictines in 9 vols., with an appendix (1885–92).

CLEMENT OF ALEXANDRIA (Lat. *Clemens Alexandrinus*, Gk. Κλήμης Ἀλεξανδρεῖος, *Klēmēs Alexandreios*) (c.150–c215). Titus Flavius Clemens, a celebrated Greek father of the Church. He was probably of heathen parentage, and his birthplace is unknown. He received a liberal education and sought out many teachers in his search for truth. He finally resorted to the Christian Pantænus, who presided over the catechetical school at Alexandria, and here he entered the Church. He was ordained a presbyter and succeeded Pantænus as head of the famous school, which was destined to achieve much greater renown because of the influence

of his own and Origen's teaching. During the persecution in the reign of Septimius Severus (c.203 A.D.) Clement left Alexandria. We hear of him afterward in Palestine and Asia Minor; but his later life is veiled in obscurity, and we know neither the place nor the date of his death.

Clement was a man of wide learning and was proficient in Greek philosophy, literature, and history. Jerome called him "the most learned of men"; but this is mere friendly exaggeration. As a theologian he ranks high, although inferior to his famous pupil, Origen (q.v.). According to his system, the divine Logos exhorts, educates, and perfects the true Christian gnostic, through a gradual process which is marked out, in three stages, in Clement's chief works—the *Exhortation to the Greeks*, the *Instructor*, and the *Stromata* ("miscellanies"), which together form a kind of trilogy. The first is a defense of the faith, designed to win converts. The second contains instructions in manners and morals for everyday life. In this Clement has not hesitated to draw freely from Stoic sources. The third is an unsystematic discussion of various points of doctrinal theology, designed to guide the mature Christian to a perfect knowledge (gnosis). He regarded Greek philosophy as a divinely inspired preparation for Christianity. Appended to the *Stromata* is one of the earliest Christian hymns, familiar to the modern world in the version beginning, "Shepherd of tender youth." Of Clement's other writings the best known is the tractate, *Who is the Rich Man that Shall be Saved?* In his interpretation of Scripture Clement followed the allegorical method, so much in vogue in Alexandria. The best edition of Clement's works is by Potter (Oxford, 1715), reprinted in Migne's *Patrol. Græc.*, vols. viii and ix (Paris, 1857). An English translation may be found in the *Ante-Nicene Fathers*, vol. ii, ed. by A. C. Coxe (New York, 1885). Consult, in general, the article "Clement," in Smith and Wace, *Dictionary of Christian Biography* (London, 1877–87); Charles Bigg, *The Christian Platonists of Alexandria* (Oxford, 1886); F. R. M. Hitchcock, *Clement of Alexandria* (London, 1899); Eugène de Faye, *Clément d'Alexandrie* (Paris, 1898).

CLEMENT OF ROME. See CLEMENT I.

CLEM'ENTS, FREDERIC EDWARD (1874–). An American botanist, born at Lincoln, Neb. He was educated at the University of Nebraska, where in 1894–1906 he was assistant professor of botany and then for a year professor of plant physiology. In 1907 he became professor and head of the department of botany at the University of Minnesota. His publications include: *The Phytogeography of Nebraska* (1898; 2d ed., 1900); *Histogenesis of Caryophyllales* (1899); *Laboratory Manual of High School Botany* (1900); *Greek and Latin in Biological Nomenclature* (1902); *Herbaria Formationum Coloradensium* (1902); *Development and Structure of Vegetation* (1904); *Research Methods in Ecology* (1905); *Plant Physiology and Ecology* (1907); *Cryptogamæ Formationum Coloradensium* (1908); *Genera of Fungi* (1909); *Minnesota Mushrooms* (1910); *Guide to the Trees and Shrubs of Minnesota* (1908); *Guide to the Spring Flowers of Minnesota* (1908; 3d ed., 1913); *Guide to the Autumn Flowers of Minnesota, Field and Garden* (1913).

CLEMENTS, JUDSON C(LAUDIUS) (1846–1917). An American politician and commerce expert, born in Walker Co., Ga. He was admitted to the bar in 1869 and practiced at LaFayette, Ga., from 1869 to 1892. He was county school commissioner in 1871, a member of the Georgia House of Representatives in 1872–76, and a member of the State Senate in 1877. From 1881 to 1891 he was in Congress and from 1892 to 1912 was a member of the Interstate Commerce Commission. He was reappointed to the commission in 1913. He published *Moral Results of Modern Transportation and Transmission Facilities* (1911).

CLEM'ENT'S INN. An Inn of Chancery, attached to the Inner Temple, in London. It originally served as a place of entertainment for those who made use of the waters of St. Clement's Well near by.

CLEMOW, FRANK GERARD. A British physician, educated in Liverpool, at Edinburgh University, and in Paris. He spent 15 months in India, served as medical officer to the British Seaman's Hospital, Cronstadt, and later became physician to the British Embassy at Constantinople. He was British delegate and plenipotentiary at the International Sanitary Conference in Paris in 1903 and in 1911–12. His publications include: *The Cholera Epidemic of 1892 in the Russian Empire* (1893); *The Medicinal Waters and Muds of Russia* (1897); *Medicine Past and Present in Russia* (1897); *Des formes cliniques de la peste* (1900); *The Geography of Disease* (1903); *Etude sur la défense sanitaire du chemin du fer du Hedjaz* (1910).

CLEMSON COLLEGE. An institution at Clemson College, S. C., chartered in 1889 and opened in 1893. Courses are offered in agriculture, mechanic arts, and electricity, chemistry, and textile arts. There are also military and academic departments. The institution is engaged in State work, such as the inspection of fertilizers, the protection of farmers against injurious insects and the diseases of animals, and in extension work among the farmers, teachers, etc. The student enrollment in 1912–13 was 834, and the instructors numbered 64. The college has an endowment fund of $154,439, and a total income of about $300,000. The value of grounds, buildings, and appliances in 1913 was $1,330,000. The president in 1914 was W. M. Riggs, B.S., LL.D.

CLE'OBU'LUS (Lat., from Gk. Κλεόβουλος, *Kleoboulos*). One of the seven wise men of Greece. He was the son of Evagoras and a native and ruler of Lindus, in Rhodes. He lived between 628 and 558 B.C., and was perhaps the first to give a literary form to riddles. He also wrote lyric poetry. Diogenes Laërtius has preserved for us several of his riddles. Consult Bergk, *Poetæ Lyrici Græci* (Leipzig, 1900).

CLE'OFAS, DON. The Spanish student for whose benefit Asmodeus exposes to view the secret life of all Madrid by unroofing the houses, in Le Sage's *Le diable boiteux*.

CLÉOMADÈS, klā'ô'mà'dĕs', THE ADVENTURES OF (Fr. *Les aventures de Cléomadès*). A French poem, of some 20,000 lines, written by Adenès le Roi towards the close of the thirteenth century.

CLEOM'BROTUS I (Lat., from Gk. Κλεόμβροτος, *Kleombrotos* (?–371 B.C.). A king of Sparta (380–371 B.C.). He was a son of Pausanias and succeeded his brother, Agesipolis I. He commanded the Spartan army which was sent against Thebes in 378 B.C.; two years later he led into Bœotia a second equally un-

successful expedition. He was defeated and killed in the battle of Leuctra (371 B.C.).

CLEOMEDES, klē′ō-mē′dēz (Lat., from Gk. Κλεομήδης, *Kleomēdēs*). A Greek writer on astronomy of the first or second century A.D. He composed a treatise, *The Circular Theory of the Heavenly Bodies*, which contains many truths of modern science—the spherical shape of the earth, the revolution of the moon about the earth, etc. The best edition is that by Ziegler (1891).

CLEOMENES (klē-ŏm′ē-nēz) **I** (Lat., from Gk. Κλεομένης, *Kleomenēs*). A king of Sparta. He was the son of Anaxandrides and came to the throne not later than 518 or 517 B.C. At the mandate of the Delphic oracle in 510 B.C. he assisted the Athenians in expelling from their city Hippias, the last of the Pisistratidæ. Shortly after this event he joined Isagoras, the head of the Oligarchical party at Athens, in an attempt to overturn the Clisthenian constitution. Clisthenes was driven from the city, and 700 families, partisans of Clisthenes, were sent into exile; but the undertaking, as a whole, proved unsuccessful. Later he made another unsuccessful attempt to aid Isagoras. At the time of the Ionic revolt he was appealed to in vain by Aristagoras to join the Grecian cause. In the war between Sparta and Argos, about the time of the capture of Miletus by the Persians, Cleomenes, having by stratagem defeated the Argives near Tiryns, treacherously slew a number of the survivors and destroyed the rest by setting fire to the grove in which they had taken refuge. Six thousand Argive citizens perished at this time, in and after the battle. By this victory Cleomenes won for Sparta supremacy in the Peloponnese. Afterward, by bribing the Delphic oracle, he secured the dethronement of his colleague, Demaratus, on the ground of illegitimacy (consult Herodotus, vi, 50–73), and the substitution for him of Leotychides. This he did because Demaratus had thwarted his attempt, in 491, to punish Ægina for submission to Darius. In his later years he became insane, finally taking his own life. Consult Wells, *Journal of Hellenic Studies* (1905).

CLEOMENES III (?–219 B.C.). A king of Sparta. He was the son of Leonidas II and the last of the Agidæ. (See Agis.) He became King about 235 B.C. Cleomenes was the inheritor of the aspirations of King Agis IV; his aim was to do away with the ephorate at Sparta and to reassert the power of the kings and then to raise Sparta to the position of leader in Greece. His plans caused war between Sparta and the Achæan League (see Achæa) in 227 B.C.; in 226 Cleomenes twice defeated the Achæans in battle—at the foot of Mount Lycæus, in Arcadia, and at Leuctra, in the territory of Megalopolis. After this he abolished the ephorate, restored the prerogatives of the kings, made a redistribution of the lands, remitted debts, and extended the franchise to certain of the periœci (q.v.). In 224 he utterly defeated the Achæans in a battle at Dyme, near Hecatombæum, but in 221 was himself defeated at Sellasia by the combined forces of the Macedonians and the Achæans, under the command of Antigonus, who had been called to the aid of the Achæans by Aratus and Philopœmen. Fleeing to Egypt, he there later endeavored to head an insurrection of the people, but, failing in that, took his own life. Cleomenes was the last great statesman that Greece produced.

CLEOMENES, or The Spartan Hero. A play by Dryden and Southerne, produced in May, 1692.

CLE′ON. The Governor of Tharsus, in Shakespeare's *Pericles*.

CLEON (Lat., from Gk. Κλέων, *Kleōn*) (?–422 B.C.). An Athenian politician, champion of the democracy. He was a son of Cleænetus and was by trade a leather dealer. He first came into prominence by opposing Pericles; he caused Pericles to be convicted of maladminstration of public funds. In 427 B.C., when the matter of the treatment of the inhabitants of Mytilene, who had revolted against Athens, came up for consideration in the Athenian Assembly, he urged that all the inhabitants be put to death. In 425, when envoys arrived at Athens to treat of the release of the Spartan citizens shut up on the island of Sphacteria and to suggest peace, the Athenians, instigated by Cleon, imposed such terms upon Sparta that peace was found to be impossible. Later in the same year, owing to a casual remark made in the public assembly to the effect that, if *he* were general, the Athenians would not long remain in front of Sphacteria, Cleon himself was placed in charge of the operations against the island. He promised to end the siege within 20 days, and, in conjunction with Demosthenes, he did this. (See Pylus.) In 422 B.C. Cleon was sent to oppose Brasidas (q.v.), in Macedonia and Thrace and to recover the city of Amphipolis. He took the towns of Torone and Galepsus, but was defeated and slain in the battle which took place beneath the walls of Amphipolis. Cleon is described by Thucydides and Aristophanes as an insolent and venal politician and a demagogue of low type. Both writers, however, had strong incentives to prejudices against him. Cleon was for many years the foremost man in Athens; he was a persuasive speaker, clever at managing public business in a popular way, and a strong advocate of war with Sparta. His death paved the way for the Peace of Nicias (q.v.), in 421. Consult: Grote, *History of Greece*, vol. vi (London, 1888); Beloch, *Die Attische Politik seit Perikles* (Leipzig, 1884); Holm, *History of Greece*, Eng. trans., vol. ii, chap. 23 (New York, 1902).

CLÉONTE, klā′ôNt′. A character in Molière's *Le bourgeois gentilhomme*.

CLE′OPA′TRA (Gk. Κλεοπάτρα). The name of several queens and princesses of Egypt of the family of the Ptolemies (q.v.). The most famous of them, Cleopatra VI, daughter of Ptolemy XIII, Auletes, was born in 69 or 68 B.C. Budge calls her the seventh; but Mahaffy declines to admit a Cleopatra VI (Tryphæna). Her father died in 51, leaving a will wherein he appointed as his successors, his elder daughter, Cleopatra, and his elder son, Ptolemy, and requested the Roman people to see his testamentary dispositions carried into effect. Two copies of this will were drawn up—one to be preserved at Alexandria (consult Cæsar, *De Bell. Civ.*, iii, 108), the other to be sent to Rome to be deposited in the public archives. Owing, however, to the unsettled state of the Empire, the latter will never reached its destination, but remained in the possession of Pompey. Cleopatra, then about 17 years old, and her brother, Ptolemy XIV, a child of about 12 years, succeeded jointly to the throne of Egypt, with the understanding that they should shortly marry. In the third year of their reign Ptolemy, urged by his advisers, assumed sole control of the government and drove

his sister into exile. She promptly gathered an army in Syria and prepared to assert her claims. It was at this time that Pompey, seeking refuge with the King of Egypt, after his defeat at Pharsalia, was murdered by the King's advisers. Cleopatra seems to have been unable to make good her claim by force of arms; but, shortly after Pompey's death, Cæsar arrived at Alexandria and, yielding to the fascinations of the Egyptian Queen, became her lover and espoused her cause. He was for a time hard pressed by the Egyptians, but ultimately triumphed, and Ptolemy lost his life. Arsinoë, the younger daughter of Ptolemy Auletes, was carried off to grace Cæsar's triumph at Rome. Cleopatra now nominally married her younger brother, Ptolemy XV, and, after settling their joint government upon a secure basis, went to Rome, where she lived as Cæsar's mistress until his assassination in 44 B.C. After Cæsar's death, having, it is said, poisoned her brother, Ptolemy XV, she returned to Egypt, where she associated with her on the throne her son by Cæsar, called Cæsarion. In the civil war following Cæsar's death, since Cleopatra had hesitated to take sides with either party, Antony, after the battle of Philippi (42), summoned her to meet him at Tarsus in Cilicia to explain her conduct. When she appeared upon the Cydnus on a splendidly adorned vessel, in the garb of the goddess Aphrodite, the Roman triumvir fell a victim to her charms and returned with her to Egypt. After living with her for some time, in the course of which she bore him twin children, Alexander Helios and Cleopatra Selene, Antony was compelled to return to Rome, where he married Octavia, a sister of Octavius. When, in 36, he went to the East in command of an expedition against the Parthians, he sent for Cleopatra, and she joined him at Antioch, and after his defeat she met him in Syria with troops and supplies. In 34, after a more successful campaign against the Parthians, he celebrated his triumph at Alexandria and continued to reside in Egypt. In 32 Octavianus declared war against Cleopatra, and Antony, in revenge, divorced his wife Octavia. Against the counsel of Antony's advisers Cleopatra insisted on taking part in the ensuing campaign. At the naval battle of Actium (31), believing Antony's defeat to be inevitable, she withdrew her fleet from action and fled to Alexandria. Her lover, beholding her flight, made no further effort to retrieve his fortunes, but retired from the battle and followed her. On the approach of Octavianus, Antony, deceived by the false report of the Queen's death, fell by his own hand. Cleopatra made some attempts to bring Octavianus under the influence of her charms, but, failing in this and hearing that he intended to exhibit her in his triumph at Rome, she killed herself (30 B.C.), probably by poison, and, according to an old tradition, by the bite of a venomous serpent. Cleopatra combined rare intellectual gifts with physical charms, and she is immortal as one of the most fascinating women of all time; so that ever since her death she has been a constant theme for artists, dramatists, and poets. There is no authentic portrait of Cleopatra extant, except in her effigy upon coins. A composite photograph has been made of these by Gorringe in his book, *Egyptian Obelisks* (New York, 1865).

Cæsarion, her son by Cæsar, was put to death by Octavius. Of her three children by Antony, her daughter CLEOPATRA married Juba, King of Mauretania, who was allowed by Octavius to take under his protection his wife's two brothers, Alexander and Ptolemy. In 40 A.D. Ptolemy, son of Juba and the younger Cleopatra, was slain by Caligula, and with him ended the line of the Ptolemies. (See PTOLEMY.) Consult: Strack, *Die Dynastie der Ptolemäer* (1896); Mahaffy, *The Empire of the Ptolemies* and *History of Egypt under the Ptolemaic Dynasty* (1899); Lombroso, *L'Egitto dei Greci e dei Romani* (1895).

CLEOPATRA. An opera by Enna (q.v.), first produced in Copenhagen, Feb. 9, 1894.

CLEOPATRA'S NEEDLES. The name given to two Egyptian obelisks of red syenite, which were transported from Heliopolis to Alexandria about 14 B.C., and remained there until 1877, when they were presented to the governments of Great Britain and of the United States by the Khedive, Ismail Pasha. One has been standing on the Thames Embankment, London, since 1878, the other in Central Park, New York, since 1880. The latter is 69 feet high, with a base 7 feet 7 inches square, and weighs 200 tons. It is supported on four bronze crabs, reproductions from the originals preserved in the neighboring Metropolitan Museum. The obelisk bears inscriptions of Thothmes III (about 1500 B.C.) and Rameses II. The London obelisk is slightly smaller than its companion in New York. Consult Gorringe, *Egyptian Obelisks* (New York, 1885). See OBELISK.

CLEP'SYDRA (Gk. κλεψύδρα, *klepsydra*, from κλέπτειν, *kleptein*, to steal + ὕδωρ, *hydōr*, water). An ancient instrument for measuring time by the efflux of water through a small orifice. Two kinds have been in use. In the simpler form the water was allowed to escape from one vessel into another. This form was used in the Athenian courts, where a speaker was allowed a certain quantity of water for his speech, the quantity depending on the importance of the suit. The more complicated form was said by some to have been invented by Plato, while others gave the honor to Ctesibius of Alexandria. In this form the water was allowed to flow at a uniform rate into a receptacle, on which was marked a scale of hours. Both forms are said to have been introduced into Rome in 159 B.C. and were widely used. (See CLOCK.) Athenæus (vol. iv, p. 174) applies the name to a variety of the hydraulic organ.

CLERC, klâr, JEAN LE. See LE CLERC, JEAN.

CLERC, LAURENT (1785–1869). A French deaf-mute and educator, born near Lyons. He was a favorite pupil of the Abbé Sicard at the institution of the deaf and dumb founded in Paris by the Abbé de l'Epée, and after eight years of study became a teacher. In 1816 he came to the United States with Dr. Gallaudet (q.v.), and the next year the two opened an institution for the deaf and dumb in Hartford, Conn., where Clerc taught successfully for more than 40 years. He married a deaf-mute, who bore him several children, all of whom had the sense of hearing and could speak. See DEAF-MUTE.

CLERESTORY. See CLEARSTORY.

CLERFAYT, or **CLAIRFAIT,** klâr'fâ', CHARLES DE CROIX, COUNT (1733–98). An Austrian field marshal, born at the castle of Bruille, Hainaut, Low Countries. He entered the Austrian service in 1753, fought with distinction in the Seven Years' War, and was advanced to the rank of colonel. During the Turkish War of 1787–91 he commanded an army

corps which won battles at Mehadia and Kalafat. In 1792 he commanded the Austrian corps sent to assist the Duke of Brunswick and defeated the French at Croix-aux-Bois (September 15). Having withdrawn into Belgium, he defeated the French at Aldenhoven (March 1, 1793), relieved Maestricht, decided the battle of Neerwinden (March 18), and took Le Quesnoy (September 11). After this series of brilliant victories he met with reverses at Wattignies (October 15 and 16), Mouscron (April 29, 1794), and Hoogleede (June 13). In 1795 he was appointed field marshal and commander in chief of the Imperial armies on the Rhine, in which capacity he defeated Jourdan at Höchst (October 11) and relieved Mainz, storming the almost impregnable works of the besiegers, which were defended by an army of 80,000 men. After concluding an armistice with the French Republic he returned to Vienna, where he was hailed as the savior of the Empire. Because of differences with the Imperial Minister Thugut over the armistice, he left the army. Consult Vivenot, *Thugut, Clerfait, und Wurmser* (Vienna, 1869).

CLERGUE, Francis Hector (1856–). An American manufacturer, born in Bangor, Me., of French Huguenot ancestry, and educated at the University of Maine. He studied law and was admitted to the bar in 1876, but in 1880 became interested in street railways and other developments. In 1888 he attempted unsuccessfully to organize a railway and electric light and water works companies in Teheran. In 1896 he began to develop hydraulic power at the falls of the St. Mary, and it was largely through his efforts, and in some cases his inventions, that in Sault Ste. Marie, Mich., and in the city of the same name in Ontario, great wood-pulp factories and reduction works were built.

CLERGY (OF. *clergie,* Lat. *clericus,* from Gk. *κληρικός, klērikos,* clergyman, from *κλῆρος, klēros,* lot). A term very generally applied to the ministers of the Christian religion in contradistinction to the laity (q.v.). This use of the term is very ancient and appears to have gradually become prevalent, as the ministers of religion more and more exclusively, instead of the members of the Christian Church equally, began to be regarded as God's "heritage" and "priesthood" (1 Pet. ii. 9, and v. 3), consecrated to Him, and peculiarly His. The distinction between the clergy and the laity became more marked through the multiplication of offices and titles among the clergy, the ascription to them of a place in the Christian Church similar to that of the priests and Levites in the Jewish church, with peculiar rights and privileges, their assumption of a peculiar dress and of official insignia, the growth of monastic institutions, and the introduction of celibacy. In harmony with the notions on which this distinction is founded is that of an indelible, sacramentally stamped character derived from ordination, so that a renunciation of the clerical office is either viewed as an impossibility or a sort of apostasy. These notions in their highest degree belong to the Church of Rome. In the Protestant churches the distinction between clergy and laity is much less wide, and, although the same terms are often used, it is rather conventionally than in their full signification. The employment of official robes by the clergy preceded their assumption of a peculiar ordinary dress and is not so intimately connected with any peculiar pretensions. Among the privileges accorded to the clergy by the Roman emperors and in the Middle Ages was exemption from civil offices; among the rights asserted by them, and occasioning much dispute, was exemption from lay jurisdiction, even in cases of felony. (See Benefit of Clergy.) The clergy were distinguished into the *higher* clergy and the *lower* clergy; the latter including ostiarii, acolytes, lectors, exorcists, etc. The term *secular* clergy is the designation of priests of the Church of Rome who are not of any religious order, but have the care of parishes. Monks who are in holy orders are designated *regular clergy* (from *regula,* rule). See Orders, Holy; Bishop; Priest; Deacon.

CLERGY, Benefit of. See Benefit of Clergy.

CLERICUS, Johannes (1657–1736). See Le Clerc, Jean.

CLERIDÆ. See Checkered Beetles.

CLERK (AS. *clerc, cleric,* from Lat. *clericus,* clergyman). In the Middle Ages, an appellation for an ecclesiastic, extended at a later period to mean a complimentary title for men of learning, whether of the Church or not. In modern times it indicates any one who makes and keeps records, public or private, or one employed in some subordinate position in a store, an office, etc. "Clerk in holy orders" and "clerk in minor orders" are phrases, still used in England as the legal designations of a minister of the Established church, which preserve the mediæval use of this term. See Clergy.

CLERK, Parish. See Parish Clerk.

CLERK, Paymaster's. In the United States navy a paymaster's clerk is appointed by the Secretary of the Navy at the request of the paymaster for whom he is to perform duty and serves until his appointment is revoked. Paymasters' clerks have the same pay and allowances as warrant officers, and, while holding appointments in the naval service, they have the same rights of retirement as warrant officers of a like length of service. The uniform is similar to that of warrant officers (see Boatswain), and they belong to the warrant officers' mess.

CLERK, Dugald (1854–). A British engineer and inventor, born at Glasgow, and educated at Anderson's and the West of Scotland Technical colleges (now merged). He was professor of technical chemistry at Glasgow and also in the Yorkshire College of Science at Leeds, became a director of the National Gas Engine Company, and invented the Clerk cycle gas engine. Besides his scientific papers he is author of: *The Theory of Gas Engines* (2d ed., 1891); *The Gas and Oil Engine* (7th ed., 1896); *The Gas, Petrol, and Oil Engine* (2 vols., 1909–13).

CLERKE, Agnes Mary (1842–1907). A British astronomer, born in Ireland. While living in Italy in 1870–77 she contributed to the *Edinburgh Review.* In 1888 she made astronomical observations at the Cape of Good Hope, South Africa, and in 1890 further observations aboard the yacht *Palatine* in the Baltic Sea. She won the Actonian prize for her work in astronomy in 1893. Her publications include: *A Popular History of Astronomy* (1885; 4th ed. rev., 1902); *The Systems of the Stars* (1890; 2d ed., 1905); *The Herschels and Modern Astronomy* (1895); *Astronomy* (1898);

Problems in Astrophysics (1903); *Modern Cosmogonies* (1905).

CLERKENWELL, klär'ken-wĕl (clerks' well, Lat. *Fons Clericorum*, from its well, which was a meeting point for the parish clerks of London). A parish of London (q.v.), England, north of St. Paul's Cathedral, between Holborn Viaduct and Islington. It is a noted district for the manufacture of metal articles, watches, and optical instruments. Northampton Polytechnic Institute, a branch of the City Polytechnic Institute, is situated on Northampton Square.

CLERK-MAXWELL. See MAXWELL.

CLERMONT-EN-BEAUVAISIS, klār'môn'-ôn-bō'vā'sēs', **CLERMONT-DE-L'OISE** (ML. *Clarus Mons*, fair hill, from *clarus*, clear, and *mons*, mountain). An ancient town in the Department of Oise, France, 36 miles north of Paris (Map: France, N., H 3). The town hall and church of St. Samson date from the fourteenth century, and above the town is an old castle of the tenth or eleventh century, now used as a penitentiary for women. Founded on the site of an ancient camp of the Gauls and Romans, Clermont was important in the Middle Ages, was frequently taken and retaken in the wars with the English, and in 1487 was surrendered to them as a ransom for the French leader, La Hire. It manufactures felt and corsets, and its trade consists of horses, cattle, and grain. Pop., 1901, 5723; 1911 (commune), 6004.

CLERMONT-FERRAND, -fĕr'räN'. The capital of the Department of Puy-de-Dôme, France, 215 miles south-southeast of Paris (Map: France, N., J 7). It is finely situated, on a gentle elevation, between the rivers Bedat and Allier, at the foot of a range of extinct volcanoes, crowned by the peak of Puy-de-Dôme, about 5 miles distant from the town. It consists of the two towns of Clermont and Montferrand, connected by a fine avenue of trees, but has a generally gloomy aspect. It contains several remarkable buildings; such as the old Gothic cathedral of the thirteenth century, the corn and linen hall, the theatre, museum of natural history, hospital, including a college of pharmacy, medicine, academy of sciences, belles lettres and arts, and a public library, in which are over 113,000 printed volumes and 1100 manuscripts. In the park outside of the library is a statue of Pascal, who was born here. It is the centre of the French manufacture of India rubber. Other manufactures include woolen and linen goods, machinery, straw hats, chocolate, chemicals, rope, candles, hats, yarn, thread, animal oils, and needles, while there is an extensive traffic in the produce of the district, and considerable transit trade between Paris and the south of France. It is an active market for horses. There are two hot mineral springs in the town, which are used for bathing. Clermont-Ferrand is the seat of a bishop. Pop. (commune), 1901, 52,933; 1911, 65,386. It succeeds the ancient Gallic city, Augusta Nemetum, later called Clarus Mons. In the Middle Ages Clermont was the residence of the counts of the same name, and the capital of the Province of Auvergne, and became the seat of one of the oldest bishoprics of France. Several ecclesiastical councils were held here, the most remarkable of which was that in 1095, at which the First Crusade was decreed by Urban II.

CLERMONT-GANNEAU, -gȧ'nō', CHARLES SIMON (1846–). A French Orientalist, born in Paris and educated at the Ecole des Langues Orientales. Becoming an attaché to the Jerusalem consulate, he took an important part in the discovery of the "Moabite Stone" (q.v.) and its piecing together. The British government made him head of an expedition to Palestine in 1874, and the French government afterward sent him on archæological missions in Syria, Tripolitana, Cyrenaica, etc. He became Vice Consul at Jaffa in 1880, Oriental "secrétaire interprète" in Paris in 1882, Consul of the first class (1886), Consul General (1896), Minister Plenipotentiary (1906), and professor of Semitic epigraphy and antiquities at the Collège de France. He exposed various forgeries, notably the "Moabite" pottery sold to the Prussian government by Shapira, Shapira's pretended fragments of Deuteronomy, and the tiara of Saïtaphernes. He published: *Etudes d'archéologie orientale* (1880); *Palestine inconnue* (1886); *Les fraudes archéologiques* (1885); *Archæological Researches in Palestine* (2 vols., 1896–99); *Recueil d'archéologie orientale* (1885–1905).

CLERMONT L'HÉRAULT, -lȧ'rō', or CLERMONT DE LODÈVE. The capital of a canton in the Department of Hérault, France, situated on a castle-crowned hill, rising from the banks of the Ydromiel, 10 miles south of Lodève by rail (Map: France, S., H 5). Its Gothic church is a fine building of the thirteenth and fourteenth centuries. Clermont is noted for its woolen manufactures, especially army clothing, which date from 1678; it has also tanneries, potteries, manufactures of cutlery, hats, wine, lime and stone quarries, and a considerable trade in agricultural and commercial products. Pop., 1901, 5280; 1911, 5177. Consult Brien, *Histoire de la ville de Clermont l'Herault et de ses environs* (Clermont l'Herault, 1838).

CLERMONT TONNERRE, -tŏ'nâr'. A well-known French family. It originated in Dauphine in the eleventh century.—STANISLAS MARIE ADELAIDE, COUNT DE (1757–92), was born at Pont-à-Mousson. He entered the States-General in 1789 as representative of the nobility, and there, as well as in the National Assembly, acquired great influence. He was moderate in his views, argued for the English system of two legislative houses and for the King's right to veto. With Malouet he founded, in 1790, in order to counteract the Jacobins, the Club des Impartiaux (later called Amis de la Monarchie), and with Fontanes he published the *Journal des Impartiaux*. He perished in the massacre of Aug. 10, 1792. A great orator, he collected his speeches, *Recueil des opinions* (Paris, 1791).—AIMÉ MARIE GASPARD, MARQUIS, and afterward DUKE DE (1779–1865), born in Paris, was a French general and minister. He was educated at the Ecole Polytechnique, entered the army, and served in the campaigns in Italy, Germany, and Spain. He was made aid-de-camp to Napoleon's brother Joseph, King of Spain. After the restoration of Louis XVIII he was Minister of Marine and in 1823–27 Minister of War. After the July revolution he refused the oath of allegiance to the new government and retired from politics.

CLERON. See HAUSSONVILLE.

CLE'RUCHY. See COLONY.

CLÉRY, klȧ'rē', JEAN BAPTISTE ANTOINE HANET (1759–1809). The valet de chambre of Louis XVI. He was born near Versailles. By his own choice he followed the King to the Tem-

ple and attended him with the greatest devotion. After his death he remained in imprisonment for some time and then rejoined the royal family in Germany. In London he published a popular account of Louis's captivity, *Journal de ce qui s'est passé à la tour du Temple pendant la captivité de Louis XVI, roi de France* (1798), which greatly aided the Royalist cause and may have been written by some one else.

CLÉSINGER, klā'zăn'zhā' (JEAN BAPTISTE) AUGUSTE (1814–83). A French sculptor and painter. He was born at Besançon, studied with his father and in Italy, and first attracted attention with a bust of Eugène Scribe (1844), and with his "Woman Bitten by a Serpent" (1847). Other important works are: Rachel as "Phædra," "Tragedy" (vestibule of Théâtre Français), "Cleopatra before Cæsar," the silver statue of "Phryne," "Louise of Savoy" (Luxembourg Gardens), "George Sand" (Théâtre Français), and the statue of "Music" on Chopin's grave (Père Lachaise). His work is of masterly technique and refined in composition, but is often lacking in content. He occasionally exhibited paintings of scenery and architecture. In 1847 he married a daughter of George Sand. He died in Paris, Jan. 7, 1883.

CLETUS. See ANACLETUS I.

CLEVEDON, klēv'don. A watering place in Somerset, England, on the Bristol Channel and Severn Estuary, 9 miles northeast of Weston-super-Mare (Map: England, D 5). It has a fine beach, a marine promenade, a pier, and a coast-guard station. It is noted for literary associations with Coleridge; also with Henry Hallam, the historian, and his son Arthur, commemorated by "In Memoriam," whose graves are in the parish church of St. Andrew. Clevedon Court, a mediæval mansion, is supposed to be "Castlewood" of Thackeray's *Henry Esmond.* Pop., 1901, 5900; 1911, 6111.

CLEVE'LAND (ME. *clif, clef,* pl. *clives, cleves,* cliffs + *land*). A hilly region with some picturesque fertile valleys, forming the eastern part of the North Riding of Yorkshire, England, between Whitby and the Tees (Map: England, E 2). Some of the heights are marked by mounds called "houes." Many archæological relics have been found among the hills. Since 1851 it has become a populous mining district, owing to the discovery of ironstone. See MIDDLESBROUGH.

CLEVELAND. The county seat of Cuyahoga Co., Ohio, the largest city of the State, and the sixth in the United States, the chief port of entry of the Great Lakes, and an important industrial and commercial centre, situated on the south shore of Lake Erie, at the mouth of the Cuyahoga River, in lat. 41° 30′ 5″ N., long. 81° 42′ 6″ W. (Map: Ohio, G 2). It is 138 miles by rail northeast of Columbus, 263 miles northeast of Cincinnati, 357 miles east of Chicago, 623 miles west by north of New York, and 527 miles northwest of Washington.

The city, 689 feet above sea level, and, at its highest point, 302 feet above the lake, is beautifully situated on elevated land, which slopes gently towards the lake, and occupies an area of 51.8 square miles, with a river frontage of 18 miles, and a lake frontage of 12 miles, extending back more than half that distance. It is divided unevenly by the winding course of the Cuyahoga River, the largest portion lying on the east side of that stream. It is intersected also by Kingsbury and Walworth "runs," the east and west tributaries of the Cuyahoga. The land bordering the river is low and flat, and here lie many of the industrial works—lumber and coal yards, ore docks, blast furnaces, steel mills, etc.—almost hidden from view. Owing to the variation in level of different parts of the city, there are several elevated viaducts and many bridges (nearly all of which are owned by the municipality) spanning the Cuyahoga and uniting the sections of the city. The most remarkable of these is Superior Avenue Viaduct of stone and iron, completed in 1878, at a cost of $2,250,000, 3211 feet long and 64 feet wide, with a central drawbridge 68 feet above the water level. This structure will soon be supplanted by a magnificent high-level bridge, affording mast clearance for any boat, having separate decks for different kinds of traffic, and costing $4,000,000. The Central Viaduct, completed in 1888, and reconstructed into a high-level bridge in 1913, crosses the river and is 2838 feet long. The Abbey Street Viaduct, crossing Walworth Run, is 1092 feet long. A smaller one (835 feet) spans Kingsbury Run. Just outside the city, spanning Rocky River, is to be found the second largest concrete bridge in the country.

Cleveland has features of beauty in its broad streets, ranging from 40 to 132 feet in width, which are so abundantly shaded that the city has acquired the name of "Forest City." There are 769.8 miles of streets (excluding Newburgh), 458 miles of which are paved, brick and asphalt being extensively used. The public-park system includes about 1902 acres, exclusive of land acquired for the "group plan," distributed in areas of varying extent throughout the city, and its suburban districts to the east and west are thoroughly accessible by the street railways, which operate 300 miles of track. In contrast with its extensive industrial and commercial interests, Cleveland has very few large tenements, with congested population. Detached houses with gardens are the rule. In 1910 it had 90,465 dwellings, which, when compared with its population, makes Cleveland preëminently a city of homes.

The lake-shore front, the valley of the Cuyahoga and the area along the Pennsylvania Railroad from St. Clair Avenue south to Harvard Avenue and along the Erie Railroad from East Fifty-fifth Street to East Ninety-third Street, are centres of the manufacturing industry, while the business area extends from the lower part of the river east along Superior Avenue, which is 132 feet wide, and along Euclid Avenue to East Twenty-second Street. The Public Square, or Monumental Park, containing the statue of Gen. Moses Cleaveland and the Soldiers' and Sailors' Monument, forms a park of 4½ acres about the intersection of Superior Avenue and Ontario Street; from this centre and from Ontario Street, which extends north and south, the principal streets of the east side of the city diverge. The far-famed Euclid Avenue, 83 to 90 feet wide, begins at the southeast corner of the Public Square and extends beyond Lake View Cemetery, through the suburbs of East Cleveland, the continuation beyond there being Euclid Road. Once called by Bayard Taylor the most beautiful thoroughfare in the country, in recent years it has lost much of its former natural attractiveness and character as a residence street by reason of the steady encroachment of the business district. Among the fine residence streets of the city are Bellflower

Road, Magnolia and Juniper Drives, East and Lake Shore boulevards, East Seventy-fifth, East Seventy-ninth, East Ninety-third, East One Hundred and Fifteenth, and West Fourteenth streets. Lying partly in the city are Lake Avenue and Clifton Boulevard, while outside of Cleveland, but maintained by the city, are the beautiful boulevards of Euclid Heights and Shaker Lakes.

Buildings. The more prominent buildings of the city include the new County Courthouse, new City Hall, Federal Building, Art Museum, Western Reserve Historical Society Building, Chamber of Commerce, Central Armory, Cleveland Grays' Armory, Adelbert College, Women's College, Case School of Applied Science, Northern Ohio Insane Asylum, new Young Men's Christian Association Building, American League Park buildings, Sheriff Street Market House (400 by 120 feet), and the new West-Side Market House, reputed to be the finest in America. Cleveland has come to be a "City of Arcades." The largest, the Superior Arcade, 400 by 180 feet, built in 1889 at a cost of $850,000, has a fine interior; arranged on both sides of a central court are the several tiers of stores and offices fronted by balconies. Between East Sixth and East Ninth streets, on the opposite side of Euclid Avenue, and extending through to Prospect Avenue S. E., are successively the Euclid, Colonial, and Taylor arcades. At the Prospect Avenue end of the Colonial Arcade is the Colonial Hotel. Other structures worthy of note are the *Leader-News*, Engineers (national headquarters of the Brotherhood of Locomotive Engineers), Williamson, New England, Society for Savings, Citizens, American Trust, Schofield, Rose, Perry-Payne, Garfield, Cuyahoga, Illuminating, Park, Marshall, Union Club, Kinney-Levan, Cleveland Athletic Club, Caxton, and Hippodrome buildings. The Euclid Avenue and Pilgrim (Congregational), St. Paul's and Trinity (Protestant Episcopal), the First Methodist Episcopal and Epworth Memorial, Calvary (Presbyterian), East End Baptist, Euclid Avenue Christian Church, St. Michael's, St. Prokop's, and the Roman Catholic Cathedral and the Euclid Avenue Synagogue are among the finest ecclesiastical edifices.

In the early part of the century a plan was conceived by the late Mayor Tom L. Johnson and initially projected by architects Arnold Brunner, John M. Carrere, and D. H. Burnham, systematically to beautify the city by grouping the public buildings that are gradually replacing the present structures—an undertaking to which $35,000,000 will ultimately be devoted. The public buildings are being arranged in a quadrangle inclosing a mall, the whole occupying a plot of land in the heart of the city one-eighth of a mile wide by one-half a mile long. With the erection of the Federal Building, the County Courthouse, and the City Hall, one-half of the "group plan" is now finished. There still remain to be erected the Public Library Building and Museum at the south end, and the new monumental union railroad station at the north end of the mall. An imposing Court of Honor will join the buildings at each end of the mall.

Parks and Cemeteries. Among the many fine parks belonging to the city, the largest within the city limits is Rockefeller Park, of 273 acres, a part of which was given by the millionaire whose name it bears. It includes the Valley of Doan Brook, with several smaller parks and parkways, and is connected with Gordon and Wade parks by the boulevard which extends also between these two. Gordon Park, on the lake front, comprises 112 acres and, with Wade Park (85 acres) to the southeast, is noted for its gardens. The former contains the statue of Commodore Perry, formerly in Monumental Park, the Goethe-Schiller Monument and the new Art Museum. Edgewater Park (126 acres) has well-kept lawns, walks, and a beach, with facilities for boating and bathing, a municipal dance hall, and contains the Wagner Monument. Brookside Park (159 acres), containing the city's zoölogical gardens; Garfield Park (181 acres); Woodland Hills Park (113 acres); Shaker-Heights Park (279 acres), just outside the city limits, and named from the community which once occupied the land; Lakeview Park, on the lake shore; Lincoln Park; Washington Park (98 acres); Forest Hill Parkway (81 acres); University Circle on the east side, and Franklin Circle on the west side of the river, are noteworthy. Besides Euclid Avenue, the more attractive drives are the boulevard system of 33 miles, connecting the parks, and Lake Avenue and Clifton Boulevard.

Cleveland has a number of cemeteries, the largest of which are Woodland, Riverside, and Lakeview. The last, one of the most beautiful in the country, contains more than 300 acres, with great natural advantages skillfully improved. Here, on an eminence 250 feet above the level of the lake, stands the Garfield Memorial, completed in 1890 at a cost of $225,000—the balcony near the top, 165 feet high, affording a fine view of the city and its suburbs. It is built principally of Ohio sandstone and contains a chapel with symbolical panels and reliefs of scenes from the President's career and his statue. His remains lie in a crypt beneath.

In Lakeview Cemetery is situated the Wade Memorial Chapel, which cost more than $350,000.

Educational Institutions and Libraries. Cleveland has the normal equipment of a great city in the matter of public schools, with a sufficient number of high, technical, and commercial schools, besides numerous private and parochial institutions. The public-school system is conducted under the supervision of a small elective board, and its plan of instruction prohibits all corporal punishment, eliminates mechanical methods, introduces manual and domestic training in all grades, and practically abolishes stated written examinations in the primary and grammar grades—the teacher's judgment being accepted as the general basis of promotion. Cleveland was one of the first cities in the United States to establish a free high school, and the first west of the Alleghany Mountains, the date being July 13, 1846. It is the seat of Western Reserve University (q.v.), with its departments of Adelbert College, Women's College, Graduate School, and schools of medicine, law, pharmacy, library, domestic science, journalism, and dentistry; Case School of Applied Science (q.v.); and St. Ignatius College (Roman Catholic). It contains also St. Mary's Theological Seminary (Roman Catholic), Baldwin University Law School, Cleveland College of Law, and Cleveland Pulte Medical College. Cleveland is also the home of the National Mouth Hygiene Association, whose purpose is to correct general mouth evils existing in the schools.

In addition to libraries of the various educational institutions, Cleveland has a Public Library of nearly 550,000 volumes, the Case Library (subscription) of 85,000 volumes, the Hatch Library (Adelbert College) of 80,000 volumes, Cleveland Medical Library Association, Law Library Association, and the Western Reserve Historical Society.

Charities. The State Institution for the Insane, founded in 1855, has 103 acres of ground and buildings that accommodate 1750 patients. The City Infirmary and Hospital treat annually 4500 patients and maintain a department for outdoor relief. A tract of over 2000 acres, lying south of the city, has been purchased for the purpose of colonizing the inmates of the infirmary and workhouse and for maintaining a tuberculosis sanitarium. Other hospitals include the Lakeside Hospital, Federal Marine, Cleveland General, Cleveland Homeopathic, St. Alexis, St. Clair, St. John's, and St. Vincent's Charity. Other institutions are industrial schools, homes for the aged, and Jewish, Roman Catholic, and Protestant orphanages. Prominent in the charitable work is the Goodrich House, incorporated in 1897—a social settlement in the poorer part of the city, which contains clubs, kindergartens, a gymnasium, baths, sewing rooms, a public laundry, and parlors and reading rooms. With this equipment the Goodrich House stands among the foremost institutional houses in the United States. The Hiram House and Alta House are prominent social settlements. It is estimated that the charitable institutions control property exceeding in value $5,000,000.

A unique innovation in coöperative benevolence is to be found in the Cleveland Federation for Charity and Philanthropy, established in 1913. Its purpose is to secure greater efficiency and economy in giving by harmonizing the work of the charitable and philanthropic organizations of the city. The federation is controlled by a board of 30 trustees, one-third elected by the participating philanthropic organizations, one-third by the givers, and one-third by the Chamber of Commerce to represent the city at large. Another remarkable institution is the Cleveland Foundation, a "Community Trust," organized in 1913, and controlling millions of dollars bequeathed for educational and charitable purposes. The income from the foundation funds is expended by an impartial, nonsectarian, nonpolitical committee, serving without compensation. No two members may be of the same religious denomination, the *personnel* changes by one member each year, and the committee is composed of residents who are informed concerning the educational, social, civic, and charitable needs of the city.

Clubs, Theatres, and Hotels. The Union, Roadside, Tavern, Colonial, Rowfant, Excelsior, and the Euclid and Country clubs, all owning the houses in which they are installed, are representative organizations. Among the principal places of amusement are the Euclid Avenue Opera House, Keith's Hippodrome, and the Colonial, Metropolitan, and Duchess theatres. The more prominent hotels include the Hollenden, Colonial, Hotel Euclid, Statler, Gillsy, Tavistock, Forest City, and American.

Commerce and Industry. The construction of the Ohio Canal—completed in 1832—connecting Lake Erie with the Ohio River, the northern terminus being the Cuyahoga River, gave Cleveland commercial advantages over other cities on Lake Erie; and, though the canal has since declined greatly in importance, the city has now other and greater advantages by virtue of its location. Chief of these is its proximity to the coal and oil fields of Ohio and Pennsylvania and to the iron-producing regions of Lake Superior, Cleveland being one of the most convenient points for the collection and distribution of the products of both districts. The city has thus become an important commercial centre and also a manufacturing place of the first rank.

The bulk of the lake traffic consists of coal, coke, and iron. The receipts of coal and coke in 1913 by lake, rail, and canal amounted to 9,817,000 tons; and the shipments for the same year were 4,986,000 tons. The coal is distributed among the various lake ports farther west and north. The receipts of iron ore in 1913 were 8,783,000 tons; and the shipments for the same year were 6,141,000 tons. Grain and live stock ranked next in importance. Cleveland is the largest market for fresh-water fish in America.

The city has remarkable advantages for the accommodation of its shipping—two parallel piers, built out 1500 feet into the lake, form a channel 200 feet wide and 21 feet deep at the mouth of the Cuyahoga; and the many windings of the latter afford 18 miles of river frontage, over five miles of which are docked. A branch of the Cuyahoga flowing westward, not far from the lake and parallel with it, has been dredged so as to afford room for excellent shipyards and docks. In 1878 the United States government began a breakwater to inclose a harbor of refuge 360 acres in extent, with an opening of 500 feet, opposite the mouth of the river. Later plans and appropriations, however, provide for an opening of 700 feet and a breakwater 4 miles in length, inclosing a harbor of 800 acres. There are now nearly 6 miles of breakwater constructed at a cost of about $6,000,000. The harbor has been dredged to 25 feet. In the number of tons of freight received and shipped by vessel, Cleveland ranks second among the ports of the Great Lakes. Cleveland is on nine railways, some of which are the leading trunk lines of the country, including several of the Vanderbilt lines and the Pennsylvania system. It is also the centre of seven interurban railroads, which radiate to important towns and cities in northern Ohio.

Cleveland is now the largest manufacturing centre in Ohio and the second largest on the Great Lakes. During the decade 1900–10 the value of its product increased from $139,356,000 to $271,961,000, or 95 per cent. In 1910 there were employed in factories 84,728 wage earners. As above intimated, the most important group of manufactures consists of iron and steel, and the large number of industries which depend upon iron and steel as their raw material. According to the census of 1910, the iron and steel products were valued at $38,463,000, and the foundry and machine-shop products ranked a close second with a value of $37,443,000. The third industry in the city was the manufacture of automobiles, including bodies and trucks, the output of which was valued at $21,404,000, which represents an increase over 1904 of over 360 per cent, and forms 55.1 per cent of the value reported for the State for this industry. Other industries of importance, and the value of their products in 1909, are women's clothing, $12,789,000; printing and publishing, $9,635,000; paint and varnish, $6,138,000; and

men's clothing, $5,953,000. In the production of wire and wire nails Cleveland outranks all other American cities, and in hardware it takes second place. Bridges, electrical apparatus and supplies, printing presses and shipbuilding are also important. From an early date Cleveland led in the construction of wooden vessels for the lake traffic and, with the change from wood to iron, has continued in the lead, producing to-day more steel merchant vessels than any other American city. The chief industries which depend upon agricultural resources are slaughtering and meat packing, and the manufacture of malt liquors, the former exceeding a value of $17,192,000 in 1910, and the latter having a value of $5,124,000. The Standard Oil Company has here one of its principal refining establishments.

Government, Finance, and Municipal Enterprise. A charter, providing for the so-called "Federal Plan" of government, in which the distinction between executive and legislative functions was clearly drawn, was obtained from the State in 1891 and continued in force until supplanted by a municipal code enacted by the Ohio Legislature, Oct. 22, 1902. This code provided for the following biennially elective officials: a city council of 32 members, a mayor, a vice mayor (who acted as president of the council and had the deciding vote), three members of a board of public service, a solicitor, a treasurer, and an auditor. A board of public safety of two members was appointed by the mayor, subject to the approval of the city council. This code stood until 1910, when it was amended by the consolidation respectively of the boards of public service and safety into two officials, the directors of public service and safety, and, thus amended, continued in force until the first day of July, 1913, when the voters of Cleveland adopted a home-rule charter drafted by a commission of 15 citizens.

The provisions of this instrument make it one of the advanced municipal charters of the country. Party primaries are eliminated, and candidates for elective offices are nominated by petition only. No party emblems or designations appear on the ballot, and the preferential system of voting is used. There are only two elective offices, that of mayor and that of councilman, and the incumbents are subject to recall upon petitions signed by 15,000 electors in the case of the mayor and 600 electors in the case of a councilman. The council is made up of 26 members elected from wards for a term of two years, and its functions are limited strictly to legislation, the members being forbidden any part in administration. On the other hand, the mayor and heads of departments have seats in the council with the right to take part in discussions, but without the right to vote. The mayor is elected for a term of two years, his salary is fixed by the council, he is granted broad supervisory powers, and responsibility is definitely fixed on him for the proper administration of the affairs of the city. He is surrounded by six departmental directors, whom he appoints or dismisses at will. These are the directors of law (vice mayor), of public service, of public welfare, of public safety, of finance, and of public utilities. Departments are then subdivided into divisions, with commissioners appointed by the respective directors. Appropriate functions are assigned to these departments and divisions. Power is given to the council, with the concurrence of the board of control (the mayor and the directors), to create, discontinue, rearrange, or abolish departments and divisions, except that the department of public utilities may not be discontinued. This department has control of all municipal enterprises which derive no revenue from taxation, and its reports are required to be kept separate and distinct and to show clearly the results of municipal ownership. The department of finance is patterned after the best modern accounting systems, and a continuous audit by competent accountants, under direction of the council, is provided. Health, charities and corrections, recreation, and employment are gathered together in the department of public welfare, and their work correlated. A civil service commission of three members, appointed by the mayor for terms of six years, is provided, and the commission given authority to see that officers and employees are appointed on the basis of merit and fitness and promoted according to competency. Exclusive franchises are prohibited, and grants or renewals must reserve to the city the power to regulate the right to terminate the same, and the right of recaption. The commissioner of the division of franchises is charged with the enforcement of the provisions of all public-utility grants. A bureau of information and publicity is established, which has charge of all city printing, reports, statistics, the publication of a city record, and the collection of municipal information. Finally, the initiative and referendum are provided. A proposed ordinance may be placed before the council by an initiative petition signed by 5000 electors. If not passed by the council, it must be submitted to the voters at the next regular election, or an additional petition containing the signatures of 5000 additional electors will compel its submission to a vote of the people at a special election. A petition of 10 per cent of the total vote at the last municipal election will compel the submission of an ordinance to a referendum.

The total indebtedness, Jan. 1, 1913, was $39,471,886, for which a sinking fund provided $5,277,311. The net per capita debt was $70.48. The total tax rate was $13.60 per $1000, of which $4.87 was for school and library purposes, $5.78 for city and sinking fund purposes, $2.48 for county, and $0.45 for State purposes. The total actual income for 1912 was $17,505,522, of which the property tax was $3,993,057. The total expenditures for maintenance and operation were $7,496,874, and for construction and other capital outlays, $6,518,753. The assessed valuation for the year 1912 was $765,754,880.

The ample water supply is provided from several reservoirs and tunnels sunk into the lake, which run out from 1½ miles to 4 miles to five different cribs. A gigantic 10-foot tunnel is now in process of construction, as is a mechanical filtration plant, and together with sewage-disposal plants which are being built, will insure a permanent supply of pure water. There are 799 miles of water mains and 619 miles of sewers.

Cleveland has attained much distinction in recent years by its unique plan of regulating the street railways. By the terms of the settlement ordinance which went into operation March 1, 1910, the public gets transportation at cost, the city controls service and the upkeep of the property, and the company manages and operates the lines for a fixed return on an agreed

valuation. Cost of transportation includes legitimate operating expenses, maintenance, renewal, and depreciation charges, interest and taxes. There are 10 possible rates of fare, ranging from the maximum, four cents cash fare or seven tickets for 25 cents and one cent for a transfer, to the minimum, flat two cents cash fare. The prevailing rate of fare is determined by a barometer reserve called the Interest Fund, containing $500,000 in the beginning. When the fund goes over $700,000, the fare is lowered to the next lower rate; when it goes below $300,000 the fare is raised to the next higher rate. The initial rate of fare was three cents and one cent for transfer; this was lowered to flat three-cent fare on June 1, 1911. The city controls and specifies service through the city council and the latter's technical adviser, the street railroad commissioner. The company runs the road on fixed allowances for operation and maintenance, employs or discharges all officers, operatives, clerks, etc., expends revenues subject to the supervision of city authorities, and its stockholders receive a guaranteed and fixed return of 6 per cent. Differences between the company and the city which cannot be adjusted amicably are settled by arbitration. The city reserves the right either to purchase the property upon six months' notice, or, after Jan. 1, 1918, to designate a purchaser, the purchase price to be the ordinance value plus future additions. If the purchase is made before the expiration of the grant, a 10 per cent bonus is added to capital value less bonds and floating debt, which latter the city assumes. The company's franchise expires May 1, 1934. The city has the option of renewing it for a longer period upon the same terms as the original grant.

Population. Cleveland rose during the decade 1900–10 from seventh to sixth rank among the cities of the United States, and is the third largest city west of the Alleghanies and the second largest of the Great Lake cities. The following gives her population by decades: 1830, 1076; 1840, 6071; 1850, 17,034; 1860, 43,419; 1870, 92,829; 1880, 160,146; 1890, 261,353; 1900, 381,768; 1910, 560,663; 1920, 796,836. Cleveland during the last decade increased nearly three times as fast as the State of Ohio as a whole. There are few negroes, but many foreigners, the foreign born in 1910 numbering 195,700, or more than one-third of the total. Among the foreign born the Germans are predominant, constituting in 1910 about 29 per cent. Bohemians and other Slavs come next with 18 per cent, and thereafter the Hungarians with 11 per cent, the Russians with 9 per cent, the Irish with 8 per cent, the English with 6 per cent, the Italians with 4 per cent, and the Canadians with less than 4 per cent. The native whites of foreign parents numbered 171,560, and with the foreign-born inhabitants made up 75 per cent of the city's population.

History. In 1795 the Connecticut Land Company bought from Connecticut a large part of that State's Western Reserve (q.v.), and in the following year sent out a party under Gen. Moses Cleaveland to survey their purchase. Cleaveland selected the mouth of the Cuyahoga as the site for a settlement, and in July, 1796, laid out on the east bank a village, which took his name, though the spelling was changed in 1831 to meet the exigencies of a newspaper editor's headlines. In 1800, by Act of Congress, the Western Reserve was included for administrative purposes in the Northwest Territory, and Trumbull County was erected to include the land about the mouth of the Cuyahoga. Of this, Cleveland, then having a population of about 57, became the county seat in 1809. In 1814, Trumbull County having previously been subdivided, the village of Cleaveland, in the county of Cuyahoga, was incorporated with a population of less than 100. In 1818 the first newspaper, *The Cleveland Gazette and Commercial Register*, began publication, and in 1827 the Ohio Canal, which five years later was completed to the Ohio, was opened between Cleveland and Akron, giving such an impetus to the former that her population increased tenfold (from 600 to 6000) between 1825 and 1835. In 1836 Cleveland was chartered as a city. In the early fifties it was first connected by rail with the East and with the other cities in Ohio, and from this period dates its rapid growth. In 1853 Ohio City, which had been founded in 1817, was united to Cleveland. During the Civil War a number of manufacturing establishments were set up, and in the interval 1861–65, owing to its ability to supply articles for which there was a great demand, Cleveland attracted many investors; its lake traffic was doubled, and its population increased 50 per cent. In 1872 it annexed East Cleveland, in 1873 Newburg, and in 1893 West Cleveland and Brooklyn. In 1905–06 Glenville and South Brooklyn were annexed, followed by Collinwood (1910), Nottingham and Newburgh City (1912), and a part of Euclid Village (1913).

Consult: Robison, *History of the City of Cleveland* (Cleveland, 1887); Avery, *Cleveland in a Nutshell* (ib., 1893); Kennedy, *History of Cleveland* (ib., 1896); Orth, *A History of Cleveland* (ib., 1910); Chamber of Commerce, *Annual Reports* (ib., 1865–1913); Johnson, *My Story* (New York, 1910).

CLEVELAND. A city and the county seat of Bradley Co., Tenn., 30 miles east by north of Chattanooga; on the Southern Railroad (Map: Tennessee, F 4). It is the seat of the Centenary Female College. The city is in an agricultural district with important peach-raising interests, and has woolen and flour mills, stove works, chair factory, hosiery mills, ice and cold-storage plant, lumber and planing mills, and a coffin factory. Settled about 1820, Cleveland was incorporated about 1880. The water works are owned by the city. Pop., 1900, 3858; 1910, 5549.

CLEVELAND, Charles Dexter (1802–69). An American educator, born in Massachusetts. He graduated at Dartmouth in 1827 and was professor of Latin and Greek in Dickinson College and of Latin in the University of the City of New York. From 1861 to 1867 he was United States Consul at Cardiff, Wales. Among his books are his compendiums of *English Literature* (1847), *American Literature* (1858), and *Classical Literature* (1861); *English Literature in the Nineteenth Century* (1851); an edition of *Milton's Poetical Works*, with a *Life* (1851); *A Complete Concordance to the Poetical Works of John Milton* (1867).

CLEVELAND, Frederick Albert (1865–1914). An American economist, born in Sterling, Ill. He graduated at De Pauw University in 1890, then studied law, but in 1896 gave up practice to devote himself to economics, first at the University of Chicago and then at the University of Pennsylvania, where he was instructor in finance in 1900–03. He was professor

of finance in the New York University School of Commerce in 1903–05, and then served as an accountancy expert on many important commissions, notably that on New York City finances (1905), and President Taft's commission on economy and efficiency (1911), which recommended a national budget and many other simplifications of Federal business. In 1907 he became director of the Bureau of Municipal Research (New York and Philadelphia). His more important books are: *Growth of Democracy in the United States* (1898); *Funds and Their Uses* (1902; revised for schools, 1903, as *First Lessons in Finance*); *The Bank and the Treasury* (1905); *Chapters on Municipal Administration and Accounting* (1909); *Organized Democracy: an Introduction to the Study of American Politics* (1913). With F. W. Powell he wrote *Railroad Promotion and Capitalization* (1908), and *Railroad Finance* (1912).

CLEVELAND (STEPHEN), GROVER (1837–1908). An American statesman who was the twenty-second and twenty-fourth President of the United States, and whose administrations signalize an epoch in American political history. He was born at Caldwell, N. J., on March 18, 1837, the son of a Presbyterian clergyman (Yale, 1824). The family moved from Caldwell to New York State, and it was in Fayetteville, near Syracuse, and in Clinton that young Cleveland received a somewhat elementary education. Upon the death of his father (1853) he became a teacher in the New York Institution for the Blind, but presently was induced by his uncle, Lewis F. Allen, to make his home in Buffalo, where he studied law and was in 1859 admitted to the bar. Four years later he became assistant district attorney for Erie County, but was defeated as a Democratic candidate for district attorney in 1865. In 1870 he was elected sheriff of the county—a position which he held for three years. He then resumed the practice of law and acquired a local reputation for firmness and integrity. While sheriff he had given a marked proof of a trait that was always characteristic of him, by hanging a condemned criminal with his own hands instead of deputing this unpleasant duty to a deputy. This was in accordance with Cleveland's own conception of the manner in which a public office should be conducted, as he held that officials should not delegate any of their important functions to others. In the same manner, when Governor of New York, he wrote most of his letters personally, instead of employing a secretary; and when President, he himself minutely examined even the most unimportant bill before signing it, leaving nothing to subordinates. At the time, however, and subsequently, his execution of the criminal was wrongly interpreted as evincing parsimony; and in 1884 his political opponents gave him the offensive nickname of "the Hangman of Buffalo." In November, 1881, however, he had so impressed his fellow citizens that men of all parties joined in electing him as mayor of Buffalo, in the belief that he would suppress the political and social corruption that was making that city notorious. Cleveland more than met the expectations of his followers and showed himself so unflinchingly courageous and so indifferent to all insidious influences as to work something like a municipal revolution. Although he incurred the hatred of many dishonest and disreputable combinations, his services were so notable as to win for him the Democratic nomination for the governorship of New York in 1882, his opponent being Judge Charles J. Folger (q.v.), then Secretary of the Treasury under President Arthur. Cleveland was elected by the extraordinary plurality of 192,854 votes —the size of this plurality, however, being due very largely to bitter dissensions in the Republican party, which had become divided into two factions, known respectively as the Half Breeds (q.v.) and the Stalwarts (q.v.).

As Governor of New York, Cleveland showed such good judgment and such independence as to make him a prominent candidate for the presidency. He cared nothing for popularity, but used the veto power so unsparingly as to offend alike the Catholic voters of Tammany Hall, the labor element, and a large number of citizens who took umbrage at his veto of a bill intended to compel the elevated railways to reduce their passenger rates. Nevertheless, Cleveland's perfect fearlessness won him a strong following throughout his party, and in 1884 the Democratic National Convention, held in July, gave him the necessary two-thirds of all its votes, so that he was selected on the second ballot. In the campaign which followed, Cleveland's opponent was the brilliant and magnetic James G. Blaine (q.v.). This campaign was immensely important as showing that the issues relating to the period of the Civil War and reconstruction had ceased to interest the younger generation of Americans, and that even the alarmist cry of "free trade" no longer terrified any but the most timid and unthinking. The contest, which began immediately after the nominations, was very long and very bitter, and was marked by a personal antagonism such as fortunately remains unique in the history of American politics. Blaine was attacked for alleged political and personal dishonesty. Cleveland had to face a charge based upon a single incident of his private life dating back a number of years and frankly dealt with. This episode is said to have inspired Paul Leicester Ford to write his remarkable political novel, *The Honorable Peter Stirling* (New York, 1886). On the day after the election in November the result was still in doubt, and victory was claimed by the Republicans; but within two days the official count showed that a very small plurality in New York State had given Cleveland a majority of 37 votes in the Electoral College. This result was largely due to the support of Cleveland by the independent Republican voters, popularly known as "Mugwumps" (q.v.), and of certain indiscretions on the part of Blaine near the close of the contest. The Democrats also won the national House of Representatives, though the Senate remained Republican by the small majority of six votes.

Cleveland assumed the presidency with the same independence of spirit that he had shown when mayor and governor. It was written of him at the time: "We have now as personal a government as we ever had under Grant." The President accepted the responsibility for every act of his administration. His cabinet officers, though men of great ability, were little more than his private secretaries. The Vice President, Mr. Hendricks, was almost studiously ignored. Cleveland, while many changes were made, refused to sweep all Republicans out of office without cause, and thereby incurred the enmity of the spoilsmen of his own party by enlarging the powers of the Federal Civil Ser-

vice Commission. He vigorously opposed the abuse of the pension system and thus became detested by the Grand Army of the Republic (q.v.) as a body. He declared himself in favor of a lower tariff and in so doing estranged the manufacturing interests. When the Senate demanded that he make public certain papers relating to removals from office of various officials, he laid down the constitutional doctrine of his predecessors that a President's papers were not subject to congressional supervision. Finally, in a message which he sent to Congress in 1885, he declared that the compulsory coinage of silver dollars as directed by the Bland-Allison Act would become a source of financial disturbance, and he recommended the repeal of that act. Other measures of his administration were marked by equal courage and vigor, such as the suppression of an insurrection on the Isthmus of Panama, which he occupied with 3000 United States marines and soldiers; the quashing of a threatened Mormon outbreak in Utah through the concentration of both infantry and artillery at Salt Lake City; and during a dispute over the Canadian fisheries, a threat to prohibit Canadian traffic from entering the United States by any except American railways. All of these measures made him new enemies, though they also intensified the admiration of his friends. His marriage with Miss Frances C. Folsom in 1885 was the second marriage of a President in his term. His hold upon his own party at large remained strong enough to secure his renomination at the National Democratic Convention held at St. Louis on June 7, 1888, and he was praised by many lifelong Republicans, among whom James Russell Lowell and Theodore Roosevelt were conspicuous. Although Congress had been partly Republican and partly Democratic, much valuable legislation had been enacted, among the principal measures being the creation of the Interstate Commerce Commission, the admission of four new States, the passage of an Anti-Polygamy Bill, of a Chinese Exclusion Act, of a Presidential Succession Bill, and of a bill limiting the powers of Congress in counting the electoral votes. A tariff measure, known as the Mills Bill, passed the Democratic House, but it was radically amended in the Republican Senate and never became a law. All this legislative activity showed that new issues were beginning to interest the country. At the presidential election of 1888 Cleveland was defeated by Gen. Benjamin Harrison (q.v.) of Indiana, who had 233 electoral votes against 168 for Cleveland. This result was largely due to a division in the Democratic party in New York State, which gave its electoral votes to General Harrison, while choosing a Democrat, David B. Hill, for Governor.

At the close of his first term, in 1889, Cleveland retired to New York City, where for four years he engaged in the practice of law. His political career was at first supposed to have been ended by his defeat; but with each year he gained a new popularity throughout the country until at last, against his own wishes, he became the most conspicuous candidate for the presidential nomination in 1892. Though defeated in 1888 in the Electoral College, he had, none the less, a majority of some 100,000 ballots in the popular vote; and the sentiment in his favor was now very strong. General Harrison was by no means popular, and he had antagonized Mr. Blaine. Furthermore, the McKinley tariff measure (see McKinley, William) with its high duties was generally regarded as a mistake. Therefore, when the Democratic National Convention met at Chicago on June 21, an ardent supporter of Cleveland was made chairman and, before the convention met, many States had instructed their delegates to support the ex-President, so that he was sure on the first ballot of at least a majority. The delegates of his own State of New York, however, owing to Tammany Hall and the opposition of Senator Hill, were against him, and this was supposed by politicians to be fatal to his chances. But when the convention reached the stage of balloting, all opposition to Cleveland was overcome. The session lasted until long after midnight. A display of fervid eloquence by Mr. Bourke Cockran on behalf of Tammany Hall merely put the delegates into a still more aggressive mood; and in the early hours of the morning the first roll call showed at once that Cleveland had secured even more than the two-thirds vote necessary to give him the nomination. The scene was one of indescribable enthusiasm, as Cleveland had broken all precedents; and, though his enemies had spoken of him as the "Stuffed Prophet" and the "Perpetual Candidate," he had been selected against his own desires, against the opposition of his own State, and through a perfectly spontaneous uprising of the people. In the very dignified campaign which followed, President Harrison had no chance of being reëlected, and in the November election Cleveland swept the country. Not merely did he carry all the Southern States, but likewise the four "doubtful States"—Connecticut, Indiana, New Jersey, and New York—and, to the surprise of all political prophets, California, Illinois, and Wisconsin solidly, while he also received some electoral votes from Michigan and Ohio. In the Electoral College he had 277 votes as against 145 that were cast for President Harrison. For the first time since the birth of the Republican party, a third candidate, Gen. James B. Weaver (q.v.) of Iowa, had also received electoral votes and to the number of 22, and in the popular vote no less than a million votes had been cast for him by the Populists. (See Populist Party.) This was ominous for the future; but in 1893 Cleveland resumed the presidency bound by no personal pledges, and free to carry out whatever policies he might choose, since both the Senate and the House were controlled by a majority of his own party.

His second administration proved to be one of the most remarkable in the history of American politics. Cleveland's personality was a determining factor in whatever he achieved and in whatever he failed to carry out. His independence had naturally developed into something like arrogance. His natural tactlessness had grown into an utter lack of consideration for the weakness and prejudice of other men. On the other hand, his robust courage had grown still more indomitable, and it stood him in good stead, despite all the virulence and hatred which his subsequent course engendered. No President ever did more unpopular things. No President ever estranged in different ways so many of his countrymen at various times. Yet it must be added that no President showed such utter fearlessness or so determined a purpose to carry out unflinchingly and uncompromisingly what he believed to be his duty. Almost his first act was

unpopular in reversing the policy of President Harrison towards the annexation of Hawaii and in endeavoring to replace upon the Hawaiian throne a queen who had been dethroned by a revolution led by men of American blood. (See HAWAII.) In this he failed, though he went to the very verge of using force against the new government of Hawaii. Coincident with this fiasco came a great money panic, based upon the evils springing from the Silver Coinage Act of 1890 for which both parties voted and supported in their party platforms. (Consult Laughlin, *The History of Bimetallism in the United States*, published at New York in 1897.) After a long and bitter contest in Congress, the Silver Act of 1890 was repealed, but not until President Cleveland had boldly used the whole power of his office and of its patronage to secure the repeal. In fact, in the Senate, his own party was seriously divided, and he carried his measure only by the assistance of Republicans. In the teeth of the opposition which he had aroused, Cleveland set himself energetically to reform the tariff. The so-called Wilson Bill (see WILSON, W. L.) looking to that end was introduced confessedly as an administration measure. It sought to lower the tariff duties on many necessities of life, especially upon wool and sugar. Here, again, Cleveland encountered the opposition of a large section of his own party, and when the bill was finally passed, after a great deal of scandal affecting the reputation of Democratic senators, it had been so emasculated that the President allowed it to become law without his signature, causing a personal letter of his to be read in Congress, that contained a denunciation of those Democrats whom he declared to be guilty of "party perfidy and party dishonor." A third measure of Cleveland's was the issuing of bonds in order to retain intact the gold reserve in the treasury and to secure the parity of gold and silver under existing legislation. These bond issues were first effected through a great banking syndicate, which made a profit of nearly 16 per cent upon its purchases of bonds; and now the President incurred the violent hostility of the whole West, which had become strongly Populistic. He himself was obliged to yield to the indignation which was everywhere expressed, and the last issue was by popular subscription, which proved a great success and stopped the drain of gold from the treasury. An income tax was enacted into law, but was declared by the Supreme Court to be unconstitutional. In 1894 a great railway strike, centring in Chicago, was crushed when President Cleveland ordered United States troops to enter the metropolis of the West "to prevent the obstruction of the mails," even though the Democratic Governor Altgeld of Illinois protested vehemently and had his protest rudely brushed aside by the President. Much acrimony was caused by the use of injunctions obtained from the United States courts against the strikers; and even in the East and among the most conservative, "government by injunction" was everywhere denounced. (See DEBS, EUGENE V.) But the most lasting mark upon American history made by Cleveland is to be found in his extension of the Monroe Doctrine (q.v.) by his Venezuelan Message, sent to Congress on Dec. 17, 1895. Great Britain had for a long time been encroaching on the territory of Venezuela (q.v.) and had refused to arbitrate the subject or to delimit the boundaries of British Guiana and Venezuela. Cleveland and his Secretary of State, Richard B. Olney, had taken up the subject and had urged the British government to submit the whole question to arbitration. Lord Salisbury replied in two notes which denied the right of the United States to intervene in such a question, and these notes were couched in terms of sneering civility. Immediately upon their receipt in Washington President Cleveland sent a terse, dignified, and haughty message to Congress, setting forth the merits of the question and declaring that it was "the duty of the United States to resist by every means in its power" a willful aggression upon its rights and interests by Great Britain in Venezuela. A single sentence showed that he was prepared to carry out this policy by war if necessary. His pregnant words produced a profound impression throughout the whole world. Great Britain was thrown into something like a panic, and so were the money markets of the United States; but both parties in Congress supported the President, and in the end the British government capitulated and accepted the arbitration which it had hitherto refused. The inflexible courage of the President, following a precedent set by Daniel Webster (q.v.) in his famous Hülsemann Letter, raised the United States to the position of a great world power, enhancing its prestige in spite of the academic criticism which came to him from American closet politicians. Dr. Edward Stanwood, a Republican, an intimate friend of Blaine, and a close student of American politics, summed up the Venezuelan episode as "the most signal victory of American diplomacy in modern times."

This was the last and most striking feature of Cleveland's public career. When he went out of office in 1896 he did so under a black cloud of disapproval almost unique in the history of politics. He was hated in the West because of his attitude towards silver. The labor element was violently antagonistic to him because he had crushed the Chicago strike. His Venezuelan Message, by causing a panic in Wall Street, had lost him the sympathy of the great financiers. His private life had been bitterly though unjustly assailed. Every corrupt element in national politics was against him. At the Democratic National Convention in 1896, contrary to all precedents, a resolution mildly commending his course as President was hooted down with jeers and curses. Even one of his strongest supporters could find little more to say of him than that he had been "successful in his failures." Yet it was Cleveland's good fortune to outlive this obloquy. The Republicans who succeeded him adopted and perfected his policies. The whole country came to appreciate the services which he had rendered by his indomitable courage. His mistakes were condoned, and his successes were universally praised. He had, indeed, saved the United States from practical repudiation; he had enforced order with a strong hand; and he had raised the nation to a foremost rank among the great powers of the world. During the campaign of 1904 his name was tremendously applauded at the national conventions of both parties.

After retiring from the presidency Cleveland made his home at Princeton, N. J., becoming a trustee of the University there and an occasional lecturer in it. The substance of his lectures will be found in a book which he wrote, entitled *Presidential Problems* (New York,

1904). In 1895 he was appointed a trustee of the majority stock of the Equitable Life Assurance Society, at the instance of Thomas F. Ryan, a position which he retained until his death, in 1908. It is somewhat characteristic of his career that at least one member of the committee which arranged a great memorial meeting in New York in Cleveland's honor should have been during the latter's public life a bitter assailant of him and a propagator of the vilest stories concerning him.

As a public speaker, Cleveland was always sensible, though somewhat ponderous in manner. He had a clear tenor voice which was easily heard at the very outskirts of immense audiences. His public papers show much felicity of diction, pungent and sometimes tipped with an acid wit, as may be seen in reading over his numerous vetoes of private pension bills. His Venezuelan Message was characterized, even in England, as "full of stateliness and force." As a phrase maker he is comparable with General Grant, and some of his sayings, such as a "public office is a public trust," "ghoulish glee," "pernicious activity," and "the communism of pelf," were widely quoted and still remain a part of the politicians' vocabulary.

Bibliography. For the facts of Cleveland's public life, consult: Hensel and Parker, *The Life and Public Services of Grover Cleveland* (New York, 1906); Gilder, *Grover Cleveland* (ib., 1910); Parker, *Recollections of Grover Cleveland* (ib., 1909). A caustic criticism of Cleveland, put forth under the pseudonym of "Siva," was published in 1885 under the title of *A Man of Destiny*. Comments upon Cleveland's extension of the Monroe Doctrine (favorable) will be found in Foster, *A Century of American Diplomacy* (ib., 1900); Stanwood, *A History of the Presidency* (Boston, 1898); Henderson, *American Diplomatic Questions* (New York, 1901); McClure, *Our Presidents* (3d ed., ib., 1905); and (unfavorable) by J. W. Burgess and J. B. Moore in *The Political Science Quarterly* for March, 1896. Consult also Reynolds, *National Platforms and Political History* (Chicago, 1898); H. T. Peck, *Twenty Years of the Republic*, chaps. i, ii, iv, vi, x, last reprint (New York, 1913); and id., *American Party Leaders* (ib., 1914). For an English view of Cleveland, especially with reference to the Venezuelan affair, consult Whittle, *President Cleveland* (London, 1896), and Gretton, *A Modern History of the English People*, vol. i (London and Boston, 1913).

CLEVELAND (or **CLEIVELAND**), John (1613–58). An English Cavalier poet. He was born at Loughborough, Leicester, and educated at Cambridge, where in 1634 he became a fellow of St. John's. Six years later he strenuously opposed Cromwell, and in consequence lost his fellowship in 1645. Joining the Royalists, he was appointed judge advocate in the King's army. In 1655 he was seized at Norwich and imprisoned at Yarmouth for three months, when he was released by Cromwell. After that he lived in retirement. Cleveland had a great reputation as a wit and satirist. A volume of his poems in circulation before 1656 was reissued in that year. In 1687 appeared his collection entitled *Clevelandi Vindiciæ*, which attempts to combine several of his preceding publications. The bibliography of Cleveland is too complicated for treatment here. Cleveland still awaits a competent editor. Thomas Fuller describes him as "a general artist, pure Latinist, exquisite orator, and eminent poet." Consult *Cambridge History of English Literature*, vol. vii (New York and London, 1907–13), and *The Poems of John Cleveland*, ed. J. Burdan (New York, n. d., but about 1910).

CLE'VENGER, Shobal Vail (1812–43). An American sculptor, born at Middletown, Ohio. He first became known through his work as a stone carver in the workshop of David Guion in Cincinnati, and afterward under the patronage of Nicholas Longworth visited the large cities of the East, where he executed busts of Clay (Metropolitan Museum, New York), Webster, Van Buren, Allston (Pennsylvania Academy), Everett, and others. His portrait bust of Webster has been used on a United States postage stamp and is considered the best likeness of that statesman. In 1840 he went to Rome, and while there he produced his "North American Indian," which cannot at present be located, but was hailed in his day as the "first distinctively American sculpture." His work is characterized by sincere, bold treatment and skill in handling his material. But for his early death, which occurred while he was on his way home, he would probably have attained a high rank in his profession. Consult Lorado Taft, *History of American Sculpture* (New York, 1903).

CLEVES, klēvz (Dutch *Kleefs*, Ger. *Kleve*, Fr. *Clèves*). A German town of Dutch origin, situated in the Rhine Province of Prussia, 23 miles northwest of Wesel and about 5 miles from the frontier of the Netherlands (Map: Prussia, B 3). It is built on three hills and has still retained some of its Dutch characteristics. It contains an old palace, the former abode of the dukes of Cleves, now used as a law court; the tower known as Swan Tower is used as a prison. Commemorating the Knight of the Swan made famous by Wagner's opera, a monument has been erected. An old Rathaus, with a number of antiquities and paintings, and an old Catholic church, built in Gothic style and containing the tombs of the counts of Cleves, still remain. In the vicinity of the town are situated chalybeate springs. Cleves is frequented as a summer resort by the Dutch. The chief manufactures are paper, paint, hats, linen, cotton, tobacco, boots, shoes, and machinery. Pop., 1900, 14,684; 1905, 16,433; 1910, 18,135. The Duchy of Cleves, which arose in the Middle Ages and which at the time of the Reformation was united with the duchies of Jülich and Berg, passed in 1666 into the possession of Brandenburg. It was wrested from Prussia in the course of the Napoleonic wars, but restored in 1815.

Bibliography. Char, *Geschichte des Herzogtums Kleve* (Cleves, 1845); Nelsen, *Die Stadt Kleve* (ib., 1846); R. Scholten, *Die Stadt Kleve* (ib., 1879–81).

CLEW. See Sail.

CLEWS, Henry (1840–1923). An American banker, born in Staffordshire, England. He entered mercantile pursuits in New York City in 1845, became a member of various firms, was United States financial agent during the Civil War, and in 1877 organized the firm of Henry Clews & Co. He was a founder of the Union League Club, New York City, and also originated the Committee of Seventy in New York and nominated 65 of its members. He published: *Twenty-eight Years in Wall Street* (1887); *The Wall Street Point of View* (1900);

Fifty Years in Wall Street (1908); *Speeches and Essays* (1910).

CLICHÉ, klē'shā' (Fr., stereotyped). An electrotype plate, the impression of a die in a mass of fusible metal. It is employed by medalists and die sinkers to make proofs of their work and in order to judge the stage of their work before the die is hardened. The term is also applied to any stereotype plate used in modern reproductive processes, such as photographic proofs on glass, either positives or negatives.

CLICHY, or **CLICHY-LA-GARENNE**, klē'shē'lä-gä'rĕn'. A northwestern suburb of Paris, France, between the river Seine and the fortifications of Paris (Map: Paris). Pop., 1901, 39,291; 1911, 46,676.

CLICK BEETLE. A beetle of the family Elateridæ, also known as elater, snapping bug, and skipjack, on account of its acrobatic performances. When disturbed, these beetles curl up their legs and fall to the ground, where they lie rigid on their backs for some moments and then begin a series of springs into the air, accompanied by a clicking sound. When the beetle succeeds in landing on its feet, it runs off. In regard to the springing, Le Conte says: "This is effected by extending the prothorax so as to bring the prosternal spine to the anterior part of the mesosternal cavity; then, suddenly relaxing the muscles, so that the spine descends violently into the cavity, the force given by this sudden movement causes the base of the elytra to strike the supporting surface, and by their elasticity the whole body is propelled upward." The larvæ, known as wireworms, are hard, brownish yellow, and may live several years before gaining maturity. Most of them are found under bark and in rotten wood, but some live on the ground on the roots of grass, Indian corn, and other grains, as well as on those of certain vegetables. When numerous enough, they may do considerable damage. Fall plowing is said to be the most effective remedy against them. Of the 7000 described species of elaters 500 occur in North America. The most conspicuous click beetle found in the United States is the eyed elater (*Alaus oculatus*), a grayish-black beetle with two large black eyelike spots on the prothorax; its larvæ live in rotting stumps. In the tropics of America there are luminous species belonging to the genus *Pyrophorus*, as the cucuyo (*Pyrophorus noctilucus*) and others. For illustration, see Elateridæ.

Bibliography. De Candeze, *Monographie des élaterides* (4 vols. and 3 supplements, Liège, 1857–81); Le Conte, "Revision of the Elateridæ of the United States," in *Transactions of Philosophical Society*, vol. x (Philadelphia, 1853); Horn, papers in *Transactions of American Entomological Society*, vols. xii, xiii, xviii (Philadelphia, 1885, 1886, 1891). See Firefly.

CLI'DOMAN'CY. See Superstition.

CLI'ENT (Lat. *cliens, cluens*, hearer, from *cluere*, Gk. κλύειν, *klyein*, Skt. *śru*, to hear; connected remotely with AS. *hlūd*, Eng. *loud*). In law, one who consults or retains an attorney or counselor at law for advice, or to prosecute, manage, or defend an action at law, or to represent him in any legal proceedings or in the adjustment of business troubles. The client's relations with his attorney are in the highest degree confidential, and the client is protected by the most stringent rules of law against the disclosure of his private affairs by his legal adviser. (See Attorney; Privileged Communication.) In the civil and political life of ancient Rome the term "client" was employed to describe the persons who stood in a relation of quasi-dependence to men of position and influence, usually patricians, who in their relation to their clients were known as patrons. The relation was not unlike that which in the United States frequently subsists between local political leaders and their supporters ("henchmen"), and the reciprocal rights and obligations of patron and client were defined by custom rather than by rules of law. Among these were the duty of the patron to advise and protect his clients in their legal and political rights, in return for which he was entitled to their support in any legal or political contest in which he became engaged.

CLIEN'TES. In ancient Rome, the inhabitants who had given up or had lost citizenship in their own cities and had settled in Rome or on Roman territory. See, under Rome, *History of Rome during the Earliest or Regal Period.*

CLIFF (AS. *clif*, Icel., OS., Dutch *klif*, from Icel. *klifa*, ME. *cliven*, to climb). A precipitous slope of the land surface. Cliffs may be formed in three ways: (1) by the erosive action of water; (2) by the disintegrating influence of rain, frosts, and the atmosphere, or weathering; (3) by dislocations of the earth's crust. On rocky coasts cliffs are carved out by the force of waves, which beat against the shore line, and by weathering of the rock that lies above the reach of the waves. The cliffs of Dover and of the Orkney and Shetland islands are notable examples of sea cliffs. Gorges, cañons, and ravines, which are characterized by steep walls, are excavated by the erosion of running water; they are usually found along the upper courses of rivers. Cliffs may mark the line of outcrop of stratified rocks, and in such cases are usually to be traced to differential weathering of hard and soft strata. In regions of disturbance cliffs are formed by faulting, which exposes a vertical rock face or scarp. Many of the notable elevations in the Adirondack Mountains in New York are characterized by faulted scarps. See Shore; Cañon; Fault; etc.

CLIFF DWELLER. A name frequently used to designate the supposed extinct builders of the numerous ancient cliff ruins scattered throughout the cañons and mesas of the arid Southwest, along the upper waters of the Colorado and Rio Grande—in Utah, Colorado, Arizona, and New Mexico. The ruins are either upon the summits of the mesas or on shelves in the rock walls of the cañons. For a long time their origin was a subject of much speculation; but recent ethnological investigation has proved that these ruins are not the work of any extinct or distinct race, but were built by the immediate ancestors of the modern Pueblo Indians (q.v.), some of whom, in fact, notably the Hopi, still have their villages upon the summits of almost inaccessible mesas, where they formerly located them for better protection against the wilder Navajo and Apache, by whom they were surrounded. Consult G. Nordenskiöld, *The Cliff Dwellers of the Mesa Verde, Southwestern Colorado* (New York, 1902), and numerous articles in the Annual Reports of the Bureau of American Ethnology. See Archæology, American.

CLIF'FORD, George, Earl of Cumberland (1558–1605). An English naval commander and buccaneer, born in Westmoreland. He succeeded

to the earldom in 1570, took the degree of M.A. at Cambridge in 1576, and in 1588 commanded the *Elizabeth Bonaventure* in the actions against the Spanish Armada. He fitted out and led several buccaneering expeditions; the most important were one undertaken with seven sail, in 1589, which captured several rich prizes, and one with 20 sail, in 1598, which took San Juan de Puerto Rico, but failed in an attempt to intercept the Spanish treasure galleons.

CLIFFORD, Harry Ellsworth (1866–). An American electrical engineer, born at Lowell, Mass. He was educated at the Massachusetts Institute of Technology and at Harvard University. At the former institution he was assistant in physics (1886–88), instructor in theoretical physics (1888–95), assistant professor of theoretical physics (1895–1902), associate professor of theoretical electricity (1902–04), and professor of theoretical and applied electricity (1904–09). At Harvard he became professor of electrical engineering in 1909.

CLIFFORD, Sir Hugh [Charles] (1866–). A British colonial administrator, born in London. In 1883 he entered the Malay States Civil Service, and from 1887 to 1903 in one capacity or another was a representative of the English government at Pahang, taking a prominent part in the suppression of the rebellion of 1892. In 1903 he left the post of British Resident in Pahang, which he had held, with few breaks, since 1890, to become Secretary of Trinidad and Tobago; and he was Colonial Secretary of Ceylon from 1907 until August, 1912, when he was appointed Governor and Commander in Chief of the Gold Coast. Besides contributions to *Blackwood's,* he published important works on the Malays, including *In Court and Kampong* (1897), *Studies in Brown Humanity* (1898), *In a Corner of Asia* (1899), *Bush-Whacking* (1901), *Further India* (1904), *Downfall of the Gods* (1911), and *Malayan Monochromes* (1913). With Sir Frank Swettenham he began in 1894, at Perak, the publication of a *Dictionary of the Malay Language.* He wrote on the Malay states in the *Journal of the Royal Geographical Society* (1896) and in the *Journal of the Royal Colonial Institute* (especially vol. xxx). In 1910 he married as his second wife the novelist Mrs. Henry de la Pasture.

CLIFFORD, Lucy Lane (Mrs. William Kingdon). An English novelist. She was the daughter of John Lane of Barbados, and in 1875 married William Kingdon Clifford, the distinguished mathematician. Mrs. Clifford is best known by *Love Letters of a Worldly Woman* (1891) and *Aunt Anne* (1892). Among her other books are: *Any How Stories* (1882; reissued with additions, 1899); *Mrs. Keith's Crime* (1885); *The Last Touches* (1893); *A Wild Proxy* (1894); *A Flash of Summer* (1895); *Mere Stories* (1896); *The Dominant Note and Other Stories* (1897); *Margaret Vincent* (1902); and *Sir George's Objection* (1911). She also produced several plays, three of which were collected under the title *Three Plays* (1909), and the most notable of which was *The Likeness of the Night* (1900).

CLIFFORD, Nathan (1803–81). An American jurist, born in Rumney, N. H. He graduated at the Hampton Literary Institution, was admitted to the bar, and commenced practice in York Co., Me., in 1827. He was a member of the State Legislature from 1830 to 1834, was Speaker of the House for the last two years, and was Attorney-General from 1834 until 1838. He served in Congress from 1839 to 1843, and in 1846 was Attorney-General in President Polk's cabinet. At the close of the Mexican War he went as a special United States envoy to Mexico and negotiated a treaty by which California and other territories became a part of the United States. In 1858 he became, by President Buchanan's appointment, an associate justice of the United States Supreme Court and in 1877 was president of the Electoral Commission (q.v.) that decided the Hayes-Tilden presidential controversy. He published *United States Circuit Court Reports* (2 vols., 1869).

CLIFFORD, Paul. The hero of Bulwer's novel of the same name, a highwayman who is finally reformed through love.

CLIFFORD, William Kingdon (1845–79). An English mathematician and physicist, born at Exeter. He was educated at a school in his native town, at King's College, London, and at Trinity College, Cambridge, where he was second wrangler in the mathematical tripos of 1867. In August, 1871, he was elected to the chair of mathematics and mechanics at University College, London, which post he retained until his untimely death at Madeira, March 3, 1879. Clifford first established his reputation as an original thinker in the realm of higher mathematics and philosophy, with the faculty of expressing scientific thought in plain and simple language by a lecture at the Royal Institution, *On Some of the Conditions of Mental Development.* He was a valued member of the London Mathematical Society, contributing to the *Proceedings;* for a time he acted as secretary, and afterward vice president, of the mathematical and physical section of the British Association; he also lectured to the Sunday Lecture Society on such subjects as *Ether, Atoms,* and *The Sun's Place in the Universe,* and took an active interest in popularizing science. The versatility of his mind in philosophical and scientific discussion was further shown by his varied contributions to periodical literature. Besides these articles, and many papers on mathematics, he issued the first part of a larger textbook, *Elements of Dynamics* (1878). Consult Clifford's *Lectures and Essays,* ed. by Leslie Stephen and F. Pollock (London, 1879), which contains a biographical sketch by the latter editor. After his death his *Mathematical Papers,* ed. by R. Tucker and with an introduction by Henry J. S. Smith, were published (1882), as was also *The Common Sense of the Exact Sciences,* which was completed by Karl Pearson and published in 1885.

CLIFFORD'S INN. An inn of Chancery, attached to the Inner Temple, in London, built in 1345, and named after Robert de Clifford, who lived in Edward II's reign. Like the other inns of Chancery, it is now used for office and business purposes.

CLIFF PALACE. A noted ruin in Walnut Cañon, Mesa Verde, Colo., a good example of the buildings of the cliff dwellers (q.v.).

CLIFF PLANTS. A group of drought plants, xerophytes (q.v.), found chiefly on river, lake, or sea cliffs. See Rock Plants.

CLIFFSIDE PARK. A borough in Bergen Co., N. J., opposite New York City, with which it has connection by trolley and ferry. It is purely residential. Pop., 1900, 968; 1910, 3395.

CLIFF SWALLOW, or EAVES SWALLOW. A swallow (*Petrochelidon lunifrons*) familiar throughout North America as one of those that make their nests about barns and outhouses. (See BARN SWALLOW.) It is distinguished from other semidomestic swallows by its short, *square* tail, reddish rump, grayish breast and collar, and white forehead; and by the fact that it places its flask-shaped nests of mud always on the *outside* of the building, unlike the fork-tailed true barn swallows, which go inside the building to nest. These swallows originally nested in colonies wherever a rocky cliff afforded a chance to fasten their nests in close companies upon its face. (See Plate of FAMILIAR SWALLOWS, with the article SWALLOW.) These nests were globular, with a spoutlike neck, forming the entrance, and were formed of pellets of mud and lined with grass and feathers. As soon as human settlements began near their resorts, they abandoned the cliffs for the more secure, better-sheltered place under the eaves of such buildings as they were permitted to occupy; and as the spread of civilization has finally covered most of the range of the species, only a few places in the remote West remain where these birds may be seen nesting after their primitive habit. In the eastern part of the country interesting modifications of habit have followed their long-continued association with man—among others, a disposition to make a much simpler style of nest, leaving off the domed roof and flasklike entrance, and forming little more than a cup in its place, since the overhanging eaves keep off the rain and conceal the sitting bird. This genus is almost cosmopolitan, has similar habits nearly everywhere, and in all countries attaches itself to and is welcomed by civilization. Consult Knowlton, *Birds of the World* (New York, 1909).

CLIF'TON. A beautiful and favorite watering place in the southwest of Gloucestershire, England, forming the western suburb and part of the parliamentary borough of Bristol (Map: England, D 5). It has a tepid spring of 73° F., which contains carbonic acid and salts of magnesia. It has a college with 700 students. Earthworks date from the beginning of the city. The deep valley of the Avon is here spanned by a suspension bridge 245 feet above the water. Pop., 1911, 15,968. See BRISTOL.

CLIFTON. A city and the county seat of Graham Co., Ariz., 121 miles (direct) north by east of Bisbee, on the Arizona and New Mexico, the Morenci Southern, and the Shannon Arizona railroads, and on the San Francisco River (Map: Arizona, F 4). The chief industries are copper mining and stock raising. There are division offices of the Arizona and New Mexico Railway. Pop., 1910, 4874.

CLIFTON, or SUSPENSION BRIDGE. Former name of the town of Niagara Falls (q.v.), Ontario, Canada.

CLIFTON FORGE. An independent city of Virginia, 192 miles west by north of Richmond, on the Chesapeake and Ohio Railroad (Map: Virginia, E 4). It contains a railway hospital, and there are extensive railway shops, foundry and machine works, flouring and planing mills, and an ice-cream factory. Iron ore and limestone abound in the vicinity. The water works are owned by the city. Pop., 1910, 5748.

CLIFTON HEIGHTS. A borough in Delaware Co., Pa., 6 miles southwest of Philadelphia, on the Philadelphia, Baltimore, and Washington Railroad, and on Darby River (Map: Pennsylvania, L 8). It has manufactories of woolen and cotton goods, hosiery, and towels. The borough contains a public library. Pop., 1900, 2330; 1910, 3155.

CLIFTON SPRINGS. A village in Ontario Co., N. Y., about 28 miles (direct) southeast of Rochester, on the Lehigh Valley and the New York Central and Hudson River railroads (Map: New York, C 5). It is well known for its sulphur springs and contains the Clifton Springs Sanitarium, the latter surrounded by three parks. There are manufactories of pumps, insect sprayers, automobiles, bicycles, and tinware. Settled about 1850, Clifton Springs was incorporated as a village in 1859. The water works and electric-light plant are owned by the municipality. Pop., 1900, 1617; 1910, 1600.

CLIM, klĭm, or **CLYM OF THE CLOUGH,** klŭf (Clim of the valley, Icel. *klofi*, ravine, from *klūfa*, to split, AS. *clēofan*, to cleave). An English archer, said to have lived one generation previous to Robin Hood. He is known through the old ballad *Adam Bell, Clym of the Cloughe, and Wyllyam of Cloudeslee.* The ballad is far older than the oldest copy extant, printed by Copeland about 1550. A fragment of an older one exists, recovered by Payne Collier. In this ballad William of Cloudeslee shoots an apple from his son's head after the manner of William Tell of the continental legend.

CLIMAC'TERIC YEAR (Lat. *climactericus*, Gk. κλιμακτηρικός, *klimaktērikos*, climacteric, from κλιμάκτηρ, *klimaktēr*, round of a ladder, dangerous point in life, from κλῖμαξ, *klimax*, ladder, staircase). The year in the life of a woman during which she undergoes what is commonly called the "change of life," and which generally falls between her forty-fifth and fiftieth years. Cessation of menstruation (the menopause) takes place, and there are vague nervous disturbances, or indigestion, hot flushes, etc. As a matter of fact, the menopause may extend over a period of two or more years. Many entirely unrelated symptoms are ascribed to it, as in the case of children during dentition. The headaches, e.g., may be due to presbyopia (see SIGHT, DEFECTS OF), which sets in at about the same time and which may be relieved by eyeglasses. The term "climacteric years" was once applied also to certain years in man's life, which were long believed by the disciples of astrology to have been the critical points of his health and fortune. Crises of this kind were, viz., supposed to be reached in the twenty-first, the thirty-fifth, the forty-ninth, and the sixty-third years of man's life. The most important of all was the sixty-third year, which was called, by way of eminence, *the* climacteric year, or the "grand climacteric." This year was supposed to be fatal to most men, owing to the fact that 63 is the product of the two mystical numbers seven and nine.

CLI'MATE (OF. *climat*, from Lat. *clima*, Gk. κλῖμα, *klima*, region, slope, from κλίνειν, *klinein*, to incline). In its broadest sense climate is the sum total or aggregate characteristics of a given geographic locality with respect to atmospheric conditions, such as temperature, rainfall, wind, etc., that prevail. Thus we may conceive of the climate of the sun, for

example. In a more restricted and usual significance the word is used in meteorology to indicate the summation or general result of all the solar and terrestrial influences that affect animal or vegetable life. It is possible, in fact, to disregard the relation to life and consider only the meteorological phenomena as such, or the phenomena that affect any phase of our activity. Thus, one may ask, How does the climate favor navigation by sailing vessels, or the use of the wind as a motive power? In one region the climate may favor the development of a certain disease; in another it may favor the development of special varieties of plants or animals. The specific features that favor the growth of either plants or animals, enabling them to make a specific spot their home, are oftentimes so obscure as to elude our observation and record; therefore climatology is, in many respects, still an unsatisfactory study; but it has made such progress in the past 50 years as to have become exceedingly important to many classes of industries, as well as to physicians, naturalists, and agriculturists. Some varieties of plants are so dependent upon the nature of the soil in which they grow that Dr. Milton Whitney, of the United States Department of Agriculture, has advocated defining climatology as that which concerns the soil around the roots of the plant; but this is too narrow a view of the subject.

According to the usage of classic Greek, climate concerned principally the temperature of a place as regulated by the altitude of the sun at midday. As this varies with latitude, the ancients divided the known globe into zones two degrees broad in latitude, each of which was supposed to have its climate. At the present time, by combining the accumulated work of thousands of observers, we divide the globe into irregular regions, each of which differs from its neighbor in some important climatic condition as to temperature, rainfall, pressure, moisture, or the inclination of the sun and the amount of cloudiness. In the extensive works of the most eminent writers on climatology, especially those of Dr. Julius Hann, of Vienna, a large number of meteorological items are enumerated as being essential to a complete study of the climate of any place. These items include not merely the mean temperature, rainfall, cloudiness, the barometric pressure and relative humidity, but also the variations of these quantities, viz., their highest and lowest values each day, or month, or year, and the liability to sudden rises or falls. For navigation and the use of windmills, we need to know the average velocity of the wind, and perhaps especially the number of hours during which the wind exceeds a specified limit. With reference to the growth or importation of tender plants, the agriculturist needs to know the mean dates of the last frost of spring and the first frost of the autumn, the difference between which is ordinarily called the growing season. Since the establishment of the fact that the germination of seed, the growth of the plant, and the ripening of the harvest require a certain amount of heat or molecular energy, efforts have been made to determine the thermal constants for many plants and for each phase in growth. This "thermal constant" is usually expressed as the sum total of the average daily temperatures when such temperatures are above 42° F. There is also a "rainfall constant" peculiar to each species of plant, the nature of which has been investigated by Linsser, who has shown that plants are able by gradual evolution to change their own thermal and aqueous constants and eventually adapt themselves to a change in climate. Linsser's laws serve as a guide to those who would transplant a species from one part of the world to another of different climate.

In the study of climate with reference to navigation, we have to consider the frequency of destructive storm winds. Charts showing this factor have been published for all the oceans and seas by the hydrographic offices of England, France, Holland, Russia, and the United States. In addition to this, for the special benefit of sailing vessels, Galton has shown how to prepare charts showing, for each square degree, the progress that a vessel of a certain size and rig would make if her sails were set so that she should go in a certain direction. From the point of view of insurance, both life insurance and fire insurance, the destruction by wind, hail, and lightning has been studied; these data, being plotted on charts, show the climate of the country from that point of view. Perhaps the most general idea of the distribution of climate is given by charts which show the frequency per month or year with which storm centres pass over a given locality, and the direction in which they pass. A map of such frequency for the eastern portion of the United States was first published in the Statistical Atlas of Gen. Francis A. Walker in 1874, and the most extensive publication of this kind was published in 1893 as *Weather Bureau Bulletin A*, showing the frequency of storm paths for all parts of the Northern Hemisphere. The wind, rain, and temperature are so distributed around a storm centre that, when its location is known, the distribution of all the others can be closely estimated. In general, in the Northern Hemisphere, the regions that lie to the south of the paths of the storm centres have prevailing warm, moist, southerly winds followed by occasional sudden changes to cool, dry, westerly winds. This change occurs with every passing storm centre, but the prevailing weather is clear and pleasant. Stations lying on the north of the paths of the storm centres have prevailing easterly winds, with cloud and rain followed by cool northwest winds; but the time occupied by the trying easterly winds is proportionately larger.

It is difficult to describe or exhibit the climatic peculiarities of any region without the use of charts. Elaborate publications of this kind, for United States weather, have issued from the Weather Bureau at Washington; the *Climatic Charts for the Years 1870–99* show the normal precipitation for each quarter of the year, the normal percentage of sunshine, the normal barometric pressure, reduced to sea level, the normal temperature of the air at the surface of the earth, the mean maximum and mean minimum temperatures, the highest and lowest recorded temperatures. In addition to these, charts of first and last frost and of prevailing winds have also been published. The ordinary popular textbooks on meteorology are very largely occupied with climatology, properly so called. Of these, that by Prof. Frank Waldo (New York, 1896) is probably the most complete for America; the treatises of Angot,

Traité élémentaire de météorologie (Paris, 1899), and Hann, *Handbuch der Klimatologie* (Stuttgart, 1908–11), are the most complete for European data. But in almost all respects the most careful work of the kind ever published is entitled "Atlas of Meteorology," vol. iii of Bartholomew's *Physical Atlas* (London, 1899). In this we have a general text on climatology accompanied by about 400 maps illustrating the climate and the weather of all parts of the globe for each month and for the whole year, and also an admirable bibliographical list of more important modern publications on this subject. A table of about 40 columns of numerical data would seem to be necessary in order to present the complete idea of climate as imagined by Hann in his great textbook on climatology; but most of these are included in the plates and diagrams collected in Bartholomew's *Physical Atlas*.

Perhaps the most important feature controlling plant life is the relative distribution of temperature and rain from month to month during the year. Climatic types have been elaborated by Harrington, Henry, and others, based upon this distribution of rain. Thus, in one region we have the prevailing summer rains; in another the prevailing winter rains; while in still other places the rains are divided into two seasons with dry weather between. Professor Hinrichs introduced the idea of a climatic distinction based upon the law governing the number of light and heavy rains that had fallen within a given space in a year's time. As the largest falls occurred least frequently, and so also the smallest falls, there is some intermediate rainfall that is most likely to happen. By counting up these different quantities, one obtains a series of numbers that may be represented by the equation of probabilities, and the constant term in this equation becomes the so-called "Hinrichs Climatic Factor."

The influence of climate on crops is a matter of continued investigation in the various agricultural experiment stations throughout the civilized globe, and the reader may refer to the *Experiment Station Record*, published regularly by the United States Department of Agriculture, for the latest information on the subject. A summary of this work has led some authorities to the conclusion that cereal crops are raised successfully only by means of careful special cultivation, so that the resulting crop is not so much an evidence of the influence of climate as of the influence of human skill and husbandry in modifying and assisting climate. In the interior of continents the clear, dry air facilitates great ranges of temperature, both diurnal and annual; the soil is dry, evaporation rapid, and delicate plants do not survive the rigors of cold and drought. On the other hand, an oceanic or insular climate is more uniform as to temperature, moisture, and cloudiness, and more favorable to the development of animals and plants. The influence of climate in disease is principally secondary in that climatic conditions affect the growth of germs, fungi, and noxious animals, through which man suffers.

There is no well-authenticated case of an appreciable change of climate within the past 2000 years. The researches of Eginitis on the climate of Greece seem to establish this principle beyond doubt. Neither is it possible that any change on the surface of the earth due to man—such as deforestation, reforestation, agriculture, canals, railroads, or telegraph lines—can have had anything more than the slightest local effect, if any, on climatic phenomena that depend upon the action of the whole atmosphere. On the other hand, it is probable that appreciable changes have taken place in the course of the very long intervals known as geological periods or æons. The phenomena of the flora, the fauna, the erosion, and the geological stratification all agree in showing that there have been times when, e.g., the Lake Region and the St. Lawrence valley, the Middle States, New England, and southeastern Canada were covered with an extensive ice sheet; a similar condition has prevailed over northwestern Europe. Such changes may have been produced by changes in the elevation of the land and distribution of the ocean, by periodic changes in latitude, by changes in the composition of the earth's atmosphere, or by changes in solar radiation. All of these are plausible causes; but at present there is no agreement of authorities as to the real cause of the changes in so-called geological climate. To these changes in the continents and the climates we may plausibly attribute the development of a great variety of flora and fauna, the migratory habits of birds, the traditions of the early history of the human race, and the extinct plants and animals of paleontology. See EVOLUTION.

One of the most evident causes of the differences of present climates is the relation of the wind to the land and ocean. When the prevailing wind is from the ocean, the land experiences moist and usually cloudy or rainy weather. This is due essentially not so much to the temperature of the water as to the mere fact that water of any temperature will evaporate largely into the air and fill it with moisture. Thus, it is an error to say that the climate of Great Britain and western Europe is affected by the Gulf Stream, or that the climate of California and British Columbia is controlled by the Japan Current; in both these cases it is the moist ocean wind that brings cloud and rain, and the amount of this latter is not influenced in the slightest degree by the Gulf Stream or the Kuro Siwo. Another important consideration in climatology is the relation of the wind to the mountain ranges. Thus, on the windward side of a range, there is ascending air which causes damp weather with cloud or rain; whereas on the leeward side of a mountain range there is descending air, which is always dry and clear and frequently quite warm.

The relation of climate to physiography has been essentially a relation of cause and effect. The surface features of the land, as we now know them, present to us hills and valleys which we may easily recognize as the result of the attacks of wind, water, frost, or heat continued for many ages.

Among the works that treat of meteorological climate, the first place must be given to Bartholomew, *Atlas*, vol. iii, "Meteorology" (London, 1899). For the United States specifically, consult the various publications of the Weather Bureau, and Waldo, *Elementary Meteorology* (New York, 1896). Consult also Woeikof, *Die Klimate der Erde* (Jena, 1887); Hann, *Handbuch der Klimatologie* (3d ed., 3 vols., Stutt-

gart, 1908–11); Solly, *Climatology* (Philadelphia, 1903); Köppen, "Versuch einer Klassifikation der Klimate," in *Geogr. Zeitschr.* (6 Jahrg., 1901); Ward, "The Climatic Zones and their Subdivisions," in *Bull. Amer. Geogr. Soc.* (July, 1905).

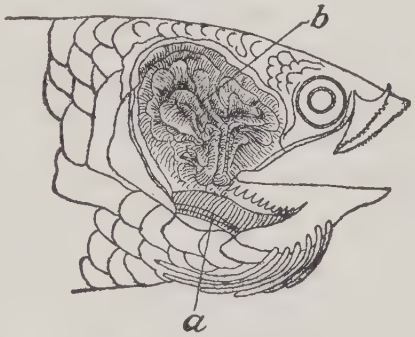
CLIMATE AND DISEASE. The selection of a proper climate is an important factor in the treatment or amelioration of many diseases. According to Barlow, we must consider atmospheric conditions according to temperature, humidity, and sunshine, atmospheric pressure (elevation), movements of winds, and purity of air. The wide variety of climatic conditions found in the United States may be roughly classified as inland, coastal, low altitude (up to 1000 feet), medium altitude (1000 to 3000 feet), high altitude (3000 to 7000 feet), and deserts. A shorter classification divides climates into enervating, of which Florida is the type; sedative or relaxing, typified by the coast of California; and stimulating, as found in mountainous regions. *Ocean or coastal climates* are in general moist and equable, with pure air and freedom from dust and disease germs. Such climatic conditions tend to strengthen the heart action and slow the pulse and have a sedative and relaxing effect on the nervous system. Respiration is made deeper and slower, and the body metabolism is increased. Certain types of chronic pulmonary disease, particularly elderly people with long-standing, inactive lesions, or those complicated with cardiorenal disease, are benefited by an ocean climate. Other cases benefited are those having myocarditis, arteriosclerosis, angina pectoris, many types of nervous diseases, and the acute and chronic bone affections of children. *Inland climates* vary with their distance from the ocean, altitude or nearness to mountain ranges. Low altitudes are generally moist and cold in winter and moist and hot in summer. They are not generally selected for the treatment of disease. Medium altitudes are beneficial to chronic invalids who are able to make a change of residence once or twice a year. In high altitudes the principal feature is purity and dryness of the air, a cool temperature in summer and an abundance of sunshine. The physiological effect of such climates consists in the stimulation of respiratory and cardiac functions, an increased appetite, and sense of well-being. The patient is forced to take more frequent breaths, owing to the rarefied atmosphere. The blood pressure is slightly decreased, and the red blood cells acquire more hæmoglobin and increase in number. Certain types of pulmonary cases are benefited by high altitude, but they must be selected with great care. A tendency towards pulmonary hemorrhage is a contraindication. Certain cases of nervous diseases, in which depression is a feature, are greatly helped by a high altitude. *Desert climates* are characterized by an abundance of sunshine, extreme dryness, warmth, purity of air, and fairly equable temperature. Patients who find most benefit in a desert climate are those having advanced pulmonary tuberculosis, chronic bronchitis or emphysema, rheumatism, gout, arthritis deformans, neuritis, and arteriosclerosis. The climatic treatment of tuberculosis will be considered under that title. Consult article by Barlow, in Hare's *Modern Treatment*, vol. i (New York, 1910).

CLI'MATOLOG'ICAL ASSO'CIA'TION, American. A society for the study of climatology, balneology, and the diseases of the respiratory and circulatory organs. It was organized in New York City in 1884 and is composed of physicians residing in the United States and Canada. It consisted in 1912 of 136 members.

CLIMATOL'OGY, CLI'MATOG'RAPHY. See Climate.

CLIMB'ING FERN, or Hartford Fern (*Lygodium palmatum*). A species of fern found, rarely, from Massachusetts to Kentucky and southward, remarkable for climbing or twining around weeds and shrubs. The leaves are broadly palmate, and the fertile frondlets form a panicle upon the upper portion of the stem. It is prized for interior decoration of houses. For illustration, see Plate of Ferns.

CLIMBING FISH. One of the small Oriental fishes of the family Anabantidæ, interesting because of the modification of the upper portion of their branchial apparatus into a series of leaflike structures, adapted for retaining small quantities of water. This water is sufficient to keep the gills moist for a considerable time, thus enabling the fish to subsist in mud or out of water. For a special account of this apparatus, consult Dobson, *Proceedings of the Zoölogical Society of London*, p. 312 (1874). The



HEAD OF CLIMBING PERCH.
a, gills; *b*, leaflike apparatus serving as air-breathing lungs.

numerous species live in fresh water in southeastern Asia and its neighboring islands and in South Africa. The best-known and typical species is the climbing perch (*Anabas scandens*), which is widely distributed in the Orient and especially abundant in the Ganges valley. It is about 6 inches in length, somewhat resembles a perch, and has large scales and a spiny dorsal fin. It has been reported to climb palm trees, but this needs verification. It often, however, leaves pools which are in danger of drying and travels over land in search of water, usually during the night or early morning, while the dew is still on.

CLIMBING HEMPWEED. See Mikania.

CLIMBING PLANTS. See Lianas.

CLINCH. See Knotting and Splicing.

CLINCHANT, klăn'shän', Justin (1820–81). A French general, born at Thiaucourt (Meurthe). He studied at the military college of Saint-Cyr, entered the infantry service in 1841, and fought in Algeria, the Crimea, the Italian campaign of 1859, and in Mexico. In 1870, as commander of a brigade of the Third Army Corps, he participated in the battles before

Metz. Having escaped from imprisonment after the capitulation, he was put in command of the Twentieth Army Corps of the Army of the East, with the rank of a general of division. He succeeded Bourbaki (q.v.) as commander of the Army of the East and, intercepted by the Germans under Von Manteuffel in an attempt at retreat, was compelled, with his 84,000 troops, to withdraw into Switzerland. In 1871 he commanded the Fifth Army Corps of the Army of Versailles against the forces of the Commune and was Military Governor of Paris from 1879 to his death.

CLINCH'ER. A character in Farquhar's comedies, *The Constant Lover* and *Sir Harry Wildair*.

CLINCHER-BUILT, or **CLINKER-BUILT.** See BOAT.

CLINCH RIVER. A tributary of the Tennessee River, rising in Tazewell Co., Va., and flowing in a southwestern direction through Virginia and Tennessee (Map: Virginia, A 5), joining the Tennessee River at Kingston. Its length is estimated at over 200 miles.

CLINE'DINST, BENJAMIN WEST (1860–). An American illustrator and painter, born at Woodstock, Va. He studied for a year in Baltimore and for five years in Paris under Cabanel and Bonnat and first attracted attention in New York with his illustrations for *Leslie's Weekly*. He is best known as the illustrator of Thomas Nelson Page's *Unc' Edinburg*, and the works of Hawthorne, Stevenson, and Mark Twain, although he works also in oils and water colors. His sympathetic collaboration with the author gives his work an especial charm. He was awarded the Evans prize of the American Water-Color Society in 1900.

CLING'MAN, THOMAS LANIER (1812–97). An American politician and soldier, born at Huntsville, N. C. He graduated at the University of North Carolina in 1832 and was elected to the State Legislature. From 1843 to 1858, with the exception of one term, he was a Whig member of Congress, where he became known as a brilliant debater. In 1858 he was selected by the Governor of his State to fill a vacancy existing in the United States Senate, whence, in 1861, he withdrew to become a colonel in the Confederate army. He was promoted to be brigadier general, served throughout the war, and in 1868 was a delegate to the National Democratic Convention. The existence in North Carolina of diamonds, rubies, corundum, platinum, and mica was first made known by him. He published *Speeches and Writings* (1877); *Follies of the Positive Philosophers* (1878); *The Tobacco Remedy* (1885).

CLINGMAN'S DOME. One of the two highest peaks of the Great Smoky Mountains, situated in Tennessee, just across the border from North Carolina (Map: North Carolina, A 4). It is 6619 feet above sea level. It was named after Thomas L. Clingman.

CLIN'IC (Lat. *clinicus*, Gk. κλινικός, *klinikos*, pertaining to a bed, from κλίνη, *klinē*, from κλίνειν, *klinein*, to recline). An institution or a department of a medical college, which is devoted to the examination and free treatment of patients. Notwithstanding the derivation of the term, "clinical" lectures have for many years been delivered, not at the bedside, but in lecture rooms, to which patients are able to come from their homes. The term "clinic" is often applied also to institutions where free medical treatment is furnished to patients who are able to walk in and return to their homes, but where there are no beds, as in a hospital. (See DISPENSARY.) The term *clinical medicine* is applied to the branch of medicine occupied with the investigation of diseases at the bedside.

CLINIC BAPTISM. In the ancient Church baptism administered to a person on a sick bed or deathbed. As such a baptism was irregular and the usual rites could not be observed, the question was discussed whether it was valid. In the third century Novatian declared that such baptized persons should not be ordained, and in 314 the Synod of Neo-Cæsarea so ordered, and this prohibition was renewed by the sixth Synod of Paris in 829. St. Cyprian insisted strongly on the validity of such baptism. See BAPTISM.

CLINK, THE (Ger. *Klinke*, Dan. *klink*, Swed. *klinka*, bolt, latch, from Ger. *klingen*, OHG. *chlingan*, Dan. *klinge*, Swed. *klinga*, to clink, to jingle). An old prison at Bankside, London, in the jurisdiction of the Bishop of Winchester, used for criminals of that part of the Manor of Southwark which was known as "The Liberty of Clink," and not embraced in the original grant to the city of London (about 1327). The later grant was made expressly for the purpose of securing jurisdiction over the malefactors of the city of London who fled to Southwark. The name has come to mean the "guardhouse," in the modern parlance of "Tommy Atkins."

CLINK'ER, HUMPHREY. The hero of Smollett's novel of the same name.

CLINKER-BUILT. See BOAT.

CLINK'ERS (from *clink*, Ger. *klingen*, to jingle). The scales or globules of black oxide of iron, obtained from red-hot iron under the blows of a hammer. The same term is applied to the slag of iron furnaces, to the calcined products of cement kilns, and, generally, to the slaglike refuse of furnaces of all kinds. The clinker produced from the burning of coal is due to the chemical combination of oxide of iron and the silica contained in the ash of the coal. The cinder-like masses which form the crust of some lava streams are called clinkers by geologists.

CLINK'STONE'. See PHONOLITE.

CLINOM'ETER (from Gk. κλίνειν, *klinein*, to incline + μέτρον, *metron*, measure; cf. Fr. *clinomètre*). An instrument used by geologists for ascertaining the dip or inclination from the horizontal of bedded rocks or veins. It consists of a graduated arc, with a pendulum or plumb line hung at the centre. When the instrument is placed on a horizontal surface, the pendulum points to 0°, while on an inclined surface the pendulum assumes a position corresponding to the angle of inclination. The clinometer is sometimes attached to a compass, which latter is required for determining the direction of outcrop or strike of rocks.

CLI'NOSTAT (from Gk. κλίνειν, *klinein*, to incline + στατός, *statos*, placed, from ἱστάναι, *histanai*, to stand). An apparatus for rotating plants, periodically or constantly, in any desired plane, for the purpose of eliminating or equalizing the effect of any directive stimulus, such as light or gravity. (See IRRITABILITY.) It consists essentially of a strong clockwork, driven by a spring or weight, with vanes or other device for controlling the speed of the mechanism, which may usually be adjusted to make one rotation in 10 to 30 minutes. Suitable tables and

clamps for holding the vessel containing the plants are provided. The intermittent clinostat is so arranged that at given intervals the mechanism is released and permitted to impart a quarter or a half rotation to the plant.

CLIN'TON. A town in Huron Co., Ontario, Canada, 130 miles west of Toronto, 50 miles north of London, on a branch of the Grand Trunk Railway (Map: Ontario, C 6). It has a collegiate institute, model and public schools, a customs office, town hall, library, park, and is the residence of a United States consular agent. Manufactured products include pianos and organs, and automobiles, and there are planing, flour, and knitting mills, and hosiery and clothing factories. Grain and live stock are shipped. Near the town are valuable salt wells. The town owns its lighting and water works. Pop., 1901, 2547; 1911, 2254.

CLINTON. A city and the county seat of Dewitt Co., Ill., 22 miles south of Bloomington, on the Illinois Central and the Illinois Traction railroads (Map: Illinois, D 3). It is in a fertile agricultural region and has railroad shops, a public library, and a hospital. Clinton has adopted the commission form of government. The city owns and operates its water works. Pop., 1900, 4452; 1910, 5165.

CLINTON. A city and the county seat of Clinton Co., Iowa, 138 miles by rail west of Chicago, Ill.; on the Mississippi River, and on the Chicago and Northwestern, the Chicago, Milwaukee, and St. Paul, the Chicago, Burlington, and Quincy, the Chicago, Rock Island, and Pacific, the Davenport, Rock Island, and Northwestern, and the Iowa and Illinois railroads (Map: Iowa, G 3). The Mississippi is crossed at Clinton by one railway and two wagon bridges, one of the latter being a mile long. The city contains two academies and Wartburg College (Lutheran), founded in 1894, three hospitals, a public library, and several parks. Its manufactures are extensive, including machinery, boilers, wagon boxes, furniture, locks, sashes and doors, overalls, boxes, wire, cloth, brick, paper, etc. The Chicago and Northwestern Railroad has large stockyards and machine shops in Clinton; and there are also bridge and iron works, sugar refineries, and roofing mills. Lyons, which in 1890 had 5799 inhabitants, was annexed to Clinton in 1895. Pop., 1890, 13,619; 1900, 22,698; 1910, 25,577; 1920, 24,151.

CLINTON. A town in Worcester Co., Mass., 12 miles (direct) north by east of Worcester, on the Nashua River, and on the Boston and Maine and the New York, New Haven, and Hartford railroads (Map: Massachusetts, D 3). It manufactures ginghams and plaids, machinery, wirework, worsteds, carpets, etc. The town owns and operates its water works and has a large public library, a hospital, home for aged people, a fine municipal building, and a park. The Wachusett Dam and Reservoir, which supplies water to Boston and the metropolitan district, is situated here. Clinton was a part of Lancaster until 1850, when it was separately incorporated. Its government is administered by town meetings. The board of selectmen, who are elected for three years, appoint the chief of police, engineers, and other officers. Pop., 1900, 13,667; 1910, 13,075; 1920, 12,979.

CLINTON. A town in Hinds Co., Miss., 9 miles west-northwest of Jackson, on the Alabama and Vicksburg Railroad (Map: Mississippi, E 6). It is the seat of Mississippi College (Baptist) and of Hillman College. The water works and light plant are owned by the town. Pop., 1910, 767.

CLINTON. A city and the county seat of Henry Co., Mo., 88 miles by rail southeast of Kansas City, on the Missouri, Kansas, and Texas, the St. Louis and San Francisco, and the Kansas City, Clinton, and Springfield railroads (Map: Missouri, C 3). It has large flour mills and exports hogs, cattle, coal, flour, and agricultural products. There are four artesian wells which have a considerable flow of white sulphur. The Clinton German Seminary is situated here. Settled in 1835, Clinton was incorporated as a village in 1840 and at present is governed under a general law, revised in 1899, which provides for a mayor, who holds office for two years, and a city council. The electric-light plant and street railways are owned by the city. Pop., 1890, 4737; 1910, 4992.

CLINTON. A village in Oneida Co., N. Y., 9 miles southwest of Utica, on the New York, Ontario, and Western Railroad and on Oriskany Creek (Map: New York, E 5). It is the seat of Hamilton College (q.v.) and contains a public library. Knit and canned goods are manufactured. There are iron-ore mines and mineral springs in the vicinity. The water, sewer, and electric-light distribution systems are owned by the municipality. Pop., 1900, 1340; 1910, 1236.

CLINTON. A city in Custer Co., Okla., 96 miles by rail west of Oklahoma City, on the Chicago, Rock Island, and Pacific, the Clinton and Oklahoma Western, the St. Louis and San Francisco, and the Kansas Central, Mexico, and Orient railroads, and on the Washita River (Map: Oklahoma, C 3). The chief industries are the milling of alfalfa and the manufacture of cottonseed oil and meal. The city contains a broom factory, cotton compress, municipal hospital, and superior court building. Clinton owns its water works and electric-light plant. Pop., 1900, 1278; 1910, 2781.

CLINTON. A town in Laurens Co., S. C., 60 miles northwest of Columbia, on the Seaboard Air Line and the Columbia, Newberry, and Laurens systems (Map: South Carolina, C 2). It contains the Presbyterian College of South Carolina and the Thorwell Orphanage. The leading industry is the manufacture of cotton. The water works and electric-light plant are owned by the town. Pop., 1900, 1869; 1910, 3272.

CLINTON, DeWITT (1769–1828). An American statesman. He was born at Little Britain, Orange Co., N. Y., March 2, 1769, the son of James Clinton, and was educated at Columbia College, graduating with high honors in 1786. Choosing the law for his vocation, he studied under Samuel Jones and was admitted to the bar in 1788. He entered immediately into political life, opposing the adoption of the Federal Constitution, and becoming an ardent supporter of his uncle, George Clinton (q.v.), who was then Governor of the State and a leader of the Anti-Federalist party. In 1797 he was elected to the State Assembly as a representative of New York City, where he made his residence, and the next year was chosen State Senator for four years. He also became a member of the Council of Appointment. Up to this time the Governor had exercised the exclusive right to make nominations; but Clinton vigorously attacked the system, succeeded in 1801 in procuring an amendment to the Constitution giving

the members of the Council of Appointment equal rights of nomination with the Governor, and by this means introduced the "spoils system" into New York politics, though it seems he was really opposed to the wholesale proscription of opponents. During this period he found time to devote himself to scientific and social questions—especially the use of steam in navigation, and the abolition of slavery and its kindred barbarism, imprisonment for debt. In 1802, when but 33 years of age, he became a member of the United States Senate, but soon resigned to accept the office of mayor of New York—an appointment made by his uncle, the Governor, and the Council of Appointment; and this position he held, with two short intermissions, until 1815. While mayor, he was also at various times State Senator, a member of the Council of Appointment, a commissioner on the Erie Canal route, and from 1811 to 1813 Lieutenant Governor of the State. After the retirement of his uncle from active participation in State politics in 1804, he speedily became the leader of the Republican party in New York and in 1812 was chosen as its candidate for President. Madison was nominated by the Republican Congressional Caucus; but the New York section of the party, tired of Virginian control, insisted on running Clinton and made a coalition with the Federalists for that purpose. Clinton, however, received only 89 electoral votes to 128 for Madison. The canvass had been hardly creditable to Clinton, and he was not henceforth an important figure in national politics; but as a great benefactor of his State in his later years he won fame and success. He took a leading part in establishing the free-school system of New York City and in the establishment and promotion of various institutions of science, in the improvement and modification of criminal laws, in the extension of agriculture and manufactures, in the relief of the poor, and the improvement of morals. But his greatest service was his promotion of the Erie Canal project. As citizen and commissioner, his zeal, energy, and optimism in planning and urging on the completion of this great waterway inseparably connected his name with the enterprise, both in the minds of its friends and in the minds of those who sneered at "Clinton's Folly." The canal became a political question, and on this issue Clinton was elected Governor in 1817. One of his first duties as Governor was to break ground for the canal at Rome. He was reëlected in 1820, but declined a hopeless nomination in 1822. His political opponents, led by Martin Van Buren and the "Albany Regency" (q.v.), sought to end his political career, and in 1824 removed him from the office of canal commissioner. This partisan act provoked a storm of public indignation, which elected Clinton Governor in that year—an office which he held until his death. The next year he opened the Erie Canal. He wrote: *Discourse before the New York Historical Society; Memoir on the Antiquities of Western New York; Letters on the Natural History and Internal Resources of New York; Speeches to the Legislature.* Consult: *Lives*, Hosack (New York, 1829) and Renwick (New York, 1840); Campbell, *Life and Writings of De Witt Clinton* (New York, 1849); Alexander, *Political History of the State of New York*, vol. i (New York, 1906); Orth, *Five American Politicians* (Cleveland, 1906); McBain's *De Witt Clinton and the Origin of the Spoils System in New York* (New York, 1907).

CLINTON, George (1739–1812). An American statesman, born in Little Britain, N. Y. In the French and Indian War he served as a lieutenant in the expedition against Fort Frontenac and after the war entered law and politics. He was chosen to the Colonial Assembly and to the Continental Congress, was made brigadier general in the Revolutionary army, and in 1777 was elected first Governor of New York. He was reëlected and occupied the executive chair for 18 years and in 1801 was chosen for one more term. From 1805 until his death he was Vice President of the United States. While Governor, his discretion in civil affairs and his military services were of great value to the State. He opposed the ratification of the Federal Constitution in the belief that it granted too great powers to the national officers, and while presiding officer of the Senate, during his term as Vice President, defeated by his deciding vote the rechartering of the United States Bank (1811). Consult the *Public Papers of George Clinton* (6 vols., New York, 1899–1902).

CLINTON, George Perkins (1867–). An American botanist, born at Polo, Ill. He was educated at the University of Illinois and at Harvard University. From 1890 to 1902 he was assistant botanist at the Illinois Agricultural Experiment Station and assistant in botany at the University of Illinois; thereafter he served as botanist at the Connecticut Experiment Station and as botanist of the Connecticut State Board of Agriculture. He was a vice president of the American Association for the Advancement of Science (Section of Botany) in 1914. He is author of experiment-station bulletins, including *The Russian Thistle* (1895); *Broom-Corn Smut* (1897); *The Smuts of Illinois Agricultural Plants* (1900); *Apple Scab* (1901); *Apple Rots in Illinois* (1902); *Test of Summer Sprays on Apples, Peaches, etc.* (1912).

CLINTON, George Wylie (1859–1921). An American negro bishop, born in Lancaster Co., S. C., of slave parents. He studied at Brainerd Institute (Chester, S. C.), at South Carolina University, and at Livingstone College, Salisbury, N. C. He entered the ministry of the African Methodist Episcopal Zion church in 1879; founded in 1889 the *Quarterly Review* of that denomination, which he edited for two years, and also edited the *Star of Zion* (1902–06); and was elected Bishop in 1896. He had taught in South Carolina and had been for a time president of the Atkinson Literary and Industrial College in Madisonville, Ky. He wrote: *The Negro in the Ecumenical Conference of 1901* (he was delegate to the Ecumenical Council); *The Three Alarm Cries* (1906); *Tuskegee Lectures* (1907); *Christianity under the Searchlight* (1909).

CLINTON, Sir Henry (c.1738–95). A British general in the American Revolution. He was the son of Admiral George Clinton (Governor of Newfoundland from 1732 to 1741 and of New York from 1741 to 1751), and the grandson of Francis, sixth Earl of Lincoln. He was a member of Parliament for Boroughbridge and for Newark between 1772 and 1784, during which time he was in the army in America. He served as major general (local lieutenant general) at the battle of Bunker Hill and took possession of New York after the defeat of Washington's forces in the battle of Long Island

(Aug. 27, 1776). For his part in that battle he was promoted lieutenant general and knighted. In 1778 he succeeded Sir William Howe as commander in chief, and, on his march from Philadelphia to New York, fought the unsuccessful battle of Monmouth (q.v.). In December, 1779, he led an expedition to South Carolina, and on May 12, 1780, captured Charleston, with General Lincoln's army of 6000 men. Replaced in command by Sir Guy Carleton in 1782, Clinton returned to England. Soon afterward he published his *Narrative of the Campaign of 1781 in North America* (1783), over which he and Cornwallis had a bitter controversy. He was again elected to Parliament in 1790, was made a general in 1793, and from 1794 until his death was Governor of Gibraltar.

CLINTON, HENRY FYNES (1781–1852). An English classical scholar, born at Gamston, in Nottinghamshire. He graduated at Oxford in 1805 and was a member of Parliament from 1806 to 1826. His two great works are the *Fasti Hellenici* (1824–34), and the *Fasti Romani* (1845–50), dealing respectively with the civil and literary chronology of Greece, and the civil and literary chronology of Rome and Constantinople. These works set classical chronology upon a solid and scientific basis. Consult *The Literary Remains of Henry Fynes Clinton*, by his brother (London, 1854).

CLINTON, JAMES (1736–1812). An American soldier, born in Ulster Co., N. Y. He was a brother of George Clinton (1739–1812) and the father of De Witt Clinton. He early entered the English army, served as a captain in the French and Indian War, and distinguished himself at the capture of Fort Frontenac. On the outbreak of the Revolution he took the side of the Colonies and was made a colonel. He accompanied Montgomery to Quebec as brigadier general and in 1777 was in command of Fort Clinton when it was captured by the British, after a brilliant defense, in which he received a bayonet wound. He was engaged against the Indians in General Sullivan's Iroquois expedition (1779) and was present at the siege of Yorktown. He was delegate to the New York Convention which ratified the Federal Constitution and was afterward a commissioner to adjust the boundary line between Pennsylvania and New York.

CLINTON STAGE. A name given to a subdivision of the Silurian system. The Clinton stage takes its name from the type locality at Clinton, N. Y.; but the strata are widely distributed in the eastern part of the United States, occurring along the Appalachians from New York to Alabama, and also in Ohio, Indiana, Kentucky, Wisconsin, and in Ontario, Canada. The prevailing rocks are sandstones, limestones, and shales, which attain a maximum thickness in the aggregate of about 1000 feet. A noteworthy feature of the Clinton stage is a persistent bed of oölitic iron ore that is the basis of an active mining industry in New York, Tennessee, and Alabama. See SILURIAN SYSTEM.

CLINTON STATE PRISON. A prison located in Dannemora, Clinton Co., N. Y. It was begun in 1844 and comprises a number of buildings inclosed in a stockade which surrounds 37 acres of land. This location was chosen for the purpose of employing convicts in the mining and manufacture of iron, there being abundance of that ore on the tract belonging to the prison or to the State. The industries at present conducted in the prison include the making of clothing, tinware, wooden ware, and cotton spinning.

CLI'O (Lat., from Gk. Κλειώ, *Kleiō*, from κλεῖν, *klein*, to celebrate, from κλέος, *kleos*, glory). In Grecian mythology, one of the Nine Muses (q.v.). When to the individual muses specific functions were assigned, Clio was at first called muse of epic poetry; later, and more commonly, she was regarded as the muse of history. In ancient art her common attribute is a partly opened roll.

CLIO. A prominent genus of pteropod mollusks. See PTEROPODA.

CLIO. A pen name of Addison, suggested by the letters "C," "L," "I," "O," with which, respectively, he signed his articles in the *Spectator*, according as he wrote at Chelsea, London, Islington, or "The Office."

CLIP OR SISTER HOOK.

CLIP'EUS. See SHIELD.

CLIP HOOKS. Two hooks, with points lying in opposite directions, made in such a manner that they overlap and fit closely so as to form a single eye when the necks are lashed together; the eyes of the separate hooks are in the same thimble or on the same pivot and also fit closely to each other when the necks are brought together.

CLIP'PER (probably connected with Dutch *klepper*, fast horse, from *kleppen*, to run swiftly, and thus with Eng. *clap*). A sailing vessel built with very sharp lines, more or less raking masts, and great spread of canvas, with a view to speed; a development of a model for the mercantile marine, first built in the United States at Baltimore, and called the *Baltimore Clipper*. The clippers, becoming famous for quick runs and occasionally making better time than the steamers, were especially employed in the South American trade, in the China trade (for tea and opium), and in the early California trade, via Cape Horn. For many years the "fruit clippers" were celebrated for their rapid passages; and the "opium clippers" and "slavers" attained an unenviable notoriety for speed. A "clipper ship," as compared with the ordinary sailing ship, is longer and generally of less beam in proportion to her length; very sharp at the bows, which are hollowed more or less below the water line; gracefully fined away towards the stern, which is almost always elliptical; and, in fact, the comparison of the race horse to the beast of burden holds good in comparing the clipper to the ordinary sailing ship. The first American clipper was the *Rainbow*, a vessel of 750 tons, built in 1843 for the China trade. The largest of these craft was the *Great Republic*, 325 feet in length, 53 feet beam, and 37 feet depth of hold, of 4000 tons' capacity. The Aberdeen builders and Mr. Scott Russell, in England, built some of the most magnificent clipper ships that have sailed the ocean. Among the fastest passages are those made by the *Flying Cloud* in 1851, New York to San Francisco in 89 days and 18 hours, making 374 miles in one day. This record, however, was reduced by the *Comet*, which made the same trip

in 83 days; in 1854, by the *Lightning*, Boston to Liverpool, 2827 miles, in 13 days, and Melbourne to Liverpool, 12,190 miles, in 64 days; in 1865, by the *Nightingale* from Melbourne to New York, 12,720 miles, in 73 days; the *Thornton*, Sandy Hook to Liverpool, 3000 miles, in 13 days, 9 hours; this record was equaled by the *Dreadnaught* in 1859; 1869, the *Golden Gate*, an iron clipper ship, from Liverpool to San Francisco, 13,800 miles in 100 days. The clipper, which was at its prime during the period from 1840 to 1855, at the advent of the steamship underwent numerous transformations as the ends of commerce demanded a greater cargo-carrying capacity at the expense of speed, and as a type gradually passed away; changes were made in the lines and rig, and smaller crews were carried, with the object of increasing tonnage capacity and competing with steamships by lower freight rates. The effect of the model, however, was shown in many subsequent ships and yachts.

CLIPPER BOW. The overhanging bow, with short bowsprit (chiefly ornamental), which is found in some wooden steamers. The bow of most steamers has a vertical stem. The clipper bow differs from the old sailing-ship bow in rising in a smooth curve from the cutwater to the scrollhead, while the latter had a reverse curve as it approached the bowsprit.

CLISSON, klē'sōN', Olivier de (1336–1407). A French soldier, born in Brittany. He fought in the Hundred Years' War, at Auray (1364), on the English side; later, after his quarrel with Duke John IV of Brittany, he took part under Bertrand de Guesclin in the campaigns (1370–80) against the English. In 1380, upon De Guesclin's death, Clisson succeeded him as constable of France, and thereafter he commanded the army in Poitou and in Flanders, where he defeated (1382) the citizens of Ghent at Roosebek. In 1385 he sailed with a fleet of 62 vessels to invade England, but was driven back by a great storm. Forced into exile in Brittany by the uncles of Charles VI, Clisson made his peace with Duke John IV, after whose death (1399) he was regent of the duchy. Consult A. Lefranc, *Olivier de Clisson* (Paris, 1898).

CLIS'THENES, klīs'thē-nēz (Lat., from Gk. Κλεισθένης, *Kleisthenēs*). An Athenian statesman, son of Megacles and Agariste, daughter of Clisthenes of Sicyon. He was, on his father's side, a member of the celebrated family of the Alcmæonidæ (q.v.). He took a prominent part in the expulsion of Hippias in 510 B.C. When Isagoras (q.v.), the head of the oligarchical party at Athens, called in Cleomenes I (q.v.), King of Sparta, Clisthenes, with 700 heads of families, was forced to retire from the city, but was afterward recalled. He made important changes in the Athenian Constitution, which he rendered more democratic. The basis of his reform was the redistribution of the people; instead of four tribes, or phylæ, which had previously existed, he made the number 10, and distributed among these the demes into which the Attic territory was divided. For the nature of these arrangements and their purpose, see Athens, *History*. He also instituted ostracism, and, according to Ælian, was the first to suffer therefrom. See Boule; Deme; Ecclesia.

CLISTHENES OF SICYON. Tyrant of Sicyon, early in the sixth century B.C., grandfather of Clisthenes the Athenian. (See the preceding article.) He aided Delphi against Crisa and brought about the reëstablishment of the Pythian Games.

CLITANDRE, klē'tăN'dr'. A favorite name with Molière, who calls four different characters by it: (1) the sensible lover of Henriette in *Les femmes savantes;* (2) the lover of Angélique in *Georges Dandin;* (3) a titled lover of Célimène in *Le misanthrope;* (4) the lover of Lucinde in *L'Amour médecin.*

CLITAR'CHUS. A Greek historian, who accompanied Alexander the Great on his expeditions and described Alexander's exploits down to the battle of Issus. Both Cicero (*Brutus*, 42) and Quintilian (x, i, 74) throw doubts on his trustworthiness. His importance lies in the fact that his work was popular and much used by writers on Alexander as well as by Quintus Curtius, Plutarch, Justin, and Diodorus Siculus.

CLITH'EROE (Welsh *Cled-dwyr*, cliff near the waters). A town of Lancashire, England, on the Ribble, and at the foot of the Pendle Hills, about 28 miles north of Manchester (Map: England, D 3). Its notable buildings include the church of St. Michael's, the ancient grammar school founded by Philip and Mary in 1554, and the ruins of an old castle built by one of the De Lacy family in the twelfth century. The town has a free public library and a technical school. Its industries consist of cotton and paper mills, and in the neighborhood are extensive limestone quarries and peat mines. Near Clitheroe is the Jesuit College of Stonyhurst. Pop., 1891, 10,800; 1901, 11,414; 1910, 12,500. Clitheroe and Pontefract were the two seats of the De Lacy family in Norman times.

CLITOM'ACHUS (Gk. Κλειτόμαχος, *Kleitomachos*, or possibly Κλειστόμαχος, *Kleistomachos*) (c.180–c.110 B.C.). A Greek philosopher of the New Academy, the most important among the pupils of Carneades, whose spoken philosophy he put in writing, and whom he succeeded as leader of the school. He was a Carthaginian by birth, was called Hasdrubal in his own tongue, came to Athens about 147, and became head of the New Academy in 129. Of his works, about 400 in number, we have no direct remains; Cicero, who praises him highly in his *Academica*, used Clitomachus' treatise Περὶ Ἐποχῆς, *Peri Epochēs, On Suspension of Judgment*. To some extent, also, Cicero based on Clitomachus' works his *De Natura Deorum*, his *De Fato*, and his *Tusculanæ Disputationes*. He was well known at Rome, if we are to believe Cicero's statement that Crassus heard him lecture at Athens in 111, and that he dedicated one of his books to the poet Lucilius and one to Lucius Censorinus, Consul in 149 B.C. Consult Zeller, *The Stoics, Epicureans, and Sceptics*, trans. by Reichel (London, 1892).

CLITUM'NUS. A river of Italy, famous through the description given by Pliny the Younger (*Epistles*, viii, 8) of the spring which formed its source, a spring still beautiful. It rose in Umbria, between Spoletium and Trebia, and fell into the Tiber.

CLI'TUS (Lat., from Gk. Κλεῖτος, *Kleitos*) (?–328 B.C.). The foster brother of Alexander the Great. He was the dearest friend of the King, whose life he saved at the battle of the Granicus. He held high positions in the Macedonian armies and in 328 was made satrap of Bactria. At a banquet given by Alexander in honor of the Dioscuri, the King, goaded to madness by the censures of Clitus, who re-

proached Alexander with slothfulness, seized a spear and in his drunken rage slew him. Alexander bitterly repented and showed his grief in the most extravagant manner.

CLITUS. In Shakespeare's *Julius Cæsar*, the servant of Brutus.

CLIVE, klīv, CATHERINE (1711–85). A noted English actress, familiarly called "Kitty Clive." She was a daughter of William Raftor, an Irish gentleman of reduced circumstances, living in London. There is a doubtful story about her having been overheard singing while scrubbing a doorstep where there were some members of the Beefsteak Club, and so securing a chance to begin her career. At any rate, during Colley Cibber's management of Drury Lane, she made her appearance there as a page, with a song, in Lee's tragedy of *Mithridates*, probably in 1728. She made a great hit, which she repeated in 1729 as Phillida in Cibber's *Love in a Riddle*, and in 1731 in Charles Coffey's *The Devil to Pay*. About 1732 she was married to George Clive, second cousin of the famous Lord Clive. In 1742 she sang the part of Delilah in Handel's *Samson*, then first produced. She left Drury Lane in 1743, during Fleetwood's management, but resumed her connection with that theatre when Garrick took its direction, three years later. Her last appearance was in 1769, as Violante in the comedy of *The Wonder*, Garrick himself, out of compliment to her, taking the part of Don Felix. Mrs. Clive's talents were seen to best advantage in comic parts, to which, however, she was not always satisfied to restrict herself. Her vigorous wit and sound sense made her the welcome companion of some of the notable people of her time. In her later life she was an intimate friend of Horace Walpole, who gave her a house at Strawberry Hill. She died Dec. 6, 1785, and was buried at Twickenham. Consult: Fitzgerald, *Life of Mrs. Catherine Clive* (London, 1888); Austin Dobson, in Matthews and Hutton, *Actors and Actresses of Great Britain and the United States*, vol. i (New York, 1886); Doran, *Annals of the English Stage* (London, 1888); Thos. Davies, *Memoirs of the Life of David Garrick* (ib., 1784).

CLIVE, ROBERT, BARON CLIVE OF PLASSEY (1725–74). An English general, whose achievements laid the foundations of the British Indian Empire. His father, a lawyer and small landowner, came of an ancient Shropshire family, whose manor seat, Styche, near Market Drayton, dates from the reign of Henry II. There Clive was born, Sept. 29, 1725, the eldest of 13 children. He spent several years with an uncle at Hope Hall, near Manchester, and at various schools showed more aptitude for pugilism and mischievousness than for study. At 18 years of age he shipped to Madras as a writer to the East India Company, where he dragged on an unhappy and quarrelsome existence as a mere drudge in the employ of the company until the outbreak of the great struggle between the French and the English in India. He applied for and obtained an ensign's commission and distinguished himself in Boscawen's unsuccessful siege of Pondicherry in 1748. His dauntless courage, previously exhibited in a duel which forms the idealized subject of Browning's poem "Clive," now had scope for development. English influence was almost extinct in India, through the prestige of the French and their allies. In 1751, with 500 mixed English and Sepoy troops, Clive marched from Madras and captured Arcot, a city of 100,000 inhabitants, garrisoned by 1500 of Chunda Sahib's best troops. The daring displayed in the capture of Arcot was equaled by the intrepidity and fortitude exhibited in its successful defense by Clive and his little band, reduced to 200 men, against a besieging army of 7000 natives and French, and impressed the natives with the strength and prowess of Britain. The succeeding campaign, in which successes and personal escapes were of a most dramatic character, included the victories of Arni and Kaveripak and the capture of Kovilam and Chingalpat. Henceforward Clive's name was a local tower of strength; the natives surnamed him "Sabat Jung," or "the Daring in War," and Pitt described him as "the youth of 27 years" who had done the deeds of a "heaven-born general." In 1753, with his bride, Margaret Maskelyne, sister of the astronomer, he visited England and received a diamond-hilted sword and the warm thanks of the India Company. Possessed of a moderate fortune, obtained from prize money, he expended part in redeeming the paternal estate and relieving his father from pecuniary embarrassment. The rest soon disappeared in an unsuccessful parliamentary contest and in luxurious display. He returned to India in 1755 and in 1756 was called to avenge the Black Hole (q.v.) atrocity perpetrated by Siraj-ud-Daula, Nawab of Bengal. Clive advanced against the Nawab, and in January, 1757, the English were again in possession of Calcutta. A peace was arranged; but Clive, bent upon a brilliant exhibition of his powers and eager for the riches of Bengal, soon returned to the struggle. To insure his success, he entered into a plot for the elevation to the throne of Bengal of Siraj-ud-Daula's general, Mir Jaffir, who was to desert his chief, and who promised to shower wealth on Clive and the East India Company for his services. On June 23, 1757, Siraj-ud-Daula was overthrown in the battle of Plassey. This victory decided the ascendancy of England over France in India and was followed by the rapid building up of a British Indian empire. Mir Jaffir was placed upon the throne of Bengal and kept his promises. From shares in these and other spoils and from presents and territorial grants from native princes, Clive amassed vast wealth, which yielded an annual income of £40,000. After managing the affairs of the East India Company at Calcutta for some years and winning fresh victories, he returned to England in 1760 and was loaded with thanks and honors. He became parliamentary member for Shrewsbury, was raised to the Irish peerage as Baron Clive of Plassey, and in 1764 was created Knight of the Bath. Through the dishonesty of its servants, high and low, the affairs of the company became greatly involved after his departure from India, and in 1765 he was sent out to set them right. He proved as competent an administrator as a warrior; and in less than 18 months, by raising salaries, abolishing perquisites, reorganizing the army and ruling with a rod of iron, he "restored perfect order and discipline in both the civil and military services and brought back prosperity to the well-nigh ruined finances of the company." He returned to England in 1767 and was received with the distinction to which he was entitled. But the energy he had displayed in righting Indian affairs antagonized many who suffered pecuniarily from the suppression of dishonest practices;

and they, possessing influence, employed it in raising English feeling against Clive. His Indian administration was made the subject of animadversion in Parliament in 1772, which he at first ignored, but subsequently replied to in a vigorous and eloquent speech, which elicited Pitt's admiration. A parliamentary inquiry, the following year, demonstrated that in certain particulars Clive's treatment of the natives had been questionable. A large part of his enormous wealth was shown to have come from presents from the natives, a fact justified by custom. But at the same time Clive undoubtedly, as in the case of Omichand, acted disgracefully. A qualified acquittal from Parliament, which acknowledged his "great and meritorious services," was not satisfactory to Clive, who never recovered from the disgrace implied in the trial; this, with sickness, recourse to opium to alleviate his sufferings, and mental depression, led to his suicide, Nov. 22, 1774.

Clive was an able man and got India for England. Perhaps Macaulay was justified in saying that "Clive, like most men who are born with strong passions and tried by strong temptations, committed great faults, but our island has scarcely ever produced a man more truly great either in arms or in council." Consult: Malcolm, *Life of Clive* (3 vols., London, 1836); Malleson, *Founders of the Indian Empire: Lord Clive* (ib., 1882); id., *Decisive Battles of India* (ib., 1883); Mill, *History of British India*, vol. iii (ib., 1858); Macaulay, *Essay on Clive* (ib., 1840); Arbuthnot, *Lord Clive* (ib., 1899).

CLOACA, klō-ā'kȧ (Lat., sewer). The cloacæ were subterranean drains, usually built of stone. In Rome the early city was drained by three natural streams, which were later confined within channels built of stone and vaulted, the largest of which, crossing the Argiletum, Forum, and Velabrum, was called, from its size, the Cloaca Maxima, though that of the Vallis Murcia and that near the Circus Flaminius rival it in size and solidity. A network of smaller passages empty into these main channels. The system was largely due to the Tarquins. The Cloaca Maxima was upward of 13 feet in width and of corresponding height, vaulted with three thicknesses or layers of large stones laid without cement, of the uniform size of over 5 feet long and 3 feet high. The flooring is paved like a Roman road, and the side walls are built of huge blocks of Gabii stone. The sewer was constantly flushed with the superfluous water from the aqueducts. Portions of the cloacæ are still visible, but the greater part lie far below the present level of the streets. The mouth of the Cloaca Maxima at the Tiber is still visible. During the Republic the surveillance of the Roman cloacæ was one of the duties performed by the censors. The Cloaca Maxima was repaired by Cato and his colleagues in the censorship. Agrippa, when ædile, is recorded to have passed through the cloacæ in a boat. Under the Empire officers called *curatores cloacarum urbis* were appointed for their supervision. So thoroughly was the city undermined by these large sewers that Pliny calls it *urbs pensilis*, a city suspended in the air rather than resting upon the earth. Drains of the same description, but of smaller dimensions, existed in other ancient Roman cities.

CLOACA MAXIMA. See CLOACA.

CLOCHES DE CORNEVILLE, LES, lā klôsh' de kôr'n'-vēl'. A very popular operetta, in three acts, produced at the Folies Dramatiques in 1877. The amusing libretto is by Clairville and Charles Gabet; the music, from which many airs have become popular, by Robert Planquette.

CLOCK (AS. *clucge*, Icel. *klukka*, Ger. *Glocke*, bell, from ML. *clocca*, bell, from OIr. *cloc*, Ir. Gael, *clog*, bell, clock, Welsh, Corn. *cloch*, Manx *clagg*, bell). A mechanical instrument for measuring and indicating the time of day, usually by a mechanism consisting of two distinct portions: first, a train or succession of toothed wheels for transmission to a definite point of a motive force, produced by a weight or spring, or the action of an electric current on an electromagnet or system of magnets; and, second, an escapement to regulate the expenditure of this motive force with uniformity and requisite slowness. A watch is simply a portable clock, to be worn on the person, in which the motive force is a spring. A maritime chronometer is a watch of unusual size, constructed and mounted with especial care, for determining longitude at sea. See WATCH; CHRONOMETER.

Historical Development. Among the predecessors of the clock, as time measurers, are the sundial, the clepsydra, or water clock, and the hourglass. (See DIAL; CLEPSYDRA; HOURGLASS.) The clepsydra was a graduated transparent vase, in which water trickled through a hole in the bottom at such a rate that the receding water marked the passage of time. In the hourglass sand was substituted for water. Among Eastern nations a great many curious mechanical devices were introduced into the construction of the clepsydra: the water was made to flow in tears from the eyes of automata; a floating statue, falling with the liquid, pointed to the passing hour, as indicated on the side of the glass; finally, a mechanism was introduced by which the water, as it fell, drop by drop, turned a little wheel, which moved the hands on the face of a dial and so marked the hour. The next step was the construction of a time indicator, whose hands were moved by the action of falling weights instead of that of falling water. When this step was taken and the first true clock constructed is uncertain. Its invention is claimed by many peoples, from the Chinese, 2000 B.C., to the Germans of the eleventh century. Certain it is that clocks were in general use in churches and monasteries throughout the latter part of the Middle Ages, and that these ancient tower clocks were the progenitors of all our modern timekeepers.

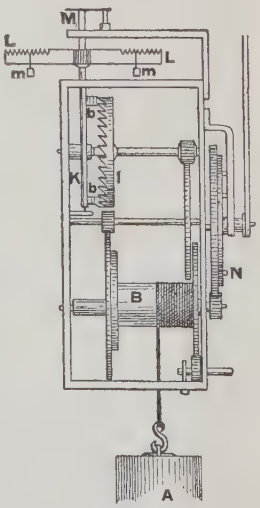


FIG. 1. MECHANISM OF DE VICK'S CLOCK.

The oldest clock of which we have a complete description was set up in the tower of the palace of Charles V of France, in 1379, by a German named Henry De Vick. This primitive clock was constructed on the mechanical principle which is the basis of most modern timekeepers. This principle, as formulated by E. A. Marsh,

is "that the power stored up in a raised weight or coiled spring shall be communicated to a train of wheels which are set revolving, and that the force or motion shall be cut up into a succession of minute but equal impulses by converting a rotary into a vibratory motion. The last and quickest wheel of the train shall have its teeth so formed that they are caught and escape alternately, and hence the wheel is called the 'scape wheel,' and, from its resemblance to a crown, the 'crown wheel.' The bar and staff, which with its projections catch and release the teeth, is termed the 'escapement,' and it is through this device that the rotary is converted into the backward and forward motion." The accompanying sketch of De Vick's clock is useful, not only from its historical interest, but also because, from its comparative simplicity, it will form a groundwork for further explanation of the mechanism of clocks in their more complicated form. It will be readily understood, from a glance at the annexed figure (Fig. 1), that as the weight *A* tends to uncoil the cord and set in motion the cylinder *B* round its axis, the motion will be successively communicated to the various toothed wheels in the figure, and finally to the crown wheel or escapement wheel, *I;* the teeth of which so act on the two small levers or pallets, *b b*, projecting from and forming part of the suspended upright spindle or vertical axis, *KM*, on which is fixed the regulator or balance, *LL*, that an alternating or vibratory instead of a circular motion of the balance itself is the result. The hands of the clock are attached to the wheel *N*, also set in motion by the cylinder *B*. Now, unless there were some check upon the motion, it is manifest that the heavy weight *A* would go rapidly to the ground, causing the wheels to rotate, the balance to vibrate, and the hands to go round with increasing velocity. In order to prevent this rapid unwinding of the clockwork, and adjust it to the more deliberate measurement of time, the balance is, in De Vick's clock, loaded with two weights, *m m;* and the farther these are removed from the axis or spindle, *KM*, the more heavily they will resist and counteract the escapement of the levers and the rapidity of the rotation of the escapement wheel, till the clock be brought to go neither too quick nor too slow.

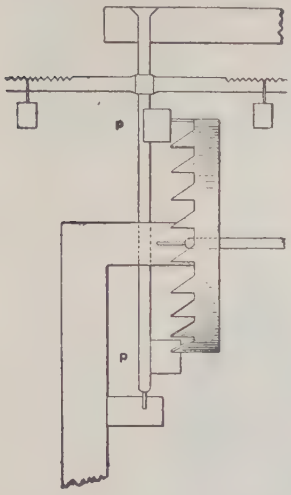


FIG. 2. BALANCE AND ESCAPEMENT OF THE FIRST CLOCK. *p p*, pallets.

Upon this simple plan it is probable that all clocks were constructed until the seventeenth century, when the principle of the pendulum was applied to the science of horology. The property of a pendulum known as its *isochronism* (q.v.) constitutes its value to clock mechanism—that, when a suspended body is swinging, any increase or decrease in its speed will not change the number of vibrations it makes in a given time, but only the length of the arc it describes. This law of the pendulum was discovered by Galileo and was first applied (probably) to clockwork by Huygens, about 1657. The two accompanying cuts show how the horizontal swing of the balance, as maintained in De Vick's clock, was converted into the vertical swing of the pendulum. By taking off one of the weights and hanging the balance in an upright position, it becomes a pendulum. Ten years later Dr. Hooke invented an escapement which enabled a weaker support to carry a heavier pendulum. Subsequent improvements in the escapement and pendulum (see ESCAPEMENT; PENDULUM), and in the use of the spring (see WATCH) in place of the pendulum, have brought the mechanism of timekeepers down to the present degree of perfection.

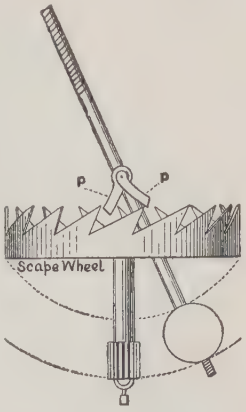


FIG. 3. DE VICK'S OLD BALANCE CONVERTED INTO THE PENDULUM. *p p*, pallets.

Striking Apparatus. The principal function of a clock, according to the mediæval conception, was that it should be a reliable instrument for automatically calling out the hours, particularly the hours for devotion. This conception of the clock is shown in the word itself, which originally meant "bell"—a meaning which has been retained in the French word *cloche*. A striking apparatus was, therefore, early invented, and it is interesting to note that the striking mechanism of De Vick's clock is similar to that used in some modern timepieces. A striking clock contains one or more extra trains of wheels to control the striker. In De Vick's clock 12 pins projected from the wheel on which the hand was attached. At each hour one of these pins, by pushing a lever, released the striking train, which lifted the hammer that strikes the bell. The number of strokes was determined by the position of the notches around the edge of a locking plate, which held the lever controlling the striking train. These notches were so placed that at 1 o'clock the catch in the lever entered a notch as soon as one blow had been struck. At 2 o'clock there was a longer space before the notch was reached, so that the bell was struck twice; at 3 o'clock the bell struck three times before the train was locked, and so on. The chief objection to this striking apparatus is that it is thrown out of order and strikes wrong every time the clock happens to run down.

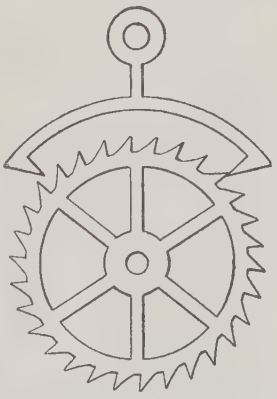


FIG. 4. DR. HOOKE'S ESCAPEMENT.

The *rack and snail repeating mechanism* has been used for over two centuries. It is a peculiar and intricate piece of mechanism. In ordinary clocks the impelling power is a weight similar to that which moves the time-measuring mechanism itself; but the pressure of this weight on the striking machinery is permitted to come into play only at stated periods in course of the workings of the timekeeping apparatus, viz., at the completion of every hour: when the minute wheel, which revolves once in an hour and carries the minute hand of the clock along with it, brings it into action by the temporary release of a catch or detent, permitting the weight wound up on the cylinder of the striking apparatus to run down a little, in doing which the hammer is forced into action, so as to strike the bell. Whether the strokes shall be one or many is determined principally by two pieces of mechanism —one called a "snail," from its form or outline, with 12 steps, and the other a "rack," with 12 teeth. The time during which the striking weight is *allowed* to descend varies according to the turning of the 12 steps of the snail on its axis, and the position of the 12 teeth of the rack at different hours of the day, being sometimes only long enough to permit one blow to be given by the hammer on the bell, and at another time long enough for 12 such blows.

It is not known when the alarm or when the striking mechanism of the clock was first applied. The alarm was adopted for the use of the priesthood, to arouse them to their morning devotions. The first striking clock probably announced the hour by a single blow, as they still do, to avoid noise in churches. During the seventeenth century there existed a great taste for striking clocks, and hence a great variety of them. Several of Tompion's clocks not only struck the quarters on eight bells, but also the hour after each quarter; at 12 o'clock 44 blows were struck, and between 12 and 1 no fewer than 113. Many struck the hour twice, like that of St. Clement Danes, in the Strand, London. Before the fifteenth century chimes had been introduced. See BELL and CHIMES; and consult authorities there cited, especially an article in the *Journal of the Society of Arts* (London, March 29, 1901), on "Clocks, Carillons, and Bells."

Clocks Provided with Automatons. The desire to construct clocks which shall perform automatically many other things besides simply recording the time of day is as old as clock making and was developed to a wonderful degree in the ancient clepsydræ of Oriental nations. Indeed, the automatons of the ancient Chinese and Arabian clocks were the models upon which all those of mediæval Europe, including the famous Strassburg clock, were based. Among the earliest of these automatons or "jacks of the clock" built in the tower clocks of Europe were those of the clocks at Dijon, Cambrai, and Linden, in each of which two figures appear and strike the hourly bell. In 1495 the clock at Lübeck was built in which the figures of the Twelve Apostles were introduced.

Probably the most widely known of these tower clocks is the one in Strassburg Cathedral. This famous clock has been reconstructed twice. The first Strassburg clock was built in 1352, under the direction of John, Bishop of Lichtenberg. It contains a calendar, an astrolabe, and a set of chimes composed of several cymbals. There were automatic figures of the Virgin, of the three Wise Men who bow before her, and a cock, which moves its beak, crows, and flaps its wings. The second Strassburg clock was built in 1570. Its mechanical works were constructed by Isaak and Josias Habrecht, of Schaffhausen, Switzerland. Early in the nineteenth century it was found that the clock required reconstruction, and the task was consigned to Charles Schwilgué, who consumed four years in its completion. Only a few of the original movements were restored by Schwilgué, most of the present mechanism being of his own design.

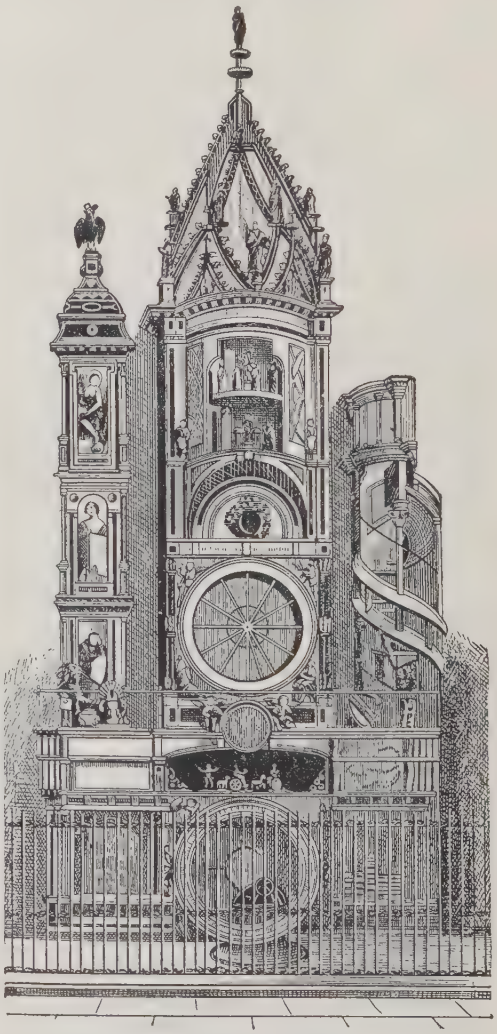


FIG. 5. STRASSBURG CATHEDRAL CLOCK.

The following description of the present Strassburg clock indicates its most important features: It is 30 feet high and 15 feet at the base. On one side of the main portion is a flight of winding stairs, surmounted by five columns. On the other side is a Gothic pillar, the panels of which are filled with figure paintings. At the base of the main portion of the clock is a celestial globe, indicating sidereal time, and showing the rising, passing over the meridian of Strassburg, and setting of all stars that appear above the horizon, visible to the naked eye. Behind the globe is a calendar,

showing the day of the month and the fixed and movable feasts. A statue of Apollo points out the day of the month. The calendar is in the form of an annular band, so arranged as to show many other astronomical events besides the day of the month. Above the calendar are figures drawn in chariots, one appearing each day. On Sunday Apollo appears, drawn by horses of the sun. On Monday Diana, emblem of the moon, drawn by stags, appears. She is succeeded in turn by Mars, Mercury, Jupiter, Venus, Cupid, and Saturn. Above these figures is the dial which tells the time of day. On each side of this dial sits a figure, one of which strikes the quarter hours, and the other holds an hour-glass and turns it every 60 minutes. The next story is devoted to a planetarium, and the next is a globe for showing the phases of the moon. Above this are movable figures, which in succession strike the quarter hour. The first figure is an infant, which strikes the bell with a rattle; the second is a youth; the third an old man; the fourth is a figure of death, which strikes the bell with a bone. In the highest compartment is a figure of Christ. Each day at noon a procession of the Apostles passes before Him; while a cock, perched above, appears and flaps its wings and crows three times.

The clock at Beauvais, France, is almost as wonderful a piece of mechanism as the Strassburg clock. It is composed of 14 different movements, includes 90,000 different pieces, and weighs 35,000 pounds. There are about 50 dials for indicating different astronomical events. The clock is 36 feet high, 16 feet broad, and nearly 9 feet deep.

The clock in Lyons Cathedral is much like the Strassburg clock. The old clock of Prague was built by one Harausch; and so jealous were the citizens of Prague lest he should build a similar clock in some other city—so the story goes—that they put out his eyes. This clock also contains various mechanical figures. The hour is rung by a skeleton, with the bell rope in his hands.

Another monumental clock is that in the clock tower on the Piazza San Marco, Venice. A Madonna sits on a platform between two doors overlaid with gold. When the time for certain religious festivals occurs, an angel comes out from one of these doors, blows a trumpet, bows to the Virgin, and passes out at the other door. The hour is struck by two giants.

Belfry clocks with automatons began to wane in popularity during the seventeenth century, and very few have been constructed since. House clocks with automatons were first made in the fifteenth century; but the height of their popularity was during the Renaissance, when wonderful skill and great artistic talent were expended in their construction. A favorite design for these clocks was that of a ship, whose crew performed numerous automatic functions. Perhaps the most beautiful as well as famous of these automatons is the ship clock of Charles V of France, now in the Cluny Museum. This clock was mounted upon rollers, on which its mechanism caused it to advance and recede. Another favorite design was a mounted huntsman, who at the stroke of the hour moved his head and arms, while the head and tail of the horse also moved. During the eighteenth century clocks with mechanically singing birds were popular. Within recent years automaton house clocks have come to be regarded as interesting examples of mechanical ingenuity and skill, to be occasionally produced and admired, rather than as necessary or desirable articles of furniture.

The United States has produced its share of automaton clocks, though most of them have been smaller than the great tower clocks of Europe. The Rittenhouse clock, made in 1767 by David Rittenhouse, of Philadelphia, has six dials, each marking off different astronomical events. The Columbus clock, made by a citizen of Columbus, Ohio, is 18 feet wide and 11 feet high. Like the clocks already described, this one records many astronomical events; in addition, miniature figures perform various movements. Three towns of Pennsylvania—Donaldson, Hazleton, and Wilkes-Barre—have possessed citizens who have added to their fame by their remarkable clocks.

In 1880 a clock was placed on exhibition in New York that was a striking illustration of the elaborateness to which clockwork may be carried. It was the work of Felix Meyer, who spent more than 10 years in its construction. The clock is 18 feet high, 8 feet wide, and 5 feet deep. It has 2000 wheels, runs by 700-pound weights, and is wound up once in 12 days. When the clock is in operation, it shows the local time in hours, minutes, and seconds; the difference in time at Chicago, Washington, San Francisco, Melbourne, Peking, Cairo, Constantinople, St. Petersburg, Vienna, London, Berlin, and Paris; the day of the week, calendar day of the month, month and season of the year, the signs of the zodiac, revolutions of the earth on its own axis and around the sun; also the phases of the moon and the movement of the planets around the sun. The quarter hour is struck by an infant, the half hour by a youth, the three quarter by an old man, and the hour by death, as in the Strassburg clock. As the hour strikes, a figure of Washington rises from a chair and extends its right hand, presenting the Declaration of Independence. A door is opened by a servant, and all the presidents, as far as and including Hayes, each dressed in the costume of his time, advance across the platform, salute Washington, and retire through another door.

Tower Clocks. As already pointed out, the earliest European clocks were all tower clocks —the house or "chamber" clock being a later invention, closely connected with the invention of watches. Among the early clock builders, ingenuity and complication of mechanism, as displayed in the automatons, was considered of more importance than accuracy as a timekeeper; but within recent years much scientific skill has been used to construct tower clocks which, in spite of their enormous size and great height, with the accompanying atmospheric disturbances at so great a distance from the earth, shall still be accurate timekeepers.

One of the largest clocks in the world is the Westminster clock, in the British House of Parliament, which was put in operation in 1860. Its four dials, situated 180 feet above the ground, are 22½ feet in diameter. Each minute hand is 14 feet long, and the hour figures on the clock are 2 feet long. The pendulum is 13½ feet long and weighs 700 pounds. There are 5 bells, weighing respectively 21 hundredweight, 26 hundredweight, 33½ hundredweight, 78 hundredweight, and 13 tons 11 hundredweight, for striking the first, second, and third quarters and the hour. These bells are hung from massive

wrought-iron framing, in a chamber above the dial. The largest, the hour bell, popularly known as "Big Ben," is 9 feet in diameter and is struck by a hammer weighing 4 hundredweight, which is lifted 9 inches vertically from the bell before it falls. This bell and the great bell of St. Paul's Cathedral are tolled on the death of members of the royal family of Great Britain.

In the Westminster clock, as in all the tower clocks formerly constructed, the mechanism which drives the clock is located in the tower directly back of the face. But in the city-hall clock erected in Philadelphia in 1899 the

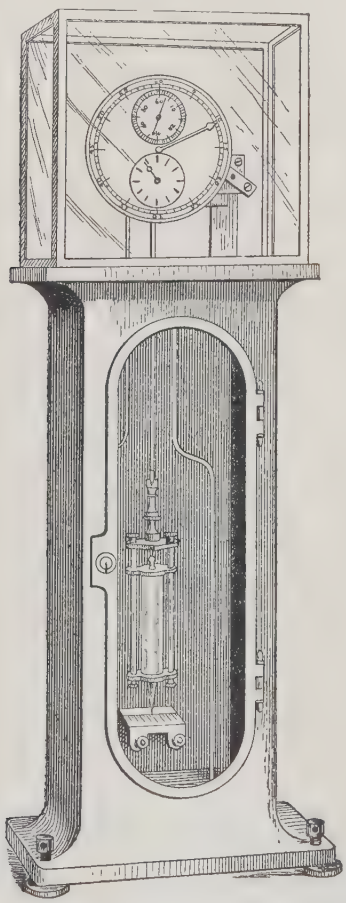


FIG. 6. ASTRONOMICAL CLOCK IN PHILADELPHIA CITY HALL.

clockwork is located in the main part of the building, and is connected with the dial mechanism in the tower by means of compressed air. The whole is based on the fundamental principle of all modern mechanisms—the governing of great forces by comparatively feeble ones. The primary clock is an astronomical clock, constructed with the greatest care, so as to be free from all disturbances from dust, moisture, and vibrations, and is so constructed that without interfering with its delicacy and accuracy it can operate four sets of hands, each weighing 500 pounds. The dials have a diameter of 25 feet. The total height of the tower is 547½ feet, and the centres of the dials are 362 feet above the pavement. The hour hand is 12 feet long and is entirely different in shape from the minute hand, so they never can be mistaken. The face of the dial is made up of several pieces, and the usual numerals are omitted from the face, not being of service at so great a height. The clock was designed by Warren S. Johnson; a detailed description of its mechanism was written by him and published in the *Journal of the Franklin Institute* (Philadelphia) for February, 1901.

The illuminated clock in the tower of the Metropolitan Life Building in New York City represents the most recent achievement in tower clocks, on the score of timekeeping and as an example of mechanical engineering, its extreme size, complication, and various adjuncts introducing many interesting and serious problems. This clock has four dials 26½ feet in diameter, which are placed on the sides of the lofty tower of the Metropolitan Life Building, nearly 350 feet above the street, the very apex of the 700-foot tower being fitted with a lantern by which signals visible over a wide range of territory are flashed for the hours and the quarters. This clock also has a set of chimes (see BELL), giving the Cambridge quarters, which sound the hours and the quarters. The minute hand is 17 feet long and the hour hand 13 feet 4 inches, and the mechanism driving them is controlled by a master clock located in the directors' room and working within an error of five seconds a month. From this clock, which is electrically driven and is of the self-winding type, through transmitters, each independently self-winding and electrically connected to relays and remote-controlled switches, the tower-clock hands, the chimes, and the flashers are all operated as well as the time service of the building. The hands are of steel-frame construction, incased in copper with fronts of wire glass, and carrying 16 incandescent lamps in the minute hand and 10 in the hour hand. Each dial is operated through a worm shaft from an electric motor which is installed in the clockroom on the twenty-sixth floor. The dial numerals are 4 feet high and the minute marks are each 10½ inches in diameter and are illuminated from behind like the figures of a stencil. The clock is so arranged that every quarter of an hour at night the time is flashed from the apex of the tower by red lamps, while white lamps flash the signals for the hour, but remain lighted ordinarily. Fifty-six red lamps and 88 white lamps giving an aggregate of 16,262 candle power are used. At 6 P.M. the chimes are cut out until 8 A.M. of the following day, and at dusk the lighting circuit is switched on. This clock was installed in 1909 and is exceeded in size only by the advertising clock at the Colgate works described below. For further description, consult *Electrical Review* (Chicago, Feb. 19, 1910).

Of a somewhat different nature, but exceeding in size the famous tower clocks described, is a clock erected on the works of Colgate and Company in Jersey City, where it may be seen from the Hudson River and from Manhattan Island. This clock has a dial 38 feet across and an area of 1134 square feet, with a minute hand 20 feet in length which, with its counterpoise, weighs nearly one-third of a ton. The mechanism is moved by a weight weighing 2000 pounds, and the whole clock weighs approximately six tons. This clock serves at night as well as in the daytime; and instead of the usual transparent dial illuminated from behind, the hands are outlined with incandescent lights, and brilliant red lights mark each numeral and an incandes-

cent lamp each minute mark, the latter being spaced 24 inches apart. The face of this clock is of skeleton form, as it was not feasible to expose so large a surface to the action of the wind without such supports that the face would be obscured. The tip end of the minute hand travels 24 inches every minute, or over half a mile a day, and the control mechanism is so regulated that the clock is maintained at a high degree of accuracy.

Electric Clocks. An electric clock is one whose mechanism is, in some way, either actuated or controlled by electricity. There are two principal types of electric clocks—(1) independent clocks, whose mechanism is kept in operation by electricity; (2) systems of clocks which are connected with a central or primary clock by an electric circuit, and are so arranged that either (*a*) the primary clock regulates its movements, at stated intervals, by forcibly moving the hands by an electric current into the proper position, or (*b*) the primary clock directly runs the hands of the secondary clocks, which are simply dials without independent machinery.

Clocks of the first class usually have some electromagnetic attachment applied to the mechanism, which keeps the pendulum in vibration, or their springs or weights constantly wound up; in other words, they are constructed like ordinary clocks, except that they are self-winding. The first self-winding clocks were made as early as 1855 by Alexander Bain, who applied electromagnetic attachments to the bob of the pendulum, which, in obedience to contacts connected with the pendulum itself, attracted it to and fro. Since that time many other means of applying the electric current to keep a clock running have been devised, and hundreds of patents for the same have been taken out. Another form of independent electric clock was put in operation in 1896, in the laboratory of Durham College, North Carolina. The clock is run directly by electromagnets, which are actuated by a current from an earth battery. The pendulum is swung by the electric current, and it is this which moves the clock. The works and dial are placed on the pendulum and swing with it. In addition to the clocks where the electric current gives an impulse to the pendulum, there are those where a spring is wound, or a weight raised, by means of a lever and ratchet working into a fine-toothed ratchet wheel. These clocks may be wound every hour or some lesser interval of time, such as every six minutes.

In the second class of electric clock the object is to keep a system of clocks correct by an automatic connection with a central and standard timekeeper. This method of time service has rapidly extended, until public buildings and private offices are supplied with time from a central clock, just as they receive a common service in heat, light, power, water, etc. Instead of employing the central clock simply as a regulator, it may be adopted as an actual propeller of the clocks on its circuit, and the secondary clocks become mere dials for indicating time, though the modern tendency is to employ self-winding time train clocks with a synchronizing system which often is one of considerable elaborateness of detail. The self-winding clocks can be connected with a continuously charged lighting circuit, thus obviating the necessity for batteries. The master clock for such a system becomes an important consideration, as well as the arrangement of the circuits. Often this time is secured in connection with the great telegraph companies, who receive on their wires the time signals from a national observatory and are enabled to maintain their local master clocks at high accuracy. Certain difficulties have been encountered in the electric connection between the main and secondary clocks, due, among other things, to induced currents from crossed telephone or other electric wires. In view of these difficulties, the Marconi wireless system has been applied to clocks, and the time signals sent out from an observatory can be received and, by means of relays, transmitted to a receiving mechanism. This device, however, has been found more useful for transmitting noon or other specified signals than a regular succession of impulses for continuous timekeeping. Though the general adoption of electrically controlled clocks is a development of the close of the nineteenth century, they have long been the subject of experimentation. In 1837 Alexander Bain began to experiment on electrically driven synchronous clocks, and in 1846 his system was in use between Glasgow and Edinburgh.

Pneumatic Clocks. A system of synchronous clocks which are connected with the central controlling clock by compressed air instead of electricity is called pneumatic. The clockwork in the city hall at Philadelphia, described above, is of this type. Under the influence of a master clock, pulsations of air are sent at regular intervals through the connecting tubes, and cause a bellows to expand at each dial, thus moving the hands.

Astronomical Clocks. An astronomical clock is one built with the simplest and most accurate mechanism possible, and with every possible protection against outside disturbances, so that its movements will be sufficiently accurate for astronomical calculations. The hour hand usually revolves but once a day, the dial being divided into 24 hours. One of the most important considerations for an accurate timekeeper of this class is that it should be maintained at a constant temperature, and often in astronomical observatories rooms are specially constructed for this particular purpose. It will be noticed, from the accompanying cut of the astronomical clock in the city hall at Philadelphia, that the dial has three circles—the minute circle above the centre, the 12-hour circle beneath the centre, and the hour circle upon the circumference of the dial. A clock regulated to keep mean solar or sidereal time is sometimes called an astronomical clock, as is also a clock having a dial on which the movements of the heavenly bodies are shown, this being the earlier application of the term.

A phonographic alarm clock was shown at the Paris Exposition of 1900, and since that time various devices have been developed by means of which the desired time, or any special message recorded on the cylinder, may be spoken when the time set on the indicator is reached. Increasing simplicity has been obtained for these devices, and while they have not attained general use, nevertheless they are available for those requiring them. Night clocks of various designs have been employed by means of which, when a button is pressed, an illuminated image of the hands and dial may be thrown upon the ceiling or wall of a room.

Clock Manufacture in the United States. American clocks were first manufactured in Connecticut, about 1800, by Eli Terry. His

clocks soon became popular, and he continued in business until his death, when his sons succeeded him, under the name of the Terry Manufacturing Company. Many neighboring establishments were soon engaged in clock manufacture, and Connecticut is still the centre of the industry in the United States. According to the census of 1850, there were 1436 clock factories and 2901 watch factories in the United States. At first the movements were constructed of wood, and in the better clocks the pendulum was of wood overlaid with gold leaf. In 1814 Terry invented the "short-shelf" clock, which rapidly displaced the long or hanging clocks previously made. Brass-wheel clocks were not made in the United States until 1837. American manufacturers introduced the system of cutting out the parts from sheet brass with a die, instead of casting them—a method which at once insured greater accuracy as well as cheapness in the product. The adoption of the die and of other forms of automatic machinery in the manufacture of clocks has now been carried to such an extent that nothing is left for the skilled hand laborer but the collocation of the parts. Coiled springs, instead of pendulums, had been used in European clocks for 200 years before their use was introduced into American factories; but they were placed only in the most expensive clocks: the invention of a reliable but cheap steel spring, which could be placed in the least expensive clocks, is due to American enterprise, and its introduction has revolutionized the clock-making industry. The small spring clocks can be manufactured and sold for less than one dollar, and are very popular.

CLOCKS AND WATCHES EXPORTED FROM THE UNITED STATES

(From the Statistical Abstract of the United States for 1913)

YEAR	Watches	Clocks	Total
1891	$ 275,707	$1,304,457	$1,580,146
1892	208,743	1,020,873	1,229,616
1893	241,758	962,423	1,204,181
1894	383,279	919,534	1,302,813
1895	357,329	846,676	1,204,005
1896	530,980	929,395	1,460,375
1897	801,491	968,911	1,770,402
1898	771,912	955,557	1,727,469
1899	819,810	1,043,621	1,863,431
1900	787,620	1,190,074	1,977,694
1910	1,228,713	1,360,218	2,588,931
1911	1,560,870	1,565,901	3,126,771
1912	1,880,677	1,661,468	3,542,145
1913	1,783,249	1,823,008	3,606,257

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CLODD, EDWARD (1840–). An English writer on evolution and allied subjects. He was born in Margate and was educated at Aldeburgh Grammar School. At the age of 15 he went to work and in 1862 became a clerk, and in 1872 secretary of the London Joint-Stock Bank. In 1896 he was for the second time president of the Folklore Society. Besides contributions to English reviews, particularly the *Quarterly* and *Fortnightly*, and to *Hastings Encyclopædia of Religion and Ethics*, he wrote: *The Childhood of the World* (1872); *The Childhood of Religions* (1875); *Jesus of Nazareth* (1880); *Myths and Dreams* (1885; 2d ed., 1891); *Story of Creation* (1888); *Story of Primitive Man* (1895); *Primer of Evolution* (1895); *Pioneers of Evolution* (1897); *Tom Tit Tot—Savage Philosophy in Folk Tale* (1898); *Story of the Alphabet* (1900); *Animism* (1906); and biographies of H. W. Bates (prefixed to an edition of *The Naturalist on the Amazons*, 1892), Grant Allen (1900), and Huxley (1902).

CLŌ'DIA. The infamous sister of Clodius Pulcher (q.v.), and wife of Quintus Metellus Celer, whom she is supposed to have poisoned. She is identified with the Lesbia to whom Catullus addressed his love poems. Her younger sister Clodia married Lucullus, but was put away on account of her conduct. Consult the *Prolegomena* to Ellis's ed. of Catullus, lxiii–lxxii (Oxford, 1889).

CLODION. A French sculptor. See MICHEL, CLAUDE.

CLODIUS PULCHER, klō'dĭ-ŭs pŭl'kẽr, PUBLIUS. A Roman politician. He first appears in 70 B.C., serving under Lucullus in Asia. In 65 he impeached Catiline for extortion in Africa; but Catiline bribed him and so escaped. Near the close of 62 he was said to have had an intrigue with Pompeia, wife of Julius Cæsar, on the occasion of the celebration of the rites of the Bona Dea (q.v.) in Cæsar's house. Clodius was tried for violation of the sacred mysteries, but was acquitted, it was charged, because he had bribed the judge. Having renounced his patrician status and having been adopted by a plebeian, P. Fonteius, he was elected tribune of the people in 59. One of his first acts was to exile Cicero, who had refused to defend him in the trial for sacrilege; but the great orator was soon afterward recalled in spite of Clodius' opposition. Clodius gathered around him the worst elements of the people, until he became a candidate for the prætorship (53 B.C.) in opposition to Milo. Both candidates worked with reckless energy. The contest was ended in an unexpected manner, Jan. 20, 52 B.C. Milo set out on a journey to Lanuvium. Near Bovillæ he met Clodius, who was on his road to Rome. Both were accompanied by armed followers, but passed each other without disturbance. However, some of the men in the rear guard of each party began to quarrel; a fight followed, and Clodius was killed. See MILO; and consult Cicero's oration, *Pro Milone*, which, however, is polemical and exaggerated.

CLODT-JÜRGENSBURG, klôt-yur'gens-bo͝ork, PETER KARLOVITCH, BARON (1805–67). A Russian sculptor, born in St. Petersburg. He

studied at the artillery school in that city, was for a short time in the army, and gained his artistic training at the Academy of St. Petersburg, where he was appointed a professor. He was particularly successful in his depiction of horses, especially as seen in vigorous action, and those of the quadriga group on the triumphal arch at St. Petersburg are excellent specimens of this feature of his work. The four colossal groups of "Horse Tamers," in bronze, on the Anitchkov Bridge, St. Petersburg, are also by him. Replicas of two of these are in the grounds of the Schloss in Berlin and in the Piazza del Re, Naples. His son, MICHAEL PETROVITCH (1835–), is a genre painter and etcher of some note. His nephew, MICHAEL KONSTUNTINOVITCH (1832–1902), was a landscape painter, whose works are to be found in nearly all Russian galleries and many private collections.

CLŒLIA, klē'li-â. A maiden given by the Romans as a hostage to King Porsenna. She escaped from the Etruscan camp with some companions, swam the Tiber, and returned to Rome. The Romans, however, bent upon keeping good faith, sent the fugitives back to Porsenna, who, in admiration of this generous action, freed Clœlia and her fellow hostages. A statue was erected in her honor on the Via Sacra.

CLOG ALMANAC. A form of rude calendar, said to be of Danish origin, consisting of a square stick notched for months and days, and showing the saints' days, moon's phases, and other features of the almanac. Specimens are to be seen in the British Museum and other collections.

CLOISONNÉ, klwä'zô'nâ'. See ENAMEL.

CLOIS'TER (from OF. *cloistre,* Fr. *cloître,* from ML. *claustrum,* inclosure, from *claudere,* to close). Strictly, the entire space inclosed by the main encircling wall of a religious establishment (Ger. *Kloster,* monastery), including church, dormitories, and all other buildings. Thus, all the buildings for the body of canons attached to a cathedral were included in the term "cloister." A "cloistered monk" is one living within monastic precincts. But common usage has recently limited the term to those rectangular courts, in the centre of the main group of monastic or canonical buildings, which are surrounded on all sides by a covered arcade. These cloisters were the centres of monastic life; from their arcades the refectory, chapter house, dormitories, and church are reached. In their central open space, or *garth,* are the well and garden. Cathedrals often had their cloisters, especially in England, where many cathedrals were at the same time abbey churches. The cathedral cloister was usually on the south side of the nave. Many large monasteries had more than one cloister; one for the lay brothers, open to all (sometimes in front of the church); one for the monks; a third, smaller, for the abbot. In such great early Benedictine monasteries as St. Gall there was a cloister for the artisans.

The earliest examples of rudimentary cloisters are in Syria; none have survived in the West earlier than the eleventh century. From that time until the fifteenth century Romanesque and Gothic cloisters abound everywhere. With the advent of the Renaissance and the decay of the orders in the fifteenth and sixteenth centuries, they ceased to be built except in Italy.

The general type of cloister is an arcade resting on a high parapet, usually with a single opening in the middle of each side of the quadrangle leading into the central garden; the passage behind the arcade being ordinarily covered with a wooden roof. Above these galleries on one or more sides there was sometimes a second story; in consequence of reconstructions this upper story is very seldom preserved. During the twelfth century the single columns gave way to coupled shafts, slenderer and higher than those of the preceding style. Sometimes, especially in the North, piers supplemented or replaced columns. The cloister followed the changes of style of other buildings. The finest Romanesque cloisters are in southern France and Italy; Germany and England enter the field particularly during the Gothic period; Italy, with few exceptions, furnishes the only fine Renaissance examples. St. Trophime at Arles and Le Puy in Velay are fine examples of French Romanesque cloisters, while those of Thoronet and Silvacanne show the French-Cistercian severity, and those of Fontfroide and Laon show transition to Gothic. In Italy at the same time there was far greater variety and richness. The northern examples at Verona (cathedral), Pomposa, and Bologna (San Stefano) are simple; but farther south the twelfth century developed richer types, as in the Oriental examples at Salerno, Ravello, and Amalfi, and the gem at Monreale (Palermo), with varied columns and mosaic decoration. These were followed by exquisite examples of the Roman school (Fossanova, S. Paolo *fuori le mura,* and the Lateran, Rome). In fact, Rome possesses an unrivaled series, from the heavy cloister of the Tre Fontane and San Lorenzo to the delicate cloister of San Paolo, through all intermediate stages. Gothic cloisters were beautiful everywhere, but the finest specimens are those of the north of Europe, especially France. The pointed arcades are sometimes, especially in England, filled with rich tracery, and the passages behind them covered with groined vaulting. In cooler climates the tracery, sometimes the entire gallery, was glazed. The cloisters of Noyon, Sémur, Soissons—the last named exquisitely rich—of Mont-Saint-Michel (with its novel alternating arrangement of shafts), of Rouen, with a beautiful second story, express the ideas of the golden age of the thirteenth century in France; while those of the fourteenth and fifteenth centuries are inferior, as at Bordeaux and Narbonne. In Germany the most interesting are the Cistercian cloisters, like those of Maulbronn, Altenberg, and Heiligenkreuz. In England, though there are some good early Gothic examples—as at Salisbury—the best are late, as at Gloucester, Hereford, Norwich, Westminster, Wells, and Canterbury. At Batalha and Belem in Portugal are extraordinarily rich cloisters in the overwrought style of the transition to the Renaissance (fifteenth century).

Cloister has a further meaning which concerns the restriction of members of religious men or women to the limits of the inclosure. By ecclesiastical legislation cloistered religious are forbidden to leave their cloister or to admit lay individuals to it. The inmates are not dispensed from this regulation save by the highest authority and only in cases of extreme necessity. The object of this rule is to prevent their being affected by any contaminating influence from outside. They may communicate by letter or even by speech provided in the latter instance

there be a veil and a grating interposing. This applies only to members of cloistered orders, not to all religious communities.

CLOISTER AND THE HEARTH, The. An historical novel of the time of the early Renaissance, by Charles Reade (1861). The scene is laid chiefly in Holland and Italy.

CLONMEL' (Ir., honey meadow). A municipal borough in County Tipperary, Ireland, built on both banks and on an island of the Suir (Map: Ireland, D 4). Traces of its old walls, demolished by Cromwell in 1650, remain, and it has two Catholic churches, a Franciscan friary, and an endowed school. Among its industries are flour milling, brewing, and tanning. The chief exports are agricultural produce and cattle. Clonmel was an important place in Danish times. In the thirteenth century the Franciscans established universities in the town. Clonmel was the birthplace of Laurence Sterne, the novelist. Pop., 1901, 10,167; 1911, 10,209; nearly one-tenth of the houses are unoccupied.

CLONTARF' (Ir., bull's meadow). A suburb of Dublin, Ireland, about 3 miles east-northeast of Dublin (Map: Ireland, E 3). It is much frequented during the summer months for sea bathing, and there are many handsome villas in the vicinity. At Clontarf, in 1014, Brian Boroimhe (q.v.) met his death while winning a victory over the Danes. Pop., about 5000.

CLŌ'NUS. Rapid flexion and extension due to irregular nerve action in certain diseases of the spinal cord. It is elicited by flexing the foot forcibly and suddenly releasing it.

CLOOTS, klōts, or **KLOOTZ,** Jean Baptiste du Val-de-Grace, Baron (1755–94). A free-thinking philosopher and republican enthusiast of the French Revolution, generally referred to as "Anacharsis Cloots, the Orator of the Human Race." He was born, June 24, 1755, at Gnadenthal, near Cleves, the son of a German baron of Dutch extraction, and was sent to Paris to be educated when he was only 11 years of age. There he imbibed extremely rationalistic ideas on religion and politics, which were strengthened by a short residence in Berlin, where he came in contact with the Potsdam philosophers, one of whom was his uncle, Cornelius de Pauw. Returning to France at the age of 21, Cloots began the campaign of Reason by an attack on revealed religion and published a curious book, entitled *Certitude des preuves du Mahométisme*—a satirical work, which fell somewhat flat. A visit to England, where he became intimate with Burke, was followed by an extended tour on the Continent. Everywhere he preached his doctrines of liberty, equality, and fraternity, and in several countries he barely escaped imprisonment. From Portugal the news of the outbreak of the French Revolution sent him posthaste to Paris, where he at once began to play an important part. He was instrumental in spreading republican principles in Brittany, and on June 19, 1790, he appeared at the bar of the National Assembly at the head of a throng of Parisians from the slums dressed up in fantastic costume to represent the nations of the earth, and delivered a magniloquent oration in behalf of "Universal Republicanism." To show the sincerity of his principles, he discarded his rank and titles (though not his large income). Cloots was made a French citizen and in 1792 was elected to the National Convention. He voted for the death of the King, "in the name of the human race." He was popular with the visionaries and with the lower orders of Paris, but incurred the enmity and suspicion of Robespierre. In consequence, Cloots was expelled first from the Jacobin Club, and later from the Convention. He was finally arrested in 1794 and after a summary trial was sent to the guillotine, with Hébert and his followers, March 24, 1794. He left a number of works, the chief of which are *L'Orateur du genre humain* (1791) and *Base constitutionelle de la république du genre humain* (1793). Consult: Avenel, *Anacharsis Cloots, l'orateur du genre humain* (Paris, 1865); Bax, *Outlines from a New Standpoint* (London, 1891).

CLOQUET, klô'kā'. A city in Carlton Co., Minn., 27 miles by rail west-southwest of Duluth, on the Northern Pacific, the Great Northern, the Chicago, Milwaukee, and St. Paul, and the Duluth and Northeastern railroads; and on the St. Louis River (Map: Minnesota, E 4). It is an important lumber centre, being especially noted for its large output of white pine, and manufactures print paper and boxes and match blocks. There are municipal water and sewage works, one hospital, and a public library. Cloquet was incorporated as a city in 1903. Pop., 1900, 3072; 1910, 7031.

CLORIDANO, klō'rē-dä'nō. A young Moor, in Ariosto's *Orlando Furioso.*

CLOSE (from OF. *clos,* p.p. of *clore,* to shut, from Lat. *claudere,* to close). A term used in heraldry. When the wings of a bird are down and close to the body, it is described as close. The word is used only with reference to birds addicted to flight. See Heraldry.

CLOSE, klōs. A space inclosed by a wall or fence; a court, yard, or quadrangle; a narrow side street or passage leading to a court; especially the precincts of a cathedral or monastery. In England, where many of the cathedrals were originally monastic foundations, the entire cathedral property, including fields, cloisters, bishop's palace, chapter house, and ecclesiastical residences, is generally inclosed within a high wall with gates at the abutting streets, the free space within, near the cathedral, being planted with grass and trees: this wide inclosure is termed the close. On the Continent the cathedrals stand in the open, usually in the heart of the city, and thus have no close.

In a legal sense, it is a parcel of land in which some one has an interest, amounting at least to a right to present possession, and which in fiction of law is considered as inclosed by an ideal or invisible, if not real, boundary. Breaking or entering another's close is a trespass. See Curtilage; Fee; Trespass.

CLOSED SHOP. A shop or other employing enterprise which is restricted to the employment of union labor. Where trade-unions are sufficiently powerful, they seek, as a rule, to incorporate in their agreements with their employers the provision that only union members shall secure employment. The closed shop is commonly denounced by spokesmen of the middle class as a tyrannical institution, a device for securing the aid of the employer to compel men averse to unionism to become members of the organization, or worse still, a means of creating a monopoly for certain favored classes of labor. The spokesmen of labor, on the other hand, assuming that organization is absolutely necessary for the defense of the interests of

labor, urge that there is nothing improper in compelling all laborers in an industry to become members of the organization and share in its burdens. Just complaint, they assert, can only be lodged against the small minority of labor organizations that bar qualified persons from the union and still attempt to enforce the closed-shop rule.

Where the union commands only a part of the trade it is customary to insist that nonmembers shall be excluded only when the union is able to furnish the number of qualified men required. A shop working under such an agreement is known as a preference shop. See TRADE-UNIONS.

CLOSET, klŏ-zĕt′ (OF. *closet*, dim. of *clos*, close). In heraldry (q.v.), the half of the bar.

CLOS'TER-SEV'EN (KLOSTER-ZEVEN). See WILLIAM AUGUSTUS, Duke of Cumberland.

CLO'SURE, or **CLÔTURE,** klō'tụr′ (OF. *closure*, Fr. *clôture*, from Lat. *clausura*, a closing, from *claudere*, to close). A rule of procedure adopted in the English Parliament, for the purpose of terminating prolonged discussion, and bringing matters under debate to an issue. It had its origin in 1882, when the policy of obstruction adopted by the Irish members made legislation impossible. It was decided then that, at the request of 40 members, the Speaker might declare debate closed, and call for a vote on the question under discussion. As modified in 1887 the rule now stands that the Speaker may cut off discussion at the request of 200 members, or at the request of 100 only, if less than 40 members vote in the negative. In France the clôture has also been frequently used, since the coup d'état of 1851. In the United States House of Representatives, and in the State legislatures, the same object is attained by moving the "previous question."

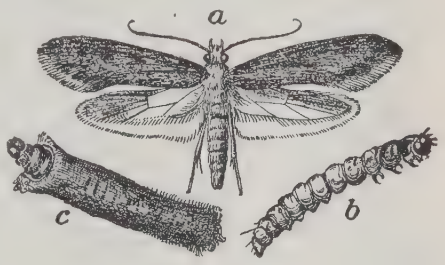
CLOT, klō, ANTOINE BARTHÉLEMY, or CLOT BEY (1793–1868). A French physician, born at Grenoble. He studied at Montpellier, and for several years practiced medicine and surgery at Marseilles. After 1822 he lived mostly in Egypt, where by order of Viceroy Mehemet Ali he established hospitals and medical and pharmaceutical colleges and organized the medical service of the army and navy. In 1832 he was given the rank of an Egyptian bey, and in 1836 that of a general. After the death of Mehemet Ali, Clot left Egypt and resumed the practice of medicine at Marseilles. In 1854 he returned to Egypt, and became physician in ordinary to the Viceroy, Saïd Pasha. Clot's great activity as an organizer did not prevent him from carrying out important scientific observations and gathering large scientific collections. His published works include: *Relation des épidémies de choléra qui ont régné à l'Héggiaz, à Suez et en Egypte* (1832); *Compte rendu des travaux de l'école de médicine d'Abou-Zabel* (1832–33); *De la peste observée en Egypte* (1840); *Coup d'œil sur la peste et les quarantaines* (1851); *Méhémet-Ali, Vice-roi d'Egypte* (1862); *De l'ophthalmie, du trichiasis, de l'entropion et de la cataracte observés en Egypte* (1864); and *Un dernier mot sur la non-contagion de la peste* (1866).

CLOTAIRE, klō'târ′, **I** and **II.** See MEROVINGIANS.

CLOTBUR. See COCKLEBUR.

CLOTH. See WOOLEN AND WORSTED MANUFACTURES; WEAVING.

CLOTHES MOTH. Any of several small moths of the genus *Tinea*, the larvæ of which feed on woolen fabrics and furs. In the United States the depredations wrought by clothes moths, or "moth," are caused by at least three different species, which differ both in structure and habits. One (*Tinea pellionella*) is a small brown moth, with darker brown spots on the fore wings, whose larvæ live within a case composed of bits of the food material bound together with silk. As the larvæ increase in size, the silk cases are lengthened, and when the case becomes too narrow it is split open and a new part is inserted, as may be demonstrated by changing the caterpillar from time to time to differently colored materials. The larva of another, the carpet moth (*Tinea tapetzella*), lives within a winding gallery made up of bits of carpet or other cloth held together with silk. Its fore wings are blackish and yellowish white; the hind wings and head are dark gray. The straw-colored species (*Tinea biselliella*) has a naked larva that spins a little silk over its food material, but makes neither a case nor a gallery. When ready to pupate a cocoon is spun, which, like the larval cases of the foregoing, is composed of fragments of cloth bound together by silk. In the spring or early summer woolen clothes and furs should be thoroughly brushed and subjected to direct sunlight. They should then be carefully packed away in cloth bags or tight boxes, together with naphtha balls or tobacco leaves. Tarred paper and plenty of newspapers are useful for wrapping up rugs. Bits of camphor wood or cedar are also helpful in keeping out moths. A few drops of carbon bisulphide allowed to evaporate in a tight compartment containing infested goods will kill moths and eggs; but as it is very inflammable and the fumes are injurious to man, it should be used with caution. Benzine and gasoline are also useful but rather dangerous moth killers, and printer's ink is poisonous. The best preventive for rugs, etc., is constant use and "kicking about"; for small garments and furs, inclosure in tight cloth bags. Consult Howard, "Household Insects," in *Department of Agriculture, Bulletin 4* (Washington, 1902).



CLOTHES MOTH.

a, The moth; *b*, feeding larva; *c*, pupa in case.

CLO'THO (Lat., from Gk. Κλωθώ, *Klōthō*, the Spinner, from κλώθειν, *klōthein*, to spin). One of the three Fates. See PARCÆ.

CLOTIL'DA, SAINT (c.474–545). A daughter of Chilperic, King of Burgundy, and wife of Clovis, King of the Franks. She was married to Clovis (q.v.), who through her influence was converted to Athanasian Christianity in 496. After the death of Clovis Clotilda took some part in public affairs until two of her grandsons were murdered by their two uncles,

her sons. Then she retired to Tours and practiced the austerities of a devotee until her death. She was buried beside her husband in the church now called St. Geneviève, which she had built in Paris, and, although never authoritatively canonized, was soon recognized and venerated as a saint. There is a statue of her in the Luxembourg, and a fine church in her honor was built in Paris in the middle of the nineteenth century. Consult Kurth, *Sainte Clotilde* (Paris, 1905).

CLÔTURE. See CLOSURE.

CLOTZ, MATTHIAS. See KLOTZ.

CLOUD, THE. One of Percy Bysshe Shelley's best-known poems (1820).

CLOUD (AS. *clūd,* mass of rock, hillock, which a cloud often resembles). In general, anything that obscures the vision through a clear atmosphere, as clouds of dust, smoke, or moisture. The clouds of smoke over cities and from forest fires and the clouds of dust over the plains of India have an important temporary influence on local climate. In meteorology, the terms denote the moisture of the atmosphere precipitated from an invisible state form cloud is the process called "dynamic cooling," first expounded by Espy, Kelvin, Reye, and Peslin, and developed in detail by Bezold and Bigelow. Air expands when it is brought under lower barometric pressure; it may be by being pushed up over a mountain, or it may be by rising because of its own buoyancy. In either case the expansion takes place against the adjacent air, and presses the latter to one side. This operation constitutes work done on the resisting air, and work involves the action of some force which, in the present case, is almost invariably the expansive force due to the heat that is latent in the atmosphere, viz., in the air and vapor combined, or the so-called thermal content.

The work done in expansion is said to be done at the expense of the internal heat of the air; or, heat is abstracted from the expanding air in order to do work on the air that is being pushed aside. Consequently, the expanding air grows cool in proportion to the work done. When it is thereby cooled to the dew point, the vapor begins to condense upon dust particles as solid nuclei and forms liquid drops; this involves the giving up of a large amount of heat

MEAN HEIGHTS AND VELOCITIES OF CLOUDS AT WASHINGTON, D. C., APRIL, 1896, TO MARCH, 1897

NAMES	MEAN HEIGHTS		MEAN VELOCITIES		EXTREME HEIGHTS	
	April to September	October to March	April to September	October to March	Maximum	Minimum
	Meters	Meters	M. P. S.	M. P. S.	Meters	Meters
Cirrus	10,358	9,511	30.3	34.9	17,182	5,354
Cirro-stratus	10,620	9,526	26.9	30.4	16,144	5,142
Cirro-cumulus	8,826	7,413	23.4	33.4	15,411	3,067
Alto-stratus	5,772	4,801	17.6	21.3	15,552	1,613
Alto-cumulus	5,030	3,822	16.5	21.1	10,167	1,524
Strato-cumulus	2,870	2,399	10.5	15.1	7,285	1,375
Nimbus	1,926	1,804	8.5	11.9	4,022	634
Cumulus, dome	3,068	2,855	...	...	.....	....
" top	1,819	1,694	7.0	10.9	5,242	545
" base	1,182	1,198	...	...	.....	....
Cumulo-nimbus, top	4,965	3,730	15.3	21.1	15,903	1,249
" " base	1,750	....	...	...	.....	....
Stratus	838	1,132	6.0	10.5	.....	....

of vapor into minute globular particles that float for a long time in the air. These particles are so small that they cannot descend rapidly through the ordinary atmosphere, even when perfectly still, on account of its viscous resistance or so-called internal fluid friction. The gentlest ascending current or the slight vertical component of a nearly horizontal current suffices to keep the cloudy particles from falling to the ground.

The condensation of the invisible moisture of the air into particles of water cannot be accomplished in the free atmosphere without a decided reduction of temperature; and this may occur in three ways: 1. If air comes in contact with a cold solid, the latter may be covered with dew; but if two masses of warm-moist and cold-moist air come together, a slight condensation and haze or cloud may be formed where they mix with each other. These clouds by mixture have been extensively studied by Brillouin. 2. If moist air is cooled by radiation of heat, the coolest portions will soon fall to the temperature of the dew point, and the vapor therein begin to become visible as a fog; these foggy particles radiate rapidly, thereby increasing the coolness of the air and stimulating the formation of more fog. 3. But the principal method by which cooling is effected in order to known as the latent heat of vaporization, which has to be lost by radiation from the drop, wherefore the cooling of the mass becomes much slower. In this process of condensation a given amount of cooling requires a much larger amount of expansion, and therefore of work done, than in the previous stage before cloudy condensation began. This stage is illustrated in the formation of the cumulus clouds seen with showers or thunderstorms or especially in hail weather. On these occasions the cumulus clouds grow rapidly upward to great heights. The upper parts of these clouds can be at such a low temperature as to contain snow or hail in place of water particles. The forms and the quantities of clouds, the direction and velocity of their movements, the apparent changes they undergo, and many other peculiarities have for a century past formed an item of increasing importance in the study of meteorology.

The first step towards simplifying and harmonizing the old meteorological records was taken by Luke Howard, in 1802, in his proposed classification of clouds into three primary forms (*cirrus, cumulus, stratus*), and three intermediate forms (*cirro-cumulus, cirro-stratus,* and *cumulo-stratus*), and these have been almost universally adopted by modern observers; but experience has shown that they do not give a

TYPICAL CLOUD FORMS

1. CIRRUS.
2. CIRRO-CUMULUS.
3. STRATO-CUMULUS.
4. NIMBUS.
5. CUMULUS.
6. STRATUS

sufficient range of terms to enable one easily to classify and describe all the varieties of clouds that are to be observed. Probably no simple system of nomenclature would suffice to do this, and Cleveland Abbe has proposed for special students a system of symbols based on the methods of formation of the various kinds of clouds. The many other modifications and new terms that have been suggested are well compared and discussed in a memoir by H. H. Clayton, of the Blue Hill Meteorological Observatory, near Boston, Mass. Consult *Annals of Harvard College Observatory.*

The descriptive abbreviations and classification introduced by the International Meteorological Congress, held at Munich in 1891, is that which is now adopted more or less completely by all the national weather bureaus. Systematic observations upon the heights and movements of all clouds were made at many stations throughout the world in concert from May 1, 1896, to July 1, 1897. From these observations a general idea of the heights of the respective kinds of clouds may be gathered, as shown in the preceding list, compiled from Professor Bigelow's *Report on International Cloudwork of the United States Weather Bureau*, page 20. The titles and descriptions of the clouds are as used by the International Committee.

CIRRUS (*Ci.*). Isolated feathery clouds of fine fibrous texture, generally brilliant white, frequently arranged in bands which spread like the meridians on a celestial globe over a part of the sky, and converge in perspective towards one or two opposite points of the horizon. (In the formation of such bands cirro-stratus and cirro-cumulus often take part.)

CIRRO-STRATUS (*Ci. S.*). Fine whitish veil, sometimes quite diffuse, giving a whitish appearance to the sky, and called by many "cirrus haze," and sometimes of more or less distinct structure, exhibiting tangled fibres. The veil often produces halos around the sun and moon when seen through it.

CIRRO-CUMULUS (*Ci. Cu.*). Fleecy cloud. Small white balls and wisps, without shadows, or with very faint shadows, which are arranged in groups and often in rows.

ALTO-CUMULUS (*A. Cu.*). Dense fleecy cloud. Larger whitish or grayish balls, with shaded portions, grouped in flocks or rows, frequently so close together that their edges meet. The different balls are generally larger and more compact (passing into strato-cumulus) towards the centre of the group, and more delicate and wispy (passing into cirro-cumulus) on its edges. They are very frequently arranged in lines in one or two directions.

ALTO-STRATUS (*A. S.*). Thick veil of a gray or bluish color, exhibiting in the vicinity of the sun and moon a brighter portion, which, without causing halos, may produce coronæ. This form shows gradual transitions to cirro-stratus; but, according to the measurements made at Upsala, was of only half the altitude.

STRATO-CUMULUS (*S. Cu.*). Large balls or rolls of dark cloud, which frequently cover the whole sky, especially in winter, and give it at times an undulated appearance. The stratum of strato-cumulus is usually not very thick, and blue sky often appears in the breaks through it. Between this form and the alto-cumulus all possible gradations are found. It is distinguished from nimbus by the ball-like or rolled form, and because it does not tend to bring rain.

NIMBUS (*N.*). Rain clouds. Dense masses of dark, formless clouds, with ragged edges, from which generally continuous rain or snow is falling. Through the breaks in these clouds there is almost always seen a higher sheet of cirro-stratus or alto-stratus. If the mass of nimbus is torn up into small patches, or if low fragments of cloud are floating much below a great nimbus, they may be called *fracto-nimbus* (the "scud" of the sailors).

CUMULUS (*Cu.*). Woolpack clouds. Thick clouds, whose summits are domes with protuberances, but whose bases are flat. These clouds appear to form in a diurnal ascensional movement, which is almost always apparent. When the cloud is opposite the sun, the surfaces which are usually seen by the observer are more brilliant than the edges of the protuberances. When the illumination comes from the side, this cloud shows a strong actual shadow; on the sunny side of the sky, however, it appears dark, with bright edges. The true cumulus shows a sharp border above and below. If often torn by strong winds, the detached parts (*fracto-cumulus*) present continual changes.

CUMULO-NIMBUS (*Cu. N.*). Thundercloud; shower cloud. Heavy masses of clouds, rising like mountains, towers, or anvils, generally surrounded at the top by a veil or screen of fibrous texture ("false cirrus"), and below by nimbus-like masses of cloud. From their base generally fall local showers of rain or snow, and sometimes hail or sleet. The upper edges are either of compact, cumulus-like outline and form massive summits, surrounded by delicate false cirrus, or the edges themselves are drawn out into cirrus-like filaments. This last form is most common in "spring showers." The front of thunderstorm clouds of wide extent sometimes shows a great arch stretching across a portion of the sky, which is uniformly lighter in color.

STRATUS (*S.*). "Lifted fog" in a horizontal stratum. When this stratum is torn by the wind or by mountain summits into irregular fragments, they may be called *fracto-stratus.*

In general the cirrus, cirro-stratus, and cirro-cumulus are the highest and swiftest; the alto-stratus, alto-cumulus, strato-cumulus, and cumulo-nimbus are median, the nimbus, cumulus, and stratus are lowest and slowest. These three groups are also generally distinctive as to their appearances and methods of formation.

There are some rarer forms of clouds that have received special or local names, such as the following: *Phosphorescent*, sometimes called iridescent, opalescent, or luminous night clouds. These are seen even at midnight in Europe as distant, pure white clouds, near the horizon. Measurements appear to show that they are from 10 to 20 miles above sea level; they may possibly be self-luminous or phosphorescent, but it is more likely that they shine by reflecting the light from a distant twilight. *Hoods*, or false cirri, envelope a mountain top, or the summit of a cumulus dome. These are formed in the air that is pushing upward over the obstructing mountain. The *tablecloth* of Table Mountain at Cape Town is formed somewhat like the hood, but covers the whole flat top of the mountain and hangs down a little way over the leeward cliffs with frayed edges as the cloud matter evaporates back into invisible moisture.

The *helm cloud* and *helm bar* are stationary clouds, formed at the summits of standing waves of air. When an east wind blows over the

Crossfell Range, in Cumberland, England, there is formed not merely a cloud or hood or helmet with rain at the summit of the range, but a series of undulations to the leeward, one or more of which may rise high enough as a standing wave to form a cloud at its summit; through this cloud, in fact, the wind is blowing, and the cloud particles formed on the windward side are carried up through the cloud and down again on the leeward side, evaporating and disappearing as they descend at about the same level as when they were formed on the windward side. *Tornado cloud* and *waterspout cloud* are the distinctive, cloudlike form that reaches down nearly to the surface of the earth or ocean from the main cloud mass above and marks the central axis of a whirling mass of air. Within such a whirl, the barometric pressure is reduced by reason of centrifugal force, and any air that is drawn inward expands, cools, and forms cloud, just as it would do if it rose upward into regions of lower pressure. When the whirl ceases, the cloud immediately disappears. *Globo-cirrus* is a cirrus cloud having a globular form, from which stream downward fibres or filaments, as though the particles of the globular mass were being pulled out by the wind, or were settling down by their own weight into air currents of a different velocity horizontal. *Mammato-cumulus* shows protuberances or pockets on the underside of an otherwise flat-bottomed cloud, as though the heavier portions of the cloud were settling down in groups from the main cloud.

The study of the movements of the clouds is our principal source of information relative to the general motion of the air at considerable heights above the sea or land. During the past fifty years an increasing amount of attention has been given to this matter, and the use of the nephoscope and photogrammeter has greatly increased the accuracy of observation. By international agreement, special observations were made in many countries in 1896 and 1897, the results of which were published in 1898–1901; of these reports the most important is that by Prof. F. H. Bigelow, published in the *Annual Report* of Prof. Willis L. Moore, chief of the United States Weather Bureau. More recently, Professor Hildebrandsson published a general report based on the international observations of clouds, which is translated in the *Quarterly Journal of the Royal Meteorological Society* for October, 1904. Consult Clayden, *Cloud Studies* (London, 1905).

The average area covered by clouds, taking the globe as a whole, is about one-half of its surface. They, therefore, play a very important part in the distribution of solar heat over the earth's surface and within the atmosphere, and the consideration of this influence alone is a very important but difficult problem in the determination of the motions of the atmosphere. See DEW; EVAPORATION; NEPHOSCOPE; RAIN; SNOW.

CLOUD'BERRY (ME. *cloud*, mass of rock, hill, AS. *clūd*, round mass, mass of rock + *berry*) (*Rubus chamæmorus*). A plant of the same genus with the dewberry, which it resembles. It has a trailing habit of growth, and never attains a height of more than 8 to 10 inches; the leaves, few, large, lobed, and somewhat kidney-shaped; the flower large and white, male and female flowers on separate plants, the female plant producing an amber-colored fruit equal in size to a dewberry, and of an agreeable flavor. It is a native of the northern parts of Europe, Asia, and America. In Great Britain it is chiefly confined to elevated moors; in Norway and Sweden it is much more abundant, and the fruit is highly valued and made into excellent preserves. In America it is found only sparingly south of the Canadian boundary, but it is common and greatly prized in Newfoundland, Labrador, Nova Scotia, and northern Quebec. It is abundant through northern Canada, extending from the Atlantic to the Pacific and north to the Arctic circle. The plant is of difficult cultivation, and no attempt to make it produce fruit freely in our gardens has yet been successful. Somewhat similar to the cloudberry is *Rubus geoides*, which yields a very agreeable fruit, as large as a raspberry, one of the few native fruits of Tierra del Fuego and the Falkland Islands. See Plate of RUBUS.

CLOUD'BURST'. A term first applied in the United States about 1840, and in India about 1860, to a sudden extraordinarily heavy local rain. No definite rate or amount of rainfall, or area covered by it, has been assigned as a limit proper for distinguishing cloudbursts from ordinary heavy rains. Many special cases of cloudbursts have been described in English and American meteorological journals, especially in the *United States Monthly Weather Review*, from which it may be seen that the term is rarely used unless six or more inches of rain fall, and at the rate of 10 or more inches per hour. Thus, in one case, 10 inches fell in an hour; in another, the extreme case, 21 inches. Nothing definite is known as to the areas covered by these heavy rains; but it is not likely that the heaviest cover more than an acre, or that the lighter ones cover more than a square mile. Several cloudbursts have occurred on the eastern slope of the Rocky Mountains; but the great rains that cause the heavy floods along the eastern slope of the Appalachians from Georgia to Pennsylvania sometimes attain the intense local character that is ordinarily attached to the term "cloudburst." Professor Ferrel has explained how a mass of water can be held within the cloud by means of rapidly ascending currents; but there is scant evidence of the actual existence of the strong ascending wind required by this explanation, and it seems equally possible that cloudbursts may result from the sudden formation of a large mass of rain in a very tall cloud, rather than from the gradual accumulation of rain in the clouds. Consult: Ferrel, *Recent Advances in Meteorology* (Washington, 1886), and his *Popular Treatise on the Winds* (New York, 1889); Hann, *Lehrbuch der Meteorologie*, pp. 361–370 (1st ed., Leipzig, 1901).

CLOUD ON TITLE. An apparent defect in the title to real estate, based on a written instrument, judgment, or order of court, which purports to create an interest or lien in or an incumbrance upon the land in question. The person whose land is so affected may have the "cloud" removed by appropriate proceeding in equity, instituted by a bill in the nature of a bill to quiet possession, known specifically as a "bill to remove cloud on title." The judgment of the court may direct the obnoxious instrument to be delivered up and canceled, or the record of such incumbrance or lien canceled, or may by decree declare a judgment, order of court, or proceedings under an invalid tax levy, to be void and of no effect so far as the land in question in concerned.

In order to obtain this remedy, however, the instrument or act purporting to create the cloud

on title must have apparent but not real validity. A deed or mortgage void upon its face does not create a cloud, and cannot be attacked by such a proceeding. See BILL IN EQUITY; INCUMBRANCE; TITLE; and consult the authorities referred to under the last-mentioned reference.

CLOUDS, THE. The most famous of the comedies of Aristophanes (q.v.).

CLOUET, klōō'ā'. A family of distinguished French painters of Flemish descent. Jean (?–1540), called Janet, was probably the son of the painter Michele Clouet of Valenciennes. He came to France from Flanders in 1516, and settled at Tours, where he was appointed court painter and valet de chambre to Francis I; later he lived in Paris. He painted a few religious pictures, but his principal works are portraits. Those of the mathematician Finé and the humanist Budé are indisputably authentic, and probably also the 130 drawings in the Musée Condé, Chantilly—a unique collection of portraits of Francis I, his family and court. It follows that the portraits in oil after these drawings, viz., those of Francis I (Louvre and Uffizi), the Dauphin Francis (Antwerp), the miniature of the Duc de Brissac (Morgan collection), and others, are also by his hand. Jean is a product of the Flemish school and was a greater technician than an artist. His portraits are full of life and charm, the drawing is delicate and effective, but the color is cold and thin.—FRANÇOIS, also called JANET (before 1522–1572), the son and pupil of Jean, was born at Tours and succeeded his father as court painter to Francis I, holding the same position under Henry II, Francis II, and Charles IX. There are numerous allusions in the court documents testifying to his honorable position, and from them we learn that he molded the wax death masks of Francis I and Henry II. He was celebrated in verse by Ronsard and in prose by Pasquier. Only two signed portraits by him survive—Pierre Cutte (1562, Louvre) and a "Lady in the Bath" (Cook collection, Richmond); but critics are agreed that he drew a series of 50 colored crayon portraits of Henry II, Francis II, and Charles IX, with their families (Bibliothèque Nationale, Paris). Among the oil portraits attributed to him are full lengths of Henry II (Uffizi), Charles IX (Vienna), Elizabeth of Austria (Louvre), Marguerite de France (Chantilly), and a miniature of Catherine de' Medici (Vienna Museum). Although less subtle than his father, François is a greater artist. His portraits are characterized by unaffected simplicity and precision of execution, and the treatment of form and perspective is admirable. In some of them the influence of the younger Holbein and the Venetian school is plainly visible. There is supposed to have been still another Clouet, a brother of Jean, but of him nothing is known. Consult: Laborde, *La renaissance des arts à la cour de France* (Paris, 1855); Bouchot, *Les Clouets et Corneille de Lyon* (Paris, 1892); Moreau-Nelaton, *Les Clouets* (Paris, 1908).

CLOUGH, klŭf, ARTHUR HUGH (1819–61). An English author. He was born in Liverpool, but when only four years old was taken by his father, a merchant, to Charleston, S. C. He returned to England, however, in 1828, and was at Rugby under Dr. Arnold, whose strenuous appeal to moral responsibility in boys probably had an unhappy effect upon Clough's temperament, naturally high strung, with a tendency to more or less morbid introspection. His Oxford career had an even more decisive influence on his life. He entered the university at the height of the "Tractarian movement," with one of whose most brilliant men, William George Ward, he was intimate. For a time he was carried away by the new current, but the reaction took him further in the opposite direction. He held a fellowship at Oriel College from 1843 to 1848, but relinquished it when it became clear to him that he could no longer subscribe to the religious doctrines involved—becoming later an examiner under the Education Department, like Matthew Arnold, with whom he had much in common. His temperament was essentially skeptical—in no mere negative sense, but in that of reverent and anxious seeking for the truth at all costs. It is this characteristic which dominates the whole of his literary work, whether verse or prose. In his three longer poems, *Dipsychus, The Bothie of Tober-na-Vuolich,* and *Amours de voyage,* the analysis of character disturbed by spiritual conflict is the main interest; though he shows a perfect consciousness that the habit of self-analysis and suspense of judgment may be carried too far. After his death, which occurred on a tour in Italy, he was commemorated in one of the noblest elegies in the English language—Arnold's *Thyrsis;* and Lowell (whom, with Emerson, Longfellow, and other eminent men, he had met on a visit to America) expressed the feeling that he would "be thought a hundred years hence to have been the truest expression in verse of the moral and intellectual tendencies, the doubt and struggle towards settled convictions, of the age in which he lived." His *Poems and Prose Remains,* with letters and a memoir by F. T. Palgrave, were published together in 1869, both volumes having been previously more than once reprinted. Another memoir entitled *A. H. Clough: A Monograph,* appeared in 1883. Volumes of selected poems were made by Mrs. Clough in 1894, for the *Golden Treasury Series,* and by E. Rhys in 1896. *Poems,* edited by H. S. Mitford in *Oxford Library of Prose and Poetry,* appeared in 1910.

CLOUS, klous, JOHN WALTER (1837–1908). An American soldier, born and educated in Germany. He came to the United States in 1855, enlisted in the United States army in 1857, and served until 1862, when he was appointed second lieutenant of the Sixth Infantry. He fought in the Civil War, and greatly distinguished himself at Gettysburg, and for this he was brevetted first lieutenant and captain. He was made a captain in the Thirty-eighth Infantry in 1867, and from 1868 to 1886 was engaged in frontier service, and became known for his bravery and skill in engagements with the Indians. In 1886 he became major and judge advocate in the United States army, and served until 1890 as assistant to the judge-advocate-general. He subsequently served successively as professor of law at West Point; staff officer to Major General Merritt (1896–98); staff officer to Lieutenant General Miles during the Spanish-American War; brigadier general of volunteers; secretary and recorder of the Commission for the Evacuation of Cuba; deputy judge-advocate-general on the staff of Major General Brooke, and judge-advocate-general. He published a series of *Lectures on Military and Martial Law.* At his own request he was retired, with the rank of brigadier general, May 24, 1901.

CLOUSTON, SIR EDWARD SEABORNE, BART. (1849–1912). A Canadian banker. He was

born at Moose Factory, Hudson Bay, and was educated at the Montreal High School. After a year in the Hudson's Bay Company's service, he joined the Bank of Montreal as a junior clerk in 1865. In 1887 he was promoted assistant general manager, in 1889 acting general manager, and in 1890, general manager, a position he retained until his resignation in 1911. In 1906 he was elected first vice president of the bank, an office he continued to hold until his death. In 1908 he was created a baronet, and in 1911 a knight of the Order of St. John of Jerusalem. He was president or director of a large number of financial and industrial institutions, and was also prominent in charitable work.

CLOVE AND ORANGE. An Elizabethan "Tweedledee-and-Tweedledum," occurring in Jonson's *Every Man Out of His Humour.*

CLOVE BARK. The bark of the wild clove of the West Indies, *Pimenta acris.* Clove cassia, sometimes called clove bark is the bark of *Dicypellium caryophyllatum,* a little-known Brazilian tree, also found in the West Indies. As marketed, clove bark resembles cinnamon cylinders about one-half foot long and about one inch in diameter, consisting of several pieces telescoped together. The bark is usually dark brown, smooth or slightly wrinkled, with a mucilaginous, aromatic, pungent taste, which suggests a mixture of cloves and cinnamon. In medicine it is known as *Cassia caryophyllata,* and is used like, but considered inferior to, cloves. A similar bark is said to be obtained from the *Myrtis caryophyllata* of Linnæus, which grows in Ceylon. The culilawan (sometimes culilawang) of the Moluccas, which is sometimes confounded with clove bark, is derived from *Cinnamomum culilaban.*

CLOVE HITCH. See KNOTTING AND SPLICING.

CLO'VER (AS. *clœfre,* trefoil, of unknown origin), or TREFOIL (*Trifolium*). A genus of plants of the natural order Leguminosæ, suborder Papilionaceæ, containing a great number of species, natives chiefly of temperate climates, abounding most of all in Europe, although about sixty species are indigenous to the United States; some of them very important in agriculture, as affording pasturage and fodder for cattle and as a means for improving cultivated soil. The name "clover" is also popularly applied to certain plants which have compound leaves with three leaflets like the clovers, and also belong to the order Leguminosæ, but which are not included in the genus *Trifolium*—such as sweet or Bokhara clover (*Melilotus*), bur clover (*Medicago*), prairie clover (*Petalostemon*), bird's-foot clover (*Lotus*), and a number of others. The true clovers (*Trifolium*) have herbaceous, not twining, stems; roundish heads or oblong spikes of small flowers, the corolla remaining in a withered state till the ripening of the seed; the pod inclosed in the calyx, and containing one or two, rarely three or four, seeds. About 17 species belong to the flora of Great Britain. The species of most importance to the farmer is the common red clover (*Trifolium pratense*). (For illustration, see Plates of DICOTYLEDONS and Plate of BLOODROOT with article SANGUINARIA.) This is native to America and most parts of Europe, growing in meadows and pastures. It stands in the front rank of forage plants for good yields, nutritive value, and adaptability to various climates and soils. It is a perennial, but is generally treated as if it were a biennial. Its heads of flowers are oval or nearly globular, very compact, about an inch in diameter, purple, more rarely flesh-colored or white; the tube of the calyx is downy; the stipules run suddenly into a bristly point. The leaflets have very often a whitish horseshoe mark in the centre. It is supposed that clover found its way into England from the Netherlands about the time of Queen Elizabeth; but it was not until the close of the eighteenth century that it was introduced into Scotland, where it is now universally prevalent. Perennial red clover (*Trifolium pratense perenne*) is a somewhat hardier form than the ordinary forms of common red clover and of longer duration, lasting for two years or more. The zigzag clover (*Trifolium medium*), also called meadow clover, marl grass, and cow grass, much resembles the common red clover, but is easily distinguished by the smooth tube of the calyx, and by the broader, less membranaceous, and gradually acuminated stipules. The stems are also remarkably zigzag, and are more rigid than in *Trifolium pratense;* the heads of flowers are larger, more lax, more nearly globose, and of a deeper purple color, and the leaflets have no white spot. It is a common plant in Great Britain and most parts of Europe, and is also grown to some extent in the United States. White or Dutch clover (*Trifolium repens*) is also a common native of Great Britain, and of most parts of Europe as well as of North America. When a barren heath is turned up with the spade or plow, white clover almost always appears. It is more permanent than common red clover, and it grows on nearly all soils, but its yield is small. White clover is seldom grown alone, but usually in mixtures of grasses and other clover. The flowers of all kinds of clover are the delight of bees, but those of white clover perhaps particularly so. Alsike or Swedish clover (*Trifolium hybridum*), a perennial, generally regarded as an intermediate form between the common red clover and the white clover, was introduced into Great Britain from the south of Sweden in 1834. It is also common in other European countries and in North America. Crimson clover, or Italian clover (*Trifolium incarnatum*), an annual, native of the south of Europe, with oblong or cylindrical spikes of rich crimson flowers, is much cultivated in continental Europe, and is also quite extensively grown in some parts of England and the United States. Moliner's clover (*Trifolium molineri*) very much resembles crimson clover, but is biennial and has pale flowers. It is cultivated in Europe. Alexandrian clover, berseem, or Egyptian clover (*Trifolium alexandrinum*), an annual species, a native of Egypt, universally cultivated in its native country, where it is the principal fodder for cattle, is supposed to be one of the best kinds of clover for warm climates —such as, for instance, the southern United States. It has oval heads of pale yellow or whitish flowers. Yellow clover, or hop trefoil (*Trifolium procumbens*), is common in dry, gravelly soils, but is not much esteemed. It has smaller leaves and flower heads than has any of the cultivated species. The flowers are yellow, and the heads resemble miniature hop strobiles.

Clovers are of great value to agriculture, on account of the many different ways in which they may be utilized. Clover is fed as hay, as

green fodder, and as silage, and it is used for pasturage, for green manuring, and as a cover crop. It is chiefly valuable as a means of enriching the soil, being capable of appropriating free nitrogen from the air by means of its roots. It has long been recognized that clover growing has a beneficial effect on the soil; but this phenomenon was not understood until about 1888, when scientists discovered that leguminous plants, through the agency of bacteria living in the characteristic tubercles or nodules on the roots, take up free atmospheric nitrogen. In the soil this nitrogen is oxidized to nitric acid, which forms nitrates, and in this form the nitrogen is assimilated by growing plants. In addition to their power of taking up free nitrogen, clovers are very valuable because of the large and deep development of their root systems, which effects a marked improvement in the physical condition of the soil, and thus indirectly increases its fertility. Plowing clover under for green manure is a most effective method of adding humus to the soil. Crimson clover is recommended in the United States as a cover crop for orchards, to be sown late in summer when the soil is no longer cultivated, and to be plowed under the following spring. In this way the soil is kept moist, its surface is kept from hardening, and much available plant food is afforded the trees for the following season's growth. In general, the common red clover is the most important in the United States. Consult: *United States Department of Agriculture, Farmers' Bulletin No. 455, Red Clover; No. 550, Crimson Clover;* Thos. Shaw, *Clovers and How to Grow Them.*

Feeding Value.—On an average red clover (green crop) has the following percentage composition: Water, 70.8; protein, 4.4; fat, 1.1; nitrogen-free extract, 13.5; crude fibre, 8.1; mineral matter 2.1. Red-clover silage contains—water, 72.0; protein, 4.2; fat, 1.2; nitrogen-free extract, 11.6; crude fibre, 8.4; ash, 2.6 per cent. Red-clover hay contains—water, 15.3; protein, 12.3; fat, 3.3; nitrogen-free extract, 38.1; crude fibre, 24.8; and ash, 6.2 per cent. Other clovers and their cured products resemble the above quite closely. Clover forage is relatively highly nitrogenous, is relished by all farm animals, and is capable of replacing in part more expensive concentrated feeding stuffs—such as bran, linseed meal, etc.

Clover is very important for soiling, as it is available early in the season, and is relished.

Pigs do well on clover pasture, building good bone and framework, and fatten rapidly later on when given concentrated feed. Clover is very succulent in the green, uncured state, and therefore, like all such feeds, liable to cause bloat, if too much is eaten. Animals should not be turned on clover pasture when very hungry, or while the dew is on the clover. Some dry fodder should be placed in racks in the pasture, as this is said to relieve bloat.

Clover hay is not usually considered a satisfactory coarse fodder for horses, as the dust it carries proves detrimental. A limited amount may, however, be fed to all kinds of horses, with favorable results. It is a very satisfactory coarse fodder for milch cows. It furnishes the protein essential for milk, and is relished by the animals. By feeding clover hay as one-half to two-thirds of the coarse fodder of a ration, the amount of concentrated feed required may be diminished, and thus the cost of the ration lowered. For calves and young stock, clover hay is very important. No other coarse fodder is superior for sheep.

As shown by experiments with ruminants, the following percentages of the nutrients in red-clover forage are digestible: Dry matter, 66.1; protein, 67.0; fat, 64.5; nitrogen-free extract, 77.6; crude fibre, 52.6; and ash, 55.0 per cent.

Red-clover hay has the following digestibility: Dry matter, 57.4; protein, 58.0; fat, 55.2; nitrogen-free extract, 64.4; crude fibre, 54.2; and ash, 29.1 per cent. In this respect it compares favorably with other coarse-fodder crops, both green and dry.

Clover Diseases.—There are two important fungous diseases of clover—a "rust," and what has been designated as the "clover rot." The rust (*Uromyces trifolii*) is said to have first been noticed in South America, and to have come to the United States by way of Europe, where it is quite destructive. It infests the leaves, leafstalks, and stems, producing definite brown spots. The fungus passes through three phases—the first on the white clover, upon which minute cups are formed, filled with orange-colored spores; the other two phases, red and black (so called from the color of the spores occurring on red clover), are quite destructive. When a portion of a field is found affected, it is best to cover the clover with straw and burn it to prevent further spread. The "clover rot" (*Sclerotinia trifoliorum*) occurs on crimson clover in the United States, although common on red and other clovers in Europe. It also occurs on alfalfa, sainfoin, fenugreek, Bokhara clover, etc. Its presence may usually be noted by all plants being killed in patches a foot or more in diameter. Small black bodies will be seen at the base of the wilted stems in the autumn, followed by the appearance of small mushroom-like bodies in the spring. Burning, as mentioned above, and rotation of crops, are recommended for its suppression. A leaf-spot disease (*Pseudopeziza trifolii*) is sometimes quite destructive to clover and alfalfa. The diseased leaves show on their upper surfaces small black specks, which enlarge and extend through the leaf, destroying it. When present, this disease is liable to become epidemic, causing considerable loss. Burning over fields in autumn and frequent cutting prevent serious loss to the crop. Another destructive parasite of clovers, although not a fungus, is the dodder (q.v.).

CLOVER, Richardson (1846–1919). An American naval officer, born at Hagerstown, Md. After graduating from the United States Naval Academy in 1867 he was promoted through the various grades, becoming a captain in 1902 and rear admiral in 1907. He had charge of the survey in southeastern Alaska in 1885–86, was hydrographer of the Bureau of Navigation in 1889–93, and chief of the Office of Naval Intelligence in 1897–98. During the Spanish-American War he was in command of the *Bancroft.* In 1906–08 he was president of the Board of Inspection and Survey. He was retired in 1908.

CLOVER BROOM RAPE. See Parasite, Plant.

CLOVER BUTTERFLY. See Colored Plate of American Butterflies, with the article Butterflies and Moths.

CLOVER INSECTS. Various insects injuriously affect cultivated clover, of which the following are prominent: The roots are attacked by borers, and the stems by a gall-making beetle (*Languria mozardi*); also by a cutworm,

the larva of the zebra moth (q.v.). Weevils do great injury to clover in various parts of the plant; the worst species (*Hylesinus trifolii*) is an importation from Europe. These minute beetles pair in early spring, and then the female gnaws a cavity in a root of two-year-old clover and places in it four to six eggs. The larvæ, as soon as hatched, bore along the axes of the roots of the clover, causing the plants to weaken and often to die. Another beetle (*Phytonomus punctatus*), called the clover-leaf beetle, sometimes appears in swarms, coiling about the tips of the leaves. The leaves are also attacked by a midge or gall gnat, and the seeds by another (*Cecidomyia leguminicola*), the latter of which is very destructive. It lays its eggs in the blossoms of red clover in May and June, and these hatch into small reddish or yellowish maggots, which destroy the forming seed. Upon reaching full growth, they wriggle out from the floret and fall to the ground, transforming to pupæ within delicate, spherical cocoons, from which the adults issue the following spring. The larvæ leave the florets just before the time of cutting the first crop of clover for hay, so that if the time of cutting for this crop be advanced two weeks, the insect will be destroyed. Another enemy to the seeds is the greenish caterpillar of a moth (*Grapholitha interstinctana*), which devours florets and seed vessels. The clover-hay worms, caterpillars of pyralid moths, especially *Asopia costalis*, affect particularly stored hay in which clover is mixed.

CLOVES (from Fr. *clou*, from Lat. *clavus*, nail, so called from the shape). The dried flower buds of the clove tree, *Caryophyllus aromaticus*, now *Eugenia caryophyllata*, of the family Myrtaceæ. The clove tree is from 15 to 40 feet high, evergreen, with a beautiful pyramidal head. The flowers are small, but produced in great profusion in cymes. The leaves, flowers, and bark have an aromatic odor. The ripe fruit resembles an olive in shape, but is not quite so large; it is of a dark-red color; it sometimes appears in commerce in a dried state, under the curious name of "mother cloves"; it has an odor and flavor similar to cloves, but much weaker; the broken fruitstalks are sometimes also used for the same purposes as cloves, but the flower buds themselves are the principal product of the tree. They are gathered, and are dried by exposure to the smoke of wood fires, and afterward to the rays of the sun, or by the latter alone. When first gathered they are reddish, but become of a deeper brown color. The unexpanded corolla forms a little round head at the end of the calyx tube which is about half an inch long, and thus the appearance is not unlike that of a little nail, whence the name. The clove tree is a native of the Spice Islands, but is now cultivated in Sumatra, Bourbon, Mauritius, some parts of the West Indies, and elsewhere. For illustration, see Plate of FLAVORING PLANTS. The wild clove tree of the West Indies is *Pimenta acris*. See MYRTACEÆ.

The properties of cloves depend chiefly on an essential oil—oil of cloves—which forms one-fifth or one-sixth of the whole weight, and is used for flavoring dessert dishes and articles of confectionery. The oil of cloves is obtained by repeatedly distilling cloves with water, when two oils pass over, one of which is lighter and the other heavier than water. The oil has a hot, acrid taste, is light yellow when pure, and brown-red when not so carefully prepared. It has a characteristic odor, and is soluble in ether, alcohol, and the fixed oils. When taken internally in small quantities, it has the effect of aiding digestion and of stimulating the appetite. It is sometimes used in medicine as a stomachic, carminative, and antispasmodic, and is often added to scammony and castor oil to prevent the griping that is likely to be caused by those substances. Oil of cloves is further employed in scenting soaps, and by the distiller. The chief constituents of the oil are eugenol, or eugenic acid, $C_{10}H_{12}O_2$, and a terpene, $C_{15}H_{24}$.

CLOVES, OIL OF. See CLOVES.

CLOVIO, klō'vē-ō, GIULIO, properly GIORGIO (1498–1578). The most eminent Italian illuminator of the High Renaissance. He was born at Grižani in Croatia, the son of a Macedonian, and went to Italy in 1516. He was at first employed in designing medals and seals for Cardinal Grimani, then studied at Rome with Giulio Romano, upon whose advice he became a miniaturist. From 1524 to 1526 he practiced his art in Hungaria under the patronage of King Louis II, after which he returned to Rome. At the sack of Rome in 1527 he was taken prisoner by the Spaniards, and upon his release, in accordance with a vow made in captivity, he entered the monastery of San Rufino, assuming the name Giulio in religion. He removed to the house of his order at Padua, which, by reason of ill health, he was allowed to leave; he entered the service of Cardinal Grimani at Perugia. For this prince he painted some of his finest illuminations: those of Grimani's *Commentary on the Epistle to the Romans* (Sloane Museum, London), and the *Book of Hours* in the British Museum, probably also the illuminations of Petrarch's poems in the Biblioteca Trivulziana in Milan. In 1538 he returned to Rome under the patronage of Cardinal Farnesi, for whom he executed his masterpiece, the *Book of Hours of the Blessed Virgin Mary* (now in the library of J. P. Morgan, New York), upon which he is said to have labored nine years. His last years, spent at Parma and Rome chiefly under the patronage of Margaret of Austria, were blighted by a disease of the eyes, and he died at Rome early in January, 1578. Clovio was most extravagantly praised by his contemporaries and was considered the greatest illuminator of all times. His technique was indeed perfect, but, like other artists of the day, he was under the ban of Raphael and Michelangelo, whose compositions were often copied in his miniatures, and he therefore lacked creative originality. His work is unrivaled in neat and sure drawing and charm of color, but the compositions were often overcrowded. Of the many other illuminations ascribed to him, few are certainly authentic. Mention should be made of *Missals*, Nos. 3805 and 3807, in the Vatican, the *Towneley Lectionary* (New York Public Library), the "Crucifixion" (Uffizi), and the miniatures of the manuscripts of poems by Eurialo da Ascoli in the Imperial Library, Vienna. Other attributions are those of the *Lives of the Dukes of Urbino* and Dante's *Paradiso* in the Vatican, besides manuscripts in the British Museum, the Bibliothèque Nationale, Paris, the library of St. Mark's, Venice, etc. Consult: Sakcinski, *Das Leben des Giulio Clovio* (Agram, 1852); Bradley, *Life and Works of Giorgio Clovio* (London, 1871); Bertolloti, *Don Giulio Clovio, principe dei miniatori* (Modena, 1882).

CLO'VIS, CHLODWIG, or CHLODOVECH (c.466–511). A king of the Franks, of the line of the Merovingians. By the death of his father, in 481, he became King of the Salian Franks, whose capital was at Tournai, in what is now the Belgian Province of Hainault. His first achievement was the overthrow, in 486, of the Gallo-Romans under Syagrius, near Soissons, after which he extended his conquests to the Loire. Clovis did not dispossess the inhabitants, as the Franks were only few in numbers, and the public lands were sufficient for them. About 493 Clovis married Clotilda, daughter of a Burgundian prince. Clotilda was a Christian, and earnestly desired the conversion of her husband, who, like most of the Franks, was still a heathen. According to the picturesque account of Gregory of Tours, in a great battle with the Alemanni, in 496, Clovis was hard pressed and, as a last resource, invoked the God of Clotilda, vowing that he would become a Christian if he obtained the victory. The Alemanni were routed, and on Christmas Day of the same year Clovis and 3000 of his army were baptized by Remigius, Bishop of Rheims. Love of conquest concurring with zeal for the Orthodox faith, Clovis marched to the southwest of Gaul against the heretic Visigoth, Alaric II, whom he defeated and slew at Vouillé, taking possession of the whole country as far as Bordeaux and Toulouse. Clovis now took up his residence in Paris, where he died in 511. His great aim had been the subjugation of all the Frankish princes and the union of the whole Frankish people into a single powerful kingdom. The means he employed to secure this end were cruel and unscrupulous; but the end itself would have been beneficial, if he had not frustrated it at his death by redividing the newly organized realm among his four sons, and exposing it to the very perils from which he himself had rescued it. An account of the deeds of Clovis may be found in Gregory of Tours, *Historia Francorum*, bk. ii, ed. by Arndt for the *Monumenta Germaniæ Historica* (Hannover, 1885). Consult also: Junghans, *Geschichte der fränkischen Könige Childerich und Chlodwig* (Göttingen, 1857); Schultze, *Deutsche Geschichte von der Urzeit bis zu den Karolingern* (vol. ii, Stuttgart, 1896); Kurth, *Clovis* (2d ed., Paris, 1901).

CLOVIS. A city and the county seat of Curry Co., N. Mex., 107 miles southwest of Amarillo, Tex., on the Atchison, Topeka, and Santa Fe Railroad (Map: New Mexico, F 4). It contains an Elks Home and a hospital and reading room of the Santa Fe system. The chief industries are dairying and poultry raising. Pop., 1910, 3255.

CLOWES, klouz, WILLIAM LAIRD (1856–1905). An English naval critic, who wrote under the name of "Nauticus." He was born at Hampstead and was educated at King's College, London, and at Lincoln's Inn for the law, which he abandoned for journalism. He served on the *Standard* (1885), *Daily News* (1887–90), and *Times* (1890–95), and contributed largely to English and foreign magazines. His articles on needs of the navy, battleships, torpedo boats, etc., became widely known. He was editor and part author of *The Royal Navy: A History from the Earliest Times to the Present* (7 vols., 1897–1901). Among his numerous works are: *The Naval Pocket-Book* (an annual); *Confessions of an English Hachish-Eater* (1883); *Black America: A Study of the ex-Slave and his Late Master* (1892); *Blood is Thicker than Water* (1894); and a volume of poems entitled *Eclogues* (1899).

CLOWN. See JESTER; PANTOMIME.

CLUB. A word said to be derived from the Saxon *clēofan*, to divide—a club being an association the expenses of which are shared among the members. Societies of somewhat the same nature existed in ancient Greece and Rome, and mention of them is made in Aristotle, Cicero, Plutarch, and other ancient writers. The modern club, however, had its origin in the London taverns and coffeehouses. Thomas Occleve, who wrote in the reign of Henry IV, mentions "La Court de Bonne Compagnie," of which he was a member; but the first celebrated club in London is that to which belonged Shakespeare, Fletcher, Raleigh, Beaumont, and other brilliant men of letters who met at the Mermaid Tavern in Bread Street. Ben Jonson founded a club which met at the Devil Tavern, for which he is supposed to have written his *Leges Conviviales*. The Calves' Head, so named in allusion to Charles I, was a famous London club, which existed in the latter part of the seventeenth century and the early part of the eighteenth century, and whose members banqueted on January 31 on a calf's head.

In 1659 the first political club, the Rota, was established and met at the Turk's Head in New Palace Yard. The famous "October ale" was served at the October Club, another political institution, of which Swift became the leading spirit after his conversion to Toryism. The Literary Club, established in 1764 by Sir Joshua Reynolds and Dr. Johnson, of which Goldsmith, Gibbon, Garrick, Burke, and other celebrated men of letters were members, afforded a meeting place for congenial spirits, where they could freely discuss the merits of the contemporary literary productions and their authors. Its membership was limited, and Garrick found it difficult to gain admission. This club still exists in London. It is usually called the Literary Club, but its members have always claimed for it simply the title of "The Club." The King's Head Club, founded by the unscrupulous Shaftesbury, and the Mug House Club, so called on account of the ale mugs used by its members, were noted political clubs of the early part of the eighteenth century. The Kit-Kat, established about 1700, was named after Christopher Katt, a noted mutton-pie man. Its members toasted some celebrated beauty, whose name was inscribed on the toasting glass, in verse. The Dukes of Marlborough and Devonshire, Sir Robert Walpole, Congreve, Granville, and Addison were members of the Kit-Kat. About the same time existed the Tattler's Club in Shire Lane, and the famous Beefsteak Society, whose members wore badges inscribed with the motto "Beef and Liberty." Its members were called "Steaks." Hogarth, Fox, Sheridan, and the Duke of Clarence were among its noted members. As already said, these clubs had their origin in the taverns and coffeehouses of London. To this class belonged Almack's, established in 1764, and White's, established in 1698, as White's Chocolate House, and removed in 1755 to St. James Street. Brooks's was established in 1764, and Boodle's, a famous resort for country squires and hunting men, in 1762.

It is, of course, very easy to understand the

genesis of clubs such as White's and Brooks's. In those days men's personal associations depended chiefly upon party affiliation. Tories lived with Tories, and Whigs with Whigs. Intermarriages between persons of different political families were not common. Hence men flocked to those taverns and public houses where they would meet members of their own party. The next step was easy and obvious. The proprietor would agree, of course for a consideration, to exclude persons whose company would not be agreeable to the habitués of the place. It was thus that White's and Brooks's were formed, White's being a Tory and Brooks's a Whig club. These clubs are known as "proprietary clubs," to distinguish them from those of which the members were the owners. The latter class of clubs is, of course, the more recent.

About 1815, after the termination of the Napoleonic wars, the restaurant or dining room was introduced into the clubs. Many army and navy officers, being no longer needed in active service, were placed on half pay and were thus compelled to observe a strict economy. By combining their resources they could live well and much more cheaply than when having their meals alone. From that time on, the number of clubs in England increased, until at the present day there are more than 100 prominent clubs in London. These may be roughly divided into the following classes: Purely social clubs, to which belong Arthur's (established in 1765), with a membership of 600; the Bachelors' Club (established in 1881), with a membership of 920, admitting ladies as visitors; the Grosvenor (established in 1883), with a membership of 3000; the Junior Athenæum (established in 1864), with a membership of 500; the Piccadilly (established in 1893), with a membership of 1500, admitting ladies as visitors; the Union (established in 1822), with a membership of 1000; the Wellington (established in 1885), with a membership of 1400; the Travellers' Club (established in 1819), with 800 members. To this last club no one may belong who has not traveled for 500 miles in a direct line from London. This rule was made just after the cessation of the Napoleonic wars, during which traveling on the Continent was difficult. Among the clubs whose main purpose is political is the Carlton (established in 1832), which has a membership of 1800 and is Conservative; the Conservative (established in 1840), with a membership of 1300; the Constitutional (established in 1883), with a membership of 6500; the Junior Carlton (established in 1864), with a membership of 2100, and strictly Conservative. The Junior Conservative and the Junior Constitutional have each a membership of 5500 and are Conservative; the Primrose, established in 1886, has a membership of 5000 and is Conservative; the Reform, established in 1837, has a membership of 1400 and is Liberal; the City Liberal, established in 1874, has a membership of 900 and is Liberal.

Among the literary, musical, artistic, and scientific clubs stands out preëminently the Athenæum, founded in 1824 by Sir Walter Scott and Thomas Moore, its members numbering 1200. It is devoted to art, science, and literature. The Press Club, established in 1882, is strictly journalistic; the Garrick, established in 1831, is the home of actors and of the patrons of the drama; the Royal Societies, established in 1894, is composed of 1700 members belonging to the learned associations. The principal clubs patronized by military and naval officers are as follows: The Army and Navy (established in 1837), with 2400 members; and the Junior Army and Navy (established in 1869), with 2000 members, including among them officers of the army, navy, marine, yeomanry, and militia.

The two principal commercial clubs are: the City of London (established in 1832), with a membership of 800, the home of merchants and bankers; and the Gresham (established in 1843), with a membership of 475 and with a like clientèle.

Some of the leading athletic and sporting clubs are: the Alpine (established in 1857), devoted to mountain exploration; the Automobile (established in 1897), with a membership of 1036; the Hurlingham, whose members number 1200, devotees of polo and pigeon shooting. The M. C. C. (Lord's) Club (established in 1787) is the headquarters for cricket and has a membership of 4700; the Prince's Racquet and Tennis (established in 1833), with a membership of 1500, devoted to the practice of these games; the Renelagh, devoted to polo, golf, etc. (established in 1894), with a membership of 1900. The Leander and the Thames are among the principal rowing clubs in England. The New Oxford and Cambridge, composed of the members of those universities, was established in 1884 for the purpose of bringing graduates of those institutions into closer social relations and has a membership of 900; the United University, also composed of Oxford and Cambridge men, has the same aim in view; the University for Ladies (established in 1887) is composed of women educated at universities and medical colleges. These are the principal university clubs of England. The St. James Club, established in 1857, has a membership of 650 and is the rendezvous for diplomats. The Royal Yacht Squadron is the leading yacht club and is a very exclusive institution. These clubs are all housed in buildings that are remarkable for their architectural magnificence and for the completeness of their interior appointments. They combine the comforts of a home and the service of a hotel without the responsibility of the one or the publicity of the other and are conducted at a comparatively moderate expense to the individual members.

Attempts to introduce clubs in continental Europe long met with little success. In Germany such associations were discountenanced by law. The first club established in France in 1782 had politics for its main object and went by the name of "Le Club Politique." There were a number of clubs that played an important part in the French Revolution. The three which are most noted and which exercised the greatest political influence were the Jacobins, the Feuillants, and the Cordeliers. Purely social clubs have also been established in Paris. First among them are the Jockey Club and the Cercle Royal, the most fashionable and exclusive clubs in Paris. The Club de Boston was established in 1885.

In the United States clubs were first introduced in the latter part of the eighteenth century. The Hoboken Turtle Club, organized in 1797, is still in existence. Such a club was, however, of slight importance in the social life of the town. In the city of New York the

pioneer club, in a modern sense, is the Union Club, established in 1836. It is one of the oldest and most exclusive in New York City. Its membership is limited to 1600, and its object is purely social. The Century Club, organized in 1846, has the promotion of art and literature in view. Membership is limited to authors, artists, and amateurs in letters and the fine arts, and must not exceed 1300. The Union League Club was founded in 1863 for the purpose of discountenancing any attempt to impair the integrity of the United States. It has a membership of 1800. The University Club, composed of college and university graduates, was incorporated in 1865. None except degree-holding persons are eligible for membership. Its aim is literary and artistic. Graduates of Columbia, Harvard, Yale, and Princeton universities have large and prosperous clubs. One of the most exclusive clubs in New York, the Knickerbocker, was organized in 1871. Its purpose is purely social. The Lotos Club, organized in 1870, is the home of journalists, authors, artists, musicians, and friends of literature. Resident membership is limited to 500. The Catholic Club of the city of New York has for its primary interest the promotion of Roman Catholic interests in New York and has existed since 1863. The Calumet, a purely social organization, was established in 1879. Its membership is limited to 500. One of the oldest organizations of its kind is the New York Club (social), founded in 1845 and having a membership of 675. The Manhattan Club is a powerful factor in Democratic politics of New York. Its membership is limited to 1500, and it has an actual enrolled membership of 1340. It was organized in 1864, in opposition to the Union League Club. The Reform Club has for its object the promotion of good government and the abolition of the protective tariff. It was organized in 1878. The City Club was founded in 1892 and has a membership of 1300. It is an advocate of honest and efficient municipal government. The United Service Club was organized in 1889 for the promotion of military science. Membership is limited to military and naval officers. The Players' Club was organized in 1888, to promote social intercourse between the different members of the dramatic profession. This club was founded by Edwin Booth, who left the house, with its furniture and pictures, to the association.

The Metropolitan Club, organized in 1891 for social purposes, and popularly known as the Millionaires' Club, occupies one of the most costly buildings of the kind in the world and has a membership of 1400. The New York Yacht Club, organized in 1844, is the most famous body of its kind in America. It occupies a very large and picturesque building and now has a membership of 2325. The New York Athletic Club, which promotes high-class modern sports, was organized in 1868 and has a membership of 4300. The Automobile Club of America, devoted to the advancement and regulation of motoring, was established in 1890 and has 1660 members. The Aëro Club of America, founded in 1906 for the promotion of aëronautics, now has 340 members. The Republican and National Democrat clubs are large and prosperous, representative of the great political parties after which they are named. The Transportation Club has a membership of 800, largely composed of railroad and steamship companies' directors, officials, and agents. It was formed in 1895 for social purposes. The New York Press Club was founded in 1872, as a centre for journalists, and now has a membership of 800. The Lambs' and Friars' clubs are representative of theatrical circles. The former was organized in 1874, and the latter, 30 years later.

Social clubs have also been formed exclusively for women. It would seem that these should have a *raison d'être*, especially in the United States, where ladies' luncheon parties, at which the company of no man is expected or desired, are so popular. Women's clubs are, however, ancient institutions. There were a number of them in ancient Rome, among them an assembly of matrons known as the "Minor Senate." This institution received Imperial recognition. It was chiefly occupied with questions of etiquette—such as the kind of dress that ladies should wear according to their social position; the question as to who might be driven in carriages drawn by horses and who should be compelled to drive mules, whose sedan chairs should have ornaments of ivory and whose of silver; and other weighty problems. The modern ladies' clubs have, therefore, the authority of very ancient example. They would seem to have a reason for existence in the gregarious and social instincts of the sex; but it is probable that the popularity of these clubs has been affected by the admission of ladies to certain of the privileges of the men's clubs—a privilege which renders special clubs for women less necessary.

There is still another class of clubs, such as the Liederkranz and the Arion in New York, the original purpose of which was musical. These clubs have one point of special interest—they are German in their origin rather than English. If the English public house, to which, of course, it was not the custom to admit women, is to be taken as the origin of the typical club of the present day, the German beer garden may be viewed as the origin of such clubs as the Liederkranz and the Arion. The German goes to the beer garden in company with his wife and daughter or his sweetheart; and so, in the modern German clubs of New York, the men are usually accompanied by the women.

It seems to be a recent tendency of clubs, particularly in the United States, to facilitate, so far as is possible, the admission of ladies to club privileges. In many of the clubs it is possible for members to bring ladies to dine—a thing unheard of in England until 30 years ago and at that time scarcely known in America. The Bachelors' Club in London, founded about 30 years ago, admitted ladies as visitors under certain conditions; and that club is one of the most successful in London. Other clubs have been founded which have the same characteristic, but the innovation has not proved so popular in England as in the United States.

The degree to which ladies are to be permitted to share the privileges of men's clubs is becoming an interesting subject. During certain hours the club must, in the nature of things, always remain sacred to men. They cannot have that comfort and unrestraint when ladies are present which they can have by themselves. During the morning hours it is natural that the ladies should be excluded. And there are also many men to whom the presence

of women in the clubs in the evening would not be agreeable. The division of men into those who prefer to spend their evenings in their domestic circle and those who prefer to pass them with other men seems to be inevitable and permanent.

As we have seen, the modern club, originating in England, has spread all over the world. It is necessary, of course, that the club in each country shall have to some extent the characteristics of that country. For instance, in a French club, a newcomer must ask to be introduced to the members of the club, that being, in general, the French habit. His failure to do so would be resented by the members. In England, on the contrary, a man newly admitted would never think of asking to be introduced personally to the members. Certain differences between English and American society appear in the club life of the two countries. In general, it may be said that there is greater sociability in American than in English clubs. Indeed, the ideals of club life in the two countries are, or at any rate were, essentially dissimilar. Early in this century Englishmen found that it was possible for an individual to live at a club for £600 a year as well as he could live at home for £6000. In the club he could have everything that he could have at home except the privacy of his own house. If he could not quite have that, he wished to have something as near it as might be. Hence the original character of the English club was somewhat solitary and unsocial. Another difference between English and American clubs was originally this: The men who founded the great English clubs were either without occupation or at most half employed. The club was, therefore, with them a place to live in and to spend a large part of the day. The American clubs, on the contrary, were originally founded by men fully employed, for purposes of social relaxation. Their early equipment, as a rule, was two or three rooms, where business men could meet outside of business hours and talk. From such a nucleus as this have grown up in our cities the great houses with library, restaurant, billiard rooms, baths, and other appliances of luxurious living.

The present tendency, however, seems to be for English and American clubs to assimilate in character. In England the clubs have extended through all classes of the community, so that in many of them membership consists fully as much of business men as it does in the United States. In the United States, on the other hand, the number of unemployed or half-employed men is growing, so that the men who use clubs as places to live in have greatly increased in number. It is said, by those who are in a position to know, that the sociability which has characterized American clubs has extended to these societies in England and is on the increase among them.

Regarded from a legal point of view, a club may be incorporated or unincorporated; but it is essential to its character as a club that it shall not be instituted for trading purposes and shall not carry on any occupation having gain for its object. Social clubs, as we know them, are of English origin and have usually been unincorporated, the earliest—such as White's, Brooks's, The Beefsteak, and other celebrated resorts in London—being of the proprietary kind, one person furnishing the club premises and all accessories, in consideration of an entrance fee and fixed annual subscriptions, the members being mere licensees and not coproprietors. This type of club still survives in England and has of late become quite common in convivial and sporting circles in New York, Chicago, San Francisco, and other large cities of the United States. Gaming clubs are usually conducted on this principle.

The more usual and familiar type of club at the present time, however, is the "members' club," in which the persons constituting the association are, by virtue of their membership, coöwners of the property of the club and equally entitled to share in its privileges. The legal relation between the members is that of mutual contracting parties, the terms of the agreement creating their mutual rights and obligations being contained in the articles of association and in the rules and regulations adopted thereunder. These articles and rules also fix the powers and determine the authority of the governing board and other officers and committees of the club, each member being bound to submit to such authority by his express or implied assent to the rules and regular proceedings of the club. Every new member becomes a party to the contract of association, whether he formally subscribes to its articles or not, though it is usual to make such subscription.

The proceedings of social clubs have not often come before the courts for review, and when they have, it has usually been in connection with the exercise of the right of expulsion of an obnoxious or offending member. This is generally provided for and regulated by the rules of the club, and, in general, it may be said that any member who brings himself by his conduct within the condemnation of the rules may be expelled in the manner provided by them, or, in the absence of any express provision, by the vote of a majority of its members. But the courts are not blind to the serious consequences of an expulsion, especially in the forfeiture of the property rights which it involves, and will see that the offending member has fair play. He is entitled to a hearing and to reasonable notice, whether the rules of the club provide for it or not. The governing committee is a quasi-judicial tribunal and must act as such. But if the proceedings have been regular and fairly conducted, the courts will usually make no further inquiry. They will not, under ordinary circumstances, undertake to control the discretion of the association or its committee, or to determine what is and what is not proper conduct on the part of a member. Doubtless, however, if it appeared to the court that a member against whom proceedings have been taken was the victim of unreasonable prejudice or of a conspiracy, it might order his reinstatement.

Generally speaking, the individual members of unincorporated clubs are not liable for the debts of the concern, unless they have authorized the transactions out of which such debts arose—a voluntary club not being a partnership and no agency being presumed; but the assent necessary to bind the members individually may be given by resolution under the rules. Of course, where no agency or ratification can be shown, the steward or house committee or other officer making or directing a purchase becomes personally liable upon the

obligation incurred, the club, as such, having no legal status. An incorporated club, however, like any other corporation, may sue and be sued in its corporate capacity; and its officers and members, so long as they have complied with the law, are equally free from individual liability for its debts. For this and other reasons it has become a common practice to incorporate clubs of this character. But incorporation does not involve the existence of a capital stock, in the ordinary sense of that term, nor of corporate shares, nor has a club member usually a transferable interest. (For a remarkable exception to this rule, see STOCK EXCHANGE.) For the dissolution of an incorporated club, legal proceedings are necessary; but a voluntary, unincorporated association may be dissolved informally by mutual agreement of its members, and thereupon the property of the club is distributed equally among them.

Although a club is not a place of public entertainment, i.e., neither a tavern nor a hotel, within the meaning of excise legislation, it may nevertheless be brought by statute under public regulation. Of course, the proprietor of a "proprietary club" is subject to the same laws as any other persons buying and selling intoxicating liquors. It has been held, however, that the furnishing of wine, beer, etc., to a member of a "members' club" is not "giving or selling" liquors within the excise laws. A club may also be a common gambling house under the law if its members in considerable numbers habitually congregate there for purposes of gaming. See CORPORATION; JOINT-STOCK ASSOCIATION; VOLUNTARY ASSOCIATION; and the authorities there referred to. See also BOYS' CLUBS; WOMEN'S CLUBS; WORKINGMEN'S CLUBS; WORKING WOMEN'S CLUBS. Consult also Wertheimer, *Law Relating to Clubs* (2d ed., London, 1889).

CLUBFOOT (in Lat., *talipes*). A deformity of the foot, due to a distortion of one or more of the joints, and characterized by extreme extension, flexion, adduction, abduction, or rotation. Surgeons recognize several varieties: a turning in of the foot (*talipes varus*), a turning out (*talipes valgus*), an elevation of the heel so that the weight is borne on the ball of the foot and the toes (*talipes equinus*), and a depression of the heel with the front of the foot raised from the ground (*talipes calcaneus*). Two of these forms are frequently combined (*equinovarus*). We may also mention here the deformities flat foot (*pes planus*), where the arch of the foot is lost, and its opposite (*pes cavus*), where this arch is unduly exaggerated.

Clubfoot is either congenital or acquired. When acquired, the deformity is usually due to infantile paralysis (anterior poliomyelitis). The changes involve the muscles, tendons, bones, and ligaments. The treatment is manual, mechanical, or operative. Considerable improvement can be obtained in congenital cases by the first method, but those of long standing require splints or special apparatus, or surgical interference with sections of the tendons and frequently removal of parts of the bones. The first operation for clubfoot was done in 1731, by Stromeyer. Consult Gould and Pyle, article "Talipes," in *Cyclopedia of Medicine and Surgery* (Philadelphia, 1912).

CLUBHAND. A rare congenital deformity, in which the hand is closed or bent backward or to one side. Defective development of the bones of the wrist coexists, and other malnutrition is apparent in the child, who rarely survives.

CLUB MOSS, or GROUND PINE. Species of *Lycopodium* and *Selaginella*, resembling coarse mosses, and frequently bearing clublike cones (strobili) of spore-bearing leaves. See LYCOPODIALES; PTERIDOPHYTES.

CLUBROOT, or ANBURY. A disease to which turnips, cabbages, cauliflowers, rutabagas, and allied plants are liable, and which often proves of serious importance to farmers, destroying the crop of entire fields. It is called clubroot because of the knobs or tubercular excrescences which form upon the root. The root often becomes divided into a number of parts, each in some small degree swelling separately by itself; whence the popular name, "finger-and-toe disease." The disease is caused by *Plasmodiophora brassicæ*, a fungus of low order, which multiplies with great rapidity in the cells of the host. This acts as a stimulus, causing the roots to assume their strange appearance. The fungus can remain in the soil for a number of years. On this account, care should be taken to rotate crops, so that no cruciferous plants shall be grown on the infested land for several years. The seed bed is often a source from which the disease is spread, and it should receive attention. The application of lime every few years at the rate of 75 bushels per acre, has given promising results. It is also advisable to remove all infected plants as much as possible and rotate crops at frequent intervals.

CLUB-RUSH. See SCIRPUS.

CLUEN'TIUS HAB'ITUS, AULUS. A Roman central figure in a celebrated and complicated poison case, which involved two trials at Rome, in 74 and 66 B.C. On the latter occasion Cicero delivered the speech *Pro Cluentio*, still extant, which is rated highly. The speech was edited by Fausset (1887). Consult Nettleship, *Lectures and Essays on Subjects Connected with Latin Literature and Scholarship* (Oxford, 1885).

CLUGNY. See CLUNY.

CLUMBER SPANIEL. See SPANIEL; and Plate of TERRIERS, SPANIELS, ETC., under DOG.

CLUMSY, SIR TUNBELLY. A boorish country squire in Vanbrugh's play *The Relapse*. He also appears in Sheridan's *Trip to Scarborough*.

CLUNCH. Old Madge's husband in Peele's *Old Wives' Tale*.

CLU'NIACS, or CONGREGATION OF CLUNY. A branch of the Benedictine Order, founded at Cluny or Clugny in France about 910, by William, Duke of Aquitaine. He placed at its head Berno, who had made a great reputation by his conduct as abbot of the monasteries of Gigny and Baume. The order was noted for its rigorous discipline and its influence for reform. It spread rapidly, and in the fifteenth century had 825 houses (the 2000 sometimes assigned is probably exaggerated), spread from Scotland to Palestine, all connected with the house at Cluny. In England the first Cluniac house was founded in 1077. At the time of the suppression of the monasteries there were 32 houses. The Congregation in France was dissolved in 1790 by the Constituent Assembly; the town of Cluny purchased the magnificent abbey church for 100,000 francs and pulled it down. When, a few years later, the citizens invited Napoleon to visit them, he dismissed them contemptuously, calling them vandals. In Paris the present Hôtel de Cluny was begun in the fifteenth

century (on the site of the old palace of the early Frankish kings) by the Congregation of Cluny, but is now a rich museum owned by the city of Paris. The Congregation was reformed by Peter the Venerable (q.v.), and in 1131 Innocent II dedicated the great church of Cluny, which was one of the wonders of the world. Among the great men whom the Congregation has produced are Popes Gregory VII, Urban II, and Paschal II. Consult Sachur, *Die Cluniacenser* (Halle, 1891–94); Duckett, *Charters and Records of Cluni* (Lewes, 1890).

CLUNY, klụ'nē', or **CLUGNY** (Lat. *Cluniacum,* probably connected with OIr. *chain,* Ir. *clon,* meadow, Gk. *κλέτος, klepos,* moisture, Lith. *szlápias,* wet). A town in the Department of Saône-et-Loire, France, 12 miles northwest of Macon (Map: France, N., K 6). It has an excellent industrial college, and manufactures pottery, paper, leather, and yarn. Pop., 1901, 4108; 1911, 4150. Its architectural attractions include, besides the celebrated Benedictine abbey of the ninth century, the church of Notre Dame, dating from the thirteenth century; the church of Saint-Marcel, with a beautiful Romanesque steeple of the twelfth century; the ruins of Saint-Mayeul; the abbot's palace; portions of the ancient fortifications; and picturesque houses, dating from the twelfth century and later, all classed among the historical monuments of France. Before the erection of St. Peter's at Rome, the abbey church at Cluny, which was begun in 1089, was the largest building of its kind in Europe, being 650 feet long by 130 wide. It is now in ruins, having been destroyed by order of the town, to which it was sold after the convent was suppressed by the Constituent Assembly in 1790. (See CLUNIACS.) A model of it is preserved in the town museum, which was once a part of the abbot's palace. It is the birthplace of the noted painter Prud'hon. Consult: Bernard, *Les chartes de l'abbaye de Cluny* (Paris, 1876–94); Duckett, *The Archives of the Ancient Abbey of Cluny* (n. p., 1886); Penjon, *Cluny, la ville et l'abbaye* (Cluny, 1872).

CLUNY, klụ'nē', HÔTEL DE. A fine Gothic edifice in Paris, built during the fifteenth and sixteenth centuries by the abbots of the Benedictine abbey of Cluny, on the site of an ancient Roman palace. In 1515 it was occupied by Mary, the widow of Louis XII, and in 1537 James V of Scotland was married in it. It passed into the hands of the nation after the Revolution, was acquired in 1833 by the antiquarian Du Sommerard, and in 1842 was purchased with its collections by the State. The museum established in it is important for its antiquities, particularly of France.

CLUPE'IDÆ (Neo-Lat. nom. pl., from Lat. *clupea,* small river fish + Gk. *εἶδος, eidos,* shape, form). An important family of soft-rayed fishes, including the herring, shad, sardines, alewives, etc. (qq.v.). The body is usually elongated and compressed; the head naked; the body covered with rather large scales, usually easily lost. The lateral line is wanting. There is only one dorsal fin, and the tail is forked. There are about 30 genera and 150 species found in all seas, and usually in immense shoals. Many species are anadromous, while some remain in fresh water permanently. See FISHERIES and FISH CULTURE, and Colored Plate of AMERICAN FOOD FISHES, under FISH AS FOOD, and Plate of HERRING AND SHAD.

CLUSERET, klụ'z'-rā', GUSTAVE PAUL (1823–1900). A French soldier and Communist, born in Paris. He was educated at Saint-Cyr, distinguished himself during the insurrection of 1848 in Paris, served in the Crimean War and in Africa against the Kabyles, and became a captain in 1855. In 1858 he resigned his commission, and in 1860, as commander of the French volunteers, joined Garibaldi in the expedition to Sicily and Naples. At the outbreak of the American Civil War in 1861 he came to the United States, entered the Union army, served on the staffs of McClellan and Frémont, and was brevetted brigadier general in 1862. In 1864 he was editor of the *New Nation* in New York, advocating the nomination of Frémont for the presidency. In 1867 he took part in the Fenian revolt and went back to France, where he wrote for several radical papers, but was condemned for certain publications and compelled to take refuge in England. On the proclamation of the Republic in September, 1870, he took part in the insurrectionary attempts at Lyons and Marseilles, whence he fled to Geneva. In 1871, after the establishment of the Commune, he was appointed delegate of the War Department, and endeavored to improve the military organization of the Communist troops, but soon gave offense to the Central Committee, was accused of treachery, and was imprisoned at Mazas. When the government troops entered Paris, he escaped to England, thence to Mexico, and finally to Switzerland. In 1872, during his absence, he was formally sentenced to death; he returned to France in 1881, having spent several years in Turkey, and was elected to the Chamber of Deputies in 1888, 1889, and 1893. He published *Mémoires du général Cluseret* (1887–88).

CLUSTER CUP. See ÆCIDIUM; UREDINALES.

CLUSTERED PIER, or CLUSTERED COLUMN, or COMPOUND PIER. A form of architectural support characteristic of the Middle Ages, though not absolutely unknown to the ancient East, as is shown by the Babylonian cluster of four columns found at Tello. It was not used in the classic, early Christian, or Byzantine style, nor until the development of the vaulted Romanesque in the eleventh century. It probably originated in the attempt to vary the plain square pier which was then being used in place of the classic column, and to connect it with moldings of the arcades and the ribs of the vaulting. These Romanesque piers had a square or rectangular core, to each face of which a semicolumn or engaged shaft was attached; this simplest form was varied by the addition of minor shafts and reëntrant angles. Very rich effects were thus obtained, especially in central France and England during the twelfth century. The developed Gothic style of the thirteenth century adopted the clustered pier as its regular support in interior architecture. The Gothic pier differed from the Romanesque in being usually more slender and more varied in plan, and in a majority of cases based on a circular or polygonal instead of a square core. The larger shafts were sometimes—especially in England—separated from the core, to which they were fastened only at the base and at the capital and by intermediary molded bands. But this form was found unsatisfactory and was abandoned except in England for the solid pier, which was a better support. Its simplest form with circular core is shown in the nave of Amiens Cathedral, but its variations are infi-

nite, being determined largely by the number, form, the grouping of the vaulting ribs and moldings above, by connecting with which the effective sweep of architectural lines is continued from floor to vaulting ridge. The neoclassicism of the Renaissance put an end to the clustered pier almost entirely except in its simplest rectangular forms.

CLUTCH. A mechanical device whereby it is possible to transmit the rotary motion of a shaft by means of connecting two elements which normally are independent. This connection may be established by means of teeth, by the friction of two surfaces, by pins and studs, by cams, or in other ways. The clutch finds extensive application for the transmission of power in various mechanical devices, and perhaps the most important types are the friction clutches, where two surfaces rub on each other when the clutch is thrown into gear, the pressure of contact being sufficient so that the friction is increased to a degree that the surfaces, which may have special coatings as of wood or cork, bind and one surface is enabled to drive the other. These surfaces may take the form of disks placed at right angles to the shaft, of blocks sliding on its outer or inner surface, of a surface or band on the rim of a pulley on the shaft, of two conical surfaces, internal and external, or of a band and ribbon around a pulley, or some one of numerous other devices. There are also magnetic clutches where the two parts are brought together by the action of powerful electromagnets. The advantage of the clutch is that shafts may be put into motion gradually without shock, and for this object they find extensive application in motor vehicles (q.v.).

For detailed consideration of friction clutches, consult Souther, in *Transactions American Society of Mechanical Engineers for 1908.*

CLUTE, Willard Nelson (1869–). An American botanist, born at Painted Post, N. Y. Between 1897 and 1911 he was assistant curator of the botanical department of Columbia University, curator of the New York Botanical Garden, instructor in biology in the Joliet (Ill.) High School, and instructor in botany in the Curtis High School, Chicago. In 1911 he became head of the biology department in the Girls' Technical High School, Chicago. He was at one time publisher of the *Plant World* and later became both editor and publisher of the *Fern Bulletin* and the *American Botanist.* He founded the American Fern Society in 1893. His publications include: *A Flora of the Upper Susquehanna Valley* (1898); *Our Ferns in their Haunts* (1901); *The Fern Collector's Guide* (1902); *The Fern Allies of North America* (1905); *Laboratory Botany for the High School* (1909); *Agronomy for High Schools* (1912; 2d ed., 1913); *Laboratory Manual and Note Book in Botany* (1913).

CLUT'TERBUCK, Captain Cuthbert. A retired officer, the fictitious editor of Scott's *The Abbot, The Monastery,* and *The Fortunes of Nigel.*

CLUVER, klōō'vẽr, or **CLÜVER,** klȳ'vẽr, Philipp (1580–1622). A German antiquarian and geographer, born in Danzig. He first studied law in Leyden, but soon forsook it for archæology and geography, whereupon his father withdrew all support and he was obliged to take service in the Austrian army. From 1607 to 1613 he traveled through Norway, England, Scotland, France, Germany, Switzerland, and Italy, and in 1615 he settled in Leyden, where he was made "Geographus Academicus." In 1617–18 he roamed once more through Italy and Sicily, on foot and under great hardship. He was the founder of historical geography and author of *De Tribus Rheni Alveis atque Ostiis* (1611); *Germania Antiqua* (1616); *Sicilia Antiqua* (1619); *Italia Antiqua* (1624), his principal work; and *Introductio in Universam Geographiam* (1624).

CLYDE (called *Glotta* by Tacitus, connected with OIr. *Cluad,* name of a river, Gk. *κλύζειν, klyzein,* to wash out, Lat. *cluere,* to purify, Goth. *hlūtrs,* AS. *hlūttor,* Ger. *lauter,* pure). The third in size, commercially the most important river in Scotland, widely celebrated for the romantic beauty of its scenery (Map: Scotland, D 4). It is formed by the Daer Water, the Potrail Water, and several small streams of the semicircular range of the Hart, Queensberry, and Lowther hills, and drains the counties of Lanark, Renfrew, and Dumbarton, flowing past Lanark, Hamilton, Glasgow, Renfrew, Bothwell, Crawford, Lamington, Blantyre, Uddingston, and Dumbarton, near which town it opens into the Firth of Clyde. In this course it receives the Medwin, Carnwath, Mouse, Calder, North Calder, Kelvin, and Leven rivers. It flows through a fertile, wooded valley, often extending into level plains, and often having bold, wooded banks. From 2 miles above to 4 miles below Lanark are the celebrated falls of Clyde—a series of four cascades and rapids, the largest in Scotland; the total descent in the course of 6 miles being 230 feet, amid very picturesque scenery. Corra Linn, the grandest fall, forms three distinct leaps—in all 84 feet high. Below Glasgow the Clyde expands into an estuary, navigable by the largest vessels, and at Greenock it attains a breadth of about 4 miles. Opposite this point the Gareloch empties into it, and a short distance below, Loch Long on the north. Turning, it expands into the Firth of Clyde, which extends between Argyll on the west, and Renfrew and Ayr on the east, to the North Channel at the island of Ailsa Craig, where its breadth is about 30 miles. In the Firth of Clyde are the islands Arran, Bute, Great Cumbrae, and Little Cumbrae. In the north a narrow arm, called Loch Fyne, extends far into Argyll. The Clyde from its source to Glasgow is, by its windings, 75 miles long, and from Glasgow to the south end of the peninsula of Cantyre the distance is about 90 miles. The basin of the Clyde occupies 1500 square miles. Floods sometimes raise its waters 20 feet. Clydesdale, or the valley of the Clyde, is noted for its coal and iron mines, orchards, and horses. The falls of Clyde furnish power for many mills, especially cotton. Bell, in 1812, launched on the Clyde the first steamboat, and to this day in Europe the Clyde forms the centre of the shipbuilding industry in Scotland. Consult Millar, *The Clyde from its Source to the Sea* (London, 1888).

CLYDE. A village in Wayne Co., N. Y., 38 miles west of Syracuse, on the New York Central and the West Shore railroads, and on the Barge Canal (Map: New York, D 4). It contains glassworks, steam-engine and boiler factory, cannery, and harness works. Pop., 1900, 2507; 1910, 2695.

CLYDE. A village in Sandusky Co., Ohio, 75 miles west by south of Cleveland, on the Cleveland, Cincinnati, Chicago, and St. Louis, the Lake Shore and Michigan Southern, the Wheeling and Lake Erie, and the Lake Shore Electric

railroads (Map: Ohio, E 3). The village contains a Carnegie library and a monument to Gen. James B. McPherson, who was born and buried here. There are manufactories of cutlery, kraut, automobiles, barrels, and screens, and granite works. The water works and lighting plants are publicly owned. Pop., 1900, 2515; 1910, 2815.

CLYDE, JOHN CUNNINGHAM (1841–1915). An American clergyman, born at White Deer Valley, Lycoming Co., Pa. After serving in the Civil War he was educated at Lafayette College and Princeton Theological Seminary. In 1869 he was ordained to the Presbyterian ministry. He was pastor at Frazer, Pa. (1872–79), and at Bloomsbury, N. J. (1879–1901). His publications include: *Rosbrugh, a Tale of the Revolution* (1880); *Life of James H. Coffin* (1881); *History of the First Presbyterian Church of Bloomsbury, New Jersey* (1884).

CLYDE, LORD. See CAMPBELL, SIR COLIN.

CLYDE'BANK. A town in Dumbartonshire, Scotland, on the Clyde, 7 miles northwest of Glasgow (Map: Scotland, D 4). It has extensive yards for building iron and steel ships, engineering works, and distilleries. Pop., 1901, 18,670; 1911, 16,202.

CLYDES'DALE, or **PAISLEY TERRIER.** See TERRIER.

CLYMENE, klīm'ē-nē. 1. The daughter of Oceanus and Tethys, and mother, by Iapetus, of Atlas, Prometheus, and Epimetheus. 2. The mother of Phaëthon (q.v.).

CLYME'NIA (Neo-Lat. nom. pl., from Lat. *Clymene,* Gk. Κλυμένη, *Klymenē,* name of a nymph, originally p.p. of κλύειν, *klyein,* to hear). A genus of goniatitoid cephalopods, found in the Upper Devonian rocks of Europe and North America, and distinguished from the other goniatites by the dorsal position of its siphuncle. The shell of this genus is a flattened spiral, the whorls of which are closely coiled so that each whorl clasps the outer half of that next inside it. The suture lines are simply curved or lobed. In some beds of the European Upper Devonian the shells of this genus are so abundant as to give the name "Clymenienkalk" to the limestone containing them. Consult Foord and Crick, *Catalogue of the Fossil Cephalopoda in the British Museum of Natural History,* part iii, pp. 14–32 (London, 1897). See also GONIATITES; CEPHALOPODA; DEVONIAN SYSTEM.

CLYMER, klī'mēr, GEORGE (1739–1813). An American patriot, one of the signers of the Declaration of Independence and a prominent member of the Constitutional Convention of 1787. He was born in Philadelphia, was orphaned when only one year old, was educated at the College of Philadelphia (now the University of Pennsylvania), and became a merchant in his native city. In 1772 he was appointed by Governor Penn to the position of "Justice of the Court of General Quarter Sessions of the Peace, and of the County Court of Common Pleas of Philadelphia." On the approach of the Revolutionary War he became an active member of the patriot party, and was chosen successively a member of the Committee of Correspondence (1774) and of the Provincial Congress of Pennsylvania (1775). From July, 1775, to August, 1776, he served as one of the two treasurers of the Continental Congress; from October, 1775, to July, 1776, he was a leading member of the Pennsylvania Committee of Safety; and in July, 1776, he was one of the five men who were appointed by the Pennsylvania Legislature in place of the Pennsylvania delegates who had opposed the Declaration of Independence, which document he signed on August 2. He was a prominent member of the Constitutional Conventions of Pennsylvania in 1776 and 1779; served as captain under Cadwalader at the battle of Princeton; was a member of the Pennsylvania Assembly in 1777 and 1778; was reëlected to the Continental Congress in March of 1778; was sent to Valley Forge by Congress as a special commissioner to inquire into the alleged maladministration of the Commissary Department; and in 1778 was one of the special commissioners sent by Congress to treat with the Indians at Fort Pitt (Pittsburgh). In May, 1780, he cooperated with Robert Morris and others in founding the Bank of Pennsylvania to facilitate the furnishing of supplies to the army, and in both 1780 and 1781 he was reëlected to the Continental Congress, by which in 1782 he, with Edward Rutledge, was sent as special commissioner to the Southern States, to secure the payment of funds due to the national treasury. From 1782 to 1785 he lived at Princeton, N. J., but returned to Philadelphia in the latter year, and from then until 1789 was an influential member of the Pennsylvania Assembly. He took a prominent part in the Constitutional Convention of 1787; was a member of Congress from 1789 to 1791; was appointed by Washington in 1789 Supervisor of the Internal Revenue for Pennsylvania, in which capacity he was charged with the collection of the tax on spirits which brought on the Whisky Insurrection (q.v.); and in 1796 was one of the special commissioners appointed by Washington to treat with the Creeks and Cherokees in Georgia. Subsequently, though taking no further part in public life, he took an active interest in public enterprises of various kinds, devoted much of his time to reading and study, and was president of the Philadelphia Bank and of the Academy of Fine Arts. He was one of the foremost leaders during the Revolutionary period and had a wide reputation for ability, learning, and patriotism. Consult Dickenson, in the *Magazine of American History,* vol. v (New York, 1880).

CLYSTER, klīs'tēr (Lat., from Gk. κλυστήρ, *klystēr,* a syringe, from κλύζειν, *klyzein,* to purify). An old term for a medicine administered in the liquid form by the rectum, or lower end of the intestines. See ENEMA.

CLY'TEMNES'TRA (Lat., from Gk. Κλυταιμνήστρα, *Klytaimnēstra*). In Greek legend, the daughter of King Tyndareus and Leda, and the twin sister of Helen. She became the wife of Agamemnon (q.v.), and bore him a son, Orestes, and three daughters, Iphigenia, Electra, and Chrysothemis. While Agamemnon was at Troy, she formed an adulterous connection with Ægisthus (q.v.), murdered her husband on his return, and reigned for seven years with Ægisthus, till she was murdered by Orestes (q.v.).

CLYTIE, klī'tē (Lat., from Gk. Κλυτίη, *Klytiē*). A Greek maiden beloved by Helios (the sun). When he deserted her for Leucothea, she betrayed the latter to her father, who put her to death. As her lover did not return, Clytie gazed ever after him, until in pity the gods changed her to a flower, called by the Greeks ἡλιοτρόπιον, *hēliotropion,* of the same family as our heliotrope. The so-called Clytie of the British Museum is only the portrait of a Roman maiden.

CNIDUS, nī'dŭs, or GNIDOS (Lat., from Gk. Κνίδος, *Knidos*). An ancient city on the western extremity of the promontory of Triopion (now Cape Krio), in Caria, Asia Minor, founded as a colony from the east coast of the Peloponnesus, and hence said to be both Laconian and Argolic; it was one of the six cities of the Dorian League. Cnidus (according to Strabo) had two ports, one of which was a closed harbor for war vessels. The original settlement was on an island, but the city later spread to the mainland, and a mole was built to unite the two parts. The southern port was formed by two moles carried into the sea to the depth of nearly 100 feet, one of which is nearly perfect at the present day. The city was famous for its worship of Aphrodite, and in one of its temples was the famous nude statue of the goddess by Praxiteles. The Cnidians valued this work so highly that they are said to have refused the offer of Nicomedes of Bithynia to pay their large public debt in exchange for this statue. Off Cnidus, the Athenian admiral Conon defeated the Spartan fleet in 394 B.C., and thus broke the power of Sparta in Asia Minor. The site is still covered with ruins. In 1857–58 Sir Charles T. Newton excavated the sacred precinct of Demeter, discovering the fine seated statue of the goddess now in the British Museum. Famous citizens of Cnidus were Eudoxus (q.v.), Ctesias (q.v.), and Sostratus, who built the Pharos (q.v.) at Alexandria. Consult Newton, *Discoveries at Halicarnassus, Cnidus, and Branchidæ* (London, 1862–63), and *Travels and Discoveries in the Levant* (London, 1865).

CNOSUS, nō'sŭs, GNOSUS, or KNOSUS (Lat., from Gk. Κνωσός, *Knōsos*, or less correctly Κνωσσός, *Knōssos*). An ancient city of Crete, on the north side of the island, 3 miles from the coast, near the modern Candia (q.v.), famous in legend as the home of King Minos (q.v.). The Dictæan cave in the neighborhood was a legendary birthplace of Zeus, though in later times somewhat supplanted as a seat of worship by the Idæan cave on Mount Ida. Here also legend placed the famous labyrinth (q.v.), in which the Minotaur was confined. In historical times Cnosus was inhabited by Dorians, and shared with Gortyna the chief power in the island. It finally became a Roman colony. The site has become highly important in the study of the civilization known as Ægean or Minoan from the excavations made by Sir A. J. Evans since 1899–1900. These have shown that the site of the early town was abandoned near the end of the Mycenæan period, never to be reinhabited. A city of the Mycenæan period has been discovered, and also a palace of far greater size and splendor than any previously known, bearing witness to the great power of the rulers of Cnosus in the heroic age. The decorations include wall paintings on stucco, and reliefs of an artistic merit hitherto unsuspected for so remote a period (about 2000–1200 B.C.) outside of Egypt. The art, however, is not Egyptian, but must be attributed to the pre-Dorian civilization of Greece. In the palace were also found a great number of clay tablets bearing inscriptions in two varieties of writing, neither of which can be read, though it seems clear that some of the tablets contain inventories of chariots, shields, and other stores. Consult Sir A. J. Evans, *An Atlas of Knossian Antiquities* (London, 1914). See ARCHÆOLOGY, *Mycenæan Period;* CRETE.

CNUT. See CANUTE.

COACH (Fr. *coche*, Ger. *Kutsche*, probably from Hung. *kocsi*, coach, named after a little place called Kocs (pronounced Koch) in western Hungary). A heavy inclosed four-wheeled carriage for the conveyance of passengers. The construction of the coach differs from that of other inclosed vehicles in the following particulars: 1. The roof forms a part of the framing of the body, and in this respect the construction is different from other covered carriages in which the roof is simply a canopy supported by iron rods or wooden pillars. 2. Coaches from the earliest times were suspended on springs. The coach sent by Ladislas, King of Hungary, to Charles VII of France is described as a carriage the body of which "trembled." 3. A coach is always designed with more than one seat for passengers.

According to Thrupp (see *Bibliography* below), coaches were first made in the town of Kocs, Hungary, and were so called from the name of the town, just as landaus and berlins are named from the towns which produced them. The same author traces their development from the huge agricultural wagons used on the Continent in the twelfth and thirteenth centuries, which were so constructed that, by different adjustment, they could carry a long timber, a cask of wine, a load of hay, or a family. The coaches of the Middle Ages were very elaborate affairs, used only by royalty and nobility, and for purposes of state. As late as 1550 there were only three coaches in Paris; one of these belonged to the Queen, another to Diana of Poitiers, and a third to a nobleman who was too corpulent to ride a horse. In 1631 a "glass coach," that is, a coach with glass windows, was built for the Infanta of Spain.

The first coach ever seen in England was made in 1555 by Walter Rippon for the Earl of Rutland; in 1564 the same builder made a showy vehicle for Queen Elizabeth. Later in her reign the royal coaches were constructed with sliding panels, so that the Queen could show herself to her subjects whenever she desired.

Stagecoaches. The Romans during the Empire had a system of public vehicles for hire which traveled over definite routes and probably at stated times. During the Middle Ages no such system of public conveyance prevailed. Towards the end of the sixteenth century wagons began to travel regularly between the principal towns of England to carry goods and people. These wagons were called stages. They were soon superseded by coaches. In 1662 we find a writer condemning this innovation because "these coaches make country gentlemen come to London on small occasion, which otherwise they would not do but on urgent necessity; nay, the conveniency of the passage makes their wives often come up, who, rather than make such long journeys on horseback, would stay at home. Here, when they come to town, they must be in the fashion, get fine clothes, and by this means get such a habit of idleness and love of pleasure that they are uneasy ever after." In spite of such protests coaches became more and more popular, and by 1750 an elaborate system of routes had been established. In 1784 these coaches began to carry the mail. The flourishing period of the stagecoach was at the opening of the nineteenth century. About this time an extensive good-roads movement had been inspired by the systems of Macadam and Telford. The stagecoach acquired a speed of 10 miles

an hour on the most important English routes. In America stage routes, although established between some of the principal cities, were never developed to the extent to which they were in England—a condition of affairs to be explained by the poor roads and the more sparsely settled territory. The introduction of transportation by steam proved a speedy and successful rival. This form of carriage—the railway car—has been given the name of coach, and, indeed, the early passenger cars were modeled in shape after the coaches. For further history, see COACHING.

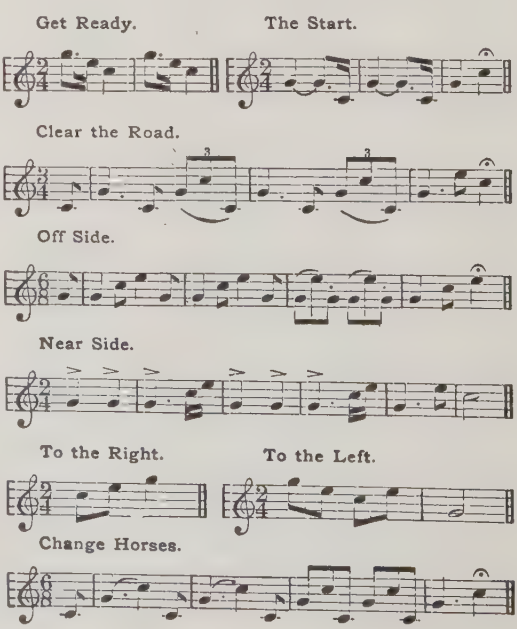
At the beginning of the twentieth century coaches are built both for public and private use, though the advent of the motor car has detracted from their use. In design they are closely akin to those in use in England during prerailroad days. They may be described as consisting of two parts—the *carriage* and the *body*. The former comprises the axles, perch (or reach), futchels, and transom (or bed), and many minor component parts, which together with the wheels form a complete vehicle or carriage upon which the body part is supported by the springs. The latter are secured to the bed and body by clips, and are always made of several stiff plates, because of their greater elasticity as compared with one plate of steel of the same length. The pole fits between the inside futchels and completes the carriage part. In the best-made carriages the dimensions of a pole are 3½ inches wide and 4¼ deep, measured at a point 2 feet from the splinter bar. For horses averaging between 15 and 16 hands, the length of the pole is usually 9 feet from the front of the splinter bar to the crosshead or the polehead; for smaller horses, cobs, etc., about 3 inches shorter. The *body* is practically the same in all coaches and is usually 4 feet 10 inches in length, 4 feet wide, and 4 feet 2 inches high. It is built as lightly as possible, so as not to detract from the centre of gravity of the coach. The roof is almost flat, in order that seats may be built on it, or for baggage, and the sides have a "cant" in a horizontal direction and the "turn under" in a vertical direction. There are two *boots*, the one in front being a few inches higher on the body than the hind boot, which latter is about 2 feet long (the front one 3 feet) and 2 feet deep. Both these boots are a little narrower than the body. The *box* and *driving seat* are placed on the front part of the front boot and are supported by solid ends or risers. The shape of the seat is made by the cushion, and not by the seat itself, which is always flat. All modern coaches have brakes, but a good driver rarely has recourse to them, except in emergencies. (See DRIVING.) A complete set of tools is carried in case of accidents to horses or vehicle. The weight of a road coach varies from 2200 to 2600 pounds. Builders generally contrive to throw more of the whole weight into the carriage part, in order to keep the centre of gravity low, and because it has to withstand the bulk of the strains.

The typical American coach is the Concord coach, so called from Concord, N. H., where many of them were built. Its principal constructive features are three parallel straight perches connecting the hind axle with the front transom bed, which steady a very rigid, rectangular frame. At each of the four corners of this frame are placed stiff iron standards carrying at their upper ends square iron shackles. Connecting with these shackles are strong leather straps, upon which rests the body of the coach, a mode of suspension common to European carriages before the use of springs. These latter are entirely absent in the Concord coach. The so-called *hackney coach* is a smaller four-wheeled vehicle for hire.

Bibliography. Consult: Adams, *English Pleasure Carriages* (London, 1837); Thrupp, *History of the Art of Coach-Building* (London, 1877); Gilbey, *Early Carriages and Roads* (London, 1903); Straus, *Carriages and Coaches: Their History and their Evolution* (London, 1912). See CARRIAGE; COACHING.

COACH DOG, or DALMATIAN CARRIAGE DOG. A dog of medium size, related to the hounds (q.v.), and having the form and smooth coat of a pointer, which properly is used only to follow a carriage, as an ornamental part of the equipage, and as a watchdog about the stable. This dog should, therefore, be capable of endurance on foot, trim of form, well groomed, and "stylish" in appearance. The coat must be pure white, evenly spotted with small, round, *distinct* spots, from half an inch to an inch in diameter, either perfectly black or pure brown. The head should be long, fine, and like that of a pointer, but not so deep. This dog is commonly said to have been first bred in Dalmatia, but the same breed seems to have been common in Spain as early, at least, as the sixteenth century. It is often used in Denmark to draw carts. See DOG.

COACH HORN. A straight tapering horn made of brass or copper, and used to sound certain simple calls. There are no keys and the range is limited to the six open notes (c^1-g^1-c^2-e^2-g^2-c^3), of which the high c is exceedingly difficult. The coach horn varies considerably in length, a short (42-inch) horn giving more brilliant notes, and a long (56-inch) horn giving a softer, richer tone. The various calls sounded with the coach horn have a well-recognized place in coaching; and in addition to those used universally, as in the case of examples noted below, there are others employed by particular coaches and routes. A few of the best-known calls are as follows:



COACHING. Driving or being driven in a coach (q.v.) drawn by four or more horses. The driving of a coach requires great skill, coolness, judgment, and a knowledge of horses on the part of the driver; and, where indulged in as a sport or pastime, may be said to derive its greatest attraction from that fact alone. The history of coaching is naturally part of the history of the coach, for which see article COACH. The first stage in England was put on the road in 1659 and traveled between London and Coventry. At the beginning of the eighteenth century there were many coaches employed throughout the country; but the slowness of travel was such that it took a week to go from London to York, and proportionately for all lesser distances. The royal mail, which had been carried by a system of postboys under a contract speed of five miles an hour, was, in 1784, undertaken by Palmer's mail-coach service, which carried mail as well as passengers, and grew to such a success that the average speed rate of mail coaches was brought up to 10 miles an hour. This, however, was due almost entirely to the improvements in road construction instituted by Macadam and Telford.

In 1836 coaching had become so important an institution that 54 coaches were employed in England, 30 in Ireland, and 10 in Scotland. The British government exercised a rigid supervision and discipline over the stagecoach service, because of its connection with the post-office system, and exacted a military punctuality and regularity in its running and general management. The landed and country gentry, generally, maintained a zealous watchfulness over the condition of the roads, and consequently much competition was indulged in by the people of the countryside, to attract coaches to some particular route, and among the coaches themselves, to establish the best records. The drivers were frequently gentlemen, and often members of the aristocracy. The "Brighton Age," in its palmy days, numbered among its professional drivers Charles Jones, Sir St. Vincent Cotton, Dick Brackenbury, and many others; while such distinguished men as the Duke of Beaufort, Lord Chesterfield, and Prince Henry Batthyányi were among the amateur drivers of that and similar coaches. Professional drivers would frequently receive as much as $3000 and $4000 per year for their services; an immense salary for those days, and the best indication of the importance attached to the position. After 1840 coaching as a public necessity ceased to be; and with diminishing business, decay set in rapidly.

In America, even in Colonial times, four-horse stage wagons were in regular employment throughout the country, the most important (1760) plying between Philadelphia and New York. Owing to the absence of regular roads, the saddle horse was the favorite means of transport. Coaching as a recreation or amusement began in England about 1868—a revival which spread to America as well as throughout continental Europe. In England it had as its leading supporters men who remembered the pre-railroad coaching days, and desired to save the institution from the oblivion which threatened it. A more or less successful effort had been made to keep alive the old spirit of coaching on one or two of the older routes; but at the time of the so-called revival the Four-in-Hand Club, established in 1856, and Sir Henry Peyton, were the only interested ones. The results were not very permanent so far as England was concerned; for in 1880 there were only four coaches running—a state of things, however, which has since considerably improved.

In 1877 the "Old Times" was again put on the road between London and St. Albans; the Four-in-Hand and the Coaching clubs afterward became permanent organizations, and their "meets" have come to be regarded as among the social events of the London season. The first English coaching club was the B. D. C., or Bensington Driving Club, limited originally to 16 members, and first organized in 1807. In 1823 the annual club meets were abandoned, and in 1856 the club ceased to exist. The Four-Horse Club, frequently but inaccurately referred to as the Four-in-Hand Club, was formed in 1808, and, after a varied career, disbanded in 1830. Amateur coaching in the United States may be said to have antedated the English revival by two or three years, August Belmont putting the first coach on the road in 1864. Leonard Jerome is credited with the distinction of driving the first American-built coach, and he, together with a number of other gentlemen, founded in 1875 the New York Coaching Club. Since then coaching has been a regular feature of fashionable New York and Newport life, the number and equipment of the coaches employed comparing most favorably with those of either London or Paris. Indeed, modern coaching in both England and France has received no little impetus from American lovers of the pastime.

At the present day coaching is confined almost exclusively to such great centres and cities of the world as are most frequented by the wealthy and leisure classes, as London, New York, Paris, Berlin, Vienna, etc., and is generally employed in connection with racing and trips to summer resorts. The first amateur road-coach service in the United States was established in 1876 between the Brunswick Hotel, New York City, and Pelham Bridge (15½ miles). The following is a list of the principal road coaches of New York, London, and Paris, past and present, together with their routes and time taken. *New York:* Holland House to Ardsley Casino, 25.8 miles in 2½ hours. *London:* Northumberland Avenue to Box Hill, 25 miles in 3 hours; Northumberland Avenue to Virginia Water, 26.5 miles in 3¼ hours; Northumberland Avenue to Windsor, 30 miles in 4 hours. *Paris:* New York Herald Office to Cernay-la-Ville, 29 miles in 3 hours; New York Herald Office to Pontoise, 26.3 miles in 2¾ hours; New York Herald Office to Maisons-Lafitte, 19.4 miles in 2 hours; New York Herald Office to Versailles, 14.5 miles in 1¾ hours. Of the "two-days" trips, or routes which require an entire day each way, the most important in the United States is that from the Holland House, New York, to Philadelphia and return, about 90 miles each way, taken annually by the New York Coaching Club members. In England, the journey from the White Horse Cellar, Piccadilly, to Brighton (54 miles) is accomplished in 6 hours; while in France the distance from the New York Herald Office, Paris, to Fontainebleau (60 miles) is accomplished in 7 hours. *Stages:* Under the best conditions a change of horses would be made every seven miles, but ordinarily it has to be done to suit the available stabling accommodations of the route. The best authorities agree that a fast coach running out and in is best served by having a horse to each mile of the road. Thus

30 horses would be necessary to run a coach out and in once a day, between points 30 miles apart. An illustration of the distance between stages under normal conditions, over a route 28 miles long, would be as follows: First stage 7, second stage 8, third stage 7, fourth stage 6 miles, each team serving one stage each way. On hilly roads longer stages are frequently made, but at a greatly reduced rate of progress. It is common experience that "pace" rather than "pull" is responsible for the disablement of the average coach horse. The bibliography of coaching is somewhat limited, but the following works are both interesting and comprehensive: Nimrod (C. J. Apperley), *Essays on the Road* (London, 1876); Rogers, *A Manual of Coaching* (Philadelphia, 1900); Ware, *Driving* (New York, 1903); Tristram, *Coaching Days and Coaching Ways* (New York, 1903).

COACHWHIP SNAKE. See WHIP SNAKE.

COAG'ULA'TION (Lat. *coagulatio*, from *coagulare*, to curdle, from *coagulum*, rennet, from *co-*, together + *agere*, to drive). The amorphous solidification of a liquid, or part of a liquid, as when the casein of milk is solidified by rennet in making cheese (q.v.), or the white of an egg by boiling. The process varies in various substances. Albumen, or the white of an egg, is said to coagulate at a temperature of about 71° C. (160° F.), although coagulation would undoubtedly take place also at lower temperatures, only more slowly. Milk is coagulated or curdled by the action of the rennet or by acids. The fibrin in the blood, chyle, and lymph of animals coagulates after the separation of these fluids from the living body.

COAHUILA. See KAWIA.

COAHUILA, kō'ä-wē'lä (named from the Mexican tribe *Coahuiltecs*). A northern state of Mexico, separated from Texas on the north and east by the Rio Grande, and covering an area of 63,745 square miles (Map: Mexico, H 4). With the exception of the eastern part, which is somewhat mountainous, the surface forms an elevated plateau, with a general incline towards the Rio Grande. The western part is taken up by the Bolson de Mapimi, a semidesert region, only partially explored, with many lagoons and vast mineral resources. The climate is moderate and healthful. Mining is an important industry of the state. Silver, lead, and zinc are the chief metals extracted. It is the only Mexican state in which coal is mined. The chief occupation is cattle raising, although the soil is well adapted for the growing of cereals and European vegetables, to which more and more attention is being paid. In the southwest some vines and cotton are cultivated. The state is traversed from north to south by the Mexican International Railway. Its southern section is well provided with railroads. Pop., 1910, 367,652; capital, Saltillo (q.v.).

COAITA, kō-ī'tä. See SPIDER MONKEY.

COAL (AS. *col*, OHG. *kolo*, Ger. *Kohle;* ultimately connected with Skt. *jval*, to blaze, and probably with Ir., Gael. *gual*, coal). A mineral fuel of solid character, found and used in many countries. The name is a word common to all the languages of the Gothic stock, and seems allied to the Latin *calere*, to be hot; as also "to glow," and "kiln." The word "coal" has often prefixed to it some qualifying word, to distinguish different kinds of coal; such as cannel coal, stone coal, pea coal, etc.

ORIGIN. Coal is one of the most important economic minerals, and is of vegetable origin. When vegetable matter accumulates under water it undergoes a slow process of decomposition, gradually giving off its nitrogen, hydrogen, oxygen, and some carbon, the result of which if carried far enough is the formation of a mass of carbon. Peat (q.v.), the material so often found underlying swampy tracts in north temperate zones, but occurring also even in warmer climates, represents the first stage in the coal-forming process, and the further stages are obtained by the burial of these vegetable deposits under great loads of sediment, where they become subjected to pressure, and at times to heat also. This effects a series of changes, especially consolidation and loss of oxygen, and gives a series of products, whose nature depends on the degree to which the original vegetable matter has been changed. The products are known as *lignite, subbituminous coal, bituminous coal, semibituminous coal,* and *anthracite coal;* these five types being connected by all degrees of intermediate stages. In Carboniferous times certain regions were covered by rank and luxuriant vegetation which grew upon swampy land slightly raised above the level of the sea. As the plants died, their remains fell into the water of the swamp, and slowly formed an accumulation of vegetable matter of increasing thickness. By slow subsidence this thick layer of vegetable matter sank below the water, and became gradually covered by sand, mud, or other mineral sediments, washed out from the shore. Successive elevations and depressions, with intervening accumulations, may thus have yielded successive beds. Subsequent elevation, folding of the earth's crust, and accompanying metamorphism, followed by erosion of the surface, has exposed to view the edges of the once deeply

ANALYSES OF COALS

LOCALITY	PROXIMATE					ULTIMATE					
	Moisture	Volatile matter	Fixed Carbon	Ash	Sulphur	Hydrogen	Carbon	Nitrogen	Oxygen	Calories	British Thermal Units
Peat, Orlando, Fla.	13.19	56.83	24.30	5.68	.49	6.06	51.18	2.56	34.03	4,961	.....
Lignite, Crockett, Tex.	13.40	42.75	29.00	14.85	1.04	5.57	52.06	.95	25.53	5,199	9,358
Subbituminous, Lafayette, Colo.	13.49	37.11	43.03	6.37	.58	5.75	61.13	1.22	24.95	5,995	10,791
Bituminous, Johnstown, Pa.	2.35	14.30	71.40	11.95	3.30	4.22	75.16	1.13	4.24	7,382	13,228
Semibituminous, Coal Hill, Ark.	1.28	12.82	73.69	12.21	2.01	3.74	77.29	1.39	3.36	7,448	13,406
Semianthracite, Russellville, Ark.	2.07	9.81	78.82	9.30	1.74	3.62	80.28	1.47	3.59	7,612	13,703
Anthracite, Schuylkill Co., Pa.	2.80	1.16	88.21	7.83	.89	1.89	84.36	.63	4.40	7,338	13,298

buried beds of coal. In the United States and even in other countries conditions favorable for coal formation occurred also in the Triassic, Cretaceous, and Tertiary.

Composition. The composition of coal may be expressed in either the elementary or the proximate form, as shown in the preceding table, in which it will be noticed that the ash and sulphur are common to both. These analyses of the several members of the coal series indicate the general increase in carbon, and decrease in oxygen, hydrogen, and nitrogen in passing from the lower to the higher members of the series. Of the two methods for expressing the composition of the coals, the proximate is of greater commercial importance, and is sometimes also used as a basis for classification.

A proximate analysis like the above is of practical value, since it gives us a better conception of the coal worth. Thus the freedom of burning increases with the amount of volatile matter, which may have a variable composition. The volatile matter of coals from the eastern United States and Canada is rich in hydrocarbons, while that of coals from Western States contains more carbon monoxide and carbon dioxide, as a result of which it gives less heat and less smoke in burning. The heating power depends chiefly on the amount of fixed carbon present. Sulphur is an injurious constituent when the coal is to be used in the manufacture of gas or for metallurgical purposes; while ash is undesirable, since it displaces so much carbon, and if it contains fusible impurities such as iron, lime, or alkalies, it causes clinkering. Moisture retards the heating power of the coal until it is driven off.

The heating power of coal, which can be expressed in calories or British thermal units (B. T. U.), is its most important property, and is often tested by means of an apparatus known as a "calorimeter" (see CALORIMETRY). The principle of the test depends on the determination of the weight of water which one pound of coal can convert into steam at 212° F. under atmospheric pressure. (See HEAT.)

Varieties of Coal. The several varieties of coal and their properties are as follows:

Anthracite often contains over 80 per cent of fixed carbon, and also little ash, sulphur, and moisture. It has great heating power, and burns with a smokeless flame. It is dense, has a shining lustre, and usually breaks with a smooth, conchoidal fracture. The largest supply of true anthracite is obtained from the great anthracite region of eastern Pennsylvania, where the quality of the coal is due to regional metamorphism. Several small fields occur in the West, and are partly the result of contact metamorphism. They include Crested Butte, Colorado; Routt County, northwestern Colorado; Cerillos, New Mexico; and a few others. A little is mined in western Canada.

Semianthracite is a variety between bituminous and anthracite, but more closely resembling the latter. It is but slightly developed in the United States, the main commercial supply coming from Sullivan Co., Pa., and being sold as anthracite. Some is found in the eastern part of the Arkansas field.

Semibituminous coal, also intermediate between anthracite and bituminous, more nearly resembles the latter. It is perhaps the best-known coal of the United States, and because of its ideal steaming qualities has a world-wide reputation. This type is produced in the fields known as Clearfield, Pennsylvania; George's Creek, Maryland; New River and Pocahontas of Virginia and West Virginia, and the Arkansas field. It is known in Colorado and some other Western States, but has not attained commercial importance.

Bituminous coal is a comparatively brittle coal, of deep-black color and often cubical fracture. It burns readily, with a smoky flame, and is much used for steaming purposes; indeed, the great bulk of merchantable coal of the United States belongs to this class. It includes most of the coal produced east of the Mississippi, as well as in Iowa, Kansas, Oklahoma, and Texas. Bituminous coal is also known in many parts of the Rocky Mountain province and the northern Pacific coast.

Cannel coal (q.v.) is a variety of coal very rich in volatile matter, and found sparingly in parts of Kentucky, Ohio, and Indiana. Its chief use is as a gas enricher, since it yields 8000 to 15,000 cubic feet of gas per ton. It is very compact in texture, and may even have an oily look.

Subbituminous coal or *black lignite* is a grade intermediate between bituminous and lignite, and sometimes difficult to distinguish from one or the other. It differs from the latter usually in having a black streak; from the former in that it cracks irregularly in drying or splits parallel to the bedding on weathering, while bituminous shows a columnar cleavage or jointing. Subbituminous coal is black, and often has a fair lustre. It is a common type in many of the Western coal fields.

Lignite or *brown coal* is the lowest grade of true coal. It often shows a woody structure, brown color and streak, and high moisture content. On drying out it usually cracks badly, and hence should be used near the point of production unless it is formed into briquettes or utilized in a gas producer.

Coking coal (see COKE). Some bituminous coals form a hard, more or less porous coke or cake when heated in the presence of little air. *Natural coke* or *carbonite* is sometimes formed when an igneous rock penetrates a coal seam, but such deposits are limited in extent and of no commercial value.

Structural Features. Coal beds are liable to thicken or thin out when traced from point to point. Others divide or split, perhaps only to reunite farther on. In regions of disturbance they may show folding and faulting. Several beds may occur one above the other, separated by varying intervals of barren rocks. The rocks associated with coal are usually shale and sandstone, but clays, conglomerates, and limestones are also known.

History and Use. The value of coal does not seem to have been known to the ancients, nor is it well known at what time it began to be used for fuel. Some say that it was used by the ancient Britons; at all events, it was an article of household consumption to some extent during the Anglo-Saxon period as early as 852 A.D. There seems to be reason for thinking that England was the first European country in which coal was used in any considerable quantities. In America the deposits near Richmond, Va., were discovered in 1701, and mining was begun in 1750, while anthracite was first produced in 1793. Extended coal mining in the United States did not really begin, however, until about 1820. Since that time up to the present the

increase has been very rapid. In 1822 the amount of coal mined in Virginia was about 48,000 long tons. Latterly the production for the United States has reached over 500,000,000 short tons, greater than that of any other country of the world.

Coal is used largely for domestic purposes, either as fuel or, in the form of gas, for illumination and fuel. Its use for the latter purposes is, however, not so widespread as formerly, water gas having superseded it to a considerable extent. In the production of steam for motive power it also finds important applications. It is furthermore widely employed in the metallurgical industry in the form of either coal or coke, and in this connection may serve both as a fuel and as a reducing agent. Coke is made only from bituminous coal. Lignite seldom has much value as a fuel, owing to the large percentage of moisture that it contains. Because of this moisture it tends to crack in drying, and must therefore be used soon after mining, and in localities where it does not require long transportation from mine to market. This is true, for instance, of some of the lignite deposits in Colorado which are near the Denver market, and therefore possess commercial value. Lignite has sometimes been successfully used in the manufacture of producer gas, and peat has been found adaptable for this purpose. It has been suggested that much lignite could be used in the form of briquettes.

Coal Areas. The leading coal-producing countries of the present day are the United States, Great Britain, Germany, Austria-Hungary, France, Russia, and Belgium. The Russian coal fields are probably the most extensive in Europe. In the Far East coal is known in India, the Malay Archipelago, Japan, and China. The coal fields of China are very large and may become a source of European supply. Up to the present time they have not been developed in a systematic manner. Italy, Spain, Sweden, Australia, New Zealand, Borneo, the Philippine Islands, and some countries in Africa also produce coal; while in America, outside of the United States, deposits are worked in Canada, Mexico, Chile, and Argentina, and are known to occur in Colombia and Peru.

United States. The coal fields of the United States are especially extensive, the total area of the known fields exceeding 300,000 square miles, as shown by the accompanying table.

The American coal fields are separable into several provinces, the divisions being geographical and not geological. The geological ages of the coals in 1 and 2 are all Carboniferous, except small Triassic areas in Virginia and North Carolina. Those of 3, 4, and 5 are Cretaceous and Tertiary.

By far the most important of these regions is the Appalachian, which takes in portions of Pennsylvania, Ohio, West Virginia, Virginia, Maryland, eastern Kentucky, eastern Tennessee, Georgia, North Carolina, and Alabama. It is about 750 miles long and 70 to 80 miles wide. The coals are all bituminous or semibituminous with the exception of those at the northeastern end, in Pennsylvania, where close folding of the rocks has changed the bituminous into anthracite coal. In general, the rocks at the upper or northern end of the Appalachian belt are folded, while those of the lower end, as in Alabama, are often faulted in addition, so that the coal miner frequently finds the coal seam suddenly broken off. The Carboniferous section of this region has been described in the article CARBONIFEROUS SYSTEM, from which it may be seen that the coal beds occupy more or less well-marked stratigraphic positions.

COAL FIELDS OF UNITED STATES

PROVINCE	State	Area of Known Fields sq. m.	Total
1. Eastern	Pennsylvania, anthracite	480	
	" bituminous	14,200	
	Ohio	12,660	
	Maryland	455	
	West Virginia	17,000	
	Kentucky	10,270	
	Virginia	1,900	
	North Carolina	60	
	Tennessee	4,400	
	Georgia	167	
	Alabama	8,373	69,965
2. Interior	Michigan	11,000	
	Indiana	6,500	
	Kentucky	4,900	
	Illinois	35,600	
	Iowa	12,560	
	Missouri	23,960	
	Kansas	18,600	
	Oklahoma	10,000	
	Arkansas	1,580	
	Texas	8,200	132,900
3. Gulf	Arkansas	100	
	Texas	2,000	2,100
4. Northern, or Great Plains	North Dakota	29,630	
	South Dakota	2,160	
	Montana*	38,265	
	Wyoming†	11,120	
	Colorado	6,455	
	New Mexico	960	88,590
5. Rocky Mountain	Montana‡	260	
	Idaho	230	
	Wyoming‖	9,540	
	Colorado	7,886	
	Utah	3,646	
	New Mexico	12,260	
	Arizona	3,610	37,432
6. Pacific Coast	Washington	1,800	
	Oregon	90	
	California	10	1,900
			332,887

* Bituminous and subbituminous areas of northern and eastern Montana.

† Bituminous and subbituminous areas of northeastern Wyoming.

‡ Coal fields in the mountainous districts of Montana.

‖ Coal fields in the mountainous districts of Wyoming.

Appalachian Field. The coal measures of the Appalachian field consist of a great thickness of overlapping lenses of conglomerate, limestone, shale, fire clay, and coal. A fairly uniform succession of beds is identifiable in Pennsylvania, Ohio, Maryland, and West Virginia, but the section is less uniform in the Southern States. Coking coal is found throughout the field, but most of it is made from coals on the eastern border, for the coking qualities seem to disappear towards the western margin. Coking coals of high quality are found in the Connellsville district in Fayette and Westmoreland counties of southwestern Pennsylvania. Excellent steaming coals are mined in Clearfield, Allegheny, and Washington counties of Pennsylvania; in the Hocking district of Ohio; in northern West Virginia, and in the Pocahontas district of south-

1. INCLINED PLANE FROM MINE TO BREAKER.

2. VIEW OF TYPICAL BREAKER.

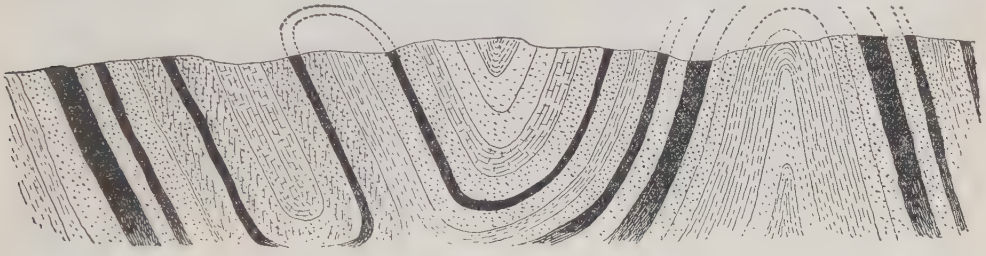
west Virginia, the latter being known as smokeless, as well as coking. Other well-known grades are the Youghiogheny gas coals of southwestern Pennsylvania, the Cumberland smithing coal of Maryland, the Kanawha splint and gas coals, the Massillon domestic coal of Ohio, etc. The anthracite district of Pennsylvania occupies an area of about 470 square miles. The strata between Pottsville and Wyoming, which belong to the lowest portion of the coal measures, are probably about 3000 feet thick; but it is difficult to make an exact estimate, because of the numerous folds and contortions. There are from 10 to 12 seams, each over three feet in thickness. The principal one, known as the Mammoth or Baltimore vein, is 29 feet thick at Wilkes-Barre, and in some places exceeds even 60 feet.

Michigan Field. The Michigan area is a small one in the lower peninsula of Michigan. It forms a circular basin with a diameter of about 50 miles. The coals are bituminous, mostly noncoking, and are mined chiefly for local use. The seams range from a few inches to 3 feet in thickness.

of the Colorado areas, and bear a good reputation, as do also many of the Wyoming coals. California has little fuel of good quality, and has for many years drawn on Australia for its coal supply, but in recent years the coals of Oregon, Washington, and British Columbia have become a source of supply.

The rocks of the small Rhode Island area have been so highly metamorphosed that the coal has been altered to graphitic anthracite. It is sold on the market as amorphous graphite, and has little value as a fuel.

Canada. The Acadian field includes deposits in Nova Scotia and New Brunswick, the former being quite important. The coals are bituminous, sometimes of coking character and of good quality. Extensive deposits of lignite and subbituminous coal are found in the Great Plains area of Saskatchewan and Alberta. In the mountain ranges of Alberta and British Columbia extensive coal seams have been discovered, and they are now under development. Semianthracite is mined near Banff, Alberta. A good quality of coke is made from the coal of Crow's Nest Pass, which finds a market at the British Columbian



CROSS SECTION OF ANTHRACITE COAL MEASURES (PENNSYLVANIA).

The Eastern Interior region of the central province includes parts of western Kentucky, Indiana, and Illinois, and lies chiefly within the latter State. These coals are all bituminous, of Carboniferous age, and are used chiefly for steaming. Many are coking, but do not yield a sufficiently high-grade coke to compete with the eastern product. The thickness of the Carboniferous system varies from 1200 to 1400 feet in southern Illinois, to about 600 feet in Indiana, and the workable coal seams vary in number from 7 to 12 in Illinois, and their thickness from 3 to 8 feet. The "block coal" of Indiana, so called because of its peculiar jointing, is very pure, dry, and noncoking. The western central region includes Iowa, Missouri, Arkansas, Oklahoma, Kansas, and part of Texas. Here again there is an abundance of bituminous coal. That of Iowa is mostly low grade, noncoking, but has fairly good steaming qualities. Some of the Kansas coal is coking, and Arkansas produces both bituminous and semianthracite.

The Cordilleran Region comprises the coal regions of Colorado, New Mexico, Utah, Wyoming, North Dakota, Montana, California, Oregon, Washington, and Alaska. In these fields are found many varieties grading between lignite and anthracite. They are all of either Tertiary or Cretaceous age excepting some in Alaska. Colorado is perhaps the most important producer, having a number of good bituminous seams. Those in the vicinity of Crested Butte have been changed locally to anthracite by the metamorphic action of igneous intrusions. Excellent coking coals are found near Trinidad. The New Mexican coals are in part an extension

smelters. Bituminous coals are worked near Nanaimo on Vancouver Island as well as at other points.

Europe. Commercially valuable deposits of coal are found in practically all the independent political divisions of Europe, but in some, as Switzerland, the reserve is nearly exhausted. Indeed in Europe as a whole the duration of the coal supply, considered in the light of the present output, is a matter of serious consideration. The principal anthracite fields are those of the Donetz basin in Russia and the Welsh fields of Great Britain, both being of Carboniferous age. The Belgium-German basins contain the largest reserves of bituminous coal, also of Carboniferous age, but they are not as easily exploited as the British fields, from which consequently a larger percentage of reserves can be extracted. A large proportion of the brown coal of Europe is of Tertiary age, the principal fields being those of Germany, Austria, and southern Russia.

South America. The fields supplying the best quality of coal are those along the Pacific coast and the Gulf of Mexico, the deposits being usually of Tertiary age. These latter occur in the coastal belt of southern Argentine, Chile, and in the mountain districts of Peru, Ecuador, Colombia, and northern Venezuela. Permo-Carboniferous coals are known east of the Andes, outcropping in southern and eastern Brazil, and underlying part of Uruguay as well as possibly a large part of Argentina.

Other Countries. The coal reserves of Asia are large, though not to be definitely estimated, as the Siberian and Chinese coal fields are in-

sufficiently explored. Those of China and India are probably Permo-Carboniferous, those of Japan, Tertiary, and those of Siberia, Lower Carboniferous to recent. In Africa the coal reserves are practically confined to the southern part of the continent. Coal deposits, especially those of Tertiary age, are widely distributed in the islands of Oceania, but New South Wales is the only producer of importance.

Coal Reserves. The accompanying table, compiled under the direction of the International Geological Congress in 1913 gives a careful estimate of the actual coal reserves of the world based on observations and calculations of the geologists in the different countries.

ESTIMATE OF COAL RESERVES OF THE WORLD IN MILLION TONS

CONTINENT	Anthracitic coals, including some dry coals	Bituminous coals	Subbituminous, Brown coals, Lignites	Totals
Oceania	659	133,481	36,270	170,410
Asia	407,637	760,098	111,851	1,279,586
Africa	11,662	45,123	1,054	57,839
America	22,542	2,271,080	2,811,906	5,105,528
Europe	54,346	693,162	36,682	784,190
	496,846	3,902,944	2,997,763	7,397,553

Output. The world's annual production normally is about 1,300,000,000 short tons; but naturally the World War disturbed production in Europe and temporarily stimulated it in the United States. The output of the more important countries as estimated by the statisticians of the U. S. Geological Survey as follows:

ESTIMATE OF WORLD'S COAL PRODUCTION IN CALENDAR YEARS 1919, 1920, AND 1921

(In metric tons of 2204,622 lbs.)

COUNTRY	*1919*	*1920*	*1921*
Australia	10,736,321	13,176,426	(*a*)
Belgium	18,342,950	22,388,770	21,807,160
British India	22,991,217	17,356,889	(*a*)
Canada	12,411,328	15,088,175	13,300,000
China	23,000,000	19,500,000	(*a*)
Czechoslovakia	26,946,813	31,086,479	(*a*)
France	22,341,000	25,300,000	29,000,000
Germany, Coal	(*b*)116,500,000	(*b*)140,757,433	(*b*)145,400,000
Lignite	93,800,000	111,634,000	120,000,000
Japan	31,461,386	29,245,384	(*a*)
Union of South Africa	9,313,232	11,181,846	(*c*) 9,400,000
United Kingdom	233,467,478	233,216,071	166,992,000
United States	502,534,410	586,000,000	448,600,000
Other Countries	46,553,865	49,068,527	(*a*)
Totals	1,170,400,000	1,305,000,000	1,100,000,000

(*a*) Estimates included in total.
(*b*) Includes Saar and Upper Silesia.
(*c*) Estimated from 11 months production.

In 1868 Great Britain produced 3.6 times as much coal as the United States, while Germany's product that year was 15 per cent greater than that of the United States. In 1871 the United States exceeded Germany's output by about 10 per cent, but afterward fell back to third place until in 1877 she once more sprang forward, and gained on both Germany and Great Britain. In 1899 the United States led the world, and in 1913 supplied 38.5 per cent of its production. By 1918 this proportion had increased to 46.2 per cent, but in 1921 it had fallen to 40.9, a larger amount than before the war but the smallest since 1916.

Coal Production of the United States. In 1921 the total production of Anthracite in the United States was 78,917,000 short tons which with a colliery consumption of 8,800,000 tons gave a commercial production of 70,117,000 tons. In 1920 the production of Anthracite was about 89,000,000 tons. In 1920 the bituminous coal produced in the United States totalled 556,500,000 tons valued at $2,225,000,000, which was the record production except for 1918 when it amounted to 579,000,000 tons. In 1920 the coal exported from the United States amounted to 39,215,030 short tons while the imports were 2,281,542 tons. Briquettes to the amount of 567,192 tons valued at $4,250,000 were made during the year. The distribution of the consumption of soft coal in the United States is indicated in the accompanying tabulation.

Soft Coal Consumed in the United States and Exported in a Year of Active Business (a)

	NET TONS	PER CENT
Railroads	153,700,000	27.7
Industrials, other than steel and coke	139,100,000	25.1
Steel plants	35,500,000	6.4
Coke, Beehive	36,000,000	6.5
By-product	47,740,000	8.7
Public Utilities	31,700,000	5.7
Electric	4,960,000	0.9
Coal Gas(*b*)	57,100,000	10.3
Domestic Consumers	12,100,000	2.2
Coal mine fuel —		
Exports:		
Canada and Mexico	16,500,000	3.0
Seaborne	9,500,000	1.7
Bunkers		
Foreign trade	6,700,000	1.2
Coastwise and Lake trade	3,600,000	0.6
Totals	554,200,000	100.0

(*a*) The figures are for the year 1917 except that the Exports are the preliminary figures for 1921 and that the proportions between beehive and by-product coke are those which obtained in 1920.

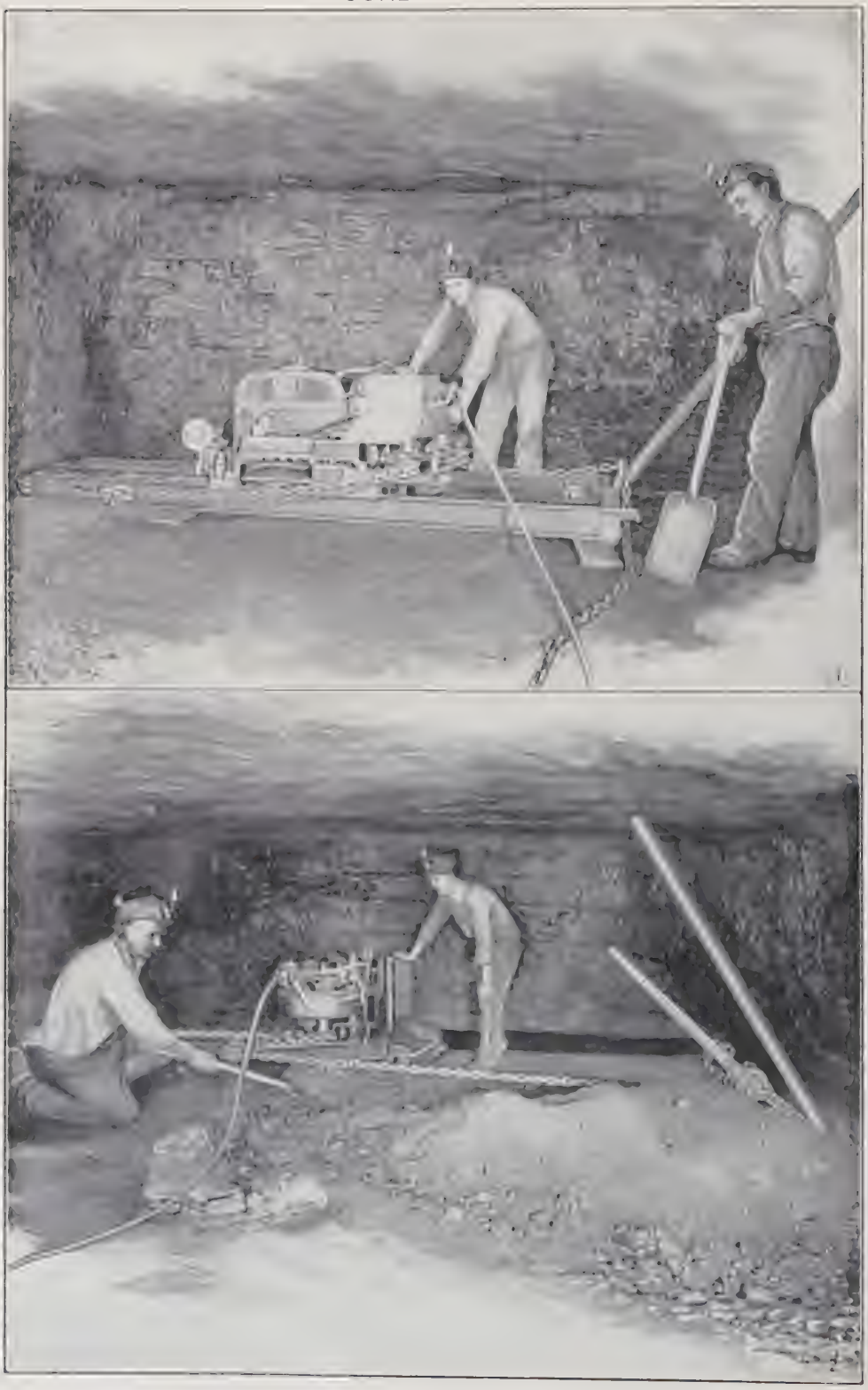
(*b*) Excludes coal consumed in by-product coke ovens supplying gas for city use, which is included under by-product coke.

A corresponding Summary for Anthracite would be as follows, the figures being for the coal year ended March 31, 1917.

ANTHRACITE CONSUMPTION	QUANTITY SHORT TONS	PER CENT
Domestic consumers (Domestic Sizes)	49,400,000	55.1
Artificial gas plants	1,650,000	1.8
Steam trade (industries, power plants and heating large buildings)	18,450,000	20.5
Railroad fuel	6,400,000	7.1
Power and heat at mines (estimated)	9,350,000	10.4
Exports	4,640,000	5.1
Totals	89,850,000	100.0

Mining of Coal. The presence of coal in paying quantities having been determined by prospecting and geological surveys, the next consideration is to extract this coal from seams. Speaking broadly, all methods of mining come under the head of either open working or closed working. Open working is employed when the deposits have no overburden of barren rock or earth, or where this overburden is of such small depth that it can be easily and cheaply removed, leaving the coal deposit exposed. The mining of such exposed seams of coal is really a process of excavation or quarrying, and the machines used in making open-pit excavations and in quarrying are applicable to the work. Closed working is adopted when the depth of the overburden is so great that the mining must be conducted underground. The first task in opening up underground coal seams is to secure access to the seam by means of shafts, slopes, or tunnels.

1. THE OLD WAY—Miner working with hand pick.
2. THE MODERN WAY—The machine cutter. The Jeffrey motor turret coal cutter cutting a break-through in a shale band.



1 SULLIVAN ELECTRIC CHAIN MACHINE, Making "tight" or corner cut.

2. SULLIVAN ELECTRIC CHAIN MACHINE, Cutting across face of room.

Shafts are vertical openings from the ground surface to the coal seams. In the United States shafts are usually made square or rectangular in form. This practice is largely due to the fact that timber is used for lining shafts. In Europe round or oval shafts are frequently employed with linings of brick, iron, or masonry.

Generally the shafts are divided into two or more compartments, one of which contains a ladder, compressed-air pipes, etc., while in each of the remaining is installed an elevator for hoisting the coal cars to the surface. Where the seams are comparatively near the surface, it is usually cheaper to sink a number of two or three compartment shafts than it is to haul all the ore to one large shaft; while, when the shafts are very deep, it is preferable to sink a smaller number of four or six compartment shafts and extend the underground haulage to a single shaft over a great area of the workings. In shallow mines separate shafts are often employed for hoisting and for pumping, ventilation, and ladder ways. One of the largest coal-mine shafts in America is situated at Wilkes-Barre, Pa.; it is 1039 feet deep, 12×52 feet in size, and has five compartments. Slopes are openings begun at the outcrop of an inclined seam, which they follow down into the earth. Slopes are usually made with three compartments side by side, two of which are used as hoistways and the third for the traveling way, piping, etc. When the dip of the slope is under 40 degrees the slope is made about 7 feet high, but when the dip exceeds 40 degrees cages have to be used and a great height is necessary. Slopes are usually lined with timber. Tunnels are nearly horizontal passageways beginning on the side of a hill or mountain and extending into the earth until they meet the coal seam; they are built for both haulage and drainage purposes, and are constructed like railway tunnels, except that the cross section is usually much smaller, and that it is lined with timber instead of with permanent masonry. The forms of timbering used in coal mining are various, and are of interest chiefly to the practical miner. In a general way, it may be said that timber used for underground support in mines should be of a light and elastic variety of wood. Oak, beech, and similar woods are heavy and have great strength, but when they do break it is suddenly and without warning, thus bringing disaster to the miners who might escape if a tough wood were employed which gives warning of rupture by bending and cracking. Steel frames as means of support have several advantages and have met with considerable favor.

The systems of working the coal seams after access is attained to them by the means described are two, known as the room-and-pillar and the long-wall systems. The room-and-pillar method—also known as the pillar-and-chamber or board-and-pillar method, which may include the pillar-and-stall system—is the oldest of the systems, and the one very generally used in the United States. By this system coal is first mined from a number of comparatively small places, called rooms, chambers, stalls, boards, etc., which are driven either square from or at an angle to the haulageway. Pillars are left to support the roof. In the long-wall method the whole face of the coal seam is taken out, leaving no coal behind, and the roof is allowed to settle behind as the excavation progresses, care being taken to preserve haulageways through the falling material. The coal is cut from the seam by hand or by some form of coal-cutting machine. In America machine cutting is used extensively and is employed increasingly in Great Britain. There are four general types of machines in general use: Pick machines, chain-cutter machines, cutter-bar machines, and long-wall machines; the machines most used in America are pick machines and chain-cutter machines. Both compressed air and electricity are used for operating coal-cutting machines. Pick machines are very similar to a rock drill; chain-cutter machines consist of a low metal bed frame upon which is mounted a motor that rotates a chain to which suitable cutting teeth are attached. The ventilation of the working is a very important feature of coal mining, owing to the presence of gases peculiar to coal formations. One of the most common of these is marsh gas, CH_4, which is very explosive if mixed with the right proportions of air. This mixture is what the coal miner calls "fire damp." Other gases found in coal mines and dangerous in one way or another are carbonic-acid gas, CO_2 (called "black damp" or "choke damp"), sulphureted hydrogen, H_2S ("stink damp"), and carbon monoxide, CO ("white damp"). "After damp" is a gas present after an explosion of gas in the mine and is very dangerous. Great care is taken to lay out the workings so as to facilitate ventilation, and mechanical ventilation by means of fans and blowers is usually employed.

Hoisting in mines is accomplished by means of cages, as the elevators are called, running up and down the shafts, and operated by large hoisting engines on the surface. There are two general systems of hoisting in use—hoisting without attempt to balance the load, in which the cage and its load are hoisted by the engine and lowered by gravity, and hoisting in balance, in which the descending cage or a special counterbalance assists the engine to hoist the loaded ascending cage. Haulage in mines is accomplished by animal power or by steam-hoisting engines operating a system of rope haulage or by mine locomotives operated by steam, electricity, compressed air, or gasoline.

The preparation of mined coal for the market consists in screening the coal over bars and through revolving or over shaking screens together with breaking it with rolls to produce the required market size. The large lumps of slate or other impurities are separated by hand, while the smaller portions are picked out by automatic pickers or by hand by boys or old men seated along the chutes leading to the shipping pockets or bins. When coal contains much sulphur, this is frequently removed by washing it with water in special washing plants.

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COAL APPLES. The name given to some curious specimens of spheroidal anthracite coal found in the Mammoth seam of Pennsylvania. They vary from one-fourth inch to 10 inches in diameter, but are usually about the size of a hen's egg. They are thought to be due to jointing.

COAL BREAKER. A structure containing machinery for the purpose of crushing, sorting, and cleaning anthracite coal. The breaker is often as much as 150 feet high and rarely less than 80 feet. The coal, as it is hoisted out of the mine, is carried up to the top of the breaker and discharged into a hopper, whence it passes downward over bars, through screens and crushers, and is finally discharged into bins at the bottom. The admixed slate is separated partly by special screens, and the slaty coal (bone coal) is picked out by boys as it slides down the chutes. In the more modern breakers water jigs are used very successfully to separate the slate and coal. The sizes produced are described in the article on ANTHRACITE. The capacity of a coal breaker is commonly about 1000 tons per day, but some exceed 2000 tons in output. Consult Chance, "Report on Coal Mining," *Report AC of the Second Geological Survey of Pennsylvania* (Harrisburg, 1883).

COAL CITY. A village in Grundy Co., Ill., 60 miles southwest of Chicago, on the Atchison, Topeka, and Santa Fe, the Chicago and Alton, and the Elgin, Joliet, and Eastern railroads (Map: Illinois, D 2). Coal is mined, and there are manufactories of brick and tile and clothing. Pop., 1900, 2607; 1910, 2667.

COALDALE. A borough in Schuylkill Co., Pa., 15 miles northwest of Pottsville, on the Lehigh and New England, and the Central of New Jersey railroads (Map: Pennsylvania, K 5). It contains the Panther Valley Mining Institute. The borough is in a productive coal-mining region. Pop., 1910, 5154.

COALFISH (so named from its color). 1. The pollack (q.v.). 2. A singular and interesting chirid fish (*Anoplopoma fimbria*) of the North Pacific, which is usually slaty-black above and white below, but variable with age and place. It is about 18 inches long, allied to the rock trout, and called in California beshow, candlefish, and skilfish.

COAL GAS. See GAS, ILLUMINATING.

COALGATE. A town and the county seat of Coal Co., Okla., 120 miles by rail southeast of Oklahoma City, on the Missouri, Kansas, and Texas and the Chicago, Rock Island, and Pacific railroads (Map: Oklahoma, E 4). The chief industries are coal mining and cotton raising. The water works are owned by the town. Pop., 1900, 2921; 1910, 3255.

COALINGA. A city in Fresno Co., Cal., 98 miles by rail west of Fresno, on the Southern Pacific Railroad (Map: California, E 6). It contains a Carnegie library and fine grammar and high school buildings. Coalinga is practically surrounded by oil wells. In 1912 the production of petroleum in the region was 18,803,292 barrels, and there are now 1327 producing wells in the entire field. The city has eight oil-field supply houses, a refinery, and several machine shops. One of the unique features of Coalinga is the direct supply, through pipe lines to the houses, of distilled water. Pop., 1900, 300; 1910, 4199.

COALING SHIP. One of the most important matters connected with modern naval war is the supply of fuel. In the United States navy this is usually provided by naval fuel ships, but in certain home ports, and occasionally elsewhere, both coal and fuel oil are brought alongside in barges carrying from 200 to 1000 tons. Notwithstanding all that can be done in the way of drill and improved appliances, the operation of coaling a large war vessel requires from 10 to 20 hours if the coal is taken from barges, and about half as long if supplied by one of the new-type fuel ships. From a collier of the older type the time required is considerably greater. Fuel oil, being pumped on board, requires little or no labor and much less time. The loss of time required to coal the vessels of a fleet, even if performed in the most expeditious manner, may seriously interfere with the operations of war. Under existing conditions coaling can be effected only in comparatively smooth water, either at sea or in a protected harbor or roadstead, and requires the vessels to remain at rest or to proceed at a very low rate of speed. Means for coaling at sea, while steaming at a moderate rate of speed on any desired course, have therefore been sought, but those so far designed have not proved very successful. The plan which has given the best results requires the battleship or collier to take the other in tow, the vessel in tow operating her engines to reduce the towing strain to a point which will just keep the lines taut. The coal, in large bags, is hoisted to a point high on the fuel ship's mast, where the bags are hooked to a trolley running on a large wire rope which extends to the other ship. While this method of supplying coal is not regarded with much favor, it is quite probable that oil could be pumped aboard from a ship in tow without great difficulty. See FUEL SHIP.

COALING STATION. See NAVAL STATION.

COAL-LAND FRAUDS. See ALASKA.

COAL MEASURES. See COAL; CARBONIFEROUS SYSTEM.

COAL OIL. See PETROLEUM.

COAL TAR, or GAS TAR. During the process of manufacturing illuminating gas from soft coal, a thick, oily, black liquid collects in the hydraulic main and condensers of the gas works. This is coal or gas tar. It is slightly heavier than water and has a strong, disagreeable odor. Coal tar is a complex mixture of substances, and the separation of its components constitutes one of the most important branches of manufacturing chemistry. It is the only source of innumerable compounds of the greatest value to science and the industries.

By fractional distillation the tar is first

broken up into groups of substances—principally hydrocarbons, phenols, and bases—which are further distilled or otherwise treated. The original fractions, or distillates, vary according to the composition of the tar or the market demand, but the following is an average separation:

1. *"First Runnings" or First Light Oil.* This fraction is collected up to 105° C., and contains water, ammonium salts, the more volatile oils, and a small amount of the heavier oils carried over mechanically. 2. *Light Oil.* The distillate between 105° C. and 210° C. is taken as light oil. It is again distilled and the fraction up to 170° C. forms crude naphtha; above 170° C. the running is put with the next main distillate, the carbolic oil. The crude naphtha is treated with alkali and acids to remove phenols, thiophene, unsaturated hydrocarbons, and pyridines. On further distillation the naphtha yields "90 per cent benzol" up to 110° C., "50 per cent benzol" from 110° C. to 140° C., and "solvent naphtha," or "benzine," from 140° C. to 170° C. The "90 per cent benzol" contains about 70 per cent pure benzene, 24 per cent toluene, and xylene. The 50 per cent benzol contains about 46 per cent benzene. Benzene is the basis for the manufacture of many compounds, notably aniline and its derivatives. It is also used as a solvent. The fraction known as "solvent naphtha," or "benzine," contains xylenes, cumenes, and other higher homologues of benzene. It is used as a solvent for rubber and resins and is also employed to enrich illuminating gas. It is a grease remover, but is not identical with petroleum benzine, also used for this purpose. 3. *Carbolic Oil* is collected between 210° C. and 240° C. It contains phenols and naphthalene. The phenols yield carbolic acid, of powerful antiseptic properties, and the source of many dyes, explosives, and medicines. Naphthalene separates from the carbolic oil as a crystalline mass. It is one of the most important constituents of coal tar and is used extensively as moth-ball camphor and in the preparation of dyes and medicines. 4. *Creosote Oil.* From 240° C. to 270° C. a small amount of distillate is received which contains some naphthalene, together with cresol, naphthol and liquid paraffin. After the removal of the naphthalene its principal use is for preserving timber and railroad ties and as a vermin destroyer. (See CREOSOTE.) 5. *Anthracene,* or *Green Oil,* is collected above 270° C. This fraction contains anthracene, the most valuable constituent of coal tar. It crystallizes out from the oil, is purified, and is extensively employed in the manufacture of the beautiful alizarin dyes, which were formerly made from madder root. See ALIZARIN.

The *Pitch* remaining in the stills after the above fractions have passed over is used in making asphalt, varnishes, tarred paper or roofing paper, and as a cement to bind together soft coal dust as "briquettes" for fuel.

Coal tar in its crude form finds some use as a protective paint, in the preservation of timber, and in making tarred paper. See COAL-TAR COLORS; GAS, ILLUMINATING; and see the articles on the various products mentioned above.

COAL-TAR COLORS. Coloring matters artificially prepared from coal tar, chiefly from the hydrocarbons extracted from it. (See COAL TAR.) The first observation of a colored compound of this class was made by Runge in 1834; but the real beginning of the great modern color industry dates from 1856, when W. H. Perkin obtained a violet dyestuff by oxidizing impure aniline with chromic acid, took out a patent for it, and commenced manufacturing it in England. Many other dyes were subsequently obtained from aniline and the substances related to it, by A. W. Hofmann, Gries, Girard, Lauth, and many others. But the most sensational step was the preparation by Graebe and Liebermann (1868) of a natural dyestuff, viz., the coloring principle of madder root, from the anthracene of coal tar. In 1880 indigo was first prepared, not from coal-tar products, but by a purely synthetic method, and other natural colors have since been prepared in a similar manner; so that natural dyestuffs reproduced by artificial means need not necessarily originate from coal tar. The artificial indigo and alizarin are not mere substitutes for the natural indigo and madder; they are chemically identical with them and surpass them in purity, and their adaptability to special methods in dyeing and printing makes them even more desirable. The color industry was first developed in England and France, but the more thorough technical instruction at the German universities produced a body of skilled manufacturers and investigators who soon took the lead. At present, in addition to the great factories near Berlin, Frankfurt, Elberfeld, and Mannheim, and a host of smaller ones in various parts of Germany, German capital controls many of the establishments in France, Russia, and other countries. The United States possesses few independent factories, and the list of their products is rather limited; indeed, American dyers appear to call for a smaller range of dyestuffs than those of other countries. A peculiar modern development has been the extension of the methods of the dye industry to the production of artificial drugs, such as antipyrin, antifebrin, etc., many of which are manufactured in the same establishments which control the dye patents.

Classification. Artificial colors were formerly classified merely according to the sources from which they were obtained. Thus, many of them, including magenta, "aniline blue," "aniline green," "aniline yellow," etc., were grouped together as *aniline colors.* At present somewhat different systems of classification are used by different authors, but all systems are based exclusively on the chemical constitution of the dyes.

Many attempts have been made to find a general answer to the question, What must be the chemical nature of a carbon compound in order that it may be a dye? An all-embracing answer to this question has not yet been found. But experience has shown that the true dyestuffs exhibit peculiar groupings of the constituent atoms. Such "chromophore" groupings produce, however, only a *tendency* towards color, but not necessarily colors; indeed, many compounds containing them are perfectly colorless, and the majority of true dyes become colorless if deprived of the small amount of oxygen they contain, although their chromophore groups may not be in the least affected. If, however, a chromophore group is combined with certain other atomic groups known as auxochromes, the result is a dye. For example, the so-called *azo group* (—N=N—) is chromophoric; the compound called azobenzene, $C_6H_5—N=N—C_6H_5$, although colored red and evidently containing the azo group, is not a dye; but it becomes one when the so-called amido group (NH_2) also is

introduced into its molecule, the compound $C_6H_5 - N = N - C_6H_4NH_2$, called amidoazobenzene, being a true dye. If, instead of the amido group, a hydroxyl group (OH) is introduced, the result is again a dye (an orange one). Further, the tints of dyes are produced by variation in the "substituting" groups which replace hydrogen in the primitive molecule. Thus, the introduction of the methyl group (CH_3) generally increases the violet tendency; the phenyl group (C_6H_5) produces bluish tints; the naphthyl group ($C_{10}H_7$) a tendency towards brown-red; etc. The relative position of the groups likewise plays a large part in the determination of color. But, as we have already observed, a definite and all-embracing rule does not exist. Frequently compounds must enter into combination with a base or an acid before they will fix themselves upon the fibre, and then the tints are frequently affected by the different bases or acids to a varying degree. For example, alizarin dyes red with the hydroxide of aluminum, and black with the hydroxide of iron.

For the purpose of the present sketch the coal-tar colors may be grouped in five classes: viz., the azo colors; triphenylcarbinol derivatives; quinone derivatives; diphenylamine derivatives; and indigo dyes.

Azo Colors. The characteristic compound of this class is azobenzene, $C_6H_5N = NC_6H_5$, already mentioned above. We have seen that the introduction of either NH_2 or OH in place of a hydrogen atom produces a coloring matter—yellow in the former, orange in the latter instance. Replacing either or both of the phenyl groups (C_6H_5) by more complex hydrocarbon groups deepens the tone (with a tendency towards the redder tints), increases the affinity for fibres, and diminishes the liability to fade. The earlier dyes of this class, such as "aniline yellow," "Bismarck brown," chrysoidin, etc., were singularly brilliant, but were not fast; whereas the browns and the many reds, ranging from scarlet to purple, which are now produced under the names of ponceaux or bordeaux, congos, quinoline red, etc., are exceedingly permanent. In manufacturing this class of dyes nitrous acid is allowed to act upon an ice-cold solution of the salt of any primary base (like aniline), and the "diazo salt" formed is allowed to act on another base or a phenol; an endless variety of combinations is thus possible.

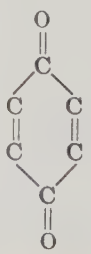
Triphenylcarbinol Derivatives. These represent the first discoveries in the aniline dyes, and some of them are still produced on the largest possible scale. The fundamental compound of the class is triphenylcarbinol $(C_6H_5)_3COH$, and its derivatives are properly subdivided into *rosanilines, rosolic acids,* and *phthaleïns.*

In the rosaniline group two or three amido groups (NH_2) are introduced in place of hydrogen atoms of the phenyls (C_6H_5). The *di*amido compounds are green; the *tri*amido compounds are red, violet, or blue. Strictly speaking, the compounds thus obtained are not themselves dyes, but are bases which must first be combined with suitable acids and thus brought into a soluble form. Their salts are beautifully crystalline bodies in the solid condition, showing colors quite different from those of the solutions and having peculiar lustres like those of beetles' wings. The solutions have very intense colorations and stain animal fibres readily and permanently, although they do not fix themselves easily upon cotton or linen. They are the most brilliant and lively dyes, but are strongly affected by sunlight and are consequently less useful than some dyes of other classes. They are generally manufactured by oxidizing processes at a comparatively high temperature, whereby two or three simpler compounds are welded, as it were, into compounds of complex molecular structure. Thus, in the manufacture of the well-known magenta dye (a triamido compound) approximately equal quantities of aniline, orthotoluidine, and paratoluidine are heated from 8 to 10 hours with arsenic oxide to 190° C. in large iron kettles. A very thick mass results, which can be extracted with hot water, and the compound thus obtained is found to be made up of molecular quantities of aniline, orthotoluidine, and paratoluidine, chemically combined.

Rosolic acid and its derivatives are made by the condensation of various phenols, three phenols being condensed into one compound of the rosolic acid group, just as three bases are condensed into one compound of the rosaniline group. The comparatively few dyes of this group give various shades of red. The hydroxyl groups, and hence the acid character of the phenols, remain unchanged in the products of condensation; the latter therefore combine with bases and then they readily go into solution.

The phthaleïns differ from the rosolic acids in so far as one of the three phenyls of the triphenylcarbinol is connected in them with a carboxyl group (COOH), the other two phenyls having one or more hydroxyls apiece, as in the rosolic acids. The phthaleïns were discovered by Adolph Baeyer and are chiefly remarkable for the fluorescence of their alkali salts in solution. They are prepared by heating phenols with phthalic anhydride and a little sulphuric acid; when resorcin is taken as the phenol a very well-known compound is obtained, which has been called *fluoresceïn,* while its sodium salt is known as *uranin.* Solutions of the latter are yellow, with a green fluorescence. This fluorescence is so intense that it is distinctly noticeable in extremely dilute solutions; so that this salt has been used to trace subterranean watercourses supposed to connect two neighboring bodies of water, the dye being thrown into one of these and fluorescence being subsequently noticed in the other. The potassium salt of a brominated fluoresceïn is *eosin,* $C_{20}H_6O_5Br_4K_2$, with a magnificent red and yellow fluorescence. The phenomenon of fluorescence is due to the action of light falling upon the solution. Some of the light rays, being reflected from the surface, carry one color to the eye; some are absorbed; some are emitted in the form of light waves with either a longer or shorter period than those which are absorbed, and thus produce a different color. Fluoresceïn and eosin emit shortened light waves.

The Quinone Derivatives. These contain the characteristic nucleus—



and are almost invariably colored, although they become suitable for dyes only when they also contain several hydroxyl groups. By far the most important substance of this class is alizarin (q.v.), which was already mentioned as identical with the active principle of madder. Anthracene (q.v.), a coal-tar hydrocarbon, is converted into anthraquinone by heating with potassium bichromate and sulphuric acid; the anthraquinone is acted upon by fuming sulphuric acid, and the resulting compound is melted with caustic soda, yielding a sodium salt of alizarin. This is soluble in water with a fine red color, but does not fasten upon any kind of fibre. If, however, cotton is previously impregnated with salts of aluminum, iron, or chromium, the alizarin will form insoluble salts ("lakes") with these metals; and as the precipitation occurs within the pores of the fibre, subsequent washing cannot remove it. Colors of this class of dyes are not suitable for silk and wool, but are very intense and permanent when properly applied to cotton.

The Diphenylamine Derivatives. These include many varieties of dyes, such as the indulins, indophenols, thiazins, etc. Their chemistry is too involved to be disposed of in a few words. It may, however, be mentioned that their characteristic groups are similar to anthraquinone, excepting that the oxygen of the latter is replaced by sulphur, imido groups, etc. The more important dyes of this class include "methylene blue" and "aniline black."

Indigo Dyes. By far the most important of these is indigo itself, a vegetable dye obtained from a tropical plant cultivated in India since the earliest times. The sap of this plant, when fermented under conditions excluding oxygen, yields *indigo white*, a soluble material having the formula $C_{16}H_{12}N_2O_2$; if the fermentation proceeds in the open air, *indigo blue*, $C_{16}H_{10}N_2O_2$, is produced. This substance is a derivative of the base called indol, C_8H_7N, which occurs ready formed, in small quantities, in many animal and vegetable secretions. It can be prepared artificially from aniline and chloraldehyde. When indigo was found to consist of two indol molecules joined together and oxidized, the clue for the production of artificial indigo was at hand. It has since been found that any benzene derivative having a nitrogenous group and a two-carbon group in the "ortho" position may give rise to the formation of indigo. The first practical method, devised by Baeyer in 1880, involved the action of potassium hydroxide on orthonitropropiolic acid; but many other methods have been devised since then, such as the action of melted potassium hydroxide on bromacetanilid, the action of halogenated acetone on aniline, etc. Indigo is one of the most reliable dyestuffs, both as to brilliancy and permanency in either its natural or its artificial form. The latter, however, gives a brighter shade than the average vegetable dye, being of uniform composition and free from the impurities of the natural indigo. Until recently, the finished compound could, however, only be applied after reduction to the soluble indigo white, and this made its use in dyeing and printing somewhat cumbersome. It was necessary to set up a fermentation vat in which the reducing action was allowed to continue for several days before the solution was in a form suitable for dyeing. At present rapid reduction is brought about by the use of sodium hydrosulphite in an alkaline bath, or the indigo may be purchased already reduced and ready for immediate dyeing in an alkaline solution. Indigo is still called a vat color, and many new dyes of great permanency have been placed on the market recently, which, like indigo, are applied in the modern alkaline hydrosulphite vat and are grouped in this class. See INDIGO.

List of Colors. The following are some of the best-known commercial coal-tar colors, their molecular formulas, and the principal methods employed in their manufacture.

Aldehyde Green. See Aniline Green below.

Alizarin, $C_{14}H_8O_4$, made artificially by successive treatments of anthracene with chromic acid and fuming sulphuric acid, and melting the product with potassium hydroxide. Among the dyes allied to alizarin are: *Alizarin Black*, $C_{10}H_6O_4.NaHSO_3$; *Alizarin Blue*, $C_{17}H_9NO_4$; *Alizarin Orange*, $C_{14}H_7NO_6$; and *Alizarin Violet*, or Galleïn, $C_{20}H_{10}O_7$.

Aniline Black, $C_{30}H_{25}N_3$, made by the oxidation of aniline with mineral salts.

Aniline Blue (triphenylrosaniline hydrochloride), $C_{38}H_{35}N_3Cl$, made by heating rosaniline, benzoic acid, and aniline, and subsequently adding hydrochloric acid.

Aniline Brown, Bismarck Brown, or Phenylene Brown (triamidoazobenzene), $C_{12}H_{13}N_5$, made by the action of nitrous acid on metaphenylenediamine.

Aniline Green, or Aldehyde Green, $C_{22}H_{27}N_3S_2O$, made by the action of ordinary aldehyde on an acid solution of rosaniline sulphate and the subsequent addition of sodium hyposulphite.

Aniline Orange. This name is applied to various compounds made by the action of amidosulphonic acids on phenols. The name is often applied to the so-called Victoria Orange, $C_7H_6N_2O_5$.

Aniline Red. See Fuchsin below.

Aniline Scarlet, $C_{18}H_{15}N_2O_4SNa$, made by the action of diazoxylene on naphthosulphonic acid.

Aniline Violet. See Mauveïn below.

Aniline Yellow (hydrochloride), $C_{12}H_{12}N_3Cl$, made by the action of nitrous acid on an excess of aniline.

Auramin (hydrochloride), $C_{17}H_{24}N_3OCl$, made by the successive action of phosgene gas (carbon oxychloride) and ammonia upon dimethylaniline.

Aurantia (ammonium salt of hexanitrodiphenylamine), $C_{12}H_5N_7O_{12}.NH_4$, made by the action of nitric acid on methyldiphenylamine.

Aurin, $C_{19}H_{14}O_3$, made by the action of oxalic and sulphuric acids on phenol.

Benzaldehyde Green. See Malachite Green below.

Benzidine Red. See Congo Red below.

Benzopurpurins, dyes of various scarlet shades. They are chemically allied to Congo Red (which see below) and are made by treating salts of toluidine (which is made from nitrotoluene, and is analogous to benzidine) with nitrous acid, and combining the resulting salts with α- and β-naphthylamine sulphonic acids.

Bismarck Brown. See Aniline Brown above.

Blackley Blue. See Indulin below.

Bordeaux. See Ponceaux below.

Chrysoïdin (hydrochloride), $C_{12}H_{13}N_4Cl$, made by the action of diazobenzene chloride on metaphenylene diamine in aqueous solution.

Congo Red, or Benzidine Red, $C_{32}H_{22}N_6S_2O_6Na_2$, made by the action of nitrous acid and then of sodium naphthionate on benzidine hydrochloride.

Eosin, $C_{20}H_6O_5Br_4K_2$, or $C_{20}H_6O_5Br_4Na_2$, made by the action of bromine on fluoresceïn.

Erythrosin, $C_{20}H_6O_5I_4Na_2$, made by the action of iodine on fluoresceïn.

Fluoresceïn, $C_{20}H_{12}O_5$, made by the action of phthalic acid anhydride on resorcin.

Fuchsin, Rosaniline Hydrochloride, Magenta, or Aniline Red, $C_{20}H_{20}N_3Cl$, made by the oxidation of toluidine and aniline in the presence of acids.

Galleïn. See Alizarin above.

Helianthin. See Methyl Orange below.

Indigo. See text of the article above.

Indulin, or Blackley Blue, $C_{18}H_{15}N_3$, made by heating aniline salts with amidoazobenzene.

Magenta. See Fuchsin above.

Malachite Green, Benzaldehyde Green, or Victoria Green, $3C_{23}H_{25}N_2Cl.2ZnCl_2 + H_2O$, made by the condensation of benzaldehyde with dimethylaniline, and the subsequent addition of hydrochloric acid and zinc chloride.

Martius' Yellow, $C_{10}H_5N_2O_5SNa$, made by the action of nitric acid on α-naphthol-monosulphonic acid.

Mauveïn (hydrochloride), or Aniline Violet, $C_{27}H_{25}N_4Cl$, made by the action of chromic acid on aniline containing some toluidine.

Methyl Orange, $C_{13}H_{12}N_3SO_3Na$, made by the successive action of nitrous acid and methylaniline upon paraämidobenzene-sulphonic acid; it is the sodium salt of helianthin.

Methyl Violet, $C_{24}H_{28}N_3Cl$, made by oxidizing dimethylaniline with metallic salts.

Methylene Blue, $C_{16}H_{18}N_3SCl$, made by heating amidodimethylaniline with sulphide of iron.

Naphthol Yellow, $C_{10}H_5N_2O_8SK$, made by the action of nitric acid on α-naphthol-trisulphonic acid.

Night Blue, $C_{38}H_{34}N_3O$ (the hydrochloride of this is the commercial dye), made by heating pararosaniline with aniline and benzoic acid.

Nigrosin, $C_{18}H_{15}N_3$, made by heating aniline salts with nitrobenzene.

Pararosaniline (chloride), $C_{19}H_{18}N_3Cl$, made by oxidizing a mixture of paratoluidine and aniline with arsenic acid, or nitrobenzene.

Phenylene Brown. See Aniline Brown above.

Ponceaux, or Bordeaux. Various derivatives of azonaphthalene. "Ponceau 3R," $C_{19}H_{16}N_2O_7S_2Na_2$, is made by combining diazocumene chloride with β-naphthol-disulphonic acid.

Primulin, $C_{14}H_{12}N_2S$(?), made by the action of sulphuric acid on thiotoluidine.

Resorcin Yellow, or Tropæolin, O, $C_{12}H_{16}N_2O_5S$, made by the action of diazobenzene-sulphonic acid on resorcin.

Rhodamine (hydrochloride), $C_{28}H_{31}N_2O_3Cl$, made by the action of phosphorous trichloride on fluoresceïn, and treatment of the product with diethylamine.

Roccellin, $C_{20}H_{13}N_2O_4SNa$, made by the action of β-naphthol on the diazo compound of naphthionic acid.

Rosaniline. See Fuchsin above.

Rose Bengale, $C_{20}H_4Cl_2I_2O_5K_2$, made by the successive action of chlorine and iodine upon fluoresceïn.

Rosolic Acid, $C_{20}H_{16}O_3$, closely allied to aurin; neither aurin nor rosolic acid is specially valuable.

Safranin, $C_{21}H_{21}N_4Cl$, made by the oxidation of a mixture of toluylene-diamine and aniline or toluidine.

Tropœolin. This name is applied to various compounds made by the successive action of nitrous acid and phenols upon amidobenzene sulphonic acids. See Resorcin Yellow above.

Uranin, $C_{20}H_{10}O_5Na_2$, the sodium salt of fluoresceïn (which see above).

Victoria Green. See Malachite Green above.

Victoria Orange. See Aniline Orange above.

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COAL'VILLE. A town of Leicestershire, England, 16 miles northwest of Leicester, in the midst of a coal district. It has mines, foundries, car works, and brick kilns. Pop., 1901, 15,281; 1911, 18,548.

COALVILLE. A city and the county seat of Summit Co., Utah, 40 miles southeast of Ogden, on the Union Pacific Railroad, and on Weber River (Map: Utah, C 2). It is in a coal-mining region and has stock-raising and agricultural interests. The water works and electric light plant are owned by the city. Pop., 1890, 1166; 1900, 808; 1910, 976.

COAMO. A town of Porto Rico, on the Coamo River, 18 miles east-northeast of Ponce, in a municipality of the same name (Map: Porto Rico, D 3). It is a favorite resort on account of mineral waters known as the Baños de Coamo. Pop., 1899, 3244; 1910, 3869. Pop. of municipality, 1899, 8249; 1910, 11,170.

COAN, kō'an, TITUS (1801–82). An American missionary, born in Killingsworth, Conn. He was ordained as a Congregational minister in 1833 and in that year explored Patagonia, where his attempt to establish a mission was unsuccessful. Immediately afterward (1835) he went to the Hawaiian Islands, and for the remainder of his life, except a visit to the United States in 1870, was a missionary at Hilo, where he received more than 12,000 into a church and organized missions from Hawaii to the Marquesas and Gilbert Islands. He published many valuable papers on the volcanoes of Hawaii and two books entitled *Adventures in Patagonia* (1880) and *Life in Hawaii* (1881), the latter a classic of missionary literature. See the *Memorial* (Chicago, 1885) by his wife.

COAN, TITUS MUNSON (1836–1921). An

American author, son of Titus Coan, born at Hilo, Hawaiian Islands. He was educated at Williams College and at the College of Physicians and Surgeons of Columbia University. From 1861 to 1863 he served as an interne at Bellevue Hospital and in army hospitals and from 1863 to 1865 was assistant surgeon in Admiral Farragut's squadron. In 1880 he founded, and thereafter was director of, the New York Bureau of Revision, and founded *Topics of the Time*. His writings include: *Ounces of Prevention* (1885); *Hawaiian Ethnography* (1899); *The Natives of Hawaii: A Study of Polynesian Charm* (1901); *Climate of Hawaii* (1901).

COAN GARMENTS. See Cos.

COANZA, kô-än'zȧ. See KUANZA.

COASTAL PLAIN. In physiography, the name given to a portion of the North American continent bordering the Atlantic Ocean and the Gulf of Mexico. From New York to Georgia the Coastal Plain includes the strip of low-lying lands that is limited on the east by the Atlantic and on the west by the first foothills of the Appalachian Mountain system. In northern Alabama the Coastal Plain passes around the southern limit of the Appalachians, after which it widens out and reaches northward as far as the Ohio River. West of the Mississippi River it extends with decreasing width southwestward into Mexico. The peculiar features of the Coastal Plain are its low elevation and the predominance of stratified rock formations of recent geological age. On the outer border the surface is flat and raised but little above sea level; towards the interior there is an increasing diversity of relief owing to the higher elevation and the extensive erosion by streams. The western limit of the plain, where the horizontal strata give way to the upturned and eroded rocks of the Appalachians, is marked by a sharp slope and by numerous cataracts. Geologically the Coastal Plain consists of Cretaceous, Tertiary, and Quaternary beds, which still retain the relative positions they acquired during deposition, although they have since been elevated above sea level. Consult Mill, *The International Geography* (New York, 1900). See AMERICA; UNITED STATES.

COAST AND GE'ODET'IC SUR'VEY, UNITED STATES. A bureau of the Department of Commerce, which has for its object the survey of the coasts of the United States and all coasts under the jurisdiction thereof, and the publication of charts covering those coasts. This includes the investigation of the character of the sea bottom, the location of reefs, shoals, etc., the rise and fall of tides, the direction and strength of currents, the character and amount of magnetic disturbances, and the position and elevation of points in the interior, for the benefit of commerce. An Act of Congress, approved Feb. 10, 1807, authorized a survey of the coast of the United States and appropriated $50,000 to pay for beginning the work. On March 25, 1807, a circular letter from the Secretary of the Treasury requested plans for the execution of the work. Nothing was immediately done beyond the consideration of these plans, and no further action was taken until April 16, 1811, when it was decided to send F. R. Hassler, whose plans had been approved by President Jefferson, to Europe to procure the necessary instruments. Mr. Hassler's proposed plan, briefly stated, was to determine the positions of certain prominent points of the coast by astronomical observations and to connect these points by trigonometrical lines from which to make a geodetic survey. Mr. Hassler sailed for Europe on Aug. 29, 1811, and, owing largely to the war between England and the United States which intervened, he spent four years in England and on the Continent, returning to the United States with his outfit complete on Oct. 16, 1815. Field work was actually begun on Aug. 6, 1816, under the direction of Mr. Hassler as superintendent. From this time until April 14, 1818, operations were continued in the vicinity of New York City. A base line was measured in the valley of English Creek, May 7, 1817, and one of verification, twice measured, was completed on December 6 of the same year. The triangulation connecting these measured lines represents the nucleus of the work of the Coast Survey and embodies its first tangible results. The trigonometric network now covers a large part of the continental portion of the United States, and will ultimately be extended north and south by Canada and Mexico. By agreement a common reference datum for all geographical positions in these countries has been adopted and designated "The North American Datum." On April 14, 1818, it was enacted by Congress that so much of the law relating to the survey of the coast as authorized the employment of other persons than those belonging to the army and navy be repealed. Between 1818 and 1832 little work was done. The instruments, records, and funds were transferred to the War Department, and the Coast Survey may therefore be considered as in army service during this period.

In 1823, 1824, and 1825 efforts were made by the Navy Department to establish a hydrographic corps, but public sentiment favored a return to the ideas of Jefferson. Bills were introduced in Congress in 1828 and in 1831, and one was finally passed, on July 10, 1832, carrying into effect the original law of 1807. On August 9 of the same year Mr. Hassler was again appointed superintendent. Field work was resumed in April, 1833. Less than a year later, March 12, 1834, the administration of the Survey was transferred from the Treasury Department to the Navy Department, Mr. Hassler, however, remaining in charge. These conditions held for two years, when a transfer was effected on March 26, 1836, and the Treasury Department again assumed control. Operations continued without interruption until March 30, 1843, when a Board of Reorganization was convened with Mr. Hassler as chairman. The plan submitted by this board practically continued in force the plans which had been formulated and acted upon in former years by Mr. Hassler. The scientific organization of the Survey may be properly said to date from 1832. Mr. Hassler died in 1843, having held the office of superintendent twice, from Aug. 3, 1816, to April 14, 1818, and from Aug. 9, 1832, to Nov. 20, 1843. During his incumbency of office the original triangulation in the vicinity of New York City was extended eastward to Point Judith, R. I., and southward to Cape Henlopen, Del. The area included in this triangulation amounted to 9000 square miles and determined the positions of about 1200 stations to be used in the delineation of about 1600 miles of shore line. Prof. A. D. Bache became superintendent in 1843. He extended the triangulation along the South Atlantic coast and among the Florida

Keys, instituted regular and systematic observations of the tides and the Gulf Stream, and investigated magnetic forces and directions.

The Civil War practically stopped the Survey, although many of its officers were assigned to service on Federal war vessels, where their knowledge of the coast waters proved of great service in the various naval operations which were conducted by the Northern fleets. In 1867 Professor Bache died and was succeeded by Prof. Benjamin Peirce, of Harvard University, who served until Feb. 17, 1874. Since then the successive heads of the Survey have been: Carlile P. Patterson, who served until his death in 1881; Prof. Julius E. Hilgard, who resigned in 1885; Frank M. Thorn, who resigned in 1889; Prof. T. C. Mendenhall, who resigned in 1894 to become president of Worcester Polytechnic Institute; Gen. W. W. Duffield, who resigned in 1897; Prof. Henry S. Pritchett, who resigned in 1900 to become president of Massachusetts Institute of Technology, and O. H. Tittmann, who was appointed superintendent in 1900.

The original and the principal purpose of the organization is a survey of the coasts of the United States primarily for the benefit of commerce. It is charged with the duty of publishing all results of such a survey that may be useful to the public. There has been added to its original duty, by legislation, that of determining the magnetic elements, exact elevations, and geographic positions in the interior. In 1878 the name of the organization was changed by Congress from Coast Survey to Coast and Geodetic Survey, in recognition of the extension of its functions to include triangulations in the interior.

The Coast and Geodetic Survey is a bureau of the Department of Commerce, and the head of the bureau, known as the superintendent, reports to the Secretary of the Department. The superintendent is charged with full responsibility in every respect for all the work of the bureau. He is aided in such of his duties as cannot be delegated to officers of lower rank by an assistant superintendent, who acts as superintendent in his absence. Eight officers or groups of officers report directly to the superintendent and assistant superintendent, viz., (1) the assistant in charge of the office; (2) the inspector of hydrography and topography; (3) the inspector of geodetic work; (4) the inspector of magnetic work; (5) the disbursing officer; (6) the editor; (7) the chiefs of field parties; (8) the heads of suboffices. The first four of these officers have a general supervision over all the operations of the Survey both in the field and office, each acting as an advisory officer to the superintendent in regard to specified portions of the work. The functions of the fifth and sixth officers are stated fully further on. The officers in groups seven and eight have direct charge of all operations in the field. Each field party is a temporary organization which is created for a specific operation by an order of the superintendent, which makes one of the officers of the field force the chief of party, and, if necessary, assigns to him as subordinates one or more other officers from the same force. The party is disbanded when the work assigned to it has been completed. If the party is for duty on land the remainder of the organization of the party, the hiring of laborers, drivers, etc., is left to the chief of party. If the party is for duty on a vessel, the assignment of an officer of the field force to command the vessel carries with it, necessarily, the command of the whole force on board the vessel, including watch and deck officers as well as crew. There was in 1913 a field force of 64 assistants, 29 aids, 12 magnetic observers, 4 nautical experts, 12 tide observers, 55 watch officers, engineers, surgeons, deck officers, etc., and 343 enlisted men, together with others found necessary to secure effective work, while the office force, consisting of 165, is divided as follows: disbursing agent, chiefs of division, clerks, computers, draftsmen, engravers, instrument makers, printers, etc. Field officers are subject to office duty. The Survey has a fleet of 10 steamers, 1 schooner, and small craft. There are suboffices at San Francisco, Cal., and Manila, P. I. The survey of the Philippine Islands has been undertaken in coöperation with the insular government, which furnished four steamers for the work and pays a large portion of the expense, and in 1914 was rapidly nearing completion. About 63 per cent of the coast line of the islands had been surveyed in the interval between 1900 and 1914.

The inspector of hydrography and topography, reporting directly to the superintendent, has a general supervision over the classes of field work indicated in his title, places before the superintendent plans for such work, makes the necessary inspection in the field to insure that the superintendent's orders are carried out economically and effectively, and is especially charged with the supervision of all matters relating to the ships and their *personnel*. *The Coast Pilot*, a publication giving full description of the coast from the mariner's point of view, sailing directions, warnings as to dangers to navigation, and other information of special value to navigators, is prepared under his direction. The inspector of geodetic work, reporting to the superintendent, is charged with the duty of preparing plans for the field operations of triangulation, astronomic determinations, and precise leveling, and of making inspections of parties in the field, and of records and correspondence received at the office from field parties, with a view of insuring that the field operations are in accordance with the superintendent's orders, are of the desired degree of accuracy, and are efficient and economical.

The inspector of magnetic work, reporting to the superintendent, is charged with similar duties in regard to the magnetic work of the Survey. The assistant in charge of the office, reporting to the superintendent, has charge of the office at Washington, is responsible for the safety and arrangement of archives and property, and receives all money paid to the Survey for charts and other publications. As the official head of the office, the chiefs of the following divisions of the office force report to him: computing division, magnetic division, tidal division, drawing and engraving division, chart division, library and archives division, and instrument division. Each of these divisions, under the direction of the assistant in charge of the office, prepares replies for the superintendent's signature to such parts of the correspondence as fall within its particular field and also furnishes such information and equipment to field parties as it is within their power to furnish. In the computing division all computations in connection with triangulation, astronomic determinations, and precise leveling are made, appropriate regis-

ters of results are kept, and the results prepared for publication as rapidly as possible. The magnetic division and the tidal division deal similarly with the computations and publication of magnetic and tidal results, respectively.

The chart-construction division is divided into five sections: (1) the photographing section, engaged in reducing, enlarging, and reproducing drawings for various purposes; (2) the drawing section, engaged in making from the original topographic and hydrographic field sheets, the office drawings, which are the originals in completing unfinished hydrographic sheets sent in from the field, corrections of charts especially with reference to aid to navigation (lights, buoys, etc.), preparation of data for the weekly *Notices to Mariners* published by the Bureau of Lighthouses in coöperation with the Survey, and the inspection of charts in their various stages of preparation, from which charts are produced, either by engraving on copper or by photolithography; (3) the engraving section, engaged in copperplate engraving; (4) the electrotype section, engaged in producing, from the original engraved copperplates by electrotype process, the copper plates actually used in printing the charts; (5) the printing section, engaged in printing charts from the copperplates and by photolithography. The chart division is engaged in applying such hand corrections to charts, before issuing, as have become necessary on account of changes, principally in the aids to navigation, as have taken place after the chart was printed; and with the clerical work connected with the issue and sale of charts, coast pilots, and tide tables. The library and archives division has charge of the library of the Survey and the archives in which all hydrographic and topographic sheets and all the original records and computations are stored.

The instrument division has charge of all the instruments and general property. Instruments needed for work of primary importance are designed and made in the division, and it is continually engaged in the repairing and remodeling necessary to keep the instrumental outfit at a high standard of efficiency. The accounting division, at the head of which is the disbursing officer, is not a division of the office in the sense of reporting to the assistant in charge of the office. This disbursing officer makes all disbursements on account of the Survey, with the approval of the superintendent, renders a quarterly account of all such disbursements to the auditor for the State and other departments, renders a statement of expenditures and balances to the superintendent whenever required to do so, suspends returns for correction or disallows all items of expenditure irregular in form or in contravention of law or regulations, and refers to the Comptroller of the Treasury, for decision, all apparently excessive or unnecessary charges. The editor, reporting to the superintendent, compiles the administrative part of the annual report and acts as editor in connection with all other publications of the Survey except the charts.

COAST ARTILLERY. This term means both the guns used in harbor defense and the troops that man these guns. In most countries there is no special body of men exclusively assigned to harbor defense. That duty is taken to fall naturally to the foot, or unmounted, artillery. In the United States, however, the Coast Artillery constitutes a special corps. (See COAST ARTILLERY CORPS.) If we keep in mind the great length of our coast line, and the fact that some of our most important harbors are immediately on that line itself, it is logical to assign their defense to a special body of men. In England the duties of harbor defense fall to the Royal Garrison Artillery, one of the great subdivisions of the Royal Regiment of Artillery.

For general administrative purposes the coast of the United States is divided into three districts: the North Atlantic, from Maine to Delaware; the South Atlantic, from Delaware to Texas; and the Pacific, from Washington to the southern boundary of California. Two of these are under the command of general officers coming from the corps. The general districts are themselves further subdivided into artillery districts proper, commanded by colonels and lieutenant colonels. Of these artillery districts proper, there are 9 in the North Atlantic, 12 in the South Atlantic (including the Gulf States), and 4 in the Pacific Coast district, respectively. To these must be added 2 districts in the Philippines, Manila Bay and Subic Bay, and 1 in the Hawaiian Islands.

The following table exhibits the guns served by the Coast Artillery (only calibres greater than 3 inches are included); the powder used is a nitrocellulose.

GUN	Weight of projectile	Range, yards corresponding to maximum elevation
3-inch	15 uncapped	8,500
4 "	33 "	8,500
4.72	45 "	11,000
5	58–59 long cap	10,000
6 (1908)	108 " "	11,000
8, M I and M II	323 " "	11,000
10	617 " "	12,000
12 (Mod. 1900)	1070 " "	11,000
14 (1910)	1660 " "	18,000
16	2400 " "	18,000
12-inch mortar (1912)	700 " "	20,000

A strong family likeness exists among all guns used for harbor defense; all fall substantially under three classes, (*a*) high power, of large calibre, 8 inches and upward, for the attack of side and turret armor; (*b*) high power, of smaller calibre, 3 to 6 inches, for unarmored vessels, torpedo boats, and to sweep mine fields; (*c*) mortars for deck attack, of which the chief development is to be found in the United States. The English place their principal reliance on a 9.2 piece for ship attack. In other countries, until lately, the highest calibre was 12 inches, but there is to-day a distinct tendency to go beyond this limit. For details, see ORDNANCE.

COAST ARTILLERY CORPS, kōr. That portion of the army of the United States charged, by the Act of Congress approved Jan. 25, 1907, with the care and use of the fixed and movable elements of land and coast fortifications, including the submarine and torpedo defense. Its *personnel* consists of a chief with the rank of brigadier general, 14 colonels, 14 lieutenant colonels, 42 majors, 210 captains, 210 first lieutenants, 210 second lieutenants, 48 "additional" officers, 63 sergeants major, 26 master electricians, 74 electrician serjeants, 1st class, 74 electrician serjeants, 2d class, 42 master gunners, 60 engineers, 60 firemen, 170 companies, and 14 bands—a total of 749 officers and not exceeding 18,931 enlisted men. Officers and certain classes of noncommissioned officers and men receive their

technical instruction at the Coast Artillery School at Fort Monroe, Va. The regimental organization of the United States artillery was abolished by the Law of Feb. 2, 1901, and the entire arm was designated as the "Artillery Corps," which was charged with the care and use of both field and coast artillery. By the Act of Jan. 25, 1907, these two branches were made separate and distinct, 6 regiments of field artillery were created, and the "Coast Artillery Corps" was organized as outlined above. See ARMY ORGANIZATION; COAST ARTILLERY; COAST DEFENSE; UNITED STATES, *Army*.

COAST DEFENSE. A sharp distinction should be drawn between coast defense and coast defenses. Coast defense involves the protection of the coast at all points, whether fortified or not, against any enemy whatever. It thus involves all arms of the service, even cavalry, for it is conceivable that the enemy, wishing to possess himself of New York, e.g., and deterred by the difficulties of a purely naval attack, may endeavor to land an army at some unprotected point and attack the city in the rear. Or a fleet may attack any unfortified region of the coast in order to support the operations of an army already ashore. To guard against such a possibility is a function of coast defense, even though not a single shore gun had fired a shot. Coast defenses, on the other hand, are the various works and batteries with all their auxiliaries, prepared in time of peace for the defense of the principal ports and waterways against purely naval attack. But even in such an attack land troops, chiefly infantry, as distinguished from artillery troops proper, may be called to play a part and should always be available.

In any war carried on over sea by a strong naval power, the acquisition of a hostile port is a matter of prime importance. Hence works are erected the world over in order to make such an acquisition, if not impossible, at least extremely difficult. In the modern defense of harbors two great classes of elements are employed: (1) guns or mortars for the direct attack of ships; (2) obstructions to delay the advance of a fleet. These obstructions themselves are either (*a*) passive, such as booms, sunken barges, etc., or (*b*) active, i.e., submarine mines, and dirigible torpedos operated from the shore. The chief reliance to-day, however, rests on submarine mines. To these two great classes of elements must be added warships proper, if any should be available. A moment's reflection will show the relation existing between the two classes of elements just mentioned. Without obstructions a fleet may run past the works, e.g., by night, or in thick weather, or even in broad daylight. Without guns and mortars the removal of obstructions is merely a question of time, involving practically no risk. But by the combination of these two elements a fleet is stopped under the effective range of the shore guns, since obstructions are placed where they can be easily swept by the batteries.

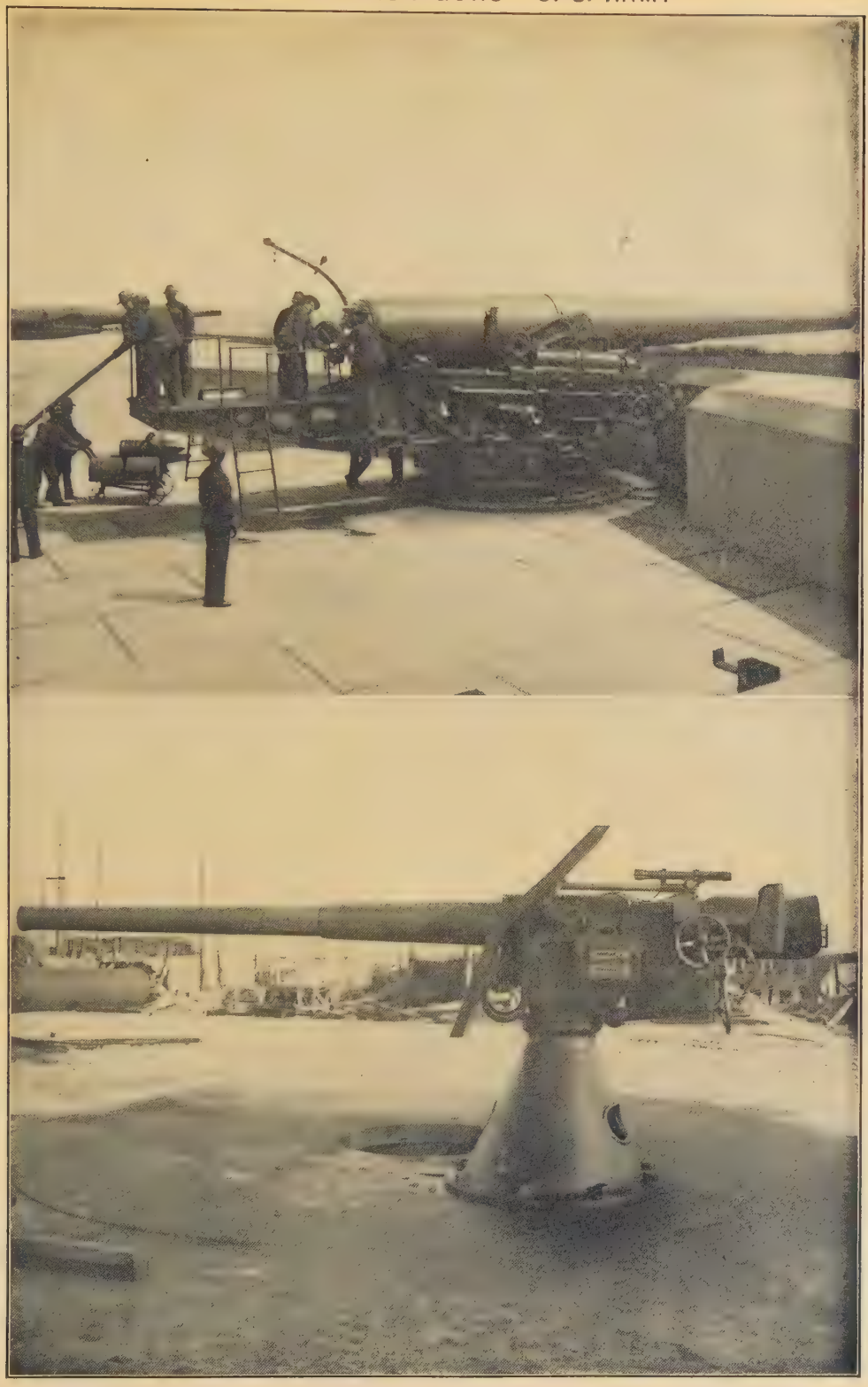
Whether coast defense in its narrower sense of harbor defense should be intrusted to the army or to the navy has been a much-debated question. The solutions reached vary according to the necessities of the countries interested. To-day, in the United States and in England, harbor defense is left to the army; in Germany, chiefly to the navy. It should be recollected, however, that Germany has only two ports—military ports—whose defense gives her any particular concern. The French have apparently never been able to come to any rational decision of the matter: the army and the navy are both responsible, so that in case of war confusion and inefficiency would probably result. It is clear that where harbor defense is intrusted to the army, the navy is free to discharge its principal function, viz., to seek out and destroy the enemy's fleets. This principle may safely be ignored only when, as in the case of Germany, harbor defense is relatively unimportant. It should be recollected, further, that even if the navy should be charged with the defense in question, it must employ the same means as the army, when it is responsible.

The defense of a seacoast involves the principles of both strategy and tactics. In considering the principles of strategy applicable to coast fortification it is essential to take into account the navy as our first line of defense. Every nation possessing a coast line has commercial interests, the protection of which requires a navy. Her fleet, whatever its strength, will require points of support on the home coast, to serve as a basis of operation in attack or defense. These points of support contain all the material necessary for building or equipping ships; they furnish all the needed men and supplies to the navy and must offer for a beaten fleet, or one which on the outbreak of war has not yet completed its equipment, a safe harbor to repair damages or complete equipment. Naval material is very expensive; it is difficult or impossible to secure it after war has begun; consequently, the greater part must be prepared in time of peace and collected at the points of support, for which purpose extensive depots, magazines, and other constructions must be erected. To prevent their destruction at one blow and to guard the fleet, while still taking in supplies or completing its equipment, against surprise, these points of support must be protected by suitable means, and this is the purpose of fortifications.

The only points of a coast that fulfill the conditions imposed by these considerations are the larger harbors (always bays and mouths of rivers), and they must be fortified not only against attack by sea, but also against land attack, for the war between Japan and Russia showed conclusively that important naval ports (Port Arthur, e.g.) may be taken by forces landed on the coast without risking an attack on them by sea.

In applying the principles of land tactics to the selection of sites for, and the construction of, seacoast forts, some modifications must be introduced, due to the fact that the enemy in the latter case is confined to the navigable channels, so that all his possible flanking attempts can be foreseen and provided against. The principles of tactics which find application here are: 1. To obstruct the enemy's advance, while leaving free that of the forces of the defense for offensive movements; in other words, so to obstruct the water approaches against the enemy as to leave free entrance and exit for the defending fleet. 2. To be superior to the enemy at the point of attack, i.e., to bring to bear on the channels of approach a heavier fire of high-power guns and howitzers and mortars than any fleet able to operate there can bring to bear on the defenses. 3. To place the isolated units for most effective action so as to be mutually

COAST DEFENSE GUNS—U. S. ARMY



1. TWELVE-INCH GUN MOUNTED ON BARBETTE CARRIAGE, WITH FIRING DETAIL.
Weight of Gun, 52 tons. Weight of Projectile, 1046 pounds. Weight of Powder Charge, 279 pounds. Projectile carries bursting charge of 58½ pounds

2. THREE-INCH FIFTEEN POUNDER RAPID FIRE GUN ON BARBETTE CARRIAGE.
Weight of Gun, 2690 pounds. Weight of Projectile, 15 pounds. Weight of Powder Charge, 5½ pounds. Projectile carries bursting charge of 4.2 ounces. This type of gun is for coast defense in repelling light-armored vessels of the torpedo class

supporting; this is accomplished by scattering the forts to prevent the enemy from concentrating his fire, at the same time arranging them so that fire can be concentrated on him. 4. To protect well the flanks of the position and compel the enemy, if he attacks at all, to make a direct frontal attack. This is done by closing all unnecessary channels, by protecting the obstructions by means of rapid-firing guns and the operators by means of bombproofs, and at night by illuminating the obstructed field with search lights. 5. To provide means for offensive returns against countermining operations, either by means of a swarm of torpedo boats, or by batteries for operating movable torpedoes from the shore. To these must be added an accurate and rapid range-finding and communication service.

There are two systems of guns in use in coast artillery: the flat trajectory, high-power guns, designed to pierce the side armor of battleships, and the high-angle pieces (howitzers or mortars) whose projectiles are designed to fall on the decks. Both are necessary, and each has its proper sphere of action, the former having by far the greater accuracy, and the latter attacking the battleship at its weakest point. In Europe howitzers are generally preferred; but the recent development of mortar fire in the United States service has proved the greater value of the latter. The calibre of the fort guns must be at least equal to that which the depth of water in the channel will enable the enemy to bring against the defenses and sufficient to pierce his armor at the outer mine field. The greatest thickness of Krupp armor used in the latest battleships is about 15 inches at the belt, and to penetrate this at the required range will require a 12-inch gun. The average thickness of deck armor at present is about 3 inches of hardened nickel steel, and to penetrate this a high-angle gun (howitzer or mortar) 12 inches in calibre will be required. These are the maximum calibres required against battleships, but to prevent distant bombardment of cities, etc., there are larger rifles and for close ranges also an 8-inch rifle. Armored cruisers have from 5 to 6 inches of hardened nickel-steel armor, and to penetrate their armor within the mine field (where they first come seriously into play) will require a 5-inch or 6-inch rapid-fire gun. The smaller vessels have but little armor protection, but as they come into action at the outer mine field (about 3600 yards) the smaller calibre guns to fight them must have the necessary penetration at that range, consequently must be about 2.5 to 3 inches in calibre.

The number of guns of each calibre essential to the defense of a harbor depends primarily on its importance; a weighty factor of this importance is the depth of water approach.

From the depth and length of the approach, taken in connection with the importance of the place, political or commercial, can be determined the number and nature of ships that might attack, and hence roughly, the number of guns to be provided by the defense. These should be, preferably, as many as the enemy can bring to bear, never less than half as many. If the enemy's armament is not known, then in deep channels from 30 to 60 guns of 6-inch calibre and over must be allowed to the mile. (Abbott.) The outer mine line is derived by the intersection of the curves representing the limit of armor-piercing ranges of the guns on either side of the entrance, so that these torpedoes are under the effective fire of all the guns in the harbor; the inner line is usually at the narrowest part of the entrance.

The battle tactics of coast defense comprise defense against blockade, bombardment, and attack by sea.

DEFENSE AGAINST BLOCKADE

The object of a blockade is the isolation of the port concerned in order to close all commercial communication by way of the sea, and presupposes the defeat of the enemy's fleet, which may also be shut up in the port. The observation of the movements of a daring enemy thus shut in is one of the most difficult problems which fleets have to encounter, and history shows that it is almost impossible. "For example, in 1759, the French fleet succeeded in breaking through the blockade of Dunkirk without being observed by the English fleet consisting of 66 ships." "In 1805 Nelson was in continuous observation of the harbor of Toulon. In spite of this fact the French fleet succeeded in running out, returning again because of injuries at sea, again leaving the harbor and joining the Spanish fleet, the combined fleets then sailing for the West Indies. Only after their return was Nelson enabled to seize them." The defender will naturally resist the blockade as long as possible and try to fit his fleet for active service again as promptly as he can. His first duty, then, is to keep the blockading fleet as far out as possible, and this duty will fall to the coast artillery, which must be constantly prepared, the guns ready for immediate action, the stations and range finders continually manned, and the searchlights constantly at work. The plentiful use of electric light as a fighting agent is a passive factor, but one of very high value. His next duty is to inflict as much damage as possible on the blockading fleet, and this duty falls to the fleet stationed in the harbor, which must at all times be ready for action, and single torpedo boats should be sent out, under cover of darkness, to attempt the destruction of the enemy's ships. When the defeated fleet is ready for sea again, the coast artillery will open a heavy fire on the enemy's ships, and, aided by their own artillery fire, the home fleet will endeavor to break through. This will naturally lead to a purely naval engagement, which need not be further considered here.

DEFENSE AGAINST BOMBARDMENT

Bombardments aim chiefly at the destruction of the naval establishments of a port, such as the arsenals, docks, magazines, and ships of the fleet lying in the harbor, but also secondarily at the destruction of cities and establishments other than those purely naval, in order to produce a moral effect on the people. Bombardments are applicable only under special circumstances and not against every harbor; indeed, the latter must be a true roadstead. But even then the fortifications and armament must be either weak or obsolete. From this fact, and because of the limited supply of ammunition carried by ships, a bombardment will but rarely be justified. If it is attempted, however, the attacking fleet will set aside a small portion of its artillery to attack the coast artillery, re-

serving the greater part to attack the establishments lying within the harbor.

The defender will attempt to hold the open sea as long as possible with his fleet, but when driven in he will assemble his ships in rear of the outer obstructions, or at least attempt to hold that line with his torpedo boats. The coast artillery will endeavor to keep the enemy as far as possible from the harbor. The object being to prevent, if possible, a bombardment of the harbor or city, all guns should take part, and when the enemy's fleet approaches the proper range, high-angle fire, with deck-piercing shell, will be used. The gunboats and coast defenders or monitors of the home fleet can materially assist the coast artillery by the fire of their guns, but they must be protected from the enemy's torpedo boats by a number of destroyers. As in case of blockade, the guns must be kept constantly manned and ready for action, and at night the searchlights must be constantly at work. Should the enemy be forced to retire, the home fleet must advance to the attack. See BOMBARDMENT.

DEFENSE AGAINST ATTACK BY SEA

In attacking a hostile coast a fleet may either direct its efforts against a fortified harbor or attempt to take possession of unfortified coast regions. The problem for the defense, therefore, naturally resolves itself into the defense of fortified places and the defense of unfortified coast regions. The phases of the attack by sea in the first case are, in order, the removal of the outer obstructions, the reconnaissance, the artillery duel, the removal of the inner obstructions, the forcing of the entrance, and, finally, landings to obtain full possession of the forts. The phases of the defense will correspond.

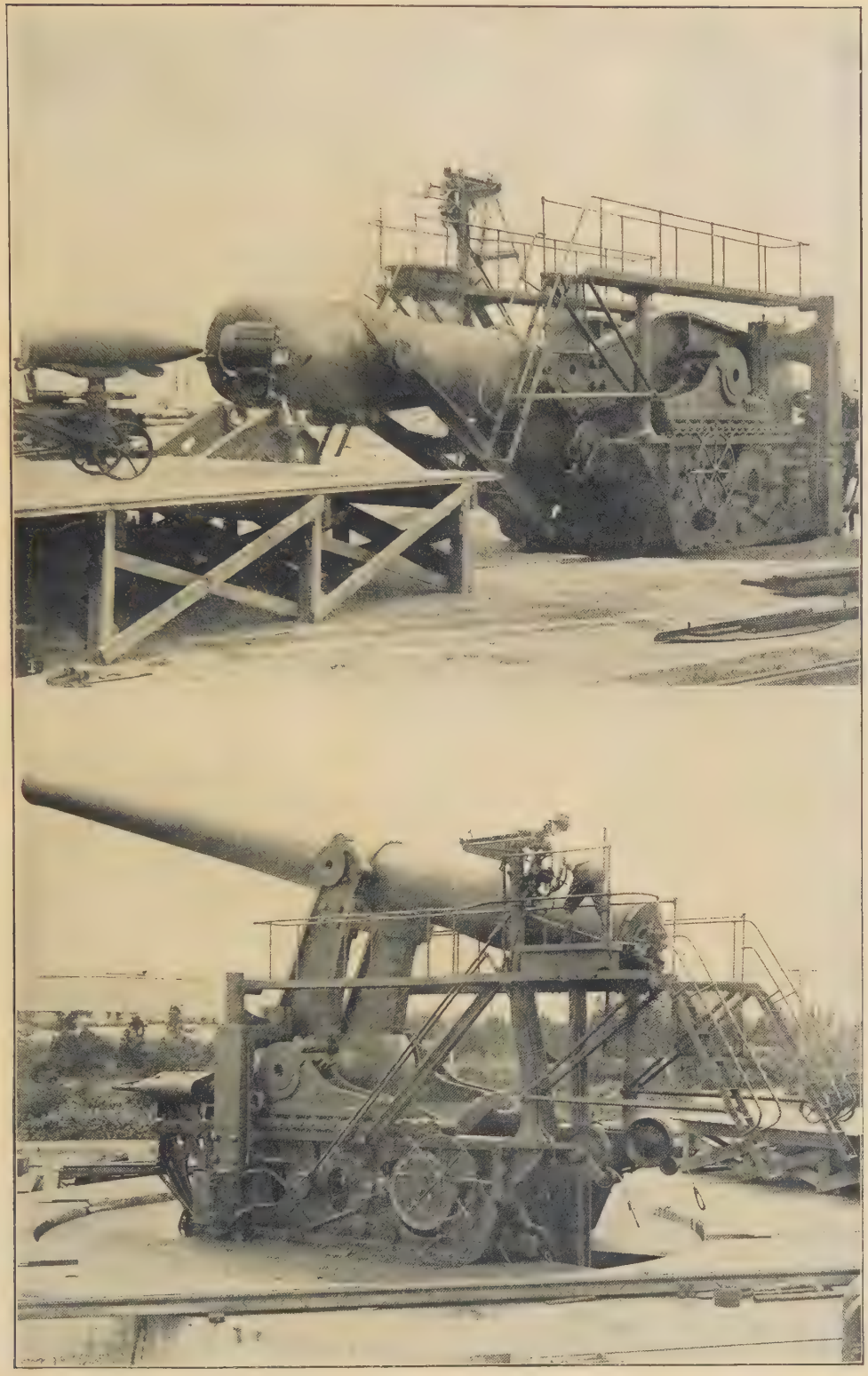
Before endeavoring to ascertain the position of the guns of the defender, the attacking fleet will seek to destroy outer obstructions, in order to get possession of the outer bay, and, if the opportunity should offer, to force the passage. The outer mine field is so important that there will be a serious struggle over it, for, once the attacking fleet passes over it, its further work is greatly simplified.

The defender, therefore, must be constantly on the alert, especially at night, when the searchlights are continually in use lighting up the foreground beyond the mines. All approaching ships are fired upon by the artillery, and since the enemy will probably not attempt to remove the mines with any but his smaller vessels, such as torpedo boats (since the outer mine field is placed intentionally in the field of the greatest effect of the guns on shore, both vertical and horizontal), rapid-fire guns should be used, because these small vessels move rapidly, offer but a small target, and their work, by the time their purpose is known on shore, can be done promptly. Moreover, since the attack may be directed on several points of the mine field at the same time, it is best to assign the rapid-fire batteries to particular sectors of the mine field to insure prompt action on all the enemy's vessels. The torpedo boats of the defense remain close up to the mine fields in order to fight the enemy's torpedo boats while they are endeavoring to remove the mines. The counterattacking torpedo flotilla must be followed by one or two mine-laying ships, for repairing the damaged mine lines.

The attacker's object in reconnaissance is to obtain full and accurate knowledge of the location and power of the defender's guns of all calibres and kinds, the position of the torpedo batteries and mine observation stations, and finally to find out what new gun positions have been erected for the war. The defense, therefore, endeavors to veil all his batteries that cannot be readily seen from the sea, and still further to deceive the enemy he erects a number of small batteries. Batteries with disappearing carriages and mortar batteries have here a great tactical advantage, because they can be readily concealed. While the fleet is reconnoitring, therefore, beyond the outer mines, only such guns of the defense open fire as cannot be concealed, but as the ships come near the mines and take up the formation in column, the other batteries open fire with armor-piercing projectiles. Each battery is assigned to a different ship, on which it concentrates its fire, and which it follows until it is sunk or gets beyond armor-piercing range. The coast artillery is assisted in this work by the guns of the ships that may be in the harbor, these vessels moving inside the mine field on lines perpendicular to the enemy's line of advance, making the greatest possible use of their artillery, the torpedo boats making counterattacks when possible. The infantry garrison of the fortified place is posted on outpost along the shore, and prevents the enemy from landing reconnoitring parties, or fires on torpedo boats sent along the shore to reconnoitre. In case the mine obstruction was removed by the enemy before his reconnaissance, the defender's larger vessels cannot take so advanced a position close up to the mine field, and as soon as the attacker approaches the latter the defender must bring all his guns into action.

The object of the artillery attack is to silence all coast forts and batteries commanding the harbor entrance, to put out of action all guns mounted in them, and to destroy all positions flanking the obstructions. It is the preparation for the final assault. The main strength of the defense in this phase of the action will be the coast artillery, and since the enemy, because of his limited supply of ammunition, will probably endeavor to gain the upper hand as rapidly as possible, this artillery will require an energetic, decisive, and rapid service, and should be assisted by the artillery fire of the ships of the defense that may be in the harbor. The targets to be attacked are mainly the large, heavy battleships, whose vitals are protected by powerful armor. To reach the vitals is the business of the heavy calibres, but a ship may be put out of action before its vitals are seriously affected. The coast-artillery defense proper must be thoroughly organized in advance, and hence the command of a fortified place is given to a fortress commander, under whom are the district commanders, and these again control the group of battery commanders and the searchlight stations. The heavier armor of a battleship is on her belt, extending above and below the water line, while the deck is but slightly protected. The large calibre, flat-trajectory guns are used for piercing the heavy side armor, and with the United States explosive D, and the delay-action fuse of the Ordnance Department, the destructive effect is expected to be enormous. Howitzer or mortar shells are used for piercing deck armor; rapid-fire guns for firing on unprotected parts and clearing decks and tops.

The naval battle of Santiago clearly illus-



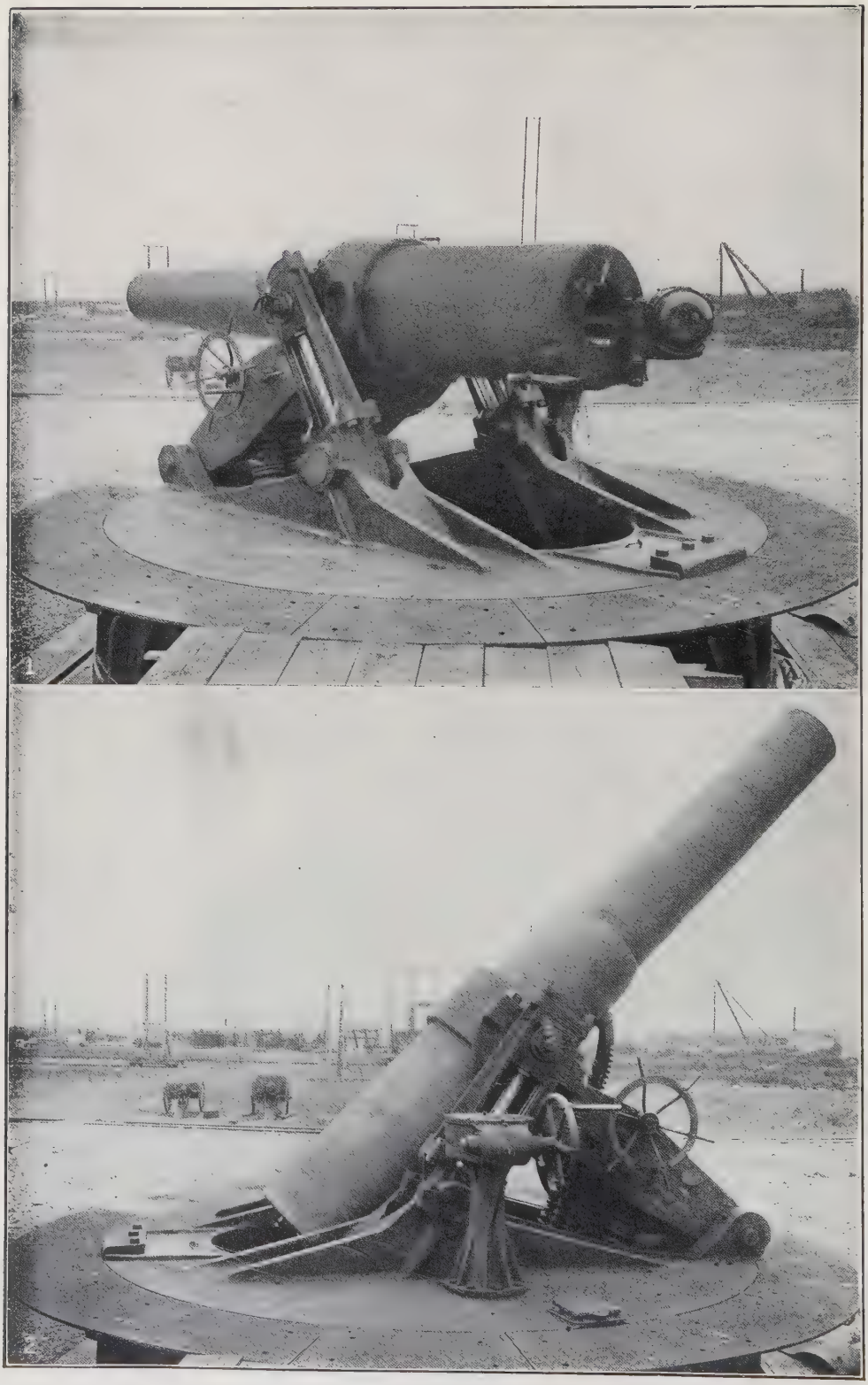
UNITED STATES ARMY 14-INCH GUN MOUNTED ON DISAPPEARING CARRIAGE

No. 1. LOADING POSITION. No. 2. FIRING POSITION.

Weight of gun, 51 tons. Weight of projectile, 1660 lbs. Weight of powder charge, 349 lbs. Range, 19,000 yards. Projectile carries bursting charge of 88½ lbs.

NOTE.— This Carriage is a type of the latest model of disappearing carriage for 6-inch, 8-inch, 10-inch and 14-inch guns

COAST DEFENSE MORTAR



U. S. ARMY 12-INCH MORTAR MOUNTED ON 1912 CARRIAGE

1. LOADING POSITION. Weight of Mortar, 15.1 tons. Weight of projectiles, 700, 824, and 1046 pounds. Weight of powder charge varies according to zone: maximum about 89 pounds. Projectiles carry bursting charges varying from 24.16 pounds to 98.4 pounds. Maximum range, 19 000 yards

2. FIRING POSITION, 45° elevation.

trated the value of a good artillery, and if such a magnificent action is possible from aboard ship, a far more favorable effect is to be expected from the land. But this battle also shows how dangerous it is to neglect all preparations on the part of the coast artillery, and the Spanish coast artillery must bear a large portion of the blame for the sacrifice of Cervera's fleet. Special attention must be paid to the equipment of the observation stations of the district artillery commanders. Good telescopes and photographs and plans of the enemy's ships must be available for immediate use, in order to facilitate the ready recognition of hostile ships, and in the group and battery commanders' stations there must be more detailed plans of the ships to determine the projectiles to be used at various ranges. Works are now published giving, in silhouette, the appearance (to the naked eye, at a particular distance) of every important warship.

The inner obstructions consist of lines of mines, sea barricades, and occasionally also of a submarine dike. The decisive engagement for the possession of the harbor will be fought at this barrier, for which reason it is protected by numerous rapid-fire and torpedo batteries. The reconnaissance of the inner obstructions, and even their partial removal, may be attempted by the enemy during the artillery duel; hence the defender must make constant use of his searchlights to detect such a move. The assailant will first attempt to destroy the inner obstructions by means of torpedo boats, then he will try to break them up by artillery fire, and finally he may attempt to land detachments at night to blow them up, or send a drifting mine destroyer against them. The inner mines are usually within the effective armor-piercing range of the heavy guns, as well as under the fire of the rapid-fire batteries; the former act against the armored ships, the latter against the small and fast torpedo boats or unarmored vessels.

The forcing of the entrance is the closing act of the assailant's undertaking, and its object is the final occupation of the disputed harbor. At the head of the final assault are torpedo boats which, acting as a patrol, make a final attempt to break through the obstructions. These, as well as the torpedo flotilla following them, should be greeted with a hail of projectiles from the rapid-fire guns of the shore batteries. All other coast guns and howitzers should be directed against the battleships of the attacking fleet and should fire especially at the leading ship. As the attacking vessels enter the harbor, the fire of the coast guns is concentrated more and more against the vessels following. This artillery battle is continued until each fort in succession is taken by the enemy. The home fleet inclosed in the harbor should now attempt to break through the lines at all hazards, and this can best be done at night.

Military history proves that it is by no means easy to capture a well-defended harbor by the means at the disposal of a fleet. The success of Farragut in the Civil War appears to contradict this statement, but it must be remembered that the condition of the navy on the one hand, and that of the coast artillery on the other, were at that time more favorable for forcing a harbor than they are to-day. Nevertheless, on many occasions, Farragut himself, while attacking a seacoast, called for assistance from the artillery on the land side. Wars are so short nowadays, and decisive battles are sought so quickly in the interest of the countries concerned, that the cooperation of a strong land army is now deemed essential to support the naval attack; indeed, the land attack will generally be the principal one. This was shown to be the case in the Chino-Japanese War, the Spanish-American War, and especially in the Russo-Japanese War. The best protection of a seacoast is a powerful navy, but should the latter meet with misfortune the coast must be protected to prevent landings. The defense of the unfortified portions of the coast will be intrusted to a special coast-guard corps, strong enough to oppose the enemy at all points with superior forces. To determine what this strength should be, the landing of the Japanese for the purpose of attacking Wei-hai-wei furnishes some useful data. The army of 27,000 men was landed in 36 hours; consequently, with the better means available to-day, about 20,000 men can be landed in 24 hours, hence a coast-defense corps of equal strength should be able to appear at the landing place in that time, and, considering the necessary detachments to be left at various points, it will take about 30,000 men to guard the coast between two fortified forts not over a day's cruise apart.

It may be remarked, in conclusion, that the issue of future ship attacks on adequate coast defenses is highly problematical. The function of the modern warship is chiefly the attack of other ships; the attack of seacoast forts is secondary. In the next place, the fire of shore guns well handled is to-day so rapid and accurate that no fleet will expose itself to its effects save under emergency. Coast defenses will have answered their purpose as fully by dissuading a naval enemy from attacking as by repelling his attack if he should attempt it.

Consult: Abbot, *Defense of the Seacoast of the United States* (New York, 1888); Wisser, *Tactics of Coast Defense* (Kansas City, 1902); Clarke, *Fortification* (New York, 1907); and the works of Mielichhofer, of the Austrian artillery. For a description of the ordnance used in modern coast defense, see ORDNANCE, the historical side of the subject being treated under ARTILLERY. The article on FORTIFICATION discusses the history and construction of coast defenses, together with the scheme adopted for the defense of the coast of the United States, and should be read in this connection.

COAST DISTRICTS. See KÜSTENLAND.

COAST GUARD. The coast-guard service of Great Britain was originally established as a means of revenue protection, but was reorganized and transferred to the Admiralty in 1856. It now partakes of the character of a naval reserve, life-saving, and signal service in addition to its duties in connection with the customs. It is under the control of the admiral superintendent of naval reserves, who has a captain in the navy as his assistant. The coasts of the United Kingdom are divided into six districts—Eastern, Southern, Western, Scottish, North of Ireland, and South of Ireland—each presided over by the captain of the coast-guard station ship of the district, which vessels are usually old-type armorclads. In addition there were (in 1914) six cruisers of 278 to 805 tons, besides several tenders. The districts were subdivided into 44 divisions in charge of inspecting officers consisting at the date mentioned of 30 commanders, 37 lieutenants, and the remainder of subordinate

coast-guard officers. The divisions are divided into stations, each in charge of a chief officer who is about equal in rank to a warrant officer. The coast between stations is patrolled at all times, day and night, and means of signaling to vessels is kept ready for instant service. The regulations of entry vary from time to time, but the men are all good-conduct men who have completed a long term of service in the navy and are not above a certain age. According to the budget of 1913–14, the number of commissioned officers attached to the coast-guard service was 102, exclusive of officers regularly serving on board the vessels of the navy acting as station ships and gunboats. There were also 198 chief officers of stations and 2830 petty officers and seamen, making a total of 3130 persons. Many of the men composing the coast guard were old men-of-war's men who retired from active service on completion of their regular service. The pay is comparatively high, and in many cases free houses are provided.

In 1913 the Secretary of the Treasury of the United States proposed that the United States Life Saving Service and Revenue Cutter Service be consolidated for administrative purposes under the title of Coast Guard.

COASTING. An outdoor winter game, supposedly of Russian origin. The sport consists of sliding down a slippery bank or other inclined grade of snow or ice, by means of a sled, or two sleds attached by a board, the rear one rigidly, the front one on a pivot so that it may be moved for steering. These contrivances have various local names, such as "bobsled," "double-ripper" and "double-runner." The connecting board may be long enough to seat from 8 to 12 coasters. Consult Steele, "Coasting," in *Outing Magazine*, vol. xli (New York, 1903). See TOBOGGANING.

COASTING TRADE. The commerce carried on by sea between the different ports of the same country. In Great Britain "coastwise" is defined to mean "from any one part of the United Kingdom to any other part thereof." Vessels engaged in this commerce are subject to different rates and regulations from oversea traders, and the masters must keep their books showing that their cargoes come strictly within the definition of coasting trade. Formerly no goods or passengers were allowed to be carried from one port of the United Kingdom to another except in British vessels; but this restriction was repealed in 1854, and the coasting trade in Great Britain is now open to all the world, though the share of foreign nations is inconsiderable. Most other countries, however, reserve the coasting trade to their nationals, as does the United States, which restricts the trade to ships built and owned in the United States, as well as officered and chiefly manned by Americans. The term "coasting trade" usually includes also the trade between the mother country and its colonies. This interpretation of the term is followed by the United States.

Owing to the length of coast, this trade in the United States is far more extensive than in any other country. Of the 49 States and Territories (exclusive of Alaska), 18 border on the Atlantic Ocean and the Gulf of Mexico, and three border on the Pacific Ocean, to which may be added the enormous coast line of Alaska, Hawaii, and Porto Rico. The extensive commerce of the Great Lakes is also included in the coasting trade. In the time of the early settlements such trading was done in small shallops, sloops, and schooners, and there was very little of it. With the growth of the country in population the trade has grown until the tonnage engaged in it exceeds by 40 per cent the total tonnage of the German Empire. At the present time many hundreds of steamers and many more hundreds of sailing craft are constantly plying from Maine to Texas, transferring the cotton, sugar, rice, and lumber of the South to Northern, and the grain and manufactured goods of the North to Southern markets. In summer these coasting steamers do a large share of the passenger as well as trade traffic. The thoroughness of the coast survey, and the introduction of the weather service, whereby mariners are duly forewarned of danger, have done much to prevent the disasters which were common not long ago, and even the dreaded Cape Hatteras has lost much of its terror. There are no records of the volume of business which is done in the coasting trade, but the fact that the licensed tonnage in the coasting trade and fisheries grew from 3,160,917 tons in 1860 to 6,782,082 in 1912, coupled with the fact that the tonnage of steam vessels increased from 770,641 tons in 1860 to 4,543,276 in 1912, attests its growth. Consult *Annual Reports* of the Commissioner of Navigation.

COAST LINE. See SHORE.

COAST PILOT. A pilot licensed to conduct vessels from one part of the coast to another. He is expected to be familiar with all buoys, beacons, lighthouses, and other aids to navigation along the part of the coast for which he pilots, and to have such a knowledge of the soundings, currents, weather, etc., as to enable him to conduct safely a vessel in thick or bad weather or at night. Upon reaching the entrance to a port the local pilots take charge of the vessel. The term *Coast Pilot* is also applied to a series of volumes published by the United States Coast and Geodetic Survey which give information in regard to the coast of the United States in great detail. See COAST AND GEODETIC SURVEY, U. S.

COAST RANGE. The system of uplifts which extends along the Pacific coast with interruptions from southern California to the Strait of Juan de Fuca in Washington (Map: United States, A 2). The name is also given to the range of mountains that defines the coast line of British Columbia and which is flanked by the Island Range on the west and merges into the Cascades towards the east. The Coast Range of the United States has its beginning where it meets the Sierra Nevada Range in the San Rafael Mountains, near Santa Barbara, southern California. Thence the line of elevation is continued in a general north-northwesterly direction by the Mount Diablo Range, the San Benito Range, and the one known locally as the "Coast Range" rising abruptly from the shore line. At San Francisco Bay a great rift is made, all ranges sloping down to the rocky hills through which this body of water has broken. The highest points in these ranges are San Carlos (5470 feet) and Mount Hamilton, on which is situated Lick Observatory (4450 feet).

Throughout northern California the Coast Range is continued through the Trinity Mountains, thence turning eastward through the Scott Mountains, throwing off branches to the south and west, but continues north again in the Siskiyous. Groups near the Oregon boundary

diverge to the east and connect with the Cascade Range. Farther north, the Coast Range in Oregon and Washington has less marked uplifts, the elevations averaging only from 1000 to 3000 feet. The Olympic Mountains, however, near the Strait of Juan de Fuca in Washington, include several peaks of considerable elevation, the highest being Mount Olympus, with an altitude of 8150 feet. The mountains of southern California below the San Rafael Mountains are sometimes called part of the Coast Range, but may more properly be considered a continuation of the Sierra Nevada. Their peaks are higher than in the north, numbering among them San Bernardino Mountain, 10,630 feet; San Jacinto Mountain, 10,805; Tehachapi Peak, 9214, and Pinos Mountain, 9214. The Coast Range presents no marked barrier to the drainage of the coastal region. This is due both to the interrupted character of the range and to its low altitude. The principal rivers crossing it are the Chehalis, Columbia, Umpqua, Rogue, Klamath, Eel, Sacramento, Santa Maria, and Siuslaw. The Salinas River occupies the valley between the parallel ranges of southern California and flows into the Bay of Monterey. See CALIFORNIA; OREGON; WASHINGTON; BRITISH COLUMBIA.

COAST-RANGE TROUT. A local name in California for the rainbow trout (q.v.).

COATBRIDGE, kōt'brĭj. A prominent and prosperous town of Lanarkshire, Scotland, 9 miles east of Glasgow (Map: Scotland, D 4). The town is in the centre of a mineral district, coal being the most important product. Its products include malleable iron, fire brick, tiles, tin plate, wire, tubes, and boilers. Owing to the great increase in the iron trade, Coatbridge has grown rapidly in size and prosperity since 1825, when James Baird put up furnaces. Educational institutions include a technical school, a mining college, and the Baird Institute. Pop., 1841, 1599; 1901, 36,981; 1911, 43,286.

COATES'VILLE. A borough in Chester Co., Pa., 39 miles (direct) west of Philadelphia, on the Pennsylvania and the Philadelphia and Reading railroads (Map: Pennsylvania, K 8). It contains a fine Y. M. C. A. building, a hospital, and is noted as an industrial centre, the establishments including iron and steel works, steel-plate mills, boiler works, brass and iron foundries, machine shops, a tube mill, silk mills, and factories of tobacco, phosphate, and automobiles. Settled about 1800, Coatesville was incorporated in 1867. The government is vested in a burgess, elected every three years, and a borough council chosen on a general ticket. There are municipal water works. Pop., 1900, 5721; 1910, 11,084; 1920, 14,515.

COATI, kō-ä't*ē*, or COATI-MONDI. The native Brazilian name of certain tropical raccoons of the genus *Nasua* and the family Procyonidæ. They are not unlike the typical raccoons in many of their characteristics, but the body is more elongated. They are from 2 to 3 feet long and are chiefly remarkable for the elongation of the snout, which is a sort of flexible proboscis and is used in search of food and in rooting up the earth to obtain worms and insects. They are often domesticated in South America and are very affectionate, active, troublesome, and amusing. They are arboreal in their habits and, besides insects, eat birds and their eggs. The colors are extremely variable, but as a rule only two species are recognized, the Mexican coati (*Nasua nasica*, or *narica*) and the Brazilian red coati (*Nasua rufa*). The former is brownish gray and is found from Panama northward to southern Mexico. The other is reddish brown and occurs throughout South America east of the Andes. In the Pleistocene these animals were abundant, judging from their fossil remains, and at least one species was much larger than any living one. Consult: *Pop. Science Monthly*, vol. ii (New York, 1872); *American Naturalist*, vol. x (Boston, 1877); *Proc. U. S. National Museum* (Washington, 1889). See Plate of AMERICAN MINOR CARNIVORES under CARNIVORA.

COATICOOK, kō-ät'ĭ-kụk. A town and port of entry in Stanstead Co., Quebec, Canada, on the Coaticook River and the Grand Trunk Railway 120 miles (direct) south by west of Quebec (Map: Quebec, G 5). It is a manufacturing and industrial centre and has a United States consulate. The manufactured products include fabrics, butter and cheese, chemicals, woolens, cream, sashes, doors, chairs, flour, shingles, lifting jacks, patent medicines, bricks, and knit goods. Pop., 1901, 2880; 1911, 3165.

COAT OF ARMS. In heraldry, "a complete armorial composition, to be charged upon a shield or banner." It is a relic of the armorial insignia which were embroidered upon a cloth worn over the armor, to render a knight conspicuous in battle. See HERALDRY.

COAT OF ARMS, NATIONAL. The coats of arms officially sanctioned by modern national governments represent, in most cases, the family heraldic insignia of their sovereigns. See HERALDRY.

COAT OF MAIL. Body armor composed of interlaced steel links. These links averaged about three-eighths of an inch in diameter, and there were two main styles. In the first, one end of the slender steel rod was flattened and pierced, the other brought to a point and turned up; the rod was then curved, the point thrust through the hole in the flat end and riveted; in the second form both ends of the rod were flattened and pierced, it was bent in a circle and the superimposed ends joined with a rivet. At the time of the Norman Conquest coats of mail were loose, shirtlike garments extending from the neck to the knees, with sleeves to the elbows; the skirts were split front and back for ease in the saddle. In the days of Richard Cœur de Lion the vogue of mail was at its height. The legs and feet were protected by leggings of this material, apparently laced behind, and a coif or hood attached to the coat covered the head and protected the throat and the face to the lips. By the end of the fourteenth century mail had practically passed out of use.

COATZACOALCOS, kō-ät'sä-kō-äl'kōs, better known as PUERTO MEXICO. A port in the State of Vera Cruz, Mexico, on the Gulf of Campeche, at the mouth of the Coatzacoalcos River, 170 miles northeast of Oaxaca (Map: Mexico, M 8). It is the Atlantic terminus of the Tehuantepec National Railway and one of the busiest shipping centres in Mexico. The natural harbor has been deepened for heavy-draft steamers. Its port works are of the most modern construction. It has a United States consular agent. The exports consist chiefly of rubber and timber. Pop., 1910, 4200.

COATZACOALCOS, or SNAKE RIVER. A river of Mexico rising on the north slope of the Tuxtla volcano, in the Sierra Madre, flowing

most of the distance across the Isthmus of Tehuantepec, and emptying into the Gulf of Mexico (Map: Mexico, M 9). It has a length of about 220 miles and is navigable for 25 miles from its mouth.

COB, OLIVER. A character in Ben Jonson's *Every Man in His Humour.*

CO'BALT (Ger. *Kobalt;* possibly same as *Kobold,* goblin). Symbol, Co; atomic weight, 59.0; specific gravity, 8.5 to 8.9; melting point, 1467 C.

A metallic element discovered by Brandt in 1735. The word "cobalt" is found in the works of Paracelsus and other early writers and was used to designate minerals that suggested the appearance of metallic ores, but when smelted failed to yield any metal; hence the name "cobalt," signifying "sprite," was given to such minerals on account of the illusive character of their metallic constituents. It was also applied to certain blue pigments containing cobalt as far back as the times of the Greeks, but it was not until Brandt investigated the blue coloring of smalt that the elementary character of the metal was established.

The color of cobalt is steel gray with a reddish tinge. It possesses considerable lustre and will take a high polish, is ductile at red heat, and at ordinary temperature is hard and brittle. The metal by itself has practically no uses at the present time, but is admirably suited for cutting tools when alloyed with chromium, molybdenum, and tungsten. This alloy, known as "stellite," is the result of the investigations of Elwood Haynes of Kokomo, Ind., U. S. A. Cobalt is very magnetic, burns in oxygen with a red light, decomposes water at a red heat, dissolves slowly in hydrochloric and sulphuric and readily in dilute nitric acids, forming cobaltous salts. It absorbs carbon when heated in it; combines with sulphur, the halogens and phosphorus, arsenic, antimony, and bismuth; is easily precipitated from its solutions, and in other respects resembles nickel in its properties. When prepared by reduction by hydrogen, it is pyrophoric.

The element has been found free only in meteorites and has been detected in the solar atmosphere. The minerals of cobalt have been found in Saxony, Prussia, Bohemia, Hungary, France, Sweden, England, Spain, and in the Timiskaming district of Ontario, Canada, the last-named region being the greatest source of supply at the present time. The minerals occurring in sufficient quantities to be classed as ores are: linnæite, $(Co. Ni. Fe)_3 S_4$, a cobalt-nickel-iron sulphide; smaltite, $CoAs_3$, a cobalt arsenide; cobaltite, (Co.Fe) AsS, a cobalt-iron sulpharsenide; wad, or earthy cobalt, (Co.Mn) O. $2MnO_2.4H_2O$, composed of oxides of cobalt and manganese; and cobalt bloom, or erythrine, $Co_3As_2O_8 + 8H_2O$, an arsenate of cobalt. Cobalt is nearly always present in nickel ores.

Cobalt combines with oxygen to form a monoxide or cobaltous oxide, CoO; a sesquioxide or cobaltic oxide, Co_2O_3; and a cobalto-cobaltic oxide, $CoCo_2O_3$, which is rather unstable and is generally considered as a mixture of the monoxide and the sesquioxide; they are all black and are reduced to metallic cobalt by carbon or hydrogen at a high temperature. Cobaltic oxide combines with water to form a dark-brown powder, $Co(OH)_3$, which when heated loses oxygen until the cobaltous-oxide stage is reached, at which point it remains stable. Of these oxides the most important is the cobalto-cobaltic oxide. In the commercial extraction of cobalt from its ores direct-fire methods are impracticable owing to the impurities present. The ore, matte, speiss (which may be the result of the separation from nickel), or slag containing the cobalt, is treated by wet methods and aims at the recovery of the cobalt as cobalto-cobaltic oxides. Smalt, other compounds, and metallic cobalt may then be prepared from the oxide. Zaffre is an impure oxide obtained by roasting cobalt ore and mixing with sand. By far the greatest quantity of the oxides is converted into smalt, also called *bleu d'azur* and *bleu de saxe,* which consists essentially of cobalt silicate and potash and is employed as a pigment for coloring glass by enamelers and potters for the production of the finest blue glaze on porcelain.

The silicate of cobalt itself is an exceedingly strong coloring agent, surpassed only by gold, one-tenth of 1 per cent imparting a deep-blue color to glass. Other pigments which are produced in smaller quantities are the phosphate; arsenate (known as red oxide of cobalt); cob bronze, a double phosphate of cobalt and ammonium; cobalt blue, also known as cobalt ultramarine and Thenard's blue, which is produced by heating an intimate mixture of alumina and the oxides; Rinman's green, or cobalt green, a mixture of the oxides and zinc oxide, which is also subjected to heat in its preparation. The principal salts of cobalt are those derived from the cobaltous oxide, viz., cobaltous sulphide, CoS; cobaltous sulphate, $CoSO_4 + 7H_2O$, which forms double salts with ammonium sulphate, $(NH_4)_2SO_4$, and serves, like nickel, for the electric deposition of the metal; cobaltous chloride $CoCl_2$, which is used as the basis of sympathetic inks; cobaltamines, so called, which are composed of cobaltic chloride, Co_2Cl_6, and varying amounts of ammonia, and are formed by the oxidation of ammoniacal solutions of cobaltous chloride, and when heated are converted into pure cobalt.

The world's estimated consumption of cobalt oxide during 1912 was 350 tons, valued at $560,000. Consult Schnabel, *Handbook of Metallurgy,* and *Metallurgical and Chemical Engineering,* vol. xii, No. 3, p. 184 (March, 1914).

COBALT. A town on Cobalt Lake, in the Timiskaming district, in the northern part of Ontario, Canada, 330 miles north of Toronto, and 103 miles north of North Bay, on the Timiskaming and Northern Ontario Railway. Rich deposits containing silver, nickel, bismuth, cobalt, copper, lead, and zinc were discovered in 1903. Claims were first worked in 1904. The yield of silver was remarkably rich. The ores were found to carry up to 3000 and 4000 ounces of silver to the ton of 2000 pounds. In 1904 the shipments of ore amounted to 158 tons, valued at $136,217. A rush to the locality set in in 1906. At the end of that year there were 20 large mines in operation, and in 1912 the output amounted to 30,322,805 ounces, valued at $17,455,080. On June 6, 1912, a large part of the town was destroyed by fire, but it was soon rebuilt. Being the centre of the richest of existing silver-mining districts, Cobalt has some of the characteristics of a mining camp. The manufacturing industries include a sampling plant, a machine shop and foundry, and 13 concentrators. An electric railway runs to Haileybury, 5 miles, and to New Liskeard, 10 miles. Pop., 1911, 5638.

CO'BALTITE. A mineral cobalt sulpharsenide, whose composition is CoAsS. It crystallizes in the isometric crystals which resemble those of pyrite (q.v.), has a metallic lustre, and is silver white, tending to red, in color. Cobaltite occurs in association with other metallic sulphides, especially those of lead and silver, and is found in Sweden, where excellent crystals are known; also in Norway, and at various localities in Silesia, but not in the United States to any extent. When present in sufficient quantities, it is a valuable ore of cobalt.

COBÁN, kō-bän'. The capital of the Department of Alta Vera Paz, Guatemala, on the Rio Cojabón, about 90 miles north of the city of Guatemala (Map: Central America, B 3). It is picturesquely situated on the slopes of a hill and is irregularly built. Its modern buildings are of some merit. The town has minor manufactures and is the centre of a fertile district producing coffee, cacao, vanilla, and sugar cane. Pop., 1900, 24,475; 1904, 30,770.

COBB, Henry Ives (1859–). An American architect. He was born in Brookline, Mass., and was educated at the Massachusetts Institute of Technology and at Harvard, where he graduated in 1880. He was architect of the Opera House, the Newberry Library, the University of Chicago, and the church of the Atonement in Chicago, and of the Pennsylvania State Capitol. In 1893 he was one of the National Board of Architects for the World's Columbian Exposition, for which he designed the Horticultural Hall, and was retained as special architect by the United States government from 1893 to 1903. Among others of his more recent works the most important are the city hall and courthouse building in Chicago, and in 1913 the Booth Memorial Theatre in New York.

COBB, Howell (1815–68). An American politician. He was born in Jefferson Co., Ga., graduated at Franklin College in 1834, and was admitted to the bar in 1836. From 1837 to 1840 he was Solicitor-General of his State, and from 1843 to 1851 was a member of Congress. In 1849 he was elected Speaker of the House. He was one of the leaders of the Southern party in Congress and favored the extension of slavery into the territory acquired from Mexico. He was chosen Governor of Georgia in 1851 and was again sent to Congress in 1855. He was Secretary of the Treasury in Buchanan's cabinet, but resigned in 1860 to join the South in the approaching war. He was the president of the congress that drafted and adopted the Confederate constitution, but antagonism to Jefferson Davis compelled his retirement from the Secession administration. He was appointed major general in the Southern army, but did not take part in any considerable military operations. In defense of slavery he published *A Scriptural Examination of the Institution of Slavery* (1856).

COBB, Nathan Augustus (1859–). An American agriculturalist, born at Spencer, Mass., and educated at Worcester Polytechnic Institute and the University of Jena. He was professor of chemistry and natural science at Williston Seminary, Mass. (1881–87), between 1891 and 1904 served as pathologist in the Department of Agriculture in New South Wales, for three years directed the division of physiology and pathology of the Hawaiian Sugar Planters' Experiment Station at Honolulu, and became agricultural technologist of the United States Department of Agriculture (1907), and also acting assistant chief of the Bureau of Plant Industry (1911). He discovered and described a large number of new species of plants and animals and patented several photographic devices. He published: *Elements of Chemistry* (1885); *Seed Wheat* (1903); *Universal Nomenclature of Wheat* (1905); *Methods of Using the Microscope, Camera-Lucida, and Solar Projector for Purposes of Examination and the Production of Illustrations* (1905); *Fungus Maladies of the Sugar Cane* (3d ed., 1909).

COBB, Sylvanus (1799–1866). An American Universalist minister, born at Norway, Me. He edited the *Christian Freeman* of Boston, for 20 years, and published *The New Testament, with Explanatory Notes* (1864), *A Compend of Divinity,* and *Discussions.* He was prominent in antislavery and temperance movements. His son Sylvanus (1823–87) was a prolific and very popular writer of tales and sketches of adventure, especially for the New York *Ledger.* He published a *Memoir* accompanying his father's *Autobiography* (Boston, 1867).

COBB, Thomas Reed Rootes (1823–62). An American lawyer and author. He was born at Cherry Hill, Ga., graduated in 1841 at the University of Georgia, and from 1849 to 1857 was a reporter of the State Supreme Court. During the Civil War he served in the Confederate Congress, where for a time he was chairman of the Committee on Military Affairs. He afterward became a brigadier general in the Confederate army and fell at Fredericksburg. He published: *Digest of the Statute Laws of Georgia* (1851); *Inquiry into the Law of Negro Slavery in the United States* (1858); *Historical Sketch of Slavery, from the Earliest Periods* (1859); *The Colonel* (1897).

COBB, William Henry (1846–). An American librarian, born at Rochester, Mass. He was educated at Amherst College. In 1872 he was ordained to the Congregational ministry. He was pastor at Plymouth, Mass. (1872–76), and at Uxbridge, Mass. (1878–87). In 1887 he became librarian of the Congregational Library and assistant treasurer of the American Congregational Association at Boston, and in 1889 he was also coeditor of the *Journal of Biblical Literature.* He is author of *A Criticism of Systems of Hebrew Metre* (1905).

COBBE, kŏb, Frances Power (1822–1904). An English philanthropist and author. She was born in Dublin and was the great-granddaughter of Charles Cobbe, Archbishop of Dublin. Though brought up in an atmosphere of evangelical piety and sent to a fashionable boarding school, which proved to be torture to her vigorous, independent spirit, yet her early study of theological, ethical, and religious subjects finally brought her to the acceptance of the doctrines of theism. In 1857, after a year of travel in Italy, she joined Mary Carpenter at Bristol in conducting schools and reformatories for girls. She contributed articles to *Macmillan's* and other magazines and weeklies and, beginning in 1867, was for seven years an editorial writer for the *Echo,* a London daily. Later she wrote for the *Standard.* During this period her special subjects were the suffrage and property rights for women, and vivisection. She was long one of the foremost opponents of vivisection in England, and, when the columns of the newspapers were closed to her for the discussion of this subject, she established a monthly periodical for that purpose. Her published works make a long list. They

are all characterized by a remarkably fluent and forcible style. Among them are: *Intuitive Morals* (1855); *Religious Duty* (1857); *Pursuits of Women* (1863); *Broken Lights* (1864); *Darwinism in Morals* (1872); *Hopes of the Human Race* (1874); *Duties of Women* (1880; 9th ed., 1905); *The Scientific Spirit of the Age* (1888); *The Modern Rack: Papers on Vivisection* (1889); *Vivisection in America* (4th ed., 1890); and a charming *Autobiography* (2 vols., London, 1894; new ed., 1904).

COB'BETT, WILLIAM (1762–1835). An English political writer. He was born March 9, 1762, at Farnham, Surrey, where his father, a peasant farmer, trained him in habits of industry and self-dependence. He took a dislike to rural occupations and at 16 years of age went to London, where he was employed as a copying clerk; but, this becoming distasteful, he enlisted in the Fifty-fourth Regiment of Infantry, which shortly afterward went to Nova Scotia. He remained in the regiment eight years and by good conduct, activity, and intelligence became sergeant major. During this period he devoted his leisure to self-education. On his return to England in 1791 he obtained his discharge through the kind offices of Lord Edward Fitzgerald, married, and later went to France, where he learned the language. In the following year he went to America and, failing in an attempt to obtain a government position, supported himself for a time at Wilmington, Del., teaching English to French immigrants, Talleyrand being one of his pupils. He settled in Philadelphia and became a political writer. Under the signature of "Peter Porcupine" he was as keen a Tory as in later life he was a Radical, and, being stung by disparaging criticism of his mother country, he lashed American democracy and French republicanism with coarse, bitter, and personal scorn. Twice prosecuted for libel, he left America in June, 1800, and returned to England, where, in January, 1802, he started his famous *Weekly Political Register*, which continued uninterruptedly until his death. At first Tory, the *Register* gradually changed its politics and became the determined opponent of the government and the uncompromising champion of Radicalism. Having previously been found guilty twice of libel on certain members of the government, he was in 1810 fined £1000 and sentenced to two years' imprisonment in Newgate for his severe comments in the *Register* upon the flogging of five militiamen by Hessian mercenaries. In sore financial straits, and again in danger of imprisonment for free speech, Cobbett returned to America in 1817, and for two years farmed on Long Island, transmitting his articles for the *Register* with unfailing regularity. On his return to England in 1820 his strange whim of transporting the bones and relics of Thomas Paine, whom he had formerly reviled and now fulsomely eulogized, met with contempt and ridicule. He established a seed farm at Kensington and for some years engaged in agriculture. In 1829–30 he traversed England and Scotland on horseback, delivering political lectures in the principal towns, and he was received everywhere with enthusiasm as the most powerful advocate of the people's rights. In 1832 he was returned to the first Reform Parliament as member for Oldham. His first speeches did not add to his reputation, but caused amusement, Peel blandly informing him that they would receive the attention due to any "respectable member," but he eventually gained a respectful hearing. He was engaged in a debate on the malt tax just before his death at Normandy Farm, near Guildford, June 18, 1835. Cobbett is one of the great newspaper men of all time. His earlier tracts, such as *A Bone to Gnaw for the Democrats*, were widely circulated, but the success of his *Political Register* as a newspaper medium has never yet been surpassed. This came about partly because of his style,—his sentences short, terse, in the vernacular, his broad humor, picturesque caricature, and striking epigrams; and partly also because of the fearless and long-protracted onslaught on intrenched privileges which characterized Cobbett through the first third of the nineteenth century. Cobbett was also greatly interested in agriculture, about which he knew much, and in banking and currency, about which he knew little. He was the compiler of the *Parliamentary History* (London, 1806), which after 1812 was published as Hansard's *Debates*, and originated Howell's *State Trials* (ib., 1809–28). Among his best-known works are his *Grammar of the English Language* (1819), *Rural Rides* (1830), *Cottage Economy* (1822), and *Advice to Young Men and Women* (1829). His *History of the Protestant Reformation* (2 parts, 1824–27) attacks the Reformers, defends Roman Catholicism, and, often translated, has been extensively circulated in France and Italy. His sons published an annotated abridgment of his political works (9 vols., 1848). While not a man of the first order of intellect, and excluded from the higher refinements of thought, in matters of common sense Cobbett exhibited vigor far surpassing that of any other writer of his day. Despite crotchets, he rendered lasting service to the cause of the people. Consult: his autobiographical *Life and Adventures of Peter Porcupine* (Philadelphia, 1798); E. Smith, *Life of Cobbett* (2 vols., London, 1878); Huish, *Life of Cobbett* (ib., 1836); Waters, *Cobbett and his Grammar* (New York, 1883); Watson, *Biographies of Wilkes and Cobbett* (London, 1870); Carlyle, *William Cobbett* (ib., 1904); "Lewis Melville," *The Life and Letters of William Cobbett in England and America* (ib., 1913).

COB'BLER, or **COBBLER FISH.** 1. See KILLIFISH. 2. See THREADFISH.

COBBLER OF PRESTON, THE. A musical burlesque by Charles Johnson, produced in 1716 and altered a century later. Its plot was suggested by the adventures of Christopher Sly in Shakespeare's *Taming of the Shrew*.

COB'BOLD, THOMAS SPENCER (1828–86). An English scientist, born at Ipswich. He studied anatomy under Crosse and later took the regular medical course at the University of Edinburgh. In 1857 he went to London, and from 1857 to 1861 he lectured on botany at St. Mary's Hospital. In 1861 he began his lectures at the Middlesex Hospital, and subsequently, while practicing medicine, also lectured on geology at the British Museum. In 1873 he was made professor of botany and later acted as professor of helminthology at the Royal Veterinary College. Although he was a scientist in the broadest sense of the term, his investigations were chiefly in the field of helminthology, the science of parasitic worms; and his published works deal chiefly with subjects of this science. His writings include: *Entozoa: An Introduction to the Study of Helminthology, with Reference More Particularly to the Internal Parasites of*

Man (1864, and supplement, 1869); *Tapeworms* (1866); *Worms* (1872); *Parasites* (1879); *The Parasites of Elephants* (1882); *Human Parasites* (1882); *Parasites of Meat and Prepared Flesh Foods* (1884); also a large number of memoirs published in scientific periodicals.

COB'DEN, RICHARD (1804–65). An English statesman and economist known as the Apostle of Free Trade. He was born in the hamlet of Heyshott, near Midhurst, in Sussex, on June 3, 1804, of a family which for centuries had been settled in the place. His father was a sweet-natured, incapable man, who proved unequal to the task of supporting his family. In 1814 the farm was sold, and young Cobden was sent off to be educated at a Yorkshire school, where he learned nothing and suffered much for five unhappy years. In 1819 he entered his uncle's warehouse in Old Change, London, and devoted himself with great energy to his new business, finding time, nevertheless, at nights, for study and reading. At 21 he was a commercial traveler for his uncle's house and loved the business for the opportunities it gave him of studying men and things. In 1828 he set up as the commission agent of a large manufacturing house in Manchester on a capital consisting mainly of energy, ability, and his good name. In 1831 he and his partners had prospered sufficiently to start in business for themselves as calico printers at Sabden, near Clitheroe, and in the following year branches were established in London and Manchester. The "Cobden prints," tasteful and original in design, became famous, and the partners were speedily on the way to the accumulation of a large fortune. In 1832 Cobden settled in Manchester, and from that time his private affairs became secondary to the interest which he displayed in the broad practical principles of economics and public education. From 1832 to 1835 he must have been busy educating himself, for this was the only time during his early life when he could have found the leisure to acquire the profound knowledge of political history and economics for which he was distinguished. Reading and foreign travel continued to the last to be a great passion of his life.

In 1835 Cobden published a pamphlet entitled *England, Ireland, and America,* "by a Manchester Manufacturer," and this was followed in 1836 by another pamphlet on *Russia.* These two pamphlets were epoch making, in that they boldly challenged the prevalent ideas of foreign policy and foreign trade in England. It would seem that the sober-minded Cobden, an enthusiast in his way, had become convinced that commerce was the great torchbearer of civilization and the great foundation of national prosperity. Anything, therefore, which interfered with the free exchange of commodities between nation and nation was harmful, and for this reason protection, which dammed the current of trade, and war, which sought entirely to destroy it, were pernicious. He attacked the historical English policy of intervention in European affairs, on the ground that it bred interminable wars in Europe, while it crushed the English taxpayer with the burden of an enormous debt. The balance of power, the political ideal for which so many sanguinary contests had been fought, Cobden ridiculed as an impossible adjustment which, in spite of centuries of bloodshed and diplomacy, still left statesmen facing an obstinate, unstable equilibrium. He strongly deprecated, too, the prevailing spirit of hatred for Russia, the great bugbear of English statesmen. Summed up, his plea was for the principles of peace, nonintervention, and a policy of retrenchment and free trade as a means of husbanding the national resources for the great economic struggle that was fast approaching with the entrance of the United States into the markets of the world. In 1835 he made a brief tour in the United States and Canada. In the winter and spring of 1836–37 Cobden traveled in Spain, Turkey, and Egypt. On his return he entered into Manchester municipal politics, being one of those who secured the incorporation of that city in 1838. Popular education was a subject of great interest to him, and he discussed it in many public speeches. In 1837 he was a candidate for Parliament at Stockport, but was defeated.

The history of Cobden's connection with the Anti-Corn-Law agitation began in October, 1838, when an Anti-Corn-Law association was founded in Manchester. (See CORN LAWS.) Cobden was one of its earliest members and soon became its guiding spirit. He converted the Manchester Chamber of Commerce to his views and made it a powerful instrument of agitation. Anti-Corn Law associations were founded in many towns of the north, and in London, in March, 1839, the delegates of the various associations united to form the Anti-Corn-Law League, of which Cobden and six others constituted the council. From the first he was the soul of the movement, and to the people at large he seemed to be the embodiment of the cause. With magnificent talents for organization, with an unequaled gift for popular oratory, and, above all, with his kindling enthusiasm and tremendous capacity for work, he was what would be called in modern parlance campaign manager, press bureau, and stump speaker all in one. The history of the Anti-Corn-Law agitation belongs properly elsewhere, but Cobden's activity is so identified with the work of the League that the two can hardly be separated. Wonderful instances are quoted of the sudden conversion of hostile audiences in country and town, as they listened to Cobden's simple, sincere, and irrefutable arguments; and his success in his "campaign of education" was all the more rapid in that his teachings confined themselves to driving home the elemental truth that food is a desirable thing for people who starve. In 1841 he entered Parliament from Stockport. His reception in the House was not friendly; but his evident sincerity and his straightforward, unanswerable arguments always gained him a hearing. At the beginning of the session Mr. Charles Villiers's annual motion to consider the repeal of the Corn Laws was rejected by a vote of 393 to 90, yet within five years after he had entered Parliament, Cobden had converted Sir Robert Peel and his party to free trade. In 1843 considerable odium was heaped upon his name as the result of an attack on the government, which Peel unjustly took to be an exhortation to personal violence against himself. Cobden, however, was undaunted, and continued to plead, in Parliament and out, against the "system of legislative murder" which "starved people to death." On March 13, 1845, he delivered an especially powerful speech in the House, at the end of which Peel is said to have muttered, "Those may answer him who can, I cannot do it." The famine in Ireland came to the aid of the Anti-Corn-Law League. On

Dec. 5, 1845, the Prime Minister pronounced for the total repeal of the Corn Laws, and in 1846 the battle had been won. Speaking in Parliament in that year, Peel declared that to Cobden was due the honor for the great reform which had just been enacted. That the intense earnestness which animated Cobden throughout the struggle was something more than enthusiasm for a principle in economics is shown in the following words of John Bright, his lifelong friend and supporter, spoken at the unveiling of Cobden's monument at Bradford in 1877. It was in September, 1841, and Bright was mourning over the dead body of his young wife when Cobden came to him, saying: "There are thousands of houses in England at this moment where wives, mothers, and children are dying of hunger. Now, when the first paroxysm of your grief has passed, I would advise you to come with me, and we will never rest until the Corn Law is repealed." The struggle and the triumph are thus described by Mr. Bright: "We were joined, not by scores, but by hundreds, and afterward by thousands, and afterward by countless multitudes; and afterward, famine itself, against which we had warred, joined in. A great minister was converted, and minorities became majorities, and finally the barrier was entirely thrown down, and since then, though there has been suffering, and much suffering, in many homes in England, no wife, and no mother, and no little child has been starved to death as a result of famine made by law."

During the agitation for the repeal of the Corn Laws, Cobden had neglected his own affairs entirely, and at the end he was a poor man. A popular subscription of more than £75,000 was made up for him and he went abroad for rest. His nature, however, was opposed to rest, and during his long travels in France, Spain, Italy, Germany, and Russia, he did not cease to advocate in public speeches and interviews with sovereigns and statesmen the great principles of free trade, peace, and nonintervention. During his absence he was elected to Parliament from the West Riding of Yorkshire (1847), and on his return to England he affiliated himself with numerous peace societies and subsequently attended a number of international peace congresses in Paris, Frankfort, and London. In 1849 he moved in Parliament that action be taken towards the establishment of international arbitration, and in 1851 he proposed a general reduction of armaments. He was active in combating the periodic outbursts of anti-Gallic and anti-Russian fever such as that which spread over the country in 1853, and lost thereby that immense popularity which he had acquired in the struggle against the Corn Laws. He bitterly assailed Palmerston's policy of active intervention in European affairs, and with John Bright opposed the war against Russia in 1854, for which he was virulently assailed by the unanimous voice of a war-mad nation. Far from considering the preservation of Turkey as desirable, Cobden maintained that the downfall of the Ottoman Empire in Europe would redound to the welfare of the Christian peoples of the Balkans and to the cause of civilization. In 1857, as the result of an attack by Cobden on the Chinese policy of the cabinet, the Palmerston ministry was outvoted and forced to appeal to the country. Cobden stood for Huddersfield, but his unpopularity on account of his attitude towards the war recently ended was still great and he was defeated. In 1859 he came to the United States, this being his second visit after a lapse of 24 years. On his return the post of President of the Board of Trade was offered him by Palmerston, with a place in the cabinet. Against the urgent advice of his friends, Cobden declined the offer, refusing frankly to take sides with a man from whom he differed *toto cælo* on matters of foreign policy. At the suggestion of M. Chevalier, the eminent champion of free trade, Cobden went to France in 1859 to attempt the negotiation of a commercial treaty between that country and England. He possessed the support of none of the English ministers save Gladstone, but his reputation was such that in his unofficial capacity he succeeded in converting the French Emperor and his ministers to his views. In January, 1860, Cobden was clothed with official authority and in the same month the treaty was concluded. He remained in Paris until November, accomplishing the tremendous labor necessary in the minute adjustment of a new tariff schedule. On returning to England he declined the offer of a baronetcy and resumed his activity in Parliament. With John Bright he earnestly supported the cause of the North in the Civil War, and in Parliament severely criticized the course of the government in permitting the equipment of Confederate cruisers for the purpose of preying on American commerce. His last speech in Parliament was delivered in July, 1864. He contracted serious bronchial trouble as the result of exposure in traveling on a public mission to London, and died there, July 2, 1865. His death was acknowledged as a national loss by men of such widely differing opinions as Palmerston, Disraeli, and John Bright, and was received with sorrow in France and other countries of the Continent.

Cobden's *Speeches on Questions of Public Policy* were published by his friends John Bright and Thorold Rogers in 1870. The best biography is that by John Morley, *Richard Cobden's Life* (London, 1881; New York, 1908). Consult also Garnier, *Richard Cobden, les ligueurs et la ligue* (Paris, 1846); Bastiat, *Cobden, et la ligue ou l'agitation pour la liberté du commerce* (Paris, 1848); Walpole, *Studies in Biography* (New York, 1907); MacCunn, *Six Radical Thinkers* (ib., 1910).

COBDEN CLUB. An association of leading free traders instituted in London in 1866, in honor of Richard Cobden (q.v.), with the object of diffusing in all parts of the world those principles with which his name is connected. For this purpose it has published tracts, pamphlets, and books for free circulation, especially in Great Britain, the United States, and the British colonies.

COBEGO, kō-bā'gō, or **KAGUAN,** kä'gwän. The native name of a singular group of East Indian flying insectivores, constituting the family Galeopithecidæ and genus *Galeopithecus*, having one species (*Galeopithecus volans*) and perhaps one or two others. They are known in the Malayan region as cobegos, colugos, kaguans, kubongs, etc., and in many books as flying lemurs, this aberrant and puzzling group having at first been considered lemuroids. But the scientific name, meaning "weasel monkey," is no more appropriate than lemur, for this creature is neither the one nor the other, but rather a distant cousin of moles and shrews. Even here we have the anomaly of an animal classed with the insectivores which, in diet, is wholly a vege-

tarian. They are slender, long-limbed, large-clawed, long-tailed, fox-headed animals, about 18 inches in length, clothed in exquisitely soft, short and protectively mottled fur, and provided with a folded extension of the skin which extends from the neck nearly to the tip of the tail and includes the feet, which are fully webbed. This parachute thus equals that of the best-furnished bats in extent, but it is furry both above and below. In flight the cobego does not equal bats, but it can sail longer distances, and come nearer to guiding its course, than do any other "flying" mammals. It is wholly arboreal in its life; in fact, on a flat surface it is as helpless as a bat, and flops awkwardly towards the nearest tree, the mode of progression resembling that of a seal. It becomes active mainly in the evening and early morning, disliking the glare of day, and impeded by the darkness of midnight. It spends most of its time scrambling about the branches or sailing from one tree trunk to another, and seems to feed upon anything vegetable that lies in its way, but mostly upon leaves and fruit. It has been said that in sleep it hangs head downward, clinging with its hind feet, and by means of the prehensile free tips of its tail, when it is nearly invisible among the flickering lights of the leaves. Like many of the owls, the cobego has two color phases, rufous and gray, which are wholly independent of age, sex, or season. The rufous is much the rarer, only about one in a dozen being of this hue. It is probable that only a single young is born at a time and this in a very imperfect stage of development, reminding one of the marsupials. The young animal sleeps hanging by all four feet, its head and tail curled inward, forming almost a circle. Consult: Wallace, *Malay Archipelago* (London, 1869); Moseley, *Notes by a Naturalist on the "Challenger"* (London, 1879); Beebe, *New York Zoölogical Society Bulletin* (New York, 1913).

COBET, kŏ-bĕt′, Carel Gabriel (1813–89). A brilliant Dutch classical scholar. He was born in Paris and studied from 1831 to 1836 in Leyden. In a journey to Italy at government cost in 1840–45 he studied carefully most of the Greek manuscripts in Italian libraries, and became thus an expert in paleography (q.v.) He became a professor at Leyden in 1847. Cobet was one of the most sagacious and acute of modern scholars in the criticism and emendation of Greek texts. He published, besides other works of high merit: *Oratio de Arte Interpretandi Grammatices et Critices Fundamentis Innixa,* his inaugural address, famous for its Latinity (1847); *Variæ Lectiones* (1854); *Novæ Lectiones* (1858); *Miscellanea Critica* (1876); *Collectanea Critica* (1878); works on Dionysius of Halicarnassus, and Xenophon; and editions of Diogenes Laërtius, Xenophon's *Anabasis* and *Hellenica,* Lysias, and Cornelius Nepos. From 1856 he was one of the editors of *Mnemosyne,* an important periodical devoted to the classics. Consult Sandys, *A History of Classical Scholarship,* vol. iii (Cambridge, 1908). See Textual Criticism.

COB′HAM, Lord. See Oldcastle, Sir John.

CO′BIA, or Crab Eater. See Sergeant Fish.

COBIJA, kō-bē′hȧ. A seaport in the Province of Antofagasta, Chile, about 70 miles north of Antofagasta (Map: Chile, C 8). It was formerly a considerable town, but has lost its commerce and now contains a population of but 500. Cobija, once known as Puerto la Mar, was part of Bolivia and its only seaport until ceded to Chile in 1883. It suffered from an earthquake and tidal wave in 1877.

COBLENZ, or **KOBLENZ,** kō′blĕnts (corrupted from the Latin name *Confluentia,* or *Confluentes,* from *confluere,* to flow together, from *con-,* together + *fluere,* to flow). The capital of the Prussian Rhine Province, about 57 miles southeast of Cologne, beautifully situated at the junction of the Rhine and the Moselle (Map: Prussia, B 3). It consists of the old town, along the Moselle, and the new town, farther up the Rhine. Among the principal buildings are the church of St. Castor, founded early in the ninth century by the son of Charlemagne, containing the tomb of Archbishop Kuno of Falkenstein; the Liebfrauen Kirche ('Church of Our Lady') of the thirteenth century; the so-called Kaufhaus, built in 1477 as a town hall; the ancient Burg, erected by the Archbishop of Treves in 1276, restored by the town; and the large electoral palace, now a royal palace, completed in 1786. In 1905 the government completed a magnificent new building in which to centre the activities of the province. At the extreme point of the city, at the junction of the rivers, stands the splendid equestrian statue of Emperor William I, erected by the province. Coblenz has numerous and excellent educational institutions, including a royal gymnasium, a teachers' seminary, and a conservatory of music. Its chief industry is the production of the sparkling Moselle wine. There are also manufactures of ships, hats, machinery, pianos, and lacquered wares. A system of four forts, including Ehrenbreitstein on the opposite bank of the Rhine, makes it very formidable. Prince Metternich, the Austrian statesman, was born here in 1773. Pop., 1900, 45,146; 1905, 53,902; 1910, 56,487. Coblenz was known to the Romans as Confluentes. In 1018 it was conferred by Henry II upon the archbishops of Treves. After 1789 it was the headquarters of the French Emigrés, and in 1794 it passed to France. In 1815 it was ceded to Prussia. Consult: Daniel, *Deutschland* (Leipzig, 1895); W. A. Gunther, *Geschichte der Stadt Koblenz* (Coblenz, 1815); Bär, *Urkunden und Akten zur Geschichte der Verfassung und Verwaltung der Stadt Koblenz bis zum Jahre 1500* (Bonn, 1898).

COBNUT. See Hazelnut.

COBOURG, kō′bĕrg. The capital of Northumberland Co., Ontario, Canada, on Lake Ontario and the Grand Trunk Railway, 69 miles east-northeast of Toronto (Map: Ontario, F 6). It is a port of entry, with a commodious harbor and regular steamship connections with Rochester, N. Y., Toronto, Montreal, and other American and Canadian ports. The town is well laid out and has notably fine public buildings. The manufacturing establishments include extensive car works, woolen and matting factories, steel works, woodworking, wire-fence, and canning factories. Cobourg is a well-known and popular summer resort. For many years Cobourg was the seat of Victoria University (Methodist), now federated with Toronto University. Electric power is generated for manufacturing purposes. Pop., 1901, 4239; 1911, 5074.

CO′BRA, or **COBRA DE CAPELLO,** kō′brȧ dā kȧ-pĕl′ō (Portug., hooded snake). One of a group of Oriental venomous snakes constituting the proteroglyphic genus *Naja.* There are six or seven species dwelling in Asia and Africa. Of the African species the best known is the

asp (*Naja haie*). (See ASP.) The Asiatic cobras are not large, except the "giant" cobra (*Naja bungarus*), which is sometimes 13 feet long. (See HAMADRYAD.) Several species belong mainly to the Malayan region and are comparatively small and harmless. None is American, the "cobras" of Brazil being something else, usually harmless.

The cobra de capello (*Naja tripudians*) is the most interesting one, as it is exceedingly numerous throughout India and Ceylon, thence westward to the Caspian, and eastward throughout the Malay Peninsula and into southern China; and is justly regarded as the most deadly of venomous serpents—certainly the most harmful considered in the aggregate, the annual mortality from its bite in India alone being many thousand human beings, besides a great quantity of live stock. Little can be done to prevent this, because of the religious veneration with which the "black snake" (the native name) is regarded by the larger part of the population. This species rarely exceeds 6 feet in length and is a rather slender, brownish snake (bluish beneath) with lighter crossbars; but the markings are variable. The head is small, without the triangular and separated appearance of the vipers; but when the snake is angry or excited and about to strike, it lifts from the ground a third of its length and spreads the nuchal ribs until the neck expands into a broad, shell-like hood of terrifying appearance; and the back of this hood displays a yellow mark, more or less of the shape of a pair of spectacles.

These cobras wander even up to elevations of 8000 feet in the Himalayas, but are most common in the lowland jungles, where they are able to climb trees, although they seldom do so; and as they can swim well they often enter the water after frogs, fish, etc. They are attracted to villages, enter gardens and houses in search of mice and other small mammals, or of eggs and young poultry, and are likely, especially during the rainy season, to take up their residence in old houses, broken walls, fodder stacks, and rubbish heaps, and remain there. It is about such places, especially at night, that they are most often trodden upon, and fatal bites are received. They are sluggish and strike rarely except when provoked or endangered, and they may be killed by a slight blow. Their bite, when well delivered by a vigorous snake, is almost surely fatal; men have been known to perish within half an hour, and in such cases all so-called remedies are useless. The immunity this snake receives among the Hindus is due to a belief that it once spread its hood as a shade over Buddha while he slept, and was blessed by the saint, who placed the spectacle mark upon its back as a warning to the kite not to molest it. Little headway can be made against this superstition in efforts towards extermination of this deadly reptile, which occasionally penetrates even the gardens and parks of large towns. Its natural enemies are few, chiefly the kite, the mungoos (q.v.), and cattle (by tramping).

Bibliography. For these and other poisonous snakes of the Old World, consult authorities referred to under SNAKE; also Fayrer, *Thanatophidia of India* (London, 1874); Ewart, *Poisonous Snakes of India* (ib., 1878); and especially Wall, *Journal Bombay Natural History Society*, vol. xxii (Bombay, 1913). See PROTEROGLYPHA; and Colored Plate of FOREIGN VENOMOUS SERPENTS with the article SNAKE.

COBRE, or **EL COBRE,** kō'brā. A small town in the Province of Santiago, Cuba, about 9 miles from Santiago de Cuba (Map: Cuba, K 6). It is the centre of a copper-mining district, and derives its name from that metal. Cobre dates from the sixteenth century, the mines having been exploited first in 1558. Pop., 1899, 1028; 1907, 1781.

COBURG, kō'bŏŏrk (Lat. *Melocabus*). The capital of the Duchy of Coburg and, alternately with Gotha, the residence of the Duke of Saxe-Coburg-Gotha, picturesquely situated on the left bank of the Itz, a tributary of the Main, about 26 miles north-northeast of Bamberg (Map: Germany, D 3). Its principal public buildings are chiefly found on the Marktplatz and Schlossplatz. The former, adorned with a statue of Prince Albert, contains the old Rathaus, from the early seventeenth century, the handsome government buildings, the arsenal, with the Ducal Library of 100,000 volumes, and the town museum. The Schlossplatz contains the large palace erected in 1549 and restored in 1693, two smaller ducal palaces, and the theatre. The church of St. Moritz, a handsome Gothic structure, dating from the fifteenth century, contains some fine monuments and brasses. On a hill about 500 feet above the town stands the ancient castle of the dukes of Coburg, dating from the sixteenth century. It has been restored and is fitted up as a museum. The rooms which Luther occupied, when in concealment here in 1530, remain, as well as the pulpit from which he preached in the chapel of the castle. It has a gymnasium founded in 1604 by Duke John Casimir, commercial, agricultural, and other schools. There are flourishing industries of beer brewing, the weaving of woolen and linen fabrics, and the manufacture of porcelain and basket ware, machinery, colors, ironwork, and lumber. Pop., 1890, 17,106; 1900, 20,459; 1910, 23,794. The town of Coburg grew up around the castle and is mentioned for the first time in 1207. In 1485 it passed to the Ernestine line of Saxon dukes and became in 1735 the capital of Saxe-Coburg.

COBURG FAMILY. An old German ducal family, dating from the fifteenth century, which has contracted various alliances with the English and continental royal houses. Queen Victoria's mother was a sister of Duke Ernst I of Coburg. The first wife of Ernst's brother, Leopold I, King of Belgium, was a daughter of George IV, of England, and his second wife was a daughter of Louis Philippe. Albert (q.v.), the son of Ernst I, was the husband of Victoria.

COBURG PENINSULA. A peninsula on the north coast of Australia, bounded by the Van Diemen Gulf and the Arafura Sea. It extends in a northwesterly direction towards Melville Island, from which it is divided by Dundas Strait (Map: Australasia, F 4). On its northeast side is the bay known as Port Essington, at the head of which was established, in 1839, the settlement of Victoria—abandoned six years later because the red-clay soil could not be cultivated. The district abounds with swamp buffaloes which were originally imported from Java.

COBURN, FOSTER DWIGHT (1846–). An American agriculturist, born in Jefferson Co., Wis. He had a common-school education, served in the Civil War in Illinois regiments, and in 1867 settled in Kansas. The agriculture of Kansas owes much to his expert knowledge and enthusiasm. He became in 1882 and again in 1894 Secretary of the State Department of

Agriculture and was chief of the department of live stock at the St. Louis Exposition (1904). He was repeatedly a member of the board of regents of the State Agricultural College and president of the State Temperance Union. In 1906 he refused an appointment as United States Senator. He wrote many State reports and *Swine Husbandry* (1904); *Alfalfa* (1901); *The Book of Alfalfa* (1906); *Swine in America* (1909).

COBWEB. One of the four fairies that appear in Act iii, Scene 1, and Act iv, Scene 1, of Shakespeare's *Midsummer Night's Dream.*

CO'CA (So. Amer. name), *Erythroxylum coca.* A shrub of the family Linaceæ, the leaves of which are much used by the inhabitants of Peru and Bolivia as a narcotic and stimulant. (For illustration, see Plate of CORNFLOWER.) The dried leaves are chewed with a little finely powdered unslaked lime or with the alkaline ashes of the quinoa (q.v.), or certain other plants. The principal constituents of coca are cocaine and several derivatives, hygrine, cocatannic acid, etc. As a local anæsthetic the alkaloid cocaine is unexcelled. The common forms of administering are in the wine of coca, a fluid extract, and the alkaloid cocaine. The properties and effects of coca resemble those of opium, although it is less narcotic, while it possesses the property of dilating the pupil of the eye, which opium does not possess. It also lessens the desire for ordinary food, and for some time, at least, enables the person who uses it to endure greater and more protracted exertion than he otherwise could, and with less food. The leaves are sometimes mixed with forage for mules, when especially long trips are taken. It is especially remarkable for its property of preventing the difficulty of respiration, so common in the ascent of long and steep slopes at great elevations. But when used habitually and in excess, it weakens the digestion, produces biliary and other disorders, and finally induces a miserable ruin both of body and mind. It has been in use from a very remote period among the Indians of South America and was extensively cultivated before the Spanish conquest. Many of the Indians of the Peruvian Andes are to this day excessively addicted to it, and its use prevails also to a considerable extent among the other inhabitants of the same regions. Its culture and use have extended into Brazil. The shrub is extensively cultivated in various parts of South America and in Ceylon, India, and Java. It could probably be grown in parts of Florida and California. The shrub is 3 to 6 feet high, with rusty branches and leaves somewhat like tea leaves, which are borne on the ends of the branches, the small yellow flowers some distance below. The annual production of leaves in South American trade is estimated at 30,000,000 to 40,000,000 pounds. There are about 100 species of *Erythroxylum.* The name is from the red wood of some species.

COCADRILLE, kŏk'ȧ-drĭl. A monster described by Sir John Mandeville as living on the island of Silha and corresponding to the crocodile, of which the word is an early form.

COCAINE, kō'kȧ-ĭn, $C_{17}H_{21}NO_4$. An alkaloid derived from the leaves of a shrub, *Erythroxylum coca* (see COCA). The hydrochlorate, $C_{17}H_{21}NO_4$·HCl, produces temporary insensibility when applied to the conjunctiva, mucous membranes, or denuded surfaces, or when injected beneath the skin. It is not absorbed by the unbroken skin, however, unless by cataphoresis (q.v.). It also causes a temporary contraction of the blood vessels of the region anæsthetized, but this is followed by congestion. Applied to the conjunctiva, it causes anæsthesia, dilatation of the pupil, diminution of intraocular tension, and some interference with accommodation. For dilating the pupil it is sometimes employed in combination with homatropine (q.v.). As a local anæsthetic for regions covered by skin it is injected in solution, by a hypodermic needle, into the tissue which is to be anæsthetized. The toxic dose varies greatly, some persons being unfavorably affected by a small amount. The only result may be restlessness and excitement, or there may be headache, rapid respiration, delirium, coma, or convulsions, with wide dilatation of the pupils. Persons addicted to the cocaine habit use the drug internally or by subcutaneous injection. Its prolonged use causes digestive disturbance, muscular twitching, insomnia, mental, moral, and physical deterioration, and often death.

Within recent years cocaine has been successfully employed as an anæsthetic in major surgical operations; if injected into the spinal canal, cocaine has the remarkable effect of producing complete insensibility to pain in the entire part of the body below the point where it is injected, but no effect at all above that point. See ALKALOIDS.

COCAMA, kō-kä'mȧ. A tribe of Tupian stock, known also as the *Ucayales,* situated on the banks of the lower Ucayalí River, in northeastern Peru, particularly in the neighborhood of the great Cocama Lagune; also in the vicinity of Nauta, on the left bank of the Amazon, opposite the mouth of the Ucayalí. On the lower Huallagá are some Cocamas, who are known as *Cocamillas.* They are closely related to the Omaguas, or Campevas, another Tupian people of the higher Amazon. Besides the older notices in De Castelnau and Marcoy, consult the article of Dr. P. Rivet, "Les langues guaranies du Haut-Amazone," in the *Journal de la Société des Américanistes de Paris* for 1908.

COCANADA, kō'kȧ-nä'dȧ (corrupted from Telugu *kakinadi*). The capital of the Godavari District, Madras, India, 315 miles north-northeast of Madras, and after that city the principal port on the Coromandel coast (Map: India, D 5). Navigable canals connect it with the Godavari River at Dowlaishwaram. The commercial establishments and docks of the town are on the banks of one of these canals, which leads to the protected roadstead in Coringa Bay. In spite of a decline in its trade due to silting of the harbor, large quantities of cotton are exported, and there are exports also of rice, sugar, oil seeds, ghee, pulse, and tobacco. The principal industries are the manufacture of salt, ironwork, and cheroots. Pop., 1901, 48,096; 1911, 54,110.

COCCAI, MERLIN. See MERLIN COCCAI.

COCCEIANS, kŏk-sē'yanz. The name given to the adherents of Johannes Cocceius, the seventeenth-century theologian (q.v.), who held that the future history of Christianity was to be found foreshadowed in the Old Testament.

COCCE'IUS, NERVA, or NERVA MARCUS (?–33). The grandfather of the Emperor Nerva, elected consul 22 A.D. His legal learning is extolled by Tacitus, and he is frequently mentioned in the *Digest.* He had charge of public works under Tiberius, to whom he was

a constant companion. Notwithstanding the Emperor's entreaties, he starved himself to death, 33 A.D., because of continual ill health.

COCCEIUS, kŏk-tsā'yo͞os, or KOCH, JOHANNES (1603–69). A German Protestant theologian. He was born in Bremen and made his first studies there. In 1625 he went to Hamburg and acquired a thorough knowledge of Oriental languages under the guidance of a learned Jew. Returning to Bremen in 1630, he taught Hebrew there and was appointed professor of theology in Franeker in 1643 and in Leyden in 1650. Cocceius' chief work is the *Lexicon et Commentarius Sermonis Hebraici et Chaldaici Veteris Testamenti* (Leyden, 1669), the first tolerably complete dictionary of the Hebrew language. By a fanciful typology he found New Testament ideas in the Old Testament. The representation of a covenant between God and man he made the centre of his theology. This idea of two covenants—one of works, or that before the Fall, and one of grace, that after it—was first broached by William Ames (died 1633); but Cocceius elaborated it and so became the virtual founder of the federal theology (q.v.), which is found in the Westminster standards and was long accepted by the Reformed churches. The most complete exposition of his views is in his *Summa Doctrinæ de Fœdere et Testamento Dei* (1648). His collected works were issued in Amsterdam (1675), with a life by his son.

COCCEJI, kŏk-tsā'yē, HEINRICH VON, BARON (1644–1719). A German jurist. He was born at Bremen and studied jurisprudence and philosophy in Leyden and afterward in Paris and Oxford. He was made professor in Heidelberg in 1672 and in Utrecht in 1688, and two years later was appointed to a similar office in Frankfort-on-the-Oder. In 1712 he was created a baron of the realm. His work on German civil law, *Juris Publici Prudentia* (1695), was almost universally used as a textbook.

COCCEJI, SAMUEL VON, BARON (1679–1755). A German jurist, born in Heidelberg, son of the preceding. He became Prussian Minister of State and of War (1727), director of ecclesiastical affairs and curator general of the universities of the kingdom (1730), president of the High Court of Appeals (1731), chief of the Prussian judiciary (1738), and Chancellor (1747). He exerted the greatest influence upon the development of Prussian law. The legal codes prepared by him, and respectively entitled *Projekt des Corporis Juris Fridericiani Pomeranici* (1747) and *Projekt des Corporis Juris Fridericiani Marchici* (1748), remained in operation until 1780. Consult Trendelenburg, *Friedrich der Grosse und sein Grosskanzler Samuel von Cocceji* (Berlin, 1863).

COC'CIDÆ (Neo-Lat. nom. pl., from Lat. *coccum,* Gk. κόκκος, *kokkos,* berry). A family of bugs, including the scale bugs or bark lice, the mealy bugs, and others without popular names. This family not only departs the most widely from the Hemiptera, but in it the most anomalous forms among insects are found; and the most extraordinary diversities occur, even in the two sexes of the same species. The habit of secreting a shell or covering of some sort is common to all the Coccidæ, most frequently in the form of a scale made up of cast skins and excreted matter. Sometimes, as in the case of the mealy bugs, the covering is white and powdery; and in the "ground pearls" it is glassy or shell-like and may entirely incase the insect. A few gall-forming species occur in Australia. The young mitelike females at first have the power of locomotion. The perfect male has only one pair of wings, like flies. Sexual reproduction is the normal method, while parthenogenesis and viviparous reproduction, so common in the aphids, is a rare method among the Coccidæ. Almost complete histolysis may occur in the female, lasting for several years. The young of both sexes sink the rostrum into plants, suck the sap, and secrete a waxy coating or shield of some sort, under which they undergo subsequent development. Coccidæ occur on bark, leaves, and fruits of various trees, and as they are sap suckers they may greatly impoverish or kill the plant. The black or brown scalelike spots on oranges and lemons are really scale insects, and by the transportation of the fruit gain world-wide distribution. Honeydew is secreted by the Coccidæ, but usually not so plentifully as by the Aphidæ. The "man" still used by the Arabs for food is probably the manna of Exodus and is secreted by a coccus. White wax is secreted by a species in India, and another produces in China the wax commercially known as China wax. The shelly resinous scale produced by another form is the lac or shellac of commerce, while the body of the lac-producing insect affords the red dye known as lake. Other Asiatic and European species furnish dyes. The tropical American *Coccus cacti* yields cochineal (q.v.). Axin and axinic acid are produced by another Mexican coccus. Consult Newstead, *Monograph of the Coccidæ of the British Isles* (London, 1900), and the references to subdivisions of this group in Banks, "List of Works on North American Entomology," *Department of Agriculture, Bulletin 81* (Washington, 1910). See LAC INSECT; SCALE INSECT.

COCCID'IO'SIS. See DIARRHŒA, WHITE, OF CHICKENS.

COCCID'IUM. A protozoön of the order Sporozoa, occurring as a cell parasite in most animals. *Coccidium oviforme* has been found in human liver and intestines. Within a mosquito inoculated with malaria are found coccidia, which, rupturing, set free threadlike bodies eventually found in the secretion that lubricates the mosquito's lancet.

COCCIUS, kŏk'tsē-o͞os, ERNST ADOLF (1825–90). A German oculist, born near Leipzig. He studied medicine at the universities of Leipzig and Prague and practiced several years in Leipzig, where he became connected with the university in 1851. He was made full professor of medicine there in 1867. Coccius made contributions of great value to the diagnosis of the diseases of the eye. His published works include: *Ueber die Ernährungsweise der Hornhaut und die Serum führenden Gefasse des menschlichen Körpers* (1852); *Ueber die Anwendung des Augenspiegels nebst Angabe eines neuen Instruments* (Leipzig, 1853); *Ueber die Neubildung von Glashäuten im Auge* (1857); *Der Mechanismus der Akkommodation des menschlichen Auges nach Beobachtungen im Leben* (1867); *Ueber Augenverletzungen und ihre Behandlung* (1871); *Ophthalmometrie und Spannungsmessung am kranken Auge* (1872); *Ueber die Diagnose des Sehpurpurs im Leben* (1877).

COC'CO (West Indian name). EDDOES, YANTIA, or TANIERS, names given in the West Indies to species of *Xanthosoma,* of which there are about 30, all American. *Xanthosoma* is a genus belonging to the Araceæ, or aroids, and

only about three species are of economic importance, viz., *Xanthosoma sagittifolium*, *X. violaceum*, and *X. atrovirens*. Until quite recently these plants have been confused with the elephant ears, or taro (*Colocasia antiquorum*), and allied species of the Pacific islands. They resemble the taro, but may be distinguished by their leaves never being in the least peltate and by their producing numerous tubers. These tuberous offshoots often contain as much as 30 per cent starch and are used similarly to white or Irish potatoes. The leaves are often served as a potherb, resembling spinach. The culture of the plant is quite simple, and the yields are large, and it may prove adapted to the frostless portions of the United States. The taro is recognized by its slightly peltate leaves and its large fleshy rootstock. In Hawaii, and the South Sea Islands generally, taro is one of the staple sources of food for the natives. The rootstock is roasted, after which it is pounded in wooden trays with water into a thick dough. This is allowed to ferment and may be eaten in that state or prepared in a number of ways. Its native name in Hawaii is poi. In Japan, Porto Rico, etc., the rootstocks are utilized as we use potatoes.

COCCOSTEUS, kŏk-kŏs'tê-ŭs (Neo-Lat., from Gk. *κόκκος*, *kokkos*, berry + *ὀστέον*, *osteon*, bone). A genus of heavily armored fishes, of the order Arthrodira, fossil remains of which are found in the Devonian rocks of Europe and North America. The head and the forward part of the trunk were covered with strong bony plates, and the plates of these two regions articulated by a hinge joint that admitted of free movement of the head upon the trunk. The skull had large orbits, placed well forward, and in the middle of the frontal surface was a pit that indicated the position of the pineal body. The jaws were strong, and the mandibles or lower jaws were furnished with conical teeth. The trunk of *Coccosteus* was sharklike in form, and was provided with a single dorsal fin, an anal fin, and perhaps a pair of rudimentary pelvic fins. It was probably covered by a soft skin that readily decomposed after the death of the animal and that hence escaped fossilization. The vertebral column shows an interesting progressive stage in the evolution from the cartilaginous backbone of the earlier fish to the completely calcified skeleton of the later genera. The neural arches and the spiny processes of the vertebræ have alone become calcified, so that in well-preserved specimens they appear as two rows of bony processes, with an intervening empty canal that represents the cartilaginous centra, or "bodies," of the vertebral elements. All the species of the *Coccosteus* are small, none of them having been found with a length greater than 20 inches. The best-known species and the type of the genus is *Coccosteus decipiens*, which is common in the Old Red Sandstone of the Scottish Devonian. A few specimens, though none so perfect as the Scottish, have been found in the North American Devonian. See FISH; DIPNOI; LUNG FISH.

COC'CULUS IN'DICUS (Neo-Lat. *cocculus*, dim. of Lat. *coccum*, berry, and Lat. *indicus*, Indian). The name given to a very poisonous seed brought from the East Indies, which is used for various medicinal purposes, and illegally, it is said, for imparting a bitter flavor to malt liquors. It possesses acrid and intoxicating qualities. It is used in India for stupefying fish, that they may be taken by the hand. When the seeds, known as "fish berries," are thrown into a stream, any fish in the neighborhood are quickly stupefied. It contains a most poisonous principle, called "picrotoxin," while the pericarp contains another called "menispermin," equally poisonous. It is the seed of the *Anamirta paniculata*, a beautiful climbing plant, of the natural order Menispermaceæ. The action of picrotoxin, when taken internally in poisonous doses, resembles that of strychnine (see NUX VOMICA); the most noticeable symptoms being uneasiness, restlessness, and tetanic convulsions. The drug is used to destroy lice and the parasite of ringworm. It has been employed internally, in small doses, to check the night sweats of phthisis. Poisoning occasionally occurs from drinking the drug, as it is sometimes prepared as a domestic parasiticide—the bottle being filled with equal volumes of the berries and rum, and allowed to stand after shaking. Absorption through broken skin also causes poisoning at times. The genus *Anamirta* is closely allied to the genus *Cocculus* (see CALUMBA), in which it was formerly included. The fruit of several allied species possesses properties analogous to those of the *Anamirta paniculata*.

COCCYX, kŏk'sĭks. See SPINAL COLUMN.

COCHABAMBA, kō'chà-bäm'bà (*Cocha*, lake + *bamba*, plain). The capital of the Department of Cochabamba, Bolivia, situated on the Río de la Rocha, in a fertile valley, about 8000 feet above the sea level (Map: Brazil). It is laid out with wide and regular streets and contains several pretentious structures, notably the theatre, government building, and the hospitals of Viedma and San Salvador. Cochabamba has a university, two colleges, and secondary schools. The city manufactures cotton and woolen goods, leather, soap, and earthenware, and besides carries on considerable trade, especially in grain. Pop., 1900, 21,881; 1910 (est.), 24,512. Cochabamba was founded in 1563 and was called Oropesa. In 1847 it was created an episcopal see.

COCHEM, kō'kĕm. The capital of a district in the Rhine Province, Prussia, at the confluence of the Moselle and Endert, 24 miles southwest of Coblenz (Map: Germany, B 3). It is noted for its picturesque situation, near the entrance to the Emperor William Railway Tunnel, 2⅔ miles in length, the longest in Germany. Cochem has a beautiful riverside park, in which is a war monument by Schies, and a former cloister of the Capuchins. The ancient episcopal castle of the archbishops of Treves, destroyed by the French in 1689 and restored since 1868, crowns a hill to the south of the town. Near by are the ruins of the castle of Winneburg. Its chief industries are milling, forestry, and the making and handling of wine. Pop., 1900, 3586; 1910, 3758.

COCHERY, kōsh'rē', GEORGES (CHARLES PAUL) (1855–). A French public official, son of Louis Adolphe Cochery, born in Paris. He was educated at the Lycée Condorcet and the Ecole Polytechnique. He was a director in the Department of Posts and Telegraphs, Minister of the Interior, President of the General Council of Loiret, and in 1895–98 and 1909–10 was Minister of Finance. He was made a chevalier in the Legion of Honor.

COCHERY, kōsh'rē', LOUIS ADOLPHE (1819–1900). A French statesman. He was born in

Paris, where he practiced law, and occupied the post of Chief of Cabinet in the Ministry of Justice during the revolution of 1848. He was subsequently editor of the *Avenir National*, and in 1868 established the journal entitled *L'Indépendant de Montargis*. As a member of the Left Centre in the Legislative Assembly, he opposed war with Germany, and after Sept. 4, 1870, acted as General Commissioner of the National Defense in the Department of Loiret. Under Dufaure he became Undersecretary of the Finances, and from 1878 to 1885 he was Minister of the Postal and Telegraphic service. He was elected to the Senate in 1888.

COCHIMI, kō-chē′mē. A name formerly applied to tribes of Yuman stock, occupying the northern and central portions of the peninsula of Lower California, Mexico. According to the account of the Jesuit Baegert, who labored among them for some years in the middle of the eighteenth century, they, like the Guaicuru and Pericu, who occupied the southern part of the peninsula, were in the lowest grade of culture, naked, without agriculture of any kind, and with no permanent shelters, depending entirely upon fishing, hunting, and wild fruits for subsistence. The dead were first buried, and after a certain time the remains were dug up, the bones cleaned and painted red, and preserved in ossuaries.

COCHIN, kō-chēn′ (Tamil *Kocchi-bandar*, 'Little Harbor'). The chief port of Malabar and the third in importance in the Madras Presidency, British India (Map: India, C 7). It is situated within the limits of the native State of Cochin in lat. 9° 58′ N. and long. 76° 14′ E. The town is about a mile long and half a mile broad, being at the northern end of a strip of land about 12 miles in length; it stands at one of the entrances of the Cochin backwater (see following article), which forms an excellent natural harbor of several square miles and provides communication by boat with a large area of rich country. The climate is very moist and hot; elephantiasis is common. Cochin is the only western port south of Bombay in which shipbuilding is carried on. It has a large trade, the main exports being coconut oil and coir; considerable tea from Travancore is exported. Of the import trade, more than half is rice. The Portuguese, under Cabral, arrived in 1500, and they soon got control of the town. Vasco da Gama founded a factory in 1502, and in 1503 Albuquerque built the Cochin fort, the first European fort built in India. Almeyda, arriving as Viceroy in 1505, enlarged the fort, and Cochin became the chief Portuguese settlement till the capture of Goa. St. Francis Xavier came in 1530 and made many converts; in 1577 the Society of Jesus published at Cochin the first book printed in India in native characters. An English settlement was made in 1634, when the East India Company by treaty acquired access to Portuguese ports. In 1663 the Dutch captured the fort and town, and the English retired to Ponnani. The town prospered under the Dutch, who remodeled it; in 1778 Van Moens rebuilt the fort. In 1795 the English besieged the town and captured it from the Dutch; the latter were allowed to retain their administration, but the cathedral (consecrated by the Portuguese in 1557), the fort, and many Dutch houses were blown up by the English in 1806, and in 1814 the town was definitely ceded to the East India Company. The population of Cochin in 1901 was 19,274; 1911, 20,023. More than half of the inhabitants were Christians, including a large Eurasian community.

COCHIN, kō-chēn′. A small native state of India in political relations with the government of Madras (Map: India, C 7). It consists of two disconnected parts, the larger of which is bounded on the north by the Malabar District of Madras, on the east by Malabar and Travancore State, on the south by Travancore, and on the west by Malabar and the Arabian Sea. The smaller part, called Chittur, lies to the northeast and is surrounded by the Madras districts of Malabar and Coimbatore. There are also a few small isolated tracts within Travancore. The total area is 1362 square miles. The eastern portion of the state, comprising nearly half the total area, is covered by a section of the Western Ghats, which reaches an altitude of about 5000 feet. It abounds in forests of teak and other valuable trees. To the west are forest-clad uplands, succeeded by plains reaching to a line of coastal backwaters. These backwaters or lagoons, which are separated from the sea by a long narrow stretch of sand densely grown with coconut palms, are very irregular in form, varying from a few dozen yards to four miles in breadth; they receive the numerous streams descending from the Ghats, communicate with the sea at three points, and are navigable for flat-bottomed boats. The climate is damp and enervating; the average annual rainfall is reported at 136 inches at Trichur, 108 at Ernakulam, and 66 at Tattamangalam; the temperature is fairly uniform, ranging from about 69° in December to about 96° in April, the mean being 82°. In the forests are found all the larger animals of southern India, and otters and crocodiles in the rivers and backwaters. Rice is the staple product, and coconuts second in importance; other crops are cereals and pulses, plantains and vegetables, betel leaf and areca nut, sugar cane, tapioca, ginger, pepper, and coffee. The forests, which cover nearly half the country, were formerly recklessly exploited, but now are conserved. The most important factory industry is the extraction of coconut oil. Coconut products constitute the principal exports. A branch line of railway, 65 miles long, was opened in 1902, connecting Ernakulam with Shoranur, on the southwest line of the Madras Railway. The backwaters form a line of communication from Trichur to the southern end of the state, 60 miles, and the canals branching therefrom aggregate about 60 miles. The capital is Ernakulam. The town of Cochin, which was formerly the capital and from which the state takes its name, has been British territory since 1814. The state is administered under a rajah, with the approval of the government of Madras. Pop., 1891, 722,906; 1901, 812,025 (increase 12.3 per cent); 1911, 918,110 (increase 13.1 per cent). Cochin leads all the districts and states of southern India in the literacy of its population, of whom over 13 per cent are able to read and write. Malayalam is the language of about 88 per cent of the people, and Tamil of about 7 per cent; in the Chittur taluk (285 square miles) over a third of the people speak Tamil. At the 1911 census Hindus numbered 615,710, Christians 233,092, Mohammedans 63,822, Animists 4177, Jews 1175, Jains 129, and Parsis 5. Of the Christians, 132,944 were Syrian and 97,987 Roman Catholic.

The Roman Catholic and the Syrian churches have a long history in Cochin, where there were probably Christians as early as the thirteenth century.

COCHIN, kō'chĭn (from *Cochin*-China). A breed of large domestic fowls, highly esteemed as producers of flesh and large eggs. They are known in black, buff, partridge (variegated), and white varieties, have yellow-feathered legs (except in the black variety) and single erect combs. See Fowl, and Colored Plate of Domestic Fowls in article Poultry.

COCHIN, kō'shăN', Charles Nicolas (1715–90). A French engraver and art critic, born in Paris. He was the most celebrated of a prominent family of engravers and painters and was the son and pupil of Charles Nicolas Cochin (1688–1754) and Louise Madeleine Hortemels, who was an etcher of note. He was named engraver to the King in 1739 and in this capacity designed a series of court subjects, such as "The Marriage of the Dauphin" (1745), in which his father assisted him. His drawings include vignettes, frontispieces, ornamental letters, and a number of portraits, including those of Garrick, Van Loo, Vernet, and Chardin. His works were catalogued by Jombert in 1770. Among them are etchings for his own pamphlets on Herculaneum and illustrations for the works of La Fontaine, Rousseau, Boccaccio, Ariosto, and Tasso. His criticisms on art were printed under the title *Œuvres diverses* (1757), and he also wrote *Voyage d'Italie* (1758), and *Mémoires inédites du Comte de Caylus*, published in 1880. He occupied many positions of distinction, and was ennobled in 1757. Consult Rocheblave, *Les Cochins* (Paris, 1893).

COCHIN, Henry Denys Benoit Marie (1854–1922). A French writer and legislator, born in Paris. He was educated at the Lycée Louis-le-Grand, Paris. In 1870–71 he served in the Franco-Prussian War, in 1877 he was an attaché of the Ministry of the Interior, and after 1893 he served continuously as a deputy. He was elected to the Academy in 1911. His publications include: *Giulietta et Romeo* (1878); *Le manuscrit de M. Larsonnier* (1880); *Boccace* (1890); *Un ami de Pétrarque* (1892); *Chronologie du Canzonière de Pétrarque* (1898); *Le frère de Pétrarque* (1903); *La vita nuova de Dante traduite et commentée* (1908); *Tableaux flamands* (1909); *Jubilis d'Italie* (1910); *Lamartine et la Flandre* (1912); *Ozanam: livre du centenaire* (1913); *Descartes* (1913).

CO'CHIN-CHI'NA, kō'chĭn-chī'nȧ. A possession of France, in the extreme south of the peninsula of Indo-China, lying between Cambodia and Annam on the north and the China Sea (Map: Asia, K 7). Its area is estimated at 21,980 square miles. It is traversed by the Mekong, which forms an extensive delta. The country is mainly a low plain, of alluvial origin. There is a region of granitic highlands in the northeast, representing the last spurs of the Annam chain, and reaching a height of 2300 feet. The Mekong, which has its source in Tibet, separates into three arms in Cochin-China, and together with many smaller rivers forms a network of waterways. The province in which Saigon, the capital, is located, is watered by the rivers Saigon, Donnai, and the two Vaicos. The delta land, almost wholly covered with rice fields and gardens, is frequently inundated, and the peninsula of Camau is like a great deserted swamp. Canals have been constructed for the joint purpose of commerce, irrigation, and drainage, vast areas thus being reclaimed for agriculture.

Cochin-China lies in the region of the monsoons. Typhoons frequently work great destruction. The healthfulness of the climate varies inversely with the frequency of the rains, and at its best is humid and warm. The severest heat is from April to June, and in the wet season there is almost a daily rainfall. Places near the seacoast are most favorable to Europeans. The flora is like that of Indo-China in general. The gamboge tree abounds, but palms are few. The vast forests are rich in the finest kinds of timber. There is game of every sort, from the elephant, rhinoceros, tiger, panther, leopard, deer, and wild boar, to the smallest rodents. Several species of venomous reptiles are found. Among the birds are the peacock, partridge, crane, duck, teal, snipe, woodcock, and pheasant. The rivers are plentifully supplied with fish of many species; alligators are numerous in the region of the Mekong. There is little mineral wealth, except phosphate of lime and salt. Most of the inhabitants are agriculturists and fishermen. About one-fourth of the area is cultivated, and the chief product is rice, which is planted throughout the country except in the north. Coffee culture is rapidly growing. Sugar cane, mulberry leaves, pepper, betel nuts, cotton, tobacco, maize, beans, sweet potatoes, oranges, bananas, and various valuable grasses, seeds, gums, and drugs are also produced. There are over 200,000 water buffaloes and 150,000 zebus employed in labor. Other farm animals are 11,200 horses, 109,000 cattle, 700,000 pigs, and 3000 sheep and goats. There are no native industries worthy of mention except the manufacture of salt, coarse silk stuffs, and sugar.

There are few good roads; but the innumerable little streams and canals give easy access to all parts of the country. The oldest railway in Cochin-China is that from Saigon to Mytho, now being extended from Mytho to Cantho, 60 miles. Other lines have been opened or are under construction and form part of the railway system of French Indo-China. In 1903 there were 2670 miles of telegraph. The chief article of commerce is rice. The minor exports consist of fish, cotton, copra, isinglass, silk, hides, and pepper. The articles imported are textiles, metals and metal implements, liquors, opium, paper, arms, and powder. In 1908, 756 vessels of 1,549,962 metric tons entered the ports of the colony. Commerce is mostly in the hands of Europeans and Chinese, but about 22,000 Annamites are small traders. There are over 73,500 fishing boats on the rivers and 3000 on the coast.

The colony is represented by a deputy in the French Parliament. It is divided into seven large provinces, Giadink, Vinh-long, Bassac, Bienhoa, Mytho, Chaudoc, and Hatien, which in turn are subdivided into 21 districts or inspectorates. The Lieutenant Governor, who is under the authority of the Governor-General of Indo-China, is assisted by a colonial council of 16 members, six of whom are French, and which has advisory functions, discusses and votes the budget, determines the taxes and the tariff. The Privy Council is a deliberative body of departmental heads as official members, together with two natives. Each province has its own administrative system, consisting of a provincial council and an administrator of native affairs. The provincial council is composed of natives and

discusses ways and means and questions of public works. The commune is the basis of the native social system, and the municipal councils are a sort of oligarchy of the prominent citizens. The cities of Saigon and Cholon are ruled by municipal councils part French and part native. Each important town has a citadel and garrison, and the collection of revenue and the suppression of robbery are secured by military posts in the interior.

The population in 1911 was placed at 3,050,785, of which 11,251 were Europeans, exclusive of the military. Saigon, the capital, had 64,845 inhabitants in the same year, of which 2939 were whites. Cholon had a population of 191,655. There were in 1911 about 380 schools, 800 teachers, and 19,000 pupils. Saigon presents a fine appearance, with its broad roads, good sanitation, and splendid government and public buildings, several of which cost over 2,000,000 francs. It has one of the finest docks in the world. A submarine cable connects it with Singapore and Hongkong.

For the administration of justice in Cochin-China there are native tribunals throughout the country, from which there is an appeal to the court at Saigon. In this appeal court European judges are assisted by Annamite mandarins in matters affecting the natives. In 1905 the penal system was reformed and punishment by torture abolished.

Cochin-China before the second half of the nineteenth century constituted a part of China, Cambodia, and Annam successively. In 1861 the French took Saigon and by treaty in the following year acquired the provinces of Saigon, Bienhoa, and Mitho. Hostilities continued until 1879. In 1888 the colony became a part of the Governor-Generalship of Indo-China. The name "Cochin-China" was formerly applied to the whole eastern division of the Indo-Chinese peninsula, including Tongking, Annam proper, and Lower Cochin-China. Consult: Lemire, *La Cochinchine française* (Paris, 1887); De Lanessan, *L'Indo-chine française* (ib., 1888); Norman, *Peoples and Politics of the Far East* (London, 1895); Baurac, *La Cochinchine et ses habitants* (Saigon, 1896–99).

COCHINEAL, kŏch'ĭ-nēl (from Sp. *cochinilla*, cochineal, wood louse, from Lat. *coccineus*, scarlet, from *coccum*, berry, or from Sp. *cochina*, sow; so called either from the color, or, if the second derivation be preferred, from the shape). A scale insect used as a dyestuff for scarlet and crimson and in the preparation of carmine and lakes. Cochineal consists of the bodies of the females of a coccid (see COCCIDÆ) called *Coccus cacti*, because it feeds upon plants of the cactus family, particularly on one known in Mexico as the nopal (*Opuntia cochinillifera*), nearly allied to the prickly pear. (See CACTUS.) These insects are minute, 70,000, it is said, being required to weigh a pound in a dried state—when not adulterated by red lead or other heavy dust. The male is of a deep-red color and has white wings. The female, which is wingless, is deep brown, covered with a white powder; flat beneath, convex above. Branches of nopal covered with insects are cut off before the rainy season sets in and carefully sheltered in a covered building. From these supplies the plantations are stocked at the close of the wet season, about the middle of October. When warmed by the sun, the females soon begin to lay eggs, each female producing more than 1000 young, which soon spread themselves over the plants. The males are very few—not more than 1 to 100 or 200 females—and are of no value as a dye. The first crop of females is picked off about the middle of December, and until May successive generations are gathered from time to time. The females, full of young, lose about two-thirds of their weight in drying. The process of gathering the insects is extremely tedious, a day's picking amounting only to about two ounces of cochineal. The killing is done in three ways: (1) by placing on a hot iron; (2) by placing in a hot oven; and (3) by dipping in a basket into boiling water, which is considered the best method. When killed and dried, they may be kept for any length of time without injury. The name "cochineal" is limited to that species first cultivated in Mexico, but long transplanted successfully to the Canary Islands, Java, and other warm parts of the Old World. Other species were known to the ancient Hebrews and Egyptians and were largely cultivated on a species of oak. Among the Arabs this insect is known as *kermes*, "red dye," and it is largely cultivated in Algeria (*Knowledge*, London, 1901). Cochineal was formerly much used for coloring wool or silk a scarlet or crimson; but, owing to the cost of its production and to the fact that the colors, although brilliant, are not very enduring, this dye has been greatly replaced by cheaper coal-tar products; and for this reason the cochineal industry has been rapidly declining. See CARMINE.

COCHITI. See Colored Plate of INDIANS (KERESAN STOCK).

COCHITUATE (cō-chĭt'ū-āt) **LAKE** (Massachusetts Indian: very deep water). A lake in Middlesex Co., Mass., 17 miles west of Boston. It is very narrow and irregular, with a length of about 4 miles, and has an area of little more than 1 square mile. From this lake and the connecting ponds, the city of Boston draws part of its supply of water (Map: Massachusetts, E 3).

COCHLEA, kŏk'lē-ȧ. See EAR.

COCHLEARIA, kŏk'lē-ā'rĭ-ȧ. See SCURVY GRASS.

COCHRAN, kŏk'rȧn, JOHN (1813–98). An American soldier and lawyer. He was born in Palatine, N. Y., graduated at Hamilton College in 1831, served as surveyor of the port of New York from 1853 to 1857, and from 1857 to 1861 was a Democratic member of Congress, where he took a prominent part in the debates on land reform, revenue, and other public questions. At the outbreak of the Civil War he became colonel of the First United States Chasseurs, which he commanded in the Peninsular campaign. In July, 1862, he was appointed brigadier general of volunteers, but resigned his commission in June, 1863, on account of failing health. He was Attorney-General of New York State in 1863–65. In 1864 he was nominated for the vice presidency on the ticket with John C. Frémont. As leader of the New York delegation to the Cincinnati Convention in 1872, he was instrumental in securing the nomination of Horace Greeley (q.v.) for the presidency. At the time of the Tweed-Ring disclosures in 1872 he became acting mayor of New York.

COCHRANE. A town in Timiskaming district, Ontario, Canada, situated on the National Transcontinental Railway and the Timis-

kaming and Northern Ontario Railway (of which it is the northern terminus), 500 miles north of Toronto, 550 miles west of Quebec, and 750 miles southeast of Winnipeg. It contains a customhouse and is the commercial centre for the newly opened northern Ontario and northern Quebec, especially the outfitting point for miners and prospectors, and for fishing and hunting parties. Machine shops and roundhouses of both the above-mentioned railways are located here. The town possesses electric-light and power, water works and sewage system. Pop., 1911, 1715.

COCHRANE, Francis (1852–1919). A Canadian merchant and statesman. He was born at Clarenceville, Province of Quebec, and was educated at the Clarenceville Academy. A few years afterward he removed to Sudbury, Ontario, and engaged in mining and lumbering. Entering municipal politics, he became mayor of Sudbury for several terms, and in 1902 was an unsuccessful candidate for the Ontario Legislature in the Conservative interest. He was elected in 1905, and again in 1908, when he was appointed Minister of Lands and Mines in the cabinet of Sir James P. Whitney (q.v.). In 1909–12 he was a member of the Royal Conservation Commission. Upon the accession to power of the Dominion ministry of Robert Laird Borden, Cochrane was appointed Minister of Railways and Canals.

COCHRANE, kŏk'ran, Thomas, tenth Earl of Dundonald (1775–1860). A British admiral, familiarly known as Lord Cochrane. The son of the ninth Earl of Dundonald, he was born at Annsfield, Lanarkshire, Dec. 14, 1775. His father, a scientist, ruined himself by experimental invention, and the boy received a desultory education volunteered by the village minister and schoolmaster. He was destined for the army, but in his seventeenth year joined his uncle's ship, on which he had been enrolled five years previously, and, in consequence of this priority, received rapid promotion. After serving in the Norway fiords and on the North American station, he won recognition in 1801 by a successful series of daring exploits in the Mediterranean, the most brilliant being the capture of a Spanish frigate of 600 tons and 319 men, which had been sent in quest of his small brig of 158 tons and 54 men. Shortly afterward his vessels were captured by three French line-of-battle ships, after several hours' resistance, but he was himself immediately released on parole. In 1802 he took advantage of the peace to repair his defective early education by a six months' assiduous course at Edinburgh University. He had imprudently offended Lord St. Vincent by a comparison, and at the renewal of hostilities in 1803 he was maliciously appointed to the stagnant Orkney station to protect nonexistent fisheries. But with a change of admiralty in 1804 he received a new ship, and within ten days captured several prizes. By a daring ruse he cleverly evaded a squadron of French battleships and sailed his prizes into Plymouth harbor, three golden candlesticks, each 5 feet high, decorating his masthead as specimens of spoil. In 1807 he was elected to Parliament for Westminster, but his indiscriminate exposure of naval abuses led to his being immediately ordered off to the Mediterranean. During four years he added to his reputation by a sequence of minor naval exploits and in 1809 was selected to burn out the French fleet which Lord Gambier had blockaded in Aix Roads, near Rochefort. He drove almost the whole squadron ashore and destroyed four ships; but, as he was unsupported by his superior, Gambier, who deliberately ignored his signals, the victory was incomplete. Cochrane received the knighthood of the Bath, but he emphatically expressed his disgust at the incompetency of Gambier, who demanded a court-martial. Through influence and a friendly court Gambier was exonerated, while Cochrane, discredited, was forced to retire on half pay. In Parliament, Cochrane continued his unsparing criticism of naval corruption, and thereby he made enemies who tried to implicate him in an attempt to influence the stock market by spreading the rumor of Napoleon's death. His uncle and another were found guilty and punished; and Cochrane, although innocent, was fined £1000, struck off the navy list, expelled from Parliament, degraded from his knighthood, sentenced to a year's imprisonment and to stand for an hour in the pillory. Owing to popular indignation, the pillory punishment was omitted. His Westminster constituents remained his friends and reëlected him. He escaped from jail in 1815, took his seat in the House, but was expelled by force, imprisoned for the rest of his term, and fined anew £100. Disgusted with vain attempts at justification, he accepted an invitation to organize the Chilean navy, and in 1818 proceeded to Valparaiso. He put the wretched Chilean vessels into the best possible condition and gained a series of remarkable successes over the Spanish fleet. In 1820 he took Valdivia and carried San Martin's army to Peru, having previously destroyed Spanish commerce on the Pacific coast and performed a brilliant exploit in cutting out the Spanish frigate *Esmeralda* from under the enemy's guns at the castle of Callao. Nonfulfillment of contracts and the refusal of arrears of pay caused him to resign, and soon afterward he became admiral in the Brazilian navy. During this appointment (1823–25) he compelled the Portuguese to evacuate Bahia, reduced Maranhão, and for his services received the marquisate of Maranhão; but the same causes as in the Chilean service led to his resignation from the Brazilian. His next appointment was the command of the Greek navy (1827–28); but an insufficiency of ships and men prevented the accomplishment of anything of importance. In 1831 he succeeded to the Dundonald peerage; in the following year William IV satisfied a general wish by granting him a free pardon for the offense of which he had been convicted, and in 1847 Queen Victoria reinstated him in the Order of the Bath and to his naval rank. In 1877 his heirs received compensation for his unjust condemnation in a restoration of 18 years' loss of pay and allowances as a naval officer. From 1848 to 1851 he was commander in chief of the North American and West Indian stations and became rear admiral of the United Kingdom in 1854. To an advanced age he busied himself with scientific inventions for the navy and early recognized the advantage of steam power and of the application of the screw propeller to war ships. He published: *Notes on the Mineralogy, Government, and Condition of the British West India Islands* (1851); *Narrative of Services in the Liberation of Chile, Peru, and Brazil*

(1859); and an *Autobiography* (2 vols., 2d ed., 1860); the same completed by the eleventh Earl and H. R. Fox Bourne (2 vols., London, 1869). He died at Kensington and was buried in Westminster Abbey. Consult: Fortescue, *Dundonald* (London, 1895); Atlay, *Trial of Lord Cochrane before Lord Ellenborough* (London, 1897); Miranda, *Memorias de Lord Cochrane* (Santiago de Chile, 1905).

COCINERO, kō'sē-nā'rō (Sp., cook). The name of various species of West Indian crévalle (q.v.).

COCK, The. A primitive tavern or alehouse on Fleet Street, near Temple Bar, London, with decorations of the period of James I. It is a famous resort and is well known through Tennyson's "Will Waterproof's Lyrical Monologue." The same name was borne by several other London taverns, of which one on Threadneedle Street was especially renowned.

COCKADE' (Fr. *cocarde* or *coquarde*, from *coq*, cock). A word first found in the works of Rabelais, "*bonnet à la coquarde*," and in the early part of the seventeenth century used to designate a cocked hat or cap set jauntily on the head. Later on, however, it acquired a more restricted meaning and was applied to the clasp or knot of ribbon which decorated the loop or cock of the hat. The word is now employed to designate a rosette or knot of ribbon, leather, or other material worn on the hat as a badge or ornament. Cockades have always been used as party badges and insignia since the War of the Spanish Succession, when the red and white cockade was adopted by the French. In England the Stuart cockade was white, the Hanoverian was black, and frequent references to the rival colors are to be met with in the literature of the time. As early as 1767 a regulation in France provided that every French soldier should "mount the cockade," the color being white; and a later decree, in 1782, restricted the wearing of cockades to the military. From this period till the outbreak of the French Revolution the cockade was an exclusively military emblem, and "to mount the cockade" was synonymous with becoming a soldier, both in France and England. After the meeting of the States-General of France in 1789, cockades of green were worn by the advanced party, but these soon gave way to the more popular red, white, and blue—the tricolor of the Revolution. See Tricolor.

Every nation of Europe has its own cockade. In Germany, black, yellow, and white, and black, red, and gold have been used; in Austria, black and yellow; in Russia, green and white. In England the cockades worn are always black—the old Hanoverian color; but being used, generally, as part of the livery of coachmen and footmen, they have lost all special significance. Consult Carter, "Cockades: Their History and Significance," in *Genealogical Magazine*, vol. iii (London, 1899), and Racinet, *Le costume historique* (6 vols., Paris, 1888).

COCKAIGNE, kŏk-ān'. A name given to an imaginary land of good things—of idleness, luxury, and perfect happiness. The word appears in a variety of spellings in English and French, and means the "land of abundance." In it the rivers flowed with wine, the houses were built of dainties, and cooked fowls offered themselves for eating. Its English synonym is "lubberland." It is the subject of a popular satirical poem of the thirteenth century, *The Land of Cockaigne*, and is a burlesque term applied to London and to Paris.

COCK AND THE FOX, The. A modernized version of Chaucer's *Nun's Priest's Tale*, made by John Dryden and published, with other translations, under the title of *Fables*, in 1699, shortly before his death.

COCK'ATEEL (from Dutch *kakatielje*, from Portug. *cacatilho*, *cacatelho*, cockatoo). A small, long-tailed Australian parrot of the genus *Calopsitta*, and the sole representative of the subfamily Calopsittacinæ. It is sometimes called "cockatoo parrakeet," or "ground parrakeet," its technical name being *Calopsittacus novæ-hollandiæ*. This pretty species is found wild over nearly the whole of Australia, where it goes about in flocks, sometimes of many hundreds, and nests in hollow trees. It is about 12 inches long, half of which belongs to the tail, which ends in two prolonged and sharply pointed feathers. The male is dark gray, with the face, cheeks, and crest bright yellow, and the ear coverts of a brick red. The wings have a wide band of white. The female is paler, and the face is only tinged with yellow. It is a favorite cage bird and thrives with but little care. If given a cage about 3 feet square and a hollow log, they are easily induced to nest, rearing 4 or 5 young at a time. A pair has been known to rear 16 young between March and September. The best food is a mixture of hemp, oats, and canary seed, with green food and fresh water. When young are in the nest, stale bread soaked in water should be provided. Consult Gould, *Birds of Australia* (London, 1865), and Seth-Smith, *Parrakeets* (London, 1903). See Cockatoo, and Plate of Parrots and Parrakeets.

COCK'ATOO' (Hind. *kākātūa*, Malay *kakatūa*, onomatopoetic from its cry). A bird of the family Cacatuidæ, of the order Psittaci (q.v.). They are closely related to the true parrots, and by some ornithologists are regarded as merely a subdivision of that family. The bill is high and curved from the base, and the tail is long, broad, and rounded. The head is also large, and in the true cockatoos is surmounted by a crest of long and pointed feathers, with their tips directed forward, which can be erected and expanded like a fan or depressed at the pleasure of the bird. The true cockatoos (*Cacatua*) are generally whitish in color, often finely tinged with red, orange, or other colors. The name "cockatoo," however, is also commonly extended to nearly allied genera, as *Calyptorhynchus* and *Microglossus*, in both of which the plumage is generally dark, and to which belong the black cockatoos of Australia and of the Indian Archipelago. The genus *Microglossus*, one of which is the great black cockatoo, or ara, of New Guinea (*Microglossus aterrimus*), the largest of all the Psittaci, is remarkable for the structure of its tongue, which is cylindrical, tubular, capable of being greatly protruded from the mouth, and terminates in a cloven, horny tip. All the cockatoos are natives of the Philippines, New Guinea, and adjacent islands, and especially of Australia and Tasmania, where they formerly abounded, and were hunted for food by the natives. They live on fruits and seeds, insect larvæ, etc. Some of them are frequently to be seen in confinement in Europe, particularly the lesser sulphur-crested cockatoo (*Cacatua galerita*), which, although of comparatively tame plumage, is a general favorite on account of its docility. None of the cockatoos learn to speak

COCKATOOS AND MACAWS

1. ROSEATE COCKATOO (Cacatuas roseicapillus).
2. WESTERN BLACK COCKATOO (Calyptorhynchus stellatus).
3. BILL OF No. 2—front view.
4. GREAT BLACK COCKATOO (Microglossus aterrimus).
5. BLUE-FRONTED MACAW (Ara nobilis).
6. GREEN-WINGED MACAW (Ara chloroptera).
7. SLENDER-BILLED COCKATOO (Licmetis nasica).

many words. Their name is derived from their cry. Compare PARROT and Colored Plate of PARROTS.

COCKBURN, kō'bûrn, SIR ALEXANDER JAMES EDMUND (1802–80), BARONET, Lord Chief Justice of England. Born Dec. 24, 1802, the son of Alexander Cockburn, who was at one time British Minister to Colombia, he was brought up on the Continent, and in 1822 entered at Trinity Hall, Cambridge, and was called to the bar in 1829. He was very successful as a practitioner and in 1841 was made a Queen's counsel. His early practice was largely in connection with election petitions, in which he won a wide reputation. In 1847 he was elected to Parliament as a Liberal from Southampton, and distinguished himself by the ardor and eloquence with which he supported the vigorous foreign policy of Palmerston. From this time on his promotion was rapid. In 1850 he was appointed Solicitor-General, and in the next year was promoted to the attorney-generalship. In 1854 he was made recorder of Bristol; in 1856 he was appointed Chief Justice of the Court of Common Pleas, and in June, 1859, he became Lord Chief Justice of England. In 1858 he succeeded to the baronetcy of his uncle, the dean of York. It fell to his lot, as a judge of the Queen's Bench, to conduct the trial of the celebrated Tichborne case (q.v.). His distinguished position as the head of the British bench was emphasized by his appointment in 1871 to represent Great Britain in the international court of arbitration convened for the settlement of the long-standing controversy between that country and the United States over the Alabama Claims (q.v.). For a sketch of his life, consult the *Law Magazine* for 1851, p. 193, and 4th series, vol. vi, p. 191; also *Law Times,* vol. xx, pp. 68–88.

COCKBURN, ALIÇIA, or ALISON RUTHERFORD (1713–94). A Scotch ballad writer. In 1731 she was married to Patrick Cockburn, of Ormiston, an advocate, and subsequently became acquainted with Burns, Hume, Lord Monboddo, and other celebrities of the day. Her lyric, "I've Seen the Smiling of Fortune Beguiling" (to the air of "The Flowers of the Forest"), has long been famous. She was one of the belles of Edinburgh, a graceful dancer, and an indefatigable letter writer. A relative of Walter Scott's mother, she all of her life sustained friendly relations with the poet and novelist. Consult her *Letters and Memorials,* with notes by T. C. Brown (London, 1900).

COCKBURN, CATHERINE (*née* TROTTER) (1679–1749). An English dramatist and philosophical writer. She wrote several plays, among which may be mentioned: *Agnes de Castro* (1696); *Fatal Friendship* (1698); *The Unhappy Penitent* (1701); *Love at a Loss* (1701). She is also known for her defense of the philosophy of Locke, and later for championing the views of Dr. Samuel Clarke. A collection of her prose works was published with a *Memoir* by Birch (London, 1751).

COCKBURN, SIR GEORGE (1772–1853). An English naval officer. His operations against Martinique brought about the surrender of that island in 1809. He was active in the war with the United States in 1812–15, planning and executing with General Ross the expeditions along the shores of Chesapeake Bay, and burning the public buildings in Washington. In the *Northumberland* he took Napoleon to St. Helena, where he remained in 1815–16 as Governor and commandant. He rose to the rank of admiral in 1837, was returned to Parliament in 1818, 1820, 1826, and 1841, and was one of the Lords of the Admiralty. William IV, when Prince of Wales and Lord High Admiral, quarreled with Cockburn over precedence, but was unsuccessful. Cockburn succeeded to the baronetcy in 1852.

COCKBURN, GEORGE RALPH RICHARDSON (1834–1912). A Canadian educator and member of Parliament. He was born in Edinburgh, Scotland, graduated at the university there in 1857, studied for several months in Germany and France, and in 1858 went to Canada, where in 1861 he became principal of Upper Canada College, which office he held for 20 years. From 1887 to 1896 he was a member of the Canadian Parliament. He was a stanch advocate of British Imperial federation. In 1893 he was chief commissioner from Canada to the World's Fair at Chicago.

COCKBURN, HENRY THOMAS, LORD (1779–1854). A Scottish advocate and judge. He was born in Edinburgh in 1779 and was educated at the high school of Edinburgh and afterward at Edinburgh University. He was called to the Scottish bar in 1800 and seven years later was appointed one of the advocates whose duty it was to assist the Lord Advocate in the prosecution of criminal offenders, but was dismissed after holding office four years. Not till the introduction of jury trial in civil causes into Scotland, in 1816, did Cockburn find opportunity for remunerative professional employment. His powers were better adapted for success with a popular than with a professional tribunal. Under the Grey ministry of 1830 he was appointed Solicitor-General for Scotland, and four years later he was made one of the judges of the Scottish supreme civil and criminal courts under the title of Lord Cockburn. He died April 26, 1854, at his residence of Bonaly, near Edinburgh.

Lord Cockburn contributed to the *Edinburgh Review* a series of articles on the reform of Scotch legal procedure, which had considerable influence. Late in life he undertook the task of writing the biography of Francis Jeffrey, the celebrated Scottish essayist and judge. This was published in 1852. Cockburn will be best remembered by the *Memorials of his Time,* which appeared posthumously in 1856. The work is an autobiography, into which have been interwoven anecdotes illustrating old Scottish life, and numerous sketches of the men who composed the brilliant circle of Edinburgh society at the beginning of the nineteenth century. For details of his life, consult also Chambers's *Biographical Dictionary of Eminent Scotsmen.*

COCKCHAFER. See CHAFER.

COCKER. A small dog. See SPANIEL.

COCK'ER, EDWARD (c.1631–75). An English engraver and teacher. He was born probably in Northamptonshire and died in London. The first edition of his famous arithmetic was published posthumously in 1678, by John Hawkins. At one time it was thought (following De Morgan's belief) that Hawkins wrote this work, but the evidence is against this view. Its popularity lasted nearly a century, and its sale probably exceeded 100 editions. The expression "according to Cocker" became proverbial through its frequent use on the title-pages of arithmetical treatises following his method. Cocker's chief works are: *Tutor to Arithmetic* (1664); *Compleat Arithmetician* (before 1669); *Arithmetic,*

edited by Hawkins (1678); and numerous contributions to methods of calligraphy.

COCKERELL, kŏk'ĕr-el, Charles Robert (1788–1863). An English architect, born in London. In 1810–17 he visited Greece, Italy, and Asia Minor to study ancient architectural remains, made excavations at Ægina and other places, and enriched the British Museum with many rare and valuable fragments, notably from the temples of Zeus Panhellenius (once so called, really of Aphaia) at Ægina and of Apollo Epicurius, near Phigaleia. He became surveyor of St. Paul's Cathedral in 1819, chief architect of the Bank of England in 1833, and a member of the Royal Academy in 1836. From 1840 to 1857 he was professor of architecture in the Royal Academy. He was the designer of many public buildings, such as the Hanover Chapel in London, and the Taylor Buildings at Oxford. His works include: *The Temple of Jupiter Olympius at Agrigentum* (1830); *Ancient Sculptures in Lincoln Cathedral* (1848); *Iconography of the West Front of Wells Cathedral* (1851); and *Travels in Southern Europe and the Levant* (1903), edited by his son.

COCKERELL, Theodore Dru Alison (1866–). An American zoölogist, born at Norwood, England. He was educated at the Middlesex Hospital Medical School, and studied botany in the field in Colorado in 1887–90. Between 1891 and 1901 he was curator of the public museum of Kingston, Jamaica, professor of entomology at the New Mexico Agricultural College, and entomologist of the New Mexico Agricultural Experiment Station. In 1900–03 he was an instructor in biology at the New Mexico Normal University; in 1903–04, curator of the Colorado College Museum; and in 1904 he became lecturer on entomology, and in 1906 professor of systematic zoölogy, at the University of Colorado. Cockerell is author of more than 2200 articles in scientific publications, especially on the Coccidæ, Hymenoptera, and Mollusca, and on paleontology and various phases of evolution. His later writings include: *Some Bees of the Genus Augochlora from West Indies* (1910); *The Scales of the Mormyrid Fishes* (1910); *Observations on Fish Scales* (1913); *Some Fossil Insects from Florissant, Colorado* (1913).

COCKERILL, kŏk'ĕr-il, John (1790–1840). An English manufacturer, born at Haslingden. With his brother, Charles, he established in Berlin a successful woolen factory, and subsequently at Seraing, near Liége, Belgium, an iron foundry and machine shop, which became the largest on the Continent. King William I of the Netherlands was for a time a partner in this business.

COCK'ERMOUTH, -mŭth. A town of Cumberland, England, at the confluence of the Cocker and Derwent, 25 miles southwest of Carlisle (Map: England, C 2). It is situated in an agricultural district, and in the vicinity are extensive coal mines. On the left bank of the Cocker are the ruins of a castle built in the eleventh century and destroyed by the Parliamentarians in 1648. Near by is a tumulus, with a Roman camp and fort, where many ancient relics have been found. The town was the birthplace of the poet Wordsworth. It has woolen and flax mills and manufactures hats, paper, hosiery, leather, and machinery. Pop., 1901, 5355; 1911, 5203.

COCKFIGHTING. This is a sport of great antiquity, and to-day is the great pastime of millions, in the place of its origin, the Far Orient, as well as a favorite sport in many Western nations, including practically all Latin America. It is noted in the earliest records of China, it was a common pastime of the Persians long before the Greek invasion, it existed in ancient Rome, and Fitzstephen vouches for it in England in the twelfth century. Cockpits existed in the metropolis of England (as they did in New York) well into the nineteenth century.

The origin of the breed of gamecocks is lost in an obscurity as dim as that of the origin of the sport. The jungle cock of India may have been its progenitor; he has the constitutional instinct of fighting highly developed. The gamecock needs neither education nor experience to teach him to fight, and his capacity for giving and taking punishment till dead has passed into a proverb. During the latter half of the nineteenth century the sport of cockfighting was made illegal throughout Great Britain. In America it is similarly prohibited in nearly all the States of the Union, either expressly or by laws for the prevention of cruelty to animals. In a few Southern States, where it is not forbidden by the statutes of the State, it is in some instances made illegal by local laws. Generally it is considered a brutal and brutalizing performance.

For early history, consult: Markham, *The Pleasures of Princes, or Goodmen's Recreations* (London, 1614); Fairfax, *Complete Sportsman* (ib., 1764); Blain, *Rural Sports* (ib., 1853).

COCK LANE GHOST, The. A supposed ghost, whose manifestations occurred in 1762 in Cock Lane, London, in connection with a young girl named Parsons and her parents. Investigation disclosed a conspiracy against a former resident, Mr. Kent, whose wife had died, and who was supposed to be accused by her ghost of murder. Parsons and his wife were punished. Among the investigators was Dr. Johnson, who described the mysterious occurrences in the *Gentleman's Magazine*, and who, because of his connection with the matter, was made the object of attack in Churchill's poem, "The Ghost." Consult Lang, *Cock Lane and Common Sense* (London, 1894).

COCKLE, kŏk'l (Fr. *coquille*, shell, from Gk. κογχύλιον, *konchylion*, dim. of κογχύλη, *konchylē*, from κόνχη, *konchē*, shell, Lat. *concha*, Skt. *śankha*, shell), *Lychnis.* A genus of plants of the family Caryophyllaceæ. The common cockle or corn cockle (*Agrostemma githago*) is a frequent weed among crops of grain, a native of Europe or the west of Asia, but now to be found in almost all parts of the world. (For illustration, see Plate of Cranberry.) It is an annual plant, clothed with long, white, appressed hairs; 3 feet high, branched, with large, solitary, terminal reddish-purple flowers. The root, stem, leaves, and seed were formerly used in medicine; the seed, which are poisonous, are still sometimes sold in Germany under the name of "black cumin" (falscher Schwartz-kümmel). The corn cockle is a very troublesome weed in some parts of Great Britain and the United States. The seed can hardly be screened from wheat, and in some localities millers reduce the grade of grain on account of the presence of cockle. Sowing clean seed is about the only means of combating it, aside from pulling the plants from the field. See Lychnis.

COCKLE. A globose marine bivalved mollusk, especially of the family Cardiidæ, often called "heart cockle" because, viewed endwise, the outline of the shell is like that of the ace of

hearts. Cockles are usually gregarious, and vast numbers are found half buried on sandy and muddy banks. The common European cockle (*Cardium edule*) is a valuable shellfish, extensively sold in Great Britain; other species are less commonly eaten elsewhere. The number of known species is great; they are most numerous within the tropics, and particularly in the Indian Ocean, where some have shells very beautiful in sculpture and coloring. The shell upon which Venus is represented, in ancient art, as riding upon the sea is a cockle; and several other genera, such as *Venus*, *Cytherea*, *Selene*, etc., are named in reference to this myth. Consult Lovell, *Edible Mollusks of Great Britain, etc.* (London, 1884); and see Colored Plate of CLAMS AND EDIBLE MUSSELS.

COCK'LEBUR', or CLOTBUR. A name given to the species of *Xanthium*, a genus of Compositæ, of which there are but few species, but these are widely distributed. Several species are all too common in the United States—*Xanthium spinosum* (called spiny clotbur) and *Xanthium strumarium*, both of which were probably introduced from the Old World, and the native species, *Xanthium canadense*, *Xanthium commune*, *Xanthium speciosum*, and *Xanthium echinatum*. (For illustration, see Plate of CORNFLOWER.) They are coarse, annual, branching plants, 1 to 3 feet high, with alternate, rough, heart-shaped leaves. The stem is frequently spotted with brown or purple. The flowers are in separate groups, the female ones furnishing the well-known burs, which are about an inch long and covered with stout, hooked prickles. These are troublesome to animals, especially to sheep, the wool of which is often seriously depreciated by their presence. The seeds contain two cells with an ovule in each. These retain their vitality for a long time, and both do not germinate in the same season. Being an annual, this weed can be exterminated if it be prevented from seeding for a number of years. In the south of Africa stringent laws for its eradication were enacted on account of the injury to the wool industry.

COCK'LOFT', PINDAR. The nom de plume used by Washington Irving in *Salmagundi*.

COCK'NEY. A word of disputed origin, used as a general term for a Londoner, more specifically for one "born within the sound of Bow Bells." It has been connected with cocagne, or cockaigne, and with the Thames, which is said to have been called "the Cockney."

The earliest form of the word is *cockenay*, i.e., 'cock's eggs,' a name given the inhabitants of towns on account of their ignorance of country ways and objects. It was not till the seventeenth century that the word began to be confined to the inhabitants of London. For a full historical explanation of the various uses of the word, consult Sir James Murray's *New English Dictionary*.

COCKNEY SCHOOL OF POETRY. A nickname which John Gibson Lockhart tried to fasten upon a school of writers, including Leigh Hunt, Keats, and Hazlitt, whom he thought vulgar. Their productions were said "to consist of the most incongruous ideas in the most uncouth language." Consult the articles "On the Cockney School," in *Blackwood's Magazine* (Edinburgh, October and November, 1817), where the expression was first used; also the article on Keats's "Endymion," in *Quarterly Review* (London, April, 1818).

COCK OF THE PLAINS. See GROUSE.

COCK OF THE ROCK (so called from building its nest on rocks). A remarkable bird of northern South America, representing a subfamily (Rupicolinæ) of the cotingas, three forms of which are known. The most familiar is *Rupicola rupicola*, or *crocea*, inhabiting the lower Amazon valley; it is about the size of a large pigeon, almost purely orange in plumage, and has a remarkable flat-sided crest. Two other species are found higher up the Amazon and in Ecuador. In each case the female is dull olive brown and uncrested. They inhabit rocky water courses and bushy hillsides, where they remain close to the ground and build their nests, largely of mud, on some rock. They are among the birds which court the females by assembling for "dances" in certain cleared spaces, each displaying its showy plumage by queer antics until chosen by some observant hen.

Great numbers of these splendid birds are shot annually, as their skins not only command a high price for millinery purposes, but are much employed by the Indians in making a variety of beautiful decorations, and they are thus becoming rare. A large state mantle, formerly worn by the Emperor of Brazil, was entirely composed of their feathers; and in some districts of South America, it is said, the natives are, or were, compelled to bring a certain supply of skins as tribute. Their flesh is well flavored, but of a very peculiar color, being bright orange red. The cock of the rock is much valued by residents of the Amazon valley as a cage bird, but does not thrive for any length of time when taken to foreign countries. Consult Hudson, *A Naturalist in the La Plata* (London, 1892). See Plate of COTINGAS.

COCK OF THE WOODS. See CAPERCAILLIE.

COCKPIT. In old sailing men-of-war the apartment in which the wounded were placed during the engagement. It was ordinarily below the water line on the orlop deck and served, under ordinary circumstances, as a broad passageway to the storerooms on each side of it. At one time the warrant officers were quartered in the forward cockpit, and occasionally other officers, for whom there was no room on the decks above, were quartered in staterooms opening from the after one, where storerooms were ordinarily placed.

COCKPIT, THE. A London theatre of the seventeenth century, changed from a cockpit, on Cockpit Alley, the present Pitt Place. It was succeeded by the Phœnix Theatre, which in turn was replaced by the Drury Lane Theatre.

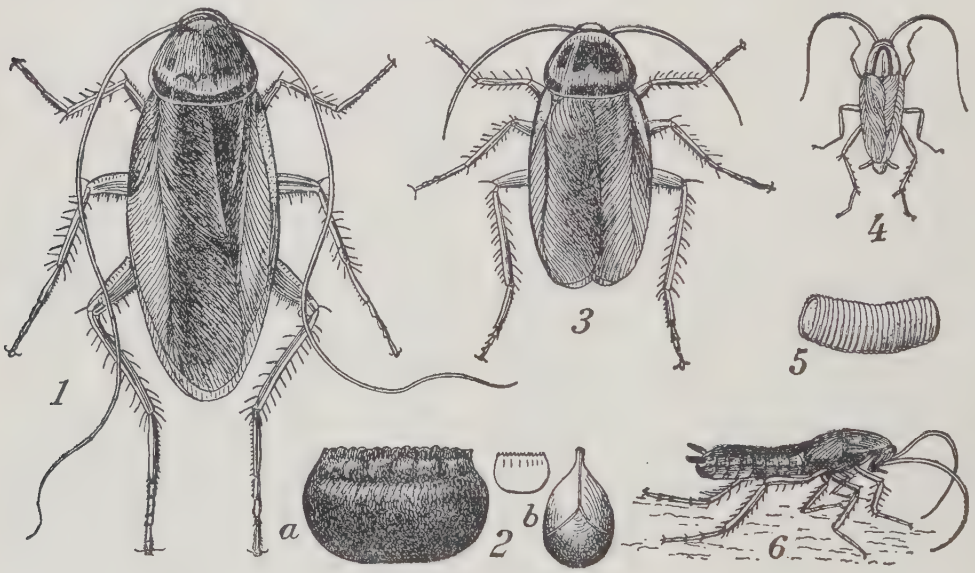
COCKRAN, kŏk'ran (WILLIAM), BOURKE (1854–1923). An American lawyer and politician. He was born in Ireland, was educated in that country and in France, shortly after his arrival in the United States, in 1871, was appointed teacher in a private academy, and subsequently became principal of a public school in Westchester Co., N. Y. He studied law at the same time and was admitted to the bar in 1876. He was elected to Congress in 1886 and again in 1890; opposed the nomination of Cleveland for the presidency in 1892; in 1896 supported McKinley; and in 1900 advocated the election of Bryan. He was again elected to Congress at a special election in February, 1904, to succeed George B. McClellan, and was re-elected in November of the same year for the term of 1905–07.

COCK'RELL, FRANCIS MARION (1834–1915)

An American lawyer and politician, born in Johnson Co., Mo. He graduated at Chapel Hill College in 1853 and practiced law at Warrensburg, Mo. During the Civil War he served in the Confederate army, rising to the rank of brigadier general. He was a Democratic Senator from Missouri from 1875 to 1905. From the latter year until 1910 he was a member of the Interstate Commerce Commission, and in 1911 he was United States Commissioner to reëstablish the boundary between Texas and New Mexico.

COCK'ROACH, or ROACH. An orthopterous insect of the family Blattidæ, several species of which are household pests throughout the civilized world. Those most common are: 1. The Croton bug (*Ectobia germanica*), so called from its becoming noticeable in New York when Croton water was introduced, but really of foreign origin and of cosmopolitan range, having followed civilized man to all parts of the globe; it is of medium size, brown or yellowish, with wings, in the adult, extending beyond the abdomen. 2. The Oriental or proper cockroach (*Periplaneta orientalis*) is also a widely distributed pest introduced from the East. Although it is not at all related to the beetles (*Coleoptera*), its British name "black beetle" well describes its dark, shining, robust appearance; its wings are characteristically shorter than the abdomen. 3. The American cockroach (*Periplaneta americana*) probably originated in tropical America, whence it long ago spread to most of the seaport cities of the world; it is large and reddish brown, with very long wings. 4. The Australian cockroach (*Periplaneta australasiæ*), much like the American but smaller. In addition to these, which frequent houses, bakeries, warehouses, and shipping, there are a large number of wood cockroaches but rarely seen.

Roaches as a group prefer warm, moist places. They go abroad mainly at night and thus often escape notice even where they are abundant; and their excessively flattened body permits them to creep into very narrow crevices—below baseboards, in table drawers, etc., where the eggs ("nits") are laid, surrounded by a peculiar "pod"; but they are often carried by the female until nearly ready to hatch. The new-born young have nearly the same shape as the adult, but are wingless and pale in color. They are practically omnivorous, injuring all kinds of provisions, eating parts of books, blackened boots, and even the nails and eyelashes of sleeping children. The loss caused to provisions by their appetite is far surpassed by the remaining food being rendered unfit for human use, on account of the nauseous "roachy" odor noticed wherever they congregate in large numbers.



COCKROACHES INFESTING HOUSES.

1. The American cockroach (*Periplaneta americana*). 2. Egg capsule or "pod" of the same (somewhat enlarged); *a*, side view; *b*, end view; the dotted figure shows the natural size. 3. Australian roach (*Periplaneta australasiæ*); natural size. 4. Croton bug, or German roach (*Ectobia germanica*); natural size. 5. Its egg capsule; double size. 6. Oriental cockroach, or "black beetle" (*Periplaneta orientalis*); natural size.

Their only claim to credit is that they serve as scavengers to a small degree and are the enemies of bedbugs.

Consult: for extended illustrated accounts of species above mentioned, Marlatt, *Household Insects* (Department of Agriculture, Washington, 1896; revised reprint, 1902); for general account of the Blattidæ, De Saussure, *Mélanges Orthoptérologiques*, fascicule ii (Geneva, 1878); for structure, Carpenter, *Insects: Their Structure and Life* (London, 1899).

Fossil Forms. During the latter part of the Paleozoic era cockroaches seem to have been very abundant, and to have formed the dominant feature of the insect life of that time. Their remains are present, though much less abundantly, in the Triassic rocks also, and some have been found in the Tertiary. The total number of fossil species is about 225, of which number 193 species are Paleozoic, and of these 133 are American. The Paleozoic cockroaches are as a rule larger, and have broader bodies than do the modern species. Their wings are quite common in the shales of the Coal Measures and Permian

at several localities, such as Richmond, Ohio; Cassville, W. Va.; Mazon Creek, Ill.; and Commentry, France. At a few localities the larval forms (nymphs) have been found and described under the generic name *Dipeltis*. The cockroach wings of the Coal Measures are usually found in shales that are replete with the leaves of ferns. One of the commonest ferns is Neuropteris, and the insect's wings so closely resemble the leaflets of this fern that the likeness has been remarked upon and explained as a case of protective mimicry, adopted by the insect to enable it to elude its pursuers by hiding among the fallen fern leaves.

For a full history of these insects, with recommendations for their suppression as a pest, consult: Howard and Marlatt, "Principal Household Insects of the United States," in *United States Department of Agriculture, Division of Entomology, Bulletin 4*, N. S. (Washington, 1896); also Miall and Denny, *The Structure and Life History of the Cockroach* (London, 1887); Marlatt, *Cockroaches*, publication of United States Department of Agriculture (Washington, 1908).

COCKS, Richard. A grocer and merchant adventurer of Coventry, England. He was one of the charter members of the East India Company (1600), merchant at Bayonne, France (1603–08), and one of the seven Englishmen who accompanied Capt. John Saris to Japan, on the first voyage of Englishmen thither. He established the British factory on the island of Hirado in 1613, and began June 1, 1615, to keep a journal, which is now of the greatest value as a contribution to the history of Japan and the foreigners there during the first quarter of the century, and as a picture of manners and customs. The *Diary* ends March 24, 1622. The great hope of the English was to open commerce with China, but they could not successfully compete with the Dutch, who understood them, and in the end starved them out of the country. In April, 1623, the dissolution of the English factory was decided upon, and Cocks and the other Englishmen arrived at Batavia, Jan. 27, 1624. Cocks made many travels through Japan, even to Yedo, meeting Iyeyasu and many native notables and the Korean Embassy. He introduced white potatoes into Japan from Java, and "Java potato" is still the name applied to this tuber by the Japanese. The diary of Richard Cocks, carefully edited and annotated by Edward Maunde Thompson, with introduction and index, was published in two handsome volumes by the Hakluyt Society (London, 1883).

COCKS'COMB' (from its crest, resembling the comb of a cock), *Celosia cristata*. An annual plant of the natural order Amarantaceæ, a native of the tropics, and formerly much grown in greenhouses and gardens. It grows with an upright stem, which becomes flattened upward, divides, expands, and forms a sort of wavy crest, covered with pointed bracts, and bearing on its surface many very small flowers. There are both tall and dwarf forms, and a number of colors of each. The plant is of easy cultivation. See Amaranth.

COCK'SFOOT GRASS. See Orchard Grass.

COCKSPUR GRASS. See Bur Grass.

COCKSPUR THORN. See Cratægus.

COCKSWAIN. See Coxswain.

COCK'TON, Henry (1807–53). An English humorous novelist, born in London. His works, of which *Valentine Vox, the Ventriloquist* (1840), is the best, were very successful in their day. *Stanley Thorne* was illustrated by so distinguished a trio as George Cruickshank, Alfred Crowquill, and John Leech. He also wrote *Sylvester Sound* (1844); *The Sisters* (1844); *The Love Match* (1847).

COCLES, kō'klēz, Horatius, "the one-eyed." A hero of ancient Rome. Aided by Lartius and Herminius, he defended the Sublician Bridge, on the Etruscan side, against a great army under Lars Porsena (q.v.), keeping the enemy at bay until the Romans behind them destroyed the bridge. When the bridge was about to fall, Cocles sent his two companions back; when it had fallen, sheathing his sword and praying the river to favor him, he plunged in and swam safely to the Roman shore. He received for reward as much land as he could plow in a day, and a statue in the Comitium. Consult Macaulay, *Lays of Ancient Rome*.

COCOA, kō'kō. See Cacao.

COCOA, Brazilian. See Guarana.

COCOA BUTTER. A pure white solid fat, obtained from the seeds of *Theobroma cacao*, in the process of working them up into cacao, having a specific gravity of .96 to .97 at 15° C. It is used in cosmetics and other pharmaceutical preparations, and in the manufacture of confectionery. Substitutes for cocoa butter are made from the solid fats obtained from palm-nut or coconut oils. See Cacao; Oils.

COCOANUT. See Coconut.

COCOA PLUM. An edible drupaceous fruit growing on a shrub (*Chrysobalanus icaco*) of the family Rosaceæ, in Florida and the West Indies. It is yellow, purple, or black, and is much like a large plum in appearance. The skin is thin, and the sweet white pulp adheres firmly to the stone.

COCOA ROOT. See Cocco.

COCOA-TREE CLUB, The. A London club, developed about the middle of the eighteenth century from the Tory Cocoa-Tree Chocolate House, which flourished during the reign of Queen Anne. It was a gathering place of Jacobites, and was frequented by many leading men of the day.

COCONU'CAN. A linguistic stock of South American Indians (its chief tribes are the Coconucos, Totoros, Moguex, and Guanacos), living on the west side of the central Cordillera, south of the Paniquitan, in the region of Popayan, in southern Columbia. Rivet attaches the Coconucan to the Chibchan stock. Several Coconucan tribes seemed to have participated before the Conquest in the more or less rude civilization of this part of South America. Consult Beaucleat and Rivet's *Affin. des langues du Sud de la Colombie, etc.* (Louvain, 1910).

CO'CONUT', or **CO'COANUT'** (Fr. *coco*, Gk. κοῦκι, *kouki*, cocoa tree, from anc. Egypt. *kuku*, cocoa tree). The well-known fruit of a species of palm (*Cocos nucifera*), perhaps originally a native of the Indian coasts and South Sea islands, although there is evidence of its prehistoric occurrence on the west coast of Central and South America. (For illustration, see Plate of Palms.) It is now diffused over all tropical regions. The coconut palm belongs to a genus having pinnate leaves, and staminate and pistillate flowers on the same tree, the latter flowers at the base of each spadix. There are about 35 known species, nearly all of which are natives of South America. Many of the species prefer dry and somewhat elevated districts. The

coconut palm, on the contrary, is seldom found at any considerable distance from the seacoast, except where it has been introduced by man, and generally succeeds best in sandy soil near the sea. It is always one of the first of the larger plants to establish itself in the low islands of the Pacific Ocean, as soon as there is soil enough. It has a cylindrical stem, about a foot in diameter, and from 60 to 100 feet high, with many rings marking the place of former leaves, and bearing at its summit a crown of from 16 to 20 leaves, which generally curve downward, and are from 12 to 20 feet in length, with numerous leaflets, 2 to 3 feet long. The flowers proceed from within a large pointed spathe; the fruit grows in short racemes, which bear, in favorable situations, from 5 to 15 nuts; and 10 or 12 of these racemes in different stages may be seen at once on a tree, about 80 or 100 nuts being its ordinary annual yield. The tree bears fruit in from 4 to 8 years from the time of planting, and continues productive for 70 or 80 years. Of the three round, black scars at one end of the shell, the largest one through which an opening is commonly made to get out the *milk* is the destined outlet of the germinating embryo, which is situated there, the kernel consisting generally of the endosperm destined for its nourishment. The thick husk is remarkably adapted to the preservation of the seed, while the nut is tossed about by the waves, until it reaches some shore far distant from that on which it grew.

The coconut affords to the inhabitants of many tropical coasts and islands a great part of their food; it is not only eaten as it comes from the tree, both ripe and unripe, being filled in a young state with a pleasant, milky fluid, but is also prepared in a variety of ways, as in curries, etc.

The kernel of the coconut contains more than 70 per cent of a fixed oil, called coconut oil, or coconut butter. The oil is itself an important article of commerce, being much employed for the manufacture of "stearin candles," and also of a "marine soap" which forms a lather with sea water. It is also employed as an article of food, so long as it remains free from rancidity—to which, however, it is very liable. It is obtained by pressure of the bruised kernel, or by boiling over a slow fire, and skimming off the oil as it floats on the surface. A quart, it is said, may be obtained from seven or eight coconuts. It is liquid at the ordinary temperature of tropical countries, but in colder climates becomes a white, solid, butter-like oil. It becomes liquid about 74° F. It can be separated by compression into a liquid portion called "olein," and a more solid part termed "stearin," or "cocosin," which is of complex constitution. The cake resulting from the pressure of the endosperm for its oil is an important cattle food. The dried kernel, known as copra, forms an important article of export from the South Sea islands, etc.

The root of the coconut palm possesses narcotic properties, and is sometimes chewed instead of the areca nut. When the stem is young, its central part is sweet and edible; but when old, this is a mass of hard fibre. The terminal bud (palm cabbage) is esteemed a delicacy, and trees are often cut down for the sake of it. The saccharine sap of the flower spathes before they open is a source of toddy and palm wine, and by distillation the liquor arrack. In the East Indies the juice is often boiled down to yield sugar (jaggery).

The dried leaves of the coconut palm are much used for thatch, and for many other purposes, as the making of mats, screens, baskets, etc., by plaiting the leaflets. The midribs of the leaves supply the natives of tropical coasts with oars. The wood of the lower part of the stem is very hard, takes a beautiful polish, and is employed for a great variety of purposes under the name of porcupine wood. The fibrous centre of old stems is made into cordage. By far the most important fibrous product of the coconut tree is coir (q.v.), the fibre of the husk of the somewhat immature nut. If the nuts are allowed to ripen, the coir is coarser and more brittle. The husk of the ripe nut is used for fuel, and also, when cut across, for polishing furniture, scrubbing floors, etc. The shell of the coconut is made into cups, goblets, ladles, etc., and is often finely polished and elaborately ornamented by carving.

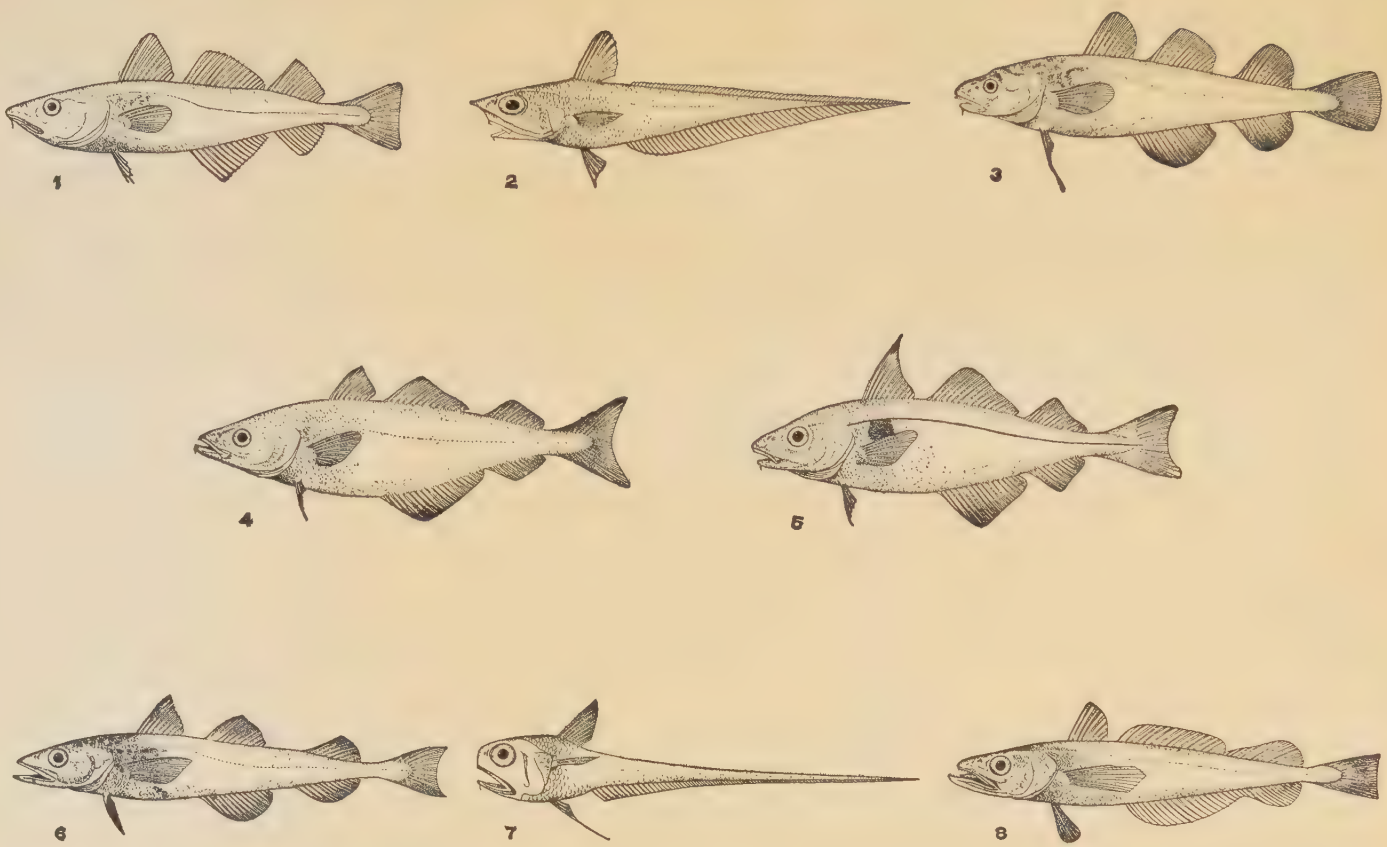
Cocos butyracea, one of the South American species of this genus, is a very large tree, and its nut abounds in an oil and butter of similar quality to that obtained from the coconut. The double coconut of the Seychelles Islands is the fruit of a palm of a different genus (*Lodoicea callipyge*). *Cocos weddelliana* is the species most commonly cultivated in greenhouses and in the open as an ornamental. For illustration, see PALM.

COCONUT, or ROBBER, CRAB. A large terrestrial macrurous crab (*Birgus latro*), of the East Indies, which feeds on coconuts. Although allied to the hermit, it has the abdomen symmetrical and covered above, with a series of horny plates, so that it requires no borrowed shell or other artificial protection. It is found in the islands of the Indian and South Pacific oceans, and may reach a size larger than that of any other land crab, enabling it to handle the largest nuts; and Forbes says that "one of its pincer claws is developed into an organ of extraordinary power, capable, when the creature is enraged, of breaking a man's arm." Its flesh is edible. It digs and inhabits burrows and long tunnels, lined with fibres stripped from coconuts. In these it lurks during the day, going abroad, as a rule, only at night. It feeds mainly upon fallen coconuts, not gathering them from the trees, as has been asserted, although it often climbs into the palms. "To get at the contents of the nut, the crab first tears away the fibre overlying the three 'eyes,' and then hammers away with its claws at the latter until a hole is made, when it extracts the kernel by means of its smaller pincers." This crab has its gills so modified as to function as lungs. It occasionally visits the water, and periodically resorts to the sea to spawn, where the young pass through their developmental stages in the water like other crabs. Several species are known. Consult Darwin, *A Naturalist's Voyage* (London, 1860), and Forbes, *A Naturalist's Wanderings in the Eastern Archipelago* (New York, 1885). See Plate of CRABS.

COCOON' (from Fr. *cocon*, dim. of *coque*, shell, from Lat. *concha*, shell). The pupa case of an insect. See INSECT; BUTTERFLIES AND MOTHS; ANT.

COCO'PA. An agricultural tribe, of Yuman stock, formerly holding the country about the mouth of the Colorado River and the head of the Gulf of California, in Mexico, and sometimes

CODFISH AND ALLIES



1. CODFISH (Gadus callarias).
2. A PELAGIC GADOID (Cœlorhynchus carminatus).
3. TOMCOD (Microgadus tomcod).
4. POLLOCK (Pollachius carbonarius).
5. HADDOCK (Melanogrammus æglifinus).
6. ALASKAN POLLOCK (Theragra chalcogramma).
7. A MACRURID (Hymenocephalus cavernosus).
8. SILVER HAKE (Merluccius productus).

ranging northward into Arizona. They still number about 245, but are rapidly wasting away from contact with civilization. They are now confined to a reservation near the mouth of the Colorado.

CO'CO RIVER. See SEGOVIA.

COCOS ISLANDS. See KEELING ISLANDS.

COCX, GONZALES. See COQUES, GONZALES.

COCY'TUS (Lat., from Gk. Κωκυτός, *Kōkytos*, river of wailing, from κωκύειν, *kōkyein*, to wail). A tributary of the Acheron in Epirus, now called Βωβός, *Bōbos* (Vuvo). Cocytus was also the name of a river of the infernal regions.

COD (origin obscure; possibly from *cod*, shell, husk, or from Flem. *kodde*, club, from the rounded shape of the fish). A fish (*Gadus callarias*) of the family Gadidæ, which almost rivals the herring in its importance to mankind. The body is elongate, slightly compressed, and tapers towards the tail, so that with the rather large head it appears heavy anteriorly. The body is covered with small scales. There are three dorsal and two anal fins. From the end of the lower jaw hangs a well-developed barbel. The general color varies greatly, being greenish, brownish, or even yellowish and reddish. The back and sides have numerous round, reddish-brown spots. The fins are dark. It will attain a weight of four to five pounds in about three years, and may ultimately reach a weight of 150 to 200 pounds, but the usual weight of large specimens is from 15 to 30 pounds.

The home of this fish is in the shallower parts of northern seas. "The southern limit of the species," on the American side of the Atlantic, according to Goode, "may safely be considered to be Cape Hatteras, in lat. 35° 10′. Along the coast of the Middle States, New England, and British North America, and upon all the offshore banks of this region, cod are usually found in great abundance during part of the year at least, . . . and it is more than probable that they occur in the waters of the Arctic Sea to the north of the American continent." It no doubt extends around the northern shore of the continent to Bering Strait, and thence into the North Pacific, for the cod of the coastal waters and shallows off Alaska, Siberia, and thence down to Vancouver Island and Japan are the same in appearance and habits, and probably specifically identical. On the European side of the Atlantic it frequents the Scandinavian and Spitzbergen coasts, the North Sea, and the waters about Great Britain and Iceland. Its favorite haunts are the ocean banks, down to about 120 fathoms, but it frequently approaches close to the coast, enters bays, and ascends the estuaries of large rivers. It is a powerful swimmer, predatory, having strong teeth upon the vomer, and is one of the most voracious denizens of the sea. It eats anything and everything it can, capturing other fishes, squids, etc., in large numbers, and devouring great quantities of deep-sea clams, which it swallows whole. The stomachs of cods have supplied to conchologists great numbers of rare shells, and before the days of deep dredging many conchological specimens were obtainable only in this way.

These fish are very prolific, 9,000,000 eggs having been taken from a single female weighing 75 pounds. The spawning season lasts from October to April, but the eggs of any given female do not all ripen at once. "Impelled by the spawning instinct, the cods seek the shoal waters of the coast or banks in shoals consisting of both sexes." Here the eggs are extruded, float to the surface, and toss about until they hatch, and the fry escape to become the prey of innumerable foes. It appears, however, that many (some say most) cod void their eggs in deep water, whence they rise and drift towards the shore. The destruction of eggs and young through various agencies must be very large; since, in spite of the enormous numbers produced, comparatively few reach maturity, so that the number of cod is limited, and liable to be materially reduced by persistent fishing. This diminution began to be felt, in fact, long ago, the cod almost disappearing from easily accessible inshore resorts, so that the fishermen have been obliged to go to the more distant oceanic banks. To compensate for this loss, the species has long been extensively propagated, both in Europe and America, more than 100,000,000 fry having been hatched and planted during the year 1897 alone by the United States Fish Commission. For the methods and results of these efforts, see FISH CULTURE; for the methods, extent, and value of the products of cod fishing, see FISHERIES; and for portraits of imported species, see Plate of CODFISH AND ALLIES.

Several other species, important as food, belong to this family, such as tomcod, haddock, ling, etc., which are elsewhere described. The "codfish" of the San Francisco markets, however, is an entirely different fish, a chirid (*Ophiodon elongatus*), for which see CULTUS COD.

For the most complete history of the cod family, consult G. Browne Goode, in *Fisheries and Fishery Industries of the United States*, Tenth Census (Washington, 1884), in which other books are mentioned; also Kendall, *Notes on the Food of Four Species of the Cod Family*, United States Fisheries Bureau (Washington, 1897); Smith, *Notes on the Tagging of Four Thousand Cod* (Washington, 1902); Bowers, *Artificial Propagation of Marine Species* (Washington, 1904); Bitting, *Preparation of the Cod and Other Salt Fish for the Market*, Government Publication (Washington, 1911). See COD-LIVER OIL.

COD, CAPE. See CAPE COD.

CO'DA (It., tail, end). The concluding passage of a musical composition. Originally a single phrase for ending a canon, it was used by the classical masters for the purpose of securing an effective close. Beethoven was the first to recognize the unlimited possibilities of the coda for the purpose of building up tremendous climaxes, thus raising it to the place of an essential factor in his architectonic scheme —a place which it has subsequently maintained in the works of later masters.

CODAZZI, kō-dät'sē, AGOSTINO (1792–1859). An Italian traveler, engineer, and geographer, born at Lugo, near Ferrara. He entered the army as a volunteer, and afterward set up as a merchant at Constantinople, whence he made extensive journeys through Europe. In 1817 he went to the United States. He served in the Venezuelan Revolutionary army, and later entered the Colombian service, in which he rose in 1826 to be a lieutenant colonel. From 1831 to 1838 he prepared maps of the State of Venezuela, being compelled, for the purpose of topographical surveys, to explore the deserts of Guiana, and to penetrate nearly to the sources of the Orinoco. The results of this undertaking

he published in Paris in 1841, under the title *Resumen de la geografía de Venezuela* (with an atlas). He subsequently made surveys of the Isthmus of Panama, with reference to the possibility of an interoceanic ship canal.

CODDE, kŏd'de, PIETER (c.1598–1678). A Dutch genre painter, born in Amsterdam. He is reputed to have been a pupil of Frans Hals, and was chosen to complete the latter's picture of the "Marksmen's Guild" in Amsterdam. He painted a few historical compositions, but most of his subjects are guardroom scenes, like those at The Hague and Dresden, or groups of people drinking, singing, and dancing, as "The Ball" (1633, Vienna), "The Dinner Party" (Emden), and others in Brussels, Berlin, Dresden, and Schwerin. His execution is spirited, his color finely shaded and of a silvery or golden-brown tone, and his treatment of costume is especially good. It is only recently that his works have been clearly identified and their value understood.

COD'DINGTON, WILLIAM (1601–78). One of the founders, and the first Governor, of the Colony of Rhode Island. He was born in Boston, Lincolnshire, England; came to Plymouth Colony in 1630 with a commission as magistrate, landed at Salem, and was for some time a trader in Boston. He undertook the defense of Anne Hutchinson, and opposed similar persecution in other cases, but without success. In 1638, with 18 others, he removed to the island of Aquidneck (later Rhode Island), and founded a colony which was to be "judged and guided by the laws of Christ." Coddington was elected Governor in 1640, and held the office until the Colony was incorporated in the charter with Providence Plantations in 1647. He went to England in 1649, and two years later obtained a commission to govern Aquidneck and Conanicut for life. His opponents in the Colony, through Roger Williams and John Clark, succeeded in having this revoked (1652); but Coddington did not finally submit until 1655. He became a Quaker in 1666, and from 1674 until his death was again in office as Governor. He left a work entitled *Demonstration of True Love unto the Rulers of Massachusetts* (1674). Consult "William Coddington in Rhode Island Colonial Affairs," No. 4 of the *Rhode Island Historical Tracts* (Providence, 1878).

CODE (from Lat. *caudex* or *codex*, trunk of a tree, tablet for writing). The word *code* is often loosely employed to describe: 1. A set of rules of any sort, as when we speak of the moral code or of the code of honor. 2. Any compilation of legal rules, from a collection of early customs like the Twelve Tables of Ancient Rome down to the building laws of a modern municipality.

As a modern legal term, the word *code* (Fr. *code*, It. *codice*, Sp. *código*, Ger. *Gesetzbuch*) may be defined as an orderly presentation, in statutory form, of some distinct branch or fairly extensive portion of the law. On the continent of Europe and in Latin America there are regularly in each State (1) a civil code, setting forth the law of persons, domestic relations, property, obligations, and succession; (2) a commercial code; (3) a penal, or criminal, code; (4) a code of civil procedure; and (5) a code of criminal procedure. Systematic arrangements of other and less extensive portions of the law, resembling the English Consolidation Acts, are sometimes termed codes, but more commonly laws. For European and Latin-American civil codes, see paragraph VIII of the subtitle *History*, in the article CIVIL LAW.

In Great Britain, the statutes of the realm have been revised by eliminating obsolete and repealed enactments (Revised Statutes, 1870, 1885); and statutes relating to certain subjects have been brought together in consolidation acts, of which, perhaps, the most important are the statute law revision and civil procedure acts of 1881 and 1883; but the only important acts in which the statutory and common-law rules relating to a given subject have been combined, and which are therefore true codes, are: the Bills of Exchange Act (1882), the Partnership Act (1890), and the Sale of Goods Act (1893). In British India codification has been carried much further. Not only have the general and provincial statutes been revised, but there are codes of civil and criminal procedure (1859 and 1861, new codes 1882 and 1898), a penal code (1860), and acts nearly equivalent to codes governing contracts (1872), and transfers of property, easements, and trusts (1882). Ceylon and the Straits Settlements have adopted or adapted some of the Indian codes. Canada, New South Wales, Victoria, New Zealand, and Queensland have criminal codes.

In the United States the general or public statutes of the Federal government, and those of a great majority of the States, are periodically revised, and these revisions are sometimes called codes. When (as is usually the case) the revision is passed by the Legislature, it replaces the original acts. The Revised Statutes are grouped according to the subjects with which they deal, and the arrangement of subjects is sometimes systematic, but more often alphabetical. Under either arrangement these compilations ordinarily contain more or less complete codes of criminal law and procedure, and sometimes codes of civil procedure. Nearly one-fourth of the States have separate codes of procedure; a small number have separate penal codes. The Revised Statutes rarely include anything approaching a complete civil code, and only four States (California, Louisiana, North Dakota, and South Dakota) have separate codes of this character; for in most of the States the substantive private law, especially the law of personal property and of contracts, is still in the main common law, i.e., to be sought for in the reports of judicial decisions. In Louisiana, where the common law has never obtained, there has been a civil code since 1808; but no State has yet passed a civil code which completely supersedes the common law. The first attempt to combine common and statutory law in a civil code was made in Georgia in 1860, in connection with a general revision of the law; but this code was not meant to be a complete enactment of the common law. Iowa, Ohio, and Texas have gone further than most of the other States in embodying common-law rules in statute form, but not so far as Georgia. The nearest approach to a complete enactment of the common law is found in a civil code which was drafted in New York, but which was not adopted in that State. It was, however, substantially adopted in the Territory of Dakota, 1865, and in California, 1872; and many of its provisions have passed into the laws of Montana, Utah, and

Wyoming. This code, although frequently revised and extended in the States of its adoption, has not completely superseded the common law. Consult *Estate of Apple*, 66 Cal. 432.

The question of codification, in England and in the United States, is practically a question of the advisability of transforming common or judge-made law into statutory law. The conditions are different from those which have prevailed on the continent of Europe. There the earlier modern codifications were provincial; and they were made partly to protect existing customs against the Romanizing tendencies of the courts, and partly to substitute for the Roman laws civil and canon laws written in the vernacular. The great codes now in force in France, Italy, and Germany were constructed to replace the earlier local provincial and State codes and to establish uniform national law. The codification movement in Switzerland has substituted a general federal law for the local cantonal laws. (See CIVIL LAW, *History*, VIII.) In England the existing common law is national, and codification by act of Parliament will simply change its form and the mode of its future development. In the United States, the common law is both national and local, i.e., bounded by State lines. As each State has its own system of jurisprudence free from national control, the United States Congress cannot codify the common law for the States, and codification is therefore possible only in the form of State codes: and even if the State codes were uniform at the outset subsequent amendment and varying judicial interpretation would speedily diversify them. Codification in the United States accordingly means the creation of a diversity of laws similar to that which has made national codification necessary in Europe. An important movement towards uniformity of law in the United States is represented by the Negotiable Instruments Act, the Sale of Goods Act, and the Bills of Lading Act, drafted by comissioners from the several States and already enacted in a considerable number of States and Territories.

Bibliography. Bentham's works, especially his *View of a Complete Code of Law* (Edinburgh, 1843); Savigny, *The Vocation of our Age for Legislation and Jurisprudence* (1814; trans. by Hayward, London, 1831); Field, *Speeches, Arguments, and Miscellaneous Papers* (New York, 1884–90); Carter, *Proposed Codification of our Common Law* (ib., 1884); *Provinces of the Written and Unwritten Law* (ib., 1889); Dillon, *Our Legal Chaos* (ib.); F. J. Stimson and Munroe Smith, "Statute and Common Law," in *Political Science Quarterly*, vols. ii and iii (ib., 1888–89); Ilbert, *Legislative Methods and Forms* (London, 1901).

CODE'INE (from Gk. *κώδεια, kōdeia*, a poppy-head), $C_{18}H_{21}NO_3$. One of the alkaloids found in opium, in which it exists in relatively small quantities. In chemical constitution it is closely allied to morphine, being a *morphine-methyl-ether*. Pure codeine may be obtained from opium by extracting the latter with water, adding a little marble to the aqueous solution, concentrating and then precipitating it with calcium chloride solution; the filtrate now obtained yields, on concentration, a mixture of morphine and codeine hydrochlorides, and when these are decomposed with ammonia, practically pure codeine hydrochloride remains in solution; the solution is evaporated, and the codeine hydrochloride that separates out is decomposed with caustic potash; finally, the free codeine produced is recrystallized from aqueous ether containing no alcohol. Its physiological action is similar to that of morphine, and it is used in medicine to diminish sensibility to pain; it is also sometimes prescribed in diabetes. Codeine is a white crystalline substance, sparingly soluble in water, freely soluble in alcohol, ether, chloroform, and other organic liquids. It may be readily identified by dissolving a small quantity in strong sulphuric acid and adding a trace of ferric chloride solution, which produces a blue coloration. The medicinal dose of codeine is from one-quarter to two grains.

CODE NAPOLÉON. Properly, the entire body of French law as contained in the so-called Five Codes promulgated between 1804 and 1810. In general usage, however, the term is restricted to the first of these, the code of civil or private law enacted in 1804 and still in force. The relation of this code to the general development of European law is indicated in CIVIL LAW, *History*, VIII. At the outbreak of the Revolution (1789) there was great diversity in the laws by which different parts of France were governed, and the establishment of a general or national code was one of the reforms urgently demanded. Such a code was promised in the constitution of 1791, and the Convention caused a code to be drafted in 1793; but this draft was rejected because it contained "no new and grand ideas, suitable to the regenerated France." It was not until the revolutionary storm had spent its force and Napoleon, as First Consul, had established a strong government that the work could be pushed through. In July, 1800, the task was intrusted to a commission consisting of the most eminent jurists in France, chief among them being Bigot-Préameneu, Malleville, Portalis, and Tronchet. These men completed their work in four months. After the proposed code had been approved by the principal courts of justice, it was discussed in the Council of State, where Napoleon displayed great interest in the work and made many shrewd suggestions, and it was then submitted, title by title, to the legislative body. Here it encountered opposition, because it was considered too conservative; and it was not passed until the legislature had been reformed into docility. The entire code was promulgated, March 21, 1804, as *Code civil des Français*. In 1807 the title was changed to Code Napoléon. These two designations have since prevailed alternately, according to the form of government. After the completion of the civil code, other codes were adopted, dealing with civil procedure, penal law, criminal procedure, and commerce.

The Code Napoléon introduced little new law. It was a compromise between the customary law of the northern provinces, which was substantially German, and the law of eastern and southern France, which was mainly Roman. It consists of three "books." The first deals with persons, including family relations. The second deals with rights in things, but does not include the law of pledge and mortgage. The third, entitled "Various modes of acquiring ownership," includes succession, by testament

and ab intestato; matrimonial property law; the law of liens and mortgages; and the rules regarding proscription.

The great merits of the code are simplicity (sometimes secured by superficiality) and clearness of statement. In spite of these merits, the code has aroused the usual amount of controversies, some of which are still unsettled, and has required no little judicial interpretation. To contemporary jurists it seemed fairly complete; but experience has revealed many "open places" which have been filled, in part by judicial decisions and in part by supplementary legislation. There has been also considerable legislative amendment.

The Code Napoléon, as a result of French conquests, was introduced before 1814 into many parts of central and southern Europe. In most instances independent national codes have since been substituted; but the Code Napoléon is still in force in Belgium, in Holland, in several Swiss cantons, and in Italy the newer codes are largely based upon the French. The same is true of the code of Louisiana, of that of Quebec, Canada, of most of the Central American and South American codes, and of the Spanish Code of 1889. The Code Napoléon is contained in Roger and Sorel, *Codes et lois usuelles* (15th ed., Paris, 1883). There are commentaries by Marcade and Pont, *Explication théorique et pratique du code civil* (Paris, 1874–94); Mourlon, *Répétitions écrites sur le Code Napoléon* (12th ed., Paris, 1885).

CO'DEX (Lat., trunk of a tree, tablet). The name "codex" seems to have been applied first to books that were made by laying sheets one on another, like tablets, in sets of three, four, or more. Each one of such sets, when folded and stitched together, constituted a book (*liber*) in the more technical sense. Any number of these "books" might be bound together in a large book or codex. In distinction from the codex, the volume or roll was made by pasting or stitching the separate sheets together edgewise, thus forming a long ribbon which had to be rolled in order to be easily handled.

The word is at present used almost exclusively for manuscript copies of the whole or parts of the Bible or of the Greek and Roman classics. Some of the most important of the former are noted in the article on the New Testament text. (See BIBLE.) About 200 A.D. the codex form began to supplant the roll form. The earlier codices appear to have been larger than the later ones. It was perhaps in imitation of the appearance of the open roll, with its several parallel columns of reading matter, that the early codices were written with three or even four columns on a page. Later it was more usual to write but two, and finally but one. Codices were of either paper or parchment—of various grades—the latter being always the more common. The oldest codices were written in uncial script—that is, in semicapitals; the letters being, as a rule, separate from each other. They are without word divisions, punctuation, breathings, or accents. The separate books have only the simplest titles. In the fifth and sixth centuries the text was broken up into large sections beginning with large capital letters, accents and breathings were introduced, the titles enlarged, and more or less of introductory matter added. Some slight attempts at decoration were also indulged in. Late uncial codices, from the seventh to the tenth century, were frequently elaborately decorated with the parchment colored purple and the text written in gold or silver letters, e.g., the Codex Rossanensis. In the monasteries of the Middle Ages decorated or illuminated manuscripts were manufactured in large numbers. In the tenth century the uncial hand gave way to the cursive or running hand. Codices so written are called minuscules, in distinction from the majuscules or uncials. For other particulars, see BIBLE; BOOK; PALEOGRAPHY; TEXTUAL CRITICISM.

Consult: F. H. A. Scrivener, *Introduction to the Textual Criticism of the New Testament* (London, 1894); Gregory, *Textkritik des neuen Testaments* (Leipzig, 1900); Birt, *Das antike Buchwesen* (Berlin, 1882); Wattenbach, *Paläographie* (Leipzig, 1877–78).

CODEX JUSTINIANEUS. See JUSTINIAN I.

CODEX THEODOSIANUS. See THEODOSIUS II.

CO'DIÆ'UM. See CROTON.

COD'ICIL (Lat. *codicillus*, little book or writing, dim. of *codex*, code). A supplement to a will, whereby anything omitted is added, or anything in the body of the will is revoked or explained or changed so as to provide for altered circumstances of the testator or beneficiaries. A codicil is authenticated or executed in the same manner as the will which it modifies and is considered a part thereof.

There may be as many codicils to a will as a testator cares to make, and where a provision in a codicil is inconsistent with a provision in a will, the provision in the codicil governs, as the purpose of making the codicil is to express the testator's latest wishes as to the disposition of his property after his death. By the Roman and early English law a codicil was an informal will, made without the appointment of executors, which was considered necessary in a valid will; but the term is no longer used in this sense. See WILL, and authorities there cited.

CODIFICATION. See CODE.

COD'LING. A squirrel hake (see HAKE), or some other species of the genus *Phycis*.

CODLING MOTH. A small tortricid moth (*Carpocapsa pomonella*), the most serious pest of the apple (q.v.). The females issue from their cocoons in the spring and lay their eggs in the early evening upon the upper sides of the leaves and occasionally upon the forming fruit. The eggs hatch in about 11 days, and the young larvæ penetrate the fruit usually by way of the calyx. In about 20 days they reach full growth, leave the fruit, crawl to a twig and thence down on the trunk of the tree, where they spin their cocoons and transform to pupæ. The moths issue in two weeks. The moth has a wing expanse of less than three-fourths of an inch. The general color is grayish brown with coppery metallic markings. It lays eggs for a second generation usually upon the fruit and hibernates in the cocoon. The best remedy consists in spraying with an arsenical mixture such as Paris green or arsenate of lead. Two sprayings in the early part of the season are advised—one a few days after the blossoms have fallen and the other two weeks later. If necessary, subsequent sprayings are made. The banding of the trees with bagging affords the larvæ convenient places for transforming. The bands are examined from time to time and the cocoons destroyed. Consult Simpson, "The Codling Moth," in *Bulletin United States*

Department of Agriculture, Division of Entomology, N. S. No. 4 (Washington, 1903).

COD-LIVER OIL (*Oleum morrhuæ*, or *Oleum jecoris aselli*). One of the most valuable therapeutic agents at the disposal of the medical practitioner. It is a pale yellow fixed oil, obtained from the livers of the cod (*Gadus callarias*) and of other related species of fish that are caught in the northern parts of the Atlantic Ocean. Cod-liver oil is a better food and is more readily absorbed than any other oil; its value as a food is due mainly to its being much more readily oxidized than other oils. The benefit derived from it in disease associated with loss of flesh cannot be overestimated. It is given in tuberculosis, in rickets, in tertiary syphilis, in chronic bronchitis, chronic eczema, in many nervous diseases, in general feebleness, etc. It should, however, be administered with some caution and in moderate quantities, larger doses being liable to cause sickness and diarrhœa. In those cases in which the oil is rejected by the stomach, it may be rubbed into the skin, through which it is readily and certainly absorbed; this treatment is, of course, disagreeable on account of the nauseating smell of the oil. The taste of the oil may be masked to some extent by taking it in coffee or in whisky, or by adding to a dose of the oil a few drops of ether and a drop of oil of peppermint. The taste is completely abolished by taking the oil in soft gelatin capsules now prepared by many manufacturing houses; after remaining in such capsules for some time, the oil turns rather dark, but does not seem to be thereby deteriorated. Cod-liver oil is often taken in the form of emulsions. An emulsion recommended by many medical men contains, besides cod-liver oil, the yolk of an egg, powdered tragacanth, elixir of saccharin, sodium bicarbonate, tincture of benzoin, oil of bitter almonds, chloroform, alcohol, and water. With malt extract, too, cod-liver oil makes an excellent emulsion. The common dose of the pure oil is from a dessertspoonful to a tablespoonful three times a day.

Manufacture. In preparing the oil for medicinal purposes, only perfectly healthy livers should be used, and the green-colored (or spotted), diseased livers rejected. In former times the oil was obtained as follows: The fishermen would stow away the livers in barrels, which were kept unopened till the end of the fishing season, i.e., from one to four months. During that time the livers would undergo putrefaction, their hepatic cells, containing the oil, would burst open, and the escaping brownish-yellow oil (called *pale oil*) would rise to the top of the barrels and be drawn off. The livers would then be allowed to undergo further putrefaction, and a quantity of dark-brown oil (called *light-brown oil*) would again be drawn off. Finally, by heating the disintegrated liver residues thus obtained above the boiling temperature of water, a last quantity of oil (called *brown oil*), though really black) would be obtained. This primitive method, a knowledge of the details of which would render the oil too repulsive to most patients to swallow, is still employed to some extent. By far the greater quantity of the oil, however, now reaching the market is prepared in a much cleaner way by the steam process first introduced by Möller in 1853. Instead of allowing the livers to undergo putrefactive decomposition, Möller obtained the oil by simply heating for about three hours the fresh livers, which were carefully selected, cleaned by washing with water, and separated from the gall bladders.

To avoid delay, the livers are often heated on board vessels, in wooden apparatus, steam being conducted directly into the mass of livers. Usually, however, the livers are heated in tinned sheet-iron vessels, either single or double walled. The single-walled apparatus is heated over large water baths; the double-walled by passing steam into the space inclosed between the interior and the exterior walls. In all these apparatus the temperature is about that of boiling water. An improvement recommended during recent years consists in heating the livers at a considerably lower temperature for a much shorter time, and as far as possible out of contact with the air; it is asserted that in this manner the oxidation of the oil may be almost completely prevented and that the oil would therefore not become rancid, nor acquire the disagreeable property of causing eructations.

Composition. Besides a large proportion of fats, cod-liver oil has been shown to contain (1) a peculiar principle called *gaduin* ($C_{35}H_{46}O_8$); (2) a crystalline substance called *morrhuol;* (3) traces of bromine and iodine; (4) biliary principles; and other substances. The brown oils contain also considerable quantities of ptomaines, which cannot but be injurious to health; bleaching brown oil by sunlight only masks the presence of such substances without destroying their injurious properties and should therefore not be resorted to. It is generally believed that the great benefit derived from cod-liver oil in tuberculosis is due to the specific action of some active principle that must be contained in the oil. It is probable, however, that the effect is due to nothing but the food value of the fatty constituents of the oil. These fats are commonly assumed to consist, like other natural fats, of the glycerides of oleic, palmitic, and stearic acids. Möller's chemist, P. M. Heyerdahl, states, on the contrary, that cod-liver oil contains a little palmitic, but no oleic or stearic acid; according to him it consists mainly of the glycerides of therapic and jecoleic acids ($C_{17}H_{26}O_2$ and $C_{19}H_{36}O_2$, respectively), two unsaturated organic acids which are not known to exist anywhere else in nature and to which the therapeutic action of cod-liver oil is due. The solid fat that is sometimes removed by freezing the oil is, according to Heyerdahl, also composed mainly of those glycerides; so that its removal appears to serve no purpose whatever. In view of the readiness with which the fats of cod-liver oil undergo oxidation, the oil should be kept out of contact with the air. Cod-liver oil is now prepared in Norway, the United States, Canada, Newfoundland, Great Britain, Iceland, and Russia. By far the greater proportion of the oil reaching the market comes from Lofoten and Romsdal in Norway.

CODMAN, Robert (1859–1915). An American Protestant Episcopal bishop. He graduated from Harvard (A.B., 1882; LL.B., 1885), practiced law in Boston until 1891, and then studied theology for three years. In 1893 he was ordained deacon and in 1894 priest; for five years he was rector of St. John's, Roxbury, Boston, at the end of that period (1900) being con-

secrated Bishop of Maine. He received the degree of D.D. from a Canadian college and that of S.T.D. from Trinity College, Hartford.

CODOGNO, kō-dō′nyō. A city in the Province of Milan, north Italy, 30 miles east of Pavia (Map: Italy, D 2). Its parochial church has a beautiful portal of the sixteenth century. It is the principal export market for Parmesan cheese and has tanneries and linen, silk, and majolica factories. Pop. (commune), 1881, 11,444; 1901, 11,594; 1911, 11,208.

COD′RINGTON, Sir Edward (1770–1851). A British admiral, born in Gloucestershire. He entered the navy in 1783 and at Trafalgar (Oct. 21, 1805) was captain of the *Orion*. He afterward served in the Mediterranean and in North America, notably in the Chesapeake and at New Orleans, and rose to the rank of vice admiral in 1821. He was appointed commander in chief of the Mediterranean squadron in 1826 and commanded the English, Russian, and French fleet at the battle of Navarino (q.v.), immediately after which he was recalled for having exceeded his orders. He had been made K.C.B. in 1815 and was promoted admiral in 1837. Consult the *Memoir of the Life of Sir Edward Codrington* by his daughter, Lady Bourchier, including autobiographic notes (London, 1873–75).

CODRINGTON, Sir William John (1804–84). An English general, son of Sir Edward Codrington. He entered the army in 1821. During the Crimean War he commanded a brigade as major general at the battle of the Alma (his first action) and at Inkerman, and in 1855 succeeded Sir James Simpson as commander in chief in the Crimea. He was elected to Parliament in 1857, was Governor of Gibraltar from 1859 to 1865, and in 1863 was appointed general.

CO′DRUS (Lat., from Gk. *Κόδρος, Kodros*). The reputed last King of Athens, the son of Melanthus (c.1060 B.C.). When the Dorians invaded the Attic territory, an oracle declared that Athens would be saved if its ruler should perish by the hand of the enemy. Codrus, disguised as a peasant, entered the Dorian camp and was struck down in a quarrel of his own making; the Dorians withdrew. His son Medon was the first archon (q.v.), chosen for life.

CODY, Henry John (1868–). A Canadian educator and clergyman. He was born at Embro, Ontario, and was educated at the Galt Collegiate Institute and at Toronto University, where he graduated with high honors in 1889. He was classical master in Ridley College, St. Catharines, in 1889–93. In 1894 he was ordained a priest of the Church of England in Canada, became curate of St. Paul's Church, Toronto, and was appointed professor of Old Testament exegesis and Church history in Wycliffe College (Toronto). He became professor of systematic theology at Wycliffe and acting rector of St. Paul's in 1899, and rector in 1907. In 1909 he was appointed Archdeacon of York; in 1904 he was elected Bishop of Nova Scotia, but declined the office; and in 1909 he was an unsuccessful candidate for the bishopric of Toronto. He was frequently a delegate to representative conferences and church conventions in Canada, the United States, and Great Britain. An able and eloquent preacher, his theological principles and outlook are largely those of the evangelical or Low Church school.

CO′DY, William Frederick (1846–1917). An American scout and showman, known as "Buffalo Bill." He was born in Scott Co., Iowa, and became one of the riders of the Pony Express (q.v.) at its establishment in 1860, and at the beginning of the Civil War was a government scout and guide. In 1863 he enlisted in the Seventh Kansas Cavalry, and at the close of the war contracted with the Kansas Pacific Railroad to furnish buffalo meat to its laborers building the line, in this way earning the name "Buffalo Bill." He was again with the army as scout from 1868 to 1872, when he was elected to the Nebraska Legislature. Later he became judge-advocate-general of the Wyoming National Guard. He served in the Fifth Cavalry in the Sioux War of 1876, and in the battle of Indian Creek killed in personal combat Chief Yellow Hand. In 1883 he organized his "Wild West Show," a representation of actual life on the plains, and in 1887 took the "show" to Europe for the first time. In 1901 he became president of the Cody Military College and International Academy of Rough Riders established on his lands in Wyoming. He is author of several books describing his life on the frontier, including: *The Life of Hon. William F. Cody* (1879); *Story of the Wild West and Camp-Fire Chats* (1888); *The Adventures of Buffalo Bill* (1904); *True Tales of the Plains* (1908). Cody is the last of the picturesque frontier scouts of American history.

COE, George Albert (1862–). An American educator and philosopher, born in Monroe Co., New York. He graduated at the University of Rochester in 1884; studied theology at Boston University and in Berlin; was professor of philosophy in Northwestern University from 1891 to 1909, and then was appointed to the chair of practical theology in Union Theological Seminary, New York. He was president of the Religious Education Association of America in 1909–10. He wrote: *The Spiritual Life: Studies in the Science of Religion* (1900); *The Religion of a Mature Mind* (1902); *Education in Religion and Morals* (1904).

COE, Wesley Roswell (1869–). An American biologist, born at Middlefield, Conn. He was educated at Connecticut Agricultural College and at Sheffield Scientific School (Yale University), and he studied abroad at the universities of Würtzburg and Naples. From 1892 to 1895 he was assistant in biology in Sheffield Scientific School; from 1896 to 1902 he was instructor, in 1902–08 assistant professor of comparative anatomy, and in 1909 he became professor of biology at Yale. He was a member of the Harriman expedition to Alaska in 1899. His writings include: *The Nemerteans* (1901); *The Nemerteans of Porto Rico* (1901); *The Nemerteans of the Hawaiian Islands* (1906); *Echinoderms of Connecticut* (1912).

COEDUCA′TION (Lat. *co-*, together + *educatio*, education, from *educare*, to bring up, to educate). The association of the sexes in the same classes for instruction is a system that prevails generally in the public elementary schools of the United States and quite extensively in Europe. Except in a few large Eastern cities, as New York and Boston, the free public elementary school in the United States is a mixed school. On the other hand, somewhat less than half the private elementary schools in this country are either for boys or for girls exclusively, and in 1910–11 about 10 per cent of the pupils receiving elementary instruction were

in such schools. The English elementary schools have since 1891 become free and coeducational, especially in the rural and small-town school systems. In France each commune having more than 500 inhabitants must establish a separate elementary school for girls, unless a mixed school is sanctioned by the departmental council. In Prussia the Volksschulen, or people's schools, were, according to the Law of 1871, advised to separate the sexes wherever possible, except when there were only two teachers in a school. Nevertheless, in 1911 there were nearly twice as many mixed as separate schools. In Switzerland the elementary schools are very largely mixed schools; but the course of study and the length of the course in some cantons vary for the sexes, while in Basel the boys' and girls' schools are separate. In Sweden practically all, and in Austria 85 per cent, of the public elementary schools are coeducational; while in Italy the reverse is true, only about one-fifth of the schools of this grade having such a character.

When, however, we turn to secondary education, we find that in Europe the sexes are almost universally separated. In Prussia the various classes of gymnasia and realschulen are, with the exception of a few girls' gymnasia, for boys exclusively. Elsewhere in Germany, where girls are given public secondary education, as in Bavaria, Saxony, and Baden, their schools are separated. The French public secondary-school system consists of state lycées and communal colleges for boys and girls separately. The secondary schools of Switzerland and for the most part those of Sweden keep the sexes apart. Since 1902 a large number of public secondary schools have sprung up in England; in 1910–11 of the 862 schools under the supervision of the Board of Education 302 were for girls only and 205 for boys and girls, but in many of the latter separate classes are conducted for the two sexes. The private secondary day schools for girls, of which there is a considerable number, admit young boys, but, as a rule, only up to the age of 9 or 10, when they can enter the secondary schools for boys. In the United States the contrast is striking. In 1911–12 there were 11,224 public high schools, of which 11,063 were coeducational, 26 for girls only, and 35 for boys. Of 2044 private secondary schools, 872 were coeducational, 749 for girls, and 423 for boys, exclusively. The public normal schools reporting to the United States Bureau of Education in 1911–12 numbered 222. Of these, two were distinctly for women; 41 had no men in attendance, though presumably coeducational; the rest contained both sexes. Of the 55 private normal schools 19 prepare kindergarten teachers and have no men in attendance, one is distinctly for women, while three others have no men, and two no women in attendance. The rest have a mixed attendance. The English training schools for teachers, the French primary and superior normal schools, and the Prussian normal schools separate the sexes.

An examination of the facts stated above will show that so far as Europe is concerned they bear out the general theory current there, that the sexes should be separated as far as possible in education. Wherever separate schools can be maintained, the French and Prussian systems require them, and they are plainly favored by the English. Since, however, elementary instruction has come to be regarded as necessary for both sexes, wherever financial considerations prevent separate schools, the elementary school is mixed. And it is this financial consideration that has most largely been the occasion of mixed schools in the United States. Through the efforts of Horace Mann, a system of town coeducational high schools was in 1826 initiated in Massachusetts, and from that time on such schools spread, at first slowly, then rapidly, throughout the Republic, until to-day they are almost within reach of all. The victory of public secondary education was in general the victory of coeducation.

Since the Civil War both elementary and secondary education have been given largely into the hands of women teachers. There accordingly followed a demand on their part for better opportunities for instruction. Oberlin Collegiate Institute in Ohio had, in 1833, admitted women. In 1855 Antioch College, also in Ohio, was founded—coeducational from the beginning, and having as its first president Horace Mann, the ardent advocate of this system. The following State universities were from the beginning coeducational: Utah, opened in 1850; Iowa, opened in 1856; Washington, opened in 1862; Kansas, opened in 1866; Minnesota, opened in 1868; and Nebraska, opened in 1871. The State universities of Indiana and Michigan admitted women in 1868 and 1870 respectively. To-day, of the 39 State universities, all except those of Virginia, Georgia, and Florida are coeducational. Of private colleges, Cornell, after an investigation and stimulated by a generous offer from Henry W. Sage, admitted women in 1872. Other private institutions were, however, somewhat slow to follow. Boston University, founded in 1873, admitted women from the first, and in 1883 the Massachusetts Institute of Technology became coeducational. In 1911–12, of the 596 colleges and universities reporting to the Bureau of Education, 108 were institutions for women only and 341 were coeducational. The principle of coeducation is almost universally accepted throughout the West, and the few remaining institutions of note which do not admit women to any of their courses are on the Atlantic seaboard. At the same time the tendency at present in the East is to strengthen the existing women's colleges, to which one or two notable additions have been made in recent years, bringing the number of first-class institutions up to 16. In addition, all the great university foundations, except Harvard and Princeton, admit women to graduate instruction. Women are also rapidly gaining ground in the professional colleges. In 1911–12, 66 out of 115 colleges of medicine, 46 out of 118 colleges of law, 35 out of 52 colleges of dentistry, and 52 out of 76 colleges of pharmacy in the United States were coeducational.

In Canada McGill University was opened to women in 1883. To-day all the Canadian universities admit women. The leading universities of Australia admit women not only as students, but as lecturers and professors. In 1878 the University of London opened all degrees, honors, and prizes to students of both sexes on equal terms. All the recently established universities, such as Manchester, Liverpool, Leeds, Birmingham, Sheffield, etc., and the University of Wales give similar privileges to women. The University of Durham excludes women only from the degree in theology. Cambridge admits women to nearly all university

and college lectures and grants a diploma to such as fulfill the regular conditions. This degree, however, does not admit them to the governing board of the university. At Oxford women are admitted to nearly all university and college lectures, except those in medicine. They may take the examinations, and the results are announced, but they do not receive a degree. The four universities of Scotland, Aberdeen, St. Andrews, Edinburgh, and Glasgow, admit women to all degrees except in law, and Aberdeen even to that. The Irish universities (Dublin, Belfast, and the constituent colleges of the National University of Ireland) grant equal privileges to both sexes. In France women are admitted to lectures on the same terms with men, professors, however, having a discretionary power of exclusion.

In Germany the struggle of women for admission to the universities has been especially stubborn, and women are now admitted to all the universities in all faculties. Heidelberg, Freiburg, and Göttingen were among the first to grant the degree of Ph.D. to women; but in 1898 Berlin, perhaps the most conservative of all in this respect, bestowed this degree on Fräulein Neumann. In 1909–10, 2324 women, including a number of foreigners, attended the German universities. In Austria, since 1878, women have been admitted to the eight universities as hearers, and since 1897 as matriculated students in the faculty of philosophy. During the winter of 1899–1900, 40 women were registered as regular students at Vienna, and in 1897 the degree of M.D. was granted to Fräulein Possauer. In 1912–13 there were 353 women in attendance. In 1895 the three Hungarian universities were thrown open to women, and graduates of the medical departments are allowed to practice. The Italian universities have, since 1876, all been open to women on the same terms with men, and the female attendance is large. The medical faculties of the Swedish universities were opened to women in 1870, and those of law and philosophy in 1873. In 1899 six women had taken the degree of licentiate in philosophy, and one that of doctor of laws. The latter, Fräulein Eschelsson, was made privatdocent (q.v.), to lecture on civil law. In Switzerland the universities are all open to women, and in most cases on the same terms as to men. At Zurich women were formally admitted in 1872, and they are even permitted to hold professorial chairs. There were, in 1911, 258 women in attendance, and a woman was lecturer on Roman law. Women have been admitted on the same terms as men to the University of Copenhagen since 1875. The Spanish universities and those of the Netherlands are equally open to both sexes. Russian higher education for women has had a stormy history. The medical schools were opened to them about 1860, then closed, and again in 1872 reopened on account of the Nihilism that sprang up among women who went abroad, and particularly to Switzerland, to study. A separate medical school for women was established at St. Petersburg in 1872, suppressed in 1882 on account of Nihilism, and in 1897 reopened. The universities are now closed to women, but there are higher courses given to them at St. Petersburg and Moscow under the Minister of Public Instruction, and in 1910 there were 10,576 attending these university courses of the medical institute for women.

Investigations made by the University of Wisconsin, and in 1893–94 by the University of Virginia, have shown that in coeducational institutions, according to testimony gathered in the United States and England, women equal or even surpass men in excellence of scholarship. Up to 1898, 54 per cent of the women taking examinations for matriculation at the University of London had passed, as against 53 per cent of men for the same period. Nor has the percentage of withdrawals from college on account of health been greater with women than with men. Investigations into the health, etc., of college women are given under COLLEGIATE EDUCATION FOR WOMEN. In the West, where coeducation is practically universal, no evil consequences have sprung from it, and there is but slight demand for separate schools. The main objection of both male and female students to coeducation is that it implies more restraint than exists where the sexes are apart. Of the many arguments for coeducation, doubtless that of economy has been most effective. It is noteworthy that in a report of the Massachusetts Society for the University Education of Women the fact that the University of California had a preponderance of women students was taken as a sign of the need for a separate college. Indeed, it may be said that having won in most cases their contention for admission to institutions for men, the advocates of higher education for women are turning their attention more and more towards separate schools, and that the privilege of separate education is, particularly in the East, coming to be sought and preferred by women rather than by men. Consult: Clarke, *Sex in Education* (Boston, 1873); *Reports of the United States Commissioner of Education*, 1898, 1891–92, 1894–95; *Circular of Information*, 1883, No. 2; Crawford, *The College Girl of America* (Boston, 1905); G. S. Hall, *Adolescence* (1902); Mills and Tyler, *Boy and Girl, should they be Educated Together* (Oxford, 1906); Shields, *The Education of our Girls* (New York, 1907); Thomas, *Sex and Society* (Chicago, 1906); Woods, *Coeducation* (London, 1903); Walker, *Woman's Unfitness for Higher Coeducation* (New York, 1903).

COEFFI'CIENT (Lat. *co-*, together + *efficere*, to work out, produce). In algebra, any factor of an expression is called the coefficient of the rest of the product. The word, however, is usually applied only to some factor whose numerical value is expressed or known, and which appears first in the product, e.g., in the expression $3ax$, 3 is the coefficient of ax, and $3a$ is the coefficient of x. Vieta seems to have introduced the use of the word in this sense (1591). Since $a = 1 \cdot a$, the coefficient 1 may be understood before any letter. The coefficients in any algebraic equation of the form

$$x^n + a_1x^{n-1} + a_2x^{n-2} + \ldots a_n = 0$$

are related to the roots; thus,

$$r_1 + r_2 + \ldots r_n \equiv \Sigma r_1 = a_1,\ r_1r_2 + r_1r_3 + \ldots$$
$$r_{n-1}\, r_n \equiv \Sigma\, r_1r_2 = -\,a_2, \ldots r_1r_2 \ldots r_n = \pm\, a_n.$$

See EQUATION; for differential coefficients, see CALCULUS; and for binomial coefficients, see BINOMINAL THEOREM.

Detached Coefficients. In many operations with algebraic functions, in which the letters are involved in ascending or descending powers, the

required calculation may be performed with coefficients only, e.g., to multiply

$$x^3 + 3x^2y + 3xy^2 + y^3 \text{ by } x^2 + 2xy + y^2$$

$$\begin{array}{c|l} 1 & 1+3+3+1 \\ 2 & \quad 2+6+6+2 \\ 1 & \quad\quad 1+3+3+1 \\ \hline & 1+5+10+10+5+1 \end{array}$$

Hence $x^5 + 5x^4y + 10x^3y^2 + 5xy^4 + y^5$ is the product.

Indeterminate Coefficients. Many functions may be expanded to any desired number of terms by assuming arbitrary coefficients whose values are determined from resulting equations, e.g., to expand $\frac{1}{1-x}$ to four terms, assume

$$\frac{1}{1-x} = a + bx + cx^2 + dx^3 + \ldots$$

Then

$1 = a + (b-a)\,x + (c-b)\,x^2 + (d-c)\,x^3 + \ldots$

$1 \cdot a$, the coefficient 1 may be understood before

$b - a = 0,\ c - b = 0,\ d - c = 0 \ldots .$

that is to say, if $a = 1$, $b = a = 1$, $c = b = 1$, $d = c = 1$, etc. Substituting these values in our assumed equation, we find:

$$\frac{1}{1-x} = 1 + x + x^2 + x^3 + \ldots .$$

The method is as old as literal algebra.

In physics a constant expressing the measure of some property of a substance is often called a coefficient, e.g., the *coefficient of elasticity* is the quotient of the stress by the strain, or the quotient of the applied pressure by the voluminal compression produced. The *coefficient of simple rigidity* is the ratio of the shearing stress to the shearing strain. The *coefficient of refraction* (often called the index of refraction) is equal to the ratio of the speed of light in the first medium to its speed in the second. This ratio for air and water has the value 1.336, representing the refractive power of water. The *coefficient of friction* is the quotient of the resistance due to the sliding of one substance on another and the pressure producing the contact. The *coefficient of expansion* is the amount of expansion of a body of unit magnitude due to an increase of 1° in temperature.

COEFFICIENT OF EXPANSION. See Heat.

COEFFICIENT OF EXPANSION FOR GASES. See Gases, General Properties of.

COEFFICIENT OF FRICTION. See Friction.

COEFFICIENT OF SELF-INDUCTION, and Coefficient of Mutual Induction. See Electricity; Induction.

COEHOORN, or Coehorn, kō′hôrn. A small mortar, usually made of bronze and formerly used in boats and small vessels and on the gangways of larger ships. Mounted on a wooden block, supplied with handles, it was light enough to be carried by two men. It threw a shell of 12 to 14 pounds' weight. Its name is derived from that of its inventor, Coehoorn (q.v.).

COEHOORN, kōō′hôrn, **COEHORN,** or **CO′-HORN,** Menno van (1641–1704). A Dutch military engineer. He was born near Leeuwarden, and, after studying at the University of Franeker, entered the Dutch service at the early age of 16, as captain in an infantry regiment. He distinguished himself at Maestricht, Graave, and Seneffe in 1673–74. It was at the siege of Graave that he used with effect a mortar of his own design, later called after him. After the Peace of Nimeguen (1679) he was employed to fortify the various Dutch strongholds. In 1685 he published his important work on fortification, *Nieuwe vestingbouw*, which was speedily translated into French and German. Coehoorn was actively employed during the wars of William of Orange against French aggression, and at Kaiserswerth, Bonn, Fleurus, and Namur he showed himself no mean opponent of the great Vauban. He was made a lieutenant general in 1695 and after the Peace of Ryswick (1697) was employed to refortify several of the Dutch towns. When the War of the Spanish Succession began, Coehoorn was at once dispatched to the front and by his brilliant and energetic generalship reduced six of the chief French strongholds. In 1704, while hastening to confer with Marlborough at The Hague, he was stricken down by apoplexy, March 17. Consult: De Peyster, *Life of Coehoorn* (New York, 1860); Bonomer, *Essai général de fortification* (Paris, 1814); Cosseran de Villenoisy, *Essai historique sur la fortification* (1869).

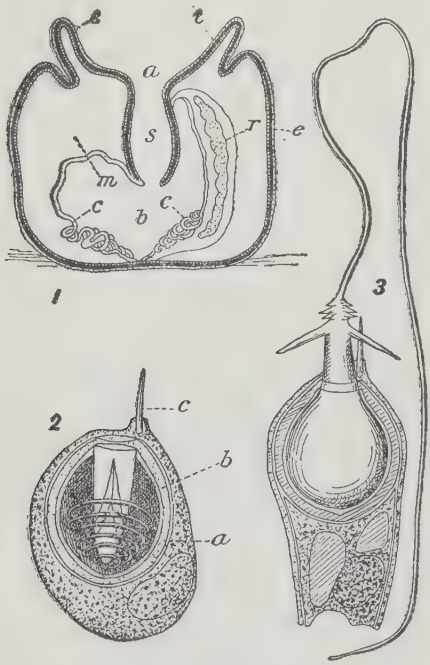
CŒLEBS (sē′lĕbz) **IN SEARCH OF A WIFE.** A novel by Hannah More (1809).

CŒLENTERATA, sē-lĕn′tē-rā′tà (Neo-Lat. nom. pl., from Gk. κοίλος, *koilos*, hollow + ἔντερον, *enteron*, intestine). One of the phyla of the animal kingdom, usually ranked as next to the lowest of the types of Metazoa; the polyps and jellyfishes. It is characterized by the absence of a body cavity and a separate circulatory system, both of these being functionally replaced by the system of chambers or tubes into which the mouth opens. Owing to the fact that this system is not only digestive, but that it takes the place of the body cavity, it is sometimes called the *cœlenteron*. More commonly the cœlenteron is called the gastrovascular cavity, since it not only serves as a stomach for digestion, but, by means of its branches, as a vascular or circulatory system in conveying food (and perhaps oxygen) to all parts of the body. All of the Cœlenterata are more or less perfectly radially symmetrical and generally on the number 4 or 6; i.e., they can be divided in either four or six vertical planes, and the resulting halves will be approximately similar. The Cœlenterata may therefore be defined as radially symmetrical, unsegmented Metazoa, having a gastrovascular cavity. In most Cœlenterata there is no anus, waste matter from the digestive system being ejected through the mouth. Between the endodermal lining of the gastrovascular canals and the ectodermal covering of the body is a structureless layer, known as the supporting layer, or "mesoglœa." This may be very thin and firm, or it may be very thick and gelatinous. It contains scattered nerve and muscle cells, skeletal cells, and pigment cells.

The mouth is usually surrounded with a circle of tentacles, which function both as organs of touch and as capturing organs. The number of these oral tentacles varies from two to several hundred, and their size and shape vary quite as much. On these tentacles, and often on other parts of the body, there are batteries of remarkable stinging cells. (See Nematocyst.) These are wanting in only one class, the Ctenophores. The sense organs of the

Cœlenterata are very simple, as a rule, and many forms have no other sense than that of touch. Pigment eyes and positional organs of several kinds occur in the free-swimming forms.

The sexes are separate, and the eggs are set free and fertilized in the water. In their life history the Cœlenterata show some of the most interesting phenomena in the whole animal kingdom. To understand them we must remember that these animals not only reproduce by means of eggs, but even more frequently, like plants, by budding, and that oftentimes, as in plants, the buds do not become detached, but remain connected with the parent stock as long as they live. Moreover, in the type of Cœlenterata we have two very different sorts of individuals—those which are bell-shaped and free-swimming, known as medusæ (q.v.), and those which are more or less cylindrical, and are attached to some object, known as polyps (q.v.). Now, it so happens that the polyp form of a species may give rise to a medusa by budding, and that medusa breaks away and becomes free-swimming; it gives rise to eggs which in turn develop into attached polyps. This process is simple *alternation of generations* (q.v.), i.e., each generation is like its grandparents and not like its parents. The process may become simplified, until the medusa generation is entirely lost, by the medusa bud never getting free from the polyp and ultimately losing even the appearance of a medusa. Or the process may become very much complicated by additional generations produced by budding coming in between the others. The forms which produce the eggs are of course the *sexual* generations, while those that produce the buds are the *asexual*.



FEATURES OF CŒLENTERATA.

1. General anatomy; *a*, mouth; *s*, gullet; *b*, cavity of the body (enteron); *e*, integument, composed of ectoderm and endoderm, separated by a space; *c c*, convoluted cords (craspeda) containing thread cells (see 2), and forming the free edges of the mesentery (*m*); *t t*, tentacles; *r*, reproductive organ contained within the mesentery. 2. Thread cell or stinging cell (nematocyst) of a hydra, undischarged; *a*, formative matrix (cnidoblast); *b*, coiled thread within the cell; *c*, trigger hair (cnidocil). 3. The same everted and discharged by rupture of the cell following a touch upon the cnidocil.

The interesting and important question as to whether the first Cœlenterata were medusoid or polypoid forms has been vigorously debated, but is by no means fully determined yet. Owing to the fact that the buds so often remain intimately connected with the parent, we find more or less complicated colonies or stocks very common. These may be free-swimming, as in the siphonophores (q.v.), having then arisen from medusæ; or they may be fixed as in all corals (q.v.), and in such cases have arisen from polyps. In most such colonies, owing to the division of labor that has taken place, we have differently appearing individuals in one colony, some being adapted to locomotion, some to capturing prey, some to digesting food, some for defensive purposes, and some simply for reproduction.

The Cœlenterata are a large group, of many hundred species, widely distributed in the oceans of all parts of the world. Only three or four species are known as occurring in fresh water. As individuals most of the species are small, though a few sea anemones and some medusæ reach a diameter of over a foot; in colonies, however, some of the reef-building corals cover an extraordinary area. As for color, the Cœlenterata are among the most gorgeous of animals; no shades are too exquisite or delicate. Nearly all are carnivorous, though perhaps some forms may use vegetable matter in part. The only species of any direct use to man are the precious and the lime-producing corals.

In classification the Cœlenterata present difficulties. The ctenophores are so different in some important ways from other cœlenterates that some zoölogists prefer to regard them as a separate type, especially since two genera are known that connect them directly with the flat worms (Platoda); but as they are radially symmetrical and have a gastrovascular system, they really come within the definition of cœlenterates. The type then may be divided into three great classes: (1) *Hydrozoa* (q.v.), which have no gastral filaments and have an endodermal œsophagus, if any; (2) *Scyphozoa* (q.v.), which have endodermal gastral filaments and give rise to medusæ; (3) *Actinozoa*, or *Anthozoa* (q.v.), which are polyp form, possess mesenteries and never give rise to medusæ; and (4) *Ctenophora* (q.v.), distinguished by having eight meridional rows of swimming plates.

Fossil Forms. The Cœlenterata comprise some of the oldest fossils found in the Lower Cambrian rocks (Archæocyathus and Ethmophyllum); they increased rapidly in variety, and attained already, early in the Silurian, great importance as rock builders in the reef-building corals (see CORAL ISLAND; LIMESTONE; DOLOMITE), which persisted through all formations to the present time, their remains often forming the greater part of whole mountain ranges, as in the southern Alps. Medusoid impressions, representing not only the Hydromedusæ, but also the Scyphomedusæ, occur as early as the Cambrian in Bohemia, Sweden, and North America, and are known

from later rocks. (See MEDUSA; JELLYFISH.) Those suborders of the Hydromedusæ, whose species possess either chitinous-calcareous or calcareous skeletons, viz., the Hydrocorallinæ and Tubulariæ, are also found in the fossil condition, though only sparingly and not until the Mesozoic and Tertiary formations. The most important representatives of the first suborder are the calcareous skeletons of Millepora, appearing in the Eocene, and of the second suborder, the masses of calcareous concentric lamellæ with supporting pillars, which have been described as Ellipsactinia from the Alpine Jurassic, and as Parkeria and Porosphæra from the Cretaceous. Similar calcareous concentrically lamellose forms, but without larger apertures on the surface, the Stromatoporoidea (see STROMATOPORA), are extremely common in the Silurian and Devonian systems, where they were reef builders and important rock-making organisms, being associated with the corals. Their real systematic position being unknown, they are provisionally allied with the Hydromedusæ.

A like relation to the Hydromedusæ is held by the graptolites (see GRAPTOLITA), which, forming chitinous hydroid-like colonies, swarmed, either as holoplanktonic or pseudoplanktonic organisms, in the Silurian seas. They differ in some important features, as the possession of a sicula and virgula, from the hydroids. On account of the world-wide distribution of their species and their short range, they are most important horizon markers or index fossils.

For bibliography of fossil forms, see the articles on CORAL; GRAPTOLITA; MEDUSÆ; STROMATOPORA; JELLYFISH; ETC.

See also ACALEPHÆ; ALCYONARIA; SEA ANEMONES; ANTHOZOA; HYDROID; POLYPS; PORTUGUESE MAN-OF-WAR; SEA FANS; SEA-PEN; SIPHONOPHORA; ZOÖPHYTES. Consult: L. Agassiz, *Contributions to the Natural History of the United States*, vols. iii and iv (Boston, 1862); A. Agassiz, "Monograph of North American Acalephæ," and other papers in the *Memoirs of the Museum of Comparative Zoölogy;* Fewkes, "Aid to Collectors of Cœlenterata," etc., *Bulletin of Essex Institute*, vol. xxiii (Salem, 1893); Minchin, "Cœlenterata" Lankester's treatise on *Zoölogy*, vol. ii, (London, 1900); Hickson, "Cœlenterata," *Cambridge Natural History*, vol. i (London, 1906); Mayer, "The Medusæ of the World," *Carnegie Inst. Pub., No. 109* (Washington, 1911); Mayer, "Ctenophores of the Atlantic Coast of North America," *Carnegie Inst. Pub., No. 162* (Washington, 1912).

CŒLE-SYRIA (Lat., from Gk. κοίλη Συρία, *Koilē Syria*, hollow Syria). A geographical term used by Greek writers in three different senses. 1. Originally, in the first century of the Seleucid era, Cœle-Syria was the name given to the region lying between the Lebanon and Anti-Lebanon mountains in Syria (so possibly referred to in 1 Esdras iv. 48; cf. Strabo, xvi, 2). "The Valley of Lebanon" (cf. Josh. xi. 17) denotes the same district. 2. Later, in the second century B.C., it was used to designate the whole of Syria, east and west of the Jordan, from the Taurus to Egypt, Phœnicia alone being excepted. Josephus once refers to it under these comprehensive limits (*Ant.* xiv, 4, 5). Such is its significance in most instances in 1 Esdras (ii. 17, 24, 27; vi. 29; vii. 1; xi. 67; cf. Strabo, xvi, 753) and in 1 and 2 Maccabees (1 Macc. x. 69; 2 Macc. iii. 5, 8; iv. 4; viii. 8; x. 11). 3. In Roman times, and even before, Cœle-Syria was again confined to the territory east of the Jordan, consisting of Perea, the Decapolis, and the provinces which constituted the tetrarchy of Philip. In 47 B.C. the Romans gave it into the military charge of Herod. Josephus puts into it the whole extent of eastern Palestine, including Moab and Ammon (*Ant.* xiii, 13, 3).

Later in the Roman period (Diocletian, 297 A.D.) the term receded to the region between the Taurus and Phœnicia; while to-day it denotes practically the valley between the Lebanons, under the Arabic name *El Bika'* ('the cleft').

Hölscher, in his brochure *Palästina in der persischen und hellenistischen Zeit* (1903), surmises that it originally described the entire Syrian country west of the Euphrates, the *'Abar-naharâ* (pp. 6–12).

Bibliography. Smith, *Historical Geography of the Holy Land* (11th ed., 1904); Leary, *Syria, the Land of Lebanon* (1913).

COELHO, kō-ā'lyō (Portug., rabbit), or CONEJOS. The rabbit fish (*Promethichthys prometheus*) of the middle Atlantic, so called in Madeira. See RABBIT FISH.

COELHO, GONÇALO. A Portuguese navigator, the commander of a ship on the coast of Senegambia about 1488. He is supposed to have been the leader of the expedition of 1501 to explore the Brazilian coast. Afterward he was placed in command of six ships sent out from Lisbon in 1503 to seek a passage to the East Indies around the southern part of Brazil, the extent of South America being at that time unknown. After suffering shipwreck and becoming separated from a part of his fleet, Coelho continued his journey of exploration in the remaining ships beyond the present site of Rio de Janeiro, returning to Lisbon in 1506.

COELHO DE ALBUQUERQUE, dā äl'bōō-kĕr'kā, DUARTE (1537–c.1579). A Portuguese governor. He was born at Olinda, Pernambuco, and was the oldest son of Duarte Coelho Pereira, whom he succeeded as captain general of Pernambuco in 1554, which possession, after completing his education in Europe, he governed personally from 1560 to 1572. On his return to Portugal he accompanied Dom Sebastião to Africa, was captured by the Moors, Aug. 4, 1578, and died in captivity at Fez.

CŒLIA GENS. See CÆLIA GENS.

CŒ'LICA. A collection of short poems by Fulke Greville (1633).

CŒLIC'OLÆ (Lat., worshipers of heaven). A sect condemned in decrees issued by Theodosius II in 408 (*Cod. Theodos.*, 16, 5, 43) and in 409 (*Cod. Theodos.*, 16, 8, 19) as marked by a "new and unwonted audacity," and, as heretical, ordered to conform within a year or take the consequences. Augustine alludes to it in a letter (Ep. xliv, cap. vi, § 13) written in 398. Consequently the sect was extant in the fourth and the fifth centuries. It seemingly did not last much longer. Its exact nature is difficult to determine, but probably it presented a combination of Jewish and Christian doctrines and practices, among which the most prominent was the use of baptism along with circumcision.

CŒLIUS. See CÆLIA GENS.

COELLO, kō-ā'lyō, ALONSO SANCHEZ (c.1515–

90). A Spanish portrait and historical painter. He was born at Benifayro (Valencia) and apparently formed his style on Italian models. In 1541 he was in Madrid, and in 1552 he went to Lisbon with Antonio Moro and worked there until he succeeded that artist as court painter to Philip II of Spain. He became a great favorite with Philip and painted portraits of the King, his children, and the personages of the court. Many of these perished in the fire of the Prado and Alcazar; among those preserved are those of Don Carlos, the Infanta Isabella, Queen Isabel of the Peace, and Antonio Perez—all in the Prado,—Alexander Farnese (Hermitage, St. Petersburg), and Father Siguenza, the historian. His portraits are vital records of personality, graceful in design and good in color, but they suffer from overelaboration of detail. Among his less interesting religious pictures are five altarpieces with saints painted for the Escorial, "The Martyrdom of St. Sebastian," and "The Marriage of St. Catharine" (Prado).

COELLO, Claudio (c.1630–1693). A Spanish painter, born in Madrid. He studied under Francesco Rizi and afterward under Carreño de Mirando, and probably learned fresco painting from his friend José Donoso. Coello is the last great painter of the Madrid school of the seventeenth century. He painted many large pictures for churches and decorations in fresco for various palaces. All of these works have disappeared, except the ceiling of the vestiary of the Toledo Cathedral. His designs for the triumphal arches raised to celebrate the marriage of Charles II with Marie Louise d'Orléans brought Coello to the notice of the King, and a few years later he became court painter. At this time he painted his greatest picture, the altarpiece of the "Sagrada forma" in the sacristy of the Escorial, which contains more than 50 characteristic portraits; it is baroque in style, carefully drawn, brilliant in color, and original in composition. Coello was now the foremost painter of his time, but the rise of Luca Giordano caused him to lose his prestige and is said to have hastened his death. Coello's mature style was based on that of Rubens and Titian, and his best work is of extraordinary power. His finest pictures are in the Prado (Madrid), in Apsley House and Grosvenor House, London, and in Munich, Budapest, Frankfort, and St. Petersburg galleries. Consult Beruete y Moret, *The School of Madrid* (London, 1909), and Schubert, *Geschichte des Barock in Spanien* (Esslingen, 1908).

CŒLORHYNCHUS, sē'lō-rĭŋ'kŭs (Neo-Lat., from Gk. *κοίλος, koilos,* hollow + *ρύγχος, rhynchos,* nose). A genus of small deep-sea fishes of the family Macruridæ (q.v.), allied to the cods, which inhabit the deeper parts of various oceans and seas. There are many species, of which a common one is the silvery-gray *carminatus* of the West Indian region. Local names for these fish are grenadiers and rat-tails. See Plate of Codfish and Allies.

COEN, kōōn, Jan Pieterszoon (1587–1629). The founder of the Dutch colonial power in the East Indies. He entered the service of the East India Company in 1607, and was Governor-General in 1618–23 and again in 1627–29. During his first term he fought successfully against the English and the native princes, and in 1619 destroyed the town of Jacatra, on the site of which he soon afterward founded Batavia. He forced the English to withdraw nearly all their factories from the archipelago and shut them out from the trade of the islands. He introduced the "colonial system" which aimed at a stable population of European stock.

CŒNO'BIA (Neo-Lat. nom. pl. of *cœnobium,* Gk. *κοινόβιον, koinobion,* life in a community, from *κοινός, koinos,* common + *βίος, bios,* life). A term applied to certain colonies of cells among the algæ, remarkable for their regularity of form. They are developed inside mother cells whose contents divide into the required number of daughter cells, which group themselves in the interior. In some forms (*Volvocales*) the individual cells are ciliated, so that the entire colony swims through the water. The colony of *Volvox* may have as many as 22,000 cells. Other colonies are motionless, and contain a small number of cells arranged with beautiful symmetry (*Pediastrum, Scenedesmus,* etc.). The water net (*Hydrodictyon*) is an immense cœnobium of 700 to 20,000 cells.

CŒN'OCYTE (Gk. *κοινός, koinos,* common + *κύτος, kytos,* cavity). The body of an unpartitioned plant, and also a segment of the body of an incompletely partitioned plant, found chiefly among certain algæ and fungi. It differs from a single cell, which has one nucleus, in that the contained protoplasm contains many nuclei. The protoplasm lies in a continuous cavity where portions of it containing the nuclei and other structures slowly circulate. Excellent illustrations are presented by the molds among the fungi and by the order Siphonales among the algæ. For details, see Algæ; Fungi.

CŒNOGENESIS. See Palingenesis.

COER'CION (from Lat. *coercio,* from *coercere,* to restrain, from *co-,* together + *arcere,* to confine). In law, such a degree of physical force, or threatened personal violence, or intimidation, applied to a person as constrains or induces him to do some act which, but for such constraint, he would not have done. Under some circumstances coercion applied to a person's wife, husband, or near relative, or injury to his property, will be held to have the same effect as if it were applied to the person himself.

The consequences of an act done under coercion may generally be avoided by a person, on the ground that it is not the product of his free will and he is not considered responsible for it. In the United States, generally, where a person commits a crime under such coercion that he has a reasonable apprehension of instant death or serious bodily harm he is excused from the consequences. A less degree of coercion will render a civil act voidable. See Duress.

COERCION ACTS. See Ireland, *History.*

COERNE, Louis Adolphe (1870–1922). An American composer, born at Newark, N. J., and educated at Harvard University and the Royal Academy of Music, Munich. He was musical director at Buffalo, N. Y. (1894–97), Columbus, Ohio (1897–99), and Troy, N. Y. (1907–09), had charge of the music department of the Harvard summer session in 1903, and in 1903–04 was associate professor of music at Smith College. After a year as director of the Conservatory of Music at Olivet College he became, in 1910, director of the School of Music and professor of the history and science

of music at the University of Wisconsin. He is author of *Evolution of the Modern Orchestration* (1908). His compositions include: *Hiawatha*, a symphonic poem (Munich, 1893); *Jubilee March* (Chicago Exposition, 1893); *Beloved America; Mass in D Minor; Swedish Sonata; Sakuntala* (1904); and the grand operas, *A Woman of Marblehead* and *Zenobia* (Bremen, 1905–06). *Zenobia* was the first grand opera by a native American composer to be played before a European audience.

CŒUR, kẽr, JACQUES (c.1395–1456). A celebrated French merchant and financier, born at Bourges. As early as 1432 he had begun to trade with the Levant and in that year made a journey to Damascus. He soon attracted the attention of the King and received many offices; in 1436 he was master of the mint in Paris; in 1444 he was one of the commissioners for the new Parliament in Languedoc; in 1448 he was an envoy to Pope Nicholas V. He had been ennobled in 1441 by the King, and now he was treated with marked distinction by the Pope, and received a special license to traffic with the infidels. His trade, which had been extensive before, increased rapidly and extended to England, Flanders, Spain, Italy, Turkey, Asia, and Africa. This enabled him to amass great wealth, and he was obliged to contribute largely to the King's purse, especially for the expenses incurred in driving the English out of Normandy. In spite of, or possibly because of, these contributions he became an object of envy, and his fall was rapid. In February, 1450, Agnes Sorel, the King's mistress, died; and Cœur, who was one of her executors, was accused of having poisoned her. There was no reasonable ground for such a charge; nevertheless, the needy and unscrupulous King, in July, 1451, who needed money for the war in Guienne, took advantage of the accusation to have Cœur arrested and his goods seized; Cœur was tried by men whose business it was to convict him without regard to the evidence or to justice; he was condemned to pay to the King an enormous sum and to remain a prisoner until the judgment was fully satisfied. All his property was confiscated, and he was exiled during the royal pleasure. In 1455 he managed to escape and, though pursued, succeeded in reaching Rome, where he was well received by the Pope. He died the following year at Chios. Consult Clément, *Jacques Cœur et Charles VII* (Paris, 1866).

CŒUR D'ALENE, kẽr dȧ-lān'. A city and the county seat of Kootenai Co., Idaho, 33 miles by rail east of Spokane, Wash.; on the Cœur d'Alene and Pend d'Oreille, the Northern Pacific, the Cœur d'Alene and Spokane Electric, and the Chicago, Milwaukee and St. Paul railroads; on Cœur d'Alene Lake; and on the Cœur d'Alene, St. Joe, and Spokane rivers (Map: Idaho, B 2). Noteworthy features of the city are Cœur d'Alene College, a Catholic academy, Blackwell and City parks, and the Old Fort Sherman military grounds. There are manufactories of lumber, ties, shingles, and brick, and a trade is carried on in fruits and farm products. The city is in a picturesque region frequented by sportsmen for fishing and hunting. On the shores of Lake Cœur d'Alene Indians held great powwows. Pop., 1900, 508; 1910, 7291.

CŒUR D'ALENE. A lake in Kootenai Co., Idaho (Map: Idaho, A 2). It lies in a wild region on the west side of the mountains of the same name, and is about 30 miles long and from 2 to 4 miles wide. Its waters are cool and clear and afford excellent fishing. It is one of the headwaters of the Columbia, the Spokane River issuing from its northern end. It also receives the St. Joseph River from the east at its southern end.

CŒUR D'ALÊNE. A Salishan tribe formerly holding the territory about the lake and river of the same name in northern Idaho, and now settled upon a reservation in the same country. The name, signifying "awl-heart," is said to have been originally given to a chief of the tribe in derision of his stinginess. The natives call themselves Skitswish, the Skeetsomish of Lewis and Clark. They now number 293. See SALISHAN STOCK.

CŒUR DE LION, *de* lẽ'ôN' (Fr., Lion-hearted). A title given to Richard I, King of England, for his exploits, mainly in the Crusades.

COF'FEE (Turk., Ar. *qahwe*, the coffee beverage). A beverage made of the roasted seeds of the coffee tree, *Coffea arabica* and other species, natives of Abyssinia, Arabia, and West Africa, now naturalized in many tropical countries. The genus *Coffea* comprises a number of species, but *Coffea arabica* is the species widest known which possesses valuable properties; although *Coffea liberica, Coffea stenophylla*, and *Coffea robusta* of West and Central Africa are being cultivated to some extent, the seeds of *Coffea mauritiana*, prepared in the same way, are bitter and slightly emetic. In the wild state *Coffea arabica* is a slender tree, 15 to 25 feet high, with few branches; in cultivation it is seldom allowed to become more than 6 to 10 feet high, and is made to assume a sort of pyramidal form, with horizontal branches almost from the ground. The leaves are evergreen and leathery; the flowers are small, fragrant, and snow-white; and the whole appearance of the tree is very pleasing. The fruit, when ripe, is cherry-like, of a dark-scarlet color, and usually contains two seeds inclosed with their flattened faces together in a tough membrane, called the parchment. Each seed is covered with a thin covering, the silver skin. The seeds are commonly termed coffee beans, a name derived not from any resemblance of the seeds to beans, but from the Arabic word *bunn*, which means 'coffee.' The seeds are also sometimes designated coffee berries. For illustration, see BEVERAGE PLANTS.

The earlier history of the coffee tree is not very clear. It was not known to the Greeks or Romans, but in Arabia it was certainly in use in the fifteenth century. Towards the end of the seventeenth century plants were carried from Mocha to Batavia by Wieser, a burgomaster of Amsterdam, and from the botanical gardens at Amsterdam the Paris Garden obtained a tree. A layer of this was carried out to Martinique in 1720, where it succeeded so well that in a few years all the West Indies could be supplied with young trees. The coffee tree succeeds where the temperature of the year ranges from 60° to 90° F. It does best in a sandy or gravelly soil, well drained, and on high lands or hill ranges from 1000 to 3000 feet above the sea. In Peru and Ecuador it is acclimatized at an elevation of 6000 feet, where, however, frost never occurs. The fruit ripens in hothouses in temperate zones. Coffee plantations

are laid out pretty much in the same way everywhere. Volunteer seedlings that come up under bearing trees or one-year-old trees 12 to 16 inches high are set from the nursery. They need shade at first and in some climates are shaded at all times. In Brazil little of any shade is used. They are pruned to the same height, and the ground between them is carefully kept clear of weeds. Where the climate is dry, abundant irrigation is necessary, but the supply of water is cut off as the fruit begins to ripen, in order to improve its quality. The tree yields its first crop in the third year, and the crop from a full-grown tree may amount to two pounds of coffee beans. The life of a tree is about 40 years. As the coffee tree continues flowering for eight months, its fruits are of very unequal ripeness; in the West Indies and Brazil three gatherings are made annually. The beans are placed on mats or large floors specially adapted for the purpose, where they are dried by the sun's rays, being meanwhile frequently turned. They are passed between rollers to remove the dried pulp of the bean, and the membrane which incloses the seeds themselves, and the coffee is afterward freed from impurities by winnowing, and conveyed in bags to the seaports. As equal care is not, however, bestowed upon the preparation of it in all places where it is cultivated, there are great differences in quality and price. The following sorts are particularly distinguished from one another in commerce: *Mocha coffee*, which comes from Arabia, and is known by its small gray beans inclining to greenish; *Java* or *East Indian coffee*, which has large yellow beans; *Jamaica coffee*, with beans somewhat smaller and greenish; *Surinam coffee*, which has the largest beans; *Bourbon coffee*, with beans pale yellow and almost whitish.

Liberian coffee, *Coffea liberica*, a native of West Africa, is being introduced into some countries, particularly in Ceylon. It is a much larger variety, and thus far it has withstood the ravages of the leaf disease that had nearly destroyed the coffee plantations of that country. This leaf disease, due to *Hemileia vastatrix*, has become very destructive in the East. The American disease, caused by *Stilbum flavidum*, is of importance in Central and South America.

The use of coffee as a beverage was introduced from Arabia, in the sixteenth century, into Egypt and Constantinople. Leonhard Rauwolf, a German physician, was probably the first to make coffee known in Europe, by the account of his travels printed in 1573. Soon after the first introduction of coffee, coffeehouses arose almost everywhere. The first in Europe was established at Constantinople in 1551. In London the first coffeehouse was opened in Newman's Court, Cornhill, in 1652, by a Greek named Pasqua. This Greek was the servant of an English merchant named Edwards, who brought some coffee with him from Smyrna, and whose house, when the fact became known, was so thronged with friends and visitors to taste the new beverage, that to relieve himself from annoyance, Edwards established his servant in a coffeehouse. The first coffeehouse in France was opened at Marseilles in 1671, and in 1672 there was one opened in Paris, which soon had several competitors. In the East coffee is not usually prepared as a beverage in the same way as in Europe, except by Europeans. A decoction of the unroasted seeds is there generally drunk; and for the "Sultan's coffee," the pericarp, with the dried pulp roasted, is employed.

The great demand for coffee has led to the employment of a number of cheaper substitutes, of which chicory (q.v.) root is the best known. Of others, dandelion root, carrot, the seeds of the common yellow iris, cereals, and sweet potatoes may be mentioned. They are prepared by roasting like coffee. The seeds of *Astragalus bœticus* are known on the continent of Europe as Swedish coffee and are said to be the best substitutes for coffee yet discovered. All the substitutes lack the most important constituent of true coffee, viz., caffeine (q.v.), and are therefore very different from it in their qualities. Coffee is subject to great adulteration, most of the articles specified as substitutes being employed for this purpose. The chief substance of mixture is chicory, the use of which is not injurious, however. The chief effect of adding chicory is to deepen the color. The leaves of the coffee trees are used in the western part of Sumatra instead of the seeds. They are prepared by quick drying in a manner similar to that in which tea leaves are prepared, and in this state contain even a larger proportion of caffeine than the coffee beans of our shops. It seems not improbable that the use of the coffee leaf may yet extend very much.

Unroasted coffee has, on an average, the following percentage composition: water, 11.2; protein, 12.1 (including caffeine, 1.2); fat, 12.3; nitrogen-free extract, 42.3; crude fibre, 18.2; ash, 3.9. Roasted coffee contains per cent: water, 1.1; protein, 14.0 (including caffeine, 1.2); fat, 14.5; nitrogen-free extract, 45.8; crude fibre, 19.9; ash, 4.7. Of the total material, some 25 per cent is soluble in water, half of this being nitrogen-free extract. When the beans are roasted till they assume a reddish-brown color, they lose 15 per cent by weight, and gain 30 per cent in bulk; when roasted till they become chestnut brown, they decrease 20 per cent by weight and increase 50 per cent in bulk; while if the roasting is continued till the beans become dark brown, they lose 25 per cent in weight and acquire 50 per cent in bulk. The beans should never be darker than a light brown color, which is quite sufficient to bring out the excellent aroma and other qualities of the coffee; when the roasting is carried further, more or less charring is the result and a disagreeable burned smell is produced, which tends to overcome the natural pleasant aroma. The improvement in flavor by roasting is probably due, in part at least, to the formation of caramel. Coffee does not retard the action of the bowels, as strong infusions of tea tend to do, partly because there is less of the astringent principle, and also owing to the presence of the aromatic oil which tends to move the bowels. The important offices which coffee fulfills are, to allay the sensation of hunger; to produce an exhilarating and refreshing effect; and possibly to diminish the amount of wear and tear, or waste of the animal frame, which occurs more or less at every minute. (See NUTRITION.) The grounds of coffee are nutritious, containing considerable protein, and some of the Eastern nations take advantage of this. The coffee is ground very fine and allowed to remain in infusion, being consumed with it. In most re-

spects coffee possesses properties similar to those of tea (q.v.).

An endless variety of apparatus has been contrived—some of them of great complexity—for preparing coffee for the table. The chief object aimed at by Western nations is to obtain the liquor free from all sediment. In France and elsewhere a very popular beverage is prepared known as *café au lait*. Coffee and milk are boiled separately and mixed in equal proportions immediately before serving. In the so-called French coffeepot boiling water is poured very slowly upon the freshly and finely ground coffee and then allowed to drip through two strainers into the bottom of the pot. This process makes excellent coffee, but is rather slow. Another and much quicker method, used by the Germans, is to infuse coffee like tea, and this has the advantage of bringing out the flavor. In using the Vienna coffeepot the water is poured through a pipe into a lower compartment of the pot. A drum with a strainer at the top is then fitted over the pipe, and in this drum the coffee is placed. A glass cover is adjusted over the pot, which is then placed over an alcohol flame. When the water boils, it rushes through the coffee and through the strainer and pours over the sides of the drum into the upper compartment of the pot, from which it is poured into the cups. The glass cover acts as a condenser of the steam and prevents the aroma from escaping. The nations of the Orient, generally, either follow the usage of the Turks, who drink their coffee thick with sediment; or the nomadic Arabs, who make it from the dried pulp, in much the same manner as tea is prepared in Occidental countries. A more curious method is that of the Somali, who boil the berries in oil and soak maize in the mixture.

The trade in coffee is of great importance. Brazil leads in its production, producing about two-thirds of the world's supply, which in 1910 was 1,996,000,000 pounds. Large exportations are also made from Mexico, Central America, Java, Sumatra, India, Ceylon, Arabia, Hawaii, and the West Indies. The exportation of coffee in 1909–10 was 1,424,000 tons. The coffee crop of the world for 1912–13 is estimated at 984,360 tons. The importation into the United States in 1912 was 885,201,247 pounds, valued at about $117,826,543. Deducting the amount exported, the average consumption per capita is over 9 pounds.

In order to prevent overproduction and maintain prices, Brazil adopted in 1906 a scheme known as the valorization plan, whereby the state through a syndicate held large quantities of coffee, selling only as the market required it. In addition a heavy tax was imposed on all new plantings so as to limit the extension of the area devoted to the crop. At the end of 1909 there were stored in New York and various European ports 901,687,265 pounds of Brazilian coffee subject to the control of the valorization committee. The plan, so far as storage in the United States is concerned, is said to have been abandoned in 1913.

Many sorts of cereal coffee are on the market. They are made of such materials as parched grains, peas, etc. On an average, they contain per cent: water, 6.2; protein, 13.3; fat, 3.4; total carbohydrates, 72.6; ash, 4.5. Only a portion of this material is soluble and enters into the infusion. The infusion of genuine coffee and cereal coffee each contains on the average 98 per cent water and 2 per cent nutritive material. Consult: Walsh, *Coffee: Its History* (Philadelphia, 1902); *Coffee*, pub. by Pan-American Union (Washington, 1909); Keable, *Coffee, from Grower to Consumer* (New York, 1910); McClelland, *Suggestions on Coffee Planting for Porto Rico* (Mayaguez, P. R., 1912). See ADULTERATION.

COFFEE BUG. Any of several sorts of scale insect which live on the coffee tree. The pest is encountered in all parts of the world, and spraying with insecticides or other means of eradication are often necessary to save the crop. It is stated that some years ago the experiment was tried in Ceylon of introducing into the plantations a red ant (*Formica smaragdina*), abundant in many of the gardens and jungles of the island, which feeds greedily on the coccids; but the fierce assaults of the ants on the naked skins of the laborers made them threaten to leave the estates, so that the ants were not further encouraged.

COFFEE-HOUSE POLITICIAN, THE. A play by Fielding (1730).

COFFEEHOUSES. Places of refreshment, first opened in the sixteenth century in Constantinople. In London they were, so to speak, clubhouses free to all who could buy a cup; and yet each was known for its special circle of visitors, literary, scientific, religious, or political. In the absence of newspapers they were a great means of spreading news and of discussing public questions. Nearly all of the middle and higher classes attended them daily, and they came to exert so powerful an influence in politics that in 1675 Charles II attempted to suppress them, but in vain. Consult Macaulay, *History of England*, vol. i (New York, 1858).

COFFEE TREE. See GINKGO.

COF'FERDAM'. A dam built to cut off a small body of water from the adjacent bay, river, etc. It consists of rows of piles, or piles and planking, the space between the rows filled in with clay, cement, or other material. Sheet steel interlocking piling is also extensively used in this form of construction. The term is also applied to iron or steel air-tight inclosures used in digging underwater tunnels or excavations. (See FOUNDATION.) On board modern ships the term is applied to inclosures designed to keep out water. In some cases they surround hatches, but their most important use is to form a continuous double wall at the sides of a ship. Above the protective deck the cofferdam is fitted as a continuous tank (with numerous bulkheads dividing it into sections), extending from that deck to several feet above the water line. It is packed with compressed corn-pith cellulose, or some similar material, which is designed to check the influx of water through a shot hole, which it does by swelling up, as soon as wetted, and closing the hole. If the hole made is not too large or the pressure of water too great, it operates very satisfactorily. Consult Fowler, *Ordinary Foundations, Including the Cofferdam Process for Piers* (New York, 1905).

COF'FEYVILLE. A city in Montgomery Co., Kans., 168 miles by rail south-southwest of Kansas City, on the Verdigris River, and on the Missouri Pacific, the Atchison, Topeka, and Santa Fe, the Missouri, Kansas, and Texas, and the St. Louis, Iron Mountain, and Southern railroads (Map: Kansas, G 8). It contains a

public library. The city carries on an extensive trade with Oklahoma and has strawboard, planing, and flour mills, railroad shops, oil refineries, a plow factory, glass factories, oil-well, packing plant, a large oxide smelter, foundry, vitrified brick works, and a roofing-tile factory. Coffeyville was incorporated in 1871 and adopted the commission form of government in 1909. The water works and the electric-light plant are owned and operated by the municipality. Pop., 1900, 4953; 1910, 12,687; 1920, 13,452.

COF'FIN. In ordinary sense, a burial case; usually a box or chest, in which the dead are inclosed for interment, or sometimes for cremation. In modern times the ordinary material of the case is wood, usually with metallic attachments; lead, copper, iron, glass, terra cotta, stone, etc., are sometimes employed. In earlier times the coffin was chiefly symbolic rather than merely utilitarian, and the material and form varied widely; and the early customs find parallels and interpretations among those of primitive peoples still surviving. Perhaps the simplest type of burial case is that of the Plains Indians, who wrapped the body tightly in a buffalo skin and then placed it upon a scaffold. Among some other tribes the corpse is merely enshrouded in all the habiliments of life, and then placed in a miniature "house of the dead" made in imitation of a dwelling; and this type grades among various peoples into cists of slabs, rock-hewn sepulchres, ornate tombs, and massive sarcophagi. Among riparian and maritime peoples of lowly culture the canoe or boat is the symbol of the home, and the body of a deceased owner may be placed in his vessel, which is portable, and may be borne to a chosen place of sepulture; and it is this type of burial case which can be traced through the customs of many peoples to the ordinary coffin of modern times. See BURIAL; MUMMY CASE; SARCOPHAGUS.

COF'FIN, CHARLES CARLETON (1823–96). An American war correspondent, novelist, and juvenile writer, born at Boscawen, N. H. Beginning as a farmer's boy, he tried civil engineering; then returned to farming, then became an expert telegrapher, and finally undertook journalism in Boston. He first attained distinction during the Civil War, as correspondent in the field for the Boston *Journal*. He served that newspaper also during the Austro-Prussian War of 1866. On his return he became popular as a lecturer and was a member of the Massachusetts Legislature (1884–85). Among his many books are: *The Great Commercial Prize* (1858), advocating a transcontinental railroad corresponding with the present Northern Pacific; *Days and Nights on the Battlefield* (1864); *Following the Flag* (1865); *Winning his Way* (1865); *Four Years of Fighting* (1866); *Our New Way Round the World* (1869); *The Seat of Empire* (1870); *Caleb Krinkle* (1875); *History of Boscawen* (1877); *Boys of '76* (1879); *Old Times in the Colonies* (1880); *Building the Nation* (1883); *The Drum-Beat of the Nation* (1887); *Marching to Victory* (1888); *Freedom Triumphant* (1891). He had a facile style and a vein of characteristically New England humor that secured for his books a wide popularity. Consult Griffis, *The Life of Charles Carleton Coffin* (Boston, 1894 and 1898).

COFFIN, SIR ISAAC (1759–1839). A British admiral, born in Boston, Mass., son of a customs official. He entered the British navy in 1773, served in the American Revolution, and rose through all grades to the rank of admiral (1814), though he was not in active sea service after 1794. He was twice court-martialed (1782 and 1788)—both famous cases in admiralty law. In 1818 he was elected to Parliament, where he remained until 1826. In 1827 he founded and endowed, on the island of Nantucket, a school which is still called by his name.

COFFIN, JAMES HENRY (1806–73). An American mathematician and meteorologist, born at Williamsburg, Mass. He graduated in 1828 at Amherst College and in 1829 opened at Greenfield, Mass., the Fellenburg Manual Labor Institution, the first school of the sort in New England and probably in the country. He was professor of mathematics and astronomy in Williams College in 1838–43, and from 1846 until his death he held the chair of mathematics and astronomy at Lafayette College. His scientific attainments were notable. He erected on Mount Greylock, at a height of about 4000 feet above sea level, an observatory, where careful observations were made by means of a self-registering anemometer of his own device. In 1846 he was appointed one of the first collaborators in the work of the Smithsonian Institution, under whose auspices he published *Winds of the Northern Hemisphere* (1853)—his chief volume, based on data collected from more than 600 stations on land and at sea; *Psychometrical Tables* (1856); and *The Orbit and Phenomena of a Meteoric Fire Ball* (1869). The theory of atmospheric circulation, known on the Continent as the Buys-Ballot (q.v.) law, was announced by him in 1853 at a meeting of the American Association for the Advancement of Science. His further works include *Solar and Lunar Eclipses* (1845) and *Elements of Conic Sections* (1849; 6th ed., 1881). Consult J. C. Clyde, *Life of J. H. Coffin* (Easton, 1882).

COFFIN, JOHN HUNTINGTON CRANE (1815–90). An American astronomer. He was born in Wiscasset, Me., graduated at Bowdoin College in 1834, and in 1836 was appointed professor of mathematics in the United States navy. In 1844 he was detailed to the Naval Observatory. He was professor of astronomy and navigation in the United States Naval Academy from 1853 to 1865, and from 1865 was in charge of the *American Ephemeris and Nautical Almanac*. He published *Observations with the Mural Circle* (1845–49); *Observations on the Total Eclipse of the Sun* (1884); *Navigation and Nautical Astronomy* (7th ed., 1898).

COFFIN, JOSHUA (1792–1864). An American antiquarian, born at Newbury, Mass. He graduated in 1817 at Dartmouth College and afterward became an instructor of the poet Whittier, who paid tribute to his memory in the poem "To My Old Schoolmaster." He was a founder of the New England Antislavery Society, of which he became the first recording secretary. He published a *History of Ancient Newbury* (1845), and *An Account of the Principal Slave Insurrections in the Last Two Centuries* (1860).

COFFIN, LONG TOM. A simple, daring sailor in *The Pilot*, by J. Fenimore Cooper.

COFFIN, LORENZO S. (1823–). An American philanthropist, born in Alton, N. H.

He studied for a few months in the preparatory department of Oberlin College, and for a year taught in Geauga Seminary, Chester, Ohio, where J. A. Garfield and Lucretia Randolph (afterward Mrs. Garfield) were his pupils. Coffin located a homesteader's claim near Fort Dodge, and served with the Thirty-second Iowa Infantry during the Civil War. After the war he was a preacher, and from 1883 to 1888 as a member of the Iowa Board of Railroad Commissioners was prominent in securing legislation for safety appliances on railways. He founded (1893) a Railroad Temperance Association, was one of the incorporators of a Home for Aged and Disabled Railroad Men near Chicago, and was president of the Iowa Anti-Saloon League, and candidate for Governor (1907) on the Prohibition ticket, and for Vice President of the United States (1908) on the United Christian ticket.

COFFIN, William Anderson (1855–). An American landscape painter, born at Allegheny, Pa. He studied at the Yale Art School and afterward in Paris under Bonnat. His work represents the different moods of nature in rural scenery and is characterized by a peculiar personal and uncompromising directness and simplicity. Mr. Coffin was active in the organization of many movements; he was the art director of the Pan-American Exposition of 1901 at Buffalo. At the St. Louis Exposition (1904) he exhibited "Sunrise in Winter" and "Evening, Somerset Valley"; in 1905, "The Last Gleam"; in 1906, "Off New London," "Flame Hill," and "Dawn, October Frost." Other paintings are "Uplands in April" (1911), "Morning" and "Early Autumn" (1912), "A Thunder Shower," "The End of the Storm," and "Early Springtime" (1913). He is represented in the Metropolitan Museum, New York, by "The Rain," and examples of his work are in the museums of Boston, Pittsburgh, Washington, and Buffalo. The Modern Gallery in Venice possesses his "Maple Tree in Spring." Coffin received various medals and is well known as a writer on art. He was elected a member of the National Academy of Design.

COFFINHAL, kō′fē-näl′, Jean Baptiste (1754–94). A French Revolutionist. He was born at Aurillac, Cantal, and after studying medicine and law became a lawyer in Paris. He was president of the Jacobin Club, and in 1792 was appointed justice and vice president of the Revolutionary Tribunal. It is related that when Lavoisier was sentenced to death he said, "The Republic has no need of chemists." Later he became implicated in the fall of Robespierre, whom he attempted to rescue, and although he escaped to the Île des Cygnes, he was betrayed, summoned before the Revolutionary Tribunal, condemned, and executed.

COGALNICEANU, kō-gȧl-nē-chȧ-än′, Michael (1817–91). A Rumanian statesman and historian. He was born at Jassy and was educated at Lunéville (1834) and Berlin. Upon his return he became one of the most active members of the party agitating for the union of Moldavia and Wallachia into a single Rumanian principality, a party which subsequently supported him faithfully. In 1840 he founded the journal *Dacia Literara*, and somewhat later the powerful unionist organ, *Stena Dunărei*. Upon the establishment of the union under Prince Cusa (1859) he was prominent in national affairs, and as Minister of Public Instruction he founded in 1860 the University of Jassy. Under Charles of Hohenzollern, Cogalniceanu was Minister of the Interior from 1868 to 1870; was Minister of Foreign Affairs at the time of the Russo-Turkish War (1877–78), participating in the Congress of Berlin; again Minister of the Interior in 1879–80, and Minister Plenipotentiary at Paris (1880–81). He distinguished himself by his zeal in the cause of educational, legislative, and political reform.

COGHETTI, kō-gĕt′tē, Francesco (1804–75). An Italian historical and religious painter. He was born at Bergamo, and studied there under Diotti di Castalmaggiore and under Camuccini in Rome, where he settled permanently and was for a number of years president of the Academy of San Luca. He was a close student of Raphael, but although a good colorist and much admired in his day, he was never able to free himself from formalism. He painted many altarpieces and frescoes for churches and palaces in Bergamo, Rome, and Savona, notably "The Exploits of Alexander the Great" and the "Parnassus," in the Villa Torlonia, Rome; "The Four Elements" in the Villa Torlonia at Castel Gandolfo. His frescoes and altarpieces in St. Paul's-without-the-walls, Rome, and frescoes in the Basilica at Savona also deserve especial mention.

COGHLAN, kōg′lan, Charles Francis (1841–99). A comedian, of Irish parentage. He was born in Paris, France, and educated for the bar, but adopted the stage, making his first appearance at the Haymarket, London, in April, 1860. After having been leading man of the Prince of Wales's Theatre, he came to America in the autumn of 1876 and played at the Fifth Avenue Theatre, New York City, under Augustin Daly. He was leading man at the Union Square Theatre during the run of *The Celebrated Case*. He appeared at Wallack's Theatre with his sister, Rose; played engagements with Mrs. Langtry (1885–91); created Alec d'Urberville in Mrs. Fiske's production of *Tess of the d'Urbervilles* (1897), and successfully produced (1898) his *The Royal Box*, a version of Dumas's *Kean*. Among his other plays are: *Lady Baxter*, *A Quiet Rubber*, and *Citizen Pierre*. The last he produced without success in the year of his death, which occurred in Galveston, Tex. Coghlan was one of the most graceful yet forceful of modern actors, equally at home in old English comedy and in modern emotional rôles. Consult Clapp and Edgett, "Players of the Present," in the *Dunlap Society Publications* (New York, 1899).

COGHLAN, Rose (1853–). A British-American actress, sister of Charles Coghlan. She was born at Peterborough, England, and her theatrical career began at the Greenock Theatre, Scotland, where she appeared as one of the witches in *Macbeth*. She was first induced to come to America by E. A. Sothern in 1871 and appeared in burlesque at Wallack's Theatre, New York, during the season of 1872–73. From 1873 to 1877 she was again in England, where she played for a time with Barry Sullivan in *Twelfth Night*, and later with Joseph Jefferson in *Rip Van Winkle*. In 1877 she reappeared at Wallack's; the following year she was the Countess Zicka in the first American presentation of *Diplomacy*. In 1880 she made a great hit as Stephanie in *Forget-Me-Not*. She remained at Wallack's Theatre most of the time till 1888, when she played Lady Teazle in *The*

School for Scandal. Her répertoire there included a wide range of characters, which she acted with great resource of feeling and technique. Since then she has starred and has appeared in several large melodramatic productions. In 1909–10 she was with the New Theatre Company, in 1911 she played in *The First Lady in the Land,* and in 1913 she was in the cast of *Fine Feathers.* Consult: McKay, *Famous American Actors of To-day* (New York, 1896); Strang, *Famous Actresses of the Day in America* (Boston, 1899).

COGHLAN, Timothy Augustine (1856–). An Australian statistician, born and educated in Sydney, New South Wales. In 1884 he became assistant government engineer for rivers and harbors, and in 1886–1905 was government statistician of New South Wales. He served also as registrar of friendly societies (1886–1905), member of the Public Service Board (1896–1900), and chairman of the Board of Old-Age Pensions. In 1905 he went to London as Agent General for New South Wales and representative of the Australian Commonwealth on the Pacific Cable Board. Among his important statistical and descriptive works on Australia are: *Wealth and Progress of New South Wales* (1887 et seq.); *Statistics of the Seven Colonies of Australasia* (1897; 1899); *Childbirth: A Study in Statistics* (1900).

COGIA HASSAN ALHABBAL, kō′gyȧ häs′sȧn ȧl-häb′bȧl. One of the tales of the *Arabian Nights.*

COGIA HOUSSAN, hōōs′sȧn. In *The Arabian Nights,* the captain of the Forty Thieves, detected and slain by Morgiana.

COGNAC, kō′nyȧk′ (Lat. *Condate,* Gall. *Condate,* confluence, from *con,* Lat. *cum,* together + *de,* Skt. *dhā,* to place). A town in the Department of Charente, south France, picturesquely situated on an old castle-crowned hill overlooking the river Charente, 31 miles west of Angoulême by rail (Map: France, S., D 3). Cognac is celebrated as the place where the famous Cognac brandy is manufactured, and is the centre of that trade in Charente. Champagne is also made extensively in this district. Francis I was born here in 1494. Pop., 1901, 19,483; 1911, 19,188. Consult L. Ravaz, *Le pays du Cognac.*

COG′NATE (Lat. *cognatus,* cognate, from *co-,* together + *gnatus,* born, from *nasci,* to be born; connected with Gk. *γίγνεσθαι, gignesthai,* Skt. *jan,* to be born). A term applied to relatives of the female branch of a family. It is most commonly employed in the civil (Roman) law and in its technical sense did not come into general use in the English law. In many systems of law cognates rank next after agnates in the inheritance of property. The term is not generally used in the United States. See Agnate; Descent; Inheritance.

COGNIARD, kō′nyär′, Charles Théodore (1806–72) and Jean Hippolyte (1807–82). Two French dramatists and theatrical managers. They were brothers, and wrote themselves and in collaboration with other dramatists about 200 fairy plays, vaudevilles, and other light pieces, which were unusually successful. Their first success was *La cocarde tricolore* (1831), which was played nearly 200 times. Between 1845 and 1869 they were directors, either together or separately, of the Porte-Saint-Martin, the Vaudeville, and the Théâtre des Variétés. Among their best-known pieces are: *Le pays latin* (1832); *Le royaume des femmes* (1833); *Les Chauffeurs* (1835); *La fille de l'air* (1837); *La chatte blanche* (1852); *Les bibelots du diable* (1858); *Le pied de Manton* (1860).

COGNIET, kō′nyā′, Léon (1794–1880). A French historical and portrait painter. He was born in Paris, studied under Guérin and at the Ecole des Beaux-Arts, and won the Prix de Rome in 1817. He first attracted attention with "Marius among the Ruins of Carthage" (1824), now in the Museum of Toulouse. His other important works include "The Massacre of the Innocents" and his masterpiece, "Tintoretto Painting the Portrait of his Dead Daughter" (1845), in the Bordeaux Museum. His portraits include those of Maréchal Maison, Louis Philippe, and M. de Crillon. He decorated several ceilings in the Louvre and the Halle de Godiaque in the Hôtel de Ville, Paris, and a chapel in the church of the Madeleine. At first a Classicist, he early joined the Romantic school. His pictures are fine in composition, but lack creative imagination and are weak in color. He was a noted teacher at the Ecole des Beaux-Arts, Bonnat and Meissonier having been among his pupils.

COGNITION. See Knowledge.

COG′NIZANCE, in legal use commonly kŏn′ĭ-zans (Lat. *cognitio,* investigation, inquiry, from *con,* with, and *nosco,* know). 1. An old term of the common law signifying legal jurisdiction or an acknowledgment of a fact having legal consequences.

Cognizance of Pleas was jurisdiction of causes, a privilege granted by the King to a city or town to institute a tribunal for the trial of suits. Sometimes such a jurisdiction was conferred to the exclusion of that of the regular tribunals of the kingdom. It was by such a grant that the universities of Oxford and Cambridge acquired their legal jurisdiction. It is in this sense that the expression *claim of cognizance* is used, when one court intervenes to assert jurisdiction over a cause which has been wrongfully instituted in another court. The term is not employed in this special signification in the United States, though it occurs in the general sense of jurisdiction, as in the expression "to take cognizance of a cause of action." See Jurisdiction.

In pleading, cognizance signifies a formal acknowledgment of an act alleged, as in replevin, an acknowledgment of the taking of the goods sought to be recovered; and in the fictitious process known as "levying a fine," an acknowledgment by the defendant that the lands claimed are the property of the claimant. See Fine; Replevin; Pleading.

2. A term in heraldry, used in a loose manner, sometimes to signify a crest (q.v.), and sometimes a badge (q.v.) or other distinguishing mark.

COGNO′MEN (Lat., from *co-,* together + *(g)nomen,* name; connected with Lat. *gnoscere,* Gk. *γιγνώσκειν, gignōskein,* Skt. *jñā,* Ger. *kennen,* Eng. *know*). A term used by the ancient Romans for the name by which a *familia* was distinguished from other *familiæ* of a *gens* (q.v.). A Roman of social position ordinarily had three names; of these the last was his cognomen. In *Marcus Tullius Cicero,* e.g., the first name is the *prænomen,* or personal name; the second the *nomen,* or name of the gens; the third is the *cognomen.*

COG′NOSCEN′TI. See Connoisseur.

COGNO'VIT (Lat., he has acknowledged). A written confession of liability by the defendant in an action authorizing the plaintiff to enter judgment for a specified sum, either absolutely or upon terms as to time of entry or payment. It is given only after the action is begun, and before the defendant has answered or otherwise pleaded, and in this respect differs from a confession of judgment, now used in England and in most of the States of the United States, which is given before the action is commenced, but is about the same in form. As originally used, the cognovit is superseded in almost every jurisdiction to-day by an order of the court entered on consent. It is still in use in some of the States of the United States where the forms of common-law pleading are retained.

COGS'WELL, Joseph Green (1786–1871). An American librarian and bibliographer. He was born in Ipswich, Mass., graduated at Harvard in 1806, and studied law, but preferred to teach, and became a tutor at Harvard in 1814. With George Ticknor he spent two years (1816–18) at the University of Göttingen. In 1820 he was made professor of mineralogy and geology and librarian of Harvard College, and in 1823, with George Bancroft, founded the Round Hill School at Northampton, Mass. He removed to New York, to become editor of the *Review* in that city, in 1836; continued in that work until 1842; became a personal friend of John Jacob Astor, and was appointed one of the trustees of the fund to create the Astor Library. He was, besides, the chief adviser of the philanthropist in planning this library. He became superintendent in 1848 and went abroad to purchase volumes for the collection. He also undertook the preparation of an analytical and alphabetical catalogue of the collection. Consult Ticknor (ed.), *Life of Joseph Green Cogswell, as Sketched in his Letters* (Cambridge, Mass., 1874).

COGSWELL, Mason Fitch (1761–1830). An American physician, adopted son of Samuel Huntington, President of the Continental Congress. He was born in Connecticut, graduated at Yale in 1780, and settled in Hartford, where he was instrumental in establishing the first asylum for the deaf and dumb in America. He was also a founder of the Connecticut Retreat for the Insane at Hartford and introduced into America the methods of removing a cataract from the eye and of tying the carotid artery (1803).

COGWHEEL. See Gear Wheel.

COHABITA'TION (from Lat. *cohabitatio,* from *cohabitare,* to dwell together, from *co-,* together + *habitare,* to dwell). The act of a man and woman in living together as husband and wife. Cohabitation does not necessarily involve the notion of sexual intercourse, and in a strict legal sense, as applied to husband and wife, may mean only *consortium,* and not *concubitus;* but the term is commonly held, even in law, to carry with it the latter implication, and this is always so where the parties are unmarried. It raises a legal presumption of marriage between the parties cohabiting, which may, however, be rebutted by other evidence. See Marriage, and the authorities there referred to.

COHAN, George Michael (1878–). An American comedian and playwright, born in Providence, R. I. He first appeared on the stage when nine years old in *Daniel Boone;* later "The Four Cohans" became one of the most popular attractions on the vaudeville stage. Between 1899 and 1914 George M. Cohan wrote and produced a large number of musical comedies and plays, in several of which he himself took leading parts. The list includes: *Little Johnny Jones, The Governor's Son, Forty-five Minutes from Broadway, George Washington, Jr., The Yankee Prince, Get-Rich-Quick Wallingford, The Little Millionaire, Broadway Jones,* and *Seven Keys to Baldpate.* All these plays were very popular, and while not pretentious, had the merit of wholesomeness. Cohan had control of several theatres in New York City until February, 1914, when he retired from business to devote himself to writing and composing.

COHEN, kō'en, Emil (1842–1905). A German mineralogist, born in Jutland. He studied in the universities of Berlin and Heidelberg and from 1867 to 1872 was assistant in mineralogy in the latter university. He then spent a year and a half in South Africa and, after devoting the following years to mineralogical studies and to the preparation of works descriptive of his African explorations, became professor of petrography in Strassburg in 1878. In 1885 he was made professor of mineralogy in Greifswald. His published works include the following: *Geognostisch-petrographische Skizzen aus Südafrika* (1874); *Erläuternde Bemerkungen zu der Routenkarte einer Reise von Lydenburg nach den Goldfeldern und von Lydenburg nach der Delagoabai im östlichen Südafrika* (1875); *Sammlung von Mikrophotographien zur Veranschaulichung der mikroskopischen Struktur von Mineralien und Gesteinen* (1881–83; 3d ed., 1899); *Meteoritenkunde* (2d ed., 1903).

COHEN, Henri (1808–80). A French numismatist and musician, born at Amsterdam, Holland. For a number of years he was curator of the numismatic collection in the National Library in Paris. He wrote the valuable *Description générale des monnaies de la république romaine* (1857) and *Description historique des monnaies frappées sous l'empire romain* (7 vols., 1859–68; 2d ed., prepared by Feuardent, 1880 et seq.). He also wrote an excellent *Guide de l'amateur de livres à vignettes du XVIIIe siècle* (1870; 5th ed., 1886), and was known as a composer and writer on the theory of music.

COHEN, Henry (1863–). An American rabbi, born in London. He was ordained rabbi in 1884, and was pastor at Kingston, Jamaica (1884–85), Woodville, Miss. (1885–88), and Galveston, Tex. (1888–). His publications include *Six Hundred Talmudic Sayings* (1894; 2d ed., 1910) and a translation from the German of Nahida Remy, *Prayer in Bible and Talmud* (1894; 2d ed., 1910).

COHEN, Hermann (1842–1918). A German philosopher, born at Koswig, and educated at Breslau, Berlin, and Halle. In 1875 he became professor at Marburg. As one of the leaders of the Neo-Kantian movement (see Neo-Kantianism), he did perhaps as much as any other follower of Kant to make the Critical Philosophy better known to students. This he has accomplished by banishing the "thing-in-itself" from his system and bringing philosophy into closer connection with the sciences. His contributions to the interpretation of Kant's writings are of permanent value. His works include *Kant's Theorie der Erfahrung* (1871; 2d ed., 1895), which led to the modification of Lange's previously published views of Kant;

Kant's Begründung der Ethik (1877); *Platon's Ideenlehre und die Mathematik* (1879); *Ein Bekenntniss und die Judenfrage* (1880); *Die Nächstenliebe im Talmud* (1884); *Kant's Begründung der Aesthetik* (1889); *System der Philosophie* (1902–06); the 5th–7th eds. of Lange's *Geschichte des Materialismus; Kommentar zu Kants Kritik* (1907); *Religion und Settlichkeit* (1907). Consult Cassirer, in *Kantstudien*, vol. xvii (1912), and *Philosophische Abhandlungen, H. Cohen zum yosten Geburtstag dargebracht* (Berlin, 1912).

COHEN, Jacob (da Silva) Solis (1838–). An American physician, born in New York City, brother of Solomon Solis Cohen. He was educated at the University of Pennsylvania. In 1861, at the outbreak of the Civil War, he became assistant surgeon of the Twenty-sixth Pennsylvania Regiment, and later he was assistant surgeon with Dupont's expedition to Port Royal and with the South Atlantic blockading squadron; from 1864 to the close of the war he served in the army hospitals in Philadelphia. There after 1866 he practiced his profession, giving special attention to diseases of the throat and chest. He also accepted a professorship in the Philadelphia Polyclinic and College for Graduates in Medicine. His publications include: *Inhalation: Its Therapeutics and Practice* (1867; 2d ed., 1876); *Diseases of the Throat* (1872; 2d ed., 1879); *The Throat and the Voice* (1879).

COHEN, Julius Berend (1859–). An English chemist, born at Manchester. He was educated at Owens College, Manchester, and at the University of Munich. From 1884 to 1890 he was demonstrator in chemistry at Victoria University, Manchester, and from 1890 to 1904 was lecturer on organic chemistry at the Yorkshire College. In the latter year he became professor of organic chemistry at the University of Leeds. Besides a number of researches his publications include: *Theoretical Organic Chemistry* (1902); *Practical Organic Chemistry* (1910); *Organic Chemistry for Advanced Students* (2 vols., 1907–13); *Organic Chemistry* (1912); *Smoke: A Study of Town Air* (1912).

COHEN, Katherine M. (1859–1914). An American sculptor and painter. She was born in Philadelphia and studied at the Pennsylvania and New York academies of design under Boyle and Saint-Gaudens, and also in Paris under Mercié and Puech. She is best known for her reliefs and decorative figures of half-legendary personages, such as "Priscilla," "Romola," and "Rabbi-Ben-Ezra." An heroic figure, "The Israelite," was exhibited in the Paris Salon of 1896, and one of her most important works, the statue of General Beaver for the Smith Memorial, is in Fairmount Park, Philadelphia. Among her portrait busts are those of Mayor Sulzberger and Lucien Moss. She is also known as a painter of figures, landscapes, and miniatures. Her work is imaginative and shows delicacy of treatment.

COHEN, Solomon Solis (1857–). An American physician, born in Philadelphia, brother of Jacob (da Silva) Solis Cohen. He was educated at Jefferson Medical College, where he served as lecturer on clinical medicine from 1888 to 1902, and thereafter as professor. From 1887 to 1902 he was also professor of clinical medicine and therapeutics at the Philadelphia Polyclinic and College for Graduates in Medicine; and in 1890–92 he lectured on therapeutics at the Dartmouth Summer School. He was recorder of the Association of American Physicians from 1902 to 1913. He served as physician to the Philadelphia General, Jefferson, Rush, and Jewish hospitals, edited *System of Physiologic Therapeutics* (11 vols., 1901–05), and was for a time editor of the *Philadelphia Polyclinic* and coeditor of the *American Hebrew*. His publications also include: *Therapeutics of Tuberculosis* (1891); *Essentials of Diagnosis* (1892; 2d ed., 1900); *The True Rôle of Drugs in the Management of Tuberculosis* (1901).

COHERER (from *cohere*, from Lat. *cohærere*, to cling together, from *co-*, together + *hærere*, to cling). An instrument invented in 1890 by Professor Branly, of Paris, for the detection of so-called "electrical waves," i.e., of waves in the ether produced by electrical oscillations. (The principle of this action had been discovered before by Munk, Varley, and Calzecchi-Onesti.) The coherer was carefully studied by Lodge in England in 1894 to detect the existence of electric waves created by a spark discharge and by Popoff in Russia in 1896 in investigations on atmospheric electricity. Marconi then adopted the instrument for use in wireless telegraphy, and in an improved form it figured in his patent specifications. It consists essentially of a tube containing minute filings of some metal, into each end of which a wire enters for a sufficient distance. It has been observed that under ordinary conditions such a tube does not allow an electric current to pass; but, if electrical waves fall upon it, a current can be passed most easily, thus affording a simple means of telling when electrical waves are passing. One explanation is that, when put in the tube loosely, the filings do not make electrical connection, owing to thin surface layers of condensed gases, etc.; but under the action of the electrical waves these layers are cleaned off, possibly by minute sparks passing between the filings, and thus establishing metallic connection through the tube. If, after the waves have passed, the tube is tapped forcibly, the filings are knocked apart, and the tube again becomes a nonconductor. The metals whose filings are used ordinarily are silver and nickel. Others might be used, but it has been shown that with some substances the electrical resistance is increased by the waves, not decreased. Consult Fleming, *An Elementary Manual of Wireless Telegraphy and Wireless Telephony* (London, 1908); id., *The Principles of Electric Wave Telegraphy and Telephony* (ib., 1910); Moncton, *Radio-Telegraphy* (New York, 1908). See Wireless Telegraphy.

COHE'SION (Fr. *cohésion*, It. *coesione*, from Lat. *cohærere*, to cling together). The name given to that property of matter observed when two portions of the same matter are brought closely into contact; thus one speaks of the cohesion of water, meaning the forces manifest at any point in water owing to the mutual action of the molecules. Sometimes the word is used to express the phenomenon observed when two pieces of a solid are stuck together, such as two pieces of glass, two pieces of lead, etc. The forces of cohesion in a liquid are greatly affected by having substances dissolved in it, and, in short, by anything which affects the molecules or their arrangements.

COHN, Adolphe (1851–). An American educator, born in Paris and educated at the University of Paris. He served in the Franco-

Prussian War, studied law in Paris, and in 1875 came to the United States. In 1882 he became tutor in French at Columbia University, where, after teaching French at Harvard in 1884–91, he became professor of Romance languages and literatures. He edited many French textbooks and, with Curtis Hidden Page, a series called *French Classics for English Readers*, and delivered the lecture on French literature in the Columbia University *Lectures on Literature* (1911). He contributed to the first edition of the NEW INTERNATIONAL ENCYCLOPÆDIA.

COHN, kōn, FERDINAND JULIUS (1828–98). A German botanist, born at Breslau. He studied at the universities of Berlin and Breslau, became connected with the latter institution in 1850, and was made full professor there in 1871. His investigations concerned chiefly the physiology and morphology of plants, to our knowledge of which he made numerous contributions of the highest importance. He is best known for his careful studies of the life histories of the lowest forms of plant life, of great service in promoting bacteriology. He also studied insect-killing fungi and germ-caused diseases, and made a microscopic analysis of water. Besides a number of papers on special topics of his science, his published works include the following: *Zur Naturgeschichte des Protococcus pluvialis* (1850); *Untersuchungen über die Entwickelungsgeschichte der mikroskopischen Algen und Pilze* (1853); *Die Wunder des Blutes* (1854); *Anthrax* (1876); *Neue Untersuchungen über Bakterien* (1872–75); *Die Pflanze Vorträge aus dem Gebiete der Botanik* (2d ed., 1895–97). He also edited the *Beiträge zur Biologie der Pflanzen* and the *Kryptogamenflora Schlesiens.* One of his best-known contributions to science was the demonstration that bacteria are plants. Consult Pauline Cohn, *Ferdinand Cohn, Blätter der Erinnerung* (Breslau, 1901).

COHN, GUSTAV (1840–). A German economist. He was born at Marienwerder and studied at Berlin and Jena. His tour through England in 1873 gave him the materials for his work, *Untersuchungen über die englische Eisenbahnpolitik* (1874). In 1884 he became professor of political science at Göttingen and in 1892 was a member of the Imperial Commission to investigate the affairs and regulations of the Stock Exchange. His works include: *System der Nationalökonomie* (1885 and 1898; Eng. trans. in the *Economic Studies* of Chicago University); *Zur Geschichte und Politik des Verkehrswesens* (1900); *Zur Politik des deutschen Finanz-Verkehrs- und Verwaltungswesens* (1905); *The Science of Finance* (trans. by T. B. Veblen, 1895); *Ueber die staatswissenschaftliche Vorbildung zum höhern Verwaltungsdienst in Preussen* (1900).

COHNHEIM, kōn'hīm, JULIUS FRIEDRICH (1839–84). A German pathologist, born at Demmin in Pomerania. After studying medicine at several universities, including those of Berlin and Würzburg, he became connected with the pathological institute of the Charité, Berlin. In 1868 he was made professor of pathology at Kiel, from 1872 to 1878 was professor at Breslau, and during the last years of his life held a similar position at Leipzig. His published works include the following: *Untersuchungen über die embolischen Prozesse* (1872); *Neue Untersuchungen über die Entzündung* (1873); *Vorlesungen über allgemeine Pathologie* (1877–80); *Die Tuberkulose vom Standpunkte der Infektionslehre* (1881). Cohnheim was the first to demonstrate that pus consists largely of white blood corpuscles, thus throwing much light on the nature of inflammations. Consult: Ponfick, *Gedächtnisrede auf Cohnheim* (Breslau, 1884); also, Kühne's biographical sketch published with the *Gesammelte Abhandlungen von J. F. Cohnheim* (Breslau, 1885).

CO'HO (American Indian). A local name in Alaska for the silver salmon (*Oncorhynchus kisutch*, or *millstschitsch*). See SALMON.

COHOES, kō-hōz'. A city in Albany Co., N. Y., 9 miles (direct) north of Albany; at the junction of the Mohawk and Hudson rivers, and on the Delaware and Hudson and the New York Central railroads (Map: New York, G 5). The Erie and Champlain canals also pass through the city, uniting a short distance to the south. In this section of the Erie Canal there are several locks which lift the boats from the lower level of the Hudson valley to that above the Mohawk Falls. The city is furnished with abundant water power by the Mohawk, here crossed by a long railroad bridge affording a fine view of the falls, which are 75 feet high and 900 feet wide. A dam above the falls stores the water which is supplied by canals to the mills and factories. Cohoes is noted as a manufacturing centre, its industries including large cotton, woolen, and knitting mills, axe factories, rolling mills, iron foundries, machine shops, furniture, soap, paper-board, sash and door, and shirt and collar factories. Cohoes was for many years a part of the Rensselaer Manor. Its first settlers were Dutch and probably came as early as 1630. It was incorporated as a village in 1848 and in 1870 was chartered as a city. The water works are owned by the municipality. Pop., 1900, 23,910; 1910, 24,709; 1920, 22,987.

CO'HORT (Lat. *cohors*, originally meaning inclosure, connected with Gk. *χορτός, chortos*, garden, OIr. *gort*, sedge, Ger. *Garten*, garden, AS. *geard*, Eng. *yard*). A portion of a legion in the ancient Roman armies. Usually there were 600 men to a cohort, and 10 cohorts to a legion (q.v.). (See CENTURION.) The term *Prætoria Cohors* sometimes denoted, under the Republic, the suite of the governor of a province; under the Empire it designated the famous Prætorian Guard, bodyguard of the Emperor, which had so much to do with the making and unmaking of Roman emperors.

CO'HOSH. The American Indian name of black snakeroot (*Cimicifuga racemosa*). It occurs in the United States from Maine to Wisconsin and south to Florida. The rhizomes, which are employed in medicine, contain resin, wax, tannin, and a crystalline principle. Alterative, sedative, and emmenagogue properties are attributed to it. See Plate with article SANGUINARIA.

COIF (from OF. *coife*, Fr. *coiffe*, It. *cuffia*, from ML. *cofia*, coif, from OHG. *chuppa*, cap under the helmet, from *chuph*, Ger. *Kopf;* connected with AS. *cuppe*, Eng. *cup*). 1. Originally a covering for the head, worn by both men and women; later a sort of skullcap, especially the one worn by English serjeants at law. The old idea that the coif was intended to conceal the ecclesiastical tonsure has no foundation. The origin of the legal coif was a black skullcap worn on top of the white coif; when the wigs came into fashion, the coif became the black patch with a white edge, worn on top of the

wig; this is the form used by English serjeants at law.

2. In the armor of the Middle Ages, a defensive hood, usually surmounted by a helmet, sometimes continuous with the hauberk and sometimes separate. Consult Pulling, *Order of the Coif* (London, 1897).

COIMBATORE, kō-ĭm'bȧ-tōr', or **KOIMBATUR**, kō-ĭm'bȧ-tōōr' (Telugu, also *Koiampadi, Koibmutur, Koiamuturu*). A city in Madras, British India, capital of the district of the same name, situated near the left bank of the Noyil, a tributary of the Kavery (Map: India, C 6). It lies 305 miles by rail southwest of Madras, and is situated 1483 feet above sea level. It is cool and healthful, but the adjacent plains are malarious. It is the seat of French, English, and German missions, and is the educational centre of the district, with Coimbatore and St. Michael's colleges and a college of agriculture. Convicts numbering 1340 are engaged in weaving cotton fabrics; its other chief products are yarn, leather, coffee, sugar, spirits, and saltpetre. The suburban Pagoda of Perur is an important archæological structure. Pop., 1891, 46,400; 1901, 53,080; 1911, 47,007.

COIMBRA, kō-ēm'brȧ. A city of Portugal, capital of a district of the same name, in Beira, picturesquely situated, partly on a steep rock and partly in a plain, amid vineyards and orange orchards, on the right bank of the river Mondego, 110 miles north-northeast of Lisbon (Map: Portugal, A 2). The upper town is badly built, its streets being steep, narrow, and dirty. Of the public buildings, the most noteworthy are the cathedral, the churches of São Francisco and São Salvador, and the convents of Santa Cruz and Santa Clara. There is here a fine aqueduct of 21 arches, which dates from the sixteenth century. The famous University of Coimbra (q.v.) is the oldest university in Portugal. Coimbra has manufactures of linen, woolen, earthenware, and combs. Pop., 1900, 18,424. The city Coimbra occupies the site of the Roman Æminium, according to a fourth-century Latin inscription, but the name was transferred in the ninth century with the transferal of the bishopric from the neighboring town of Condeixa, which had been called till then Conimbriga, or Conembrica. In 1064 it was taken from the Moors by Ferdinand I, and for 250 years (1129–1383) was the capital of Portugal. It was the scene of prolonged fighting between Masséna and Wellington in the campaigns of 1810 and 1811.

COIMBRA, UNIVERSITY OF. A national university of Portugal and, until the foundation of the University of Lisbon, in 1910, the only university in that kingdom. With some 1400 students in law, medicine, mathematics, and philosophy, its library, hospitals, observatory, museums, and laboratories, it is an institution of great national importance. Its history is long and checkered. Founded about 1290 by the poet king, Diniz, at Lisbon, a supplementary charter was issued in 1308, transferring it, because of dissensions between town and gown, to Coimbra, the first of a long series of migrations which make it unique among universities. From 1308 to 1380 it vibrated between Coimbra and Lisbon, in the latter year being settled at Lisbon. In 1537 it migrated again to Coimbra, where it has since remained. It was at the beginning of this last period that it reckoned Camoëns (see CAMÕES) among its members. Alone among continental universities to-day, it preserves the mediæval academic dress; and in this, as in its architecture, traditions, and customs, it finds its only rivals in picturesque interest in Oxford and Cambridge. Consult Braga, *Historia da Universidade de Coimbra* (Lisbon, 1892).

COIN'AGE (from Eng., OF. *coin*, wedge, piece of money, from Lat. *cuneus*, wedge; connected with Gk. *κῶνος, kōnos*, cone, Skt. *śāna*, whetstone, from *śā*, to sharpen). Coins are pieces of metal designed to circulate as money, whose weight and fineness are certified by the impressions they bear. These impressions are the symbols of the authority by whose orders the coins are issued, but they also bear an important function in maintaining the integrity of the coin. To insure constancy in the weight of the coin it is necessary to protect it against clipping and against unnecessary wear and tear, or abrasion. The form of the coin is, in itself, a guaranty. Convenience of carriage, as well as greater durability, has given the preference to a rounded, generally a circular, coin over other shapes. Where, as in Japan, we find oblong coins, the corners are generally rounded off. The symmetry of outline guarantees the coin. This is heightened by milling the edges. Raised inscriptions served the same purpose and do so better than incised letters, which are also used. The design upon the face of the coin is usually protected by raised edges, which project as much as the highest part of the design.

The importance of these features of modern coins in maintaining intact the weight of the coin by showing at once any attempted clipping, and by preventing the wearing off of surfaces by use, can best be appreciated by comparing them with the crude, irregular disks from which early coins were made, and the high relief of many of the designs upon them.

Gold and silver were used in settling accounts before coins were invented, but scales were a necessary adjunct of such transactions. Just as gold dust is weighed in the mining regions, so all exchanges effected by the metals before the introduction of coinage involved weighing the metal used. The prevalence of exchange by weight is reflected in the correspondence, at least in their origin, between coins and measures of weight. To go back no further than the origin of English money, it is sufficient to recall that the monetary pound was once a pound weight of silver. This system was derived from the money of Charles the Great, and while in the subsequent development they departed widely from the original source, the monetary systems of modern Europe all trace back to the pound of silver.

The invention of coins, which in classical antiquity seem to have been first used in Lydia, did away in a measure with the necessity of weighing. In the multiplicity of Grecian states coins were numerous, and while this was removed by the Roman Empire, it reappeared with the breaking up of the Empire of Charles the Great. Not only did each nation make its own coins, but, with the disintegration of central authority, nobles and cities usurped this right or had it conferred upon them by feeble monarchs. The multiplicity of coins restricted the area within which they were current. Outside of such areas they had no legal validity; they did not pass by count, but, if at all, only by weight. Certain coins, however, bore such an excellent reputation for uniformity and excel-

lence of workmanship that they acquired an international circulation and passed generally by count or tale. As modern centralized states became strongly rooted, a unification of the coinage took place, and the numerous units disappeared. Improvements in the processes of coinage have made effective the certification of weight and fineness which coinage implies.

The right to coin money is a prerogative of the state and one of the foremost marks of sovereignty. The circulation of coins rests, in the first instance, upon the authority of the state, but that authority must be exercised in good faith. Coinage issued by individuals would lack authority and lack also the guaranty of good faith. There have been occasions of great dearth of money where private persons have issued coins. Such issues are known as tokens and gain circulation either from their similarity to legal coins or from the promise of redeeming them. Their total lack of uniformity gives a picture of what might be expected were the issue of coins left wholly to private initiative. Almost equally obvious is the necessity for the manufacture by the state of the coins which it issues. To delegate the manufacture of its coins to a private establishment, as was done in France before 1879, requires such a minute control of all its operations by state officials that the plan has generally been abandoned. The greater integrity of a national mint over a private enterprise is further illustrated by the fact that the mints of the leading nations are frequently called upon to execute the coinage for smaller states which have no mints of their own. Thus, in 1901, the United States Mint executed a gold coinage for Costa Rica.

The metallic circulation of a country usually consists of standard coins and token coins, with respect to whose issue different rules prevail. The first are those of the standard monetary metal, and their coinage is usually free. This means that such coins are freely issued to individuals who bring bullion to the mint for coinage. There may be a coinage charge or this transformation may be made gratuitously by the state. Gratuitous coinage, which prevails in England and the United States, is favored because it promotes the transformation of bullion into coin to meet the demands of trade. A coinage charge, as in France (7 francs 44 centimes per kilogram of gold, or 3437 francs), is justified on the ground that the value of the coin is greater than that of the bullion by the cost of production; and, further, that the policy of the government should be to give reasonable ease to the transformation, but not to favor a constant oscillation between coin and bullion. The English language knows but one name, seigniorage, for such coinage charges, whether they merely cover the cost of coinage (Fr. *brassage*) or are high enough to involve a profit. High seigniorage charges upon the standard money metal defeat the purposes of free coinage and are no longer customary. See SEIGNIORAGE.

Token coins are those whose metallic value is less than their nominal value. As such coinage involves a profit to the state, the state reserves the right of issue to itself. (See MONEY for an exposition of the principles of such issues.) In the United States this applies to the silver, nickel, and bronze coins. The metallic value of the coin is no protection against its unauthorized issue by individuals, but this protection is secured by the laws punishing counterfeiting. The processes of manufacturing a good counterfeit are so complex and require such heavy machinery that the secret manufacture can hardly escape detection.

Important considerations in coinage legislation, apart from the larger monetary aspects, are to secure uniformity in the coin at its manufacture and to maintain the integrity of the coin in circulation. Absolute accuracy in weight and fineness for every coin issued is out of the question. The law therefore allows, in the manufacture of coin, a certain tolerance both of weight and fineness. Variations within these limits, over or under the standard fixed by the law, do not disqualify the piece from issue. In former days these limits were often set quite wide, and by systematically getting under rather than over the average, considerable profits were stolen from the coinage. This was one of the abuses of the old régime in France which awakened the ire of the legislators of the Revolution when they took the reform of the coinage in hand. It should of course be the object to make these limits as narrow as possible, with the idea that the deviations, one side or the other, should balance, so that for the mass of the coinage the legally established standard should prevail. In the United States the standard fineness for both gold and silver is 900, and no gold ingot showing a greater deviation than one-thousandth, or silver ingot with a greater deviation than three-thousandths, can be used in coinage. As to weight, the rule for single pieces prohibits deviations of more than one-half a grain for the double eagle (516 grains legal weight) or eagle, or more than a quarter of a grain for the half eagle. The law also provides that in "weighing a number of pieces together, when delivered by the coiner to the superintendent, and by the superintendent to the depositor, the deviation from the standard weight shall not exceed one-hundredth of an ounce in $5000 in double eagles, eagles, and half eagles."

Every effort is made, by watching the process of manufacture, to insure the observance of these rules. Trial pieces of every lot of coin which passes through the mints must be reserved. Once a year an Assay Commission is appointed for the examination of these sample pieces, which are both weighed and assayed. The accuracy of the work of the United States mints is shown by the report of the Assay Commission for 1901 that the fineness of gold coins varied from 899.5 to 900.2, the legal limits being 899 to 901, while that of silver coins varied from 898.2 to 900.9, the legal limits being 897 to 903.

In the circulation of coins from hand to hand, the friction gradually wears the impressions off and reduces the weight of the coin. It is, therefore, customary for coinage legislation to determine the point at which the coin loses its legal validity. In the United States gold coins which have lost more than one-half of 1 per cent of their weight in 20 years from date of issue, or proportional amounts for less periods, are legal tender only by weight. All such coins received by the government must be recoined. The depreciation of coins by abrasion has, in earlier times, been a serious problem. By a familiar monetary law (Gresham's Law) full-weight money is always preferred for export, while the worn coin remains at home. If the home circulation is much worn, there is a great temptation to "sweat" all the new coins which come

from the mint for the profit of the transaction. Hence the necessity from time to time of general recoinage of the money in circulation. The government calls in all outstanding coins of certain dates and replaces them with new coins, declaring, moreover, that after a certain date the coins not presented shall lose their legal-tender quality.

In England, coining, although a prerogative of the crown, is regulated by Parliament. By the Constitution of the United States the power of coining money, regulating the value thereof, and of foreign coin is granted to Congress, and the several States are prohibited from coining money as well as from making anything but gold and silver coin a tender in payment of debts. The uttering of spurious coin, therefore, is a crime against the United States. It is also punishable by a State government as a cheat. Coin has been judicially defined as "a piece of metal stamped and made legally current as money." A counterfeit coin is one made falsely in imitation of the genuine, and intended to resemble or to pass for it. The mutilation or debasement of United States coin, as well as the fraudulent importation or use of spurious foreign coin, is a crime under Federal statutes. See COUNTERFEITING.

Consult also *Reports of the Director of the Mint; Coinage Laws of the United States;* Hepburn, *History of Coinage and Currency in the United States* (New York, 1903). See MINT; MONEY; NUMISMATICS; LEGAL TENDER.

COIR (Tamil *kayiru*, cord), or COCONUT FIBRE. The fibre of the husk of the coconut palm. Coir is a corruption of a word meaning "rope." Its manufacture is an important industry, both in England and America. The fibre of the husk is divided into two classes—the ordinary fibre converted directly into mats, and the so-called brush fibre, which lies just under the skin. The latter is packed under great pressure and then shipped to the manufacturer. It is spun by special machinery and produces a perfectly cabled yarn, which is woven into doormats or ordinary yard matting. In 1913 the coir yarn imported into the United States amounted to 7,322,314 pounds, valued at $312,-049. The refuse from coir is used for stuffing mattresses, and also in horticulture as a protection against insects for vines and young trees.

COIRE, kwär. See CHUR.

COIT, JAMES MILNOR (1845–). An American teacher, born at Harrisburg, Pa. He received his education at Hobart College and was connected for some time with the Cleveland Tube Works. In 1876 he became master in natural sciences at St. Paul's School, Concord, N. H., of which school he was appointed vice rector in 1904. He engaged in research work at the University of Munich in 1909, and later became head of the Coit School for American boys in Munich. His publications include the following works: *A Manual of Chemical Arithmetic* (1886); *Treatise on the X-Rays and their Relation to Medical and Surgical Sciences* (1897); *Liquid Air* (1899).

COIT, STANTON (1857–). An American leader in the Ethical Culture movement, especially in England. He was born in Columbus, Ohio; studied at Amherst, at Columbia, and at Berlin, where he took the degree of Ph.D.; was head worker of the New York University Settlement, and became an *aide* of Felix Adler in the Society for Ethical Culture. In 1888 he went to London as minister of the South Place Ethical Society. He became president of the West London Ethical Society, preached in the Queen's Road (Bayswater) Ethical Church, and in 1910 was a Labor candidate for Parliament from Wakefield. He was editor of the *International Journal of Ethics* in 1893–1905; did much for the organization of the English ethical societies, especially in compiling *The Message of Man: A Book of Ethical Scriptures* (1902), an *Ethical Hymn Book* (1905), *Responsive Services* (1911), and *Social Worship* (1913); and wrote translations of Gizycki's works on ethics. He published: *Die ethische Bewegung in der Religion* (1890); *National Idealism and a State Church* (1907); *National Idealism and the Book of Common Prayer* (1908); *Woman in Church and State* (1910); *The Soul of America* (1913). See SOCIETIES FOR ETHICAL CULTURE.

COI'TER, VOLCHER (1534–90). A Dutch anatomist, born at Groningen. He studied in France and Italy, where he heard the lectures of Fallopius at Pisa, was city physician of Nuremberg, and later was attached as surgeon to the army of Johann Kasimir, Count Palatine of the Rhine. He is considered one of the founders of the science of pathological anatomy. Numerous anatomical discoveries are credited to him, including that of the superior muscles of the nose. His studies in osteology and myology are partially set forth in the volumes *Tabulæ Externarum et Internarum Humani Corporis Partium* (1573) and *Lectiones Gabrielis Fallopii* (1575), which are also interesting as revealing one of the earliest attempts at an examination of the internal structure of birds. Indeed, his table, *De Differentiis Avium*, included in the latter, is among the first ornithological classifications.

COJUTEPEQUE, kō-hōō-tā-pā'kā. The capital of the Department of Cuscatlán, Salvador, about 20 miles east by north of San Salvador (Map: Central America, C4). It is situated north of the volcano Cojutepeque and near Lake Ilopango. The city has considerable transit trade. Cojutepeque, for a few years after 1854, when San Salvador was destroyed by an earthquake, was the capital of the republic. Pop., about 10,000.

COKE (probably connected with *cake*). A hard, brittle, porous solid of a blackish-gray color and more or less metallic lustre. It does not soil the fingers when rubbed and gives no smoke when burning. It absorbs moisture from the air to a very great extent. In general, the operation of making coke consists of expelling by heat the volatile elements of bituminous coal. The residue resulting consists chiefly of carbon, mixed with varying amounts of ash containing sulphur and phosphorus, and is known as coke. In the manufacture of illuminating gas coke is produced as a by-product (see GAS, ILLUMINATING); but this method is inadequate to produce the requisite quality and amount, and the manufacture of coke is itself an industry of great and rapidly increasing importance. Coke, charcoal, and anthracite coal are the fuels most used in metallurgy, and of these coke possesses the advantages and is without the disadvantages of the other two. Its hardness enables it to sustain the weight of furnace charges, and its porosity helps to make it readily combustible. Charcoal is too soft, while anthracite coal, which is in reality a natural coke, is hard enough, but so dense in structure that its combustion is slow and its calo-

rific energy moderate. The superiority of coke is due to its cellular structure. The walls are hard and vitreous, and the tiny passages between afford free course for the oxidizing gases of the blast furnace. Besides its use in metallurgy, coke is an important fuel in other industrial operations, especially in cities where the emission of smoke from the combustion of bituminous coal is prohibited. It is also adapted for the use of locomotives. In 1899 the Boston and Maine Railroad began using coke as a fuel. Its advantages are that it is smokeless and does not produce sparks, thus decreasing the number of fires caused by the locomotives. Coke is also employed as a filtering material in water and sewage purification, being used extensively for the latter purpose, particularly in English practice.

Not all bituminous coals can be made into coke, and much experiment and research on the part of chemists have been devoted to ascertaining the necessary constituents of a good coking coal. It appears that the coking property of coal is independent of the constituents, such as moisture, fixed carbon, ash, and sulphur, which it contains, and depends wholly upon the relations and volumes of the elements composing the *volatile combustible* matters of the coal. Just what these relations and volumes are has not been definitely shown. In continental Europe, where the manufacture of coke has been very highly developed, only a poor quality of coal is available, and much ingenuity has been expended in constructing furnaces suitable for this inferior grade of material. In America there has been as yet an abundant supply of coal of the very best quality for coking purposes, the supply having been drawn chiefly from the Connellsville coal of Pennsylvania, that from the Warrior basin coal beds of Alabama, the Flat Top-Tug River district, and other mines of West Virginia, and the Pocahontas coal of Virginia. But, with the increasing demand for coke for metallurgical and other purposes, poorer grades of coking coal must be drawn upon.

The preliminary preparation of coal for the manufacture of coke is chiefly a cleansing and separating process. Some of the best coking coal requires no special treatment, but is charged into the coke ovens direct from the mines. It is usually found advantageous, however, to break up the coal into small pieces, in order that the volatile matter may be utilized to the utmost extent. When the coal is not uniform in size, it is found that it cokes unevenly, the finer portion fusing much more rapidly. When there is much slate in the coal, it is necessary to wash it; the slate separating itself from the coal in the process of washing, on account of its greater weight. Fire clay also will be separated and washed out. Before washing, however, it is necessary carefully to sort the coal according to size. Various machines of great efficiency have been devised for crushing, sorting, and washing coal ready for the ovens, which are described in great detail, as are also the different forms of coke ovens, by John Fulton in his *Treatise on the Manufacture of Coke* (Scranton, Pa., 1905). Three general methods have been followed in the process of transforming coal into coke. The first was the primitive and wasteful process, borrowed from the charcoal burners, of *open-air burning*. The coal is simply piled in a rectangular heap on the ground, with longitudinal and vertical flues running through it, in which enough wood is placed to ignite the whole mass of coal. The fire is lighted at the base of the vertical flues and gradually extends through the mass. When the mass ceases to flame, it indicates that the gaseous matter has been expelled, and the fire is partially smothered by covering the heap with fine dust. Last of all, the mass is sprinkled with a hose, the water being at once converted into steam, which permeates the whole mass. This process is called *coking in heaps* and requires from five to eight days.

The second method of making coke, and one which is still largely employed, is in the *beehive oven*, many improvements in its construction having been made from time to time. As late as 1893 all of the 44,201 coke ovens in the United States were constructed on the beehive plan. The chief advantage claimed for it is that it produces from prime coking coals the best quality of metallurgical fuel. A minor advantage is that water is applied to cool it, while the coke is still in the oven, after which the oven heat reduces the amount of moisture in the coke. The great disadvantage of the beehive oven is that, as ordinarily constructed, the valuable by-products—gas, ammonia, and tar—contained in the volatile matter are entirely lost, though in rare instances the burning gases are used to generate heat, light, and power. This oven is not adapted to inferior grades of coal. It derives its name from the dome shape of its interior. It is usually built of stone masonry, on a firm foundation, with its interior lined with specially designed fire brick. The beehive oven is usually about 12 feet in diameter and 6 to 7 feet high in the centre. The coal is charged through a hole in the centre of the roof and is leveled off to an even depth of about 23 inches. The fresh charge is fired by the heat remaining in the walls from the previous charge, and the combustion is supported by air admitted through the front door, over the top of the charge. The volatile matter in the coal is driven off by the heat and burned in the top of the oven, along with a portion of the fixed carbon. The source of heat being at the top, the coking process proceeds downward and is effected by the partial combustion of the charge itself. In England, and in a few American plants, the volatile matter is gathered into a conduit, carried under boilers and burned, to raise steam for pumping water and other purposes; but usually the gases escape directly into the open air and are wasted.

A recent type of oven is rectangular instead of circular in form and so built that the coke may be pushed instead of drawn from the coking chambers. The beehive oven with the partial combustion method has long since been abandoned in Belgium and Germany, and coke is made in retorts as outlined below, where various valuable by-products are saved, and an increased yield amounting to about 15 per cent is obtained.

As early as 1766 attempts were made in Germany to save the by-products from coke ovens. It is now accomplished in the *retort oven*, which was devised in Europe for the double purpose of saving the by-products and of utilizing for coke making inferior grades of coal. Very slow progress was made in developing the process, and it was not until 1883

that it was put upon a paying basis. This was due to the unsatisfactory design of the early coke ovens and to the low price of the by-products, on account of the supply from gas works. In 1856 Knab of France built a group of retort coke ovens which had for their object, in addition to the making of coke, the double purpose of separating the tar and ammonia from the gases generated and of then returning these gases to be burned in the flues to heat the ovens. The principal defect of these ovens was the failure to proportion the several parts to the quality of coal to be coked. This mistake was corrected by Carvès of France in the Knab-Carvès oven of 1873, which has proved a model for later ovens. Coke produced in by-product ovens was regarded with disfavor till Dr. Otto introduced improvements which were patented in 1883 and are embodied in the Otto-Hoffmann coke oven, to which the Siemens regenerator is applied. In 1887 the Semet-Solvay oven for coking dry coals, or a mixture of pitchy and dry coals, came into notice, first introduced into the United States in December, 1893. The Belgian ovens, designed for coking poor grades of coal, are also widely used in Europe.

The retort oven used in the Semet-Solvay process, as now built, is a long, narrow chamber 36 feet 3 inches long, 11 feet 10 inches high, and from 17 to 21 inches wide, depending on the quantity of the coal to be coked. The ovens are built in blocks of from 25 to 34, separated by flues in which gas is burned, the heat from which cokes the coal. The charge is introduced through several openings in the top, the ovens are nearly filled, and then tightly sealed. As the heat in these ovens comes from the sides instead of the top, as in the beehive oven, the flow of gases generated is from the sides to the centre, while the free expansion of the coke is somewhat checked. As a result, some coals that in a beehive oven make a coke that is too soft and spongy for blast-furnace use are hardened and strengthened in the retort oven so that they are able to bear the furnace burden. The ovens being so much narrower, the process of coking requires only half as much time as in the beehive furnace. When the charge is coked, it is pushed out by means of rams through doors at each end, the doors are immediately closed, and the oven is ready for a recharge with almost no loss of heat. The coke is quenched as soon as it leaves the oven. The gases are conducted from the oven, through an opening in the top, into a collecting main. This is a hydraulic main, like that used in illuminating-gas works. The gas bubbles through the water, and a part of the tar and ammonia is condensed and separated as the gas cools, and then collected. The gas next passes through tubular condensers, where it is cooled by contact with a series of tubes through which cold water is flowing. During this process more ammonia and tar are condensed. The gas now goes through an exhauster, and, last of all, to a scrubbing apparatus, where the last traces of tar and ammonia are removed. The gas is now returned to be burned in the flues of the coke oven; but as this consumes little more than half of that generated, the rest is available for other purposes. The tar is collected into tanks, and the ammonia is concentrated into a strong crude liquor or into sulphate of ammonia. A ton of coal will yield from 15 to 25 pounds of sulphate and from 5 to 14 gallons of tar.

In Germany 12,000 Otto-Hoffmann coke ovens are in operation, of which 400 save the by-products. The Otto-Hoffmann oven has been even more widely introduced into the United States in recent years. In its most recent form, the Schniewind modification, it combines the regenerative principle of developing the heat with uniform underfiring for distribution of the heat required for the coking of the charge in the oven.

In 1908 the first plant of Koppers's regenerative ovens, where the retorts are heated by vertical flues, were built by the Illinois Steel Company at Joliet, Ill., and in 1911 and 1912 there were installed 560 ovens of this type at the Gary, Ind., plant of the United States Steel Corporation.

In addition to the by-product coke ovens, there are now running in the United States a number of establishments making gas in so-called vertical retorts. In these retorts another type of coke is produced, harder than the old-fashioned gas coke and yet softer than the beehive-oven coke. This is a very desirable coke for domestic fires, such as cooking, furnace, hot-water, and steam-heating.

At the close of 1912 there were in the United States 5211 by-product coke ovens, and 793 were building. These were divided as follows: United-Otto, including Otto-Hoffmann and Schniewind types, 2100; Semet-Solvay, 1443; Rothberg, 287; Koppers, 1215, and Klönne, 22. In 1912 the total production of by-product coke in the United States was 11,115,164 short tons, valued at $42,632,930, while the beehive coke amounted to 32,868,435 short tons, valued at $69,103,766, thus giving a total of 43,983,599 tons, valued at $111,736,696.

The accompanying table gives the yield in coke and other products of certain standard coals:

YIELDS OF VARIOUS COALS IN OTTO-HOFFMANN OVENS

	Coke, per cent.	Tar, per cent.	Sulphate, per cent.	Total gas per 2000 pounds, cubic feet.
AVERAGE OPERATING RESULTS				
Everett, Dominion coal	72.83	4.99	1.010	About 9,000
Glassport, Youghiogheny coal	75.60	5.07	1.100	" 9,000
Germany, Westphalian coal	74.50	3.70	1.280	" 9,600
DISTILLATION TESTS				
Connellsville coking coal	76.34	6.14	1.223	" 8,924
Pittsburgh coking coal	68.25	4.38	.908	" 8,884
Eastern Pennsylvania coking coal	85.00	2.00	.800	" 8,400
Virginia coking coal	66.01	4.70	1.070	" 10,090
Kanawha coking coal	73.60	6.40	1.000	" 10,289

Bibliography. Consult "Mineral Resources of the United States," in the *Annual Reports of the United States Geological Survey;* Platt, "Special

Report on Coke Manufacture," *Pennsylvania Second Geological Survey Report of Progress L* (Harrisburg, 1876); Weeks, "Coke," in *United States Census Office Eleventh Report on Manufacturing Industries* (Washington, 1895); Schniewind, *Manufacture of Coke in the United States: The Mineral Industry* (New York); Fulton, *Coke: A Treatise on the Manufacture of Coke and the Saving of By-Products* (2d ed., Scranton, 1905). See AMMONIA; GAS; TAR.

COKE, kuk *or* kōk, SIR EDWARD (1552–1634). A distinguished English lawyer and judge, born at Mileham, in Norfolk, on Feb. 1, 1552. Educated at the free grammar school at Norwich, and at Trinity College, Cambridge, he passed thence to Clifford's Inn and subsequently to the Inner Temple to study law, and was called to the bar in April, 1578. His great ability, legal learning, and the tact he exhibited in the conduct of his cases, secured him a large practice on the very threshold of his career. In 1586 he was appointed recorder of Norwich, in 1592 recorder of London, a position he resigned the same year for the solicitor-generalship. In the following year he was elected member of Parliament for the County of Norfolk and was chosen Speaker of the House of Commons. In 1594 he was made Attorney-General, and it was in this capacity that he conducted the prosecution in the famous state trials of Southampton and Essex in 1601, of Sir Walter Raleigh in 1603 (in which he exhibited a brutal rancor and bitterness), and of the Gunpowder plotters in 1605. He held this office until 1606, when he was appointed Chief Justice of the Court of Common Pleas, the duties of which position he discharged in a manner that secured for him a great reputation. Upright and independent, with a high notion of the dignity and importance of his office, he did not, in an age of judicial sycophancy, hesitate to oppose any illegal encroachment by royalty. At the suggestion of Bacon (between whom and Coke there was a long-standing hostility), James I, in order to bring him over, appointed Coke, in 1613, Chief Justice of the King's Bench, and shortly afterward Privy Councilor. But here he proved equally incorrigible, among other things maintaining, in the Commendams case, that the King had no power to stay the proceedings in a court of justice, even after his more pliable colleagues had retracted and begged the royal pardon on their knees for having entertained and expressed that opinion. As a consequence of this unflinching assertion of the supremacy of the law of the land, Coke was (November, 1616) relieved from his chief-justiceship. His ardent and unflinching support of liberal measures in Parliament, especially of the right of freedom of debate, soon brought him into further trouble with the court party, and in 1621–22 he suffered nine months' imprisonment in the Tower. In the third Parliament of Charles I (1628) Coke took an active part in framing the celebrated Petition of Right, and it was in a great measure owing to his advocacy that the Lords were induced to agree to it. He died Sept. 3, 1634. He had an extraordinary popularity, and his utterances and courage did much to contribute to the final result in the struggle between the crown and the commons. Yet he was of an intolerant disposition, and in religious matters and in his fear of the growth and influence of the papal power he was fanatical. He is now best known for his law treatise, *Coke upon Littleton; or, the First Institute,* a work of extraordinary learning and of great acumen, which is still, perhaps, the most influential and authoritative treatise on English law. His other works are the *Second, Third, and Fourth Institutes, The Complete Copyholder,* and *Reading on Fines;* while his collection of law reports, which made an epoch in the history of law on their appearance, are still of great value to the profession. Consult: Johnson, *Life of Sir Edward Coke* (2d ed., London, 1845), which is somewhat untrustworthy; also Woolrych, *The Life of Sir Edward Coke* (London, 1826); and the sketches of his life in Foss, *Judges of England,* vol. vi (London, 1857), and in Campbell, *The Lives of the Chief Justices of England,* etc., vol. i (London, 1849).

COKE, THOMAS (1747–1814). The first Bishop of the Methodist Episcopal church. He was born at Brecon, Wales, was educated at Oxford, and took orders in the Church of England in 1770. About 1772 he was converted and showed great fervor; in 1776 he met Wesley for the first time and after that began open-air preaching. In consequence of his revivalism he was dismissed from his curacy of South Petherton and attached himself to the Methodist Society. In 1782 he was appointed president of the Irish Conference, and two years later he was made superintendent for America, with power to confer ordination, by the laying on of hands administered by John Wesley and two other clergymen of the Church of England. Charles Wesley, who had not been aware of the ceremony and heartily disapproved of it, wrote the well-known epigram:

> So easily are bishops made
> By man's or woman's whim;
> Wesley his hands on Coke hath laid,
> But who laid his hands on *him?*

In 1787 both Coke and Asbury, whom Coke had ordained, assumed the title of Bishop, much to John Wesley's displeasure. They traveled together among the various conferences until the middle of 1785, when Coke returned to England. He made in all nine visits to America and spent the rest of his life in active missionary work, in personal visitation in the United Kingdom and in America, and in the encouragement of enterprises for the Christianizing of Asia and Africa. After Wesley's death Coke was secretary of the British Conference, and, with Asbury, he edited *The Doctrine and Discipline of the Methodist Episcopal Church of America* (1787). In 1813 he applied unsuccessfully to Lord Liverpool and William Wilberforce to be appointed Bishop for India. He was consumed with a desire to spread Christianity in India, and as the government was unfavorable to missions by Dissenters there, he believed he could work more effectively in connection with the Church of England, to which, like many Methodist ministers, he himself belonged. In the same year (1813) he sailed for Ceylon, but died of apoplexy on the voyage, May 3, 1814. He was of a very energetic disposition and of remarkable executive abilities. He had the advantage of considerable personal means, which he spent freely in the cause. Among his works are a *Life of John Wesley* (1792); a commentary on the Scriptures (6 vols., 1803–08); *History of the West Indies* (3 vols., 1808–11). For his life, consult Etheridge (London, 1860) and Upham (New York, 1910).

COKES, BARTHOLOMEW. A simpleton in Jonson's *Bartholomew Fair.*

COL, kôl (Fr., neck). In geography, a marked depression or pass in a mountain range. In those parts of the Alps where the French language prevails, the passes are usually named *cols;* hence the Col de Balme, the Col du Géant, etc.

COLADA, kô-lä′dȧ. One of the two swords of the Cid, taken from the Count of Barcelona.

CO′LA NUT′, or **KOLA NUT.** The seed—not properly the nut—of *Cola acuminata*, a large tree of the family Sterculiaceæ, native to western tropical Africa, cultivated in the West Indies, Brazil, and other tropical countries, where it has to some extent become naturalized. The seeds average about an inch in length, are brown or reddish gray, slightly mottled, have an odor resembling nutmeg, and a bitter flavor when fresh, which becomes mildly aromatic with age. In the tropics, especially in the Sudan, where they are known as guru nuts, they are employed as a stimulant and as a remedy for tropical diarrhœa. The nuts contain from 0.7 per cent to 2 per cent of alkaloid caffeine (q.v.) and small amounts of tannin and theobromine. According to Knebel and to Hilger, fresh cola nut probably contains no caffeine at all, but a glucoside, the fermentative decomposition of which yields caffeine, glucose, and cola red.

COLBAN, kōl′bȧn, Adolphine Marie (1814–84). A Norwegian novelist, whose literary genius was developed late and by necessity. She was born in Christiania, Dec. 18, 1814. Left a widow without resources in 1850, she went to Paris, where a friend published part of her correspondence as *Lettres d'une barbare*. These were received with such favor that she was led to try fiction, and between 1869 and 1881 published seven volumes of tales, most of which were translated into German. *Jeg lever* ('I live') (1877) is the most characteristic, but nearly all are charming for their sympathetic insight into Norwegian character.

COLBERG, kōl′bĕrk. See Kolberg.

COLBERT, kôl′bâr′, Jean Baptiste (1619–83). A French statesman, Minister of Finance under Louis XIV. He was born at Rheims, Aug. 29, 1619, and served his apprenticeship in a woolen draper's shop. He afterward went to Paris and soon obtained a position in the War Office, where his tireless activity brought him into notice. He became secretary to Le Tellier, then at the head of the War Office, and through his influence was made a counselor of the King and introduced to Mazarin, who soon employed him in important affairs of state. On his deathbed Mazarin recommended Colbert to the King, who in 1665 appointed him Comptroller General of the Finances. Colbert found the finances in a ruinous condition and immediately entered upon an elaborate programme of reform. Fouquet, the Superintendent of Buildings under Mazarin, was found guilty of maladministration and was imprisoned for life. The new Comptroller instituted a council of finance and a chamber of justice, to call to account the farmers of the state revenues, who were forced to yield up all the wealth of the crown of which they had fraudulently possessed themselves. In 20 years the revenue rose to 116,000,000 livres, of which but 23,000,000 were spent in collection and administration, whereas before Colbert took the finances in hand the revenue had amounted to only 84,000,000 livres, of which 52,000,000 were absorbed in collection. Colbert did not rest satisfied with being a financial reformer, but in various ways developed the industrial activity of the nation by state support. He was created Minister of Marine in 1669, and shortly afterward he acquired control of commerce, the colonies, and the royal expenditure. French trade was extended, and roads and canals, including the great canal of Languedoc, were built. Certain features of his economic policy, such as a too stringent regulation of commerce, high protective duties, and the maintenance of the corporation system, have been frequently criticized, but they were rather the faults of the age than of the man. He organized anew the colonies in Canada, Martinique, and Haiti, and founded those of Cayenne and Madagascar. To encourage trade in the Levant he granted special privileges to traders in imitation of the East India Company scheme, but, owing to his high protective tariffs and rigid regulations, failure followed his efforts.

Perhaps the most successful of all Colbert's reforms was the creation of a French navy. He found France in 1669 with a few old hulks and provided her in three years with a fleet of 60 ships of the line and 40 frigates. The mercantile marine was also developed, and bounties were given on ships built in France. Colbert revised the Civil Code, introduced a code of marine law, as well as the so-called *Code Noir* for the colonies. Statistical tables of the population were first made out by his orders. Men of learning and genius found in him a generous patron. The academies of inscriptions, science, and architecture were founded by him. In short, he appears as the promoter of industry, commerce, art, science, and literature—the founder of a new epoch in France. Notwithstanding his remarkable ingenuity, the unbounded extravagance of his master forced him to raise money in ways objectionable to his reason, and to maintain war taxes in time of peace. The last years of his life were a constant struggle to find money for Louis's ruinous wars, and he died Sept. 6, 1683, bitterly disappointed because his great services were but ill appreciated by the King, whose confidence in Colbert had been undermined by the favorite Louvois. The people of Paris, enraged at the oppressive taxes, would have torn his dead body to pieces but for the intervention of the military and his burial by night. He left large estates in France, and some of his offices descended to his sons, one of whom became Minister of Marine and another Superintendent of Buildings. A third was made Archbishop of Rouen. It is not the least of Colbert's merits that he saw the wisdom of Richelieu's tolerant course towards the Huguenots and restrained the King from that fatal policy of persecution which began with the revocation of the Edict of Nantes (q.v.) soon after the great Minister's death. Nevertheless, he ruled with an iron hand, and even to his friends he was known as the "man of marble." The coldness of his nature is well caught in the epithet of Madame de Sévigné, who styles him "The North." Among Colbert's posthumous papers were found *Mémoires sur les affaires de France* (c.1663), and a fragment, *Particularités secrètes de la vie du Roy*, which have been published several times.

Consult: Clément, *Vie de Colbert* (Paris, 1846); id., *Lettres, instructions, et mémoires de Colbert* (9 vols., ib., 1861–82); id., *Histoire de Colbert et son administration*, ed. by Mademoiselle Clément (ib., 1874); Gourdault, *Colbert, ministre de Louis XIV* (Tours, 1885);

Lavisse, *Histoire de France*, vol. vii, part i (ib., 1905). Sargent, *Economic Policy of Colbert* (London, 1899), contains a bibliography of works relating to Colbert and his time. See FRANCE; LOUIS XIV.

COLBERT, JEAN BAPTISTE, MARQUIS DE SEIGNELAY (1651–90). A French statesman, Minister of Marine, and son of the famous Minister of Finance. In 1683 he succeeded his father as the head of the navy. He led a naval expedition against Genoa in 1684. If his advice had been taken after the battle of Beachy Head, the French fleet might easily have won control of the channel. Consult Clément, *Le Marquis de Seignelay* (Paris, 1887).

COLBURN, kōl'bûrn, WARREN (1793–1833). An American mathematician, born in Dedham, Mass. He graduated at Harvard in 1820 and in the same year opened a private school in Boston. In 1821 he published *First Lessons in Intellectual Arithmetic*, the sale of which far exceeded that of any previous mathematical work. It was translated into many foreign languages. From teaching, Colburn went into manufacturing and was superintendent of large establishments in Waltham and Lowell; but much of his time was devoted to lecturing on commerce, natural history, physics, and astronomy. He published a *Sequel* to his arithmetic (1822), and an *Algebra* (1827).

COLBY, ALBERT LADD (1860–). An American metallurgist, born in New York City. He was educated at the College of the City of New York and at the Columbia School of Mines. After 1886 he was engaged as a specialist in steel metallurgy. In 1897 he became secretary of the Association of American Steel Manufacturers, and in 1904 he was iron and steel commissioner at the St. Louis Exposition. Besides several technical papers he is author of *American Standard Specifications for Steel* (1902).

COLBY, CHARLES CARROLL (1827–1907). A Canadian statesman. He was born at Derby, Vt., and graduated from Dartmouth College in 1847. He was called to the bar in the Province of Quebec in 1855 and for some years practiced law in Stanstead, but abandoned it for industrial and mining pursuits. In 1867, the year of confederation, he was elected Conservative member for Stanstead in the House of Commons and represented that constituency until 1891. In 1887–89 he was Deputy Speaker of the House, and in 1889–91 he was President of the Privy Council in the administration of Sir John A. Macdonald. During his extended parliamentary term he became one of the ablest debaters in the House and was one of the earliest advocates of the protective or national policy adopted in 1878. He published *Parliamentary Government in Canada* (1886), a work highly praised by Alpheus Todd (q.v.), an authority on British constitutional law. His eldest son, CHARLES WILLIAM COLBY (1867–), was Kingsford professor of history in McGill University in 1895–1910 and published *The Sources of History* (1899) and *Canadian Types of the Old Régime* (1908).

COLBY, EVERETT (1874–). An American lawyer and political leader, born in Milwaukee, Wis. He graduated at Brown University in 1897 and was admitted to the New York bar in 1899. He served in the New Jersey House of Assembly in 1903–05 and, although opposed by the political "machine" of the State, became a member of the State Senate for the term of 1906–09. In 1913 he was the candidate of the Progressive party for Governor of New Jersey.

COLBY, FRANK MOORE (1865–1925). An American editor and writer, born in Washington, D. C. He graduated from Columbia University in 1888, was acting professor of history at Amherst College in 1890–91, lecturer on history at Columbia and instructor in history and economics at Barnard College from 1891 to 1895, and professor of economics at New York University thereafter until 1900. From 1893 to 1895 he was a member of the editorial staff of *Johnson's Cyclopædia* in the department of history and political science, and in 1898 he became editor of the *International Year Book* and one of the editors of the *International Cyclopædia*. He was one of the editors of the first edition (1900–03) of the NEW INTERNATIONAL ENCYCLOPÆDIA and of the second edition (1913–15); served as American editor of *Nelson's Encyclopædia* (1905–06); and after 1907 edited the *New International Year Book*. His other literary work comprises editorial writing for the New York *Commercial Advertiser* (1900–02), "The Book of the Month" in the *North American Review* (1913–), as well as critical articles for the *Bookman* and other magazines, and *Outlines of General History* (1900), *Imaginary Obligations* (1904), and *Constrained Attitudes* (1910).

COLBY, HARRISON GRAY OTIS (1846–). An American naval officer, born at New Bedford, Mass. After graduating from the United States Naval Academy in 1867 he was promoted through the various grades, becoming captain in 1902 and rear admiral in 1908. He served on the *Dakotah* during the Civil War and commanded the *Hannibal* in the Spanish-American War. In 1904–05 he commanded the European squadron. He retired in 1908.

COLBY, THOMAS FREDERICK (1784–1852). An English engineer connected with the British Ordnance Survey for 45 years. He invented the "compensation bar," used in base measurements. In 1824 he planned, and from then until 1846 supervised, the survey of Ireland. Consult Portlock, *Memoirs of the Life of General Colby* (London, 1869).

COLBY COLLEGE. An institution of higher education, founded by the Baptists of the District of Maine, at Waterville, Me. It was chartered by the Legislature of Massachusetts in 1813 and was known as "The Maine Literary and Theological Institution" until 1820, when its name was changed to Waterville College. In 1867 the name was again changed to Colby University, in honor of Gardiner Colby, whose gifts to the college amounted to $200,000. The name was changed in 1899 to Colby College. The principal college buildings include Memorial Hall, Champlin Hall, Foss Hall, North College, and South College. Colby College offers courses leading to the B.A. degree, without requiring Greek for entrance, and courses leading to the B.S. degree. Men and women are admitted on equal terms and pursue the same studies; in the required courses they recite separately. The courses are largely elective after the first year. The library in 1914 had 50,000 volumes and 20,000 pamphlets. The number of students was 425. The endowment funds amounted to $600,000, and the value of college property to $500,000. The president in 1914 was A. J. Roberts, A.M.

COLCHAGUA, kōl-chä′gwȧ. A province of Chile, bounded on the north by the provinces of Santiago and O'Higgins, on the east by Argentina, on the south by the Chilean Province of Curicó, and on the west by the Pacific (Map: Chile, C 10). Area, 3856 square miles. The eastern and western parts are traversed by the Andes and the Coast Range respectively, while the middle section forms a part of the central valley of Chile, the best-cultivated part of the country. The soil is well watered and of exceptional fertility, yielding corn, wheat, oats, and beans. Cattle raising is carried on extensively. The province is traversed by the Santiago-Valdivia Railway. Pop., 1895, 157,566; 1907, 159,119; 1910, 159,421. Capital, San Fernando.

COLCHESTER, kōl′chĕs-tẽr. A parliamentary and municipal borough and river port of Essex, England, on the south bank of the Colne, 12 miles from the sea and 51 miles northeast of London (Map: England, G 5). It is partly surrounded by the remains of an old Roman wall. The most notable building is the castle erected in the reign of William Rufus, with walls from 10 to 30 feet thick, of which the Norman keep is said to be the largest in England. The ruins of St. Botolph's Priory are also Norman. The streets are well paved and lighted by electricity, supplied by the town, which also owns the water supply. The castle contains a museum of antiquities and a library. A gateway of the former monastery of St. John has been restored. The town maintains baths, recreation grounds, and markets. Its educational institutions include the Albert School of Science and Art and a public library. The city owns the oyster fishery at the mouth of the Colne, and it is a great source of revenue. Its corn markets are important, and its manufactures include boots, shoes, and woolen ware. It has a quay for vessels of 150 tons at the suburb called "Hythe." Pop., 1901, 38,373; 1911, 43,463. Colchester is the *Camulodunum* of the British and Romans and the later *Colneceaster* (Colne Castle) of the Saxons. Many Roman remains have been found here, bushels of coins of many emperors, vases, urns, lamps, pavements, and baths. The town was ravaged by the plague in 1348, 1360, and 1665. In the Civil War, Colchester held out for the King, but was captured by General Fairfax after a three months' siege. Old King Cole, according to the legend, gave the town its modern name. Consult: Cutts, *Colchester* (London, 1889); Round, "Colchester during the Commonwealth," in *English Historical Review*, vol. xv (ib., 1900); Benham, *Red Paper Book of Colchester* (Colchester, 1902); id., *Oath Book of Colchester* (ib., 1907).

COLCHESTER. A town in Chittenden Co., Vt., containing the village of Winooski (Map: Vermont, B 3). Winooski is a manufacturing village, 2 miles from Burlington, on the Central Vermont Railroad. It contains a public library and has a large plant of the American Woolen Company, cotton mills, machine shops, brickworks, large screen works, butter factory, lumber and cider mills, etc. Pop. (Winooski village, 1900, 3783); town, 1900, 5352; 1910, 6450.

COLCHESTER, first Baron. See Abbot, Charles.

COL'CHICINE (Fr., from Lat. *colchicum*, Gk. κολχικόν, *kolchikon*, the poisonous meadow saffron, from Gk. Κολχίς, *Kolchis*, a country on the Black Sea), $C_{22}H_{25}NO_6$. A bitter alkaloid, the active principle of colchicum root, the corm of *Colchicum autumnale* (Linné), growing in southern and central Europe. It is a crystalline substance, soluble in water, alcohol, and chloroform. Colchicum preparations are used in medicine to relieve pain in gout. In larger doses colchicine is poisonous, and even in medicinal doses may act as a powerful gastro-intestinal irritant and heart depressant, in which case its administration must be temporarily discontinued. The medicinal dose of colchicum root, which contains about 0.5 per cent of colchicine, is from 2 to 8 grains, in powder. The dose of colchicum seed, which contains less of the alkaloid than the corm, is from 1 to 5 grains. Colchicine itself may be extracted from colchicum seed, with water, alcohol, and chloroform, by a somewhat lengthy process. It is a bitter, yellow, rubber-like substance, very soluble in cold water, but less readily in hot water, and extremely soluble in alcohol and chloroform. With chloroform it also forms a fairly stable chemical compound. It is optically active, turning the plane of polarized light to the left. See Alkaloids.

COLCHICUM, kŏl′kĭ-kŭm (Lat., from Gk. κολχικόν, *kolchikon*, the poisonous meadow saffron). A genus of plants of the family Liliaceæ, native to Europe and to the Mediterranean region. The species, of which there are about 30, are stemless, with flowers half subterranean like the crocus, only the limb of the perianth and part of the tube rising above ground. The flowers much resemble crocus flowers. The only British species is *Colchicum autumnale*, the meadow saffron, sometimes also, but incorrectly, named "autumn crocus," which is plentiful in meadows and pastures in some parts of England and of the continent of Europe. The flowers are pale purple; they appear in autumn unaccompanied by any leaves; the leaves, which are large and broadly lanceolate, appear in spring, when the stalk which bears the ripening fruit rises among them. The whole plant is very acrid and poisonous, chiefly owing to the presence of colchicine. Cattle are not infrequently injured by it in pastures where it abounds. It is, however, not difficult to extirpate, the repeated pulling of it by hand, as it appears above ground, being sufficient for this purpose; the roots soon become exhausted and die. It is a valuable medicinal plant, the parts chiefly used for medicinal purposes being the corm (popularly called the root) and the seeds. The seeds are round, brown, and rather larger than mustard seed; and fatal accidents have occurred from their poisonous nature. Other species of *Colchicum* appear to possess similar properties. (See Colchicine.) *Colchicum autumnale* is common in flower borders, and a number of other species are employed in the same manner. Most of the species are autumn blooming, a few flowering in spring along with the crocuses, snowdrops, etc. *Colchicum luteum* is one of the finest of spring-flowering species, and *Colchicum parkinsoni*, *Colchicum speciosum*, and *Colchicum autumnale* of autumn-blooming species. For illustration, see Plate of Cornflower.

COLCHIS, kŏl′kĭs (Lat., from Gk. Κολχίς, *Kolchis*). In ancient geography, a region on the east coast of the Pontus Euxinus, or Black Sea, situated north of Armenia and south of the Caucasus. It corresponded very nearly to the Russian Province of Kutais. It was celebrated in the very earliest times as the country of

Medea (q.v.), and was the goal of the Argonauts (q.v.). It was afterward better known to the Greeks as the seat of some colonies of the Milesians. It was noted for its wine and fruits. The Colchians seem to have differed ethnologically from their neighbors, which led Herodotus to argue that they were descended from the Egyptian invaders under Sesostris (q.v.). Darius Hystaspes made them tributary to Persia; subsequently they threw off their allegiance and were ruled by kings of their own; the country then came, nominally, under the dominion of Mithridates, King of Pontus; after Mithridates was defeated by Pompeius, there were princes of Colchis dependent on the Romans. The principal town was Dioscurias (called under the Romans Sebastopolis and now Iskuriah); the principal river was the Phasis, now the Rion.

COL'COTHAR. See IRON, *the Oxides of.*

COLD. See CATARRH.

COLDBATH FIELDS PRISON (named from *Coldbath Fields*, Middlesex). A London jail, erected in the time of James I and sometimes referred to as the English Bastille. It is mentioned as the meeting place of the rioters in Dickens's *Barnaby Rudge.* The prison became inadequate and was closed in 1886.

COLD CREAM. A term applied to preparations of fatty substances, which are used as mild and cooling dressings for the skin. The composition of an excellent cold cream is as follows: spermaceti (125 parts); white wax (120 parts); expressed oil of almonds (600 parts); strong rose water (190 parts); and sodium borate (5 parts). Cold cream softens the skin and promotes the healing of wounds and of chapped hands.

COLDEN, kōl'den, CADWALLADER (1688–1776). A Scottish-American naturalist and politician, born at Duns, Scotland. He graduated at the University of Edinburgh in 1705, came to America in 1708, practiced medicine for 10 years in Philadelphia, and then, in 1718, settled in New York City. He was the first surveyor-general of the Colony of New York, was a member of the Provincial Council, and in 1761 was appointed Lieutenant Governor, which office he held until his death. As the governors were often changed, Colden was frequently called upon to act as chief executive and in this capacity came into conflict upon many occasions with the radical element of the "patriot" party, and in 1765 he was burned in effigy by an angry mob because of his support of the Stamp Act. He devoted much attention to the study of the sciences, especially botany, furnished Linnæus with descriptions of several hundred American plants, and was the first to introduce the Linnæan system of classification into America. He published a *History of the Five Indian Nations of Canada* (1727; reprinted, 1905), a work of great value, and a less important work on *The Principles of Action in Matter* (1752). Consult Alice M. Keys, *Cadwallader Colden, a Representative Eighteenth-Century Official* (New York, 1906).

COLDEN, CADWALLADER DAVID (1769–1834). An American lawyer and politician. He was born near Flushing, L. I., and was a grandson of Cadwallader Colden. He studied law and attained considerable eminence at the New York bar. In the War of 1812 he was a colonel of volunteers. In 1818 he was chosen to the State Assembly and in the same year succeeded De Witt Clinton as mayor of New York City. He was elected to Congress in 1821 and from 1824 to 1827 was a member of the State Senate. Colden was one of Clinton's strongest supporters in the work of internal improvements and was conspicuous in the cause of public education, the reformation of juvenile offenders, and other matters of moral and social betterment. He wrote a *Life of Robert Fulton* (1817); *Vindication of the Steamboat Right Granted by the State of New York* (1819); *Memoir of the Celebration of the Completion of the New York Canals* (1825).

COLD FRAME. See FRAME.

COLD HARBOR, BATTLE OF. One of the most sanguinary battles of the Civil War in America, fought June 1 and 3, 1864, at Cold Harbor, Va., about 10 miles northeast of Richmond, between the Federal Army of the Potomac, numbering about 102,000, under General Grant, and the Confederate Army of Northern Virginia, numbering about 65,000 under General Lee. After fighting the battles of the Wilderness and Spottsylvania (qq.v.), Grant proceeded towards Richmond, crossed the Pamunkey on May 28, and on June 1 found himself again face to face with General Lee. On the afternoon of May 31 the Federal general, Sheridan, with his cavalry, carried a position known as Old Cold Harbor, and held it, in spite of the stubborn attacks of the Confederate general, Fitzhugh Lee, until night. On the following day he was relieved by General Wright with the Sixth Corps of the Army of the Potomac and Gen. W. F. Smith with the Eighteenth Corps of the Army of the James, who at 6 P.M. attacked Lee with great vigor in face of a terrible fire and, with a loss of about 2000, succeeded in capturing a large part of the first line, the Confederates making a counter assault, but with little effect, on the position of the Federal Fifth Army Corps under General Warren. Confederate attacks during the night failed to alter the relative positions of the two armies, and the following day was spent in readjusting the Federal lines, Warren remaining on the right, Hancock moving to the left of the Sixth Corps, and Burnside taking up a position in reserve at Bethesda Church. At about 4.30 A.M. on the 3d an assault was made "all along the line," the Federals fiercely attacking the impregnable intrenchments of the Confederates, but being driven back with terrific loss in less than 30 minutes. Most of the fighting ceased within an hour, the Federals having made comparatively little impression on the defenses, but having advanced their lines somewhat closer to the Confederate works. In their brief charge the Federals lost in killed, wounded, and missing fully 7000 men, more probably falling in the first 10 minutes than in any other similar period throughout the war. General Hancock's corps suffered most severely. The two armies remained in their positions until the 12th, when Grant began his march for the James River. (See PETERSBURG.) The total loss sustained by the Federals during these 12 days, but chiefly on the first and third, was fully 12,700; while that of the Confederates, though never accurately ascertained, probably did not exceed 2500. For several days after the attack of June 3 great numbers of dead and wounded lay wholly unattended to between the two lines, Grant and Lee being unable to agree upon any plan for furnishing the needed relief. The battle con-

siderably discouraged the Army of the Potomac, whose loss had not been atoned for by any corresponding gain; and military critics are almost unanimous in the verdict that the assault was the great mistake of Grant's career. General Grant himself afterward said of it: "Cold Harbor is, I think, the only battle I ever fought that I would not fight over under the circumstances" (Young, *Around the World with Grant*, vol. ii, p. 304, New York, 1879), and, "I have always regretted that the last assault at Cold Harbor was ever made" (*Memoirs*, last ed., vol. ii, p. 171). The battle of Gaines's Mill (q.v.) was fought in 1862 nearly on the site of that of Cold Harbor. Consult: *Personal Memoirs of U. S. Grant* (last ed., New York, 1895); Humphreys, *The Virginia Campaign of 1864 and 1865* (New York, 1883); Johnson and Buel (eds.), *The Battles and Leaders of the Civil War*, vol. iv (New York, 1887).

COLD HARBOUR. An old London edifice near the Thames, once the property of a line of wealthy merchants, purchased about the middle of the sixteenth century by the Earl of Shrewsbury and renamed Shrewsbury House. It was soon afterward torn down, and the small buildings erected on its site became a place of refuge for debtors and bad characters.

COLDING, kōl'dĭng, LUDWIG AUGUST (1815–88). A Danish engineer and physicist. He was born at Arnakke, studied at the Polytechnic Institute of Copenhagen, and was appointed a professor there in 1865. He also became connected with the water system of Copenhagen, in 1847 as inspector and in 1858 as an engineer, and in 1865 was appointed professor in a polytechnic school. In addition to many contributions to the *Reports* of the Scientific Society of Copenhagen and to scientific journals, he published *Tropical Cyclones* (1871) and other works.

COLD LIGHT. A term applied to the illumination produced by apparatus, invented by C. F. Dussaud, whereby a rapid succession of illuminated incandescent lamps takes the place of a single source of light. It consisted essentially of a wheel on the circumference of which a number of tungsten lamps were placed, connected, each one in turn, to a source of electricity. By the rotation of the wheel each lamp at a particular point on the wheel was in turn illuminated and cut off from the supply, the speed of rotation of the wheel making it possible to light any one lamp for an exceedingly short interval, the succeeding lamps furnishing, in turn, a source of illumination. There was produced on the retina of the eye of the observer the impression of a continuous luminous source. This being so, Dussaud operated his machine at such a rate that the period of darkness for any lamp was more than twice the duration of its brightness, and it was possible, therefore, he found, to apply a much higher voltage than that at which the lamp was rated. Furthermore, the short period of time during which the lamp is luminous allowed the development of a very small amount of heat, measurable, of course, yet so small as to be unobjectionable; hence the title "cold light." Tests have shown that with from 50 to 160 watts applied to 16 lamps ranging from 25 to 80 candle power, there was obtained a brightness equal to from 250 to 800 candle power for several hours continuously. It will be at once understood that such an arrangement, in connection with a moving-picture machine, allows the latter to be run at any desired speed and even to be stopped without danger of igniting the film; and as regards the intrinsic brightness of the source of light, it has been shown that pictures projected on a screen 15 feet square in a perfectly satisfactory manner involve the consumption of only 150 watts of energy.

COLD SPRING. A village in Putnam Co., N. Y., 6 miles south of Newburgh, on the New York Central and Hudson River Railroad, and on the Hudson River opposite West Point (Map: New York, A 2). It has two foundries and embroidery works. Pop., 1900, 2067; 1910, 2549.

COLD SPRING. A village and summer resort in Suffolk County, New York, 32 miles by rail east of New York City, on Cold Spring Harbor, an inlet of Long Island Sound and on the Long Island Railroad. It is noted for its fine scenery and contains an extensive trout hatchery, public library, station for experimental evolution of the Carnegie Institution of Washington, and laboratories of the Brooklyn Institute. Pop., 1914, about 750.

COLD'STREAM. An historical border village of Berwickshire, Scotland, on the left bank of the Tweed, 15 miles southwest of Berwick (Map: Scotland, F 4). Pop., 1901, 1482; 1911, 1375. Near Coldstream is the famous ford of the Tweed, where the English made famous crossings, once in the thirteenth century under Edward I, and again in the seventeenth century under Montrose. Here General Monk, 1659–60, raised the regiment still known as the Coldstream Guards (q.v.). Being a border town, Coldstream, like Gretna Green, was formerly celebrated for its clandestine marriages, and the Marriage House still remains. About 4 miles to the south of Coldstream is Flodden Field (q.v.).

COLDSTREAM, LADY CATHARINE. A Scotchwoman in Foote's *The Maid of Bath*.

COLDSTREAM GUARDS. A regiment of foot guards in the British army, forming part of the Royal Household Brigade. It is one of the oldest regiments in the British service, dating from 1660. In that year General Monk, who after the death of Cromwell took sides with the Parliament and the army, organized the regiment at Coldstream, a border town of Berwickshire, Scotland, whence the name of the regiment, and marched with it into England. It has seen service in every British campaign of any magnitude and has emblazoned on its regimental colors the names of many of the most brilliant victories of British arms. It was first known as Monk's Regiment, but when Charles II ascended the throne, Parliament gave the regiment to him as part of his Household Brigade, and it has since borne its present name. See FOOT GUARDS; HOUSEHOLD TROOPS.

COLD'WATER. A city and the county seat of Branch Co., Mich., 125 miles (direct) west-southwest of Detroit, on the Lake Shore and Michigan Southern Railroad (Map: Michigan, D 7). It is the seat of the State School for Dependent Children and has a public library and several fine lakes and parks. It has manufactories of shoes, sporting goods, Portland cement, flour, marine engines, condensed milk, liniment, and machine-shop products, and contains the Bromo-Hygia Mineral Wells. The city owns and operates its water works and electric-light plant. Settled in 1830, Coldwater was incorporated in 1862. It is governed by a mayor, elected annually, and a city council. Pop., 1890, 5247; 1900, 6216; 1910, 5946.

COLD WAVE. A term first applied by the United States Weather Bureau in 1872 to the areas of cold, clear, dry air that flow near the ground from Canada southward over the United States and become the so-called "northers" when they reach the Gulf States, or "Nortes" when they reach the Gulf coast of Mexico and Yucatan. The northers of Colon may possibly have a different origin. The cold stratum of air, being quite shallow, keeps to the lowlands and rarely rises to the 5000-foot level; there are but one or two cases on record in which it attained the altitude of Cheyenne or Santa Fe; often it is not deep enough to overflow the 3000-foot level of the Appalachian Range. The cold wave advances with a well-defined front, marked by a sudden fall of temperature and an outflowing wind that undoubtedly curls upward and overflows backward, forming an advancing border of clouds with spits of rain or snow. The barometric pressure underneath this cloud is a few hundredths of an inch higher than in front of it, and it is this difference of pressure that causes the mass of cold air to underflow and lift up the warmer air as it spreads southward towards the equator. This excess of pressure is in part caused by gravity or the hydrostatic pressure due to the weight of the air in the rear, and is also in part the result of the diurnal rotation of the earth on its axis, giving a centrifugal force to the denser cold air greater than that of the neighboring warm air. The progress southward or southeastward of the front of a cold wave is so steady that, having charted its position at several successive moments by means of telegraphic reports, the Weather Bureau has almost always been able to forecast its future progress with satisfactory accuracy, thereby enabling all interested in the matter to make provision against sudden drops in temperature, which often exceed 30° in 24 hours. According to the technical definition adopted by the Weather Bureau, the forecast of a cold wave (as made by hoisting the cold-wave flag) implies that there will be a drop of at least 20° within 24 hours, and that the temperature will go below freezing. Similar sudden changes in the warmer half of the year, when temperatures do not go below freezing, are simply cool waves.

COLDWELL, George Robson (1858–). A Canadian lawyer and statesman. He was born in Durham Co., Ontario, and was educated there and at Trinity University, Toronto, where he graduated in 1880. Removing to Manitoba, he was admitted to the bar of that province in 1882. He practiced his profession at Winnipeg and afterward at Brandon, where he entered municipal life, serving as alderman. He was elected a Conservative member of the Manitoba Legislature, and in 1907 was appointed Provincial Secretary, Municipal Commissioner, and Minister of Education in the administration of Sir Rodmond Palen Roblin (q.v.), later resigning the provincial secretaryship. He was elected a councilor of Manitoba University and in 1910 became a member of the Royal Commission to inquire into the Manitoba system of technical schools.

COLE. See Rape.

COLE, Alfred Dodge (1861–). An American physicist, born at Rutland, Vt. He was educated at Brown University and also studied at Johns Hopkins, Harvard, Berlin, Cornell, and Chicago universities. Between 1885 and 1901 he was instructor in chemistry and physics, acting professor, and professor at Denison University. In 1901–07 he was professor of physics at Ohio State University, to which, after a year at Vassar College, he returned as head of the physics department. He served as trustee of Denison University in 1901–07 and again in 1911– . In 1911 he was elected secretary of the American Physical Society. His publications include researches on electric oscillations, electric waves, and the capillary electrometer.

COLE, Frank Nelson (1861–1926). An American mathematician, born at Ashland, Mass. He was educated at Harvard University, where in 1885–87 he lectured on mathematics. Between 1888 and 1895 he was instructor and assistant professor of mathematics at the University of Michigan; he was then appointed professor of mathematics at Columbia University. He became secretary of the American Mathematical Society in 1895 and an editor of its *Bulletin* in 1897. He published *The Diurnal Variation of Barometric Pressure* (1892) and contributed to the second edition of the New International Encyclopædia.

COLE, George Watson (1850–). An American bibliographer, born in Warren, Conn., and educated at Phillips (Andover) Academy. He studied law and practiced from 1876 to 1885, when he became cataloguer of the Fitchburg (Mass.) Public Library. He was librarian of the Jersey City Free Public Library in 1891–95 and then gave himself up entirely to bibliographical work. He published the valuable *Catalogue* (5 vols., Americana, 1907; 2 vols., English Literature and Miscellanea, 1909) of the E. Dwight Church library; *Bermuda in Periodical Literature* (1898; rev. ed., 1907); and *First Folio of Shakespeare* (1909).

COLE, Sir Henry (1808–82). An English official, art critic, editor, and etcher. He was born at Bath and was educated at Christ's Hospital. Appointed assistant keeper of the records by Lord Langdale in 1838, he contributed by his writings to the erection of a general-record office. In 1845 he won the prize offered by the Society of Arts for a tea service, and the design submitted by him afterward became exceedingly popular. In 1846 he became a member of the Society of Arts, and by his efforts promoted those exhibitions of art manufactures (1847–48–49) which led to the great Crystal Palace Exhibition in 1851. He played an important part in the erection and organization of the South Kensington Museum and was also one of the principal founders of the National Training School (1876), which was subsequently (1882) reorganized as the Royal College of Music. Under the pseudonym of Felix Summerly he wrote *The Home Treasury* (1841) and other works. His etchings, published 1860–66, have little artistic value.

COLE, King. A British king of the third century, who is said to have taken Camulodunum from the Romans and to have named it after himself, Colchester. According to some of the old chroniclers, he was the father of the Empress Helena, mother of the Emperor Constantine. He is the subject of the well-known nursery rhyme, "Old King Cole was a merry old soul."

COLE, Mrs. In Foote's play *The Minor*, a character modeled on Mrs. Douglass, a notorious woman of the eighteenth century.

COLE, Thomas (1801–48). An American

landscape painter. He was born in Lancashire, England, Feb. 1, 1801, and came to America at the age of 19. He had learned wood engraving in Liverpool and practiced it a short time in Philadelphia. His love for painting was awakened by an itinerant portrait painter, who, passing through the village of Steubenville, Ohio, gave him some instruction in the rudiments. After a few years of varied success at landscape work and two years' study at the Philadelphia Academy, Cole reached New York in 1825, where he received counsel and encouragement from Durand and Trumbull, and his success began. He traveled three years in Europe and visited Italy again in 1841, but preferred the scenery of America to that of the Old World. He was the founder of the Hudson River school (q.v.) of landscape painting, from which American landscape art has developed. In his large allegorical pictures, such as the "Expulsion from Eden," and in the series of the "Course of Empire," in the New York Historical Society, and the series of "The Voyage of Life," he endeavored to achieve a moral object, but to the detriment of the landscape, which is very artificial. His small paintings of the wild scenery of New York State and New England, however, show truer feeling, and though his color is always thin and dry, he was the first to give the real character of American landscape. Some of his larger canvases, which are panoramic in character, are original and impressive, as, e.g., "Oxbow," a scene on the Connecticut River, in the Metropolitan Museum, New York, which possesses five of his paintings. He died near Catskill, N. Y., Feb. 11, 1848. Consult: Tuckerman, *Book of the Artists* (New York, 1827); his biography by Noble (ib., 1853); Isham, *History of American Painting* (ib., 1905).

COLE, TIMOTHY (1852–). An American wood engraver, born in London. He came to the United States when very young, studied under Bond and Chandler, and in 1875 began to illustrate for the Century Publishing Company in New York City. His first series, "The Old Italian Masters," was finished in 1892. This was followed by the Dutch and Flemish series in 1896 and the English in 1900. The "Old Spanish Masters" was begun in 1902 and completed in 1907; the French series followed in 1910. He is now engaged on the old masters in American public and private galleries. By many critics Mr. Cole is considered the best of modern engravers. Several of the French engravers may be his equals, or technically cleverer than he, but there is none whose work is more substantial. He is especially effective in his use of the white line and in reproducing textures; his results in general are produced by conservative methods, in the employment of which he has gained breadth and power and appreciation of light and of the personality of his subject. He gives the intimate qualities of each school, so that there is no mistaking one for another, and yet he retains his own individuality. Consult Weitenkampf, *American Graphic Art* (New York, 1912).

COLE'BROOKE. See GRAND FALLS.

COLEBROOKE, HENRY THOMAS (1765–1837). An eminent English Orientalist. He was born in London, June 15, 1765. From the age of 12 to 16 he resided in France, and in 1782 he went out to India, where, after serving in various civil capacities under the East India Company, he was appointed professor of Sanskrit in the newly founded college at Fort William. Afterward he became a judge at Mirzapur, and subsequently held the appointment of President of the Board of Revenue. During his residence in India he gained an extensive knowledge of the literature of the Vedas and of the Sanskrit grammarians, metaphysicians, and mathematicians. A sound critical judgment marks all his writings. He was a director of the Royal Asiatic Society of Bengal; and many of the most valuable essays in the *Asiatic Researches* were contributed by him. These, with other papers of his, were republished as his *Miscellaneous Essays,* in 2 vols. (1837). The translation of the great *Digest of Hindu Laws,* left unfinished by Sir William Jones, was intrusted to him. He likewise made translations from Sanskrit works on mathematics, religion, and philosophy, which have remained as important contributions to our knowledge of India. (Consult his *Miscellaneous Essays,* London, 1837; new ed., 1873.) Colebrooke wrote a Sanskrit Grammar (1805) and contributed to Sanskrit lexicography by his edition of the *Amarakośa* (Serampur, 1808). His *Essay on the Vedas* (1805) was for many years the standard work on the subject. After his return to England he was made director of the Royal Asiatic Society. He died in London. Consult his *Life* by Sir T. E. Colebrooke (London, 1873).

COLE'MAN. A town on Old Man River, in the Macleod district, Alberta, Canada, and on the Canadian Pacific Railway, 10 miles from Crow's Nest Pass. It has banking facilities and an electric-light system and water works. It is a coal and coke centre, where two companies give employment to about 1000 men. Good fishing and hunting are to be had in the vicinity. Pop., 1911, 1557.

COLEMAN. A city and the county seat of Coleman Co., Texas, 120 miles (direct) southwest of Fort Worth, on the Gulf, Colorado, and Santa Fe Railroad (Map: Texas, C 4). It has beef, cotton, grain, and brick interests, and there are some deposits of coal and oil gas. The water works and electric-light plant are owned by the city. Pop., 1900, 1362; 1910, 3046.

COLEMAN, ARTHUR PHILEMON (1852–). A Canadian educator. He was born at Lachute, Province of Quebec, but removed to Ontario in his youth and was educated at the Cobourg Collegiate Institute and Victoria University, where he graduated with high honors in 1876. He afterward studied natural science at the University of Breslau, Germany, paying special attention to geology and undertaking numerous geological expeditions in different parts of Europe. He was professor of geology in Victoria University (1881–90), professor of assaying and metallurgy in the School of Practical Science, Toronto (1891–95), acting professor of geology in Toronto University (1895–1901), and after 1901 professor of geology. In 1893–1909 he was geologist to the Ontario Bureau of Mines. In 1910 he was awarded the Murchison medal for distinguished geological investigation. He was elected a fellow of the Royal Society of Canada, and in 1910 a fellow of the Royal Society. Besides numerous scientific papers, he published *Reports on the Economic Geology of Ontario* (1903) and *The Canadian Rockies: New and Old Trails* (1911).

COLEMAN, JOHN (1803–69). An American editor and clergyman of the Protestant Episcopal

church, born in Baltimore, Md. He was ordained priest in 1836, and from 1836 to 1856 was rector of Trinity Church, Philadelphia, Pa. For a time he was associated with the Rev. F. Ogilby in the editorship of the *Banner of the Cross*, published in Philadelphia. He prepared an edition (1840; with an introduction) of George S. Faber's *Difficulties of Romanism* (1826), and one (1840) of Dr. W. H. Wilmer's *Episcopal Manual* (1815; 2d ed., 1822).

COLE'MAN, JOHN (1832–1904). An English actor and theatrical manager. He won distinction as an actor, but his career was chiefly that of a manager. During the last half of the nineteenth century he was lessee and manager of various theatres, including the Olympic and Drury Lane.

COLEMAN, LEIGHTON (1837–1907). An American clergyman of the Protestant Episcopal church. He was born in Philadelphia, Pa., graduated in 1861 at the General Theological Seminary (New York City), took orders as deacon in 1860, and as priest in 1862, and from 1861 to 1879 was rector of churches successively at Bustleton, Pa., Wilmington, Del., Mauch Chunk, Pa., and Toledo, Ohio. After residence in England from 1879 to 1887, he was rector at Sayre, Pa., and in 1888 was consecrated Bishop of Delaware. His publications include *A History of the Lehigh Valley* (1872); *The Church in America* (1895); and *A History of the Church in the United States* (1901, in the "Oxford Church Text Series"). He contributed to the first edition of the NEW INTERNATIONAL ENCYCLOPÆDIA.

COLEMAN, LYMAN (1796–1882). An American educator and author, born at Middlefield, Mass. He graduated at Yale in 1817, was tutor there from 1820 to 1825, and later studied in Germany, and taught German at Princeton. From 1861 to 1868 he was professor of Greek and Latin at Lafayette College, and from 1868 until his death professor of the Latin language and literature. He published *The Apostolical and Primitive Church* (1844); *Ancient Christianity* (1852); *Historical Text-Book and Atlas of Biblical Geography* (1854; revised, 1859); *Prelacy and Ritualism* (1869).

COLEMAN, WILLIAM TELL (1824–93). An American pioneer. He was born in Cynthiana, Harrison Co., Ky., and was educated at St. Louis University. In 1849 he went to California and eventually settled in San Francisco, where he engaged in the shipping and commission business. After opening a branch in New York, he established a steamship line between that city and San Francisco in 1856. He was president of the vigilance committees (1851 and 1856) in San Francisco. In 1857 he removed to New York and conducted his business from that city until 1864. During the labor troubles of 1877 in San Francisco he again organized a force of several thousand men to preserve order. One of his most noteworthy achievements was the embellishment and extension of the town of San Rafael, Cal. See VIGILANCE COMMITTEE.

COLENSO, BATTLE OF. See SOUTH AFRICAN WAR.

COLEN'SO, JOHN WILLIAM (1814–83). An English bishop, born in St. Austell, Cornwall. He was educated at Cambridge, was fellow and tutor in St. John's College; became rector of Forncett St. Mary, in Norfolk, in 1846, and in 1853 was appointed first Anglican Bishop of Natal, South Africa. In England he had edited mathematical textbooks. The first of his works that attracted especial attention was *A Translation of the Epistle to the Romans, Commented on from a Missionary Point of View* (1861). The *Pentateuch and Book of Joshua Critically Examined* (7 vols.), in which the authorship of Moses and the accuracy of many statements in the books were questioned, and the inspiration of the Old Testament denied, appeared in 1862–79. His views were the result of study undertaken to answer questions on biblical chronology put by native converts. Especially through Kuenen (q.v.), his influence on biblical criticism was large. Colenso had already roused ecclesiastical opposition for permitting polygamy among his converts. He was deposed by his Metropolitan, the Bishop of Cape Town, but the deposition was declared void by the Privy Council. The trustees of the Colonial Bishoprics Fund then stopped his income, but the Court of Chancery ordered it to be paid, with arrears and interest. The see of Grahamstown was erected in place of that of Natal, in order to carry out the effect of the spiritual sentence without conflict with the state; and for the rest of his life Colenso occupied a schismatic position. He strongly favored the natives in their quarrels with the Boers. He published *Ten Weeks in Natal* (1855), a Zulu grammar (1859) and dictionary (1861), and translated the New Testament and part of the Old into the Zulu language. Consult Cox, *Life of Bishop Colenso* (2 vols., London, 1888).

CO'LEOP'TERA (Neo-Lat. nom. pl., from Gk. *κολεόπτερος, koleopteros*, sheath-winged, from *κολεός, koleos*, sheath + *πτερόν, pteron*, wing). An order of insects, comprising beetles, and characterized primarily by the possession of wing covers. See BEETLE.

COLEPEPER, kōl'pĕp-ĕr, JOHN, LORD (?–1660). An English politician, prominent as a supporter of the Stuart kings against the Parliament. He was born at Wigsell, in Sussex, and after traveling abroad began to play an active part in county politics. In 1640 he became a member of the Long Parliament and, a zealous adherent at first of the popular party, gradually passed over to the side of the King, who in 1642 made him Chancellor of the Exchequer. With Falkland and Hyde, he played an important part in the negotiations between King and Parliament, preceding the outbreak of hostilities. He fought in the battle of Edgehill (Oct. 23, 1642) and in January of the following year was made Master of the Rolls, leaving the chancellorship to Hyde, of whose influence he was exceedingly jealous. On the downfall of the Royalist fortunes in 1645 Charles I intrusted Colepeper with the care of the person of the Prince of Wales, with whom in the following year he went to France. Later he lived with Prince Charles in the Netherlands and remained one of his principal advisers, going in his behalf on a mission to Russia (1650) and accompanying him to the Peace Congress of the Pyrenees in 1659. He returned to England after the Restoration, but died soon after. Colepeper was one of the ablest debaters and politicians of his time in England, but his influence suffered from his having a certain lack of confidence in his own opinions. He was given, too, to violent outbursts of temper.

COLEPEPPER, kōl'pĕp-ĕr, CAPTAIN JOHN. A bully and murderer, nicknamed "Poppercul," in Scott's *Fortunes of Nigel*.

CO'LER, ALWIN GUSTAV EDMUND VON, 1831–

1901). A German physician, born in Groningen. He studied medicine in Berlin, entered the Prussian army in 1856, was made surgeon-general in 1874, and head surgeon of the general staff in 1889. General Coler's activity resulted in improvements of the highest importance in army hygiene, reforms in the military hospital service, the establishment of corps of sanitary officers, and the introduction of antiseptics into military surgical practice. He was also largely instrumental in formulating medical regulations for the German army, which have since been adopted by the armies of all civilized nations. In 1892 he was made professor at the University of Berlin. His writings include: *Sanitatsbericht über die deutschen Heere im Kriege 1870–71; Veröffentlichungen aus dem Gebiete des Militärsänitswesens* (1892); *Die transportable Lazarettbaracke* (with Langenbeck and Werner, 1890).

COLER, Bird Sim (1868–). An American politician, born in Illinois. He established himself as a stockbroker in New York City, became prominent in municipal and State politics, and served as first comptroller of Greater New York in 1897–1902. In 1902 he was the Democratic nominee for Governor of New York, but was defeated by a small plurality in spite of his enormous vote in New York City. In 1905 he was elected president of the Borough of Brooklyn, on the Municipal Ownership ticket. His publications include: *Municipal Government as Illustrated by the Charter, Finances, and Public Charities of New York* (1900); *Socialism in the Schools* (1911); *Two and Two Make Four* (1912).

COLERAINE, kŏl-rān′. A parliamentary and municipal borough and seaport, in the County of Londonderry, Ireland, on the Bann, 4 miles from the sea, and 47 miles by rail north-northwest of Belfast (Map: Ireland, E 1). It is built on both sides of the river, the main town being on the east bank. Its best-known foundation is the Academical Institution. The town is known on account of its linen manufactures, one brand of cloth being called "Coleraines." Other products include soap, pork, whisky, paper, and leather. Its port is accessible to ships of 200 tons. Salmon and eel fishing flourishes on the Bann. Pop., 1901, 6958; 1911, 7785.

COLE'RIDGE, Ernest Hartley (1846–1920). An English author, grandson of S. T. Coleridge. He was graduated from Balliol College, Oxford, in 1870. He became secretary to the Lord Chief Justice of England in 1894. He edited *Letters of S. T. Coleridge* (1895); *Anima Poetæ* (1895); *Poetical Works of Byron* (1898–1901); *Life and Correspondence of John Duke, Lord Coleridge* (1904); a one-volume edition of Byron (1905); *Poems of Coleridge* (1907), and the *Complete Poetical Works of Samuel Taylor Coleridge* (2 vols., 1912).

COLERIDGE, Hartley (1796–1849). An English poet, born at Clevedon, Somersetshire, the eldest son of S. T. Coleridge. He studied at Oxford and was elected to a fellowship at Oriel College, from which he was removed by the authorities in 1826 on the charge of intemperance. For two years he resided in London. Then he returned to the Lake Country and, after having twice attempted school teaching, first privately at Ambleside and later at the grammar school of Sedbergh as an assistant in 1837 and 1838, settled at Grasmere. An almost constant wanderer about the vales, this diminutive figure, prematurely gray and old, became familiar to the peasantry as "Little Hartley." He was a scholar of rare attainment, a poet of exquisite taste and easy felicity, to whom, in the words of Dowden, "good thoughts came as of free grace." But, lacking will and the capacity for sustained application, he remained despondent, fragmentary, ineffectual. His longest literary work was in the preparation of an edition of the dramas of Massinger and Ford, with biographies of those authors (1840). He also wrote a series of lives of the *Worthies of Yorkshire and Lancashire* (1836; originally as *Biographia Borealis*, 1833). He is best known, however, for his verse, which, though it is distinctly lacking in power, is singularly fine in mood and happy in expression. Of the sonnet, a form, as Dr. Garnett observes, "which precisely suited both his strength and his limitations," he composed some of the finest examples in English. Such are "Whither," "To Shakespeare," "Prayer," "May, 1840," "Regrets," and "Ideality." His brother, Derwent, edited, with a memoir, his *Essays and Marginalia* and *Poems* (London, 1851). Selections are to be found in all important anthologies. His *Complete Poetical Works*, ed. by R. Calles, appeared in New York (1908). Hartley Coleridge was, his life long, a friend of Wordsworth, whose "To H. C.: Six Years Old" seems strangely prophetic.

COLERIDGE, Henry Nelson (1798–43). An English man of letters, nephew of Samuel Taylor Coleridge. He was born at Ottery St. Mary, Devonshire, graduated at Cambridge, and studied law. Soon afterward he made a trip to the Barbados, which he describes in *Six Months in the West Indies* (1825; 4th ed., 1841). In 1829 he married his cousin, Sara Coleridge. He was his uncle's literary executor and prepared the second edition of the latter's political and dramatic works (1834). He edited *Literary Remains* (1836–39); *Confessions of an Inquiring Spirit* (1840, with notes by Sara Coleridge, 1849); and published *Table Talk* (1835), notes which he had collected during several successive years and gathered into a volume. His son, Herbert Coleridge (1830–61), born at Hampstead, was a philologist. He was appointed secretary of a special committee of the Philological Society for the purpose of collecting material for a dictionary which was expanded into the *New English Dictionary*, published by the Clarendon Press under the editorship of Dr. J. A. H. Murray.

COLERIDGE, John Duke, Baron (1820–94). An English jurist, son of Sir John Taylor Coleridge (q.v.). He was born in London, graduated at Oxford in 1842, was called to the bar in 1846, and soon ranked high in his profession. He was a member of the House of Commons from 1865 to 1873, was knighted in 1868, became Attorney-General in 1871, was appointed Chief Justice of the Court of Common Pleas in 1873, and in the same year was raised to the peerage as Baron Coleridge of Ottery St. Mary. On the death of Sir Alexander Cockburn in 1880, he succeeded him as Lord Chief Justice of England. In 1883 he visited the United States. Consult E. H. Coleridge, *Life and Correspondence of John Duke, Lord Coleridge* (2 vols., London, 1904), and C. Yarnall, *Forty Years of Friendship* (ib., 1911).

COLERIDGE, Sir John Taylor (1790–1876). An English judge and author, a nephew of Samuel Taylor Coleridge. He was born at

Tiverton, graduated at Oxford in 1812, was called to the bar in 1819, and was made a judge of the King's Bench in 1835 and a privy councilor in 1858. On the retirement of Gifford in 1834 he became for a short period editor of the *Quarterly Review*. He published an annotated edition of Blackstone's *Commentaries* (1825); *Public School Education* (2d ed., 1860); *Life of Keble* (1869). He was a friend of the latter as well as of Wordsworth, Pusey, and Newman.

COLERIDGE, Samuel Taylor (1772–1834). An English poet, philosopher, and critic. He was born at Ottery St. Mary, Devonshire, and educated at Christ's Hospital, where Charles Lamb was a schoolfellow. He was an omnivorous reader, even as a boy, and, gaining access to a library through a chance acquaintance, he read "right through the catalogue." He soon gained a remarkable knowledge of Greek, and before he was 15 plunged boldly into the sea of metaphysics. The sonnets of W. L. Bowles, which fell into his hands at this time, gave him his first impulse towards poetry. In 1791 he entered Jesus College, Cambridge. At the university his whole mind was given to classics, and he obtained a prize for a Greek ode. During his second year there, in a fit of despondency, he went up to London and enlisted in the Fifteenth Dragoons, under the name of Silas Tomkyn Comberback, or Cumberbatch—remaining faithful to the initials S. T. C., which were afterward to be so familiar among the readers of his period. His identity was discovered through an accident, and his friends intervened to procure his discharge. He returned to Cambridge in 1794, but never took a degree. During a visit to Oxford he became acquainted with Southey, and in the same year, after a trip through Wales, visited him at Bristol. The two young men and some of their friends now formed a scheme for emigrating to the United States, where, on the banks of the Susquehanna (the melody of the name seems to have been one of the inducements), they were to found a colony where the laws of equality and fraternity were to prevail, and the golden age was to be ushered in. They, with Wordsworth and other generous youth of the time, were deeply impressed with the proclamation of liberal principles in the French Revolution, though they afterward drew back, alarmed by its excesses, some into extreme Toryism. The establishment of their ideal "Pantisocracy" was delayed by the lack of capital; and a year or two later the dream faded away.

At Bristol, Coleridge became acquainted with his future wife, Sara Fricker, to whose sister Southey was engaged. Joseph Cottle, a bookseller in Bristol, had offered Coleridge 30 guineas for a volume of his poems and promised him a guinea and a half for every 100 lines he should write after finishing it. On this prospect he married in October, 1795, and settled in a cottage at Clevedon. After many delays his volume of *Juvenile Poems* appeared in April, 1796. His earlier work is all in the stereotyped style of the eighteenth century and shows little trace of the powers which were to make him famous. In the early part of 1796 he began the publication of a weekly review, the *Watchman*, devoted to literature and politics, but met with little success, and abandoned the undertaking after the tenth issue. In the winter of 1796 he settled at Nether Stowey, near Bridgewater, whither Wordsworth removed in the following year. He was freed from the material cares of life by the generosity of Charles Lloyd, the son of a Birmingham banker, who had become a devoted disciple of Coleridge, and Thomas Poole, who conferred on him a small annuity. At Nether Stowey, inspired perhaps partly by the beautiful scenery and still more by the strengthening companionship of his friend, he composed his finest poems, including the "Ancient Mariner" and the first part of "Christabel" and "Kubla Khan," though the two latter were not published until 18 years afterward. The two authors had many discussions on the principles of their art, which resulted in the publication, in 1798, of their epoch-making *Lyrical Ballads*. This little book, published anonymously, though a total failure at the time, was decisive in its influence on the future of nineteenth-century poetry, freeing it finally from the conventional trammels which had long bound it. The work of the two poets is singularly complementary—Coleridge treating supernatural subjects in such a way as to give a strong impression of their reality, while Wordsworth so handled the simplest themes as to disclose unsuspected elements of mystery and awe. Coleridge's contribution to the *Ballads* comprised the "Ancient Mariner," the "Nightingale," and two scenes from his play *Osorio*. In the edition of 1800 there was added "Introduction to the Tale of the Dark Ladie."

Coleridge, who had become a Unitarian at Cambridge, preached frequently during this period in the chapels of that body and had thoughts of becoming a regular minister. To deliver him from this necessity, two brothers named Wedgwood settled on him an annuity of £150, and this enabled him to carry out the long-cherished plan of going to Germany to study. In September, 1798, he sailed for Hamburg with Wordsworth, and after acquiring the language went to Göttingen, remaining, in all, nearly a year. This was a period of vast importance in his development, and he said himself that there was no time of his life to which he looked back with such unmingled satisfaction. He came under the influence of what Shairp calls "an impulse, the most original, the most far-reaching, and the most profound which Europe has seen since the Reformation." The first result of his new knowledge of German thought was not in philosophy, but in poetry; on his return to England he published his noble translation of Schiller's *Wallenstein*. He also contributed fitfully to the *Morning Post* to the end of 1802. Before that time, however, he had settled at Greta Hall, Keswick, in the Lake District, attracted by the proximity of Wordsworth and Southey, who were to share with him the designation of Lake Poets, given in derision by the *Edinburgh Review*. Here, in 1800, he wrote the second part of "Christabel." Driven from the North by rheumatism in 1804, he went to the Mediterranean, acting for some months as secretary to the Governor of Malta and spending several more at Rome.

On his return to England he delivered some lectures on poetry and the fine arts at the Royal Institution, London, and began the publication of the *Friend*, a periodical which contained too much abstruse philosophy to be popular and lived less than a year. During part of 1811 he was connected with the *Courier*, contributing articles of a general political nature. In 1813 his play *Remorse* was successfully produced at the Drury Lane Theatre and helped to relieve his

distressed financial condition. His enslavement to opium, which he had begun to take as a relief from his rheumatic pains, was now increasing and, in De Quincey's opinion, "killed him as a poet." His constitutional indolence and dislike for steady application completed his unfitness for meeting the demands of life. Roving between London and the Lakes, where his family was generally under Southey's care, he spent a number of baffled and disappointed years.

From 1816 until his death, July 25, 1834, he lived in the house of Mr. Gillman, at Highgate in London, where he received the kindest and most judicious care and at least to some extent mastered his craving for opium. Though he projected far more than his habits ever allowed him to accomplish, he left as the result of those years no inconsiderable bulk of critical and philosophic writing; the *Biographia Literaria* (1817, and, with annotations and biographical supplement by Sara Coleridge, 1847) is especially noteworthy. It was, however, as a talker, discoursing with an inexhaustible flow of ideas to admiring visitors, that he shone most brilliantly in his latter years. Talk was his best medium for showing himself to others. His style in prose writing was cumbrous and his matter involved. In reading his written work of this class we feel instinctively that the critic was greater than the criticism.

No man had ever appeared in England who united in so eminent a degree the three functions of critic, philosopher, and poet. With all his defects Coleridge must be recognized as being, in Mill's phrase, the greatest "seminal mind" of his time. The present generation does not realize how much it owes to him in many fields of thought—how many impulses, still powerful, he set in motion. In criticism he was the father of modern Shakespearean study, laying in a few pregnant sentences a broad basis for criticism in contrast to the narrow canons of Johnson and the eighteenth-century school. His *Aids to Reflection* and some of his other theological writing inspired Maurice and Stanley and the Broad Church movement as a whole. His aphorisms are often decisive—it is to him we owe what are now commonplaces, the distinction between genius and talent, fancy and imagination, wit and humor. Detached phrases of his are still upon the lips of many who do not remember their source—like "Every man is born either an Aristotelian or a Platonist," or "Prose is words in their best order; poetry is the best words in the best order." In philosophy, originally a fervent disciple of Hartley (q.v.), who had been a member of his own college, he passed on through the theories of Berkeley and Leibnitz, and, after falling under the influence of the German and other mystics, came to a point where, he says, the works of Kant took hold of him as with a giant's hand. He adopted and based all his teachings on Kant's distinction between the Understanding and the Reason; and while he has not as a philosopher left any complete system, yet he rendered excellent service by his insistence, in such a period as his, on the reality and preëminence of the spiritual verities. His introduction into England of German literature and philosophy, so powerfully seconded by Carlyle, is alone enough to give him a high place among the forces that determined the course of nineteenth-century thought among English-speaking people. But it is as a poet that he must hold the highest rank, though no other poet has ever attained such a place on so small a volume of first-class work. "Christabel," "The Rime of the Ancient Mariner," and "Kubla Khan" (which so good a judge as Swinburne has called "for absolute melody and splendor the first poem in the language") cannot be put in any but the highest class. Moreover, his influence on his successors must be taken into account. The Pre-Raphaelite movement, which Theodore Watts-Dunton defines as "the Renaissance of the Spirit of Wonder in poetry and art," owes more to him than to any other English poet. One can only regret that so much was wasted of the greatest powers which for generations had been granted to any Englishman.

Consult: *Complete Poetical Works . . . including Poems now Published for the First Time*, ed., with . . . notes, by Ernest Hartley Coleridge (2 vols., Oxford, 1912); *Complete Works*, ed. by Shedd (7 vols., London, 1853; New York, 1884); *Poetical Works*, ed. by Campbell (London, 1893); *Poems*, a facsimile reproduction of the proof and manuscripts of some of the poems, ed. by Campbell (ib., 1899); *Lyrical Ballads*, centenary ed. by Hutchinson (ib., 1898); *Anima Poetæ*, from his unpublished notebooks by his grandson (ib., 1895); lives by Gillman (ib., 1838), Traill ("English Men of Letters Series," ib., 1884), Dykes, the standard life (ib., 1894), and Hall Caine (ib., 1887); Cottle, *Early Recollections* (ib., 1837); Brandl, *Samuel Taylor Coleridge und die englische Romantik* (Berlin, 1886; Eng. trans. by Lady Eastlake, London, 1887); and a thorough and luminous discussion in Shairp, *Studies in Poetry and Philosophy* (Edinburgh, 1868). Consult also: E. H. Coleridge, *Letters of Samuel Taylor Coleridge* (London, 1895); Beers, *English Romanticism in the Nineteenth Century* (New York, 1900); Barnett, *Coleridge* (ib., 1904).

COLERIDGE, Sara (1802–52). An English author, born at Greta Hall, near Keswick. She was the only daughter of Samuel Taylor Coleridge and married her cousin, Henry Nelson Coleridge (1829). The early part of her life was spent with her uncle, Robert Southey. After the death of her husband she continued the editing of her father's works, and this was her principal literary work. Her intelligence and learning are shown in various translations and some original work, of which the tale *Phantasmion* (1837) is the most important. Consult her *Memoirs and Letters*, ed. by her daughter (London, 1873).

COLERIDGE-TAYLOR, Samuel (1875–1912). An English composer of music, born in London, Aug. 15, 1875. He was of African descent through his father, who was a native of Sierra Leone. His mother was an Englishwoman, and he himself was brought up under English influences. After a distinguished career at the Royal Academy—which he entered at 15, winning the composition scholarship in 1893, and studying under Villiers-Stanford until 1896—he devoted himself entirely to composition. In 1903 he organized a series of successful orchestral concerts at Croydon. His reputation as a composer grew rapidly, so that he was commissioned to contribute works to three different English festivals in one year. He made three visits, in 1904, 1906, and 1910, to the United States, where his works made a decided impression. His early death, on

Sept. 1, 1912, in London, cut short a career that had held out great promise for the future. His principal works are a *Symphony* in A minor, a *Ballad* for violin and orchestra, a *Ballad* for orchestra in A minor, a *Solemn Prelude*, an orchestral rhapsody *Endymion*, *Four Waltzes* for orchestra, *Bamboula Rhapsody Dance*, a *Concerto* for violin and orchestra, incidental music to *Nero*, *Herod*, *Ulysses*, *Faust;* an operetta *Dream-Lovers*, an oratorio *The Atonement*, five choral works with orchestra, of which *Hiawatha's Wedding* is the best known, chamber-music works of a high order of excellence, piano pieces, and songs.

COLES, kōlz, Cowper Phipps (1819–70). An English naval officer. He served as flag lieutenant to Sir Edmund Lyons in the Mediterranean (1853) and at the bombardment of Sebastopol (Oct. 17, 1854). In 1856 the plan of defensive armor for battleships began to engage his attention. The idea originally proposed had been that of a raft and shield, and this idea was modified by Coles into that of a vessel with a low freeboard surmounted by a series of turrets equipped with heavy guns. His plan for such a ship in a paper read in June, 1860, is so like the monitor type elaborated by Ericsson that the respective claims of the two men led to a bitter controversy. In 1864 the *Royal Sovereign*, a wooden ship built in 1857, was cut down and armored after Coles's plans. A vessel, constructed in accordance with Coles's specifications, was launched under the name of *The Captain*, in 1869, and on Sept. 7, 1870, capsized in a gale off Cape Finisterre, and almost everybody on board, including Coles, was drowned.

COLESEED. See Rape.

COL'ET, John (c.1467–1519). An English theologian, born probably in London. He studied at Oxford, traveled in Paris and Italy (1493–96), and became acquainted with Budæus and Erasmus. Returning to England, he took up his residence at Oxford and there lectured upon the Epistle to the Romans, displaying originality and independence of the schoolmen. The next year he lectured in the same fashion on 1 Corinthians, and so upon other New Testament books, until in 1505 he was appointed dean of St. Paul's, London. Having inherited from his father a large fortune in 1509, he founded St. Paul's School in London, of which William Lilly was the first master. His religious opinions were so much more liberal than was common at the time that he was subjected to considerable persecution. As dean of St. Paul's he lectured much on the Bible, disapproved of auricular confession and the enforced celibacy of the clergy, denied the efficacy of pilgrimages and the worship of images, and denounced corruption in the Church. His influence is traceable as paving the way for the Reformation, although it is probable that, like other humanists, he would not have left the old Church. Erasmus was much influenced by his emphasis on the study of Scripture. He died in London (or at Sheen, a few miles southwest of London), Sept. 16, 1519. Aside from his *Latin Grammar* and his *Daily Devotions*, his works did not appear until the nineteenth century, edited by Rev. J. H. Lupton, with English translations. Consult his biography by J. H. Lupton (2d ed., 1909), and F. Seebohm, *Three Oxford Reformers: Erasmus, Colet, and More* (3d ed., London, 1887).

COLET, kō'lā', Louise Révoil (1810–76). A French poet and novelist, of the Neo-Romanticist school. Among her verses are *Les fleurs du midi* and *Pensérosa*. The *Musée de Versailles* and *Les funérailles de Napoléon* are more sustained flights, the former crowned by the Institute. A comedy, *La jeunesse de Goethe* (1839), and two novels, *La jeunesse de Mirabeau* (1841) and *Les cœurs brisés* (1843), deserve mention, but nothing that she composed equals in interest her publication, in defiance of a legal injunction, of the correspondence of Madame Récamier with Benjamin Constant (1849). She enjoyed the friendship and admiration of the greatest littérateurs of her time. Two famous men, Victor Cousin, the philosopher, and Gustave Flaubert, the novelist, figure most prominently in her life. *Lui, roman contemporain* (1859), her most important novel, is a biased account of her relations with the latter. Her salon became in 1849 the continuation of the brilliant Récamier salon.

COLEWORT, (from *cole*, AS. *cāwel*, *cāul*, OHG. *kōl*, Ger. *Kohl*, cabbage, from Lat. *caulis*, cabbage, Gk. καυλός, *kaulos*, stalk + *wort*, AS. *wyrt*, plant, Ger. *Wurz*, root; ultimately connected with Lat. *radix*, root). A name given to some of the many cultivated varieties of *Brassica oleracea*, and applied, like the names "borecole" and "kale," to varieties differing from the cabbage (q.v.) in their open heads of leaves, which are used as greens, especially in the winter months. The same name is also given to cabbages cut for use before their leaves have fully closed into heads.

COLEY, William Bradley (1862–). An American surgeon, born at Westport, Conn. He was educated at Harvard and Yale universities and entered upon the practice of medicine in 1888. He became attending surgeon at the General Memorial Hospital and the Hospital for Ruptured and Crippled, and also professor of clinical surgery at the Cornell University Medical School. His publications include the topic of "Hernia" in *Dennis's System of Surgery* (1896), *Warren and Gould's International Text-Book of Surgery* (1898), *Progressive Medicine* (1898), and *Keen's Surgery* (1907); and that of "Cancer" in *Twentieth-Century Practice of Medicine* (1897).

COLFAX, kōl'făks. A city in Jasper Co., Iowa, 23 miles east of Des Moines, on the Chicago, Rock Island, and Pacific Railroad (Map: Iowa, D 3). Colfax contains a public library and mineral springs of note. The chief industries are coal mining and the bottling of the spring water. The water works are owned by the city. Pop., 1900, 2053; 1910, 2524.

COLFAX, kōl'făks. A city and the county seat of Whitman Co., Wash., 55 miles (direct) south of Spokane, on the Palouse River, and on the line of the Oregon Railroad and Navigation Company (Map: Washington, H 4). The centre of a fertile agricultural country, it controls a considerable trade in live stock, grain, fruits, and lumber. The city contains a hospital and fine courthouse and owns its water works. Pop., 1900, 2121; 1910, 2783.

COLFAX, Schuyler (1823–85). An American statesman, born in New York City. He removed to Indiana in 1836, where he studied law, and in 1845 became editor of the *Register*, a Whig newspaper at South Bend, which under his management became the most powerful organ of its kind in that part of the State. He

was a delegate to the Whig conventions of 1848 and 1852, and in 1850 he was a member of the State convention to revise the constitution. After a defeat in 1851 he was elected to Congress in 1854, served seven consecutive terms, and was Speaker from 1863 to 1869. He was Vice President of the United States from 1869 to 1873. In the John C. Frémont campaign of 1856 a speech made by him was used for party purposes, and half a million copies were distributed over the country. He introduced several important acts for the reform of the postal system, in which he took an especial interest, and in 1862 framed the law which made fraudulent contractors felons. Charges of corruption were brought against him at the time of the Crédit Mobilier (q.v.) scandal, in 1873, but the charges were never conclusively substantiated. His reputation suffered, however, and he retired from public life. Consult Hollister, *Life of Schuyler Colfax* (New York, 1886).

COLGATE, kōl'gāt, James Boorman (1818–1904). An American financier. He was born in New York City and received his first commercial training in the house of Boorman, Johnston and Company. He later established the banking house of Trevor and Colgate, afterward known as J. B. Colgate and Company. His extensive loans to the government and sound financial policy during the financial crisis of 1873 contributed materially to the reëstablishment of confidence both in the United States and in the markets of Europe. He was one of the founders of the New York Gold Exchange and was for several years its president. As trustee of Colgate (formerly Madison) University, he for 30 years made almost annual donations to that institution, the development of which is due chiefly to his constant care and valuable advice.

COLGATE, Samuel (1822–97). An American manufacturer and philanthropist, born in New York City. He became widely known as a soap maker, and the manufactory he built in Jersey City has developed into one of the largest establishments of the kind in the world. He was also prominent in philanthropical work. For more than 30 years he was trustee of Colgate University, and for many years he was president of the New York Baptist Education Society, president of the Society for the Suppression of Vice, and a member of the executive committee of the American Baptist Missionary Union and of the American Tract Society. One of his most noteworthy achievements was the collection of 30,000 volumes of reports (now in the Colgate University Library), comprising the documentary records of the Baptist denomination. Conjointly with his brother, James B. Colgate, he gave large sums to Colgate (formerly Madison) University, which in 1890 was named in honor of the Colgate family.

COLGATE (kōl'gāt) **UNIVERSITY.** An institution for higher education, situated at Hamilton, N. Y. It was founded in 1819. It has two departments, the College and the Theological Seminary. Colgate Academy was discontinued in 1912. The institution was incorporated in 1846 under the name of Madison University. In 1850 occurred a migration of a large number of the students and faculty to Rochester, N. Y., thereby founding the University of Rochester. The presidents of the university have been Nathaniel Kendrick, D.D., president in reality but not in name; Stephen W. Taylor, LL.D.; George W. Eaton, D.D., LL.D.; Ebenezer Dodge, D.D., LL.D.; George W. Smith, LL.D.; George E. Merrill, D.D., LL.D.; and the present incumbent, Elmer Burritt Bryan, LL.D. In 1890 the name of the institution was changed to Colgate University, in honor of William Colgate and his sons, one of whom, J. B. Colgate, established the Dodge Memorial Fund of $1,000,000. In 1893 Hamilton Theological Seminary became part of Colgate University. The attendance in 1914 was about 500. The faculty numbered 46. The library in 1914 had about 65,000 volumes, including the Samuel Colgate Historical Collection. Colgate University offers courses leading to the bachelor's and master's degrees in arts and science and to the bachelor's degree in divinity. It offers also courses in education which enable students to obtain college graduates' professional certificates. The university endowments in 1914 amounted to over $2,000,000, and the total value of the university property was estimated at over $3,000,000.

COLIC (from OF., Fr. *colique,* ML. *colica,* colic, from Gk. *κωλική, kōlikē,* colic, from *κῶλον, kōlon,* colon). A severe pain in the bowels or adjacent organs. When arising in the bowel, it is spasmodic in character and is dependent upon irregular contraction of the muscular coat of the intestines. Intestinal colic is a symptom of neuralgia of the intestines, caused by cold; of mild enteritis, caused by irritating food or purgative medicine; of toxic conditions such as lead poisoning, poisoning by the bacterial toxins of shellfish, etc.; of peritonitis, appendicitis, and other diseases. Infantile colic, common in the first six months of life, is caused usually by overfeeding, either of proteids or carbohydrates, which cause flatulence and distention. The infant is restless, draws up its legs, and has paroxysms of crying. Relief comes from vomiting or the passage of flatus. Infantile colic may be merely the result of enfeebled digestion, and careful modification of the food is the only remedy. If warmth, an aperient (such as castor oil), or peppermint, or tincture of ginger fails to give relief, a physician should be summoned. Renal colic is pain over the kidney and through the abdominal wall, due to passage of a calculus, or stone, from the kidney through the ureter into the urinary bladder. Biliary colic is caused by the passage of a gallstone from the gall bladder into the intestines.

COLIC IN ANIMALS. Colic (enteralgia) is a term usually applied to various morbid conditions of the stomach and intestines, particularly of the horse and mule, of which pain is the chief symptom; this does not signify a specific disease. Of the various forms of true colic, flatulent, or wind, colic and spasmodic, or cramp, colic are those more commonly met with. Spasmodic, or cramp, colic is caused by spasm of the small intestines and is due to the presence of foreign bodies in the intestines, such as undigested food, to large drafts of cold water, to exposure to cold, or to hard work too soon after eating. It is most frequent in high-bred horses. This form of colic always begins suddenly. The horse looks backward, shows acute pain, paws, lies down and gets up frequently. As the pain becomes more intense, the animal throws himself down with great violence and strikes with the feet.

These spasms are interrupted by intervals of quiet, but the intervals become shorter and shorter. This form of colic ordinarily yields promptly to appropriate treatment. Perhaps the best remedy is one ounce of chloral hydrate in a pint of water given as a drench. *Cannabis indica* gives good results, as also ether and laudanum. Flatulent, or wind, colic is sometimes used as synonymous with bloat (q.v.). Turpentine in doses of one ounce in a pint of linseed oil is a good remedy. Any alkaline substance neutralizes the acid fermentation and should be administered at once. In severe cases the bowels may be punctured at the most distended part by means of a trochar and cannula. Enemas of lukewarm water, to which a little soap has been added, are useful in both forms of colic, as are also cathartics, such as aloes in full doses. Consult H. C. Reeks, *The Common Colics of the Horse*, and M. H. Hayes, *Friedberger and Fröhner's Veterinary Pathology*, vol. i.

COLIGNY, kô'lē'nyē', or **COLIGNI,** GASPARD DE (1517–72). Admiral of France and Huguenot leader, born at Châtillon-sur-Loing, Feb. 16, 1517. He came of a noble family, his father having been Marshal Gaspard de Coligny, his mother Louise de Montmorency. He was introduced at court at the age of 22 and served under Francis I in Italy, where he evinced great bravery, especially at the battle of Ceresole (1544). Under Henry II he was made colonel general of the infantry, and in 1552 he became Admiral of France. In all the wars in which he took part he showed himself a born general and leader, his most noted exploit being the defense of Saint-Quentin (1557) against an overwhelming force of Spanish and English troops. He was finally forced to surrender and spent the next two years in a Spanish prison. On the death of Henry II, 1559, Coligny, who had previously adopted the Reformed faith, became, with the Prince of Condé, one of the great leaders of the Huguenots. In this capacity he was remarkable alike for his prudence and his bravery. Opposed to the Huguenot chiefs was the powerful Catholic party headed by the Duke of Guise and the Constable de Montmorency. At the disastrous battles of Dreux (1562) and Jarnac (1569), Coligny's skill saved the remnants of the Protestant army. Condé was slain on the field of Jarnac, and Coligny assumed the sole leadership until he gave way to the young Prince of Navarre. (See HENRY IV.) Together they besieged Poitiers, but the Huguenot forces were again routed on the bloody field of Moncontour (Oct. 3, 1569). When peace was concluded in 1570, Coligny went to court and was apparently well received by Charles IX, whose ardor he aroused by the plan of a national war against Spain, in which Coligny hoped to sink all religious differences. His projects and his favor with the King aroused the enmity of the Catholic party, whose leader, the Duke of Guise, always suspected the Admiral of having caused the death of his father at the siege of Orléans. Guise and the Catholics formed a plot to murder Coligny, which narrowly failed, and after their lack of success in this passed to a more general plot which resulted in the Massacre of St. Bartholomew (Aug. 24, 1572) in which Coligny perished. While upholding the Huguenot cause at home, Coligny exerted himself to secure a safe asylum for his coreligionists in the New World and sent repeatedly expeditions (Ribault in 1562, Laudonnière in 1564) to colonize what is now the southeastern part of the United States. Among his papers, burned by order of Catharine de'Medici, was his *History of the Wars of Religion in France*. Consult: Tessier, *L'Amiral Coligny* (Paris, 1872); Delaborde, *Gaspard de Coligny* (3 vols., ib., 1879–82); Bersier, *The Early Life of Coligny* (London, 1884); Blackburn, *Life of Coligny* (Philadelphia, 1869); Besant, *Life of Coligny* (London, 1892); Whitehead, *Gaspard de Coligny* (ib., 1905); Erich Marcks, *Gaspard von Coligny* (Stuttgart, 1892; vol. i (to 1560) is all that has so far appeared).

COLIMA, kô-lē'mȧ. The capital of the state of the same name, Mexico, on the Colima River, about 40 miles from the Pacific coast (Map: Mexico, G 8). It is situated at an altitude of 1476 feet, is generally well built, and has fine plazas and a number of pretentious buildings, among which are the government building and town hall, the Hospital de San Juan, and the market. The town has connections by rail and water with the port, Manzanillo, and is the seat of considerable trade. Colima was founded in 1523 by Gonzalo de Sandoval. Pop., 1900, 20,698; 1910, 25,148. About 40 miles to the northeast of the town, in the State of Jalisco, is the volcano of Colima (nearly 13,000 feet), which is constantly in a state of eruption.

COL'IN CLOUT. 1. A poetical satire on the clergy by John Skelton. 2. The nom de plume adopted by Spenser, suggested by the above. 3. A shepherd in Gay's pastoral, *The Shepherd's Week*.

COLIN CLOUT'S COME HOME AGAIN. A pastoral poem by Edmund Spenser, dedicated to Sir Walter Raleigh in a letter dated Kilkolman, Dec. 27, "1591" (probably 1595). In it he thanks that knight for sundry "favors and good turnes done to me at my late being in England."

COLINS (COLIN, COLYN), ALEXANDER (1527 or 1529–1612). A Flemish sculptor, born at Mechlin. Nothing is known of his artistic training, but in 1558 he was charged with the sculptural decorations of the castle of Heidelberg by the Elector Otto Heinrich, and in 1563, at the summons of Emperor Ferdinand I, he went to Innsbruck, where he modeled, after designs by Florian Abel, 20 reliefs on the tomb of Maximilian, in the Hofkirche. They represent scenes from the life of the Emperor; they show great technical ability and have been called "paintings in plastic form." Subsequently he was appointed court sculptor to the Emperor. Among his other works is the fine monument to the Archduke Ferdinand of Tirol, in the Silver Chapel of the Hofkirche and the mausoleum of Emperor Ferdinand II, his wife, and his son Maximilian II, in the cathedral at Prague. Consult *Gesammelte Schriften*, vol. i.

COL'ISE'UM. See AMPHITHEATRE.

COLL, kŏl. One of the Inner Hebrides, or western isles of Scotland, situated 7 miles northwest of the Island of Mull, Argyllshire. It is 14 miles long from northeast to southwest, with an average breadth of 2½ miles (Map: Scotland, B 3). More than a third of it is cultivated or in pasture. The isle is low and rocky and composed of gneiss. The highest point is 350 feet. It exports dairy produce, sheep, and cattle. Pop., 1901, 432; 1911, 389, engaged in agriculture and fishing. Chief place, Arinagour, which has a steamship service to Oban on the coast.

COLLAB'ORA'TION (Fr., from Lat. *collaborare*, to work together, from *con-*, together + *laborare*, to labor, from *labor*, work). The united labor of two or more persons on a literary production, as in the arrangement of a drama, or the compilation of a book requiring knowledge from different sources. Thus, Charles Reade and Dion Boucicault wrote *Foul Play;* Charles Dudley Warner and Mark Twain, *The Gilded Age.* Walter Besant and James Rice also long worked in collaboration upon numerous novels. The collaboration of Messrs. Erckmann and Chatrian (q.v.), in French, produced many delightful works. Perhaps most famous of all is the literary partnership of Beaumont and Fletcher (q.v.).

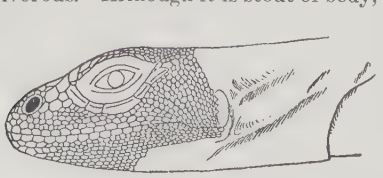
COL'LAMER, JACOB (1791–1865). An American lawyer and politician, born in Troy, N. Y. He removed when very young to Vermont, graduated at the university of that State in 1810, was admitted to the bar in 1813, and soon became one of the leading lawyers of the State. From 1833 to 1842 he was associate justice of the State Supreme Court. He was a member of Congress from 1843 to 1849, and in President Taylor's cabinet was Postmaster-General, which position, however, he resigned on the death of the President. In 1850 he was again elected judge of the Supreme Court of Vermont, and four years later was elected to the United States Senate, where he was chairman of committees on post offices, post roads, and the library. He remained in the Senate until his death.

COLLAPSE. See SHOCK.

COL'LAR (OF. *coler, colier*, Fr. *collier*, from Lat. *collare*, collar, from *collum*, neck; ultimately connected with AS. *heals*, with OHG. *hals*, Ger. *Hals*, neck). In architecture, a band around a column or other architectural member; the necking of the capital in the Doric, Ionic, and Tuscan orders. In mechanical work and engineering, a collar is any projecting band or flange shrunk on or otherwise applied so as to encircle a structural or mechanical member. For the collar as an article of apparel, see COSTUME.

COLLAR BONE. See CLAVICLE.

COL'LARED LIZARD. One of a genus (*Crotaphytus*) of iguanid lizards, characteristic of the dry, open regions of the southwestern United States. They are often called "collared" or "ring-necked" lizards, because of the double black collar around the wrinkled neck of the common Texan species (*Crotaphytus collaris*). This species is found from the Ozark Mountains to Nevada and southern California and is entirely insectivorous. Although it is stout of body, it can



HEAD OF COLLARED LIZARD, SLIGHTLY ENLARGED.

run very rapidly, and very often runs upon the hind legs alone. In the deserts of the Colorado valley there lives a second species, called "leopard lizard" (*Crotaphytus wislizenii*), which is larger, has no collar, and is noted for its fierce and greedy disposition. It eats not only blossoms, leaves, and insects, but also young horned toads, and all sorts of smaller lizards, killing and swallowing some two-thirds its own size. It will even kill and devour smaller individuals of its own species. This lizard is remarkable for the fact that not only the male, as is usual among lizards, but the female as well, undergoes a change of color in the breeding season (midsummer), the latter becoming salmon red on the whole abdominal region. Consult Merriam and Stejneger, *Death Valley Expedition* (Department of Agriculture, Washington, 1893), and Ditmars, *The Reptile Book* (New York, 1907).

COLLAT'ERAL (Fr. *collatéral*, It. *collaterale*, from ML. *collateralis*, collateral, from ML. *con-*, together + *lateralis*, relating to a side, from *latus*, side). In law, supplemental or related to the principal thing in consideration, especially, (*a*) given by way of security in addition to a principal obligation; (*b*) descended from a common ancestor but not from one another—a sense used to describe the character of relationship of individuals for legal purposes.

Collateral Security is either (*a*) something of intrinsic value actually delivered over and pledged to the creditor, the value of which is to be applied on the debt in case of default; or (*b*) an additional obligation, given to guarantee performance of a debt or duty. The term is more frequently used to designate a pledge of stocks, bonds, negotiable paper, or other evidences of obligation, as distinguished from a pledge of chattels. The practice in case of a default is for the creditor, upon notice to the debtor, to sell the securities and apply the amount received therefrom towards the satisfaction of his claim and charge the debtor with the deficiency, or credit him with the surplus, if any. See MORTGAGE; PLEDGE; FORECLOSURE; and consult the authorities cited under PLEDGE.

Collateral Relatives, more frequently spoken of as "collaterals," are those who are descended from the same common ancestor, but not one from the other, as lineal descendants are. Thus, an uncle is a collateral relative of a nephew, both being descended from a common ancestor, but the nephew not being a lineal descendant of the uncle. The term includes those in the relationship of brothers and sisters, aunts and uncles, nephews and nieces, and cousins. Collateral relatives are included in the term "heir," real property descending in the first instance to lineal descendants, if any, and then to collaterals in the order of their relationship or as prescribed by statutes. See CONSANGUINITY; DESCENDANTS; HEIR; LINEAL; DECEDENT; and consult the authorities referred to under DESCENT.

COLLATERAL WARRANTY. See WARRANTY.

COLLA'TION (OF. *collacion*, from Lat. *collatio*, collection, from *con-*, together + *latus*, borne, connected with *tolerare*, Gk. τλῆναι, *tlēnai*, OHG. *dulten*, Ger. *dulden*, to endure). In law, a collecting or bringing together of all the assets of an estate into one common fund for distribution among the heirs or next of kin; a term more particularly used where heirs who have received property from the deceased ancestor by way of advancement return it to the estate in order that a more equitable division of the whole may be made. The term is used in the civil law, and in England it is called *hotchpot* (q.v.). The term is not in general use in the United States, but the law in most States provides that advancements made to a legatee or devisee shall be considered as a part of the decedent's estate

and as such applied in satisfaction of the legacy or devise. See ADVANCEMENT.

In English ecclesiastical law, the term *collation* is used to denote the presentation of a clergyman to a benefice by the patron and bishop. See BENEFICE.

In maritime law, *collation* is sometimes employed in the sense of contribution or average (q.v.).

COLLATION OF MANUSCRIPTS. See BIBLE, *Textual Criticism*.

COLLÉ, kôl'lā', CHARLES (1709–83). A French dramatic author and song writer, born in Paris. He became the secretary of the Duke of Orleans, the grandfather of Louis Philippe, and wrote plays for the theatre of the Palais Royal and for the Comédie Française, of which several are still produced. "Soldat de fortune dans les lettres," as he has been called, he declined to become a member of the Academy, though his songs have made him famous in French literature. His plays have been collected under the title *Théâtre de société*, and his verses as *Les chansons de Collé*. Among the best plays are: *La vérité dans le vin* (1747); *Dupuis et Desronais* (1763); and *La partie de chasse de Henri IV* (1774). His interesting *Journal historique* was edited by Barbier (Paris, 1807), and his *Correspondance inédite* by Bonhomme (ib., 1864).

COLLE, kôl'lā, RAFFAELLO DAL (c.1490–1566), usually called RAFFAELLINO. An Italian painter, born at Colle, near Borgo San Sepolcro (Tuscany). He was a pupil of Raphael, whom he assisted in frescoing the Loggie of the Vatican, where portions of the story of Moses are from his brush. He is supposed also to have assisted Raphael in the Farnesina, and after his master's death to have worked with Giulio Romano in Rome and in the Palazzo del Te at Mantua. Still later he was employed to fresco several churches in the Duchy of Urbino, and the Villa Imperiale at Pesaro, the last after the cartoons of Bronzino and Gengas. He likewise assisted Vasari in various decorative schemes, and finally settled at Borgo San Sepolcro, where he founded a school. He painted in the manner of Raphael, without being a servile imitator. His principal paintings in oil are "The Resurrection," in the church of San Rocco, Borgo San Sepolcro; the same subject in the cathedral; the beautiful "Assumption" and an "Annunciation" now in the Gallery of Città di Castello; and several pictures in the chapel of the Olivet monks at Gubbio. Consult Patzak, *Die Villa Imperiale in Pesaro*, with biographical sketch of Colle (Leipzig, 1908).

COL'LECT. A brief, comprehensive prayer varying (like the epistle and gospel, which it immediately precedes) with the season of the Church year. Such prayers are found in all the earlier Christian liturgies, and most of those now used come from the sacramentaries of St. Leo, Gelasius, and St. Gregory. The name (which, however, does not occur in the Roman missal, where the word *oratio*, prayer, is used) is also of great antiquity. It probably comes from *collecta*, in the sense of *collectio*, a gathering, the prayer being originally designated *oratio ad collectam*. It may have originated as the prayer of a gathering of people at a church before starting in procession to some other station. In the oldest liturgies only a single collect was used, but with the growth of the calendar it became customary to "commemorate" a festival which was displaced by one of greater importance with the use of its collect; the sacred number of seven, however, might never be exceeded. In the Roman missal two other prayers, the *secreta* and the *communio*, are of similar structure to that of the collect, and, like it, vary with the day. These were not retained in the Anglican Prayer Book, which has almost literal translations of the Latin collects for nearly all its services. The structure of the collect is simple and uniform. It begins with a form of address nearly always to God the Father, generally including a commemoration of the special event celebrated, then offers as a rule a single petition for some grace or blessing, and ends normally "through Jesus Christ our Lord, who with Thee and the Holy Ghost liveth and reigneth, one God, world without end."

COLLECT, THE, or COLLECT POND. Formerly a large pond in the city of New York, part of whose site is now occupied by the Tombs prison. It drained the district later known as the Five Points and discharged into the Hudson River by a channel through the present Canal Street. The name "Collect" was a corruption of the Dutch "Kolch Hoek," meaning 'shell point' (Fiske, *Dutch and Quaker Colonies*, 1899).

COL'LECTA'NEA (Lat. nom. pl., collected sc. *dicta*, sayings). A name given to literary collections of any description, such as sayings of noted men, aphorisms, jests, miscellaneous anthologies, and chrestomathies.

COLLECTIVE PSYCHOLOGY. A term used to include all those subdivisions of "general psychology" which treat of the collective mind as opposed to the individual mind. For example, social psychology (q.v.), which treats of the social consciousness, ethnic psychology (q.v.), or the differential psychology of nations and races, and class psychology, the differential psychology of classes, professions, etc., are all subheadings of collective psychology. Consult: W. Wundt, *Völkerpsychologie* (Leipzig, 1904 and later); G. Le Bon, *The Psychology of Peoples* (New York, 1898); E. Tardieu, *Psychologie militaire* (Brussels, 1898); L. Dauriac, *Essai sur l'esprit musical* (Paris, 1904).

COLLECT'IVISM (Fr. *collectivisme*, from *collecter*, ML. *collectare*, to collect, from Lat. *collecta*, collection, assembly, from *colligere*, to collect, from *con-*, together + *legere*, to gather). The vesting in the community, or collectivity, of all the means of production. Collectivism is the economic basis of both Socialism and Anarchism. Modern Socialism contemplates, as a rule, the vesting of property in the centralized state; Anarchists, especially the earlier school, held as their ideal the vesting of property in the local commune; Syndicalists would vest the property in groups organized on an industrial basis. See SOCIALISM; ANARCHISM; SYNDICALISM.

COL'LEEN BAWN, THE (Ir. *cailin*, girl, dim. of *caile*, girl, and Ir. *babhun*, Gael. *babhunn*, bawn, inclosure of a castle, barnyard), or THE BRIDES OF GARRY-OWEN. A play by Dion Boucicault, produced Sept. 10, 1860, based on Griffin's *The Collegians*. It was republished in the form of a novel in 1861.

COL'LEGE (Fr. *collège*, Lat. *collegium*, assembly, from *collega*, associate, from *con-*, with + *legare*, to send on an embassy, from *lex*, law. In its early Roman use "college" signified any association of persons having a common purpose or performing a specific function. In some respects it was synonymous with *corpus*,

a corporation or body of members, with *universitas*, a whole as contrasted with its parts, and with *societas*, a partnership. The Roman college was required to be incorporated by public authority, could possess common property, and could sue or be sued in the name of its manager. Many of these colleges were mercantile in character or were organizations of artisans similar to the mediæval guilds; but there were others having religious or political objects, such as the college of augurs, pontiffs, etc. In modern usage the term has similar applications, as college of cardinals, college of bishops, college of presidential electors, etc. It is also, especially in Great Britain, applied to associations of scientific or literary purposes, such as college of physicians, college of surgeons, college of heraldry.

In American usage the term "college" commonly indicates a stage of instruction intermediate between the high school or preparatory school and the university; but in Europe and, especially in Great Britain, the term is almost entirely confined to institutions of university rank. In France "collège" is, as a rule, a municipal institution equivalent to lycée and gymnasium, but there are some noteworthy exceptions, especially the Collège de France in Paris. The early colleges grew out of the monastic care of the indigent, sick, and feeble, and were at first, in connection with *hospitia*, established by the various orders. In 1180 a foundation for eighteen "scholar clerks" was made in the "Hospital of the Blessed Mary of Paris," commonly known as the Hôtel-Dieu. Other foundations devoted solely to this purpose soon followed. During the same period it was customary for groups of students to organize for the purpose of renting rooms, providing board, etc. Such organizations were self-governing, though ordinarily, and soon by compulsion, their governors were masters in the university. Sometimes, too, as at Bologna, alien needy students had national boarding houses under this name, as the College of Spain, etc. Under the influence of the mendicant orders and the example of Robert de Sorbonne, who about 1255 founded the college which bears his name for students who had already taken the earlier degree, colleges became more numerous, assumed the teaching function within their own walls, and tended to become coextensive with the university. In time, both in Paris and in the English universities, every member of the university had to attach himself to some college, and every person admitted to college had to matriculate at the university. In this way the colleges became the constituent members of the university, supporting not only the students and fellows, but the professors as well. For a more detailed account, see CAMBRIDGE, UNIVERSITY OF; OXFORD UNIVERSITY; PARIS, UNIVERSITY OF, ETC.

In this relation the college becomes a subcorporation. The English universities hold the examination and grant the degrees, while the colleges provide for the lodging of the students, to a certain extent for their support, and for their instruction. Students in one college may receive instruction in other colleges. In Scotland and in America the distinction between the college as the member and the university as the body has been neglected; and we consequently hear of the one and the other indiscriminately granting degrees, a function which in the English and in the original European view of the matter belonged exclusively to the university. Barnard College, Columbia, and Sibley College, Cornell, however, besides many correlated professional colleges, may be said to illustrate the older usage. Where there is but one college in a university, as is the case in the universities of Scotland, the two bodies are of course identical, though the functions which they perform are different. The University of Dublin and Trinity College are also virtually the same. In Germany there are no colleges in the English sense; and the verbal confusion between the college and the university is avoided by the latter's performing the functions of both in its own name, as two separate parts of its proper duties. See also COEDUCATION; COLLEGES, AMERICAN; COLLEGIATE EDUCATION FOR WOMEN; DEGREE; DUBLIN, UNIVERSITY OF; EDINBURGH UNIVERSITY; HARVARD UNIVERSITY; SORBONNE; YALE UNIVERSITY; and the names of individual colleges, universities, and other higher institutions.

COLLÈGE DE FRANCE, kŏ'lĕzh' de fräns (Fr., College of France). A college in Paris, founded between 1518 and 1545 by Francis I, who tried in vain to secure Erasmus for its head. From the beginning it has been autonomous. The successive kings upheld its independence, notwithstanding the vigorous efforts of the University of Paris to secure control; this independence has been maintained, and though now under the charge of the Minister of Public Instruction, it has no connection with the University of France. From this has resulted its distinguishing characteristic: freedom of teaching and the encouragement of scientific research. The collège has had varying fortunes, but its activity has been continuous; even during the Revolution, although it had been the royal college, its reputation saved it from suspension. Originally founded for the teaching of Hebrew, Greek, and Latin only, it has now 40 different chairs. Instruction is gratuitous, no examinations are held, no diplomas given. The collège is specially designed to attract scholars other than the ordinary university students. In its long roll of illustrious teachers are included the names of Ramus, Gassendi, Rollin, Sylvestre de Sacy, Barthélemy Saint-Hilaire, Laboulaye, Renan, Michelet, and Gaston. Consult Goujet, *Le Collège Royal de France* (Paris, 1758); Bouchon-Brandely, *Le Collège de France* (ib., 1873); Lefranc, *Histoire de Collège de France* (ib., 1892); Renan, *Questions contemporaines* (ib., 1868).

COLLEGE JOURNALISM. See JOURNALISM, COLLEGE.

COLLEGE OF ARMS. See HERALDS' COLLEGE.

COLLEGE OF ELECTORS. See ELECTORAL COLLEGE.

COLLEGE OF HERALDS. See HERALDS' COLLEGE.

COLLEGE OF THE FOUR NATIONS (Fr. *Collège des Quatre Nations*). An appellation given to the Collège Mazarin, founded 1661, from the fact that that university was founded for the free education and support of 60 sons of gentlemen residing in the provinces of Pignerol, Alsace, Flanders, and Roussillon.

COLLEGE PARK. A village in Prince Georges Co., Md., 8 miles northeast of Washington, D. C., on the Baltimore and Ohio Railroad. It has a fine situation, as a suburb of the capital, and is the seat of the Maryland Agricultural College and Experiment Station,

established 1850. There are also aëroplane factories. Pop., 1913, about 350.

COLLEGES, AMERICAN. The offspring of European colleges, and possessing at first the same general form of organization, American colleges have gradually undergone changes which make them distinctive. Harvard (q.v.), the oldest, was founded in 1636, under the influence of men who for the most part had received their education at Emmanuel College, Cambridge University. The second American college, William and Mary (q.v.), founded in 1693, and the third, Yale (q.v.), founded in 1701, were modeled on similar lines. The numerous institutions founded since then have followed very closely the same traditions. During the eighteenth century there were 21 such institutions founded, 9 before the Revolution and 12 afterward. From 1800 to 1830 there were 33 such foundations; from 1830 to 1863 there were 180; from 1865 to 1900 there were 244; in 1911–12 the United States Bureau of Education received reports from 596 degree-conferring institutions of college rank, a number which represents perhaps but two-thirds of the total number of institutions in the country claiming such rank.

The early colleges were separate institutions of learning, each offering a single prescribed course of study leading to the degree of A.B. and, with some additional work, to that of A.M. This course was intended to furnish a liberal education and to prepare the student for the Christian ministry or other learned profession. Both Harvard and Yale came under the control of self-perpetuating corporations and relied for their support on tuition and private endowments. Most of the earlier and many of the later colleges were controlled in the interest of certain religious denominations, it being frequently part of the organic law of such institutions that the president and trustees should be members of the church that dominated the school.

The leading changes in the early college system have been the outcome of a demand for a wider circle of studies in the liberal programme; the development of better systems of secondary instruction, to which could be intrusted a large part of the work formerly done by the college; the growth of specialized instruction preparatory to the various professions not only of law, medicine, and theology, but also of the various fields of applied science; and the appearance of higher institutions under the support and control of the States, notably in the West and the South. In many of the colleges, also, e.g., Harvard, Yale, and Columbia, the influence of the sectarian element in control has largely disappeared. The development about the nucleus of a college of liberal arts of colleges for special professional instruction has led to the university, so called, although many institutions bearing that name give very little attention to graduate instruction of the true university character.

At first the Colonial colleges took from the grammar schools students who had barely attained a fair knowledge of Latin. As the character of secondary instruction grew better, the entrance requirements of the colleges grew severer. As a result, the average age of entrance of students increased, until at Harvard it is at present over 19, an age at which students were commonly graduated in the earlier history of the institution. The curriculum, originally limited to Latin, Greek, a little mathematics, logic, metaphysics, rhetoric, and theology, was extended by the introduction, in the latter part of the eighteenth century, of astronomy and natural philosophy and, early in the nineteenth century, of modern languages and the elements of the natural and political sciences. This process of expansion led, by the middle of the nineteenth century, to the elective system (see ELECTIVE COURSES), fostered by President Wayland of Brown University, and later by President Eliot of Harvard, President Barnard of Columbia, and President Tappan of Michigan. Certain work was still prescribed to the student, but new work was offered from which he was allowed to make a choice. Then, at many colleges, various courses were established, among which election could be made. The required subjects in each course were from some general field, as science, literature, modern languages, or classics, and distinct degrees, as B.S., Ph.B., B.L., etc., were bestowed upon the graduates of the different courses. Brown, Michigan, and Western institutions generally, illustrate this plan. Finally, at Harvard in 1894, the right of election, permitted in 1872 in the senior year, was extended to all subjects, except English A, in the first year, the degree of A.B. being given to all graduates of the college of liberal arts. To emphasize the equality of different lines of work thus elected, the Stanford University has adopted the policy of granting this degree even to those whose work has been almost entirely in the sciences. Cornell, too, has in this, as in many other respects, assumed the most liberal attitude in its educational aims. Few institutions remain where the whole course is prescribed; the rest either permit complete election, or prescribe certain studies, or leave the rest to be elected by the student.

Along with the development of broader curricula, and elective subjects and courses, has come the establishment of special professional colleges and colleges of applied science. Medical schools had appeared at the University of Pennsylvania and at Columbia and Harvard in the eighteenth century. Law schools were founded early in the nineteenth century, and scientific schools soon after. Some of these institutions were affiliated with older colleges, others were established independently. The year 1846 saw the foundation of the Union College of Civil Engineering, the Sheffield Scientific School, Yale; and the next year the Lawrence Scientific School at Harvard was established. Finally, there appeared the extension of the work of the liberal-arts college into further fields of scholarship and research, the organization of which has given rise to the graduate departments, the universities proper of the United States. (See UNIVERSITY.) But the distinction of the university from the college or group of colleges for undergraduates has not yet been clearly made. Some institutions calling themselves universities are merely colleges; others consist of several undergraduate colleges; in a few cases the name "university" is restricted to purely graduate departments.

It must be added that the professional colleges of law, medicine, and theology are coming to have more and more the character of graduate schools. In 1896 Harvard required all students entering the law school to be college graduates. A similar requirement exists in its medical school, and practically in its divinity school as well. Like steps have been taken at Columbia, where a combined collegiate and professional

course can be taken in six years, and the matter is being agitated generally throughout the country. It must be noted, however, that so far no important movement has been set on foot to make the colleges of applied science graduate schools. In case they follow in the path of the schools of law, etc., the special preparation for the higher professions, together with higher training in research and scholarship, will be left to the university, while the college will represent a higher liberal course preparatory to these. As it is, the word "college" is applied either to (1) liberal-arts colleges, or (2) professional colleges admitting undergraduates; and colleges of either type may be parts of universities or separate institutions.

The character of the influences and the life surrounding the student in the college which has grown into a large university is essentially different from that to be met with in the smaller colleges which have continued to work in the spirit of the old Colonial institutions. The smaller college affords less opportunity for election, thus bringing about greater uniformity in the work pursued. While it does not allow so much for individual peculiarities, it provides greater chance for intimate social intercourse among students and between them and the faculty, and for a firmer grip of the latter in discipline. The educational aim is frankly liberal and social rather than special and individual. Fraternities are an important feature in the social life, athletics prosper, and college spirit is strong. The faculty is even more a teaching body than a learned one, the reverse of which tends to be the case in the larger universities. Many believe that the smaller college affords a better liberal education for one who will later take up a profession or pursue special lines of research at a university. On the other hand, the attendance at the smaller college is not increasing in proportion to that in the collegiate departments of the universities. The length of the liberal-college course has been a matter of much agitation. Many advocate its reduction to three years; and President Butler, of Columbia, in his first annual report to the trustees of that university, proposed to award the B.A. degree at the end of the second year of undergraduate study. According to the present system, a student, beginning at six years of age, and progressing at the normal rate, will enter the college at 18, and not until 22 begin his special professional training. To gain time, in many universities, the senior collegiate year is allowed to be partly spent in professional work. At Chicago and Columbia the specialized work may begin in the junior year. The system of credits, too, generally in vogue, by which the satisfactory completion of a certain amount of work entitles a student to his degree, without regard to the time required to accomplish it, often renders graduation possible in less than four years.

The entrance requirements and curricula of the colleges have varied widely. Many colleges, especially in the West and the South, are yet little more than high schools. Some of the States have, however, interfered to determine what institutions shall be authorized to grant degrees, and it is highly desirable that this example should be universally followed. Attempts have also been made among the better colleges to insure greater uniformity in entrance requirements. In addition to numerous examination boards for different sections of the country, the greatest influences in raising the standards of entrance have been exercised by the Carnegie Foundation for the Advancement of Teaching, the National Conference Committee on Standards of Colleges and Secondary Schools, and the College Entrance Examination Board. In the West the State universities set the standard for collegiate entrance requirements within their several commonwealths.

It remains to mention a few new methods of control that have come to prevail over American colleges. Originally they were all governed by corporations or boards of trustees and were chartered either by the King or by Colonial legislatures. The older institutions have retained these charters, with the obvious modifications necessary after the Revolution. A little later, a movement was set on foot to take the colleges under State supervision and control, but it was checked by the decision in the Dartmouth College case, by which States were prevented from assuming control over the property of corporations existing by virtue of a charter sanctioned by their legislatures. The result was that the older Eastern foundations remained under private management, while in the West and the South the system of State universities—usually merely colleges—grew up. These institutions are controlled by regents appointed in various ways, often by the Governor of the State, although in Michigan they are elected by the people. In some of the Eastern institutions also the State has come to exercise a voice in the governing board. Ordinarily, the control of these private colleges is in the hands of a self-perpetuating board, which controls the finances, appoints the instructors, makes laws for the government of the institution, and confers degrees. The instruction and discipline of the students, their admission and dismissal, and the recommendations for degrees are left in the hands of the faculty as a matter of immemorial custom. Much general power is lodged in the hands of the president, and in the university colleges the deans are intrusted to a large extent with the control and direction of the students. In 1911–12 the number of students (men and women) in institutions of higher learning, including technical and professional schools, was 255,673. This is an increase of over 100 per cent in actual attendance within the period of 10 years, and of over 100 per cent in the ratio of students to population within the period of 10 years. The ratio of increase is highest with graduate students and with women. The total number of professors and instructors in the same institutions amounted at the given date, in round numbers, to about 25,000. The value of their productive property was estimated at $357,048,919, and the annual income was $104,514,095 from all sources. Consult Thwing, *College Administration* (New York, 1900); Harper, *The Trend in Higher Education* (Chicago, 1905); Flexner, *The American College* (New York, 1908); also the *Annual Reports* of the Carnegie Foundation for the Advancement of Teaching. See COLLEGIATE EDUCATION FOR WOMEN; ELECTIVE COURSES; UNIVERSITY; and the various colleges.

COLLEGE VIEW. A village in Lancaster Co., Neb., a few miles southeast of Lincoln, the State capital. It is the seat of Union College (Seventh-Day Adventist), opened in 1891. There is a manufactory of health-food products, and

a large printing and publishing house. The village owns its water works and electric-light plant. Pop., 1900, 865; 1910, 1508.

COL'LEGEVILLE. A village in Stearns Co., Minn., 10 miles (direct) west by north of St. Cloud, on the Great Northern Railroad (Map: Minnesota, C 5). It is the seat of St. John's University (Roman Catholic), opened in 1857. Pop., 1910, 606.

COLLEGEVILLE. A borough in Montgomery Co., Pa., 25 miles (direct) northwest of Philadelphia, on the Perkiomen River and on the Perkiomen Railroad (Map: Pennsylvania, L 7). It is the seat of Ursinus College (German Reformed), opened in 1870, and has a bridge over 100 years old. There are manufactures of steam and hot-water heaters. Collegeville was incorporated as a borough in 1895. Pop., 1910, 621.

COLLE'GIAN. See CLUB; COLLEGE (at the beginning).

COLLE'GIANS, THE. A novel by Gerald Griffin (1829). See COLLEEN BAWN.

COLLE'GIANTS (from Lat. *collegium*, assembly). A branch of the Dutch Arminians, who called their assemblies for worship "colleges." The sect was founded in 1619 by the brothers John, Adrian, and Gilbert van der Codde, at Rijnsburg, a couple of miles north of Leyden; hence they were also called the Rijnsburgers. They rejected creeds, and had no regular ministry, nor any form of church government. They adopted baptism by immersion, but their communion was open to all. They were not unlike the Plymouth Brethren of the present day. They opposed war and office holding by Christians. For a time they spread rapidly, but became extinct in the eighteenth century.

COLLE'GIATE CHURCHES (from Lat. *collegiatus*, member of a college, from *collegium*, assembly). A title applied to certain churches other than cathedrals to which is attached a body of clergy living in community, but having no voice in the government of the diocese. (See CANON; CHAPTER.) Of the numerous collegiate churches which flourished in Germany as early as the time of Charlemagne, that of Aix-la-Chapelle was especially famous. In England after the Reformation the title was retained, without much of the organization, as in the cases of Westminster, Windsor, Wolverhampton, Heytesbury, Southwell, Middleton; also Brecon in Wales, and Galway in Ireland. Ripon and Manchester have been constituted the cathedrals of new dioceses. The term is also applied to churches with an associated body of clergy without episcopal supervision. The best-known instance is the Collegiate Reformed Dutch Church of New York City.

COLLEGIATE EDUCATION FOR WOMEN. A system of education which originated in the United States and may be said to have sprung from the seminaries for young women. Although at first these were frequently concerned with somewhat superficial accomplishments, the trend was rapidly towards a sounder and broader scholarship. Their development, and, later, that of the coeducational public high schools, led to the establishment of women's colleges and to the admission of women to colleges for men.

In 1808 Mrs. Emma Willard (q.v.) opened a school for young women at Middlebury, Vt. In 1819 she removed by invitation to Waterford, N. Y., and 10 years later founded the celebrated Troy Female Seminary. By earnest and effective advocacy, notably by the publication of her *Plan for Improving Female Education*, she succeeded in getting the recognition and to some extent the aid of the State of New York in her efforts to give to women the same educational opportunities as to men. In 1819 Rev. Joseph Emerson opened a female seminary at Byfield, Mass., where such instruction was given as is done in academies for men. One of his students, Miss Zilpah P. Grant, became in 1824 the first preceptress of Adams's Female Academy at Derry, N. H. In 1828 she became the principal of a seminary at Ipswich, Mass., associating with her her fellow pupil at Byfield and assistant at Derry, Mary Lyon (q.v.). It was the latter's efforts, aided by the advice and plans of Miss Grant, that led to the founding and endowment in 1837 of Mount Holyoke College (q.v.) at South Hadley, Mass. This institution gave a three years' course nearly equivalent to that of the better colleges for men. Another prominent woman in the early history of advanced education for women was Miss Catherine E. Beecher (q.v.), who opened in 1827 a seminary for girls at Hartford, Conn., and in 1829 published an influential pamphlet on *Suggestions Respecting the Improvement of Female Education*. Later she turned her attention to the West, and through a national board and society did much for improving the facilities as well as for developing a sentiment for the higher education of her sex. In 1821 Wesleyan Seminary and Female College was founded at Kent's Hill, Me., and in 1834 a similar institution was established at Granville, Ohio. Georgia Female Seminary at Macon (now Wesleyan Female College) was chartered with collegiate powers in 1836, and in 1839 it was opened, offering a four years' course. Monticello Female Seminary, at Godfrey, Ill., was opened in 1838 on the plan of colleges for men, and it soon gained great reputation and influence. Elmira College, at Elmira, N. Y., claims to be the first women's college in the United States, and, with the exception of Queen's College, London (1848), probably in the world, to establish the same standard as in colleges for men. It was founded in 1855 and offered a four years' course. Vassar College (q.v.) was opened in 1865 at Poughkeepsie, N. Y.; Wellesley College (q.v.) at Wellesley, Mass., and Smith College (q.v.) at Northampton, Mass., in 1875; and Bryn Mawr College at Bryn Mawr, Pa., in 1885. These four, with the Goucher College (q.v.), Baltimore, are to-day the wealthiest of the female colleges in the United States. In 1888 Mount Holyoke College established a full collegiate department, and in 1893 the seminary was dropped. Wells College (q.v.) opened at Aurora, N. Y., in 1868 as a seminary, became a college in 1870, and in 1896 dropped the preparatory department. During the last 20 years several new institutions for women have been added. Among these are Randolph-Macon Women's College (1893), Simmons College, Boston (1902), Wheaton College, Norton, Mass. (1912), and Connecticut College for Women (1914). Among the several Catholic colleges for women are New Rochelle College, New Rochelle, N. Y.; Trinity College, Washington, D. C.; St. Elizabeth's, Madison, N. J.; Mt. St. Vincent's on Hudson; Notre Dame, Maryland; and D'Youville College, N. Y. Besides these institutions there were in 1911–12, 108 institutions for women in the United States call-

ing themselves with more or less correctness "colleges." This represents a decline in number as compared with the preceding 10 years, but it has been far more than made up by the increased attendance at the better women's colleges and the coeducational institutions. The latter are discussed in the article on COEDUCATION.

An additional class of schools offering higher instruction to women are the colleges affiliated with institutions for men. Of these the earliest to be established in the United States was Radcliffe College (q.v.), instruction in which is carried on by certain members of the Harvard faculty. It was founded by the Society for the Collegiate Instruction of Women in 1879 and assumed its present name with power to grant degrees in 1894. Barnard College (q.v.), founded in 1889, and at first affiliated with Columbia as Radcliffe is with Harvard, was made in 1900 an undergraduate college of the university, graduate work in that institution being thrown open to women. Brown University has a women's college that began work in 1892. The College for Women of Western Reserve University, at Cleveland, Ohio, was established in 1888, and in connection with Tulane University at New Orleans, La., there was opened in 1886 the H. Sophie Newcomb Memorial College for Women. Evelyn College, connected with Princeton University, was opened in 1887, but ceased to exist in 1897.

The attitude of the universities of Europe towards the admission of women is described in the article on COEDUCATION. In Great Britain there are many women's colleges connected with the great universities. At Cambridge Girton College was opened in 1869 and Newnham College in 1871. At Oxford Somerville Hall and Lady Margaret Hall were opened in 1879, and St. Hugh's Hall in 1886. At the University of London, University College and King's College have departments for women. Queen's College, London, was opened in 1848, Bedford College for Women in 1849, and Royal Holloway College in 1886. There are also numerous local universities and university colleges in England and Wales. In Ireland Belfast University, Dublin University, and the National University of Ireland (University College, Dublin, University College, Cork, and University College, Galway) admit women. In Scotland University College at Dundee is a college for women affiliated with the universities of London, St. Andrews, Edinburgh, and Glasgow. At Glasgow Queen Margaret College was in 1892 affiliated with the university at that place. On the Continent, however, women's colleges have not been established, but separate university courses for women are in existence in Russia. The Victoria Lyceum in Berlin, established in 1869, is probably the only institution in Germany giving higher courses for women, but no degrees. Private training and "finishing" schools suffice for those who do not enter the universities. In the various professions women find no chance for instruction to any extent in separate institutions except in the case of medicine. In the United States there is at present one medical school of repute for women. In London there is one, and Edinburgh has two; several are in Canada, and there is one at St. Petersburg.

The development of opportunities for the higher education of women has been actively promoted by a number of organizations, prominent among which are, in the United States, the Massachusetts Society for the University Education of Women, founded in 1877, and the Association of Collegiate Alumnæ, founded in 1882; and in England the Girls' Public Day School Company, founded in 1874, and the Cambridge Association for the Promotion of the Higher Education of Women, established in 1879. An organization for similar purposes was in 1898 formed in Berlin. The development of opportunities for the university education of women has also had a favorable reaction upon facilities for their secondary instruction, not only in the United States, but also in England and France, and to-day the system of girls' gymnasia in Germany shows the influence of the demand that women shall be prepared for the universities. Much progress has been made since 1898, when the Prussian Minister of Education refused an application for the establishment of a girl's school in Breslau, saying that university education for women is only for exceptional cases, and that the government will not undertake to prepare them for this. Since that date the whole system has been reorganized, and practically the same opportunities are open for higher education of girls and women in Germany.

Three statistical investigations into the health of college women have been undertaken—two in America by the Association of Collegiate Alumnæ in 1885 and 1900, and one in England by Mrs. Henry Sidgwick in 1897. In America the health of the college women compared favorably with that of working women, and in England with that of noncollege sisters and cousins. Nor does the marriage rate of college women seem to be less than that of their sisters. On the other hand, a large proportion of them are self-supporting, the principal occupation being teaching. Several recent studies indicate the following conditions: of 1076 graduates of Bryn Mawr up to Jan. 1, 1911, 28.5 per cent were teachers; 9.2 per cent were in other occupations; 5.5 per cent were engaged in study; 25.6 per cent were unmarried and without paid occupation; 27 per cent were married. Of the graduates of Mount Holyoke College from 1890 to 1909 about 65 per cent joined the teaching profession. Of the women graduates of the University of Wisconsin 88 per cent become teachers and 3.3 per cent engage in library work.

Consult: Thomas, "Education of Women," in Butler, *Monographs on Education in the United States* (New York, 1900); Fitch, "Women and Universities," in *Educational Aims and Methods* (ib., 1900); Lange, *The Higher Education of Women* (ib., 1900); French, "Educational Status of Women in Different Countries," in *Report of Commissioner of Education* (Washington, 1894–95); Crawford, *The College Girl of America* (Boston, 1905); Talbot, *The Education of Women* (Chicago, 1910). See COEDUCATION.

COLLENCHYMA, kŏl-lĕn′kĭ-mȧ (Neo-Lat., from Gk. *κόλλα*, *kolla*, glue + *ἔγχυμα*, *enchyma*, infusion, from *ἐν*, *en*, in + *χεῖν*, *chein*, to pour). A supporting tissue in certain plants, usually developed just beneath the epidermis, and recognized by the prominent thickenings in the angles of the cells. See HISTOLOGY (OF PLANTS).

COLLEONI, kôl′lȧ-ō′nē, or **COLEONE**, kō′lȧ-ō′nȧ, BARTOLOMMEO (1400–75). An Italian general, born at the castle of Solza, near Bergamo. At the age of 32 he fought in the Venetian army and distinguished himself in the war against the Milanese. He was a condottiere, and when Venice made peace with Milan he entered the

service of the latter. Finally he returned to Venice and was rewarded with large estates, upon which, during periods of peace, he introduced agricultural improvements. During the last 30 years of his life he was generalissimo of the Venetian state, in which capacity he is reputed to have displayed much strategical ability. A fine equestrian statue, executed by Andrea del Verrochio, was erected to his memory out of funds which he had left for that purpose.

COL'LES, Christopher (1738–1821). An Irish engineer, the pupil of Pococke. He was born in Ireland, but came to America before the Revolution and delivered lectures in New York on pneumatics, gunnery, and inland navigation. One of the first steam engines made in America was designed by him; and he was among the first to propose water supply by reservoirs for the city of New York. As early as 1784 he presented to the New York Legislature a plan to connect Lake Ontario with the Hudson River by canals and such natural channels as could be used, and with this purpose in view he surveyed the Mohawk River. He published *Inland Navigable Communications* (1808).

COL'LETT, Jakobine Camilla (1813–95). A Norwegian novelist. The keynote of her work is the emancipation of woman. In addition to her first and most popular novel, *The Magistrate's Daughters* (1855), she wrote *Tales* (1861); *In the Long Nights* (1863); *Against the Stream* (1879; 2d series, 1885); *Last Leaves, Recollections, and Confessions* (1868; 1872; and 1873).

COLLET'TA, Pietro (1775–1831). An Italian Minister of War and historian. He served with distinction in the army under Joseph Bonaparte upon the latter's accession to the throne of Naples in 1806 and was retained in his military dignities by Ferdinand I. In 1820 he was dispatched to suppress the insurrection in Sicily. Appointed Neapolitan Minister of War in 1821, he was afterward imprisoned by the Austrians, but was finally permitted to reside in Florence, where he wrote his well-known historical work, *Storia del reame di Napoli, 1734–1825* (first published in 1834; Ger. trans. by Leber, 8 vols., Grimma, 1849–50). For his biography, see Gino Capponi's memoir of him published in the *Storia del reame di Napoli* (2d ed., Florence, 1848).

COL'LEY, Sir George Pomeroy (1835–81). An English soldier. He was educated at the Royal Military College, Sandhurst; served in Cape Colony as a lieutenant, and was a border magistrate there in 1857–58; was ordered to China, and as captain participated in the taking of the Taku forts in 1860. He was professor of military administration and law at the Staff College, Sandhurst (1871–73). In 1875 he was promoted to a colonelcy for efficient service in Ashanti, and from 1876 to 1880 he was private secretary to Lord Lytton, at that time Viceroy of India. He was sent to succeed Sir Garnet Wolseley as Governor and commander in chief of Natal in 1880. In January, 1881, he commanded against the Boers at Laing's Nek and Ingogo, and on February 27 his detachment was annihilated at Majuba Hill (q.v.), and he himself fell. He was a good water-colorist, contributed to periodicals, and wrote the article "Army" for the 9th edition of the *Encyclopædia Britannica.* Consult Butler's biography (London, 1899).

COLLIBERTS, kŏl'ĭ-bĕrts; *Fr. pron.* kô'lē'-bâr'. See Cagot.

COL'LIE. The Scotch shepherd dog. See Sheep Dog and Plate of Dogs.

COLLIE, Sir John. A British physician. He was educated at Aberdeen University. For many years he served the London County Council, first as assistant medical officer, then as medical superintendent of several classes, and finally as medical examiner and member of the Insurance Committee for London; for a time he was also examiner in physiology and hygiene at the British College of Physical Education and house surgeon at the Royal Maternity Hospital, Edinburgh, besides holding various other appointments. In 1912 he was knighted. His publications include: *The Emergency Book* (1899); *Schemes of Instruction in First Aid to the Injured, Home Nursing, and Hygiene* (1908); *Medical Evidence in the Laws Relating to Compensation for Injury* (1909); *A Simple Remedy for Grave Abuse* (1909); *Sidelights on Medical Technicalities from an Insurance Point of View* (1911); *Fraud and its Detection in Accident Insurance Claims* (1912); *Medico-Legal Examinations and the Workmen's Compensation Act, 1906* (1912); *Malingering and Feigned Sickness* (1913); *The Psychology of the Fraudulent Mind* (1913).

COLLIER, kŏl'yĕr, Constance (1878–). An English actress, born at Windsor, Eng. In 1901 she was engaged by Beerbohm Tree, and for nearly six years she played in His Majesty's Theatre. She made her first trip to America in 1908, when she appeared at the Garrick Theatre (New York) as Charlotte in *The Latch.* She made return trips to the United States in 1909 and 1911, and in 1912 she toured in *Thais.* She also appeared in a revival of *Oliver Twist* (1912) in both New York and London. In 1914 she played with distinction the part of Emilia in Faversham's production of *Othello.*

COLLIER, Jeremy (1650–1726). A nonjuring English clergyman, born at Stow Qui, or Quire, in Cambridgeshire, Sept. 23, 1650. He went to Cambridge in 1669, took his degree of M.A. in 1676, and entered the ministry. At the revolution of 1688 he plunged into the stormy waters of controversy, his foeman being Gilbert Burnet, afterward Bishop of Salisbury. For a publication of his at this time, entitled *The Desertion Discussed* (1688), which maintained the invalidity of King William's regal authority and gave offense to the government, he was sent to Newgate, where he remained several months. On his release he rushed anew into party contentions and distinguished himself by the publication of several controversial works. Suspected of being a partisan of the Stuarts, he was again arrested in 1692 and imprisoned for a short time in the King's Bench. From this period his life was a perpetual literary strife, the government being the principal object of his attack. In 1713 he was consecrated a bishop among the nonjurors, and was their leading man after the death of Hickes in 1715. He died in London, April 26, 1726. Collier wrote many books, including the *Great Historical, Geographical, Genealogical, and Poetical Dictionary* (4 vols., 1701–21), founded on Moreri's, and *Ecclesiastical History of Great Britain to the End of the Reign of Charles II* (2 vols., 1708–14). The best edition of the latter work is by T. Lathbury (9 vols., London, 1852). It is a work of great learning, the first of its kind except Fuller's that had appeared. But the work by which he is best known is his *Short View of the Im-*

morality and Profaneness of the English Stage (1698), in which he attacked Dryden and Congreve as vigorously as D'Urfey, and which had a marvelous success. For his life, consult the *Ecclesiastical History*, edited by Lathbury (London, 1852).

COLLIER, JOHN PAYNE (1789–1883). An English Shakespearean critic and commentator. He was born in London. In 1820 he published *The Poetical Decameron.* From 1825 to 1827 he superintended a new edition of Dodsley's *Old Plays;* and in 1831 appeared his best work, a *History of English Dramatic Poetry, and Annals of the Stage.* From 1835 to 1839 he published three volumes on Shakespeare entitled *New Facts, New Particulars,* and *Further Particulars,* followed by an edition of Shakespeare in 8 vols. (1842–44). Not content with these efforts for the illustration of his favorite author, Collier, in 1852, published a volume entitled *Notes and Emendations to the Text of Shakespeare's Plays, from Early Manuscript Corrections in a Copy of the Folio of 1632, in the Possession of J. P. Collier.* This volume is now known as the Perkins Folio, as "Tho. Perkins his Booke" is inscribed on the cover. The publication excited great commotion in the literary world; opinion was divided, and the *Emendations* were furiously applauded or furiously assailed. It has since been proved that all the marginal notes are forgeries. In 1862 he published an excellent edition of Spenser; and the next year he began a series of reprints of our early poets and pamphleteers. Of his later publications, the most interesting is *An Old Man's Diary* (1871–72). For a list of Collier's forgeries, and the bibliography of the subject, consult Lee, *A Life of Shakespeare* (3d ed., London, 1900); and Warner, *Catalogue of MSS. of Dulwich College* (London, 1881). The question of Collier's emendations is fully considered in C. M. Ingleby, *Complete View of the Shakespeare Controversy* (1861).

COLLIER, PRICE (1860–1913). An American author. He was educated in Geneva and Leipzig, graduated from the Harvard Divinity School in 1882, and entered the ministry of the Unitarian church. For two years he was European editor of the *Forum.* He served in the navy during the Spanish-American War, and wrote a volume on "Driving" (1903) in Macmillan's *Sportsman's Library.* But he attained celebrity as the writer of essays on national characteristics, which were marked by much insight and real literary quality. In this field, in which he followed his father, Robert Laird Collier, he wrote *America and the Americans from the French Point of View* (1897), *England and the English from an American Point of View* (1909), *The West in the East, from an American Point of View* (1911), and *Germany and the Germans from an American Point of View* (1913), which was less sympathetic than some of his earlier works. At the time of his sudden death he was preparing a similar discussion of Norway and Sweden.

COLLIER, ROBERT JOSEPH (1876–1918). An American editor and publisher, born in New York City. He graduated from Georgetown University in 1894, and following this studied a year each at Oxford and Harvard universities. He became associated in the publishing business of his father, P. F. Collier, and on the death of the latter in 1909 succeeded him as head of the firm of P. F. Collier and Son, becoming editor and publisher of *Collier's Weekly.* He initiated the Lincoln Farm Association, which raised by popular subscription funds for purchasing the old Lincoln farm in Kentucky and erecting thereon a granite memorial at the log cabin in which Lincoln was born.

COLLIER, WILLIAM (1868–). An American actor and playwright. He made his first appearance in a children's company in 1879. From 1883 to 1888 he was a member of the Daly Theatre Company. *On the Quiet,* in which he starred in 1901–02, and *The Dictator,* in which, as Robert Travers, he had a great London success in 1905, were taken on an Australian tour (1906). Later he appeared in *A Lucky Star* (1909); *Bunty Pulls the Strings* (1912–13); *A Little Water on the Side* (1914). He also played rôles in the following plays of which he is part author: *I'll be Hanged if I Do* (1910); *Take my Advice* (1911); *Never Say Die* (1912); and he is sole author of *Caught in the Rain* (1906) and *The Patriot* (1908). Collier came to be known as a comedian with a large following.

COLLIER, WILLIAM MILLER (1867–). An American diplomat and commerce expert, born at Lodi, N. Y. He was educated at Hamilton College and Columbia College Law School, and was admitted to the bar in 1892; served as referee in bankruptcy of the northern district of New York State in 1898; was president of the New York State Service Commission from 1899 to 1903, and during the next two years lectured in the New York Law School. President Roosevelt appointed him special assistant Attorney-General in 1903, and in 1904 solicitor in the United States Department of Commerce and Labor. He was United States Minister to Spain from 1905 to 1909, when he became general legal counsel and special agent for various American corporations in Europe. His publications include: *The Law and Practice in Bankruptcy under the National Bankruptcy Act of 1898* (1898; 4th ed., revised by William H. Hotchkiss, 1903; 9th ed., 1912); *The Trusts* (1900); *The Civil Service Law of the State of New York* (1901); *At the Court of His Catholic Majesty* (1912).

COL'LIMA'TION. See MERIDIAN CIRCLE; TRANSIT INSTRUMENT.

COLLIN, kô'lăn', LOUIS JOSEPH RAPHAEL (1850–1916). A French figure and portrait painter. He was born in Paris and studied there at the École des Beaux-Arts under Bouguereau and Cabanel. In 1873 he obtained a medal with "Sleep" (Museum, Rouen), and in 1889 the Grand Prix at the Paris Exposition. In 1902 he was appointed professor at the Ecole des Beaux-Arts. He is perhaps best known for such works as the decorations in the Sorbonne, and the ceilings of the Odéon and the Opéra Comique, Paris. He also decorated several ceilings in the United States. The most noted of his easel pictures are those of nudes in the open air, such as an "Idyll" (Arras), "Daphne and Chloe" (Alençon); "Floral" (1886, Luxembourg); "Eveil et Primerose" (1894, Bucharest), and many others in private collections, including the Anderson collection, New York. Collin is also a portrait painter, illustrator, and painter on faïence. His work is in the classical style of his masters Bouguereau and Cabanel, and in his decorative work the nude plays a conspicuous part.

COLLIN D'HARLEVILLE, kô'lăn' dăr'l'-

vĕl′, JEAN FRANÇOIS (1755–1806). A French dramatist. He was born at Mévoisins, near Maintenon, and after studying law devoted himself entirely to literature. His numerous character plays, which occasionally suggest the influence of Regnard, are noted for their gayety, wit, and comic episodes. The more popular are *L'Inconstant* (1780; played at the Comédie Française in 1786); *L'Optimiste* (1788); *M. de Orac dans son petit castel* (1791); *Le vieux célibataire* (1793), usually considered his best production; *Les châteaux en Espagne* (1803). He was an original member of the Institute. His theatrical works were edited by Moland (1876) and Thierry (1882). Consult the memoir by Andrieux in his complete edition of Collin (Paris, 1822).

COLLIN′EAR′ITY. See CONCURRENCE.

COLLINE (kŏl′līn) **GATE,** THE (Lat. *Porta Collina,* hill gate, from *porta,* gate, and *collinus,* hilly, from *collis,* hill). An important gate of ancient Rome, on the Quirinal, at the point where Rome was most exposed to attack, at the north end of the Servian Wall (q.v.). According to Ovid, Hannibal rode up to it and hurled a spear into the city. The victory won here by Sulla over the Marian forces (mainly Samnites), in 82 B.C., made his power supreme in Rome. The remains of the gate were discovered (and destroyed) during the building of the Treasury (1872–73).

COLLINGSWOOD. A borough in Camden Co., N. J., adjoining Camden, on the Pennsylvania Railroad and on Cooper River (Map: New Jersey, B 4). It is beautifully laid out and contains a fine park. Collingswood is in an agricultural region and has manufactories of wagons and wall paper. Pop., 1900, 1633; 1910, 4795.

COL′LINGWOOD. A city and a suburb of Melbourne (q.v.), Victoria, Australia.

COLLINGWOOD. A town and port in Simcoe Co., Ontario, Canada, on Georgian Bay, Lake Huron, 70 miles (direct) northwest of Toronto (Map: Ontario, D 3). It is important as the terminus of the northern division of the Grand Trunk Railway, and is the starting point for steamers to Owen Sound, Sault Ste. Marie, and Parry Sound. Its harbor, which is well protected, has a depth of 20 feet. Among the public buildings and institutions are the collegiate institute, Carnegie library, Young Men's Christian Association building, and an armory. There are also two parks, two skating and curling rinks, a government rifle range, and a government fish hatchery. The manufacturing industries and establishments include the most extensive steel-shipbuilding yards and dry docks in Canada, where some of the largest freight ships in the British Empire have been built; a large meat-packing and canning establishment, wire-nail and fence factories, grain elevator, planing mills, foundries, machine shops, saw mills, fruit and vegetable canneries. The town owns its water works, electric lighting, sewerage, and hydro-electric power plants. It has a United States consulate. Pop., 1901, 5755; 1911, 7090.

COLLINGWOOD, CUTHBERT, LORD (1750–1810). A British admiral, born at Newcastle-upon-Tyne. He went to sea on the *Shannon* at the age of 11 and in 1775 took part in the battle of Bunker Hill and was made a lieutenant for his services. He became a commander in 1779 and a rear admiral in 1799. Among the great naval victories in which he bore a prominent part were those of Lord Howe off Brest in June, 1794; of Lord Jervis off Cape St. Vincent in 1797; and of Nelson at Trafalgar in 1805, where his ship was the first to break through the line of French and Spanish vessels, and after Nelson had received his death wound he assumed the chief command. For his conduct in this battle he was raised to the peerage. There is a monument to him at Tynemouth. He is buried in St. Paul's. See the life, *A Fine Old English Gentleman* (London, 1875), by Davies; and Collingwood's *Memoirs and Correspondence* (2 vols., 1828), with a memoir by his son-in-law.

COL′LINS, ANTHONY (1676–1729). An English author, a noted deist writer. He was born at Isleworth or at Heston, near Hounslow, in Middlesex, June 21, 1676. He studied at Eton, and King's College, Cambridge, and in the Temple in London. In 1707 he published his *Essay Concerning the Use of Reason;* and in 1709 his *Priestcraft in Perfection,* which disturbed the churchmen of that time exceedingly. The controversy excited by this last work induced Collins to sum up several previous pamphlets in his *Historical and Critical Essays on the Thirty-nine Articles* (1724). He had published a *Defense of the Divine Attributes* (1710), in reply to the Archbishop of Dublin, who asserted the compatibility of divine predestination and human freedom. Collins was a philosophical necessitarian and afterward advocated his opinions more fully in his *Philosophical Inquiry Concerning Liberty and Necessity* (1715). In 1711 he went to Holland, where he made the friendship of Le Clerc and other eminent literati. On his return to England he published his *Discourse of Freethinking* (1713), the best known and the most important of all his works, which Swift assailed in one of his best pieces of irony, while Bentley disposed of its pretensions to scholarship. In 1718 he was made treasurer for the county of Essex; and in 1724 appeared his *Grounds and Reasons of the Christian Religion,* which gave occasion to no less than 35 replies. He defended himself in his *Literal Scheme of Prophecy;* and in 1727 published his last work, *A Letter to the Rev. Dr. Rogers on Occasion of his Eight Sermons on the Necessity of Revelation and the Truth of Christianity.* Collins died Dec. 13, 1729. He was a friend and correspondent of Locke, who declared that Collins had as much love of the truth for the truth's sake as ever he had met in anybody. His character for integrity and benevolence stood very high. For an estimate of Collins, consult Stephen, *English Thought in the Eighteenth Century* (London, 1881). See DEISM.

COLLINS, ARTHUR (1863–). An English theatre manager, born in London. He was apprenticed with a scenic artist, Henry Emden, at the Theatre Royal, Drury Lane, in 1881. From 1887 to 1896 he was stage manager at that theatre, and in 1897 he obtained a lease of Drury Lane and formed a managing company with himself as director. Under his management were produced: *Hearts are Trumps* (1899); *Ben Hur* (1902); *The Prodigal Son* (1905); *The Bondman* (1906); *The Sins of Society* (1907); *Marriages of Mayfair* (1908); *The Whip* (1909); *Everywoman* (1912).

COLLINS, FRANK SHIPLEY (1848–). An American botanist, born at Charlestown, Mass. He entered business in 1864 and later became connected with the Boston Rubber Shoe

Company at Malden, Mass. He early began research work in botany and became an active member of various botanical societies. Besides his contributions to botanical journals, he is author of *Flora of Middlesex County* (1888); *Phyotheca Borcali Americana* (1894–1911); "The Green Algæ of North America," in *Tufts College Studies* (1912).

COLLINS, JOHN (1625–83). An English mathematician, born at Wood Eaton, in Oxfordshire. He was a member (1667) of the Royal Society of London and wrote a number of works on algebra and dialing. Writers are much indebted to his *Commercium Epistolicum* (published by the Royal Society in 1712) for information on contemporary discoveries, as well as on the great controversy relating to the priority of Newton or Leibnitz in the invention of the calculus. Consult Rigaud, *Correspondence of Scientific Men of the Seventeenth Century* (Oxford, 1862).

COLLINS, JOHN CHURTON (1848–1908). An English educator and author. He was born at Bourton-on-the-Water, Gloucestershire, and graduated at Balliol College, Oxford, in 1872. He contributed largely to the reviews, strenuously opposing the philological method of literary study. In 1904 he became professor of English literature at the University of Birmingham. He is a writer of force, wit, and scholarship, with a lucid literary style. In 1908, while staying with a doctor to care for his broken health, he was found dead in a ditch, the verdict at the consequent inquest being that he died by accident. Besides editions of Cyril Tourneur (1878), Lord Herbert of Cherbury (1881), Robert Greene (1899), he published *Sir Joshua Reynolds as a Portrait Painter* (1874); *Bolingbroke and Voltaire in England* (1886); *Study of English Literature* (1891); *Dean Swift* (1893); *Essays and Studies* (1895); *Ephemera Critica* (1901); *Studies in Shakespeare* (1903); *Essays in Poetry and Criticism* (1905); *Rousseau and Voltaire* (1908). Consult L. C. Collins, *Life and Memoirs of J. Churton Collins* (1911).

COLLINS, MICHAEL (1892 ?–1922). Irish patriot and soldier, born at Woodfield, Klonakilty, Ireland. He was a clerk in the civil service and afterwards in a London bank. He took part in the Easter rebellion of 1916, and was captured. After his release he became one of the chief workers for Irish freedom. In 1918 he was again in jail, and after that in spite of persistent attempts to arrest him, he succeeded always in eluding the police, effecting many remarkable escapes. While still a fugitive, he was elected to the revolutionary parliament. He was prominent in the party councils of Sinn Fein and was finance minister in the new government, and afterwards commander-in-chief of the Free State forces. On Aug. 22, 1922, he was ambushed and killed near the village of Crookstown.

COLLINS, MORTIMER (1827–76). An English poet and miscellaneous writer, born at Plymouth. He was master of mathematics for a time at Queen Elizabeth's College, Guernsey, but resigned in 1856 and devoted himself thereafter wholly to literature. His publications include: *Idyls and Rhymes* (1865); *Who is the Heir?* (1865); *Sweet Anne Page* (1868); *The Secret of Long Life* (1871); *The British Birds, from the Ghost of Aristophanes* (1872); *Sweet and Twenty* (1875); *Fight with Fortune* (1875). His wife, Frances, published *Letters and Friendships of Mortimer Collins, with Some Account of his Life* (London, 1877).

COLLINS, PATRICK ANDREW (1844–1905). An American lawyer and politician, born in Fermoy, Ireland. He was brought to the United States in 1848 and settled in Chelsea, Mass., where he prepared himself for the study of the law. In 1871 he graduated at the Harvard Law School and was admitted to the bar. He was a member of the State Legislature in 1868–69 and State Senator 1870–71, served three terms in Congress (1883–89), and from 1893 to 1897 was Consul General at London. He was an active Fenian and was made first president of the Land League in 1884. He was elected mayor of Boston in 1901, was reëlected in 1902, and was serving at the time of his death.

COLLINS, REV. MR. A character in Jane Austen's *Pride and Prejudice.*

COLLINS, WILLIAM (1721–59). An English poet. He was born at Chichester, where his father was a hatter, and received his education at Winchester College and at Oxford. In 1742 he published a small volume containing the *Persian Eclogues,* in which he failed to escape from the poetical commonplace of his time, and in 1743 the *Epistle to Sir Thomas Hanmer.* Leaving Oxford, probably early in 1744, he went to London, resolved upon a literary career. Here, from time to time, he published other poems, consisting chiefly of odes; but misfortunes, occasioned by his indolence and irresolution, finally induced melancholy, which at times deepened into insanity. The poems which Collins left are comparatively few; but they entitle him to high rank among the poets of the eighteenth century. He was essentially a lyrist, and it is upon his odes that his reputation is principally founded. His most popular ode is *The Passions.* The personification of the passions is true and striking, and the variation of the measure is well adapted to the various emotions to be expressed. Among his poems may be mentioned the odes, *To Liberty, To Mercy, To Evening, On the Death of Mr. Thomson,* the ode, written in 1746, beginning, "How sleep the brave who sink to rest," and the *Song from Cymbeline.* Not only is much of Collins's poetry exquisite, but it is important as one of the early landmarks of English romanticism. This is particularly true of the *Ode on the Popular Superstitions of the Highlands of Scotland,* completed in 1749, but not published until 1788. Consult: Johnson, sketch of Collins in *Lives of the Poets* (Oxford, 1781); *Poems,* ed. Bronson (Boston, 1898), and ed. Stone (Oxford, 1907); Beers, *English Romanticism in the Eighteenth Century* (New York, 1899) and Millar, J. H., *The Mid-Eighteenth Century* (Edinburgh, 1902).

COLLINS, WILLIAM (1788–1847). An English genre painter and etcher. He was born in London and as a boy studied with Morland and later at the Royal Academy. Subsequently he went to Italy, where he painted Italian landscapes. His predilection, however, was for child life, which he painted in every phase and introduced into picturesque and minutely but somewhat weakly executed landscapes of village and beach. In the course of 40 years he exhibited 121 pictures at the Academy. The chief criticism against Collins's children is that they lack the unconscious air of childhood; their sweetness and charm too often degenerate into sentimentality. In later years he attempted

religious subjects, but without much success. Among his pictures in public museums are "Happy as a King" (Melbourne Gallery, Australia); "The Prawn Catchers" (1831); "Sunday Morning" (1836), and "Cromer Sands" (1845), in the National Gallery, London; "Rustic Civility," "The Stray Kitten," "Hull Sands," and others in the South Kensington Museum; "The Childhood of Wilkie Collins," in the Walker Gallery, Liverpool; "Children Fishing" and "Meadford Bay," in the Fitzwilliam Museum, Cambridge; and others in Dublin, Edinburgh, Manchester, and in several provincial museums. He was the father of Wilkie Collins, the novelist. Consult: W. Wilkie Collins, *Memoirs of the Life of William Collins, Esq.* (London, 1849); Koehler, *English and American Painters* (New York, 1888).

COLLINS, William Wilkie (1824–89). An English novelist. He was the eldest son of William Collins (q.v.), a landscape and portrait painter, and he received his favorite name from Sir David Wilkie. Born in London, he was educated privately at Highbury and accompanied his father to Italy (1836–38). On his return to London he became a clerk in a London firm of tea merchants (1841–46) and afterward studied law at Lincoln's Inn, whence he was called to the bar (1851). He was already drifting towards literature. Even while in the London warehouse he turned his knowledge of Italy to good account in an historical romance entitled *Antonina; or, the Fall of Rome* (not published till 1850); on the death of his father he prepared an excellent memoir in 2 vols. (1849); and a visit to Cornwall resulted in a series of popular sketches called *Rambles beyond Railways* (1850–51). Some time in 1851 he met Dickens, and this event decided his career. Thenceforth the two novelists were intimately associated, working at times in collaboration. To *Household Words,* edited by Dickens, Collins contributed many tales, including the capital series of short stories known as *After Dark* (1856); and for *All the Year Round,* which was also conducted by Dickens, *The Woman in White* (1860), which met with instant success at home and abroad. In the meantime had appeared: *Basil: A Story of Modern Life* (1852): *Hide and Seek* (1854); *The Dead Secret* (1857); *The Queen of Hearts: A Collection of Stories* (1860). And among the numerous novels that followed are: *No Name* (1862); *Armadale* (1866); *The Moonstone* (1868); *Man and Wife* (1870); *The New Magdalen* (1873); *The Frozen Deep, and Other Stories* (1874); *The Law and the Lady* (1875); *The Two Destinies* (1876); *The Fallen Leaves* (1879); *Heart and Science* (1883); *The Legacy of Cain* (1888); *Blind Love* (1889). In 1873–74 Collins visited the United States, where he gave public readings from his own works. He died in London and was buried in Kensal Green.

Soon after his acquaintance with Dickens, Wilkie Collins began to evolve a new type of novel, in which the study of character counts for little, and in which the main effort is given to the construction of a mystery so involved in details and circumstances as to baffle the reader. Of this kind *The Woman in White* and *The Moonstone* are masterpieces. Within his sphere Collins had no equal among his contemporaries. Consult Swinburne, *Studies in Prose and Poetry* (London, 1894).

COL'LINSON, Peter (1694–1768). An English naturalist. One of his pursuits was the naturalization of plants, flowers, and trees. He sent English plants to America and brought American plants to his own country, successfully introducing many species. Benjamin Franklin was indebted to him for his first information in 1745 regarding the progress of new electrical experiments in Europe.

COLLINSON, Sir Richard (1811–83). An English naval officer. He entered the navy in 1823, in 1840 was appointed to the *Wellesley,* on which he served during the Chinese War, and in 1842 was promoted to be commander of the *Bentinck.* In 1849 he commanded the *Enterprise,* which, with the *Investigator,* Commander McClure (q.v.), was sent by way of Bering Strait for the relief of Sir John Franklin. Collinson wintered in 1850 at Hongkong, in 1851 in Prince of Wales Strait, in 1852 in Cambridge Bay, and in 1853 in Camden Bay. He arrived at Point Barrow in August of 1854. In 1858 he was awarded the gold medal of the Royal Geographical Society. He was appointed admiral on the retired list in 1875, when he became K.C.B. He edited *The Three Voyages of Martin Frobisher in Search of a Passage to Cathaia* (1867), for the Hakluyt Society.

COL'LINSVILLE. A city in Madison Co., Ill., 10 miles east by north of East St. Louis, on the Vandalia Railroad (Map: Illinois, B 5). It is an important coal-mining centre and has a lead smelter and zinc works, cowbell factory, and knitting and flour mills. The city contains a hospital and tuberculosis colony, and owns its water works. Collinsville was settled in 1800 and was first incorporated in 1830. It is governed by a charter of 1872, which provides for a mayor, elected biennially, and a unicameral council. Pop., 1900, 4021; 1910, 7478.

COL'LINWOOD. Formerly a village in Cuyahoga Co., Ohio, annexed to Cleveland in 1908. It has railroad repair shops and a street-car manufactory.

COLLI'SION. See Impact.

COLLISIONS OF VESSELS (from Lat. *collisio,* from *collidere,* to dash together, from *con-,* together + *lædere,* to dash). To prevent vessels running against one another in passing, there are "rules of the road" (q.v.) at sea as well as on land. In both the United States and Great Britain regulations are laid down which, though not having the force of law, are recognized by the admiralty courts and govern the decisions in cases of collisions. In general, they are analogous to the rules observed by pedestrians in crowded thoroughfares and by vehicles on highways. It is at night that the danger of collision is greatest; and hence the necessity for a well-arranged system of lights and other precautions. Of 3575 casualties of all kinds on and near the coasts of the United Kingdom in 1880–81, 713 were due to collisions; of these 69 resulted in total loss. The transatlantic steamers running between Queenstown, or the Channel ports, and New York have adopted the "lane system," first advocated by Lieutenant Maury, U. S. N., and afterward developed by the Hydrographic Office, United States Navy, and approved by the Marine Conference held at Washington in 1889. This consists in the assignment of a definite lane or track to each separate line of steamships, along which route their vessels are required to maintain their course.

It has been held by American courts that, if a collision happens without fault, and no blame

can be charged to those in charge of either vessel, each party must bear its own loss. In case both parties are at fault, neither can have relief at common law; but maritime courts aggregate the damage to both vessels and their cargoes and divide the amount equally between the two. In case of inscrutable fault, i.e., by a fault of those in charge of one or both vessels, and yet under such circumstances that it is impossible to learn who is at fault, the rule of equal division is also adopted. Where the fault is on the part of one vessel and no fault on the other, the owners of the vessel at fault must bear their own loss and are also liable for the damage to the other vessel. In some cases the personal liability of owners is limited to the value of the vessel and freight. Strict laws, rules, signals, etc., are adopted by all nations to prevent collisions. (See NAVIGATION LAWS.) But, no matter how exacting may be the rules, cases will occur when their following would result in disaster. No vessel should unnecessarily incur the probability of collision by strict adherence to the rules. If it is clearly in the power of one vessel to avoid collision by departing from the rules, she will be held bound to do so; but a vessel is not required to depart from the rule when she cannot do so without danger. A proper lookout must be kept; the absence of such a lookout is in itself evidence of negligence. In some cases certain lights must be kept. Loss of a vessel injured by a collision is within the ordinary policy of insurance; but when the collision is the fault of the insured vessel, or of both vessels, the insurer is not ordinarily liable for injury done to the other vessel which may be decreed against the vessel insured, although recent policies provide that the insurer shall be liable in such case.

COLLITZ, HERMANN (1855–). An American philologist. He was born in Bleckede, Hanover, and was educated at Lüneburg, Göttingen (Ph.D., 1879), and Berlin. He was assistant librarian (1883–86) and instructor in Sanskrit and comparative philology (1885–86) at the University of Halle. In 1886 he came to the United States. He was professor of German until 1897 and of comparative philology until 1907 at Bryn Mawr, and then became professor of Germanic philology at Johns Hopkins University. His earlier work was in comparative philology in general and Greek dialects in particular; his later in German philology. He published: *Sammlung der griechischen Dialektinschriften* (1884–1909; with Bechtel), including all of importance for dialect study; *Die Verwandtschaftsverhältnisse der griechischen Dialekte* (1895); *Die neueste Sprachforschung* (1886). He became an editor of *Modern Language Notes*, the *Journal of English and Germanic Philology*, and *Hesperia: Schriften zur germanischen Philologie;* and he contributed to the first edition of the NEW INTERNATIONAL ENCYCLOPÆDIA.

COLLITZ, KLARA HECHTENBURG (1863–). An American philologist, wife of Hermann Collitz. She was born at Rheyat, Rhenish Prussia, and was educated at Neuwied, Lausanne, the University of London, Oxford, and Heidelberg (Ph.D., 1901), specializing in linguistics. She lectured on French philology at Victoria College, Belfast (1895–96), on Germanic at Smith College (1897–99), and on the same subject for women students at Oxford (1901–04). She then returned to the United States. She wrote, besides contributions to periodicals, *Das Fremdwort bei Grimmelshausen* (1901), *Der Briefstil im 17. Jahrhundert* (1903), *Fremdwörterbuch des 17. Jahrhunderts* (1904), and edited *Selections from Early German Literature* (1910); *Selections from Classical German Literature* (1914).

COLLO'DION (Neo-Lat., from Gk. κολλώδης, *kollōdēs*, gluelike, from κόλλα, *kolla*, glue + εἶδος, *eidos*, form). A solution of pyroxylin in a mixture of alcohol and ether. For its manufacture a convenient form of cellulose, such as cotton wool, is immersed in a mixture of nitric and sulphuric acid with a little water, or in a mixture of potassium nitrate with sulphuric acid. The product is thoroughly washed in water and dried. The pyroxylin thus obtained is then treated with ether, to which alcohol is added until the substance is completely dissolved. The solution is a clear, colorless liquid that does not mix with water or alcohol, but readily mixes with ether; when exposed to the air, it dries up, leaving a transparent film, which becomes electric by friction and may be exploded by heat, pressure, or percussion. Mixed with substances sensitive to light, collodion is extensively used in photography; the mixture is spread over a glass plate, on which it forms, when dried, a sensitive film. Collodion is also used in surgery, the tenacious and transparent film left by its evaporation preventing the access of air to the injured surface and protecting it from infection. Pills and other medicinal preparations may be coated with it so as to render them tasteless. Among the medicinal collodions that are official is *blistering* or *vesicating collodion*, which consists of cantharides dissolved in collodion; the solution is applied to the skin when it is desired to raise a blister. Wood, paper, and fabrics may be rendered waterproof by being covered with collodion. Small balloons are made from it by pouring a solution into a flask of the desired dimensions, which is then turned about so as to spread the liquid uniformly over the surface and then inverted to allow the excess to run out. The solvent is then allowed to evaporate, and the edges of the remaining film are loosened from the glass by attaching a glass tube to the neck of the flask and withdrawing the air, whereupon the collodion balloon detaches itself, contracts, and is easily withdrawn. See also CELLULOSE and the references given under that head.

COL'LOIDS (from Gk. κόλλα, *kolla*, glue + εἶδος, *eidos*, form). A name applied by Graham to a group of substances, including ferric oxide, alumina, silicic acid, starch, dextrin, gum, albumin, gelatin, tannin, caramel, agar-agar, and others. These substances, though not by any means belonging to the same class chemically, behave alike in certain respects when obtained in solution in water or in some other solvent. In the first place, they diffuse, when dissolved, very much more slowly than most other substances ordinarily met with. In the second place, their presence in solution has scarcely any effect on the freezing point or on the vapor tension of the solvent, while most other substances have the effect of notably lowering both the freezing point and the vapor tension. Again, colloids often spontaneously deposit from their solutions in the form of gelatinous masses that cannot in many cases be redissolved and that usually retain mechanically a large amount of water. Such "gelatinized solutions" are now

used for a variety of purposes in the arts, advantage being taken of the mass being in a semi-solid condition, while the liquid retained by it may be used for the same purposes as when in the free state; such masses are used in photography by the "dry" process, in making "dry" electric batteries, in the manufacture of certain valuable explosives, etc. In scientific researches gelatinized solutions are now used for the purpose of studying the relative rates at which various substances diffuse in water. For this purpose it is important that the solutions should remain absolutely undisturbed for a considerable length of time, and this is accomplished best by adding to them a certain amount of agar-agar or some other colloid, and causing them to "gelatinize," the "dry" solutions thus obtained showing the same rates of diffusion as ordinary aqueous solutions. (See DIFFUSION.)

Another important property of colloids is their incapacity of traversing parchment paper and animal membranes. This permits of the separation of colloids from noncolloids (called "crystalloids") without any difficulty; the process of separation being known as *dialysis*. Thus, to dialyze a solution containing common salt (a crystalloid) and silicic acid (a colloid), the solution may be placed in a bag of parchment paper and immersed in pure water: the salt will then readily pass through the paper, while the silicic acid will remain behind.

The properties of colloids are undoubtedly due to the comparatively very large size of their molecules. Thus, while the molecular weight of water is only 18, and that of most organic substances only a few hundred, the molecular weight of dissolved starch has been shown to be about 25,000, and that of dissolved silicic acid is at least 50,000.

The particles of a colloidal substance in solution must thus be considered as made up, not of single chemical molecules, but of aggregates of them. And in many cases the aggregates, or "colloidal molecules," are large enough to be "seen" by the method of so-called *ultra*-microscopy. When, viz., a colloidal solution is examined microscopically by transmitted light, as usual, it appears as clear and homogeneous as water or, say, a solution of common salt. If, however, a powerful beam of light is directed into the colloidal solution sidewise, perpendicularly to the axis of the microscope, then the path of the ray becomes visible by reflection of the light from the colloidal particles, just as the path of a ray entering a darkened room through a small hole in a shutter is rendered visible by the dust particles in the air. In this manner Zsigmondy, in 1906, was able to discern colloidal molecules whose diameter was only *a few millionths of a millimeter*, or even only one-millionth. No wonder chemists are beginning to hope that the true chemical molecules themselves may yet actually be seen.

An interesting colloidal solution in the *solid* state of aggregation is constituted by ordinary ruby glass. When examined ultramicroscopically, ruby glass appears like a suspension of gold dust in a colorless transparent medium; yet by transmitted light the microscope shows it as no less homogeneous than ordinary colorless glass. Bredig in 1901, Svedberg in 1906, and others since, have also succeeded in obtaining colloidal solutions of metals in liquids, e.g., of gold, silver, and platinum in water, and of cadmium and even the alkali metals in organic solvents. Bredig's method consisted in establishing an electric arc between electrodes of the metal whose solution was desired, under the surface of the solvent, the direct current being used. Svedberg used the alternating current and kept the solvent during the operation at a low temperature. All the metal solutions so obtained looked perfectly homogeneous under the microscope, though more or less strongly colored; the ultramicroscope, however, showed plainly the colloidal molecules distributed throughout their volume like fine dust. Zsigmondy has shown that the colloidal molecules of all such solutions, whether the dissolved colloid be a metal or not, are constantly vibrating ("Brownian movement," so called after the English botanist Brown, who as far back as 1827 observed the continual vibration of fine particles of solids suspended in liquids), and in the case of the finest visible molecules he has also observed a secondary, translatory motion. It has since been demonstrated, by Perrin and others, that these movements are in complete accord with the kinetic theory of gases and that the colloidal molecules obey the gas laws in every respect, so that the movements themselves are nothing else than the molecular motion which has long been assumed to constitute heat. Thus the study of colloidal solutions has in recent years turned the kinetic hypothesis of heat into practically a fact.

We have seen that the colloidal molecule is really a complex made up of a large number of the minuter chemical molecules. It seems probable that some of these component particles of the colloidal molecule are electrically charged ions (see DISSOCIATION, *Electrolytic*), and that unless ions formed part of their composition they could not exist in solution at all, but would form coarser conglomerates and "precipitate out," or, in the case of very fine suspensions, "settle out." That colloids in solution carry electric charges, is indicated by the fact that when the terminals of an electric battery are introduced into a colloidal solution, the colloid migrates in the direction of one of the terminals: ferric hydrate, e.g., moves in the direction of the current; colloidal platinum, silicic acid, and other substances, move *against* the current. In suspensions such movements caused by the electric current were first observed by Quincke in 1861—a phenomenon referred to as *cataphoresis*. That, unless charged, colloids cannot remain dissolved, is indicated by Picton and Linder's rule, according to which colloids which migrate, under the influence of the current, in opposite directions, cause each other's precipitation if their solutions are mixed: plainly, colloids which migrate in opposite directions must be charged with the opposite electricities; when mixed, they neutralize each other's charge, and since precipitation is the result, the inference is justified that the electric charge is indispensable to the existence of either colloid in the dissolved state. If this view is correct, then we are justified in expecting that a certain definite quantity of one colloid will be necessary and sufficient completely to precipitate another; for electric neutralization can only set in when the opposite charges brought together are equal. That this is really the case, was shown by Biltz in 1904. Colloidal gold travels *against* the current; colloidal zirconium hydroxide travels *with* the current. When to a gold solution containing

1.4 milligrams of the metal Biltz added gradually increasing amounts of the zirconium hydroxide, he found that complete precipitation occurred only when 1.6 milligrams of the latter had been added; when the amount added was only 0.065 milligram, no precipitation could be observed. On the other hand, when to a similar amount of colloidal gold as before he added at once as much as 16.2 milligrams of the precipitating colloid, the mixed solution remained clear, the charge carried by the zirconium hydroxide being in this case sufficient, not only to neutralize the opposite charge of the gold, but also to maintain in solution the resulting colloidal mixture.

Bibliography. The literature on colloidal solutions—or "disperse systems," as they are now frequently called—is yearly growing more and more extensive. A summary may be found in Freundlich, *Kapillarchemie* (Leipzig, 1909). Consult also: Lottermoser, *Anorganische Kolloide* (Stuttgart, 1901); Bredig, *Anorganische Fermente* (Leipzig, 1901); Müller, *Theorie der Kolloide* (ib., 1903); Zsigmondy, *Zur Erkenntnis der Kolloide* (Jena, 1905); Perrin, *Les atomes* (Paris, 1913).

COLLOPH'ANITE (from Gk. *κόλλα, kolla*, glue + *φαίνειν, phainein*, to show). Amorphous hydrated calcium phosphate. It has a banded structure, resembling opal, and a conchoidal fracture. In color it is snow-white or yellowish white. This mineral is found chiefly on the island of Sombrero, having been formed in the elevated coral reef by infiltration of salts from the overlying guano.

COL'LOP MONDAY. An old English phrase used to designate the Monday before Lent, from the custom of those days (when fasting was more strictly observed than at present) of cutting meat into strips or collops and salting it to keep till after Lent.

COLLOT D' HERBOIS, kô'lô' dâr'bwä', JEAN MARIE (1750–96). A French Revolutionist. He was born in Paris and passed his early life as an actor. After visiting Holland and acting as the director of a troupe at Geneva, D'Herbois took to playwriting. Most of his productions were adaptations from English and Spanish, and one, *Le paysan magistrat* (1777), was popular for a time. In 1789 D'Herbois, who was then living in Paris, wrote *La famille patriot ou la fédération*, a Revolutionary drama, and followed up this success by bringing out the *Almanach du Père Gérard*, for which he was awarded a prize by the Jacobin Club. Elected as the third deputy from Paris to the Convention in 1792, he became in the following year president of that body and a member of the Committee of Public Safety. In November, 1793, he was sent to Lyons to complete the work of pacification begun by Couthon. There he showed himself merciless in the service of the Republic and caused 1600 persons to be put to death. On returning to Paris he found himself, owing to his popularity, an object of suspicion to Robespierre, and, after an attempt to assassinate him had failed, Robespierre's jealousy increased. Collot d'Herbois took part in the conspiracy which led to Robespierre's downfall, but the reaction was fatal to himself. He was expelled from the National Convention, and in April, 1795, was sentenced to deportation to Cayenne, where he died of fever, Jan. 8, 1796. Consult: Aulard, *Les orateurs de la Législative et de la Convention* (Paris, 1885–86); Morse-Stephens, *The French Revolution* (London, 1891) and *Statesmen and Orators of the French Revolution* (Oxford, 1892).

COLLU'SION (Lat. *collusio*, from *colludere;* to defraud, to play together, from *con-*, together + *ludere*, to play). In law, a species of fraud (q.v.), consisting in an agreement between two or more persons to defraud a third, or to accomplish some illegal purpose; thus, it is collusion for a failing debtor to transfer property to another, who receives it to enable him to defraud some or all of his creditors; or for husband and wife, by mutual agreement or understanding, to institute a suit to procure a divorce without legal cause. Such transactions or proceedings are voidable because of their fraudulent character.

COLLU'THUS, or COLUTHUS (Lat., from Gk. Κόλλουθος, *Kollouthos*). A Greek poet of the fifth century, a native of Lycopolis in Upper Egypt. He wrote various works, on the hunt of the Calydonian Boar (q.v.), the Persian wars, etc. Only one is extant, a poem in 392 hexameters, entitled Ἑλένης Ἁρπαλή, *Helenēs Harpalē*, or the *Rape of Helen*, which was discovered by Cardinal Bessarion in Calabria. The versification is good, but the poem is, on the whole, a poor imitation of Homer, without imagination. The text has been edited by Lehrs in the Didot collection (1841), and by Abel (1880).

COLL'YER, ROBERT (1823–1912). An American clergyman of the Unitarian church. He was born at Keighley, Yorkshire, England; at eight years of age he was a mill hand; at 14, a blacksmith; and in 1849 he became a local preacher of the Methodist church. In 1850 he came to America and began work as a hammer maker at Shoemakersville, Pa. His license as a Methodist minister was revoked, partly for his preaching against slavery. In 1859 he joined the Unitarian church and went to Chicago as a missionary of that denomination and shortly after organized and became pastor of Unity Church. He was prominent during the Civil War in the work of the Sanitary Commission. He was called in 1879 to the Church of the Messiah, New York City, of which, after a successful active pastorate, he was senior associate minister from 1903 until his death. His publications include: two volumes of sermons, *Nature and Life* (1865; 11th ed., 1882) and *The Life that Now Is* (1871; 10th ed., 1882), written in a style noteworthy for its effective Anglo-Saxon vocabulary; *The Single Truth* (1877); *History of Ilkley* (1883; with Horsefall Turner); *Things New and Old* (1893); and *Clear Grit* (1914), a collection of lectures, addresses, and poems, edited by J. Haynes Holmes.

COLM, SAINT. See COLUMBA, SAINT.

COLMAN, kōl'mən, BENJAMIN (1673–1747). An American Congregational clergyman, prominent in the Colonial period. He was born in Boston, graduated at Harvard in 1692, preached and studied theology for three years, and spent the years 1695–99 in England. After his return he became first pastor of the newly organized Brattle Street Church, a position which he filled until his death. He was opposed by Increase and Cotton Mather (qq.v.), who insisted that his ordination, in England and by Presbyterians, was irregular. He exercised a great influence both in religious and secular affairs and was a popular preacher. In 1724 he re-

fused the presidency of Harvard College. He aided in the foundation of Yale. Besides a collection of sermons, in 3 vols. (1707–22), he published a number of poems and a pamphlet advocating inoculation for the smallpox. Consult Turell (Colman's son-in-law), *Life and Character of Benjamin Colman* (Boston, 1749).

COLMAN, George, called The Elder (1732–94). An English dramatic author and theatrical manager. He was born in Florence, was educated at Oxford, and was called to the bar in 1755, but soon abandoned law for literature. In 1760 his first dramatic piece, entitled *Polly Honeycomb*, was produced at Drury Lane with great success. This comedy was followed the next year with *The Jealous Wife*, and in 1766 with *The Clandestine Marriage*, written in conjunction with Garrick. In 1767 he became one of the purchasers of the Covent Garden Theatre and held the office of acting manager for seven years. In 1777 he purchased the Haymarket Theatre. Colman wrote and adapted upward of 30 dramatic pieces. He also translated Terence, edited Beaumont and Fletcher, and wrote considerable other verse and prose. Consult George Colman (2d), *Random Records* (1830), and Peake, *Memoirs of the Colman Family* (London, 1841).

COLMAN, George, called The Younger (1762–1836). An English dramatist and miscellanist, son of George Colman. His bent lay in the same direction as his father's, during whose last years he acted as manager of the Haymarket Theatre. On the death of the elder Colman, George III transferred the patent to his son. After 1824 Colman held the office of examiner of plays. In industry he rivaled his father, and he received large sums for his plays, of which the best known are *John Bull* and *The Heir-at-Law*. He wrote many humorous poems, among which were *Broad Grins* (1802) and *Poetical Vagaries* (1812). In 1830 he published an amusing autobiography, *Random Recollections*.

COLMAN, Norman J. (1827–1911). The first Secretary of Agriculture of the United States. He was born on a farm near Richfield Springs, N. Y., May 16, 1827. In 1847 he removed to Louisville, Ky., and he afterward practiced law in New Albany, Ind., and in St. Louis, Mo. He served in the Union army during the Civil War as lieutenant colonel of volunteers. In 1865 he established an agricultural paper, *Colman's Rural World*, which he continued to edit to the close of his life. In 1874 he was elected Lieutenant Governor of Missouri and in 1885 was appointed United States Commissioner of Agriculture. Towards the end of his term he was appointed Secretary of Agriculture, under the law reorganizing the Department of Agriculture.

COLMAN, Samuel (1832–1920). An American landscape painter. He was born in Portland, Me., and studied first in New York under Durand and later in France, Spain, Rome, and Dresden. After traveling extensively he returned to New York and was one of the founders of the American Water-Color Society, and its first president (1866–67). His early landscapes are in the style of the Hudson River school (q.v.), but later show the influence of Turner and Achenbach. They display no special originality or technical ability, but are mellow in tone and good in color. Examples of his work are found in the Metropolitan Museum, New York, and in the Art Institute, Chicago. Consult his biography by Koehler, in *American Art Review* (Boston, 1880), and Isham, *History of American Painting* (New York, 1905).

COLMAR'. See Kolmar.

COLNE, kōln *or* kōn. A market town of Lancashire, England, on a branch of the Calder, 32 miles north of Manchester (Map: England, D 3). Colne was incorporated in 1895, has an excellent modern system of sewage disposal, and maintains a public library, markets, and slaughterhouses. It has manufactures of cotton, calicoes, and mousselines de laine. There are also numerous collieries and limestone and slate quarries in the vicinity. Pop., 1901, 23,000; 1911, 25,689. Colne is very ancient and is supposed by some to be the *Colunio* of the Romans.

COL'OCA'SIA. See Cocco; Tara; Taro.

CO'LOCO'LO. A wildcat of South America, related to the ocelot (q.v.).

CO'LOCOTRO'NIS. See Kolokotronis.

COL'OCYNTH (OF. *coloquinte*, from Lat. *colocynthis*, from Gk. κολοκυνθίς, *kolokynthis*, colocynth, from κολοκύνθη, *kolokynthē*, pumpkin), or Bitter Apple. A well-known medicine, much used as a purgative. It is the dried pulp of the colocynth gourd, colquintida, bitter apple, or bitter cucumber, a globose fruit about the size of an orange, of a uniform yellow color, with a smooth, thin, solid rind. The plant which produces it, *Citrullus colocynthis*, is allied to the cucumber (q.v.). It is common in Turkey, the Grecian Archipelago, various parts of Asia, and in Africa and Spain, which last country supplies no small part of the colocynth of commerce. The fruit is gathered when it begins to turn yellow, peeled, and dried quickly either in a stove or in the sun. It is chiefly in the form of a dry extract that it is used in medicine. It owes its properties to a bitter principle called *colocynthin*, a bitter glucoside having the chemical formula $C_{56}H_{84}O_{23}$. It is a curious, though not unique, fact that the seeds of the colocynth plant, produced in the midst of its medicinal pulp, are perfectly bland, and they even form an important article of food in the north of Africa. The name "false colocynth" is sometimes given to the orange gourd (*Cucurbita aurantia*), sometimes cultivated as an ornamental plant in our gardens, on account of its globose, deep-orange fruit. The pulp of the fruit possesses the properties of colocynth, but in a milder degree. Colocynth is generally administered in the form of pills, in which the extract is associated with aloes, scammony, and in some cases with calomel or with extract of hyoscyamus. In small doses colocynth acts as a safe and useful purgative; when accompanied by hyoscyamus, the latter prevents much of the pain and griping which are attendant on the use of colocynth by itself. It is a drastic purgative, acting upon the whole intestine, and is used only in obstinate cases of chronic constipation. Colocynth is an ingredient of some powders for destroying moths. In large doses colocynth is a poison, causing severe inflammation of the stomach and intestine. The medicinal dose is from 2 to 8 grains; that of the official extract from ½ to 2 grains; that of the compound extract from 5 to 15 grains.

COLOGARITHM. See Arithmetic Complements.

COLOGNE, kō-lōn' (Ger. *Köln*, officially *Cöln;* the *Colonia Agrippina* of the Romans).

The largest city of Rhenish Prussia, and the sixth largest in Germany, on the left bank of the Rhine, in lat. 50° 56′ N., long. 6° 58′ E. (Map: Prussia, B 3). It is 44 miles by rail northeast of Aachen, 57 miles north-northwest of Coblentz, and 24 miles southeast of Düsseldorf. Cologne is a fortress of the first rank, its fortifications forming a semicircle, with the Rhine as its chord, and the former town of Deutz (since 1888 included in Cologne) on the opposite bank, as a tête-de-pont. It is connected with this suburb by a bridge of boats and a splendid iron bridge for railway and wagon traffic, completed in 1910 and replacing the notable iron bridge built in 1855–59. Still another bridge was completed in 1910, for railway and wagon traffic, at the southern end of the city. In the old quarter the streets are narrow and crooked, but the main residential quarter presents a thoroughly modern aspect. The Ringstrasse, a stately boulevard, nearly 4 miles long, occupies the site of the ancient walls, dismantled in 1881–85. A new line of fortifications established beyond the Ringstrasse embraces 1000 acres and has nearly doubled the city's area.

Among the public buildings the churches claim the greatest share of attention, the splendid specimens of the Romanesque period being more numerous than in any other city in the world. The oldest is perhaps the church of St. Gereon, said to have been founded by the Empress Helena; the choir, with its two square towers, was added in the eleventh century, and the decagonal nave dates from 1219–27. St. Maria im Capitol, consecrated in 1049 and considered by some as the oldest church in Cologne, is a cruciform basilica of imposing appearance. The interior is decorated with fine frescoes. The Apostles' Church, a remarkably fine basilica, presents the best specimen of the highly developed style of architecture in which ecclesiastical enthusiasm and civic love of splendor found expression towards the end of the twelfth century; and the church of St. Cunibert, dating from 1247, is a prominent example of the Byzantine-Moorish style. The church of St. Martin was consecrated in 1172; its massive eastern portion has an imposing tower, 270 feet high. The Jesuits' Church, erected in 1618–29, may be mentioned as an excellent specimen of the mingled style peculiar to that order. The church of St. Peter, in late Gothic style, is celebrated for the altarpiece of the crucifixion of St. Peter by Rubens, and that of the Minorites for containing the tomb of the famous scholastic Duns Scotus. St. Ursula is another church of historic interest. Most of these edifices underwent complete restoration during the nineteenth century. The newer ecclesiastical edifices include a handsome Roman Catholic church in Deutz (1896) and a large synagogue in the new section west of the Ringstrasse (1899).

The Cathedral. The chief object of interest in the city, however, as well as its greatest ornament, is the cathedral, Germany's grandest church building, and one of the noblest specimens of Gothic architecture in Europe. It is said to have had its origin in a structure erected at the beginning of the ninth century by Archbishop Hildebold. This was burned in 1248, and the present cathedral was begun in the same year by Archbishop Konrad von Hochstaden. The design is modeled upon that of Amiens Cathedral, and the architect may have been Master Gerhard von Rile, who is mentioned as conducting the building operations. The choir, the first part completed, was consecrated in 1322. The work was carried on intermittently till the era of the Reformation, when it was suspended, and during the subsequent centuries not only was nothing done to advance it, but the uncompleted structure was suffered to decay. In the beginning of the nineteenth century, however, attention was attracted to its incomplete state, especially by the brothers Boisserée (q.v.); and it became the subject of an enthusiasm extending over all Germany, giving birth to a multitude of associations for the supply of the necessary funds to repair and complete it according to the original designs, which had fortunately survived. On Sept. 4, 1842, the King of Prussia, who had contributed largely to the funds, laid the foundation stone of the transept, from which time great progress was made. The naves, aisles, and transepts were completed in 1848, the magnificent south portal in 1859, and in 1860 the iron central spire was added. With the exception of the towers, the whole was finally completed in October, 1863. The towers, its most impressive and dominating feature, were finished in 1880, and on the 15th of October the completion of this grand work was celebrated with great splendor in the presence of Emperor William I and most of the sovereign princes of the German Empire. The cathedral has a length of 443 feet and a width of 200 feet; the height of the roof is 201 feet, that of the central tower over the crossing 357 feet, and of the two main towers 512 feet. The great bell of the south tower, the "Kaiserglocke," cast in 1874 from conquered French cannon, is the largest and heaviest in the world. The interior is particularly impressive by reason of its soaring height, and the stained glasses are among the finest modern specimens of that art in Germany. It contains the relics and shrine of the "Three Magians," which, since their acquisition in 1164, have been the goal of countless pilgrimages. Consult the monumental monograph on Cologne Cathedral by Boisserée (Munich, 1842), and those of Fahne (Düsseldorf, 1849), Bock (Cologne, 1874), Schmitz (ib., 1868–76), Lamprecht (Bonn, 1881), Wiethase (Frankfort, 1884–89), and Helmken (Cologne, 1899).

The most noteworthy secular edifices are: the Rathaus, the central and oldest portion of which dates from the fourteenth century and contains the handsomely restored Hansa Saal, in which the first general meeting of the Hanseatic League was held in 1367. The graceful portico in Renaissance style and the splendid five-storied tower deserve attention. South of the Rathaus rises the imposing structure of the Gürzenich, erected in 1441–52 as a festive hall for the entertainment of distinguished guests by the City Council, and first used for that purpose at the grand festival held in honor of Emperor Frederick III in 1475. Thoroughly renovated in 1856, it is now the most splendid among the old secular structures, and since 1875 has been used as a stock exchange. The Templars' Lodge, the ancestral seat of the Overstolzen, a distinguished family of mediæval Cologne, is a fine Romanesque building of the twelfth or thirteenth century, now used by the Chamber of Commerce. Of the numerous modern public buildings the most prominent are: the palatial government buildings (1830); the Municipal Museum

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CATHEDRAL RATHAUS

(1855–61); the Stadttheater (1872); the Court of Justice (1886–93), an extensive Renaissance structure, with an impressive façade and handsome staircase; the imposing new post office (1893); and the Imperial Bank (1897). A handsome central railway station was built in 1889–94. The city contains many fine monuments, including statues of Frederick William III, Johann von Werth, and Bismarck.

Cologne is administered by an *Oberburgermeister*, appointed for a period of 12 years and assisted by 11 associates. The municipality operates successfully its own gas and water works, as well as an electric-lighting plant. The street railways are operated by a private company, whose franchise expires in 1916, when the lines will be turned over to the municipality without compensation. The municipality also owns and maintains a pawnshop and slaughterhouses. The educational establishments of Cologne include four gymnasia, a realgymnasium, an oberrealschule, and a realschule; also an academy of medicine, a commercial high school, a theological and a teachers' seminary, a conservatory of music, and a girls' gymnasium. The municipal library contains over 185,000 volumes, and the museum has a number of valuable collections. The zoölogical garden, opened in 1860, is one of the finest in Europe. The industries of Cologne are extensive and varied. The industrial establishments include sugar refineries, chocolate factories, cigar factories, tanneries, machine shops, paper mills, flour mills, breweries, distilleries, and several factories producing the celebrated eau de Cologne. The commerce, both by rail and by Rhine steamboats, is very great. A fine modern harbor, with extensive quayage, has been constructed. The population of Cologne has greatly increased since 1888, when outlying districts began to be annexed to the city. In that year the population numbered 144,772; it rose to 281,681 in 1890, and 372,229 in 1900. The census of Dec. 1, 1910, returned 516,527 inhabitants (about five-sixths Roman Catholics); the area of the city at that time was 117 square kilometers (45 square miles).

Cologne was originally a town of the German tribe of the Ubii (*Oppidum Ubiorum*). It received the name of Colonia Agrippina, 50 A.D., from Agrippina, the wife of the Emperor Claudius, who planted a colony of Roman veterans on the spot, which was her native place. It grew to be an important city under the Romans and retained its prominence under the Frankish sway. The bishopric of Cologne, instituted in Roman times, was elevated to the rank of an archiepiscopal see by Charles the Great in 785. At this time the city was a busy seat of commerce. It entered the league of the Hansa towns in the beginning of the thirteenth century and contended with Lübeck for the first rank. The archbishops acquired considerable territory, and some of them distinguished themselves as politicians and warriors. They took their places among the great princes and electors of the Empire, but were involved in a protracted contest with the citizens of Cologne, who successfully asserted against them the independence of the city. Within the city a bitter contest was carried on all through the Middle Ages between the small number of merchant princes and the trade guilds. The Reformation made little progress in Cologne, and the Protestants were treated with intolerance. With the sixteenth century began a process of steady decline, which remained unchecked till after the end of the Napoleonic wars, when a new period of industrial prosperity set in. In the course of the wars of the Revolution the city lost its independence, to become part of France, and on the downfall of Napoleon it was annexed to Prussia. The archbishopric was secularized in 1801–03, and the Congress of Vienna assigned all of its territories to Prussia. A new archiepiscopal see was created in 1824. Consult: Ennen, *Geschichte der Stadt Köln* (5 vols., Cologne, 1862–80); Heldmann, *Der Kölngau und die Civitas Köln* (Halle, 1900); Binterim and Moosen, *Die Erddiözese Köln bis zur französischen Staatsumwalzung* (2 vols., Düsseldorf, 1892–93); *Die Chroniken der niederrheinischen Städte: Cöln* (3 vols., Leipzig, 1875–77).

COLOGNE, Eau de. See Eau de Cologne.

COLOGNE, The Three Kings of. The three wise men, or magi, by name Melchior, Kaspar, and Balthazar, who followed the star from the East to where it rested above the new-born Jesus. Their bones are said to have been placed in Cologne Cathedral, and their skulls were exhibited there as late as the eighteenth century. Those who touched them were supposed to be healed of their diseases. The names of the three kings were also used as a charm.

COLOGNE YELLOW. A yellow pigment made by precipitating a mixture of lead and calcium nitrates with sodium sulphate and potassium chromate. It is essentially a chrome yellow in which the intensity of the color is lessened by the calcium salt.

COLOMB, kô-lôm′, Philip Howard (1831–99). A British admiral, born in Galloway, Scotland, the son of an army officer. He entered the navy in 1846 and saw varied service, against Chinese pirates in 1848–51, in the Burmese War in 1852, in the Arctic relief expedition of 1854, in the English attack on Sveaborg in 1855, and in suppressing the slave trade in 1868–70—the subject of his interesting book *Slave-Catching in the Indian Ocean* (1873). After his superannuation (1886) he became rear admiral (1887) and vice admiral (1892). In 1858–67 he attempted to make the Real cone signals practical, and, failing, perfected the system of flash signals adopted by the British navy in the latter year. He did equally important work in revising evolutions for steam warships, and the Washington Conference of 1889 adopted a code of marine regulations based upon his study of maritime collisions and contradictory "rules of the road." His great book on *Naval Warfare* (1891; 3d ed., 1900) developed independently the same thesis as Captain Mahan's works on sea power—the prime importance of the command of the sea. He wrote *Memoirs of Sir Astley Cooper Key* (1898).

COLOMBA. See Calumba.

COLOM'BA. A story of Corsica, by Prosper Mérimée (1840). It is considered his masterpiece.

COLOMBAT DE L'ISÈRE, kô′lôN′bâ′ de lē′zâr′ (1798–1851). A French physician, born at Vienne, Department of Isère. He devoted himself to the study of defects of speech and established in Paris an institute for the correction of stuttering, on the principle of rhythmic pronunciation. His best-known work, entitled *Traité de tous les vices de la parole et en particulier du bégaiement* (1830), passed through several editions. He wrote also *Traité des maladies des femmes et de l'hygiène spéciale de leur*

sexe (1839–43); and *Memoire sur l'histoire physiologique da la ventriloquie* (1840). In recognition of his fruitful services the Academy of Sciences awarded him a prize of 50,000 francs.

COLOMBES, kô'lôNb'. A town in the Department of Seine, France, suburban to Paris, 3 miles northwest of the city walls. It has manufactures of starch, gelatin, oil, vinegar, measuring instruments, and woolens; there are also petroleum refineries, etc. Pop., 1901, 23,061; 1911, 22,862.

COLOM'BIA (so called in honor of Christopher Columbus). A republic in South America, occupying the northwest corner of the continent and bounded by the Caribbean Sea and Venezuela on the north, Venezuela and Brazil on the east, Ecuador on the south, and the Pacific and the Republic of Panama on the west. It lies between lat. 3° S. and 12° 30′ N. and between long. 67° 30′ and 83° W. The area was estimated in the census of 1912 at 461,606 square miles.

Topography. Colombia may be divided into two natural regions—the Andean Cordilleras and the great plains or llanos of the east. Entering Colombia from Ecuador, the Cordilleras are continued in a general northerly direction by three diverging ranges, which spread out over the entire western section of the country. The Western Cordillera constitutes a long mountain ridge, with summits 10,000 to 11,000 feet in altitude, which is defined on the east by the valley of the Cauca River. In the northern part the chain is flanked on the west by the Cordillera del Chocó. The Central Cordillera, the continuation of the Eastern Cordillera of Ecuador, contains the highest peaks in Colombia, including the volcanoes Huila, Puracé, and Tolima, the last reaching an altitude of 18,432 feet. The Eastern Cordillera, separated from the central range by the Magdalena River, attains an extreme elevation of 16,700 feet and has great table-lands that are the most thickly populated regions in the republic. This chain divides at the north, the eastern range extending into Venezuela, and the western, known as the Sierra de Perijá, running northward and merging into the Sierra Nevada de Santa Marta, near the coast. The llanos east of the Cordilleras have a surface tilted towards the Atlantic. They cover the northeastern portion of Colombia, comprising the entire basin of the Meta River and extending as far south as the Guaviare River. Their grazing land is rich and well watered. The forest belt lies south of these plains.

Colombia has a coast line of over 3600 miles, of which more than 1600 miles are on the Pacific. Omitting minor sinuosities the Pacific coast line is about 500 miles and that of the Caribbean about 700. The shores are very irregular and form better harbors on the west than on the north. The region abounds in long rivers. The Magdalena traverses the country through almost its entire north-south length and receives numerous tributaries. Navigation is occasionally impeded by rapids. La Dorada is its head for steamers, although the river is navigable for 900 miles from its mouth. The Atrato flows north not far from the west coast and enters the Gulf of Darien. The eastern plain, belonging to the basins of the Orinoco (which forms part of the eastern boundary) and the Amazon, is crossed by many long rivers. The chief affluents of the Orinoco are the Guaviare and the Meta; of the Amazon, the Uaupés and the Yapurá (or Caquetá).

In the Cordilleras the climate is moderate in the upper regions, but very hot in the valleys.

The belt of greatest heat lies south of the llanos. On the table-lands of the Cordilleras the mercury occasionally falls as low as 44° F. In the mountainous parts there are two rainy seasons; on the coast rains occur at any time of the year. Generally speaking, the country is healthful.

Flora. In the low regions plant life is purely tropical. Palms are very numerous and include the lofty wax palm (*Ceroxylon andicola*). Of the more useful forest trees of this region is the rubber (*Castilloa elastica*). The mountain slopes are mostly clothed with thick forests, the timber line being above 10,000 feet. Dye and cedar woods, as well as copaiba trees, grow naturally in Colombia. Cinchona trees of several species are found between 7000 and 9000 feet above the sea, and the aloe, the sarsaparilla, and other medicinal plants grow in abundance. Cacao is cultivated mainly in the provinces of Cauca and Tohina. Other Colombian products are coffee, sugar, and indigo. Cotton and tobacco are also grown.

Fauna. The fauna is also of great variety and includes the larger South American mammalian types, such as the jaguar, puma, tapir, anteater, sloth, several species of monkey, and one or more species of red deer (on the plateaus). The condor, vulture, numerous toucans and parrots, and a variety of humming birds are a part of the rich avifauna. Serpents of several kinds are found in the torrid regions. Fishing is carried on along the banks of the Magdalena and Orinoco.

Geology. The mountain regions here have long been the seat of great volcanic activity. The chief formations in the central range are granite, gneiss, basalt, and eruptive rocks, while in the eastern range Cretaceous formations predominate. The entire portion east of the Cordilleras is occupied by the llanos—vast treeless plains having an altitude of from 1000 to 1500 feet and well adapted for pasturing.

Mineral Resources. Colombia is very rich in minerals, especially in precious metals. Gold is found mostly in alluvial deposits and in the streams. During the Spanish régime the proceeds from the gold mines constituted the chief revenue, but the extracting was carried on by most primitive means. Modern methods were introduced only during the last quarter of the nineteenth century, though the principal mines have long been operated by English companies. The chief centre of gold mining is Antioquia. The leading silver mines are in Tolima and Cauca. The annual gold output of the country amounts to over $3,000,000. The other mineral resources—iron, copper, platinum, lead, and salt—are little developed. Emeralds are mined in the Department of Boyacá, the mines of Muzo and Cosquez being the most noteworthy. Salt mining, a government monopoly, is carried on chiefly around Zipaquirá and Nemocón, in Cundinamarca, where salt is found both in rock form and in springs. Coal exists in the Eastern Cordillera and in many other parts, but is as yet scarcely touched.

Agriculture. The principal industry of Colombia is agriculture, which is greatly favored by the soil and climate, but is carried on by primitive methods. Cultivation is confined mainly to the elevated plateau of the western part, which is best adapted to settlement by

PROVINCES IN EQUADOR
1. Esmeraldas
2. Carchi
3. Imbabura
4. Manabi
5. Pichincha
6. Leon
7. Rios
8. Bolivar
9. Tungurapua
10. Guayas
11. Chimborazo
12. Canar
13. Azuay
14. El Oro
15. Loja
16. Oriente
COLOMBIA
VENEZUELA
ECUADOR
PERU
BRAZIL
BOLIVIA
PARAGUAY
ARGENTINA
CHILE
BOGOTA
QUITO
LIMA
CARACAS
La Paz
Cuzco
Callao
Trujillo
Iquique
Arica
Tocopilla
Cobija
Barranquilla
Cartagena
Maracaibo
Barquisimeto
Valencia
Puerto Cabello
Ciudad Bolivar
Maracay
Guayaquil
Cuenca
Loja
Riobamba
Ibarra
Esmeraldas
Portoviejo
Manta
Machala
Tumbes
Iquitos
Pucallpa
Yurimaguas
Tarapoto
Moyobamba
Chachapoyas
Huanuco
Huancayo
Ayacucho
Huancavelica
Ica
Nazca
Arequipa
Mollendo
Moquegua
Tacna
Puno
Juliaca
Sicuani
Abancay
Andahuaylas
Huaraz
Chimbote
Trujillo
Pacasmayo
Chiclayo
Piura
Talara
Tumbes
Cajamarca
Huancabamba
Jaen
Bagua
Chachapoyas
Tarma
La Oroya
Cerro de Pasco
Huanuco
Huacho
Callao
Lima
Chancay
Barranca
Supe
Huarmey
Casma
Chimbote
Santa
Huaraz
Caraz
Yungay
Recuay
Pomabamba
Huari
Sihuas
Corongo
Mollendo
Islay
Camana
Ocona
Caraveli
Chala
Atico
Acari
Nazca
Palpa
Ica
Pisco
Chincha Baja
Cerro Azul
Chilca
Huacho
Huaral
Canta
Matucana
Chosica
Lurin
Pachacamac
Chorrillos
Barranco
Miraflores
Lima
Callao
Bellavista
La Punta
Ventanilla
Puente Piedra
Carabayllo
Comas
Independencia
Los Olivos
San Martin de Porres
Rimac
San Juan de Lurigancho
Ate
Chaclacayo
Lurigancho
Cieneguilla
Pachacamac
Villa El Salvador
Villa Maria del Triunfo
San Juan de Miraflores
Barranco
Chorrillos
Surquillo
San Isidro
Magdalena del Mar
Pueblo Libre
Jesus Maria
Lince
La Victoria
Rimac
Breña
San Luis
San Borja
Surco
La Molina
Ate
Chaclacayo
Lurigancho
Cieneguilla
Pachacamac
Villa El Salvador
Villa Maria del Triunfo
San Juan de Miraflores
Barranco
Chorrillos
Surquillo
San Isidro
Magdalena del Mar
Pueblo Libre
Jesus Maria
Lince
La Victoria
Rimac
Breña
San Luis
San Borja
Surco
La Molina
Caribbean Sea
Gulf of Darien
Gulf of Panama
Gulf of Guayaquil
Gulf of Maracaibo
Lake Maracaibo
Lake Titicaca
Amazon R.
Orinoco R.
Magdalena R.
Cauca R.
Putumayo R.
Napo R.
Marañon R.
Ucayali R.
Madre de Dios R.
Beni R.
Mamore R.
Guaporé R.
Paraguay R.
Pilcomayo R.
Bermejo R.
Desaguadero R.
Titicaca
Andes
Cordillera Real
Cordillera Central
Cordillera Occidental
Cordillera Oriental
Sierra Nevada de Santa Marta
Sierra de Perija
Sierra de Merida
Sierra de Lema
Sierra de Imataca
Sierra Pacaraima
Sierra Parima
Sierra Tumucumaque
Sierra Acaray
Sierra Dourada
Sierra Geral
Sierra Maracaju
Sierra Amambay
Sierra Mbaracayu
Sierra Ybytyruzu
Sierra Caaguazu
Sierra Caapucu
Sierra Caazapa

SOUTH AMERICA
NORTHERN PART
SCALE OF STATUTE MILES
0 50 100 200 300 400 500
SCALE OF KILOMETERS
0 100 200 300 400 500 600 700 800
Important towns are shown in heavy face type
Railways shown thus
RIO DE JANEIRO
SCALE OF MILES
0 1 2 3
ATLANTIC OCEAN
EQUATOR
Mouths of the Amazon River
Rio Pará or Tocantins
Maranhão (S. Luiz)
Ceará (Fortleza)
Pernambuco (Recife)
São Salvador (Bahia)
Rio de Janeiro
Victoria
Ouro Preto
Diamantina
Ottoni
Caravellas
Ilhéos
Marahu
Cuyaba
Matto Grosso
Goyaz
Januaria
Theresina
Belem (Para)
GEORGETOWN
New Amsterdam
PARAMARIBO
CAYENNE
DUTCH GUIANA
FRENCH GUIANA
BRITISH GUIANA
RIO
Petropolis
Nictheroy
Larangeiras
Jurujuba
Sacco de S. Francisco
Da Gloria
Catete
Ft. Gravata
Ft. Lage
Ft. Boa Viagem
Ft. S. João
Ft. Villegagnon
Ft. Sta. Cruz
Ilha de Cobras
Ilha das Enchadas
Ilha Sta. Barbara
Ilha Cotunduba
Ilha Fundão
Ilha Sacopaya
Ilha Frades
Inhauma Bay
Rio de Janeiro Bay
Morro d'Armação
Praia Grande
Praia de Icarahy
Praia de Fora
Praia Vermelha
Praia do Pinto
Enseada de Botafogo
Lagoa de Freitas
Lagoa de Sacopenapa
Lagoa de Sabandiba
Alto do Corcovado
Mt. de Dona Martha
Mt. S. João
Mt. do Sanado
Bom Gosto
Boa Vista
Boa Vista de Tijuca
Copacabana
Pt. Leme
Pt. Jurujuba
Pt. Gloria
Pt. Cajucz
Pt. Tamandua
Pt. Frio
Cape Blanco
Cape Roque
Cape St. Augustin
Cape Frio
C. Cachipour
C. Raso do Norte
C. Magoari
C. Gurupy
Bay Turyassu
Bay Turyassu
Canal do Norte
Canal do Sul
Maracapoeira Channel
Maracá Channel
Turiuri Channel
Parnahyba R.
Camocim
Acaracu
Mundahu
Parnaiba
Pessoa
Aracaty
Macau
Assu
Natal
Mangue Alto
Manguinha
Formosa
Goyanna
Barreiros
Porto das Pedras
Maceio
Estancia
Aracaju
Itapicurú R.
Conde
Tacholira
Sinimbu
Cannavieras
Belmonte
Santa Cruz
Porto Seguro
Trancoso
Prado
Vicasa
Itaunas
Villa da Barra de St. Matheus
St. Matheus
Linhares
Regencia
Cruz
Barra
Rio Pardo
Januaria
Pto. da Manga
Urucuia
Pancatu
Corrego Grande
Arassuahi
Minas Novas
Jequitinhonha R.
Rio Grande
Rio Preto
Paracatu
Sta. Cruz
Sta. Rita
Mt. Alegre
Araguary
Parrocinho
Araxa
Prata
Uberaba
Sabara
Antonio Bellofloriszonte
Carangola
Tapura
Tijuco
Diamantina
Curralle
Figueira
Naque
Cuitte
Abaite
Piss
Abaite
Sta. Luzia
Ubaa
Vasabinha
Caldas
Campanha
Pastos
Juiz de Fora
Parahybuna
Parahyba R.
Parahyba do Sul
Parahyba
Pinheiro
Pirapetinga
Macahe
Campos
Goytacazes
Sta. Anna
Sta. Rita do Passo
Sta. Rita do Paraizo
Sta. Rita do Sapucahy
Sta. Rita do Jacutinga
Sta. Rita do Rio Preto
Sta. Rita do Rio Novo
Sta. Rita do Rio Claro
Sta. Rita do Rio Verde
Sta. Rita do Rio Branco
Sta. Rita do Rio Grande
Sta. Rita do Rio Pardo

European immigrants on account of the salubrious climate. In the hot districts the important crops include coffee, tobacco, sugar, and cacao. Tobacco, and especially coffee, are largely exported. In the less torrid regions the agriculture is more European in character, wheat, corn, and barley being leading crops. The banana tree is found throughout the republic, and the fruit is exported in large quantities, mostly to the United States. The import records of the United States show an annual average of about a half million dollars worth of this fruit from Colombia. The absence of adequate transportation facilities and the sparseness of population are such hindrances to agriculture that the total yield of the food crops is not sufficient, and it is cheaper for the coast towns to bring wheat from New York than from the interior plateau to satisfy the home demand. The rubber tree and the copaiba tree grow wild and are tapped. The uplands are the home of the tolu, well known for its balsam. Cattle raising is conducted on a considerable scale. Cattle hides are an important export, the export to the United States being about one million dollars annually.

Manufactures. The manufacturing industries are insignificant. There are iron works near Bogotá, and pottery is made at Espinal, in Tolima. There are woolen mills at Popayán and Pasto. The Indians make pottery, cotton fabrics, and straw mats and hats. The manufacture of "Panama" hats from the jipijapa fibre is carried on as a domestic industry in many localities. The sugar mills are of the most primitive kind. The industry of wood carving and horn carving, once well developed among the aboriginal population, is gradually dying out. The distilling of liquor from sugar is a government monopoly.

Transportation and Communication. Owing to its mountainous surface, Colombia is very deficient in roads. Communication is mostly maintained by means of narrow paths accessible only to pack mules, and even the principal roads are often in an almost impassable condition. The lack of good roads is partly remedied by the navigable waterways. The Magdalena chiefly and the Atrato, Cauca, and a number of minor streams are utilized for transportation, while through the river Meta communication is had with the Orinoco. The construction of railways in the republic has been very slow and irregular. There were in 1911 about 620 miles in operation. Some lines are operated by American companies, and others are managed by the states with the assistance of the central government. These short lines—ranging from 25 to 100 miles in length and forming no connected system—have little influence on the general economic conditions of the republic. Telegraph lines in 1912 aggregated upward of 11,800 miles chiefly owned by the government. The republic is in regular steamer communication with Europe and the United States. There are over 600 post offices. The postal service is poor.

Commerce. The commerce of Colombia, like its industries, has been hindered by lack of transportation facilities, the frequency of political disturbances, and the heavy export and import duties. Chief exports are coffee, gold bars and dust, cattle hides, bananas, "Panama" hats, rubber, and ivory nuts. Leading imports are petroleum, flour, cottons, wine, iron and steel wares, drugs and chemicals. Imports increased in value from about $12,000,000 in 1909 to nearly $24,000,000 in 1912, and exports from about $16,000,000 to over $32,000,000. Over half of the latter figure represented coffee. In 1912 the United Kingdom sent imports and received exports valued at $7,839,000 and $4,376,000 respectively; United States, $7,612,000 and $15,833,000; Germany, $4,201,000 and $1,854,000. Exports of the United States to Colombia have grown from $3,084,718 in 1907 to $7,397,696 in 1913 and imports therefrom from $6,308,680 to $15,992,321. About 30 per cent of the imports are from the United States and 45 per cent of the exports are sent to that country. The commerce between Colombia and the other South American countries, excepting Venezuela, is insignificant. The inland trade, owing to the great variety in the products of the different portions of the republic, is active and carried on chiefly by means of weekly markets.

Government. Colombia has practically had a republican form of government since 1819. The constitution of 1886 (the seventh since 1821) underwent radical changes in 1905 and 1909. In contrast with the preceding instruments, which recognized the sovereignty of the constituent states, it provides for a strong centralization of power, and under it the name of the country was changed from the "United States of Colombia" to the "Republic of Colombia." Under the constitution the legislative power is vested in a congress consisting of the Senate (35 members, elected indirectly for four years) and the House of Representatives (92 members, elected for four years by direct vote). The president is elected by the congress for four years, and is assisted by a cabinet of seven ministers. The president for the term ending in August, 1914, was Carlos E. Restrepo. The departments have councils elected by the people at the rate of one member for every 25,000 inhabitants, and are divided into provinces presided over by prefects appointed by the governor. For the administration of justice there are a supreme court of seven judges, appointed by the president, district supreme courts, and provincial courts. Military service is nominally compulsory, but is not generally enforced. The peace effective is about 6000 officers and men; the war strength is estimated at about 50,000. A military school, with a course of four years, is maintained at Bogotá.

Finance. The finances of the republic have always been in a deplorable condition. The public debt has constantly increased. The internal debt in 1904 was the paper currency, 746,801,420 pesos, and 7,398,817 pesos additional. The external debt, held chiefly in Great Britain, amounted in 1896, with arrears, to $17,080,188. By an arrangement with the bondholders in 1897 the government was able to cut the external debt down to £2,700,000 ($13,122,000), and new bonds were issued to that amount at 1½ per cent interest, the rate to be gradually increased to 3 per cent. This programme was satisfactorily carried out until the civil troubles of 1899. On Jan. 1, 1912, the foreign consolidated debt stood at £2,486,000 (in addition, guarantee railway debts amounting to £1,469,400). On July 1, 1912, the internal debt was 5,476,888 pesos silver; floating debt, $2,756,545; in addition is the enormous outstanding paper currency. The revenue is derived from import and export duties and monopolies (salt, liquors, cigars, etc.). For 1912, estimated revenue and expenditure were $12,043,145 and $12,500,000; 1913, $14,070,654

and $14,060,294. The departments are independent in their internal financial affairs and derive their revenues chiefly from monopolies. The currency of the country consists of the depreciated paper pesos. The gold peso is equivalent to the United States gold dollar, the silver peso fluctuates with the price of silver, and the paper peso is legally current at one cent.

Population. The census of 1870 returned a population of 2,951,323. From that time no census was taken until March 5, 1912, for which date the population is returned at 5,472,604. The latter figure includes an estimated 400,000 for Panama, sovereignty over which Colombia still claimed. On the other hand, it does not include a considerable number of uncivilized Indians; the number is quite unknown, but has been surmised to be about 30,000. Total population (1918), 5,847,491. Population by departments, etc. (1912), was as follows:

	Sq. miles	Pop.	Capitals
Departments:			
Antioquia	22,752	740,937	Medellín
Atlántico	1,008	114,887	Barranquilla
Bolívar	22,320	420,730	Cartagena
Boyacá	16,460	586,499	Tunja
Caldas	7,380	341,198	Manizales
Cauca	20,403	211,756	Popayán
Cundinamarca	8,046	713,968	Bogotá
Huila	8,100	158,191	Neiva
Magdalena	19,080	149,547	Santa Marta
Nariño	9,360	292,535	Pasto
Norte de Santander	6,255	204,381	Cúcuta
Santander	17,868	400,084	Bucaramanga
Tolima	10,080	282,426	Ibagué
Valle del Cauca	3,897	217,159	Cali
Intendencies:			
Meta	.....	29,309	Villavicencio
Chocó	.....	68,127	Quibdó
Commissaries:			
La Goajira	.....	53,013	Puerto Estrella
Arauca	.....	4,922	Arauca
Caquetá	.....	24,543	Florencia
Putumayo	.....	31,380	Mocoa
Vaupés	.....	5,545	Calamar
Urabá	.....	6,476	Acandí
Juradó	.....	8,207	Pizarro
Lazarettos	.....	6,793	
Colombia	1,206,200	5,072,604	Bogotá

The larger municipal populations in 1912 were: Bogotá (the capital), 121,257; Medellín, 71,004; Barranquilla, 48,907; Cartagena, 36,632; Manizales, 34,720; Sonsón, 29,346; Pasto, 27,760; Cali, 27,747; Aguadas, 26,423; Ibagué, 24,693; Palmira, 24,312; Neiva, 21,852. The language and civilization are Spanish; persons of pure Indian blood number perhaps 15 per cent of the total population, and of pure white blood 10 per cent.

Education and Religion. Education is free, but not compulsory, and is to a large extent maintained by the state. Besides the university at Bogotá, there are a national institute for working people, a school of arts and trades, and a national school of music. Secondary education is directed largely by the religious orders. There are over 4000 primary schools, with nearly 300,000 pupils. Religious toleration and free speech are guaranteed by the constitution; but the state religion is Roman Catholicism.

History. The north coasts of Colombia were visited by Ojeda and Vespucci in 1499. Three years later Columbus explored a section of the country and attempted to found the first Spanish colony on the American mainland. Between 1511 and 1517 Balboa and Pedrarias explored and settled both coasts of the Isthmus. As early as 1515 Pizarro and Gaspar de Morales had explored the Pacific coast as far south as "Biru," a term from which the present territory of Peru gets its name, although lying considerably beyond Pizarro's "Biru." Between 1536 and 1540 Ximenes de Quesada conquered the Chibchas, or Muyscas, the principal nation, and the country became a dependency of Spain. It was known as the Province of New Granada till 1718, when it was made a viceroyalty. With the other Spanish possessions, it revolted in 1810 and in 1819 became independent, joining with Venezuela (1819), under the leadership of Bolívar, and Ecuador (1822) to form the Republic of Colombia. This union was dissolved in 1829–30, and New Granada was founded as a separate republic in 1831. A new constitution was adopted in 1858, by which the separate "provinces" were changed into "states," associated under a federal government, known as "Confederación Granadina." The states were made self-governing in all internal affairs. In 1860 another revolution broke out, and for more than two years the country was devastated by civil war. Finally, in 1863, the nine states again agreed upon a constitution, organizing themselves under the name of "United States of Colombia." Another revolution, begun in 1884, was terminated in 1886 by the promulgation of a new constitution, which transformed the loose federal union into a strongly centralized state. In 1889 the insurrectionary elements reappeared, but were suppressed before they had gathered headway. A year later there was a more formidable outbreak, with severe fighting at Panama. The insurrection was due in great measure to a general feeling of discontent aroused by the corrupt conduct of the Conservative party, which was then in power. In August, 1900, the Vice President, Marroquin, made himself master of the government, and carried on an energetic campaign against the Liberals. Late in 1901 Colón was taken by the Liberals, who, however, were compelled to evacuate it within a few days. Peace was concluded through the intercession of the United States in the fall of 1902. In September, 1903, the Colombian Congress rejected the Hay-Herran Treaty with the United States for the construction of the Panama Canal. This was followed by a proclamation of independence on the part of Panama on November 3. (See PANAMA.) The rôle played by the United States in the Isthmian revolution aroused bitter resentment in Colombia. President Marroquin in vain pledged himself to conclude a new treaty on terms satisfactory to the United States government. A conciliatory mission to Washington headed by Dr. Reyes was likewise without result. In 1904 Dr. Reyes became President and forthwith attempted to install himself as a dictator. Congress was dismissed, a new constituent assembly summoned, and the presidential term lengthened to 10 years. Reyes proved a success in developing Colombia's economic resources, but became unpopular by attempting to reopen negotiations with the United States, and fled, in 1909, to England. His successor, Restrepo, began his administration as a violent anti-American, but has changed his policy, and in 1913 Colombia renewed her efforts to obtain indemnity for the loss of Panama. A new treaty was negotiated with the United States authorities, which was unofficially stated to include an indemnity payment by the United States of $25,000,000 and certain privileges to Colombian vessels passing through the canal, but has not yet been sub-

mitted to the Congress of the United States and its exact provisions cannot therefore be stated. With the opening of 1914, the Colombians, despairing of their hopes, are hinting that they will build a canal of their own with British capital.

Consult: Nuñez and Jalhay, *La république de Colombie: Géographie, histoire, organisation, etc.* (Brussels, 1893); Regel, *Kolumbien* (Berlin, 1899); Scruggs, *The Colombian and Venezuelan Republics* (Boston, 1905); Wheeler, *The Agricultural Condition of Colombia* (London, 1889); Röthlisberger, *El Dorado: Reise- und Kulturbilder aus dem südamerikanischen Columbien* (Bern, 1897); Dawson, *South American Republics* (New York, 1904); Pedraza, *Republica de Colombia* (Norwood, Mass., 1909); Serret, *Voyage en Colombia* (Paris, 1912).

The standard work on the history of Colombia is Pereira, *Les Etats-Unis de Colombia* (Paris, 1883). There are numerous narratives of events of the war against Spain, written by English officers serving with the Revolutionists, of which the best are, perhaps, Hall, *Present State of Colombia* (London, 1825), and the anonymous *Recollections of a Service in Venezuela and Colombia* (ib., 1828).

COLOMBO, kō-lŏm′bō. The capital and chief seaport of Ceylon, situated on the western coast of the island, on a rocky headland, in lat. 6° 54′ N. and long. 79° 51′ E. (Map: India, C 7). The European part of the city is magnificently laid out, with broad avenues shaded by tropical trees and lined by modern buildings of fine architecture. The business part of the European city occupies the site of a fort founded by the Portuguese and rebuilt by the Dutch, and is still known as the "Fort." Its chief thoroughfare is Queen Street, in which are situated the governor's residence, the chief mercantile houses and banks, and the post office, the finest public building on the island. The residential section of the European city covers an area of about 20 square miles. The part nearest to the water is occupied by numerous clubs. Farther inland this section is crossed by beautiful roads bordered with bungalows amid luxuriant gardens. The native part of the city, or *Pettah,* is dirty and crowded, with crooked and narrow streets, always thronged with motley crowds of different types and nationalities. The houses are without doors or windows, and the passer-by can freely observe the private life of the natives. Colombo owes its commercial importance largely to its breakwaters. The southwest breakwater, one of the largest in existence, was begun in 1875 and completed in 1885; it is 4212 feet long and is built of concrete blocks weighing from 18 to 30 tons. The northeast and northwest breakwaters are rubble embankments, begun in 1894 and finished in 1906; the former is 1100 feet and the latter 2657 feet long. The three breakwaters inclose an area of about 640 acres, with a depth of from 30 to 36 feet at low water. In addition there is a graving dock 700 feet long. The shipping of the port of Colombo is very extensive, nearly the whole of the imports and exports of Ceylon passing through it. Colombo is one of the most important coaling stations for British and foreign steamers on the Australian and East Asiatic routes. It is connected by rail with Kandy, Galle, and the north of the island. It is the seat of a United States consulate.

The population of Colombo in 1901 was 158,228 (127,836 in 1891), including about 5000 Europeans, chiefly Englishmen and descendants of the Dutch, and a number of Parsis, Jews, Arabs, Tamils, descendants of Portuguese, and mixed breeds, many of whom live in houses made of mud. The 1911 census showed a population of 213,396. The natives are mostly artisans and laborers, while the Europeans are either owners of large plantations or merchants.

The early name of Colombo, Kalan-totta, the "Kalany ferry," derived from its proximity to the river, the Arabs corrupted into Kalambu. At the arrival of the Portuguese, in 1517, Kalambu had merged into Kolamba, or Columbu, which they henceforth wrote Colombo, in honor of Christopher Columbus. It was taken by the Dutch in 1656 and by the British in 1796. Consult Caye, *Golden Tips* (London, 1900).

CO'LON (Lat., from Gk. *κόλον, kolon*). The portion of the large intestine that extends from the cæcum (q.v.) to the rectum, which is the terminal portion of the intestinal canal. It is divided into the ascending, the transverse, and descending colon, and the sigmoid flexure. See ALIMENTARY SYSTEM; and, for illustration, ABDOMEN.

The whole length of the colon, from its commencement in the cæcum to its termination in the rectum, is rather more than 4 feet. It is retained in its position by the serous membrane, which envelops, partly or completely, all the intestinal viscera and is termed the peritoneum (q.v.). Its structure is essentially the same as that of the rest of the intestinal canal, which is described in the article DIGESTION, ORGANS AND PROCESS OF; but in consequence of a peculiar arrangement of the longitudinal muscular fibres, the interior of the colon is divided into sacculi, which serve to retain its contents for a longer period than if it were a uniform tube, and thus, by extracting water from them, to reduce them to a more solid consistence, such as is possessed by normal excrement. It is also devoid of villi, and it is of much greater diameter than the small intestine. In some animals, as in the horse and sheep, the shape of the fæces is completely molded in these cells.

COLÓN, kō-lōn′. A seaport city of Panama, on the Caribbean shore, about 48 miles by rail northwest of the city of Panama (Map: Central America, H 6). Colón, geographically within the Canal Zone, is situated on Manzanillo Island, between Manzanillo Bay and Limón Bay. It is the northern terminus of the Panama Railway and the Panama Canal. Practically all of the land in the city is owned by the Panama Railroad, under its original franchise from the United States of Colombia, and as the United States now owns the Panama Railroad it has thus become the owner of the land, but cannot sell it. Adjacent to Colón, on Limón Bay and practically forming a part of the city, is the American town of Cristobal, where are located the great cold-storage plant of the Isthmian Canal Commission and the shops of the Panama Railroad. The deep but exposed harbor of Colón, in Limón Bay, is naturally much inferior to that of Porto Bello, 20 miles to the east, but has been improved by a long breakwater from Toro Point erected by the Canal Commission. Steamships can come alongside the piers, and the docking equipments are modern, including cranes and other apparatus. In 1914 Colón was either the terminus or a port of call for about a dozen lines of steamships, and, on

account of the approaching completion of the canal, other lines were in project. The city has served as an entrepôt for much of the commerce between Atlantic and Pacific ports. During 1912 there entered at Colón and Cristobal 877 steamships, of 3,330,600 tons, and 32 sail, of 5200 tons. Colón consists largely of unattractive frame houses and small shops, but many of the newer houses, including the modern municipal building and the principal public school, are of concrete. Under the Treaty of 1903 the cities of Colón and Panama, while remaining Panaman territory, came under the jurisdiction of the United States in all matters relating to sanitation and quarantine. Formerly Colón was a notoriously unhealthful place, but the unsanitary conditions were removed by the Canal Commission in 1906–07; sewers and a system of water works were constructed and stringent sanitary regulations established. Unlike Panama, Colón is not an old city, having been founded in 1850 by the builders of the Panama Railroad (which was completed in 1855). For a time it was called "Aspinwall," in honor of William H. Aspinwall, one of the builders of the railroad, but subsequently the name was changed by statute to "Colón," in honor of Christopher Columbus, who sailed into Limón Bay in 1502. A fine statue of Columbus, the gift of Empress Eugénie in 1870, stands near the mouth of the old (French) canal. The town has suffered frequently from fires, notably during the revolution of 1885. When the Canal Commission undertook its work, the population of Colón was probably not much over 3000, consisting largely of Jamaica negroes and of natives of mixed Spanish, Indian, and negro blood. The census of 1911 returned a population of 17,748; estimated by Isthmian Business Directory at 20,000 in 1913. According to the Canal Zone census of 1912, Cristobal had 3584 inhabitants.

COLON (Sp., Columbus). A town in the Province of Matanzas, Cuba, about 52 miles southeast of Matanzas, connected by rail with Havana, Matanzas, Cardenas, and other important cities (Map: Cuba, E 4). It is the centre of extensive sugar refineries. Pop., 1899, 7175; 1907, 7124.

COLON BACIL'LUS, or BACILLUS COLI COMMUNIS. A microörganism discovered by Escherich in 1885, and since demonstrated to be a normal inhabitant of the intestinal tract in man and some of the domestic animals. It is a short bacillus with rounded ends, is somewhat motile, has a few flagellæ, and does not form spores. The main interest which attaches to this organism at present is due to its close resemblance to the typhoid bacillus, with which it is morphologically identical, but from which it may be distinguished by its biological peculiarities. Some investigations made within the last few years tend to show that this bacillus, while of normal occurrence in the healthy intestine, may under certain conditions migrate to other organs of the body and there be associated with pathological processes.

COLONEL, kẽr'nel (originally *coronel, coronell,* from Sp. *coronel,* colonel, It. *colonello,* Fr. *colonel, colonnel,* from Sp. *colonello,* column at the head of a regiment, dim. of *colonna,* column, from Lat. *columna,* column; the first *l* is changed to *r* either through dissimilation, or through popular confusion with Lat. *corona,* crown). A military title, ranking in the United States army between lieutenant colonel and brigadier general. The command appropriate to the grade is a regiment. In the United States service the army grade of colonel corresponds to that of captain in the navy. In addition to the colonels commanding regiments of the three arms, infantry, cavalry, and artillery, there are also *staff* colonels, without command, assigned to the several staff corps and departments. In the English service a colonel actively commands artillery and engineers. The infantry battalion and cavalry regiment are actually commanded by the lieutenant colonels of the regiments, the office of colonel being an honorary sinecure, carrying certain emoluments, and often bestowed upon royal and other distinguished personages. The same custom prevails in some of the continental armies. In England the custom prior to 1888 was to give the appointment of colonel to retired general officers as a reward for long service. Since that date no officer can obtain the rank except as a brevet, and then only for distinguished service or on such appointments as the colonel commanding a territorial district depôt. See RANK AND COMMAND.

COLONEL CHABERT, LE le kō'lō'nĕl' shȧ'bâr'. A story by Balzac (1832), the tale of a soldier of the Grand Army, who comes back from the wars to find his wife married to another.

COLONEL JACK, HISTORY OF. A novel by Defoe (1722). Beginning life as a thief, the hero goes to Virginia, and finally becomes a respectable planter and slave owner.

COLONIA. See COLONY.

COLONIA, kō-lō'nē-ȧ (Sp., colony). The capital of the department of the same name, Uruguay, on the Río de la Plata, nearly opposite Buenos Aires. It has a good harbor, docks, and a dry dock, and is a place of some commerce, particularly with Buenos Aires (Map: Uruguay, F 10). Pop., about 1500. Colonia was founded by the Portuguese about 1680 under the name "Colonia del Sacramento." Owing to its nearness to Buenos Aires, it gave rise to many conflicts for its possession between the Spanish and the Portuguese. In the course of one of these struggles it was almost totally destroyed in 1777. In 1806 the English, in a desperate attempt to secure the La Plata region, captured Colonia and held it for some months.

COLO'NIA AG'RIPPI'NA. The Roman name of Cologne (q.v.).

COLO'NIAL ARCHITECTURE. See ARCHITECTURE, *Colonial Architecture.*

COLONIAL CORPS. A term formerly applied specifically to colonial troops of the British Empire, but now in general use as referring to similar troops of other nations. They are usually raised for service in the colony to which they belong and not for foreign operations. An exception is the use made of the West Indian regiments of Great Britain, in the frequent punitive expeditions on the west coast of Africa. Colonial corps are officered by the regular army officers of the nation to which the colony is subject. English colonial corps are the King's African Rifles, the West African regiments (negroes), and the Hongkong Regiment. The Philippine Scouts, the Philippine Constabulary, and the Porto Rico Regiment of Infantry serve a similar purpose in the United States army. The most important attempt in recent years to build up a body of colonial troops is that made by the French Republic, which has 16 regiments of colonial infantry, three regiments of colonial artillery, and a corps of colonial cavalry. They

include the Senegal, Tonkin, and Annamite tirailleurs; the Senegal spahis; the Nalagasy tirailleurs, and the native battalions of Gaboon. Twelve of these regiments are stationed in France.

COLONIAL DAMES OF AMERICA, National Society of the. A women's patriotic society, organized in Wilmington, Del., in 1892. It is composed of State societies, of which there is one in each of the 13 original States and in the District of Columbia, together with associated societies in the non-Colonial States of California, Illinois, Michigan, Minnesota, Iowa, Ohio, Colorado, Maine, Missouri, Wisconsin, Tennessee, Louisiana, Kansas, Indiana, Alabama, Texas, Arkansas, West Virginia, Mississippi, Oregon, and Vermont. The objects of the society are the collection and preservation of manuscripts and relics of Colonial days, the restoration of historic buildings, the more general diffusion of information concerning the Colonies, and the stimulation of a spirit of true patriotism. Membership in the society is limited to women who are especially invited, and who are descended from some ancestor of worthy life who came to reside in an American colony prior to 1750. The national committee on historic research in the several States has erected memorials, pursued investigations, and issued publications such as *The Letters of William Pitt, Lord Chatham.* The membership in 1914 was over 9000.

COLONIAL DAMES OF AMERICA, Society of. A patriotic society of women in the United States, organized in New York City in 1890, incorporated in 1891, and having for its purposes the collection of manuscripts, traditions, relics, etc., of Colonial and Revolutionary times, and the commemoration of the success of the Revolution. Membership in the society is restricted to women who are directly descended from some ancestor of distinction who came to reside in an American colony before 1776. In 1914 it had chapters in New York, Baltimore, Philadelphia, Washington, Paris, San Francisco, and Shreveport, La. Consult Browning, *Some Colonial Dames of Royal Descent* (Ardmore, Pa., 1900).

COLONIAL EDUCATION. See Education, Colonial.

COLONIAL WARS, Society of. A patriotic society, organized in New York City in 1892. It consists of a general society made up of general officers and of delegates from the various State societies as follows, in the order of their institution: New York, Pennsylvania, Maryland, Massachusetts, Connecticut, District of Columbia, New Jersey, Virginia, New Hampshire, Vermont, Illinois, Missouri, Ohio, Nebraska, Minnesota, Kentucky, California, Colorado, Iowa, Georgia, Michigan, Wisconsin, Delaware, Rhode Island, Washington, Maine, and Indiana. The various State societies have, for their general object, to perpetuate the memory of Colonial events and of the men who, in military, naval, and civil positions of high trust and responsibility, by their acts of counsel assisted in the establishment, defense, and preservation of the American Colonies. With this end in view they seek to collect and preserve records relating to the Colonial period of American history and to inspire in their members the fraternal and patriotic spirit of those who made American freedom and unity possible. They admit to membership male descendants of those who assisted in the establishment, defense, and preservation of the American Colonies. The publications of the general society include general registers and historical papers and registers by the various local societies. The general society has erected a monument at Louisburg, on Cape Breton Island, and memorial tablets have been placed by the New York society on the sites of Fort Oswego and Fort Ticonderoga, and an imposing monument has been erected at Lake George. The membership in 1914 was about 4500. The New York society has placed tablets at Fort Amherst at Crown Point and also at the corner of Wall and William streets, New York, where once stood a bastion of the wall raised by the colonists for protection.

COLONIES, The Thirteen American. See United States, *History.*

COL'ONIES of Plants or Animals. See Cœnobia; Polyp.

COL'ONIZA'TION SOCIETY, The National, of America. An association organized in 1816, by Robert Finley (q.v.), "to promote a plan for colonizing (with their consent) the free people of color residing in our country, in Africa, or such other place as Congress may deem most expedient." Branches were established throughout the country, and an active propaganda was conducted in almost every State, the official agents of the society speaking frequently in public and soliciting the coöperation of the various State legislatures. The first colonists were sent out to Sherbro Island, Africa, in 1820; and two years later Liberia was founded. Bushrod Washington, Charles Carroll, James Madison, Henry Clay, and J. H. B. Latrobe served successively as presidents of the society, while such men as Bishop Hopkins, Rufus King, Dr. Channing, Benjamin Lundy, Gerrit Smith, and James G. Birney were at one time zealous members. After about 1831, however, when the movement for the abolition of slavery may be said to have first attracted general attention, the inadequacy and impracticability of the society's aims became increasingly apparent, and many of its more influential members withdrew their support. Its persistent refusal to interfere in any way with slavery, moreover, and its apparent encouragement of the racial prejudices of the whites against the blacks alienated many others who, though strongly opposing the radicalism of Garrison, believed in a policy of gradual abolition and had faith in the negro's capacity for improvement. The general idea of colonization seems to have originated with the Rev. Samuel Hopkins, of Newport, in 1770. Consult Wilson, *History of the Rise and Fall of the Slave Power in America,* vol. i (Boston, 1875), and Alexander, *A History of Colonization on the Western Coast of Africa* (Philadelphia, 1846).

The shortcomings of the society's aims, judged from an abolitionist standpoint, are admirably set forth in Garrison, *Thoughts on Colonization* (Boston, 1832); Birney, *Letter on Colonization* (New York, 1834); and Jay, *An Inquiry into the Character and Tendency of the American Colonization and Antislavery Societies* (ib., 1834).

COLON'NA. A celebrated Italian family, prominent in the history of Rome from the twelfth century to the sixteenth. They were hereditary enemies of the Orsini (q.v.), and their numerous strongholds around Rome made them at all times formidable enemies to the papacy, and on occasion its masters. To Rome the Colonnas gave a pope, 30 cardinals, and a

great number of senators and military commanders. The name of the family was probably derived from Colonna, a small settlement near the fortress of Palestrina; and Pietro of the Column, Lord of Palestrina in 1100, is commonly regarded as the ancestor of all the princely branches of Colonna, comprising at present the houses of Colonna-Paliano, Colonna di Sciarra, and Colonna-Stigliano.—Egidio Colonna was born at Rome about 1247. He entered the Augustine Order and pursued the study of theology at Paris, where he was preceptor to Philip the Fair. He became general of the order in 1292 and in 1296 was made Archbishop of Bourges. He was the author of a political treatise entitled *De Regimine Principum*, dedicated to Philip the Fair and noteworthy for its systematic treatment of the art of war. He died in Avignon in 1316 and was buried at Paris. Of his works, which are marked by a good deal of dull erudition, part have remained unpublished.—Landolfo Colonna was a canon of Chartres in the first half of the fourteenth century. There are attributed to him a manual of history from the creation to the pontificate of John XXII, a history of the popes, and a Latin work, *De Statu et Mutatione Romani Imperii*.—Sciarra Colonna was a bitter enemy of Pope Boniface VIII. War broke out between the two in 1297 over the possession of Palestrina. Sciarra was excommunicated and deprived of all his honors, and after the destruction of Palestrina by the papal forces in 1298 was compelled to flee to France. He gained the favor of Philip the Fair and, returning in the company of the French Chancellor Nogaret in 1303, resumed hostilities with the Pope, and on September 7 took the aged pontiff prisoner at Anagni. (See Boniface VIII.) He became Senator of Rome in 1313. He embraced the cause of Louis the Bavarian, whom he crowned Emperor in St. Peter's in 1328, but on the latter's departure was forced to flee from Rome. He died in exile in 1329.—Stefano Colonna, brother of Sciarra, was made Governor of Bologna in 1289. Involved in the struggle against Boniface VIII, he fled to France at about the same time as his brother. He returned after the death of Boniface and assumed a leading part in Roman politics, acting in opposition to Rienzi (q.v.), who drove him from the city in 1347. Stefano was a friend of Petrarch, who speaks of him in the *Trionfo della fama* and in his sonnets.—Giovanni Colonna led an insurrection against Boniface IX in 1404 and after the election of Innocent VII joined forces with Ladislaus of Naples, driving Pope John XXIII from the city in 1413. He was killed in 1417.—Ottone, or Oddone, Colonna was Pope from 1417 to 1431. (See Martin V.)—Fabrizio Colonna joined Charles VIII of France in the invasion of Naples in 1494, but soon went over to the enemy and was made Grand Constable of Naples. He defended Capua against the forces of Louis XII and took part in the battle of the Garigliano (1503). In the Holy League against France he was commander of the papal forces and, with his Spanish allies, was defeated by Gaston de Foix at Ravenna in 1512. He died in 1520. His military talents are lauded by Machiavelli in his *Arte della guerra* and by Ariosto in the *Orlando*. His daughter was Vittoria Colonna. (See Colonna, Vittoria.)—Pompeo Colonna, one of the ablest generals of his time, fought under Gonsalvo de Cordova against the French. In 1513 he defeated the Venetian General Alviano in the neighborhood of Vicenza. He took Milan from the French in 1521, and in the following year gained the victory of La Bicocca over Marshal Lautrec and captured Genoa. In 1523 he held Milan against the French, but was struck down by disease and died of fast living towards the end of the year.—Another Pompeo fought in the wars of the great Cordova, distinguishing himself at Cerignola (1502) and the Garigliano (1503). He entered the Church after the death of Alexander VI and in 1517 was made Cardinal. He took an especially active part in political affairs during the pontificate of Clement VII, whose enemy he was. He was made Viceroy of Naples in 1530 and died suddenly June 23, 1532.—Ascanio Colonna, the son of Fabrizio, shared the family hatred for Clement VII. With the support of the Spaniards he stormed Rome, Sept. 20, 1526, and sacked St. Peter's and the Vatican. Entering the service of Charles V he was made Grand Constable of Naples, but towards the end of his life fell into disgrace. He died in prison in 1557.—Marc Antonio Colonna was exiled from Rome by Pius IV and entered the military service of Spain, whose forces he successfully commanded against the Papal States in 1556. He was thereupon recalled and commanded the papal galleys in the battle of Lepanto, Oct. 7, 1571. He was made Viceroy of Sicily and died in 1584.—Fabio Colonna, born at Naples in 1567, was a botanist of some eminence. He was the author of *Storia naturale del Messico*, a work based on that of Hernandez. He died in 1651. Consult: Cirocco, *Vite de alcuni cardinali de casa Colonna* (Foligno, 1635); Agostino, *Storia de casa Colonna* (ib., 1608); Gregorovius, *The History of the City of Rome in the Middle Ages* (London, 1895–1900); Mattioli, *Studio critico sopra Egidio Romano Colonna* (Roma, 1896).

COLONNA, Alexandre, F. J. See Walewski.

COLONNA, Cape. See Cape Colonna.

COLONNA, Giovanni Paolo (1637–95). An eminent Italian composer. He was a pupil, in Rome, of Carissimi, Benevoli, and Abbatini, became chapelmaster of San Petronio in Bologna, and was repeatedly president of the Accademia Filarmonica there. One of the most distinguished Church composers of the seventeenth century, he is remembered as the head of the Bolognese school, which produced many famous musicians. His best works for the Church, including masses, psalms, litanies, motets, etc., for from 3 to 8 voices, were published in 12 collections (1681–94). He also produced 11 oratorios and 3 operas. Many other works are preserved in manuscript.

COLONNA, Vittoria (1492–1547). An Italian poet. She was the daughter of Fabrizio Colonna, the Grand Constable of Naples, and was born in Castello di Marino near Rome. Her youth was passed among the greatest literary spirits of Italy, and from them she gathered a love of learning and in that atmosphere composed her first poems. At 17 she married Francesco Ferrante d'Avalos, Marquis of Pescara, to whom she had been betrothed since childhood. This marriage had no issue, to the bitter disappointment of them both, and for Vittoria Colonna the sorrow was deepened by the gradual estrangement of her husband. Living apart from him at Naples and Ischia, she wrote her earlier poems in an exquisite vein of tender melancholy

at his absence, clinging later, as Ferrante rose to fame in the service of Charles V, to his glory as her principal consolation. After his death in 1525 with the laurels of Pavia on his brow, her sonnets assume a high flight of religious exaltation, expressed as were the earlier ones in Petrarchistic form. Of her many distinguished friendships that with Michelangelo is the most celebrated. Their "Platonic" relationship was at its height about this time, and left the sonnets of Michelangelo as its enduring monument. Vittoria Colonna at Naples was in close touch with the group of reformers about Valdés, and she undoubtedly shared the religious views of Reginald Pole, Contarini, and Bernardino Ochino. Her personality, one of the most beautiful of her age, is developed in the biography of Reumont (Turin, 1893), and in her *Carteggio*, ed. by Ferrero-Müller-Tordi (Turin, 1889 and 1892). Of her poems, translated by Roscoe (London, 1868) and Lawley (London, 1889), the best editions are by Mazzone (Marsala, 1897, and Giarre, 1900), and by Tordi (Pistoia, 1900). Consult also Jerrold, *Vittoria Colonna* (New York, 1906).

COLONNADE'. A row of columns supporting an entablature. When a row of columns supports arches, it is properly termed "a columnar arcade." A colonnade may be either internal or external to a building, or may, like the great curved quadruple colonnades of the plaza in front of St. Peter's at Rome, be a quite independent structure. The Greeks were the first to develop the artistic use of colonnades as exterior features; they surrounded the courts of palæstræ and market squares with them and built columnar porticoes called *stoæ* to connect important buildings or afford sheltered places for meeting and conversation. The Romans erected colonnades of colossal dimensions and great splendor, not only in Italy, but at Palmyra, Baalbec, Gerasa in north Africa, and elsewhere. A colonnade surrounding a temple is called a *peristyle;* the temple is called in that case *peripteral*, or *dipteral* if the peristyle be double. The names "tetrastyle," "hexastyle," "octastyle," "enneastyle," "decastyle," and "dodecastyle" specify colonnades of 4, 6, 8, 9, 10, and 12 columns respectively. The spacing of columns is treated of under ORDERS OF ARCHITECTURE (q.v.). See COLUMN.

COLON'NA PALACE. The palace of the Colonna family at Rome. It contains an important gallery of pictures and has a beautiful garden.

COLONNE, kô'lŏn', JULES JUDE, called EDOUARD (1838–1910). A French orchestra leader and violinist, born at Bordeaux. He was a pupil, while at the Conservatory in Paris, of Sauzay, Elwart, and Ambroise Thomas. After taking the prize in harmony and the first *prix de violon* at the Conservatory, M. Colonne became first violin at the opera house, but gave that up in order to establish a series of Sunday concerts at the Odéon, known later as the Association Artistique. He gave Paris its first hearing of works by Tschaikowsky, Grieg, Wagner, and Raff, and did much for the cause of Berlioz. He was in great demand as a "guest conductor." In 1904 he visited the United States.

COLONNE DE LA GRANDE ARMÉE, de là grän dàr'mā'. A Doric column near Boulogne, France, commemorating Napoleon's project of invading England and founding a republic there. It is 172 feet in height and surmounted by a bronze statue of Napoleon. It was begun in 1804, but was not finished until 1841.

COL'ONNETTE' (Fr., dim. of *colonne*, column). In architecture, a small column used more for decorative than constructive purposes. It is seldom found in ancient monuments, but is a characteristic feature of the Middle Ages. The façades and apses of Tuscan churches (Pisa, Lucca), and the interior galleries of French Gothic cathedrals, show how rich an effect can be obtained by long lines of such colonettes, connected by arches and either free standing or placed against a wall. Colonnettes also occur in early Renaissance architecture, especially in minor works (pulpits, tombs, etc.) and in the Francis I style in France.

COL'ONSAY. One of the inner Hebrides, or Western Isles of Scotland, off the southwest mainland of Argyllshire, in the Firth of Lorne, between the isles of Islay and Mull, with the small isle of Oronsay, of the southern end, separated by a narrow sound, dry at low water (Map: Scotland, B 3). Colonsay and Oronsay are together 12 miles long from northeast to southwest, and 1 to 3 miles broad. The surface is irregular and composed of mica slate. Half the surface is cultivated. Next to Iona, Colonsay contains the most extensive remains of religious edifices in the Western Isles. On Oronsay stands a large stone cross and the ruins of a monastery founded in the fourteenth century. Potatoes and barley are the chief products, cattle also being raised. Pop., 1901, 301; 1911, 267.

COL'ONY (Lat. *colonia*, from *colonus*, a husbandman, colonist, from *colere*, to till). In its proper sense "colony" denotes a body of immigrants living in a foreign land under the laws and protection of the mother country; but the term has been used loosely to describe all classes of distant territories dependent in any form on a ruling power, from mere military posts like Gibraltar or Port Arthur to practically autonomous states like Canada or Australia. The Greeks were preëminently a colonizing people. They established communities in Asia Minor, in Thrace and the Crimea, on the coast of Africa, in Italy and Sicily, and in Gaul. Marseilles was a Greek town, founded by the inhabitants of Phocæa about six centuries before the Christian era. The first great colonization movement of the Greeks followed as a consequence of the so-called Dorian migration, when the conquered peoples were driven from their lands and compelled to find new homes. The second movement, which took place in the period between the eighth and the sixth centuries B.C., was due to political disturbances at home, the necessity of drawing off the surplus of population, and military and commercial interests. When it had been determined to send out a colony, the oracle was consulted, and a leader, called *oikist*, *οἰκιστής*, was duly appointed; fire was taken from the sacred fire that burned in the Prytaneum, and the new society, though politically independent, patterned itself after the mother city. The relation between the two communities was one of mutual affection only; but, if the new colony undertook itself to found a colony, it went, through custom, for its *oikist* to the mother city. Differing from the colony as thus described was the *cleruchy* (*κληρουχία*, allotment or apportion-

ment, from κλῆρος, lot, and ἔχειν, have), the members of which remained in close connection with the mother city and did not form an independent community. The Athenian cleruchies, the only ones of which we have any detailed knowledge, possessed a certain measure of autonomy, but only in internal affairs.

It was one of the triumphs of the organizing genius of the Romans to develop the colony to a more perfect form. It was a principle of Roman policy that not only every conquered territory, but every district where Roman citizens settled, should be an integral part of the Empire. The *colonia* was one of the municipal institutions of the Empire, having its own governing corporation dependent on Rome. There were various grades of colonies—some where there was the high privilege of Roman citizenship, and others where the citizenship was of a humbler grade. Corresponding with the consuls in Rome, there were municipal officers in the colonies (*duumviri, quatuorviri*), in whom were preserved, after the Empire was formed, the old republican institutions. The Romans appointed men of very high rank to the government of their provinces or colonies—men who had held such offices as the consulship or prætorship at home. It was a feature of the Roman system to limit their period of government, lest they should become independent of the Empire and establish separate states.

After the fall of Rome centuries passed before colonization recommenced; for the various tribes who broke into the Empire were not connected with any parent state, and the Normans who spread themselves over Europe at a later period were utterly unconnected, in the countries where they settled, with the government of the northern states whence they migrated. When Venice and Genoa were at the height of their power, they sought to advance their commercial interests by the establishment of colonies in the islands of the Mediterranean and on the shores of the Hellespont and the Black Sea. At the close of the Middle Ages the Portuguese and Spaniards became the great colonizing nations of Europe. Portugal was first in the field, establishing settlements along the western coast of Africa in the fifteenth century. After the rounding of the Cape of Good Hope by Bartholomeu Dias in 1488, which was followed 10 years later by the voyage of Vasco da Gama, she extended her settlements along the eastern coast and into India, finally penetrating to the islands of the Pacific. The Emperor Charles V, who ruled Spain when at the height of her power, aimed not only at the restoration of the Roman Empire in Europe, but at the creation of a new empire in America. Neither Spain nor Portugal followed the policy of developing the agricultural resources of the regions which they occupied, but merely used the colonies as a basis of profitable trade with the home country and as an asylum for high-salaried officials. Portugal established mere trading factories. The Spanish colonies were chiefly concerned with mining. They were governed by an official hierarchy, under the general direction of an executive department in Spain. The other governments of Europe—Great Britain, France, Holland, and the minor states—subsequently colonized in America, the East Indies, and Africa.

The earlier British colonies arose in the reverse order to those of Spain—the colonists went first, the dignitaries followed. This was especially true of the New England Colonies. Before 1630 the British race had gained a firm foothold in America. The settlers were organized as privileged companies with royal letters patent, which in practice made them virtually independent of the government at home; and as they were, for the most part, dissenters seeking a place of refuge from what they considered the grievances of the Established church and the government, they took care not to convey the grievance with them. The Northern colonists, indeed, acted as if they were a sort of private corporation. The policy of Great Britain towards her American Colonies was the result of the accepted economic philosophy of the times (see POLITICAL ECONOMY), according to which it was thought that the trade with colonies must be strictly confined to the home country. The idea was that the colonies should supply raw materials to the mother country, and in return should purchase from the latter its manufactured products. Shipping was to be in the hands of the home country. This policy was no more characteristic of England than of other European states, and the reason why it encountered such vigorous opposition in the Anglo-American Colonies was that the latter were settled by men who deliberately planned to establish homes in the New World, whereas those who made up the colonies of Spain, Portugal, or France were seeking wealth and prestige with which to re-establish their position in Europe. But no matter from what country these earlier colonists came, they did accomplish one fundamental thing: they made possible the accumulation of a sufficient supply of capital to encourage and to stimulate the invention of new machinery which, beginning in the eighteenth century, completely revolutionized society in the nineteenth. See INDUSTRIAL REVOLUTION.

During the eighteenth century Great Britain rose to a foremost position among colonial powers, and in the nineteenth century she firmly established her primacy. Rich compensation for the loss of the Thirteen Colonies—a loss which for a time seemed to threaten the dissolution of her empire—was found in the vast realm built up in India and in the flourishing colonies of Canada and Australia. In Africa, which became the principal scene of colonial activity for the European Powers in the last quarter of the nineteenth century, Great Britain holds possession of Cape Colony and the former Boer republics, and of immense tracts of territory in Central and eastern Africa. Coupled with her predominance in Egypt, this would seem to assure to England a splendid colonial development in the Dark Continent. Spain's colonial empire attained its fullest development in the seventeenth century, declined in the eighteenth, and disappeared in the nineteenth. The Treaty of Paris, in 1763, deprived France of her possessions in America and put a quietus on French colonization, Algeria excepted, for more than 100 years, until the statesmen of the Third Republic initiated a new policy of expansion in Africa and the Far East. The Dutch establishments in the East were founded in great part upon the ruins of the colonial power of Portugal. At the time of the French Revolutionary wars Holland was shorn of some of her possessions (Ceylon, Cape Colony), which went to increase the colonial domain of Britain. The annals of Dutch dominion in the East Indies have until recent times been the history of a

nation seeking to enrich itself at the expense of downtrodden peoples. With the loss of Brazil in 1822, the importance of Portugal as a world power departed. By its victory over Spain in 1898 the United States took its place among the colonial powers of the world; and through the solution of the problems presented by the necessity of reconciling the element of autocracy inherent in the administration of foreign possessions with the republican theory of American institutions, the term "colony," already loose in meaning, has attained a still broader application. See the articles on the various countries for detailed accounts of their colonies.

The problems of modern colonization are manifold. Among them are the meaning and significance of imperialism; the subjugation of alien races; the fight to capture world markets; the possibility of the tropics as a permanent home for settlers from the more temperate zones, and a dozen others. The literature upon colonization is enormous and is ever widening in scope and scientific value, from Adam Smith's *Wealth of Nations* (1776) down to the publisher's latest announcement. Consult: Brougham, *An Inquiry into the Colonial Policy of the European Powers* (Edinburgh, 1803); Wakefield, *A View of the Art of Colonization* (1849); Heeren, *A Manual of the History of the Political System of Europe* (London, 1857); Cairnes, *Colonization and Colonial Government* (ib., 1873); Roscher, *Kolonien, Kolonialpolitik und Auswanderung* (Leipzig, 1885); Norman, *The Peoples and Politics of the Far East* (London, 1895); Worsfold, *South Africa: A Study in Colonial Administration and Development* (ib., 1895); Dubois, *Systèmes coloniaux et peuples colonisateurs* (Paris, 1895); Englehardt, *Les protectorats anciens et modernes* (ib., 1896); Kidd, *The Control of the Tropics* (London, 1898); Reinsch, *World Politics* (New York, 1900), and *Colonial Government* (ib., 1902); Giddings, *Democracy and Empire* (ib., 1900); Dilke, *The British Empire* (London, 1899); Egerton, *A Short History of British Colonial Policy* (ib., 1897); Reinsch, *Colonial Administration* (New York, 1905); Zimmerman, *Colonialpolitik* (Leipzig, 1905); Schaefer, *Kolonialgeschicte* (ib., 1910); Adam, *L'Impérialisme et la morale des peuples* (Paris, 1908); Alston, *The White Man's Work in Asia and Africa* (London, 1907); Leroy-Beaulieu, *De la colonisation chez les peuples modernes* (Paris, 1908); Flammarion, *Domination et colonisation* (ib., 1910).

COL'OPHON (Lat., from Gk. Κολοφών, *Kolophōn*). An ancient Greek city of Ionia in Asia Minor. It was situated on the river Hales, about 15 miles north of Ephesus, was the native city of Mimnermus and claimed to be the birthplace of Homer. The expression, "to put the Colophon," meaning "to give the finishing stroke," is explaned by Strabo as arising from the belief that the cavalry of Colophon was so excellent that it always decided the contest. Hence comes the term *Colophon*, used of a device at the end of a book, or a note, especially one giving the name of the printer, date of publication, etc. The name of the town may, however, come rather from Gk. κολοφών, *kolophon*, 'summit'; in the expression "to put the Colophon," the word κολοφών may easily have passed from the sense of "summit" to that of "end." Several other Greek words meaning "peak," or "tip," are used in phrases of similar meaning. Cf. the history of the word *acme*.

COL'OQUIN'TIDA. See Colocynth.

COL'OR (Lat., connected with Lat. *celare*, Gk. καλύπτειν, *kalyptein*, Ger. *hehlen*, to hide, Ir. *celim*, I conceal, Skt. *śarana*, refuge). The color of an object in nature depends upon several conditions: the character of the light which illuminates it, the phenomena which take place in the body itself, the individual peculiarities of the eye which views the body. It has been shown by Sir Isaac Newton that ordinary white light may be regarded as a mixture of many colors; i.e., it may be analyzed into parts, each part producing a different color sensation. In scientific language, the sensation white, as perceived by looking at any ordinary "white" object, is due to the incidence upon the eye of trains of ether waves of different wave numbers, varying continuously between certain limits; while, if a train of waves of a definite wave number enters the eye, the sensation of color (if any) will be of a definite hue. Thus we speak of yellow light, of red light, etc., meaning those ether waves which produce these sensations of yellow or red in a normal eye. When the ether waves fall upon an object, some of the energy goes into reflected waves *at the surface*, the rest goes into the entering waves; there will in general be absorption in the interior; but if the body is transparent there will be transmitted waves, and also, in general, waves reflected and scattered by little particles in the interior of the body. The color of a green leaf is due to the fact that when viewed in ordinary daylight, out of all the waves which *enter* the leaf, only those which combine to produce the sensation green are transmitted, the others being absorbed by the coloring matter of the leaf; thus, those waves which are scattered by the minute interior parts traverse a layer of this coloring matter, and only green light emerges from all sides. The light which in this case is reflected at the surface is simply diffuse white light. An object whose color is due, as here, to what is called "body absorption," appears of the same color when viewed by reflected light or by transmitted; i.e., if we look *through* it at the source of light, or look at it from the same side as is the source. The colors of almost all natural objects are due to this body absorption.

The colors of metals, however, and some aniline dyes, are due to what is called "surface absorption." When white light is incident upon a piece of gold, yellow light is reflected *by the surface*, thus giving the yellow color. If, however, the gold is hammered out exceedingly thin, it will be found to transmit greenish-blue light, so that in the case of surface color the colors by reflection and transmission are different.

The energy of the waves which are absorbed in bodies generally goes to producing heat effects; but in some cases it is spent in producing other ether waves, thus giving rise to other colors. These bodies are called "fluorescent." (See Fluorescence.) In these cases, then, the color as seen by transmission and by looking at the bodies sidewise will be different.

The color of the blue sky, of fine smoke, and of water in many lakes is due to the scattering of light by extremely small particles—generally minute solid particles; for the short waves—i.e., blue light—are reflected by minute particles, while the other waves simply pass

around them. In all these cases it is evident that if the incident light is altered, so will be the color perceived. A green leaf in a yellow light would appear black. For an excellent treatise on color, consult Rood, *Modern Chromatics* (New York, 1879); also, Bradley, *Elementary Color* (Springfield, Mass., 1895); Jorgensen, *The Mastery of Color*, 2 vols., with 22 colored plates, showing about 1000 colors (Milwaukee, Wis., 1906); and Ridgway, *Color Standards and Color Nomenclature*, with 53 colored plates and 1115 named colors (Washington, D. C., 1912). See LIGHT; VISUAL SENSATION.

COLOR. In art, either the pigment employed to produce a certain effect to the eye, or the effect thus produced, i.e., the tint of a picture. In the former sense it is treated of in this work under PIGMENTS and the names of the principal colors. In the latter sense it may be defined as the general effect of all hues entering into the composition of the picture. It is the most important technical requisite of painting, and quite essential to a production of the first rank. The sensation of color is produced by waves of light setting into vibration fibres of the optic nerve, and the length of these light waves is the cause of the different hues. For example, when the light wave is $\frac{1}{39000}$ of an inch long, red is the color produced, and as the waves decrease in force, we see yellow, green, blue, and so on through the spectrum. According to the theory of Chevreul, now generally accepted, white light is the union of all colors, and its decomposition by an object reveals the color separated from the rest. Thus, a rose absorbs all colors but red, which it reflects; while a white substance, rejecting all colors, is therefore colorless. Correctly speaking, there are but six colors—three primary (red, blue, and yellow), and three secondary (orange, violet, and green). Orange is composed of purple and yellow, violet of red and blue, green of yellow and blue. All other colors are compounds of these.

Complementary Colors are those which, combined with another color or colors, make up the three primary colors constituting white light. If the given color be primitive, its complement is composed of the other two primitive colors. For example, the complementary color of blue is orange, i.e., red and yellow. If the given color be a secondary, its complementary is the remaining primitive color—as, e.g., the complementary color of green (blue and yellow) is red. In painting brilliancy of coloring may be obtained by placing complementary colors side by side, because each lends to the other a favorable halo, while the juxtaposition of noncomplementary colors has the opposite effect of dullness. This method of heightening and softening colors was used with great effect by Delacroix and is to-day much practiced by French and Spanish painters.

It is also usual in the studios to divide colors into warm tones and cool, according as they approach or depart from the colors of sunlight. Reds, oranges, and yellows are regarded as warm; blues, greens, and violets as cool. In painting it has long been customary to relieve warm colors by placing them near cool. This is especially marked in Correggio's pictures, which have a central point of warm color with the surroundings cool. The Florentines reversed this process, while the Venetians intermixed warm and cool tones, and Rubens placed them side by side.

Contrast of Color is either simple or compound. Each of the primary colors forms a contrast to the other two. Thus, blue forms a simple contrast to red and yellow. But if red and yellow were mixed together, the complementary color to blue would be produced, viz., orange, which is the most powerful contrast to blue. Contrast was the earliest and simplest way of obtaining color effects. It was almost universal among the Italians of the Renaissance, as witness the reds and blues in the garments of the Madonna and the saints. In modern times it has been much used, but not with the same success, by the Pre-Raphaelites in England and the followers of Ingrès in France.

Harmony of Color is usually attained by giving to the painting a prevailing color or tone, to which all the others are subordinated. It is based rather upon accord than upon contrast. For in nature there are few sudden contrasts of color, but rather gradual transitions and delicate gradations. Harmony endeavors to preserve the same tones in a painting as exist in nature. It discriminates between the same color seen in sunlight and in shadow, near or at a distance; or, in other words, between the values of colors. No matter how different the colors of the pictures, they must all accord with the dominant color tone.

The mastery of color is the most difficult achievement of painting, and it has been truly said that the colorist, like the poet, is born and not made. Concerning the Greeks, it is impossible to make statements with surety, since all their great paintings have perished. The Oriental peoples have always excelled in color, especially in their textile fabrics and ceramics. In painting, also, the Chinese and Japanese have attained remarkable and subtle harmonies. All the great schools of painting have attained excellence in color. Among the Italians the painters of Venice excelled, and in the works of Giorgione, Titian, and others attained an unsurpassed excellence. Of the great schools of the seventeenth century, which likewise excelled in color, the Flemish (Rubens) excelled in bright but harmonious effects, the Dutch (Rembrandt) in more subdued color schemes, with subtle treatment of light and shade (q.v.), and the Spanish (Velasquez), in values (q.v.) of colors. The chief excellence of the old English masters consisted in their color, and the French painters of the rococo (Watteau, Fragonard) were excellent colorists. The beginning of the modern development of painting consisted in the romantic reaction against classic line in favor of color. (See PAINTING, *History*.) The Impressionists have discovered many new tints and raised the entire scale of color. Among the many colorists of note belonging to the American school are Whistler, Abbey, and Childe Hassam.

Bibliography. The technical qualities of painting are briefly treated in a number of manuals on the appreciation of art, enumerated under the bibliography of ART, among which see especially Van Dyck, *Art for Art's Sake* (New York, 1901). Other good manuals are Blanc, *Grammaire des arts du dessin* (Paris, 1870); Bracquemond, *Du dessin et de la couleur* (ib., 1885); Grant Allen, *The Color Sense* (London, 1892); Rood, *Color* (ib., 1904); Kiesling, *Wesen und Technik der Malerei* (Leipzig, 1908 et seq.); Berger, *Beiträge zur Entwickelungs-Geschichte*

der Maltechnik (Munich, 1909), very exhaustive; Bouvier, *Handbuch der Olmalerei* (Leipzig, 1910); Sandford, *Manual of Color* (New York, 1910); Vanderpoel, *Color Problems* (London, 1903); Solomon, *The Practice of Oil Painting* (ib., 1911); Moreau-Vanthier, *The Technique of Painting* (New York, 1912); Grunewald, *Das Kolorit in der venezianischen Malerei* (Berlin, 1912).

COLOR. In law, in a figurative sense, a semblance or appearance of something, implying that the thing to which the term is applied has not the quality or character claimed; as, *color of title* means an apparent but not valid title.

Formerly in common-law pleading in England, when the defendant, pleading by way of confession and avoidance, confessed that the plaintiff had a prima facie or apparent right, the "confession" was said to give "color," and the defendant then pleaded matter by way of avoidance, i.e., to show that the facts pleaded by the plaintiff did not in law give ground for recovery against the defendant. See CONFESSION AND AVOIDANCE.

Color of Office is the semblance or pretense of authority, by virtue of an official position, assumed or claimed by an officer when he does some act outside of his actual jurisdiction. The term includes acts done under an honest but mistaken belief of power, as well as where one knowingly exceeds his authority. All such acts are void, and an officer who is thus guilty of an abuse of power is liable for any damages which may result from it or may be removed from office by impeachment or other appropriate proceeding. See CONVERSION; DE FACTO; FALSE IMPRISONMENT.

Color of Title is that which on its face appears to be proof of ownership, but which, by reason of some defect not easily discoverable, does not in law constitute a valid title. The term is generally used to describe a deed or will purporting to vest in the claimant the title to an estate in land. A conveyance by one so claiming title gives the vendee only such rights as the vendor has, i.e., the possession of the property under whatever title the vendor had, and a right to "tack," or add, the period of possession to make up the time necessary to gain absolute title by adverse possession. In the United States one claiming title under an invalid instrument purporting to convey a definite parcel of land may in some cases make good his claim by adverse possession to the entire parcel described, even though his actual physical possession (called *pedis possessio*) covers only a part or parcel thereof. See ADVERSE POSSESSION; TITLE (to property).

COLOR, IN PLANTS. The great majority of plants show distinct coloration, especially in aërial or aquatic organs. The absence of color is an index of parasitic or saprophytic life, but it must be borne in mind that many parasites and saprophytes are highly colored. The most common coloring matter in plants is chlorophyll, which manifests itself in various shades of green. Light of some strength has been shown to be necessary for the development of chlorophyll, though recent experiments show that it may develop in various seedlings germinated in perfect darkness, and that the synthesis of carbohydrates may take place vigorously under a dense layer of cork. The presence of plastids and favorable conditions of nutrition are necessary for the proper development of chlorophyll. Yellow coloration in plants is also commonly associated with plastids, and is due to the relative abundance of xanthophyll or carotin present as compared with the true chlorophyll. The phenomenon of yellowness is most common in dying leaves and is especially well shown in autumn. However, in many young leaves, especially where the nutrition conditions are unfavorable, yellow leaves also appear. Unfavorable nutrition is probably the cause of yellowness in most cases. In dying leaves the part near the veins usually remains green longest. In young leaves the green parts are longer and much better developed internally than are the yellow or white parts.

Red or blue coloration in plants is not directly associated with plastids, but is due to pigments that are scattered through the cell sap. The coloring substances are called anthocyans—erythrophyll if red, cyanophyll if blue. Blue colors occur most commonly in flowers, while the reds occur abundantly in leaves as well as in flowers. The red coloration of leaves has been much discussed in literature and deserves further mention. While in some plants, as coleus, red colors are more or less permanent, in most cases redness is periodic. Perhaps the three most common examples of color display are: (1) in the young actively growing leaves of seedlings or perennial shoots; (2) in wintering leaves, especially of rosette plants; and (3) in dying leaves, especially in autumn leaves. All kinds of causes have been assigned to account for periodic coloration, but by far the most satisfactory is one proposed by Overton in 1899. He has shown experimentally that an excess of sugar in nutrient solutions causes an early and rich development of color, while an absence of sugar retards this development. In the summer the products of a day's photosynthesis are commonly carried off before another day begins; but in the cool autumn nights this transfer is checked, and sugars accumulated in the leaf unite with tannin substances and cause the production of the pigments. A similar explanation, plus the great flow of sap, would account for red leaves in spring. Mechanical injury, which prevents the carbohydrate transfer, also causes an excess of sugar and gives rise to red colors. Light seems to favor color development, perhaps because it favors the increased production of carbohydrates.

Much has been said as to the ecological significance of red colors. Stahl and Kny, as a result of experiments, hold that red colors increase the available supply of heat and thus prolong the leaf activities in fall and enlarge them in spring. Kerner has also held the "protective" theory of color. If red colors do have any such function—and this is by no means proved—it must probably be regarded as quite incidental. In no case can the need for protection be regarded as a cause of the development of pigment, as one might suppose from reading various treatises on the subject of color. Consult Sorby, *On Comparative Vegetable Chromatology* (London, 1873). See CHLOROPHYLL; PHOTOSYNTHESIS; LEAF.

COLORADO, kŏl'ō-rä'do (Sp., colored red), "The Centennial State." A State of the American Union, admitted in 1876, the twenty-fifth in order of admission. It lies between lat. 37° and 41° N., and approximately long. 102° and 109°

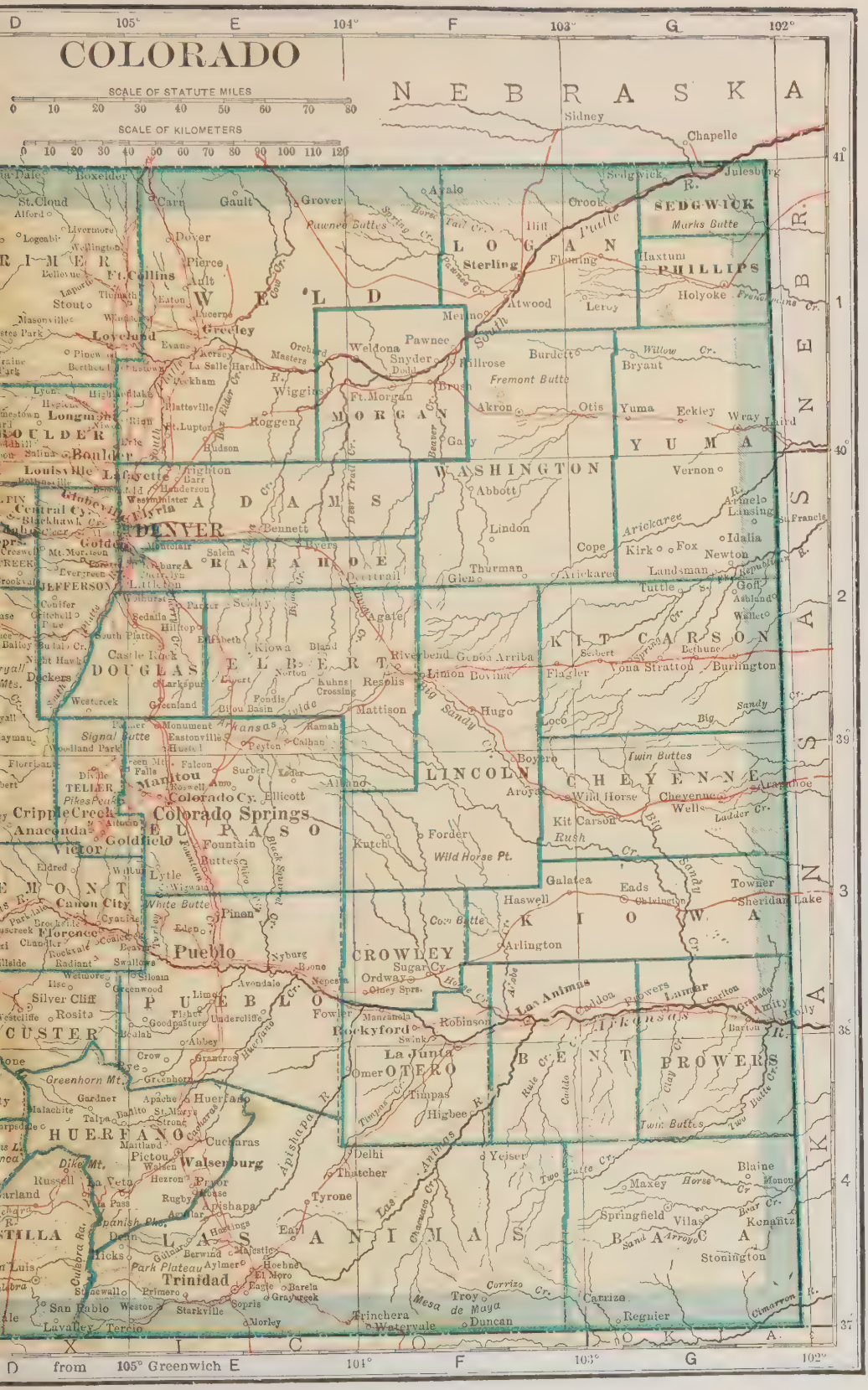
W., and is bounded on the north by Wyoming and Nebraska, on the east by Nebraska and Kansas, on the south by Oklahoma and New Mexico, on the west by Utah. Longitudinal extent, about 375 miles; latitudinal extent, about 276 miles. Land area, about 103,600 square miles; water area, about 300 square miles.

Topography. Colorado lies upon the great watershed of the continent, and is, except Wyoming, the most elevated State of the Union. Several of the most prominent ranges of the Rocky Mountain system traverse it in a northerly and southerly direction. The eastern two-fifths is a portion of the region known as the Great Plains. It varies in elevation from about 3000 feet at the eastern boundary to over 5000 feet at the western edge, where it meets the foothills. It is drained by the South Platte, Arkansas, and Republican rivers, with their tributaries. Approximately in long. 105° the plains give way to chains of foothills, quite regular and in places very abrupt in the northern part of the State, more broken to the south. Back of the foothills rise abruptly the lofty ranges of the Rockies. The easternmost mountains, entering the State from the north, are called the Medicine Bow Range, and continue south as the Front Range to Pike's Peak. The crest of the Front Range is in part a portion of the Continental Divide—the waters from the east side flowing to the Mississippi and thence to the Gulf of Mexico, and those from the west side flowing westward to the Gulf of California. Pike's Peak, at the southern end of this range, is the most famous mountain in the State, but not the highest, being twenty-third in the list of 36 named peaks which reach an altitude of over 14,000 feet. Probably a dozen or more unnamed peaks could be added to the list. Over 100 other named peaks are known to rise above 13,000 feet, and at least 200 undetermined and in many cases unnamed peaks doubtless reach that altitude.

West of Medicine Bow and Front ranges are three valleys called, respectively, North Park, Middle Park, and South Park. North Park is bounded on the west by Park Range, and is separated from Middle Park by an east-west ridge which connects Park Range with Front Range and forms part of the Continental Divide. The headwaters of the North Platte River rise on the north slope of this ridge, while the waters of the south slope flow into the Grand River, thence southwestward to the Pacific. Between Middle and South parks the Front Range meets the Saguache (or Sawatch) Range, the loftiest of them all. For miles its crest towers above the 13,000-foot level, surmounted by the well-known Holy Cross Mountain (see Plate with article Holy Cross Mountain), as well as by Princeton, Harvard, Yale, and over half a dozen others whose heights exceed 14,000 feet. To the southeast the mountains are continued in the Sangre de Cristo and Culebra ranges, which extend southward into New Mexico. West of the latter ranges lies the great San Luis valley, while west of this rise the San Juan Mountains. The remainder of the west portion of the State is an area of broken mountains, plateaus, and valleys, with a general slope to the west. Many of the mountain passes are over 11,000 feet in altitude, and some of them over 13,000 feet. The great intermountain valleys or parks above mentioned are a distinguishing feature of the scenery. There are a number of smaller mountain parks, the one best known and most frequented being Estes Park, northwest of Denver, a favorite summer resort. San Luis valley extends into New Mexico, but contains in Colorado 8000 square miles, including the most level land in the State, at an altitude of about 7500 feet. Other important valleys are the Arkansas (q.v.), Rio Grande (q.v.), White, Grand, Gunnison, and Yampa (or Bear). The North Platte and South Platte rivers unite to form the Platte of Nebraska. The source of the South Platte is about 11,000 feet above sea level, and the fall in the distance to Denver is 6000 feet. The Arkansas rises over 10,000 feet above sea level, rapidly falling to 7800 feet, passing through the Royal Gorge 3000 feet deep, and flowing southeast and east into Kansas. The Rio Grande del Norte rises on the east slopes of the San Juan Range and flows through San Luis valley into New Mexico. The largest streams on the west slope are the Green, crossing the northwest corner of the State, and its tributaries, the Yampa and White; the Grand, one of the main affluents of the Colorado, and its tributaries, the Gunnison, Dolores and San Miguel. None of these streams are navigable. No other State contains the headwaters of so large a number of rivers. In the high mountains are many hundreds of small lakes, chiefly of glacial origin. Their area in many cases has been increased by artificial additions, for the storage of water for irrigation. Large reservoirs have also been constructed for the same purpose in the lower valleys and on the plains. The lofty peaks and mountain parks are equaled in grandeur by the river cañons; those of the Arkansas, Grand, Gunnison, South Platte, Boulder, Uncompahgre, Big Thompson, and others varying in depth from 1000 to 3000 feet.

Climate and Soil. The topographic features—great differences in elevation, extensive plains, high mountain ranges, and broad valleys—result in a varied, though in general mild and salubrious, climate. The high altitude of the State premises a cool temperature. In the lower portions the days are sometimes hot, but the nights are cool and free from humidity. Mean annual temperature at Fort Collins, 46.7°, July 68.2°, December 29.7°; at Pueblo, 51.1°, July 74°, December 33.7°; at Denver, 49.4°, July 71.7°, December 32°; Long's Peak Inn, 37.7°, July 55°, December 25.1°. The mean annual precipitation varies from 7 to 40 inches, according to location. In several small areas it falls below 10 inches; in about one-third of the State it is from 10 to 15 inches; in about one-third from 15 to 20 inches; in the higher mountain ranges it is from 20 to 25 inches; and in a few of the highest mountains from 25 to 40 inches. The dry climate and pure, bracing atmosphere of Colorado are considered beneficial to asthmatic and pulmonary sufferers, and the charming parks are becoming great natural sanitariums. Thousands of persons flock to the State annually to regain their health, and other thousands for recreation and the enjoyment of the scenery, hunting, and fishing. The various mineral springs are also adjuncts to the remedial nature of the climate. The hot sulphur, iron, and soda springs of Middle Park, Steamboat Springs,

WYOMING
County Towns
Railroads
109°
108°
107°
A
B
C
41°
40°
39°
38°
37°
Longitude
Slater
Pearl
Zirkel
Hahns Peak
Columbine
Cowdrey
Walden
Whitehead Pk.
Clark
Butler
Hebron
Jackson
Spicer
Rand
Bear Mt.
Trull
Steamboat Sprs.
Hayden
Eddy
Sidney
Harrison
Dunkley
Pagoda
Oak Creek
Pinnacle
Martin
Middle Park
Dexter
Sulphur Sprs.
Troublesome
Gremmling
Thornburg
Pyramid
Pyramid Pk.
Tyonas
Egeria Park
Angora
Rangley
Whiteriver
Meeker
White River Plateau
Gray Hills
Danforth Hills
Axial
Hamilton
Lay
Craig
Maybell
Juniper
Lily
Wahiti Pk.
Yampa Plateau
Midland Ridge
Cedar Mt.
Escalante Hills
Bear
Green
Snake
Gaulka Ridge
Vermilion Bluffs
Sunny Pk.
Ladore
Dry Mt.
Zenobia Pk.
O-wi-yu-kuts Plateau
Rio Blanco
Buford
Burro Mt.
Mt. Marvine
Burns
McCoy
Sheephorn
Lone Pk.
Scholl
Ute Pk.
Mt. Powell
Wolcott
Edwards
Avon
Eagle
Gypsum
Minturn
Dillon
Frisco
Breckenridge
Eagle
Red Table Mt.
Holy Cross Mt.
Fulford
Gilman
Redcliff
Robinson
Bakomo
Boreas
Sloss
Mitchell
Piceance
Sulphur
Rioblanco
Dragon
Twin Buttes
Douglas Cr.
Cathedral Bluffs
Garfield
Atchee
Rifle
Grand Valley
Balzac
Mamm Pk.
Raven
Silt
New Castle
Grand
South Canon
Cardiff
Glenwood Sprs.
Sunlight
Carbondale
Basalt
Spring
Gulch
Emma
Meredith
Snowmass
Sellar
Watson
Ivanhoe
Thomasville
Wortman
Leadville
Malta
Fair Play
Parachute
De Beque
Plateau Cr.
Tolbrun
Vega
Molina
Mack
Loma
Book Cliff
Fruita
Rhone
Clifton
Palisades
Mesa
Grand Junction
Grand Mesa
Plateau
Conbasin
Redstone
Pitkin
Aspen
Sheep Mt.
Twin Lakes
Lake
Granite
Buffalo Sprs.
Marble
Crystal
Ashcroft
Winfield
Whitewater
Cedaredge
Bardine
Somerset
Dorchester
Crested Butte
Mt. Harvard
Buena Vista
Mt. Yale
Chaffee
Delta
Cory
Eckert
N. Fk.
Paonia
Floresta
Hotchkiss
Crawford
Baldwin
Round Mt.
Tincup
Hortense
Centerville
Gateway
West Cr.
Uncompahgre Plateau
Uncompahgre R.
Maher
Olathe
Cathedral Pk.
Gunnison
Fossil Ridge
Pitkin
Ohio
White Pine
Monarch
Parlin
Waunita
Poncha Sprs.
Monarchs Jc.
Gunnison
Montrose
Sapinero
Cebolla
Iola
Doyleville
Uranium
Paradox
Cimarron
Dubois
Spencer
Vulcan
Sargents
Alder
Cochetopa Hills
Bonanza
Villagre
Powderhorn
Cochetopa
Dayton
Blue Mesa
Colona
Coventry
San Miguel R.
San Miguel Plateau
Ouray
Ridgway
Sawpit
Placerville
Leonard
Norwood
Hasalli
Sams
Cathedral
Lake Cy.
Capitol Cy.
Benson
Sagu
San Miguel
Telluride
Vance
Gladstone
Ames
Ophir
Smuggler
Pandora
Sneffels
Cedar
Lavender
Lone Mesa
Dunton
Dolores
Rico
Ellston Mt.
Silverton
Howardsville
Eureka
Arastra
Hinsdale
Lake Fork
Continental Divide
Carnero
Carnero Cr.
Peller
Creede
N. Creede
La Garita
Wagon Wheel Gap
Center
San Juan
Hermit
Needleton
Showdon Pk.
South Fork
Del Norte
Rio Grande
Mineral
Monte Vista
Summitville
Pagosa Pk.
Jasper
Alamosa
Lonedome
Quarry
Burro Pk.
Mt. Sheridan
Rockwood
Dolores
Arlon
Montezuma
Laplata
Vallecito
La Plata
Durango
Carbon Jc.
Bayfield
Oxford
Ignacio
Hesperus
Mancos
McElmo
Moqui
Cortez
Hermans Pk.
Porter
Consent
Breen
Kline
Southern Ute Indian Reservation
Rio Mancos
Rio La Plata
Rio Las Animas
Rio Piedra
Dyke
Pagosa Sprs.
Archuleta
Piedra
Pagosa Jc.
Arboles
Juanita
Chromo
Platoro
Capulin
Conejos
Rio Conejos
Rio Alamosa
Osier
Ortiz
Rio Grande
Utah
New Mexico
Arizona
L. L. Poates Engr'g Co., N.Y.


COLORADO
SCALE OF STATUTE MILES
0 10 20 30 40 50 60 70 80
SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80 90 100 110 120
D 105° E 104° F 103° G 102°
NEBRASKA
Sidney
Chapelle
Julesburg
Sedgwick
SEDGWICK
Marks Butte
PHILLIPS
Haxtum
Holyoke
LOGAN
Sterling
Atwood
Merino
Pawnee
Weldona
Snyder
Fillrose
Burdett
Bryant
Fremont Butte
Akron
Otis
Yuma
Eckley
Wray
Laird
YUMA
WASHINGTON
Vernon
Abbott
Lindon
Cope
Kirk
Fox
Idalia
Armelo
Lansing
Newton
Landsman
Thurman
Glenn
Ariekaree
Tuttle
Goff
Ashland
Wauneta
KIT CARSON
Seibert
Bethune
Flagler
Vona
Stratton
Burlington
Limon
Boyton
Riverbend
Genoa
Arriba
Hugo
Loco
Sandy
Big
Twin Buttes
LINCOLN
CHEYENNE
Boyero
Arroyo
Wild Horse
Cheyenne Wells
Kit Carson
Rush
Bijou
Ladder Cr.
Wild Horse Pt.
Forder
Kutch
Galatea
Eads
Towner
Haswell
Chivington
Sheridan Lake
KIOWA
Cow Butte
Arlington
CROWLEY
Sugar City
Ordway
Olney Springs
Las Animas
Caldona
Rowers
Lamar
Carlton
Granada
Limon
Holly
Arkansas R.
Robinson
Manzanola
Rocky ford
Swink
La Junta
Omer
OTERO
Timpas
Higbee
Rule
Caddo
Craig Cr.
Two Butte Cr.
BENT
PROWERS
Twin Buttes
Blaine
Maxey
Horse Cr.
Springfield
Vilas
Konantz
Bear Cr.
Stonington
Delhi
Thatcher
Yeiser
Tyrone
Lees
Chacuaco Cr.
Apishapa R.
Timpas Cr.
Two Butte Cr.
Sand Arroyo
BACA
LAS ANIMAS
Trinidad
Park Plateau
Aguilar
Hoehne
El Moro
Barela
Graysreek
Primero
Starkville
Weston
Sopris
Morley
Tercio
Luvalley
San Pablo
Stockwell
Hicks
Berwind
Majestic
Aylmer
Eagle
Gulnare
Hastings
Earl
Dean
Spanish Peaks
Cuchara R.
Greenhorn Mt.
Dike Mt.
Russell
La Veta
Pass
Rugby
Acosta
Huerfano R.
Cucharas
Maitland
Pictou
Walsenburg
Hezron
Prior
Rouse
Apishapa
Gardner
Malachite
Talpa
Badito
St. Mary's
Strong
Apache
Huerfano
Greenhorn
Graneros
Crow
Abbey
Fisher
Goodpasture
Undercliffe
Beulah
Rosita
Silver Cliff
Westcliffe
Custer
Wetmore
Ilse
Greenwood
Avondale
Limeta
Fowler
Nyberg
Boone
Nepesta
Pueblo
Eden
Pinon
Florence
Cañon City
Penrose
Rockvale
Coaldale
Chandler
Park Head
Grockett
Cragtie
Beaver
Radiant
Swallows
Silcam
Lytle
Wigwam
White Butte
Eldred
Willis
Victor
Goldfield
Cripple Creek
Anaconda
Colorado Springs
EL PASO
Fountain
Buttes
Black Squirrel
Falcon
Surber
Loder
Allano
Manitou
Colorado Cy.
Ellicott
Roswell
Awo
Falls
Green Mt.
Divide
TELLER
Pikes Peak
Altona
Woodland Park
Florissant
Signal Butte
Monument
Eastonville
Peyton
Calhan
Ramah
Hustead
Palmer
Arkansas
Bijou Basin
Squirrel
Mattison
Kuhns Crossing
Resolis
Elbert
Kiowa
Bijou
Bland
Elizabeth
Castle Rock
Larkspun
Greenland
Perry Park
Westcreek
Dackers
Mts.
Sedalia
Hilltop
Parker
Scully
Aurora
Denver
Bennett
Byers
Deertrail
Barr
Brighton
Henderson
Westminster
Lafayette
Louisville
Boulder
Longmont
Lyons
Highlandlake
Hygiene
Allen
Niwot
Erie
Salina
Pinewood
Berthoud
Loveland
Evans
Greeley
Ault
Eaton
Lucerne
Windsor
Fort Collins
Laporte
Timnath
Stout
Masonville
Estes Park
Lyon
Longmont
Boulder
Louisville
Lafayette
Central City
Blackhawk
Golden
Mt. Morrison
Evergreen
Conifer
Littleton
Englewood
Sheridan
Bowles
Jefferson
Mitchell
Pine
Bailey
Kittredge
Buffalo Cr.
Deckers
Mts.
Castle Rock
Larkspun
Greenland
Westcreek
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Elbert
Kiowa
Bijou
Bland
Elizabeth
Castle Rock
Larkspun
Greenland

Wagon Wheel Gap, Manitou, Cañon City, Glenwood Springs, and Idaho Springs are famous.

The soil along the river bottoms is largely alluvial, with much light loam in the eastern part of the State. In some places siliceous and micaceous substances abound, while here and there clay formations crop out. The forests cover about 10,500,000 acres of land, restricted mainly to the mountains.

For the flora and fauna, see the paragraphs under ROCKY MOUNTAINS.

Geology. The geological structure of Colorado is extremely varied. On the eastern plains Cretaceous and Tertiary strata are exposed in nearly horizontal position and in great thickness. On the eastern flank of the mountains these formations give way to Cambrian, Ordovician, Carboniferous, Jurassic, and probably some Permian and Triassic. The lowest foothills are in most cases Cretaceous. These formations are upturned and in some places much folded. The axis of the mountain system is formed by granites and other igneous rocks, more or less metamorphosed, of Archæan age, with a great variety of later volcanic rocks. On the western edge of the system Paleozoic strata again appear, including Devonian, and are overlaid farther west by Cretaceous, Jura-Trias, and Tertiary beds. In North and Middle parks the formations are mostly Cretaceous and Tertiary, surrounded by Archæan rocks and volcanic intrusions. The Carboniferous rocks of the State, unlike those along the Appalachian Mountains, inclose no coal seams. Coal occurs, however, in great abundance in later formations—mostly Cretaceous, that in North Park, Tertiary. The great upheavals, accompanied by volcanic activity, along the Rocky Mountains have favored the formation of ore deposits, some of which are of great economic importance. Cripple Creek, Leadville, Boulder, Ouray, Aspen, Rosita, Silverton, Gilpin, Lake City, and Gunnison are important centres of gold, silver, and lead mining. Copper, zinc, manganese, and iron ores also occur in extensive deposits. During Pleistocene time the mountain valleys in all the higher ranges were occupied by glaciers for a distance averaging about 10 miles on each side of the crests. Several small glaciers are still active, the one most visited and best known to geologists being the Arapahoe, west of Boulder.

Mining. Colorado is best known as a mining State. Although it does not lead in any important mineral product, it closely approaches California in the production of gold, and in former years its yield was larger. In 1912 it ranked eleventh among the mineral-producing States in the total value of its output. The total value of mineral products in that year was $58,167,399. The chief mineral is gold, which in 1912 was valued at $18,588,562 and in 1913 at $18,395,000. Gold production has fallen off somewhat because of the exhaustion of certain rich deposits. In 1906 the production exceeded $30,000,000, and in 1908–09 the State stood first in the production of gold. California regained first place in 1910. The most important gold-producing district is Cripple Creek in Telluride County. In this district in 1912 gold was produced to the value of $11,008,362, or over 60 per cent of the production from all the deep gold mines of the State. There was an increased production of about $175,000 in 1913. Other important gold-producing counties are San Miguel, Ouray, San Juan, Gilpin, and Clear Creek. Of the gold mined 95 per cent is from siliceous ores. Many famous camps which have been large producers have become practically exhausted. These include Silverton and Ouray. At the latter place is the Camp Bird Mine, which was for a long time one of the richest and most steadily producing mines in the United States.

Coal is the mineral product of second importance. There were produced, in 1912, 10,977,824 short tons, valued at $16,345,336, compared with 10,157,373 short tons, valued at $14,747,764, in 1911. The production in 1913 was a decrease of about 1,500,000 tons over 1912. The coal fields of the State are divided by the major ranges of the Rocky Mountains into three general groups, designated as the Eastern, the Park, and the Western. The Eastern group, the most highly developed of the three, comprises the Denver region and the Cañon City and Trinidad fields. The Park group includes the little-known and almost undeveloped fields of the South, Middle, and North Park. The Western group is the largest in area and it contains the greatest amount of coal. All the fields of this group, with the exception of the Yampa field in the extreme north and the Durango field in the south, belong to the great Uinta basin, which extends from Gunnison Co., Colo., on the east, to Carbon and Emery counties, in the central part of Utah, on the west. The coal ranges from subbituminous in the Denver regions, through various grades of bituminous, including the high-grade coking coal of the Trinidad and Glenwood Springs fields, to true anthracite, in the Crested Butte and Yampa fields. Some of the coal beds are of enormous thickness. The total area underlain by coal was estimated at 17,130 square miles, and about 60 per cent of that entire region is believed to contain coal workable under present conditions. There is an extent of territory which embraces over 4000 square miles about which little is known, but which may contain workable coal, and nearly 3000 square miles of territory in which the coal lies under heavy cover and is not workable on that account at the present time. Colorado is the most important coal-producing State west of the Mississippi River and ranks seventh among all the States in production. In 1912 there were about 13,000 men employed in the coal mines.

Zinc is also mined extensively, and its production has increased considerably. In 1912 the recoverable zinc content of the ores mined in Colorado amounted to 66,111 tons, valued at $9,123,374. The product for 1913 decreased in value by $1,732,000 over 1912. Zinc mining ranks third in importance among the mining industries.

Colorado leads all the Western States in the manufacture of pig iron. The ore from which the iron is made, however, is obtained chiefly from New Mexico and Wyoming, and the value of the product is not included in the total mineral production of the State.

Silver ranks fourth in the value of the output, amounting in 1913 to $9,159,367, compared with $5,050,423 in 1912 and $3,884,989 in 1911. Silver production is largely from dry and siliceous gold and silver ores and from silver-lead ores, the principal producing coun-

ties being Lake, in which is the famous Leadville district, San Miguel, Mineral, Ouray, Pitkin, Clear Creek, San Juan, and Gilpin. The same counties furnish the larger part of the lead production, which in 1913 was over 40,000 tons, an increase in value of $377,000 over 1912. In 1912, 37,621 short tons were produced, valued at $3,385,902, compared with 34,884 short tons, of $3,135,568 value, in 1911. This quantity is that of recoverable lead content of the ore mined, not the quantity and value of the lead smelted. Other mineral industries which yield products exceeding $1,000,000 in value are stone quarrying and clay and copper mining. The value of the stone production, most of which was marble, was $1,420,607 in 1912. The clay products, exclusive of the raw clay sold, were valued at $1,437,394. Copper is produced in considerable quantities. The main output of the mineral is derived from the treatment of mixed ores, of which copper is of minor importance. These include lead-silver ores and pyritic ores rich in gold and silver. The quantity of copper thus derived in 1913 was 7,634,000 pounds. In 1912 it was 7,007,303 pounds, valued at $1,172,705, compared with 8,024,488 pounds, valued at $1,003,061, in 1911.

As a result of the interest taken in the manufacture of radium, popular attention has been directed to the production of uranium-bearing ores, from which the radium is obtained. There are two distinct varieties of these ores in Colorado—the carnotite impregnations in sandstone of the southwestern part of the State, in the Paradox valley, and elsewhere, and the pitchblende of Gilpin County. From these mines are obtained practically all the radium-bearing minerals in the United States. The State ranks first in the production of tungsten ores. These in 1912 were valued at $297,533. Other minerals produced are cement, feldspar, fuller's earth, gem materials, gypsum, iron ore, lime, natural gas, petroleum, sand and gravel, and sulphuric acid. The production of petroleum in 1912 was 206,052 barrels.

The figures of the thirteenth census, which are for the calendar year 1909, show that in that year there were in Colorado 672 mine operators with 1575 mines and quarries. The capital invested in the mining industry was $144,639,558. There were 26,743 persons engaged in these industries, of whom 24,769 were wage earners. The value of the products of the mines in that year was $45,680,135. The results of the census show that Colorado and Indiana, of the important mining States, show a decrease in mining activity. This decline in Colorado is shown not only in the value of products, but also in the amount expended for salaries and wages, which decreased 7.2 per cent since 1904.

Agriculture. The agricultural development of Colorado has had a comparatively recent beginning. Although a larger part of its area is of a character which makes the growing of crops impossible, large portions are admirably adapted for cultivation. The eastern two-fifths, which lies within the Great Plains section of the United States, is largely utilized for grazing purposes, but dry farming has been successful and irrigated portions yield large crops. Within the central mountain mass there are numerous parks and smaller valleys, the floors of which are formed from alluvial or lacustrine deposits. Wherever water is available and the altitude is not too great, these are irrigated for the production of vegetables, grain, grass, and fruit. There is little agricultural activity in the high mountainous regions except in the San Luis valley in the south-central part of the State. To the west of the divide the streams supply large volumes of water for irrigation in the valleys. The rainfall is at times considerable. To the east of the divide on the plains the rainfall is heavier, and here some crops are grown without irrigation. Wherever water is available irrigation has been introduced. The largest irrigated areas in the State are in the valleys of the South Platte and Arkansas rivers, extending from the mountains to the eastern boundary of the State.

The growth of agriculture is indicated by the following figures. The number of all farms in 1910 was 46,170, compared with 24,700 in 1900, or an increase of 86.9 per cent in the decade. Out of an approximate land area of 66,341,120 acres, the land in farms in 1910 amounted to 13,532,113 acres, compared with 9,474,588 acres in 1900, or an increase of 42.8 per cent. The improved land in farms in 1910 was 4,302,101 acres, while in 1900 it was 2,273,968 acres, or an increase of 89.2 per cent in the decade. The average number of acres per farm decreased from 383.6 in 1900 to 293.1 in 1910. The value of farm property from 1900 to 1910 shows a remarkable increase. In the latter year it was $491,471,806, while in 1900 it was $161,045,141—an increase of 205.2 per cent. The average value of all property per farm in 1910 was $10,645, and in 1900 $6520. The average value of land per acre increased from $9.54 in 1900 to $26.81 in 1910. If an earlier period is taken, the increase in the development of agriculture is even more striking. During the period from 1870 to 1910 the number of farms increased on an average over 1100 a year, and there were 26½ times as many farms in 1910 as in 1870.

In 1910 the total number of all farms was 46,170, of which 37,780 were operated by owners and managers, and 8390 by tenants. The farms operated by owners and managers in 1900 numbered 19,119, and those operated by tenants, 5581. It is significant that while there was an increase of 21,470 in the total number of farms during the decade, the number of farms operated by owners and managers increased by 18,661, while those operated by tenants increased only 2809. The great majority of the farms have been acquired by their owners or operators from the government or from private corporations, in the form of homesteads, Carey Act entries, desert-land entries, or irrigated farms. Most of these have been acquired at a small price or on long time and other favorable terms, making ownership possible to the man of small means. This fact doubtless accounts in the main for a smaller proportion of farms operated by tenants than is found in most of the older States. In 1910 the total number of farms owned or operated by tenants was 36,993, of which 26,822 were reported free from mortgage and 9636 were reported as mortgaged. The average amount of the mortgage debt per farm was $2508. The average equity per farm above the mortgage was $7706.

Over one-third of all the farms in the State in 1910 were between 100 and 174 acres in size. About one-fifth were from 260 to 499 acres. Of the total farm acreage of the State

in 1910, 36.1 per cent was in farms of 1000 acres and over, and 29 per cent was in farms of 175 to 499 acres, these being the most important size groups. Four-fifths of the farmers of the State in 1910 were native whites, and almost one-fifth were foreign-born whites. There were only 574 non-whites; of these 405 were Indians, 87 Japanese, 81 negroes, and 1 Chinese. Of the 8398 foreign-born white farmers in 1910, 1926 were born in Germany, 1128 in Sweden, 882 in England, 734 in Russia, and 643 in Canada.

The total value of crops in 1909, according to the thirteenth census, was $50,275,000. Of the total value, less than one-third (29 per cent) was contributed by cereal crops. About one-third was contributed by hay and forage, about one-eighth by sugar crops, and about one-eighth by potatoes and other vegetables. The remainder, representing 13.2 per cent of the total, consisted chiefly of fruits and nuts. The total value of crops in 1909 was 200.4 per cent greater than in 1899. This increase was due partly to higher prices. The table given below gives the acreage, production, and value of the chief crops in 1909 and in 1913. The figures for 1909 are from the thirteenth census, and those for 1913 are estimates from the United States Department of Agriculture.

		Acreage	Prod. bu.	Value
Corn	1913	420,000	6,300,000	$4,368,000
	1909	326,559	4,903,304	2,673,584
Wheat	1913	460,000	9,680,000	7,551,000
	1909	340,729	7,224,057	6,463,926
Barley	1913	100,000	3,250,000	1,820,000
	1909	71,411	1,889,342	1,100,753
Oats	1913	305,000	10,675,000	4,697,000
	1909	275,948	7,642,855	4,177,260
Rye	1913	20,000	340,000	204,007
	1909	15,715	198,025	123,530
Potatoes	1913	80,000	9,200,000	5,980,000
	1909	85,839	11,780,674	3,704,768
Hay	1913	890,000	*824,000	18,240,000
	1909	1,285,064	2,241,566	17,282,276

* Tons.

It will be noted from this table that by far the most important crops are hay and forage, which have more than three times the acreage and three times the value of wheat, the next crop in order. The production of sugar beets is one of the most important agricultural industries, and Colorado ranks first in the country. The acreage in sugar beets in 1909 was 108,082. The production was 1,231,712 tons, with a value of $6,061,162. In 1913 the acreage was 157,000 and the production 1,800,000 tons, from which 215,000 short tons of sugar were made. Certain portions of the State are particularly adapted to the growing of vegetables and fruits of various sorts. Of these the best known are the cantaloupes, or melons, which are shipped annually in hundreds of carloads from the Arkansas River region. These include the famous Rocky Ford cantaloupes. The most important vegetable produced is the potato. The statistics of its production will be found in the table above. Orchard fruits grown include apples, peaches, nectarines, pears, plums, prunes, cherries, and apricots. The total number of trees or vines bearing orchard fruits in 1910 was 2,947,920. The total value of the product was $4,651,792. The most important fruit produced is apples. Of small fruits there was an acreage in 1909 of 2829, and the crop was valued at $398,836. The most important small fruit is the strawberry. There were, in 1910, 101,332 grapevines of bearing age, and the value of the grape crop was $28,026. A small quantity of nuts was produced.

Stock Raising. The total value of the live stock on the farms of Colorado in 1910 was $68,840,485. Cattle numbered 1,127,737, with a value of $31,017,302; horses, 294,035, with a value of $27,382,926; mules, 14,739, valued at $1,798,535; swine, 129,294, valued at $1,568,158; and sheep, 1,426,214, valued at $6,856,187. The number of domestic animals in 1913 was, according to the statistics of the United States Department of Agriculture, 3,076,863. The number of fowls of all kinds in 1910 was 1,721,445, valued at $1,012,254. The wool produced on the farms in 1909 was valued at $1,172,666.

Stock raising was the original agricultural industry of the State, and for a time it had almost the whole field to itself. The introduction of mixed farming has, to a certain extent, modified the conditions under which cattle were raised in former years. There are still large areas of semiarid land which can be utilized only for grazing purposes. Upon this land are many large farms or ranches.

That cattle raising on a large scale is decreasing is shown by the fact that in 1906 there were 1,362,303 cattle being raised for market purposes, while on Jan. 1, 1914, the number was estimated at 921,000. There were also fewer sheep grown in 1914 than in 1906, the figures for the latter year being 1,677,561 and for the former (est.) 1,668,000. Sheep raising is confined chiefly to the southern counties.

Irrigation. Of the 46,170 farms in Colorado, 25,926, or 56.2 per cent, were irrigated in 1910. The acreage of these irrigated farms was 2,792,032, or 64.9 per cent of the improved land in farms. Enterprises existing in 1910 were capable of supplying 3,990,166 acres with water, and the total acreage included in irrigation projects which were completed or under way was 5,917,457. (See IRRIGATION; RECLAMATION.) On Sept. 28, 1909, the Gunnison irrigating tunnel was formally opened by President Taft. This tunnel is a part of the largest single irrigation project undertaken by the United States government up to that time. The tunnel was driven from two points, 6 miles apart—one on the Gunnison River, whence the water supply came, and the other at Montrose in the Uncompahgre valley, on the other side of the range. Through this tunnel water to irrigate from 150,000 to 175,000 acres of land is carried. The tunnel was completed for use in June, 1910, and the complete project was nearly three-fourths completed at the beginning of 1914. The government is also carrying on preliminary work on another irrigation project in the Grand valley. It is designed to irrigate about 50,000 acres by means of tunnels from the Grand River.

Forest Products. These include firewood, fencing material, logs, railroad ties, telegraph and telephone poles, material for barrels, naval stores, etc. There were, in 1902, 2181 farms in the State reporting forest products, the total value being $305,719, compared with $113,055 in 1899—an increase of 170.4 per cent. Of the value in 1909, $137,701 was reported as

that of products used or to be used on farms themselves, $153,978 as that of products sold or for sale, and $14,040 as the amount received for standing.

Manufactures. Colorado is preëminently a mining State, but the proportion which the value of its manufactures formed of the total value of the manufactures of the United States increased steadily at each census from 1869 to 1899. From 1899 to 1909, however, this proportion decreased. In the former year it was eight-tenths of 1 per cent, seven-tenths of 1 per cent in 1904, and in 1909 six-tenths of 1 per cent. During this period of 40 years the gross value of products per capita of the entire population of the State increased from $72 to $163 in 1909. Much of the manufacturing activity such as smelting, iron and steel operations, cement manufacture, and marble and stone work, is dependent upon the development of its extensive mineral resources. Furthermore, many manufacturing establishments owe their existence to the needs of the mining industry. Irrigation of the fertile valleys of the Platte and Arkansas rivers and other streams has made the beet-sugar production of Colorado greater than that of any other State. (See *Agriculture.*) The canning industry is also the outgrowth of the development of irrigation. Coal and timber as fuel for industrial consumption and timber as manufacturing material are abundant and generally accessible. The fact that Colorado is a natural grazing country is responsible for the development of such industries as slaughtering and meat packing, the manufacture of butter, cheese, and condensed milk, the rendering of grease and tallow, and wool scouring.

The table below gives the most important data in regard to manufactures in 1909 in comparison with 1904:

COMPARATIVE SUMMARY FOR 1909 AND 1904

ALL INDUSTRIES COMBINED AND SELECTED INDUSTRIES

INDUSTRY	Census	Number of establishments	PERSONS ENGAGED IN INDUSTRY		Capital	Wages	Value of products	Value added by manufacture
			Total	Wage earners (average number)	Expressed in thousands			
STATE — ALL INDUSTRIES	1909	2,034	34,115	28,067	$162,668	$19,912	$130,044	$49,553
	1904	1,606	25,888	21,813	107,664	15,100	100,144	37,030
Bread and other bakery products	1909	250	1,325	889	1,676	559	3,969	1,672
	1904	186	934	670	943	411	2,657	1,170
Brick and tile	1909	69	1,036	922	2,421	637	1,670	1,159
	1904	63	580	495	1,036	322	817	653
Butter, cheese, and condensed milk	1909	39	304	210	1,221	130	2,340	416
	1904	*20	141	97	593	59	1,290	209
Canning and preserving	1909	30	630	518	1,486	250	1,528	856
	1904	15	358	315	554	136	821	392
Cars and general shop construction and repairs by steam-railroad companies	1909	29	4,300	3,993	4,708	3,393	6,559	3,955
	1904	34	3,267	3,052	1,646	2,265	5,259	2,596
Confectionery	1909	35	483	349	580	136	1,023	492
	1904	19	296	239	341	105	685	391
Flour-mill and gristmill products	1909	77	429	282	4,835	220	7,868	1,196
	1904	52	362	244	2,326	203	5,783	986
Foundry and machine-shop products	1909	111	2250,	1,813	7,056	1,280	5,907	3,103
	1904	†88	1,677	1,451	3,241,	1,062	4,108	2,175
Furniture and refrigerators	1909	14	224	176	494	146	542	285
	1904	11	186	157	167	137	432	254
Ice, manufactured	1909	30	315	251	2,415	190	570	444
	1904	16	182	138	1,240	93	376	305
Leather goods	1909	30	363	269	585	172	1,054	515
	1904	22	230	175	364	125	577	319
Liquors, malt	1909	11	514	424	7,327	349	3,311	2,404
	1904	11	367	300	4,702	243	2,120	1,662
Lumber and timber products	1909	263	2,614	2,190	3,472	1,458	4,185	2,789
	1904	110	1,631	1,430	1,892	896	2,497	1,691
Marble and stone work	1909	44	346	267	967	208	626	406
	1904	33	276	212	288	200	626	395
Pottery, terra-cotta, and fire-clay products	1909	6	231	214	1,079	143	436	328
	1904	11	511	476	832	268	787	491
Printing and publishing	1909	439	3,747	2,366	4,941	1,823	6,962	5,156
	1904	‡419	2,916	1,902	3,604	1,343	5,467	4,156
Slaughtering and meat packing	1909	13	834	659	3,653	389	9,657	1,362
	1904	11	303	247	1,107	175	3,324	542
Tobacco manufactures	1909	99	563	427	427	306	1,021	663
	1904	‡117	632	481	299	308	979	643

* Excluding statistics for one establishment, to avoid disclosure of individual operations.
† Excluding statistics for six establishments, to avoid disclosure of individual operations.
‡ Excluding statistics for two establishments, to avoid disclosure of individual operations.

From this table it will be noted that the industries with the largest value of products are those connected with slaughtering and meat packing. The value in 1909 was $9,657,000.

The wage earners employed in this industry numbered 659. The second in value of production were flour-mill and gristmill products, followed by the industries relating to printing and publishing. From 1904 to 1909, the number of manufacturing establishments increased 26.7 per cent, and the average number of wage earners 28.6 per cent, while the value of products increased 29 per cent, and the value added by manufacture 33.8 per cent.

The wage earners in the State in 1909 numbered 28,067, of whom 25,957 were male and 2110 were female. The wage earners under 16 years of age numbered 165, of whom 16 were females. The prevailing hours of labor for more than one-half of the wage earners employed ranged from 54 to 60 a week. Of the total number of wage earners, 22.7 per cent were employed in establishments where the prevailing hours of labor were less than 54 hours per week, and 22.9 per cent in establishments where the prevailing hours were more than 60 a week. There are only four cities in the State in which manufactures are important—Denver, with 12,058 wage earners and a product valued in 1909 at $51,538,547; Pueblo, with 1320 wage earners; Colorado Springs, 516; and Trinidad, 220.

Population. Colorado is the most populous of the Rocky Mountain States. The steady increase in population is shown by the figures by decades—1860, 34,277; 1870, 39,864; 1880, 194,327; 1890, 412,198; 1900, 539,700; 1910, 700,024. The increase in the decade 1900 to 1910 was 259,324, or 48 per cent. The State ranked thirty-second in population, the same relative rank which it held in 1900. The population per square mile in 1910 was 7.7, compared with 5.2 in 1900, and 4 in 1890. The urban population in 1910 was 404,840, and the rural population 394,184. Urban population showed an increase of 50.1 per cent in the decade 1900–10, and rural population an increase of 46 per cent. The estimated population on July 1, 1914, was 909,537; 1920, 939,629.

Of the total population in 1910, 475,136, or 59.5 per cent, were native whites of native parentage; 181,428, or 22.7 per cent, were native whites of foreign or mixed parentage; 126,851, or 50.9 per cent, were foreign-born whites; and 11,453, or 1.4 per cent, were negroes. The percentage of the foreign-born population is as follows: Germans, 13.5; Italians, 11.3; Russians, 10.7; Austrians, 10.3; English, 10.2; Swedes, 9.8; Canadians, 7.5; Irish, 6.9; Scottish, 3.4; Danes, 2.2; Mexicans, 2, and all others, 12.4. The Indian population in 1910 was 1482, compared with 1437 in 1900. The Chinese numbered 373 in 1910, compared with 559 in 1900, and the Japanese, 2300 in 1910, compared with 48 in 1900. The total number of males of voting age in 1910 was 271,648, representing 34 per cent of the population. The principal cities of the State with their populations are as follows: Denver, 1910, 213,381, 1900, 133,859; Colorado Springs, 1910, 29,078, 1900, 21,085; Leadville, 1910, 7508; 1900, 12,455; Cripple Creek, 1910, 6206, 1900, 10,147. The decrease in the population of Leadville and Cripple Creek is due to the exhaustion of mines which were chiefly responsible for the settlement and growth of those cities. There were, in 1910, 27 cities having a population of more than 2500.

Transportation. Colorado has a greater railway mileage than any other of the Rocky Mountain States. On Jan. 1, 1913, there were 5871 miles of track. Of this, 4380 was standard gauge, and 1491 narrow gauge. The railroads in the State having the longest mileage are as follows: Atchison, Topeka, and Santa Fe, 512; Chicago, Burlington, and Quincy, 394; Chicago, Rock Island, and Pacific, 165; Colorado Midland, 261; Colorado and Southern, 397; Denver and Rio Grande, 970; Rio Grande Southern, 179; and the Union Pacific, 590. The electric roads include the Denver and Intermountain Railroad Company, 34 miles; the Denver and Interurban, 54 miles; the Grand Junction and Grand River Valley, 21 miles; and the Trinidad Electric Transmission Railway and Gas Company, 19 miles. The Legislature of 1909 created a State Railroad Commission, which has general charge of the regulation of railway rates. It is composed of three commissioners appointed by the Governor. There are no navigable rivers in the State.

Education. Colorado has an excellent educational system, and it is efficiently administered by the State board with the State Superintendent of Public Instruction in charge. The number of illiterates is small. The thirteenth census showed 23,780 persons, or 3.7 per cent of the population, unable to read and write. The number in 1900 was 17,779; the percentage, 4.2. The percentage of illiteracy in urban population in 1910 was 2.4 and in rural population 5.2. Among the native whites the percentage in 1910 was only 1.6. According to the census figures the total school population in 1910, ages 6 to 20 inclusive, was 215,940. Of these 147,626 were in attendance in schools. Of the number attending schools, 97,182 were of native white parentage, 42,895 were of foreign or mixed parentage, 12,070 were foreign-born whites, and 1548 were negroes. According to the school census taken in 1913 the total school population in that year between the ages of 6 and 21 was 177,428. The enrollment in the public schools in the same year was 130,948. The average daily attendance was 120,326. There were enrolled in high schools 16,377, and in graded schools below high schools 112,582. The enrollment in rural schools was 48,469. The total number of teachers in graded schools was 3683, of whom 3079 were females and 604 males. In the rural schools were 2042 teachers, of whom 1744 were female and 298 male. The average monthly salary of male teachers in graded schools was $102.45, and of female teachers $69.01. The average monthly salary of teachers in rural schools was $61.09, and for female teachers $56.19. The disbursements for educational purposes in 1912 included $3,836,166 for teachers' salaries, $1,232,254 for current expenses, $1,262,794 for building, sites, and improvements, and $13,252 for library purposes. The assessed valuation of school property in 1912 was $425,911,427. Increased attention has been given in recent years to the development of rural schools. Courses in agriculture have been introduced in several counties, and a department of rural schools has been established in the State Agricultural College. In addition to the common schools, the State supports a School for the Deaf and Blind at Colorado Springs, a State Industrial School for Boys at Golden, a State Home and Training School for Mental Defectives in Jefferson County. Provision is also made for the teaching of the adult blind outside of schools. The Legislature has made provision for the appoint-

ment of a State teacher of the adult blind, and such a teacher was appointed in 1911. The institutions for higher education include the State Normal School at Gunnison, the State Teachers' College of Colorado at Greeley, the University of Colorado at Boulder, Colorado College at Colorado Springs, College of the Sacred Heart and Colorado Women's College at Denver, Colorado Agricultural College at Fort Collins, State School of Mines at Golden, University of Denver at University Park, and Westminster College at Westminster. The University of Colorado, Colorado College, State Teachers' College, University of Denver, and Westminster College are coeducational.

Finances. The report of the State Treasurer for the biennial period, 1911–12, shows a balance in the treasury at the beginning of the period Dec. 31, 1910, of $3,309,320. The receipts for the period were $8,237,909, and the disbursements $7,383,035, leaving a balance on Dec. 1, 1912, of $4,164,195. The net floating and bonded indebtedness of the State on Nov. 30, 1912, was $2,890,544. The Legislature of 1911 created a State Auditing Board and a Tax Commission. It also provided for the revision of the revenue laws of 1902 and 1908.

Banks. There were in the State, on June 14, 1912, 127 national banks, with deposits subject to check amounting to $56,310,371, and savings deposits amounting to $4,051,179. There were 136 State banks with deposits subject to check amounting to $7,516,205, and savings deposits of $1,171,509. The savings banks numbered 8, with 14,955 depositors and deposits aggregating $2,816,070. In addition to these there were 25 private banks with deposits subject to check amounting to $1,852,660, and savings deposits amounting to $147,870.

Charities and Corrections. The charitable and correctional institutions under State control include the Home for Children, Soldiers' and Sailors' Home, Workshop for the Blind, State Hospital, State Home and Training School for Mental Defectives, Boys' Industrial School, Girls' Industrial School, State Penitentiary, and State Reformatory. For the maintenance of the above institutions for the biennial period ending Nov. 30, 1914, there was appropriated the sum of $882,000, and for improvements, $95,500. Largely through the efforts of Judge Ben B. Lindsey, the Legislature in 1909 passed a bill providing that delinquent children shall come under the chancery powers of the courts of record. The bill provided for a referee to be called the Master of Discipline to hear cases of delinquency and dependency when it is practicable to try the same before the chancery side of the court. The same Legislature also passed bills to supplement and strengthen existing acts punishing those charged with juvenile delinquency. Another bill, actively supported by Judge Lindsey, passed at this session created a probation court, wherein it is lawful for the judge of the court to hear evidence in relation to all matters properly put before it, to fix the amount of damage committed by the person charged with the offense, and, with the consent of the person in whose interest the proceedings were begun, to order reparation to be made by him to the person suffering such damage by the return of the property taken or payment of the damage done. The Legislature of 1911 passed a measure permitting the State Soldiers' and Sailors' Home to admit Confederate veterans. This Legislature also provided for the parole of prisoners in county jails for good conduct and work, and for the employment of prisoners in jails. Half of any prisoner's earnings by this enactment is to go to his dependent wife and children. The same Legislature also passed the child-labor laws to forbid any child under 14 being employed in a theatre, or in places of amusement where intoxicating liquors are sold, or in any other places; a child of this age must have a permit to work on a farm or an orchard. No child under 14 may be employed during school hours or before 7 A.M. or after 8 P.M., and 8 hours is the maximum for child labor. The Legislature of 1913 also enacted several important bills relating to the work of charities and corrections. These provided for the regulation of the sale of cocaine, and the registering of tuberculous persons, and forbade the publication of trial, etc., where children are involved. At the general election of 1912, through the operation of the referendum, a mother's compensation law was carried. Other measures passed by referendum at this election were those providing for a more extended civil service, and limiting the hours of work for women. In 1913 a home for the blind was established at Denver. An international white-slave association was also organized in that city.

Militia. The militia organizations of the State include two regiments of infantry of 11 companies each, one squadron of three troops of cavalry, one battalion of two batteries of field artillery, one company of engineers, one company of signal troops, and three detachments of sanitary troops. The total strength of enlisted men in 1913 was 1309, and of officers 137. The official designation is the Colorado National Guard.

Government. The constitution was adopted by a vote of the people Aug. 1, 1876. By a two-thirds vote of each House a proposed amendment may be referred to popular vote, but amendments must be voted upon separately. A proposal for a constitutional convention may also be referred to the people by a two-thirds vote of each House, and if a majority of the people approve, the next session of the Legislature must provide for such convention. It must consist of twice as many delegates as there are members of the Senate, and the constitution drawn up must be submitted to the people for ratification.

Suffrage and Elections.—Since 1893 women have had suffrage in Colorado on equal terms with men. The constitution specifies 12 months' residence as a principal requisite to voting and authorizes the Legislature to make other time requirements. At a special session of the Legislature held in 1910 a direct-primary election law was passed. This provides for nominations by direct-primary elections except for municipal officers and delegates to national assemblies or presidential electors. According to provisions of this law political parties have separate tickets, and all candidates for nominations are placed on a direct-primary ballot by petition or certificate of designation. All party direct-primary elections are to be held at the same time and place, and all voters must register before they have the privilege of voting. All direct-primary elections are conducted under the general election laws of the State as far as the provisions of these laws are applicable. The law contains provisions regulating campaign expenses. Personal expenses for candidates for United States Senator are limited to $5000, the

candidate for House of Representatives or a State office to $2500, and for any other office to $1000. Candidates are obliged to file sworn statements of expenses. Candidates for United States Senator are nominated at direct-primary elections. Candidates for State Senator or member of the State House of Representatives are given the privilege of making a declaration of their purpose to vote for candidate for United States Senator who has received the highest number of the people's vote of that office at the general election next preceding the election of the Senator of Congress, without regard to individual preference. Severe penalties are prescribed for the bribery of voters and for other election offenses. The election commission in cities having special charter providing for such commission are given all the powers of jurisdiction and perform all the duties provided by this act in respect to county clerks, city or municipal clerks, and members of county commissions or any other election officials or members subject to the general laws of the State except as otherwise specifically provided by their charters. The Legislature of 1913 passed an elaborate act regulating the registration of voters previous to election. Voters, except for school election, must register 10 days or more before the election. The Legislature of 1913 ratified the seventeenth amendment to the constitution providing for the direct election of Senators, and passed a measure permitting the Governor to make temporary appointments in case of vacancy, and prescribing the method by which elections for Senators are to be held. An amendment to the constitution carried in 1912 provided for the recall of all elective officials.

Legislative.—State elections are held on the first Tuesday in October of even years, and the Legislature meets on the first Wednesday of the following January. Senators and Representatives are elected for terms of four and two years respectively. The aggregate number of Senators and Representatives can never exceed 100. No bill can be so altered or amended on its passage through either House as to change its original purpose. Revenue bills must originate in the House of Representatives. Ordinary expenses only can be included in general appropriation bills. A member cannot vote on a bill in which he has a personal or private interest. In 1910 constitutional amendments providing for the initiative and referendum were adopted by the people. This law in its essentials is similar to that of Oregon (q.v.). It was declared invalid by the district court on Aug. 23, 1912, but was held constitutional by the State Supreme Court on September 23 of the same year.

Executive.—The executive officers are a Governor, Lieutenant Governor, Secretary, Auditor, Treasurer, Attorney-General, and Superintendent of Public Instruction, the term of each being two years. Their salaries are determined by law, and neither Treasurer nor Auditor can be his own immediate successor. A two-thirds vote of both houses overrules the veto of the Governor. The Governor may veto any item of a money appropriation bill. He may grant reprieves, commutations, and pardons, and convene the General Assembly in special session. The Lieutenant Governor, who is President of the Senate, succeeds to the governorship in case of vacancy.

Judicial.—The judicial power of the State as to matters of law and equity, except as in the constitution otherwise provided, is vested in a supreme court, district courts, county courts, justices of the peace, and such other courts as may be provided by law. There are three supreme court judges, elected for nine years; the district judges—one or more for each judicial district—elected for six years; and a judge for every county, elected every four years. The Legislature of 1911 created a court of appeals to consist of five judges appointed by the Governor for a term of four years. This court is to supplement the work of the Supreme Court, which may transfer cases to it. A constitutional amendment adopted in 1912 provided for the recall of judges and certain judicial decisions.

Local Government.—Three county commissioners (five permissible in counties exceeding 70,000) are elected in every county, the term of office being four years. Other county officers, elected on the first Tuesday in October of the even years, are: clerk, sheriff, coroner, treasurer, superintendent of schools, surveyor, and assessor. Towns and cities may be classified into not more than four classes, and the powers of each class are defined by general laws. Cities and towns have been granted the power to adopt a commission form of government. At the end of 1913 the following towns and cities were under this form of government: Colorado City, Colorado Springs, Denver, Durango, and Pueblo. Most of the charters of these cities include provisions for preferential voting on ballots for commissioners. Voters may mark candidates as first, second, or third choice. Charters for the most part contain also provisions for the initiative, referendum, and recall. A constitutional amendment adopted in 1912 gave cities and towns home rule in municipal affairs.

History. Prehistoric remains, similar in character to those discovered in New Mexico and Arizona, have been found in southern Colorado. In the second half of the eighteenth century several expeditions into the limits of the present State were undertaken by the Spaniards. The most important of these was the one headed by Francisco Escalante, who in 1776 traversed the southwestern corner of the State and explored the region of the Dolores and Gunnison rivers. But though Spain claimed the region, she attempted no settlement. The country, a portion of which was included in the Louisiana Purchase (1803), was partially explored in 1806–07 by Captain Pike and in 1820 by Colonel Long. Further exploration was carried on by Frémont in 1842 and 1844, and before the Mexican War fur-trading stations had been built on the Arkansas and Platte rivers. In the Treaty of Guadalupe-Hidalgo (1848) Mexico relinquished her territorial rights to the United States. Prospectors and emigrants from Georgia and Kansas entered Colorado in 1858. In 1859 the discovery of gold near Boulder and Idaho Springs was followed by a large immigration and the sudden rise of the mining towns of Denver and Boulder. The region, together with lands taken from Nebraska and New Mexico, was organized into the Territory of Colorado on Feb. 28, 1861. From 1864 to 1870 wars were waged with the Cheyenne and Arapaho Indians. The Utes ceded the mountain and park regions between 1863 and 1880. In 1864 and 1868 unsuccessful attempts at organizing a State government were made. The final enabling act was passed by Congress on March 3, 1875, and on Aug. 1, 1876, Colorado was admitted into the Union. Gold digging was on the decline in 1878, and many mining towns

were being deserted, when it was discovered that from the masses of carbonates discarded by the gold seekers silver and lead might be extracted. Immigrants flocked to Leadville, and soon the value of the lead and silver output came to excel the yield of gold. Serious strikes broke out among the miners in 1894, 1896–97, and 1904, and recourse was had to military force to restore order. The greatest disturbance was that of 1904, during which the strikers blew up the railway station at Independence, killing fifteen non-union miners and injuring several others. In an endeavor to quell the disorder suspected persons were deported from the State, attempts were made by the soldiery to intimidate the courts, and the writ of habeas corpus was suspended by the Governor. These measures, which aroused much criticism throughout the United States, were largely actuated by the Citizens' Alliance, an organization formed with the avowed purpose of exterminating the Western Federation of Miners. From 1876 to 1888 Colorado was Republican in national politics, but on the free-silver issue it was carried by a fusion of Populists, Democrats, and Silver Republicans in 1892, 1896, and 1900. In 1904 the State again gave its electoral vote to the Republicans. The State election in 1904, however, was bitterly contested. The attitude of Governor Peabody, the Republican candidate, during the mining troubles, lost him the support of a large part of the labor element, and the returns showed the election of Adams, Democrat. A contest ensued, and the Republican Legislature seated Peabody, who resigned immediately afterward and was succeeded by McDonald, the Lieutenant Governor.

In 1906 Henry A. Buchtel, a Methodist Episcopal clergyman and chancellor of the University of Denver, was elected Governor on the Republican ticket. The Legislature of 1907 elected Simon Guggenheim, one of the heads of the American Smelting and Refining Company and a capitalist of national repute, United States Senator. In the presidential election of 1908 Bryan received 126,772 votes; Taft, 123,732. In this year the Democrats elected their first Governor since 1905. J. F. Shafroth, Democrat, received 128,898 votes, against 118,832 cast for McDonald, the Republican candidate. The Democratic National Convention of 1908, which nominated Mr. Bryan, was held in Denver July 9–14. An auditorium costing $650,000 and seating 10,000 persons was erected for the purposes of the convention. The Legislature of 1909 elected Charles J. Hughes, Democrat, United States Senator, to succeed H. M. Teller. On September 28 of this year the Gunnison tunnel, a part of the Uncompahgre irrigation project, was formally opened by President Taft, who was at that time making a tour of the Western States. (See paragraph *Irrigation* above.) In 1910 Governor Shafroth was reelected. Senator Hughes died on Jan. 11, 1911. The Legislature was in a deadlock over the election of his successor throughout the entire session and was obliged to adjourn without an election, and Colorado was represented in the sixty-second Congress by only one Senator. In December, 1912, Senator Guggenheim announced that he would not be a candidate for reëlection. This necessitated the election of two Democratic Senators by the Legislature of 1913. John F. Shafroth was elected for the full term, and for the short term Charles S. Thomas, who was Governor of the State from 1899 to 1901, was chosen. In the presidential election of Nov. 5, 1912, Wilson received 114,223 votes, Roosevelt 72,306, Taft 58,386, and Debs 16,418. For Governor, E. A. Ammons, Democrat, received 101,293 votes; Costigan, Progressive, 63,035; Parks, Republican, 54,724. The Democrats elected all Representatives to Congress. The Legislature of 1913 was Democratic by more than 40 on a joint ballot. By the reapportionment as a result of the census of 1910, the State has four Representatives in Congress instead of three as formerly. There were serious strikes in the mining regions in the early part of 1914. For an account of these, see STRIKES.

TERRITORIAL GOVERNORS

William Gilpin	1861–62
John Evans	1862–65
Alexander Cummings	1865–67
A. C. Hunt	1867–69
Edward McCook	1869–73
Samuel H. Elbert	1873–74
Edward McCook	1874–75
John L. Routt	1875–76

STATE GOVERNORS

John L. Routt	Republican	1876–79
Frederick W. Pitkin	"	1879–83
James B. Grant	Democrat	1883–85
Benjamin H. Eaton	Republican	1885–87
Alva Adams	Democrat	1887–89
Job A. Cooper	Republican	1889–91
John L. Routt	"	1891–93
Davis H. Waite	Populist and Democrat	1893–95
Albert W. McIntire	Republican	1895–97
Alva Adams	Democrat and Silver Rep.	1897–99
Charles S. Thomas	Dem., Pop., and Silver Rep.	1899–1901
James B. Orman	" " " "	1901–03
James H. Peabody	Republican	1903–05
Alva Adams	Democrat	1905–
James H. Peabody	Republican	1905–
Jesse F. McDonald	"	1905–07
Henry A. Buchtel	"	1907–09
John F. Shafroth	Democrat	1909–13
Elias A. Ammons	"	1913–15
G. A Carlson	Republican	1915–17
J. C. Gunter	Democrat	1917–19
O. H. Shoup	Republican	1919–

Consult: Bancroft, *History of the Pacific States*, vol. xx (San Francisco, 1890); Hayes, *New Colorado and the Santa Fé Trail* (New York, 1880); Pabor, *Colorado as an Agricultural State* (ib., 1883); *The Resources, Wealth, and Industrial Development of Colorado* (Denver, 1883); *Labor Disturbances in the State of Colorado from 1880–1904*, etc. (58th Congress, 3d sess., Senate doc. 122); Snook, *Colorado History and Government* (Denver, 1904); Parsons, *A Guide to Colorado* (1911); Mills, *The Spell of the Rockies* (1911).

COLORADO. A city and the county seat of Mitchell Co., Tex., 262 miles by rail west-southwest of Dallas, on the Colorado River and on the Texas and Pacific Railroad (Map: Texas, B 3). It is the commercial centre of a cotton-growing and stock-raising region, carries on a trade in sand and gravel, and has extensive salt works and cotton gins. The water works are owned by the city. Pop., 1910, 1840.

COLORADO, *Sp. pron.* kō'lō-rä'ᴅo. A name given by the Spaniards to various unrelated tribes in different parts of Spanish America, including Texas, owing to their custom of painting the body with red pigment. Of the tribes thus known, one of the most noted was that of the Sacchas, "men," as they call themselves, of whom a few still survive in the upper valleys of the Daule and Chones rivers, in northwestern Ecuador. They go naked and are naturally light-skinned, almost blond, but paint their whole bodies with a red paint. They belong to the Barbacoan stock.

COLORADO, Río, rē'ō. A river of central

Argentina, rising in the Andes and flowing southeast. It empties into the Atlantic in about lat. 39° 50′ S. (Map: Argentina, E 11). Its entire length is about 700 miles, but it is navigable for light vessels for only 200 miles. The upper course is through a desert.

COLORADO, UNIVERSITY OF. An institution of higher learning situated at Boulder, Colo. It was incorporated by the Territorial Legislature in 1861, and in 1876 the constitution of Colorado provided for it as the State University. At the formal opening of the institution in 1877 it consisted of a College of Liberal Arts and a preparatory department (the preparatory department was discontinued in 1907). The university in 1914 comprised the following schools and colleges (with date of establishment): the College of Liberal Arts, 1877; School of Medicine, 1883; Graduate School, 1892; School of Law, 1892; College of Engineering, 1893; Summer Session, 1904; College of Commerce, 1906; College of Education, 1908; School of Pharmacy, 1911; University Extension, 1912; and School of Social and Home Service, 1912. The following degrees are offered: B.A., M.A., Ph.D., M.S., C.E., E.E., M.E., D.Oph., M.S. in Public Health, Doctor of Public Health, M.S. in Sanitary Engineering, B.S. (C.E.), B.S. (E.E.), B.S. (M.E.), B.S. (Ch.E.), M.D., Ph.C., B.Phar., B.S. in Phar., LL.B. The university is coeducational. The library contains 75,000 bound volumes besides maps and pamphlets. The total registration in 1913–14, not including the Extension Division and the Summer Session, was 1250. The university is supported by a two-fifths mill tax and special appropriations. Its government is vested in a board of six regents elected by the people. The president in 1926 was George Norlin, Ph.D., LL.D.

COLORADO CITY. A city in El Paso Co., Colo., 75 miles south of Denver, on the Colorado Midland and the Denver and Rio Grande railroads (Map: Colorado, E 3). It contains gold-reduction works, railway shops, and an iron foundry, and has a Carnegie library. The commission form of government was adopted in 1913. Pop., 1900, 2914; 1910, 4333.

COLORADO COLLEGE. An institution of higher education, founded at Colorado Springs, Colo., in 1874. The college offers courses leading to the bachelor's degree in arts, science, and philosophy. The college has departments of engineering, forestry, and of business administration and banking. It has 14 large stone buildings, costing $1,000,000 with their equipment. The library contains 110,000 volumes, and the endowment is $1,040,000. In 1913–14 it had 679 students, with standards the same as the best Eastern institutions. It has a system of exchange instructors with Harvard University. The president in 1914 was W. F. Slocum, LL.D., D.D.

COLORADO DESERT. A portion of the great arid region of southeastern California and the contiguous part of Nevada, generally known as "the Desert." The more important subdivisions of this region are called the "Colorado Desert," the "Mohave Desert" (q.v.), and "Death Valley" (q.v.). The Colorado Desert extends southward from San Gorgonio Pass (between the San Bernardino and the San Jacinto mountain ranges). Its general northern boundary is roughly outlined by the San Bernardino, Cottonwood, Chuckwalla, and Chocolate mountain ranges, north of which lies the Mohave Desert. It comprises about 2000 square miles and includes chiefly the western portion of Riverside County, the eastern portion of San Diego County, and the western half of Imperial County. Much of this region lies below sea level; the lowest area is the Salton Sink, within which lies the Salton Sea (q.v.). The Salton Sink, in a comparatively recent geological period, was a part of the Gulf of California, from which it is now separated by the delta of the Colorado River. Topographically this entire desert area is characterized by a series of approximately parallel mountain ranges, between which lie desert valleys. The trend of these mountains in the northern part of the desert is north and south, or nearly so, while the ranges in the southern part swing to the southeast.

The desert is due chiefly to the effect of the Sierra Nevada Mountains, which condense upon their westward slopes practically all of the moisture in the winds from the Pacific. During the five summer months the heat in the desert valleys is intense, frequently reaching 125° F. in the shade and rarely falling below 70°, the average being about 90°. Men subjected to these conditions without water (of which very little is to be had) generally perish quickly. Rain falls frequently upon the mountains, and sometimes in the valleys, but the air generally is in active movement, and the winds quickly dry the surface of the ground. Sudden cloudbursts, accompanied by startling electrical displays, are not uncommon in the mountains, where the resulting flood waves develop enormous erosive and transporting energy. Railroads traversing this country are often damaged by these storms. The normal rainfall for the desert is between three and four inches annually. For a description (with a good map) of this region, consult Mendenhall, "Some Desert Watering Places in Southeastern California and Southwestern Nevada," *Water-Supply Paper 224, United States Geological Survey* (Washington, 1909); also the authorities cited under CALIFORNIA.

COLORADO RIVER OF THE WEST. A large river flowing through the plateau region of the southwestern United States. It is formed in the southeastern part of Utah by the junction of the Green River from the north (the upper continuation of the Colorado) and the Grand from the northeast, the former rising in southwestern Wyoming in the Wind River Mountains, and the latter in the north-central part of Colorado (Map: United States, C 3). These head streams receive numerous tributaries from the well-watered heights of the Rocky Mountains and the Wasatch. These streams are extraordinary, but below their junction the Colorado passes through what is in some respects the most remarkable region on the earth, not only for its natural scenery, but also for the great interest which it possesses for geologists, as it gives on a mighty scale the clearest exemplifications of the action of erosive forces in shaping the contour of the land and presents vertical structural sections of vast extent unmasked by vegetation. In the Eocene epoch the whole region of Arizona, Utah, and Nevada was subjected to a vast upheaval, and what was formerly the bottom of the ocean was raised to a height of more than 10,000 feet above sea level. This region, consisting chiefly of horizontal strata of the Paleozoic and Meso-

zoic systems, was subjected to extensive denudation by wind and water, and again to successive upheavals accompanied by volcanic action. In the northwestern part the strata were faulted into huge blocks, running north and south, giving the present shape to the mountains of Nevada. The result of the uplifting and erosion was the washing away of the weaker and softer strata, especially to the west of the present course of the Colorado, while those rocks that were protected by harder layers were left standing as extensive plateaus with precipitous escarpments. In some places lavas have been thrust up through the strata by volcanic action, and volcanic cinder cones and craters are numerous, one small lava flow in the Uinkaret locality being so recent that no vegetation has found root on it. For a time the Colorado itself was dammed up by a lava overflow from above at this place. The precipitation is heaviest on the high mountains, diminishing according to altitude; and, in a general way, also according to latitude, towards the southwest, where in the valleys it is very light, in places less than 5 inches. Denudation therefore proceeds much more rapidly along stream beds, even where these, as is frequently the case, are dry for a great part of the time, with the result that the stream beds are depressed to great depths below the surrounding levels, giving rise to a multitude of profound gorges or cañons. These begin with Flaming Gorge on Green River, near the south boundary of Wyoming where the river cuts into the Uinta Mountains, and they encompass the river and its tributaries, with few breaks, for 1000 miles, to the foot of Black Cañon. Grand River flows through similar cañons and joins the Green in a gorge 1300 feet below the general surface of the plateau. The largest, longest, and deepest of these remarkable chasms is the famous Grand Cañon of Arizona, in the northern part of that State, where the Colorado passes through an enormous uplift called, south of the cañon, the Colorado Plateau, and north of it, the Kaibab, Kanab, Uinkaret, and Shiwits plateaus, differentiated by variations of altitude from about 6000 to 8500 feet above the sea. The Grand Cañon, 217½ miles long, 4000 to 6000 feet deep, and from 1 or 2 to 15 miles wide at the top, is immediately preceded in the series by Marble Cañon, 65½ miles long, 3500 feet in its maximum depth, and ½ mile to 2 miles wide at the top, with only a nominal separation from the Grand Cañon, thus making a continuous chasm 283 miles long as the river runs. In two of its sections the Grand Cañon is made up of two distinct chasms: an inner, cut in archean rock, and an outer in sedimentary rock, the latter being very wide and the former very narrow. This is mainly caused by the disparity in hardness of the rocks, as is evident from the fact that where the trend of the river eliminates the archean formation there is no defined inner gorge, although in other parts the main chasm is flanked above by a line of cliffs marking the summit of the plateau, and set some distance back, the level interval being called the esplanade. Everywhere the configuration is due to structural conditions acted on by weather and water.

The Grand Cañon ends at the Grand Wash, where the cliffs retreat north and south, terminating the great plateau. Several minor cañons follow, and at about 113° 45′ the river swings sharply to a straight south course, passes through the last important gorge, Black Cañon, and flows thenceforth with less declivity in comparatively open country all the way to the Gulf of California. It forms here the boundary between Arizona and Nevada and California. The river is navigable for properly built steamboats of light draft as far as the foot of Black Cañon, but the enormous quantity of shifting silt makes progress uncertain. The first white man on the river was Hernando Alarcon, commander of the marine division of the Coronado expedition, who discovered its mouth in 1540 and ascended in small boats to about the thirty-fourth parallel. The same year Cardenas, in command of one of Coronado's land divisions, came to the south rim of the Grand Cañon. In 1776 Padre Escalante, coming from the northwest, crossed about where latitude 37° intersects the river, and this place ever since has gone by the name of "Crossing of the Fathers." In 1825 General Ashley took his band of trappers in boats down the Green as far as Brown's Park, and in 1849 William L. Manly, with several others, went in a boat from the emigrant crossing near the present Union Pacific bridge down to the Uinta valley. One or two other parties attempted to descend about this time. The name "D. Julien, 1836" is carved into the rock in three places in the cañon near the junction of the Green and Grand, but that is all that is known about Julien. Early in 1858 George A. Johnson, who for several years had navigated between Fort Yuma and the Gulf with steamboats, took one, named the *General Jesup*, as far up the river as the head of Black Cañon, about lat. 36° 05′. On his return he met the government expedition under Lieutenant Ives, with the steamer *Explorer* on the way up. Ives got to the foot of Black Cañon with his steamer. In 1866 Captain Rodgers took the steamer *Esmeralda* as far up as Callville (about to Johnson's limit), and the next year, 1867, a man named James White was picked up at Callville in a famished, exhausted condition, whose story led to the belief that he had come down through the Grand Cañon. The fact is that he entered on the river below the end of the great gorge, and his story shows that he knew nothing about it, but at that time neither did any one else; he actually knew very little about any of the country.

The first human beings of any color or condition known to have made the passage of the Grand Cañon were Major John Wesley Powell and the remnant of his party which had started from Green River, Wyoming, May 24th, 1869, reaching the mouth of the Virgin August 30th. In 1871–72 Powell made a second descent, this time for the government. In 1871 Lieutenant Wheeler, U. S. A. Topographical Engineers, proceeded up the river with boats, from Fort Mohave, going as far as the mouth of Diamond Creek, by means of much pulling, towing, and dragging over portages. Twenty years later (1889) F. M. Brown started a railway survey along the river from Blake, Utah. He and two of his men were drowned in Marble Cañon, and the expedition failed, but R. B. Stanton reorganized it with better boats and completed the descent the next year. Others have in recent years been the entire length of the river; but it is always a hazardous undertaking.

The total length of the stream from the head of the Green is about 2000 miles; from the junction of the Grand, about 1100. The area drained is approximately 300,000 square miles. The declivity is very great, the total river fall from the Union Pacific crossing to the end of the Grand Cañon being 5235 feet. The river fall in Marble-Grand Cañon is 2330 feet. Rapids are counted by hundreds. The sharpest single descent is the Sockdologer Rapid, with a fall of about 35 feet in one-third of a mile, in the Grand Cañon. The river varies in width from hardly 75 feet in places among the rocks to a quarter of a mile in open places and more in the lower reaches. The depth changes with the seasons and with locality. In the narrowest parts of the Grand Cañon it is at times more than 100 feet. The great rise occurs in May and June, but rains in July frequently cause sudden and great increase in volume. The velocity of the current is sometimes more than 25 miles an hour. Consult: Report of Lieut. J. C. Ives on the *Exploration of the Colorado River* (1861); J. W. Powell, *Exploration of the Colorado River of the West and its Tributaries* (1875); F. S. Dellenbaugh, *A Canyon Voyage* (1908), giving the only story of Powell's second descent; id., *The Romance of the Colorado River* (history); C. E. Dutton, "Tertiary History of the Grand Canyon of the Colorado," in *Monograph II, United States Geological Survey* (1882); the various writings of William Morris Davis; G. W. James, *In and Around the Grand Canyon* (1902); id., *The Grand Canyon of Arizona, How to See It* (1910).

COLORADO RIVER. A river rising in the western part of Texas, near the southeastern boundary of New Mexico (Map: Texas, C 4). It flows in a generally southeast direction across the State and empties into the Gulf of Mexico through Matagorda Bay. Its chief tributaries (all received from the west) are, from north to south, the Concho, San Saba, and Llano, which enter the main stream in the counties of the same name. The Concho supplies a steady volume of water greater in amount than that of the Colorado at their confluence, furnishes much water power, and serves efficient irrigation systems in Irion and Tom Green counties. The drainage of the Colorado embraces about 37,000 square miles above Austin, and about 40,000 square miles above Columbus. At Austin the river emerges from a cañon, and has a discharge of about 70,300 second feet. Below this point it flows through a generally level country, where it supplies water power and is used for rice irrigation, especially in Colorado, Wharton, and Matagorda counties. The river is about 900 miles long and is navigable for steamboats to Austin. The other chief towns on its banks are Bay City, Wharton, Columbus, Lagrange, and Bastrop. It is frequently called the "Eastern Colorado," to distinguish it from the larger and better-known river—the Colorado River of the West—which empties into the Gulf of California.

COLORADOS. An important tribe of Indians belonging to the Barbacoan stock (q.v.) and living on the upper courses of the rivers Esmeraldas, Daule, and Vinces, in northern Ecuador. They have been studied by Selee, Gonzalez Suarez, Beuchat, and Rivet. See BARBACOAN.

COLORADO SPRINGS. A city and the county seat of El Paso Co., Colo., 74 miles south by east of Denver, on the Atchison, Topeka, and Santa Fe, the Denver and Rio Grande, the Chicago, Rock Island, and Pacific, the Colorado and Southern, the Colorado and Midland, and the Colorado Springs and Cripple Creek District railroads (Map: Colorado, E 3). Its location, 6000 feet above sea level, near the base of Pike's Peak and the celebrated mineral springs at Manitou, have made the place one of the most popular health resorts in the United States. It is the seat of Colorado College, founded in 1874, and contains the Colorado School for the Deaf and Blind, the Union Printers' Home (international), national sanitarium of the Modern Woodmen of America, and the Myron Stratton Home for the Poor. There are many places of historic and scenic interest in the vicinity, notably Pike's Peak (q.v.), Ute Pass Highway, Garden of the Gods (q.v.), an old Indian trail, Cripple Creek, North and South Cheyenne Cañons, Glen Eyrie, Cave of the Winds, and Phantom Cliff Cañon. The city has also a beautiful system of parks, comprising 3000 acres. The chief industries are the refining and reduction of ores, coal mining, and the manufacture of tile and pottery. Settled in 1871, Colorado Springs was incorporated in 1872 and is governed under a special charter, adopted in 1909, which provides for the commission form of government. The city owns its water system, valued at $3,000,000, which brings from the streams and reservoirs on the slopes of Pike's Peak water noted for its purity. Pop., 1890, 11,140; 1900, 21,085; 1910, 29,078; 1920, 30,105.

COLORADO STATE AGRICULTURAL COLLEGE. A scientific school of agriculture and the mechanic arts, situated at Fort Collins, Colo., organized in 1876. The college received 90,000 acres of the lands granted to the State in 1862, and since its inception has been supported chiefly by a State tax and acts of Congress. Its gross income is about $170,000. It offers courses leading to the B.S. and M.S. degrees in engineering, agriculture, and home economics. It also includes a School of Veterinary Medicine, requiring four years to gain the degree of D.V.S. Women are admitted on equal terms with men. The library contains about 50,000 volumes. The attendance in 1913 was about 500 in collegiate grade. It also conducts a School of Agriculture of secondary grade with an attendance of over 400, and a Conservatory of Music with an attendance of over 100. The activities of the college are divided into education, research, and extension. The president in 1914 was Charles A. Lory, LL.D.

COLORATION IN ANIMALS. See BIRD; INSECT; PROTECTIVE COLORATION; MIMICRY.

COLOR BLINDNESS, ACHROMATOPSIA, or DALTONISM. An incurable defect of vision, owing to which some persons are unable to distinguish certain colors. The name "Daltonism" is derived from Dalton, the English chemist who, in 1794, discovered the condition and himself suffered from the defect. Acquired color blindness is a symptom of diseases of the optic nerve and retina. Congenital color blindness usually affects both eyes and is often hereditary, and may be partial or complete. It is found in from 3 to 4 per cent of men and less than 1 per cent of women. It occurs in eyes whose power of vision may be otherwise (as to form and distance) perfect, but errors of refraction usually coexist. It is usually partial, being a

failure to distinguish one or two of the fundamental colors—red, green, and blue. The eyes of persons having this defect of vision have been carefully examined after death without the discovery of any peculiarity. Color blindness therefore has its seat in the sensorium, not in the visual apparatus. The Hering theory is that the retina contains three pairs of visual materials—white-black, red-green, and blue-yellow. Color blindness is accounted for by the supposed absence of one or two of these substances. According to the Young-Helmholtz theory there are three primary color perceptions—for red, green, and violet. In the absence of one of these a color appears composed of the others. The most common forms of color blindness are red blindness, green blindness, and red-green blindness. To detect the defect, the method of having the patient name colors is not satisfactory, because colors may be differentiated by apparent differences of brightness. Professor Holmgren of Upsala, Sweden, devised a series of test wools which furnish the best means of recognizing defects. These are skeins of wool of certain colors ("test colors"), various tints and shades of the same colors, and so-called "confusion colors." When the patient attempts to match the colors with the other skeins, the confusion colors are often added also, and it may be noticed that there is some hesitancy in making the selections. See VISUAL SENSATION — THE COLOR TRIANGLE.

Acquired color blindness may result from disease or accident. It is a symptom of toxic amblyopia brought on by the excessive use of tobacco and alcohol. An important fact in regard to tobacco amblyopia is that the subject may show no signs of color blindness when looking at the objects near at hand, but is unable to distinguish colors at a distance. The Holmgren test would be insufficient in such a case.

The question has received serious legislative attention, and in most of the States of the Union stringent laws have been passed regarding the examination of the vision of all who depend on colors for their guidance. It is a crime in color-blind persons to pursue any calling when their defect, known to them, is liable to injure others, and it might be added that it is foolish for a color-blind painter, tailor, or milliner to attempt to compete with those who have perfect vision.

The safety of the traveling public depends in large measure upon the accuracy with which green or red signals are observed by employees of railways and ships. The colors selected for signals by transportation companies are unfortunately those which are most usually confused by the color blind—red and green. In Sweden, since 1877, only men with normal color vision have been employed in the railway service. In Holland the government controls the matter efficiently. In Italy, while there is no special law, the employees are tested. In France, in the absence of law about examination, Holmgren's test is usually employed. In Germany examination of color sense is prescribed by law. In Austria, on the state railroads, examination is made. In England there is no government regulation, the tests employed by certain companies being considered sufficient. In the United States examination for color blindness among the employees of transportation companies is general, in connection with tests for visual acuity, hearing, and other physical examinations. In some states the tests are required by law, in others, as in New York, the railroad commissioners formulate regulations. Visual tests were first begun in 1880 by Dr. William Thomson, among the employees of the Pennsylvania Railroad. In 1887 the same tests were adopted by the Philadelphia and Reading Railroad. The New York Central instituted color tests about 1890; and by 1902 the majority of the 128 railroads included in the American Railroad Association had adopted some form of color tests. Since that time the practice has become practically universal.

Chromatopsia is a condition in which objects appear tinted with certain colors. The phenomenon is common after cataract operation and may be caused temporarily by certain drugs. Large doses of santonin, e.g., often cause objects to assume a yellow tinge.

Consult: Holmgren, *De la cécité des couleurs* (Sweden, 1877); Edridge-Green, *Color Blindness* (1911); Posey and Spiller, *The Eye and the Nervous System* (Philadelphia, 1906); and Thomson and Weiland, "Detection of Color Blindness," in Norris and Oliver's *System of Diseases of the Eye*, vol. ii (Philadelphia, 1897).

COLORED FIRE. See PYROTECHNY.

COLORED HEARING, or CHROMÆSTHESIA. The anomalous association of colors with sounds. It is the commonest type of synæsthesia, or the formation of unusual connections between sensations of different sense departments. While colored hearing is relatively frequent (statistics record one person in eight), it is exhibited in very varied forms. These may, however, be grouped, in the first place, with regard to the nature and intensity of the photism (the color which is induced), and, secondly, with regard to the nature of the inducing sound. The induced color may in rare cases be of hallucinatory intensity, so as to be seen objectively when the eyes are open. Usually the intensity is less—the photism is localized (Flournoy), though not projected. In the third grade the photism is "imagined"—the color is really present as a visual sensation, but has no definite place; e.g., all soprano voices may be white, all tenor voices green. Fourthly, photisms may be simply "thought," no visual sensation being present. Finally, certain persons possess "negative photisms"—they cannot say what color a sound has, but can say what colors it "ought not" to have. Any auditory impression may serve as the inducing agency. The sources may, therefore, be grouped, for convenience, as (1) musical tones and noises (subdivided into single notes, chords and discords, musical selections, etc., each with further arrangement according to pitch, intensity, clang tint of instrument), and (2) articulate speech (vowels, consonants, words, sentences).

Can we find any uniform relation between these two series of variables, the inducing sound and the induced color? Certain investigators, using the questionary method, have answered in the affirmative. Thus, Bleuler and Lehmann say that "sharply demarcated, small, bright, or pointed photisms are aroused by high-pitched sounds. Red, yellow, and brown are frequent colors; violet and green are rare; blue stands midway in frequency. The tendency to secondary sensations (synæsthesia) is inheritable." Other investigators, who have made detailed experimental studies of a few individuals, contend that the questionary method is inadequate

and that there is a considerable degree of variation, not only between individuals, but also for the same individual at different times, so that "generalization is at present to be avoided."

Numerous theories in explanation of colored hearing have been proposed, though no one of them is entirely satisfactory. The evidence seems, however, to favor a theory which regards the colored "image" as belonging to the domain of sensation rather than to that of the image proper. An adequate explanation, therefore, must be sought in some unusual condition of the brain, and not, as has frequently been suggested, in the association of ideas. The absence of abnormality is attested by the facts that colored hearing is no more frequent among neurotic than among normal individuals and that the associations do not interfere with mental operations. They may, indeed, furnish positive sources of pleasure to their possessor. See SYNÆSTHESIA.

Consult: Bleuler and Lehmann, *Zwangsmässige Lichtempfindungen durch Schall* (Leipzig, 1881); Flournoy, *Les phénomènes de synopsie* (Paris, 1893); G. M. Whipple, *American Journal of Psychology*, vol. vi (Worcester, 1900); Gruber, *L'Audition colorée et les phénomènes similaires* (Paris, 1892); Titchener, *Text-Book of Psychology* (New York, 1910).

COLORED METHODIST EPISCOPAL CHURCH OF AMERICA. See METHODISM.

COLOR GUARD. A military escort for national and regimental colors. (See COLORS.) Formerly a position of great honor and considerable danger when on active service; now used only on regimental parades, reviews, and inspections. The United States Infantry Drill Regulations define the composition of a color guard as "two color sergeants, who are the color bearers, and two experienced soldiers, selected by the colonel."

The colors (national and regimental) are kept at the office or quarters of the colonel, unless required on parade, in which case they are escorted by the color guard, marching in one rank, the color bearers in the centre.

COLOR PHOTOGRAPHY. The reproduction by photography of natural objects in their own colors. There is no means known at present by which, using ordinary photographic processes, this is possible. When a photograph is taken with a camera and a sensitive plate, the developed negative shows an image of the object in various shades of gray, which depend upon the sensitiveness of the photographic plate to the ether waves characteristic of the colors of the natural object. It is possible so to stain a photographic plate that it is more or less sensitive to all colors; but the developed negative is always gray, except possibly for certain accidental colors which have not the faintest connection with those of the object photographed. To reproduce the colors, therefore, other methods are essential, and there are at the present time two quite distinct processes.

One of these is based upon the work and a suggestion of Prof. J. Clerk Maxwell (1831–79), of the University of Cambridge. He showed that if there were produced simultaneously in the normal eye three sensations—viz., definite shades of blue, green, and red—the eye could be made to perceive any desired color of the spectrum by properly adjusting the intensities of these three component sensations. Thus, if by any means—e.g., by sets of mirrors—the eye can be made to see at one time three ordinary photographs of any natural object, looking at one through a piece of red glass, another through a piece of green glass, and a third through a piece of blue glass, the eye will see the object in its natural colors, *provided the intensity of the deposit of silver on the original three negatives is so adjusted for each negative that the intensities of these red, green, and blue sensations are exactly such as to produce the proper color sensations.* To secure this intensity on the photographic plates, three photographs of the object must be taken, each through such a colored screen as will transmit enough light of all wave lengths to produce the desired result on the plate. Thus, one plate is exposed in a camera in front of which is a screen which allows to pass a great deal of red and small amounts of yellow and green; the second is exposed with a screen which is transparent to the green and slightly to yellow and blue; the third is exposed with a screen which is transparent to blue and slightly to green and violet. It is a question of the most careful experimenting to find what photographic plates should be used, and what colored screens give the proper intensity with them.

There are several processes of color photography based upon this general idea. In the process due to F. E. Ives, the three photographs of identical sizes are taken simultaneously on three plates, each through its proper "taking" screen. From these three negatives three positives are made by contact; and these positives, each with its proper "viewing" screen of pure red, green, or blue, placed in a so-called "kromskop" in such a manner that sunlight is reflected through them and their screens, and all three pictures are seen superimposed apparently on each other. In another process invented independently by Professor Joly, of Dublin, and Mr. McDonough, of Chicago, the three colored screens through which the photographs are taken are combined by having a series of lines of these three compound colors ruled very closely together on a piece of glass, every fourth line having the same color. A single photograph is taken through this composite screen; a positive is taken of this, and a viewing screen, consisting of a series of lines—one a pure red, the next pure green, the next pure blue—with the same spacing as in the taking screen, is superimposed on the positive, so that the colored lines come in exactly the proper positions; and this compound plate is used as a transparency by holding it up to the light, or by looking through it at a piece of white paper which is brightly illuminated.

Quite a different process, although of the same general principle, has been invented by Professor Wood, of Johns Hopkins University. It depends for the production of the pure colors, red, green, and blue, upon the phenomena of diffraction gratings (q.v.), by means of which white light may be dispersed into pure colors. (For details concerning this process, consult the references given at the end of this article.)

The most prominent modern system of color photography is that based upon the use of the autochrome plate, which has been perfected by Lumière Frères. The principle underlying the production of this plate is briefly as follows: upon a piece of clear glass numberless starch granules are caused to lie side by side, some of the granules having been dyed red, others green,

and the remainder blue. By filling in the interstices between the granules with opaque material the light transmitted by the plate comes through a single layer of dyed starch granules which have been so thoroughly mixed that the plate has a grayish appearance. Upon this minute mosaic there is flowed a photographic emulsion sensitive to the entire visible spectrum. The plate is exposed in an ordinary camera, the glass side of the plate being towards the lens. To make clear the behavior of the plate, let it be assumed that a red blossom is being photographed. The red light in the image of this blossom will have to pass through the starch granules before reaching the sensitive emulsion and, as only the red granules will transmit this light, the emulsion is acted upon only at the spots underlying red granules. The plate is next developed and then "reversed," i.e., portions which had developed out black are made transparent and vice versa. Since, now, the spots under the red granules alone have become transparent and since only those lying within the extent of the image have been affected, a beautiful colored image of the blossom is seen as the plate is viewed in transmitted light.

In contrast to Ives's process, the above suffers from the defect that the "taking" and the "viewing" screens, i.e., the starch granules, must necessarily be the same. While this circumstance brings about a loss of fidelity in the reproduction of certain spectral colors, the method is nevertheless capable of yielding very beautiful results, even in the hands of amateurs.

An entirely different physical principle is made use of in the Lippmann method of color photography; it depends upon the fact that the colors seen by the eye are caused by ether waves of different wave number; and so, under proper precautions, it is possible to have "stationary vibrations," so called, produced. If one vibrates rapidly the end of a long rope, the other end of which is fastened to a wall, waves are sent along the rope; reflected waves are produced; and, as the direct and reflected waves are thus superimposed, there are certain points, regularly spaced, where the two waves neutralize each other's action, while in between these "nodal" points the string vibrates exactly as if it were an ordinary string stretched between two fixed pegs. This is called a stationary vibration; and the distance between two nodal points equals half the wave length of the train of waves which is the original cause of the vibration. The same phenomenon may be produced by ether waves if allowed to fall upon a mirror. In Lippmann's process a photographic plate of particularly fine grain is placed so as to form one side of a bath containing mercury, the film side being in contact with the mercury. If light of a definite color falls upon the photographic plate, the waves enter the film, reach the mercury, are reflected, and form stationary vibrations. In between the nodes there will be chemical action, which is thus confined to plane surfaces, parallel to each other and very close together, their distance apart depending upon the wave number of the light. If this photographic plate is now suitably developed, the nodal planes will be dissolved out largely, thus forming of the film a pile of parallel plates at minute intervals. If such a pile of plates is viewed with white light, it will appear to be of the same color as that of the light which produces the chemical action, owing to the phenomena of interference (q.v.). Similarly, if the colored light from any natural object falls upon the film in its original condition, each color will produce its own stationary vibration and its own set of parallel planes, where there is chemical action; and so, when developed and viewed in white light, the image will have the proper colors of the object itself. (The above explanation of the Lippmann process is not complete; it offers but a rough idea as to what takes place. In fact, a satisfactory explanation of all the phenomena is not known.) Recent work of H. E. Ives has shown that if a slow, clean working developer be used, and if the developed plate be bleached with mercuric oxide, films containing hundreds of laminæ may be produced. These laminæ impart to the film so high a resolving power that spectral colors of great purity are reflected back when white light is incident upon the plate.

To print in the natural colors the photograph of any colored object is perfectly possible by a simple modification of the method of Ives or of Joly-McDonough, which will be found discussed under THREE-COLOR PROCESS. For additional information, see: Wood, *Philosophical Magazine*, vol. xlvii (London, 1899); Joly, *Nature*, vol. liii (ib., 1895–96); Lippmann, *Proc. Royal Society of London*, vol. lx (ib., 1896); Wiener, *Smithsonian Report* (Washington, 1896); Bolas, Tallent, and Senior, *A Handbook of Photography in Colors* (New York, 1900); Donath, *Die Grundlagen der Farbenphotographie* (Brunswick, 1906); R. Child Bayley, "The Autochrome Plate," in *Scientific American*, vol. xcvii, pp. 42–43 (1907); J. H. Powrie, *Photographic Journal*, vol. xlviii, pp. 3–9 (1908).

COLOR PRINTING. See THREE-COLOR PROCESS; LITHOGRAPHY.

COLORS, MILITARY AND NAVAL. The term applied to the national flag or ensign wherever it is displayed and also to other flags, banners, or guidons carried by military bodies and usually indicating their designation. Emblems, banners, or similar devices have been in use among soldiers and sailors from remotest antiquity. They have been conspicuous in the past for their great moral as well as practical value to the troops carrying them. The older and more historic the colors, the greater their moral value; for the soldiers of succeeding generations would vie with each other in maintaining their traditions and adding to their glory, with the result that many of the greatest exploits of military valor have been born of this desire. In practice they were the rallying point of the organization, the embodiment of its history, and the material symbol of headquarters. They have been in use in battle in every army and in every age. In modern armies the colors are still carried in campaign, but not on the firing line as formerly. An exception to this rule is found in British regiments, which, ever since the battle of Isandhlwana (1879), never imperil the colors when engaged in savage warfare. They still retain their historic and moral value. With the British infantry, colors were originally known as *ensigns* (q.v.), each company carrying its own color. This soon gave way to the system at present in use, whereby each regiment or battalion is supplied with a royal or King's color and a regimental color. The former is a *Union Jack* and the latter a flag of the same color as the facings (q.v.) of the regiment, with the blue union in the corner and the title,

number, and honors of the regiment embroidered upon its folds. Both colors are made of silk, measure about 3 feet 9 inches by 3 feet, and are each mounted on a pole of about 8½ feet in length. Cavalry regiments of the Guard carry oblong *standards*, and dragoon regiments, *guidons*. Both types are made of crimson silk. The Royal Artillery, Royal Engineers, Lancers, Hussars, and Rifle regiments do not carry colors. Since the Zulu War of 1880 British troops no longer take their colors with them when on active service.

In the British military service at the public mounting of garrison guards an elaborate ceremony of considerable antiquity, known as *Trooping the Colors*, is often observed. The origin of this custom goes far back and is said to be uncertain, but it is one of the most impressive ceremonies in the formal routine of the British army. The colors, after being received by an officer, are carried under the escort of the color guard from the left to their position at the right of line between ranks of troops. In the military service of other countries various formalities attach to receiving the colors and having the color guard take their appointed positions in ranks while the assembled regiment presents arms, but in no service is the ceremony as elaborate as in the British army. See ENSIGN.

The colors carried in the United States army by the various regiments and battalions are two in number, the national flag (see FLAG) and the regimental color, both of which are of prescribed size and form for the various arms of the service. The flags of mounted regiments are called *standards;* those of dismounted or foot troops, *colors*. The battalions of engineers carry the national flag, with the title of the battalion embroidered in silver on the centre stripe; and the battalion color, of scarlet silk having in the centre a castle, with the number of the battalion placed above the castle, and the words "U. S. Engineers" below. The coast artillery corps have similar colors, on which the corps device of two crossed cannon are emblazoned. Infantry regiments have the same national color as artillery and engineers; the regimental color being of blue silk, the coat of arms of the United States embroidered in silk on the centre, beneath the eagle, a red scroll with number and name of regiment embroidered in white; cavalry standards in size are somewhat smaller than those carried by the infantry and consist of a national flag made of silk. The regimental standard is of yellow silk, with the coat of arms of the United States embroidered in silk on the centre, beneath the eagle a red scroll, with number and name of regiment embroidered in yellow, fringe yellow. The national standard for field artillery regiments is as prescribed for cavalry. The regimental standard, of the same size, is of scarlet silk embroidered as for cavalry except that the number and name of the regiment is in scarlet on a yellow scroll.

According to the *United States Army Regulations* (1913, par. 232) the national and regimental colors and standards will be carried in battle (usually with the main body or reserve), campaign, and on all occasions of ceremony in which two or more companies participate. At other ceremonies it is carried only when specially ordered. The names of battles in which one or more companies of a regiment, or of the battalions of engineers, or of the artillery corps, have borne a meritorious part are engraved upon silver rings fastened on the pikes or lances of the colors. Each troop of cavalry, battery of field artillery, mounted section of engineers, and mounted company of the signal corps, has a guidon (q.v.) on which the numbers or letters designating the command are inscribed. Camp colors are small flags used to mark the location of some particular headquarters or organization.

In naval usage colors play an equally important part. On board old-fashioned ships they are flown at the peak of the spanker gaff, but on recent ships a special flagstaff fitting in sockets at the stern is used for the colors. In port they are hoisted at 8 A.M. and kept hoisted until sunset. On board ships of the United States navy, when the colors are hoisted, they are saluted by a call on the bugle, or the band, if there is one on board, plays the "Star-Spangled Banner." While the colors are going up and the bugle or band is playing, all officers and men on the upper deck face aft and salute as the colors reach the head of the staff. Dipping the colors (i.e., lowering them a short distance and then hoisting them again) is a species of compliment or salute, but United States naval vessels are forbidden to dip their colors except in returning such a salute. Colors are half-masted to express mourning and hauled down to indicate surrender or submission. When colors are carried in a funeral procession, they are draped with black crape. See BUGLE AND TRUMPET CALLS.

COLOR SERGEANT, sär'jent *or* sēr'-. In the United States army, a noncommissioned officer of the rank of sergeant detailed for the color guard (q.v.). Two sergeants are detailed for each color guard. The senior carries the national, the junior the regimental color. In the British army he is the equivalent, in rank, of the United States army first sergeant, but formerly was one of the noncommissioned officers constituting the color guard, from which fact the present title is derived.

COLORS OF ANIMALS. See EVOLUTION.

COLORS OF THIN PLATES. See LIGHT, *Interference and Diffraction.*

COLOR SYMBOLISM OF THE AMERICAN INDIANS. The Navaho, Osage, Winnebago, Hopi, Arapaho, Sioux, Zuñi, and no doubt many other tribes employed colors to symbolize various religious and mystic concepts. The Sioux and several other Plains tribes used colors to symbolize deeds in a system of heraldry. Each tribe, however, had its own way of associating the colors, so that no general statement of details can be made. Consult *Handbook of American Indians* (Washington, 1907).

COLOS'SÆ (Lat., from Gk. Κολοσσαί, *Kolossai*, also spelled Κολασσαί, *Kolassai*). An ancient city of Phrygia in Asia Minor, situated on the south bank of the Lycus River, where it enters a deep gorge through the ridge that divides the upper from the lower Lycus valley, some distance below which it joins the Mænander. Colossæ was at one time the most important city of southwestern Phrygia, lying on the trade route from Sardis to the south and east. Like its near neighbors, Laodicea and Hierapolis, it probably carried on an extensive trade in the dyed woolen goods for which the region was famed. Unlike Hierapolis, however, it was without natural advantages and was finally outrivaled by the trade of Laodicea. In Roman times the town had lost a considerable share of its former importance. In Byzantine times it

largely retrieved its fortunes and was protected by a fortress built at Chonæ, the modern *Khonas*, on a spur of Mount Cadmus, 3 miles southeast of the city. In the later centuries the population of the city gathered around the fortress, leaving the city finally to disappear. Christianity made its way to Colossæ in the days of Paul, not through his personal visitation (cf. Col. ii. 1), but through evangelistic work directed during his long sojourn at Ephesus (cf. Acts xix. 10), and carried on probably by Epaphras in the general region of the Lycus valley (cf. Col. iv. 12, 13). During his first imprisonment at Rome Paul sent to the city two letters—one addressed to the church and the other to Philemon, an individual belonging to the church. Through the Phrygian element in the membership the church was more or less infested with a mysticism derived from the native religious (cf. Col. ii. 1–19). Consult Ramsay, *Cities and Bishropics of Phrygia*, vol. i (1895). See COLOSSIANS; PHILEMON.

COL'OSSE'UM. See AMPHITHEATRE.

COLOSSIANS, kŏ-lŏsh'ĭ-*anz or* kŏ-losh'*anz*, EPISTLE TO THE. In the oldest Greek manuscripts the title is simply *πρὸς Κολοσσαεῖς*, 'to the Colossians.' One of Paul's Epistles, addressed to the Christians at Colossæ (q.v.).

This letter, and those sent to the Ephesians and Philemon, make a closely connected group of three writings of the Apostle, addressed to the same general region and written about the same time, probably at Rome during Paul's imprisonment mentioned in Acts xxviii. With Philemon it is connected by an identity of personal references, cf. iv. 9 and Philem. verse 10; iv. 12 and Philem. verse 23; iv. 17 and Philem. verse 2; to Ephesians it is bound by a significant community of contents.

The general outline of the Epistle is as follows: After an *introductory* section (i. 1–13) the Apostle passes almost imperceptibly to an extended statement of the *nature* and *work of Christ* (i. 14–ii. 3). Then he discusses and warns against the *false teachings* by which the church at Colossæ was threatened (ii. 4–23). This is followed by a *hortatory* section, in which the church is urged to live up to the doctrine of the faith (iii. 1–iv. 6), after which *personal* matters, salutations, etc., close the letter (iv. 7–18).

The Pauline authorship of Colossians has been vigorously assailed by such individual critics as Mayerhoff (1838) and Holtzmann (1872), and by such schools as that of Tübingen (1845)—the critics holding that it gives proof of a literary imitation of other writings (Ephesians) which prevents it from being considered genuinely Paul's; the school claiming that it betrays such a presence of second-century Gnostic ideas as to make it necessary to assign it to that post-Pauline age. Neither of these contentions is accepted as valid by the best scholars of the present time. As a matter of fact, assuming, as a working hypothesis, the claim involved in the Epistle's greeting that it was written by Paul, the document shows itself throughout so consistent with the claim as to make it critically impossible to deny its validity.

Within the circle of those who accept its Paulinity, however, the chief question among critics to-day concerns the nature of the errors opposed by the Apostle. From a careful study of the Epistle the following facts are apparent: 1. The errors had not developed to such an extent as to cause separation from the Church (the phrase in ii. 19 "not holding fast to the Head" could hardly be said of full separatists). 2. The teachers were Jews, and Jews of a Judaistic type (the references to circumcision in ii. 11 and to the ordinances of the law in ii. 14 show that Paul was opposing propagandists of a Jewish legalistic character). 3. At the same time they went beyond this type (see the mention of "drink" in the warning of ii. 16, an element which did not enter into the restrictions of the Judaizers; see also the designation of their position as being "according to the traditions of men" (ii. 8), and "according to the precepts and teachings of men" (ii. 22), which would not have been a natural way for Paul to designate the Judaistic position that rested on the authority of the Old Testament law; notice also the absence of all antithesis between faith and works and of any insistence on legalism as necessary to salvation, which were characteristics of the Judaistic propaganda). 4. Further, there are passages which might seem to indicate that these teachers were under the influence of Essenism, though they do not show them to have been Essenes (e.g., ii. 20–23, which describes their regulations as an ascetic severity towards the body—*ἀφειδία*—though asceticism is evidently not represented as practiced as an end in itself, as it was with the Essenes; ii. 18, which shows them to have been given to angel worship, a cult which was perhaps more consonant with Essenism than with the practice of Judaizers, though this worship was also apparently accompanied by visions which were foreign to Essenism). 5. There are passages which seem to indicate the presence of Gnostic elements in these errors (e.g., ii. 2–9, which give us characteristic Gnostic terms such as "the *mystery* of God," "all the *fullness* of the Godhead," also ii. 10, which discloses the distinctive Gnostic idea of a graded series of supernatural beings, conceived of as emanations from God—"who is the head of all principalities and powers." This idea is repeated in verse 15—"having despoiled the principalities and powers"—and appears in various forms in the long passage i. 15–20, e.g., "the first-born of all creation"—"in Him were all things created, in the heavens and upon the earth, things visible and things invisible, whether thrones or dominions or principalities or powers"—"He is the head of the body, the Church, who is the beginning, the first-born from the dead," which latter passage, together with ii. 9–11, 15, 19, shows the significant emphasis placed by the Apostle upon the supremacy of Christ in both the physical and the spiritual worlds, and the absolute essentiality of union with Him in order to foster spiritual life and well-being. Such a full recognition of the supreme and sole mediatorship of Christ would serve to combat the Gnostic tendency to subordinate Him to the category of these angelic emanations, which seems to have been one of the most serious of the false teachings). 6. These errors, moreover, while vague and indeterminate, appear to have been set forth as mutually related, and to have been promulgated in a very dogmatic way (cf. ii. 4, 8, 18), being held forth as a mystery known only to the initiated (cf. Paul's counterassertion in ii. 2–3; iii. 3).

It would thus seem that these errors constituted a teaching of a more or less systematic kind, in which the underlying speculative principles were brought to bear upon the rule and

habit of life; that it was something more than mere Judaism, even Judaistic Judaism; that, in its main features, it was due to an attitude of mind somewhat similar to that which produced Essenism, and that it also possessed elements which appear in a more fully developed form in the Gnosticism of the second century. The great difficulty is in historically locating such a combination as is here presented to us.

In the effort to solve this problem it is to be remembered: (1) that, while these errors constituted a system of teaching, the system was not a fully developed one—at least Paul does not so treat it; (2) that Gnosticism was, in reality, an attempt to assimilate Christianity and philosophy, and that its philosophic element was a mystical rather than a logical one, so that we should be prepared to find the place of its beginnings in the East rather than the West; (3) that this attempt at assimilation was made on the principle of eclecticism, Gnosticism being, in fact, a combination of Jewish, Pagan, and Christian elements, the Jewish element being furnished by such types of thought as are seen in the Apocalyptic literature (e.g., in the Book of Enoch with its extensive angelology), and in certain of the doctrines of the Essenes, the Pagan by Hellenic philosophy and Oriental theosophy, the Christian by the evangelistic preaching; (4) that, as these Jewish speculative tendencies came in contact with Eastern speculation, they fermented, and this fermentation, going on within the Christian Church and in contact with Christianity, gave rise to Gnosticism.

Inasmuch, therefore, as this Epistle was sent to a church of the East, in the region where and at the time when the thoughtful Jew and the philosophic Greek and the theosophic Oriental were coming together—especially to this region of Phrygia, the home of one of the most mystical of the Pagan cults, that of Attis and Cybele, and whose Jewish population had been originally imported out of Babylon, from which place they may have brought with them an Oriental habit of Jewish thought—it would seem as though we had in these Colossian errors a specimen of just that process of fermentation which produced the beginnings of Gnosticism.

The attempt of Harnack and others to consider the Apostle as referring to parish difficulties of a purely practical nature, devoid of all speculative elements, results from a superficial exegesis which does not take the Epistle seriously.

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COLOSSOCHELYS, kō-lŏs'sō-kē'lĭs (Neo-Lat., from Gk. *κολοσσός, kolossos,* colossus + *χέλυς, chelys,* tortoise). A gigantic fossil turtle found in the Pliocene deposits of India. See TURTLE.

COLOS'SUS (Lat., from Gk. *Κολοσσός, Kolossos*). A rare Greek word of unknown origin, used to denote a statue very greatly above the size of life. The English adjective colossal has a wider sense, denoting all statues which exceed the size of life. Innumerable colossi were raised in Egypt, mostly of the hardest stone, many of them 50 to 60 feet in height. Among the most celebrated are the two statues of Amenophis III. (See MEMNON.) It was in Greece that the most famous colossi appeared; e.g., three by Phidias —the bronze statue of Pallas Athene, on the Acropolis of Athens, the plume of whose helmet and the point of whose spear were landmarks to sailors between Sunium and Athens; another statue of the same goddess, of gold and ivory, in the Parthenon at Athens; and the Olympian Zeus, of the same material. Among the seven wonders of the Old World was reckoned the Colossus of Rhodes, representing Helios, the sun god, the national deity of the Rhodians, the work of Chares, of Lindus. It was erected by the Rhodians, at a cost of 300 talents, apparently as a thank offering after the successful defense of the city against Demetrius Poliorcetes. It is said to have been of bronze, cast in separate pieces, and to have occupied the artist 12 years. It was set up about 280 B.C., but 56 years later was overthrown by an earthquake, and lay in ruins until in 653 A.D. the Arabs captured the city and sold the metal to a Jewish merchant. The height was probably about 90 feet. The Hellenistic age seems to have taken delight in colossal statues and groups, and the Romans followed the Greeks. We hear of a statue of Jupiter on the Capitol made from the spoils of the Samnites, of such a size as to be visible from the Alban Hills. More celebrated was a Colossus of Nero, executed in marble, 110 or 120 feet high, from which the neighboring amphitheatre is believed to have derived the name of "Colosseum." At the death of Nero the head was changed to that of the sun god. The colossus was subsequently moved by Hadrian to make room for his temple of Venus and finally disappeared during the Middle Ages. Its later pedestal, discovered in 1828, may be seen between the Colosseum and the temple built by Hadrian. In modern times many colossal statues have

been set up. Especially celebrated are the "Bavaria," at Munich, the "Germania," at the Niederwald on the Rhine, the equestrian statue of Peter the Great in St. Petersburg, and the Bartholdi statue of "Liberty Enlightening the World" in New York harbor.

COLOS'TRUM (Lat.). A term applied to the first milk yielded after the birth of the young. It differs materially from ordinary milk in appearance and composition and is ordinarily considered unfit for consumption or manufacture. When examined under the microscope, it is found to contain, in addition to the ordinary fat globules of milk, peculiar aggregations of very minute fat granules, which are known as colostrum corpuscles or colostrum bodies, and which are probably the débris of the cells of the mammary gland. The chief chemical differences between colostrum and milk are a larger percentage of total solids and ash, a much greater proportion of albumin to casein, and less milk sugar. The fat differs somewhat in character from that of normal milk, containing considerable colesterine. Colostrum exerts a purgative effect upon the new-born infant and thus removes the meconium which has accumulated in the fetal intestine. Colostrum disappears as such within a few days after parturition, gradually assuming the characteristics of normal milk.

COL'PEO. A fox dog (*Canis magellanicus*) of Patagonia and Tierra del Fuego, larger, redder, and more wolflike than the other South American species. See Fox Dog.

COLPEPER, Thomas. See Culpeper, Thomas.

COL'PORTAGE (from Fr. *colporter,* to carry on one's neck, from *col,* Lat. *collum,* neck + *porter,* Lat. *portare,* to carry). The distribution of religious publications, books, tracts, etc., by carriers called *colporteurs.*

COLQUHOUN, kō-hōōn', Archibald Ross (1848–1914). An English traveler. He became associated with the Indian Department of Public Works in 1871. After acting as secretary of the British Commission to Siam, he in 1881–82 and 1883–84 made extensive tours of exploration in order to find a route for a railway between India and China. He became Administrator of Mashonaland in 1890, and in 1895 visited Central America as a representative of the Panama and Nicaragua canal projects. His travels are related in the various books he wrote, which include: *Across Chrysé* (2 vols., 1883); *The Opening of China* (1884); *English Policy in the Far East* (1885); *The Key of the Pacific* (1895); *China in Transformation* (1898); *Overland to China* (1901); *Greater America* (1904); *Mastery of the Pacific* (1904); *The Africander Land* (1906); *The Whirlpool of Europe; Austria-Hungary and the Hapsburgs* (with Mrs. Colquhoun, 1907); *From Dan to Beersheba—Reminiscences of Public Service* (1908); *Germany and Sea Power* (1909); *China in Reformation* (1912).

COLQUHOUN, John (1805–85). A Scottish writer on sport. He was born at Edinburgh and was educated at the university in that city. In 1840 he recorded his manifold adventures as a sportsman in the extremely interesting and popular volume entitled *The Moor and the Loch,* with an autobiographical preface (4th ed., 1878). He is also author of: *Rocks and Rivers* (1849); *Salmon Casts and Stray Shots* (1858); *Sporting Days* (1866).

COLQUHOUN, Patrick (1745–1820). An English police magistrate and writer, known for his efforts in behalf of administrative reform and the amelioration of the condition of the poor. He was born at Dumbarton and at an early age went to Virginia, where he became a successful merchant. Returning to Glasgow in 1766, he became a leader in public affairs, and in 1782 founded the Glasgow Chamber of Commerce, the oldest institution of its kind in Great Britain. He removed to London in 1789 and published there in 1795 his famous *Treatise on the Police of the Metropolis,* in which he advocated a complete reform of the police system of that city. Several of the recommendations made by him in the work, which passed through seven editions, were subsequently adopted. In consequence of the numerous important municipal reforms introduced by him, he was appointed magistrate at Westminster, London, in 1798. He published other treatises, including: *System of Education for the Laboring People* (1806); *On Indigence* (1806); *On the Population, Wealth, Power, and Resources of the British Empire* (1814; 2d ed., 1815).

COLQUHOUN, Sir Patrick, or Mac Chombaich de (1815–91). An English lawyer. He was a great-grandson of Patrick Colquhoun (q.v.) and was educated at Westminster, Cambridge, and Heidelberg. While at Cambridge he became an expert oarsman, and in 1837 he won the Wingfield sculls, making him the amateur champion of England. He was for many years a member of the British diplomatic service, more particularly in Saxony, where he was Councilor of Legation until 1866. He also held the position of Chief Justice of the Supreme Court of the Ionian Islands while these were under British rule (1861–64). His principal work is a *Summary of the Roman Civil Law* (4 vols., 1849–54).

COL'QUITT, Alfred Holt (1824–94). An American soldier and politician, the son of Walter T. Colquitt (q.v.). He was born in Walton Co., Ga., graduated at Princeton in 1844, and was admitted to the bar in the following year. He volunteered for service in the United States army at the beginning of the Mexican War; was soon afterward appointed major, and served as an aid to General Taylor at the battle of Buena Vista. From 1853 to 1855 he was a prominent Democratic member of Congress, but at the expiration of his term declined a renomination; he was a member of the Georgia Legislature in 1859. On the approach of the Civil War he became an active secessionist and was a prominent member of the Georgia secession convention in 1861. He enlisted in the Confederate army early in 1861; quickly rose from the rank of captain to that of major general; was engaged in most of the operations in Virginia; distinguished himself at Antietam and Petersburg, and was engaged at the battle of Olustee, Fla., and the defense of Fort Fisher. After the war he was Governor of Georgia from 1876 to 1882 and was a member of the United States Senate from 1882 until his death.

COLQUITT, Walter T. (1799–1855). An American lawyer and politician, born in Halifax Co., Va. He studied at Princeton, read law at Milledgeville, Ga., was called to the bar in 1820, and practiced with great success, first at Sparta and later at Columbus. He was circuit judge from 1826 to 1832. In 1834 and 1837 he was a member of the State Senate of Georgia, and from 1839 until his resignation in 1840 occupied a seat in the Federal House of Representatives. In 1842–43 he was again in Congress

and from 1843 until his resignation in 1848 was a United States Senator. He was originally a States-rights Whig, but became a Van Buren Democrat. During the Mexican War he was strongly opposed to the Wilmot Proviso (q.v.).

COLT, kōlt, Le Baron Bradford (1846–1924). An American jurist and legislator, born in Dedham, Mass. In 1868 he graduated from Yale College and in 1870 from the Columbia Law School. He spent a year in European travel, practiced law in Chicago and in Providence, R. I., and was a member of the General Assembly of Rhode Island from 1879 to 1881. In the latter year he was appointed United States district judge for Rhode Island by President Garfield, and three years later, by President Arthur, United States circuit judge for the first judicial circuit. He held this office until Jan. 21, 1913, when he was elected United States Senator for the term expiring 1919.

COLT, kōlt, Samuel (1814–62). An American manufacturer, inventor of the revolver. He was born in Hartford, Conn., where he worked in his father's factory. Obtaining a knowledge of chemistry, he lectured on that subject in the United States and Canada, and in 1835 secured patents for a revolving pistol, a wooden model of which he had made while at sea when a boy. In the same year the Patent Arms Company was formed for the manufacture of his invention, but became insolvent in 1842 through insufficient demand for its product. In 1847 Colt contracted to make 1000 weapons for General Taylor, and the improvement of the revolver, together with the increased demand for it, set the business on a stable footing, while new improvements were constantly made in the weapon. In 1852 he built a large armory in Hartford, where, besides firearms, machinery was made for their manufacture in other places, notably at the English and the Russian arsenals. He invented a battery for submarine harbor defense, and in 1843 laid and successfully tested in New York harbor the first submarine telegraph cable. His line was insulated with a combination of cotton yarn, beeswax, and asphaltum, incased in a lead pipe, gutta-percha not then having been discovered.

COLTMAN, Robert, Jr. (1862–). An American physician, born in Washington. He received his professional training at Jefferson Medical College, Philadelphia, and in 1881 began the practice of medicine. In 1896 he was appointed professor of anatomy at the Tung Wen College, Peking, and in 1898 professor of surgery at the Imperial University, Peking. During the siege of Peking by the Boxers in 1900 he sent out the first message that reached the outside world, acting as correspondent for the *Chicago Record.* He became attorney for the Standard Oil Company at Tientsin, China. He is author of *The Chinese, their Present and Future: Medical, Political and Social* (1891) and *Yellow Crime, or Beleaguered in Peking* (1901).

COLTON, kōl'ton. A city in San Bernardino Co., Cal., 58 miles east of Los Angeles, on the Atchison, Topeka, and Santa Fe, the Southern Pacific, and the San Pedro, Los Angeles, and Salt Lake railroads (Map: California, H 8). It is an important shipping centre for fruit and vegetables, has railroad-car shops, large precooling plants, canneries and packing houses, cement works, flour mills, and fertilizer plants. The water works and electric-light plant are owned by the city. Pop., 1900, 1285; 1910, 3980.

COLTON, Arthur (Willis) (1868–). An American writer of stories, born at Washington, Conn. He was educated at Yale University (A.B., 1890; Ph.D., 1893) and was instructor in English there in 1893–95. In 1906 he became librarian of the University Club, New York City. Besides his contributions to *Harper's, Scribner's, Collier's,* and the *Atlantic Monthly,* he is author of *Bennie Ben Cree* (1900); *The Delectable Mountains* (1901); *The Debatable Land* (1901); *Tioba* (1903); *The Belted Seas* (1905); *The Cruise of the Violetta* (1906); *Harps Hung Up in Babylon,* poems (1907).

COLTON, Charles Henry (1848–1915). An American Roman Catholic bishop, born in New York City. He was educated at St. Francis Xavier College and at St. Joseph's Seminary, Troy, N. Y. Ordained a priest, he was assistant (1876–86) and pastor (1886–1903) at St. Stephen's Church, New York City. After 1896 he was also chancellor of the archdiocese of New York until 1903, when he was consecrated Bishop of Buffalo. He is author of *Seedlings* (1906); *My Trip to the Holy Land* (1906); *Buds and Blossoms* (1910).

COLTON, George Radcliffe (1865–1916). An American public official, born at Galesburg, Ill. He was educated at Knox College. He was a ranchman in New Mexico in 1881–86, a member of the Nebraska House of Representatives in 1889–90, and a national bank examiner for the District of Nebraska in 1897. As lieutenant colonel of the First Nebraska Volunteer Infantry he went to the Philippine Islands, where he remained, upon the American occupation, to organize the Manila customs service. In 1905 he undertook a similar task in Santo Domingo. He was insular collector of customs in the Philippines from 1907 to 1909, and then became Governor of Porto Rico. The new tariff bill for the Philippines, enacted by Congress in 1909, was drafted by him.

COLTON, kōl'ton, Walter (1797–1851). An American writer. He was born in Rutland, Vt., graduated at Yale and Andover, and for several years was professor of moral philosophy and belles-lettres in the Middletown (Connecticut) Academy. In 1831 he became chaplain in the navy. He was made alcalde of Monterey, Cal., in 1845, and founded the *Californian,* the first newspaper published in that State. He also built the first schoolhouse and made the first announcement of the discovery of gold. Colton edited newspapers in Washington, Charlestown, Mass., and Philadelphia, and published *Ship and Shore in Madeira, Lisbon, and the Mediterranean* (1835); *A Visit to Athens and Constantinople* (1836); *Three Years in California* (1850); *Deck and Port* (1850); *The Sea and Sailor* (1851).

COLTS'FOOT'. See Tussilago.

COLU'BRIDÆ (Neo-Lat. nom. pl., from Lat. *coluber,* serpent). The largest and most scattered family or group of snakes. It is variously limited by systematic authors and has served as a residuary group for all serpents not easily classified elsewhere, so that a definition is difficult. The group, however, may be said to include the "common" small, harmless serpents everywhere. The garter snakes, water snakes, hognose, etc., are North American representatives of this family, to which, indeed, all nonvenomous American snakes belong except a few species along the Mexican border.

COLUGO, kō-lōō'gō, or Kaguan. See Cobego.

COLUMBA. See Calumba.

COLUM'BA, Saint, Saint Colum-cille, or Saint Colm (521–597). An Irish missionary, one of the greatest names in the early ecclesiastical history of the British Isles. He was born at Gartan, County Donegal, northwest Ireland, Dec. 7, 521. His father was Fedhlmidh, of the powerful Clan O'Donnell, and related to several of the rulers of Ireland and west Scotland; his mother was Eithne, who also boasted royal ancestry. He studied first at Moville, County Down, 5 miles south of Bangor, on Belfast Lough, under Bishop St. Finnian, and was ordained deacon by him; next under another St. Finnian, at Clonard, who ordained him a priest. He was early distinguished by his piety, and the name Columba, i.e., 'dove,' was recognized as an appropriate one. He showed rare monastic zeal. In 545 he founded the church and monastery of Derry, and in 553 those of Durrow, not far west of Dublin. The latter became of great importance and in both places the saint is still commemorated by a well and a stone. He founded other monasteries, the chief of which was Kells. In 561 he embroiled himself in the civil strifes of his country and was charged with having incited the bloody battle of Culdreimhne (now Cooladrummon), because he appealed to his tribe to defend by force of arms the copy of the Latin Psalter which he had made from one borrowed of his old teacher, St. Finnian of Moville. Legend says that for this he was required to do penance by foreign missionary labor. In 563 he headed a little company of 12 disciples and sailed across to the west coast of Scotland, and landed upon the little island of Hy, since called I-colum-cille, but better known as Iona. There he began the great work of converting the Picts, to which he owes his fame. His missionary operations were probably very simple, consisting of persistent personal appeals. In the legends which are told about him, as in the life of him by Adamnan and in the *Book of Deer*, a Celtic manuscript of the eleventh or twelfth century, preserved at Cambridge, England, edited by John Stuart for the Spalding Club (Aberdeen, 1869), many miraculous occurrences are narrated. He promoted monasticism, overcame the opposition of the Druids, made many converts, including royal personages, and founded many churches. As in Ireland, so in Scotland, he took part in secular affairs. He died at Iona at midnight between June 8 and 9, 597. With loving care his bones were enshrined, and his relics—the stone pillow on which he slept, the books he loved so well, the staff which was the symbol of his pastoral authority, and other objects which he had used—were long preserved and exhibited. Columba was a poet, and three Latin hymns now extant are attributed to him. In one of them, the "Altus Prosator," published with an English paraphrase, by John, Marquis of Bute (Edinburgh, 1872), each strophe begins with a different letter, in alphabetical order. Besides these, some Celtic poems were attributed to him, and a Rule (printed in Celtic and English in Haddon and Stubbs, *Councils and Ecclesiastical Documents*, vol. ii, p. 119, and in English only in Skene, *Celtic Scotland*, vol. ii. p. 508).

Columba, while he was an ascetic, was an eager student and made copies with his own hand of documents which fell in his way. Two of these—the *Book of Kells* and the *Book of Durrow*—were long preserved. His energy sometimes led him to harsh actions, but that he was tender-hearted the affection of his monks evinces. He seems to have had original ideas upon church government; for Bede writes of Iona that its ruler was "an abbot, who is a priest, to whose direction all the province, and even the bishops, contrary to the usual method, are subject, according to the example of their first teacher [Columba], who was not a bishop, but a priest and a monk" (*Eccles. Hist.*, vol. iii, p. 4). Bede then criticizes the Columban monks because they did not, until 715, keep Easter after the Western manner, but upon the 14th of Nisan, or whatever day it came, as the Eastern church did. Their religious services were numerous, but the rest of their time was spent in labor, either in working upon their fields and tending cattle (for they raised what they needed for their support), or in copying books, particularly the Bible, or in studying or in teaching others. Latin was spoken as well as Celtic and was employed by them in writing. Some of the monastic communities contained famous schools. The continuance of the memory of St. Columba in Scotland is shown by the fact that his is one of the commonest names given to a church, even to-day, among the Presbyterians. The life of St. Columba was written by two of his successors in the abbacy of Iona—Cuimine Ailbhe, seventh abbot (657–669), whose *De Virtutibus Sancti Columbæ* (printed by Pinkerton, London, 1789; Paisley, 1889) was incorporated in the *Vita Sancti Columbæ* of Adamnan, the ninth abbot (679–704). But both these writers are concerned not so much with the life as with the prophecies, miracles, and other unusual phenomena which were ascribed to their subject, and so the amount of real biographical facts is very small. This life by St. Adamnan is, however, one of the best of the mediæval lives of saints. It has been edited in a very superior manner, first by W. Reeves (Dublin, 1857), and again upon Reeves's edition by J. T. Fowler (Latin text and English notes, Oxford, 1894; Eng. trans. of the text, 1895). There is a more recent English translation by Wentworth Huysche (London, 1906). Consult also Chevalier, *Repertoire des sources historiques* (q.v.) (Paris, 1905); Macgregor, *Stories of Three Saints* (New York, 1908); Leahey, *Columbanus, the Celt* (Philadelphia, 1913); Troup, *St. Columba; the Lord's Song in a Strange Land* (London, 1913).

COLUM'BÆ (Lat. nom. pl. of *columba*, dove), or **COLUM'BIFOR'MES.** An order of birds, containing the pigeons (Columbidæ and allied families) and the dodos (Didiidæ). See Dodo; Dove; Pigeon.

COLUM'BAN, or **COL'UMBA'NUS,** Saint (543–615). One of the most learned and eloquent of the many missionaries whom Ireland sent to the Continent during the Dark Ages. He was born in Leinster. Having studied under St. Congall, in the great monastery of Bangor, in Ulster, he passed over to France, accompanied by 12 companions (c.585), and in Austrasia and Burgundy, near the southern extremity of the Vosges Mountains, founded the monasteries of Anegray, Luxeuil, and Fontaine. His adherence to the Irish rule for calculating Easter involved him in controversy with the French bishops about 603; and a few years later the courage with which he rebuked the vices of the Burgundian court led to his expulsion from France. Passing through Switzer-

land into Lombardy, he founded, in 612, the famous monastery of Bobbio, in the Apennines, where he died on Nov. 21, 615. The writings of St. Columban, which are wholly in Latin, consist of a rule for the government of his monastery, a few poems, several letters on ecclesiastical affairs, and 16 short sermons. His monastic rule has been printed more than once; but the most complete edition of his works is in Patrick Fleming's *Collectanea Sacra*, published at Augsburg in 1621 and at Louvain in 1667. It is reprinted in Migne, *Patrol. Latina*, lxxx. Of the sermons of St. Columban, M. Guizot remarks that "the flights of imagination, the pious transports, the rigorous application of principles, the warfare declared against all vain or hypocritical compromise, give to the words of the preacher that passionate authority which may not always and surely reform the soul of his hearers, but which dominates over them, and, for some time at least, exercises paramount sway over their conduct and their life." The town of San Colombano, in Lombardy, takes its name from the Irish monk, as the town and Canton of St. Gall (q.v.), in Switzerland, perpetuate the name of the most favored of his disciples. For his life, consult: Jonas, who was almost a contemporary and one of his successors as the abbot of Bobbio, in Migne, *Patrologiæ Cursus Completus* (Paris, 1857–60); Besser (Leipzig, 1857); Zimmermann (St. Gall, 1865); Bispham (New York, 1904); and for other reference works, see Chevalier, *Repertoire des sources historiques* (Paris, 1905).

COL'UMBA'RIUM (Lat., dovecote, from *columba*, dove). From a fancied resemblance to a dovecote, the name given to the rows of niches in the walls of sepulchral chambers in Roman burial places, to receive the little urns or sarcophagi of marble or terra cotta containing the ashes of the deceased; finally, to the sepulchral chamber itself. Tombs of this description were chiefly used by the poorer classes who could not afford separate tombs, and were erected by great families for their slaves and dependents, or by funeral associations or corporations under the Empire. Several perfect examples have been found near Rome; among them, those of the Vigna Codini, at the Licinian Gardens. Others exist at Naples and elsewhere in Italy. The *ustrina*, or places for incinerating the bodies, were attached to the columbaria. In recent times the term "columbarium" has been applied to a room or hall connected with a crematory and provided with niches for the cinerary urns.

COLUM'BA'S ISLE. The poetic name for the island of Iona, on the western coast of Scotland, where St. Columba, "The Apostle of Caledonia," founded a monastery about 565 and was buried in 597.

COLUM'BIA (Neo-Lat., from *Columbus*). The name under which the United States is usually personified.

COLUMBIA. A name formerly applied to the region, west of the Rocky Mountains, embracing British Columbia and the States of Washington and Oregon.

COLUMBIA. A city and the county seat of Boone Co., Mo., 146 miles by rail west-northwest of St. Louis, on the Wabash and the Missouri, Kansas, and Texas railroads (Map: Missouri, D 3). It is the seat of the University of Missouri (State), opened in 1841; of institutions for women, Christian College (Christian), established in 1851, Bible College, and Stephens College (Baptist), founded in 1856, and two academies. The library of the State Historical Society is in one of the State university buildings. A monument to Thomas Jefferson, originally erected in Monticello, Va., is now set up here. The city contains a United States government weather station and the Parker Memorial Hospital. Columbia has flouring and planing mills, elevators, packing plant, and a shoe factory; also farming, fruit-growing, and stock-raising interests. Settled in 1820, Columbia is governed by a mayor, elected biennially, and a council. The water works and light plant are owned by the city. Pop., 1890, 4000; 1900, 5651; 1910, 9662; 1920, 10,379.

COLUMBIA. A borough in Lancaster Co., Pa., 28 miles southeast of Harrisburg; on the Susquehanna River, here more than a mile wide, and on the Pennsylvania and the Philadelphia and Reading railroads (Map: Pennsylvania, J 7). The borough is situated in one of the most fertile tobacco regions in the country. It is an important industrial centre, its manufactures including boilers and engines, iron, laundry machinery, silk, lace, shirts, wagons, brushes, flour, novelties, malt liquors, stoves, etc. Wrightsville, on the west bank of the river, is connected with the borough by one of the longest bridges in the United States. The place was founded in 1726 by English Quakers from Chester County and was for many years called Wright's Ferry. In 1789 it was proposed to locate the capital of the United States here. In June, 1863, the original bridge was burned to prevent the Confederate troops from marching on Philadelphia. Pop., 1890, 10,199; 1900, 12,316; 1910, 11,454; 1920, 10,836.

COLUMBIA. The capital of South Carolina, and the county seat of Richland County; on the east bank of the Congaree River below the junction of the Broad and Saluda rivers, 82 miles by rail northeast of Augusta, Ga., and 129 miles by rail northwest of Charleston; on the Southern, the Atlantic Coast Line, the Columbia, Newberry, and Laurens, and the Seaboard Air Line railroads (Map: South Carolina, D 3). Columbia is at the head of steam navigation on the river and is on the Columbia Canal, which furnishes abundant water power (13,000 horse power). The city is laid out attractively, with streets well shaded and crossing at right angles. Among the notable buildings are the Capitol, courthouse, city hall, post office, the State insane asylum, and the State penitentiary. The city contains also a municipal hospital, a public library, and the Baptist Church in which the secession ordinance convention was held. The educational institutions include the University of South Carolina, opened in 1805; Presbyterian Theological Seminary; Columbia Female College (Methodist Episcopal, South), opened in 1859; College for Women (Presbyterian), opened in 1890; Lutheran Seminary; Allen University (African Methodist Episcopal), opened in 1881; and Benedict College (Baptist), opened in 1871, for colored students. Columbia has extensive manufacturing interests, principally in cotton and fertilizers; and there are also sash and door factories, iron works, foundries, machine shops, etc. The commission form of government was adopted in May, 1910. Pop., 1900, 21,108; 1910, 26,319; 1914 (est., including suburbs annexed), 60,000; 1920, 37,524.

In response to a demand for a more central place of government than Charleston, the Legislature of South Carolina in 1786 ordered Columbia to be laid out, and in January, 1790, it met there for the first time. On Feb. 17, 1865, General Sherman, at the head of the Union army, entered Columbia, and that night a fire started which lasted an entire day and destroyed three-fifths of the city, including the old statehouse and its library of 25,000 volumes, a convent, several churches, the railroad depot, and much cotton. After the war Columbia rapidly recovered its prosperity.

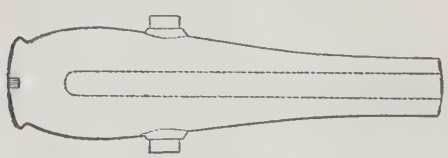
COLUMBIA. A city and the county seat of Maury Co., Tenn., 49 miles by rail south by west of Nashville, on Duck River, and on the Louisville and Nashville, the Nashville, Chattanooga, and St. Louis, and the Nashville, Florence, and Sheffield railroads (Map: Tennessee, D 3). The courthouse, a well-equipped military academy, library, hospital, and the Columbia Institute for young ladies are noteworthy features. Columbia is the centre of a fertile agricultural region and an important grain and live-stock market. It controls large phosphate interests and has cotton, corn, and flouring mills, pump factory, lumber and planing mills, marble works, machine shops, garter factory, etc. Settled in 1811, Columbia was first incorporated in 1822. It is governed under a revised charter of 1903, which provides for a mayor elected every two years and a council elected by wards. Pop., 1890, 5370; 1910, 5574.

COLUMBIA, British. See British Columbia.

COLUMBIA, District of. See District of Columbia.

COLUMBIA CITY. A city and the county seat of Whitley Co., Ind., about 100 miles (direct) north-northeast of Indianapolis; on the Vandalia and the Pittsburgh, Fort Wayne, and Chicago railroads (Map: Indiana, D 1). It has a fine courthouse and manufactures furniture, wagons, etc. There are also important live-stock interests. The water works, sewage system, and electric-light plant are owned by the city. Pop., 1890, 3027; 1900, 2975; 1910, 3448.

COLUM'BIAD. A heavy muzzle-loading cast gun, invented by Colonel Bomford and improved by Colonel Rodman, and combining some of the features of the gun, howitzer, and mortar, answering in this respect to the modern



COLUMBIAD.

breech-loading rifled mortar or howitzer. It appeared early in the nineteenth century and was in use until after the War of the Rebellion. See Artillery; also Ballistics; Guns, Naval; Ordnance.

COLUMBIAD, The. A lengthy poem, by Joel Barlow (1807), enlarged from his previous *Vision of Columbus* (1787) and incorporating also some of his other poems.

COLUMBIA INDIANS. A term sometimes applied to all the Indians of Oregon and Washington, but specifically the name of a Salishan (q.v.) tribe, the Sinkiuse.

COLUM'BIAN EXPOSITION. See World's Columbian Exposition.

COLUMBIA, or OR'EGON, RIVER. One of the largest rivers of North America. It rises in the eastern division of the Kootenai district in British Columbia, in about lat. 50° N. and long. 116° W. (Map: Washington, E 4). It flows at first northwest as far as lat. 52° and then turns sharply on itself and flows southward through a series of narrow lakes, crossing the international boundary line near the northeast corner of Washington. Just before crossing the boundary, it is joined by the Pend Oreille River (Clark's River or Fork), a large branch from the east, which by some geographers is considered a part rather than a branch of the main stream. In Washington it flows in a winding course, at first south (to a little beyond its junction with Spokane River), then west, then south, and then southeast to the Oregon line in about long. 119° W. Near the Oregon boundary it is joined by its largest branch, Snake River, which rises in Yellowstone Park. Below the point of junction the river flows in a westerly direction, forming the boundary between Oregon and Washington over the remaining distance to the Pacific, being joined on its way by the John Day, Deschutes, and Willamette rivers from the south. Its headwaters drain the Rocky Mountain region on the west from about lat. 54° N. to about lat. 42° N. Its length is 1300 to 1400 miles. Its total drainage area (including its tributaries) is about 259,000 square miles, of which about 48,000 square miles lie in Washington, 55,370 in Oregon, 81,380 in Idaho, 25,000 in Montana, and 38,700 in British Columbia, the remainder (10,550 square miles) being about equally divided between Nevada and Wyoming. Its flood discharge at The Dalles, Oregon, is estimated at 1,000,000 second feet, and the low-water flow at 40,000 second feet. The river is broken by falls and rapids into many separate portions; the first navigable reach is that from its mouth to the Cascades (160 miles) around which are built a canal and a portage railroad. About 50 miles above the Cascades are The Dalles, a series of falls and rapids extending over 12 miles to Celilo. From Celilo, 13 miles above The Dalles, it is navigable to Priest Rapids, 198 miles, and for several shorter stretches farther up, the total navigable length amounting to 756 miles. The total navigable mileage of the Columbia and its branches is 2132 miles. The important city of Vancouver, Wash., is built on its northern bank, just above the entrance of the Willamette, and Astoria, Oreg., is situated at the mouth of the river. The value of the river as a waterway is lessened by the fact that the entrance to its mouth is obstructed by a bar. Large vessels, however, ascend the Columbia to Vancouver, and also the Willamette to Portland. The tide ascends to the cascades about 150 miles from the sea, which are overcome by vessels through a lock constructed by the United States government. (See Jetty.) Its mouth forms the only fresh-water harbor on the Pacific coast, and the only deep-water harbor between Cape Flattery and San Francisco, a distance of 700 miles. The Columbia is famous for its salmon fisheries. This great river was long vaguely believed to exist. Its mouth was discovered only in 1792, by Captain Gray, of Boston, Mass., who gave it the name of his own vessel in place of the name "Oregon." It was partly explored by Lewis and Clark in 1804–05.

COLUMBIA SALMON. See QUINNAT.

COLUMBIA SERIES. In geology the accumulations of sands, gravels, and clays that are found along the Atlantic and Gulf Coastal Plain of the United States and that constitute the surface deposits, of later age than the Tertiary strata, within the area of their occurrence. They are equivalent in time with the Glacial deposits of the Northern States, but of course are of different origin, as the ice sheet did not extend farther south than northern Pennsylvania. The series is divisible into two or three phases, each represented by terraced beds along the stream valleys and coast, the higher and older terraces being more remote from the sea. There are very few fossils in the beds, and it is believed that the series in general is the work of streams and subaërial agencies rather than of marine deposition.

COLUMBIA UNIVERSITY. One of the most important educational institutions in the United States. Save for a few years during the Revolution, it has carried on its work in the city of New York since the middle of the eighteenth century and has always been identified closely with the development of the city and the State. It was the college of Alexander Hamilton, John Jay, Robert R. Livingston, De Witt Clinton, Hamilton Fish, and Abram S. Hewitt.

Since the beginning of the eighteenth century the idea of a college in the Province of New York had been discussed among the citizens, and when, in 1754, a fund of about £3500 had been obtained mainly through public lotteries, a royal charter for King's College was obtained from George II, and in the following year Trinity Church gave a plot of land on what is now Murray Street and West Broadway. The work of instruction began with the scholarly Dr. Samuel Johnson, as president and sole instructor, and eight students. The first Commencement was held on June 21, 1758. The first college building, erected on a portion of the King Farm, at what is now the corner of Park Place and Church Street, was completed in 1760. A Medical Department was founded in 1767 under Myles Cooper, the successor of President Johnson. In 1776 the buildings were seized by the Committee of Safety, and exercises were practically suspended until 1784, when the institution reopened as Columbia College, first under the regents of the State of New York, and from 1787 on under its own board of trustees (see infra). The new president was William Samuel Johnson. He was a son of the first president of King's College, one of the framers of the Constitution, and United States Senator from Connecticut.

Although the professors were many of them men of distinction, including Samuel L. Mitchill, later United States Senator, and Chancellor James Kent, the author of the famous Commentaries, the college was greatly hampered by poverty, and until past the middle of the nineteenth century its growth was slow. In 1849, however, came the appointment of the first of a series of four notable presidents —Charles King, Frederick A. P. Barnard, Seth Low, and Nicholas Murray Butler. Under President King, in 1857, came the moving of the college to Madison Avenue and Forty-ninth Street, the establishment of a Law School in 1858, and of a School of Mines in 1864. In 1860 came a formal union with the College of Physicians and Surgeons (founded in 1807). Under President Barnard, who succeeded President King in 1864, the institution grew rapidly. The growth of the city had greatly increased the income from the two main endowments of the institution—the gift of land from Trinity Church and the gift from the State Legislature, in 1814, of the Hosack Botanical Garden, now bounded by Forty-seventh and Fifty-first streets and Fifth and Sixth avenues. In 1880 came the establishment of the School of Political Science; in 1881, of a Department of Architecture; and during the same decade the development of courses in civil engineering, applied chemistry, and electrical engineering. One of the most important results of Barnard's presidency was the movement to provide for the higher education of women, which resulted in the establishment, in 1889, of Barnard College, and the opening of postgraduate studies to women on equal terms with men. President Barnard died in 1889, and his successor was Seth Low, of the class of 1870, formerly mayor of Brooklyn and, after his resignation as president, mayor of the city of New York. During his presidency the several flourishing but loosely connected schools were consolidated into a single organism. In 1890 a representative University Council was formed, and in the same year the School of Philosophy was established. The College of Physicians and Surgeons surrendered its charter and became an integral part of Columbia in 1891, and in 1892 the School of Pure Science was established.

In 1896 the trustees authorized the use of the title "Columbia University," the term "Columbia College" being reserved for the undergraduate courses for men. In 1897 the institution moved to a new site on Morningside Heights, where the first five of a group of academic buildings had been erected, the central one being a Library building given by Mr. Low as a memorial of his father. In 1900 Teachers College, founded in 1888, and Barnard College, while retaining their separate corporate existences, became integral parts of the educational system of the university, and in the same year a Summer Session was established.

On President Low's resignation in 1901, Nicholas Murray Butler, a graduate of the class of 1882, professor of philosophy and education and dean of the Faculty of Philosophy, was elected to succeed him. In 1903 the growth of the university made necessary the purchase of eight additional acres to the south of the original site, and in the same year Joseph Pulitzer made a gift of $1,000,000 to establish a School of Journalism, which was ultimately founded in 1912. In 1904 the work in extension teaching, which had been developing under the auspices of Teachers College, was formally made a part of the work of the university, and in the same year the New York College of Pharmacy, founded in 1829, became a professional school with the same relations to the university as those of Barnard College and Teachers College. The one hundred and fiftieth anniversary of the founding of King's College was celebrated in October, 1904, and included the laying of the corner stones of four new academic buildings. In the following year two of these buildings, with accommodations for 500 men, were opened as university residence halls.

During the first years of President Butler's administration careful consideration had been given to the place of undergraduate collegiate instruction in the university and its relation to professional training, and in 1905 a new programme of studies was adopted in Columbia College and Barnard College, which is so arranged as to make it possible for a properly qualified student to complete the requirements both for the B.A. and for the professional degrees of the university in six years. In 1906 came the formal establishment of the Faculty of Fine Arts, with schools of Architecture, Music, and Design. During the same year an interchange of professorships was effected with the German government. In 1911 a similar arrangement was made with France, and in 1913 with Austria.

Columbia University in 1913 comprised the following: *Undergraduate colleges:* Columbia College, with 877 students, and Barnard College (q.v.), with 618 students, each offering courses leading to the degrees of B.A. and B.S. *Professional schools:* School of Law, with 478 students, offering courses based upon at least three years of collegiate work and leading to the degree of B.C.L.; the College of Physicians and Surgeons, with 344 students, offering a four-year course leading to the degree of M.D.; the schools of Mining, Engineering, and Chemistry, with 669 students, offering courses of four years each and leading to the degrees of E.M., Met.E., C.E., E.E., Mech.E., Chemist, and Chem.E.; the School of Journalism, with 76 students, offering a four-year course in letters, science, and practical journalism leading to the degree of Bachelor of Literature; Teachers College (q.v.), with 1684 students, offering courses open to men and women, leading to the degree of B.S. and to the several diplomas in teaching; the Faculty of Fine Arts, with 157 students, offering courses leading to degrees and certificates in architecture, music, and design; the New York College of Pharmacy, with 414 students, offering university courses leading to the degrees of Pharmaceutical Chemist, Bachelor of Science in pharmacy, and Doctor of Pharmacy. *The nonprofessional graduate schools* of Political Science, Philosophy, and Pure Science, with 1570 students, offer advanced courses and opportunities for research, leading to the degrees of A.M. and Ph.D., in philosophy and education, psychology and anthropology; ancient and modern languages and literatures; history, economics, and public law; the mathematical, physical, chemical, biological, and geological sciences; mining, metallurgy, and engineering (civil, electrical, mechanical, sanitary, and chemical). The Summer Session of six weeks' duration, with 4539 students in 1913, and the system of Extension Teaching, with 1828 students, offer additional opportunities to those who cannot attend the regular courses of instruction. The teaching staff of the university, exclusive of administrative and emeritus officers, numbers 706.

Women are admitted as undergraduates at Barnard College, as professional students at Teachers' College and at the College of Pharmacy, as graduate students by the faculties of Philosophy, Political Science, and Pure Science, and to the Summer Session and Extension courses. They are not admitted to the schools of Law, Medicine, Applied Science, or Architecture.

The title to all property in the central corporation (The Trustees of Columbia College in the City of New York) is vested in a board of 24 trustees, whose term of office is for life and who form a self-perpetuating body, appointing all officers of instruction and administration and having general oversight and control of the affairs of the university. In 1909 provision was made for the nomination by the alumni of six of the 24 trustees. The president has charge of the educational administration and is chairman of the University Council and of every faculty. The deans, under the general supervision of the president, have immediate charge of the work of the several faculties. The University Council, a representative body consisting of the president and the dean and one elected member from each faculty, has immediate charge of the regulations for the higher degrees, the appointment of university fellows and scholars, and the correlation of courses. It has also the power to make recommendations concerning the educational administration of the university and to advise the president upon matters of general policy. The professors and other officers of instruction are divided among 58 departments, grouped into 14 divisions.

The total assets of the university exceed $50,000,000 in grounds, buildings, and invested funds. The budget of 1913 amounted to $2,367,269.33, and the income for the previous year to $2,038,354.22.

The University Library numbers about 500,000 bound volumes, including the Avery Architectural Library and the Phœnix collection. A number of learned societies make it the depository of their collections. The numerous laboratories and museums of the university are all well equipped. See Plate of NEW YORK.

The buildings of the Corporation of Columbia University at Morningside Heights include, besides the central Library, the following: Havemeyer Hall, given by the family of Frederick Christian Havemeyer and used for chemistry; Fayerweather, for physics and astronomy; Schermerhorn, given by William C. Schermerhorn and used for the other natural sciences; Engineering; School of Mines, given by Adolph Lewisohn for mining and metallurgy; Hamilton, given by John Stewart Kennedy for Columbia College; Journalism, provided by the gift and bequest of Joseph Pulitzer for the purpose of the School of Journalism; Avery, the gift of Samuel B. Avery, containing the Avery Architectural Library and the School of Architecture; Earl, given by William E. Dodge as a building for the students; St. Paul's Chapel, the gift of Olivia E. P. Stokes and Caroline Phelps Stokes, one of the most beautiful ecclesiastical interiors in New York, with windows by John La Farge; and University (unfinished). The resident halls are: Hartley, a memorial to the late Marcellus Hartley, given by his daughter and grandson; Furnald, given by the family of Royal B. Furnald, a member of the class of 1901; and Livingston. On the extreme east of the group are the Crocker Research Laboratory and the residence of the president of the university; and in the neighboring West One Hundred and Seventeenth Street the Deutsches Haus, the gift of Edward D. Adams, and the Maison Française, the gift of A. Barton Hepburn, centres respectively of German and French interests.

The buildings of Barnard College are immediately to the west, and those of Teachers College

to the north, of the university site. The Medical School is on Fifty-ninth Street, between Ninth and Tenth avenues, and the College of Pharmacy in West Sixty-eighth Street. The entire university occupies more than 34 acres of ground in New York City, and has, in addition, a Summer Camp of Surveying and Geodesy, covering 500 acres, in Morris, Conn.

The university is intimately connected with the other educational enterprises of the city. The head of the Union Theological Seminary and of the General Theological Seminary are non-voting members of the University Council, and the directors of the American Museum of Natural History, the Metropolitan Museum of Art, and the president of the National Academy of Design are members of one or another of the Columbia faculties. Columbia professors deliver lectures at these museums and at Cooper Union and conduct courses in special investigation at the Botanical and Zoölogical gardens. The university makes annual provision for more than 200 fellows and scholars, whose stipends range from $150 to $1500. In the academic year 1912–13, $120,279 was earned by self-supporting students. Under the auspices of the Columbia University Press, established in 1903, has appeared a notable series of scholarly volumes, 172 in all. The *Columbia University Quarterly*, the *Political Sciences Quarterly*, the *School of Mines Quarterly*, and, in addition, 21 departmental series and 13 journals are issued under the editorial direction of university officers, and 20 more with their coöperation. There are also 10 student publications. Consult: *A History of Columbia University, 1754–1904* (New York, 1904); Nelson, *Columbiana: A Bibliography* (ib., 1904); *An Official Guide to Columbia University* (ib., 1912).

COLUMBIAN UNIVERSITY. See GEORGE WASHINGTON UNIVERSITY.

COL'UMBINE (Fr., It. *Columbina*, from Lat. *columbinus*, dovelike, from *columba*, dove). 1. A conventional character in old Italian comedy and the pantomime, first appearing about 1560. She was the daughter of Pantaloon and the object of Harlequin's adoration and so appears in English pantomime. See PANTOMIME. 2. A wild flower, emblematic of forsaken lovers in old English verse.

> "The columbine in tawny often taken,
> Is then ascribed to such as are forsaken."
> Browne's *British Pastorals*, 1613.

COLUM'BITE. An iron and manganese niobate which passes chemically by such insensible gradations into the mineral tantalite, an iron tantalate, that it is impossible to separate the two mineral species. The iron and manganese vary widely, and tin and tungsten are also often present in small amounts. Columbite crystallizes in the orthorhombic system. It has a bluish iridescence and is of an iron-black, grayish, or brownish color. This mineral occurs in granitic and feldspathic veins in the form of crystals, crystalline granules, and cleavable masses. It is found at various localities in Bavaria, Italy, Finland, Greenland, and in the Ural region; in the United States it is found in greater or less abundance in nearly all of the States bordering along the Appalachian Mountain system, in the Black Hills of South Dakota, and in California and Colorado. It has some slight economic value for the preparation of salts of niobium and tantalum, but as only small quantities of these salts are used, the mineral is in but little demand. It is interesting to mention that the first occurrence of columbite in America was made known from a specimen sent by Governor Winthrop of Connecticut to Sir Hans Sloane, then president of the Royal Society of Great Britain.

COLUM'BIUM (Neo-Lat., from *Columbia*, United States of America), or NIOBIUM. A metallic element discovered by Rose in 1846. It is found in the minerals columbite, from Haddam and Middletown, Conn., and tantalite, from near Falun and elsewhere in Sweden; also in small quantities in other minerals. In order to obtain the element the mineral is fused with acid potassium sulphate; the resulting mass, which is washed and boiled with concentrated hydrochloric acid, yields the hydroxide, which is then reduced. However, the purest metallic columbium that has yet been obtained still contained nearly 0.3 per cent of hydrogen. A metallic columbium containing about 3 per cent of carbon was obtained in 1901 by Moissan, by heating in the electric furnace a mixture of 82 parts of columbic acid and 18 parts of pure carbon. The product did not melt in the oxy-hydrogen flame and was hard enough to scratch quartz readily. Columbium (symbol Cb or Nb, atomic weight 93.5) is a steel-gray powder with a specific gravity of 7.06 at 15° C. It forms three oxides with oxygen, of which the pentoxide, Cb_2O_5, forms salts called *columbates* or *niobates*.

COLUM'BUS. A city and the county seat of Muscogee Co., Ga., 95 miles (direct) south-southwest of Atlanta, at the head of navigation on the Chattahoochee River and on the Central of Georgia, the Southern, and the Seaboard Air Line railroads (Map: Georgia, B 3). Steamboats ply between Columbus and Apalachicola, Fla. The city, from its important manufactures called the "Lowell of the South," is also the centre of a fertile agricultural region, and has vast water power, the river having at that place a fall of 120 feet in three miles, developing 67,000 horse power. The trade with adjoining States is extensive. Columbus receives annually 350,000 bales of cotton, 100,000 bales of which are used in its manufactures of cotton goods. It has foundries and machine shops, cottonseed-oil mills, refineries, barrel factories, and manufactories of caskets, bank and show-case fixtures, ginning machinery, agricultural implements, fertilizers, and ice. Columbus contains an industrial school, a conservatory of music, and a public library. The water works are under municipal control. Pop., 1890, 17,303; 1900, 17,614; 1910, 20,554; 1920, 31,125.

Columbus was laid out in 1828 and incorporated in 1829. During the Civil War it was an important Confederate depot of supplies and was only surpassed by Richmond in the quantity of manufactured articles furnished to the Confederate army. It was captured by Federal forces April 16, 1865.

COLUMBUS. A city and the county seat of Bartholomew Co., Ind., 41 miles south by east of Indianapolis, on the Pittsburgh, Cincinnati, Chicago, and St. Louis, and the Cleveland, Cincinnati, Chicago, and St. Louis railroads, and on the east fork of the White River (Map: Indiana, D 3). It has extensive manufactures of pulleys, tanned leather, threshing and sawmill machinery, tools, transmission gears, gasoline engines, flour, furniture, etc. Settled in 1821, Columbus was chartered as a city in 1864.

The government is vested in a mayor, elected quadrennially, and a city council. The water works and electric-light plant (for city use) are owned and operated by the municipality. Pop., 1900, 8130; 1910, 8813.

COLUMBUS. A city and the county seat of Cherokee Co., Kans., 53 miles by rail south of Fort Scott; on the St. Louis and San Francisco, the Joplin and Pittsburg, and the Missouri, Kansas, and Texas railroads (Map: Kansas, H 8). It is the centre of a farming and a coal, lead, and zinc mining region, has a considerable trade in agricultural products, and contains machine shops, grain elevators, flour mills, cigar factory, bottle works, canning factory, and an extensive brick-making plant. Natural gas occurs in the vicinity. A Carnegie library and fine high school are notable features. The water works are the property of the municipality. Pop., 1900, 2310; 1910, 3064.

COLUMBUS. A city and the county seat of Lowndes Co., Miss., 123 miles, by rail, west of Birmingham, Ala.; on the Tombigbee River, which is navigable six months of the year, and on the Mobile and Ohio and the Southern railroads (Map: Mississippi, J 3). It has a public library, two hospitals, and is the seat of the State Industrial Institute and College for young women, Franklin Academy, for white, and Union Academy, for negro children. Columbus carries on an extensive trade in cotton, hay, and gravel. It has cotton and oil mills, foundries and machine shops, brickkilns, stave works, lumber mills, and manufactories of plows, underwear, hosiery, comforts, yarn, and stoves. To the east there are coal and iron in abundance. Columbus was settled in 1830, incorporated in 1832, and is governed at present under a charter of 1884, which provides for a mayor, elected every two years, and a council, elected on a general ticket. The water works are owned and operated by the city. Pop., 1900, 6484; 1910, 8988; 1920, 10,501.

COLUMBUS. A city and the county seat of Platte Co., Neb., 92 miles by rail west by north of Omaha; on the Loup River a short distance above its confluence with the Platte, and on the Union Pacific and the Chicago, Burlington, and Quincy railroads (Map: Nebraska, G 3). It is of importance as a railroad junction and has flour mills, foundry, brewery, wooden-shoes factory, roller mills, and a creamery. The city contains a hospital and a Carnegie library, and owns its water works. Along the Loup River are ancient Indian mounds, and the city is believed to occupy the site of the old Indian city of Ouivera. Pop., 1900, 3522; 1910, 5014.

COLUMBUS. The capital of Ohio and the county seat of Franklin County, the third city of the State in population. It is situated at the confluence of the Scioto and Olentangy rivers and extends eastward to Alum Creek, near the geographical centre of the State, 120 miles northeast of Cincinnati and 135 miles southwest of Cleveland (Map: Ohio, E 6). The city is built on generally level ground, at an altitude of 780 feet, and covers an area of about 22 square miles. Its two main central thoroughfares, High Street and Broad Street, intersect at right angles, and other streets in the central portion conform. High Street is the main business thoroughfare, 100 feet wide; Broad Street, 120 feet wide, with four rows of trees for a considerable portion of its length, is a street of public buildings, churches, and fine residences.

At the southeast corner of High and Broad streets is the Capitol Square of 10 acres, in the centre of which stands the Capitol building (completed in 1857), a gray stone structure of the Grecian Doric style of architecture, 304 feet long, 184 feet wide, with a rotunda 158 feet high. To the east, connected with it by a wide terrace, is the Judiciary building (completed in 1900), in which are a number of other State offices. Notable art features of the interior of the Capitol are William H. Powell's painting of "Perry's Victory on Lake Erie," portraits of all the Ohio governors, and Thomas D. Jones's sculptured representation of the surrender of Vicksburg by Pemberton to Grant. At the west entrance to the square is the McKinley memorial (H. A. McNeill, sculptor), and near the northwest corner of the building, the "Ohio's Jewels" group of statues of Grant, Sherman, Sheridan, Chase, Stanton, Garfield, and Hayes. Other public buildings are the city hall, chamber of commerce, the post office and Federal court, and the Y. M. C. A., all facing Capitol Square. On Broad Street is the Soldiers' and Sailors' Memorial building, with an auditorium seating 4000, and at the head of State Street is the Columbus Public (Carnegie) Library. Ohio State University (q.v.), established by Act of 1870 as Ohio Agricultural and Mechanical College and reorganized in 1878 under its present name, is located here. Other educational institutions are: Capital University (Lutheran), founded in 1850; St. Mary's of the Springs (Catholic), in 1866; St. Joseph's Academy (Catholic), 1875; Columbus Art School; and three private schools of academy grade, two for girls and one for boys. The State schools for the blind, for the deaf and dumb, and for the feeble-minded are also located in Columbus, as well as the State central hospital for the insane, and the Ohio penitentiary, which is soon to be removed to a 1500-acre farm in Madison County. Of county buildings there are the courthouse, the children's home, infirmary and tuberculosis hospital (completed in 1914). Other hospitals are: St. Francis, St. Anthony's, Mount Carmel, Grant, St. Clair, Protestant, and Mercy. Besides the Library of Ohio State University (140,000 volumes), there are here Ohio State Library (225,000 volumes), including a traveling library (88,000 volumes), available for responsible organizations in any part of the State and having departments of library organization and legislative reference; Columbus Public Library (85,000 volumes), including an endowed music section (7500 volumes) and a Lincoln collection (2000 volumes); Public School Library (90,000 volumes), miscellaneous and supplementary reading, and the Law Library of the Supreme Court, with complete sets of State, Federal and many foreign reports, statutes, and digests. The city has nine parks, with a total area of 260 acres, two amusement resorts, and a United States military post and recruiting station, the grounds of which are beautifully parked and open to the public. The Ohio State fair grounds of more than 100 acres, with walks, driveways, and buildings, some of which are used by the Ohio College of Agriculture, is just outside the city's north boundary line.

Columbus is an important commercial and manufacturing centre because of its nearness to the coal, iron, and natural-gas fields and its position on the line of East and West travel. Nine trunk-line railroads, 16 divisions, and 7 electric interurban traction lines afford excel-

lent transportation facilities for the manufacturing interests. The city is connected by a feeder with the Ohio Canal, completed to the Ohio in 1832. It is also on the line of the National Road from Cumberland, Md., westward, completed and turned over to the States in 1836. Including the industries located just outside the city limits, there are here 700 manufactories, with an annual product valued at $70,000,000. Fifty-eight of these are foundries or machine shops. Carriages, wagons and materials, boots and shoes, patent medicines and compounds, malt liquors, tobacco, regalia, society emblems, and oleomargarine are leading products. More than half of the forged anvils used in the United States and most of the piano stools are made here.

The government is administered by a mayor and a unicameral council elected every two years, the mayor appointing the director of safety and the director of public service. The people elect the treasurer, auditor, and solicitor. A charter commission, elected in 1913, submitted, in May, 1914, a new charter offering a modified Federal form, with a number of progressive features, such as nonpartisan ballot, preferential voting, recall of elected officials, the referendum, and a small council elected at large. The charter was adopted, effective January 1, 1916. The city has its own water works, electric-light plant, garbage and refuse disposal, sewage disposal and sewer farm, and other and more common public utilities. The investment in the four mentioned is about $8,500,000. The water-works system includes a storage reservoir and filtration system. Current from the electric-light plant lights the streets and municipal buildings, while garbage reduction is done at a net annual profit of about $25,000. There are 300 miles of sewer and 240 miles of paved streets. City assets (1913), $35,157,723.63; liabilities, $17,633,831.92. Pop., 1830, 2435; 1850, 17,882; 1870, 31,274; 1890, 88,150; 1900, 125,560; 1910, 181,511; 1920, 237,031.

The first permanent settlement within the city limits was made by Lucas Sullivant and party, in 1797, at the confluence of the two rivers, and was named Franklinton. Columbus was platted on the east bank of the Scioto in 1812, and the site was accepted by the Legislature for the capital. In the first Capitol building the Legislature first met in 1816. In that year Columbus became a borough; in 1834 it became a city, and in 1870 Franklinton was annexed. In 1832 and again in 1849 the city suffered severely from cholera. In March, 1913, a flood devastated the West-side lowlands; 4071 dwelling houses were flooded, 345 being damaged beyond repair; 20,000 persons were fed and sheltered for many days, the property damage was estimated at $5,625,000, and 94 lives were lost. Consult: J. H. Studer, *Columbus, Ohio: Its History and Resource* (Columbus, 1873); Alfred E. Lee, *History of the City of Columbus* (New York, 1892); Fitzpatrick and Morris, *The Franklinton Centennial* (Columbus, 1897); W. A. Taylor, *Centennial History of Columbus.*

COLUMBUS. A city and the county seat of Colorado Co., Tex., 87 miles by rail west of Houston, on the Colorado River and on the Southern Pacific Railroad (Map: Texas, D 5). It is in a fertile agricultural region and has a considerable trade in cotton, live stock, hides, etc. The water works are owned by the city. Pop., 1890, 2199; 1900, 1824; 1914, about 1800.

COLUMBUS. A city in Columbia Co., Wis., 63 miles east-southeast of Milwaukee, on the Chicago, Milwaukee, and St. Paul Railroad, and on Little Crawfish River (Map: Wisconsin, D 5). Columbus contains the county normal school, St. Mary's Hospital, and a public library. It is in an agricultural and stock-raising district and has pea canneries, brewery, flour mill, and carriage and wagon shops. Pop., 1900, 2349; 1910, 2523.

COLUMBUS, Bartholomew (Bartolomé Colón) (c.1461–1514). A brother of Christopher Columbus. He was a sailor by profession and in the year 1480 joined Christopher at Lisbon. In 1489 he was sent to England by his brother to seek assistance from Henry VII for the execution of his project. He was taken by pirates and landed in England in a destitute condition, and on presenting himself at court was unfavorably received by the King. He then sought help at the court of Charles VIII in France. Accounts vary as to the treatment he received here, some authorities claiming he was unfavorably received, and others saying that, because of the news of Columbus' successful expedition, Charles received him well and aided him on his return journey. Whatever may be the truth of this matter, in January, 1494, he returned to Spain and was given command of a fleet of three caravels sailing for Española. He arrived there in June of the same year, just in time to render effectual assistance to his brother, who was being hard pressed by the unruly members of the little Spanish colony. From that time on he became the most devoted follower of the Admiral, who in 1495 made him hereditary *Adelantado,* or Governor, of Española, a title which was confirmed by the crown in 1497. In March, 1496, he assumed command of the colony on the departure of his brother. He founded the town of San Domingo and effectually repressed a native insurrection. During the hardships of the last voyage of Christopher Columbus Bartholomew proved of invaluable assistance. At Puerto la Gloria in 1504 he repressed a mutiny among the sailors. Late in life he received some recognition for his services from the crown, which bestowed on him the island of Mona, near Española, as a possession. He died at Seville in December, 1514.

COLUMBUS, Christopher (the usual English form, adopted from the Latinized form of the Italian Colombo, which was the original spelling of the family name. After the discoverer entered the Spanish service he became known as Cristóbal Colón) (1451–1506). The discoverer of America. There have been so many fanciful tales related, and so many wild guesses made, concerning the life and work of Columbus that we decide to give here a brief documentary chronology of his life down to 1493, beyond which point there is less confusion. This chronology is obtained from Henry Vignaud's *Histoire critique de la grande entreprise de Christophe Colomb,* where all the documents are cited.

Columbus was born in Genoa between Aug. 26, 1451, and Oct. 31, 1451. His father was Domenico Colombo, a weaver, and his mother, Susanna Fontanarosa. There were neither nobles nor sailors in the family, all of whose members were artisans. Nor was Columbus related to the noble family of Colombo of Cuccaro, nor to the two admirals called Colombo. He had no university training, did not navigate in his youth, and in 1472 was still a weaver in Savona.

The last date at which we are certain of his residence in Italy is Aug. 7, 1473. He did not serve under the two admirals Colombo, and made no campaign under "King" René d'Anjou, Count of Provence. About 1474–75 he made, from Genoa or Savona, a voyage to Chios, probably with the two Genoese, Spinola and Di Negro. In 1476 he embarked, again from Genoa or Savona, in one of several Genoese merchantmen bound for England. These vessels were attacked at St. Vincent, Aug. 13, 1476, and Columbus took refuge at Lisbon. Later he continued to England and sailed up into the Northern Seas, but did not reach Iceland. In 1477–78 we find him in commerce at Lisbon. In August, 1479, he visited Genoa and left a deposition stating that he was a citizen of Genoa and about 27 years old. In this year or the next he married, at Lisbon, Felipa Moniz Perestrello, whose exact relationship with the families of Moniz and Perestrello is not well established. In 1480, and probably at Lisbon, was born Diego Columbus, oldest son of the discoverer, and his only child by his marriage. After his marriage his mother-in-law gave him certain papers of Perestrello which made Columbus decide to devote himself to maritime discovery, It was in 1481 that the apocryphal correspondence with Toscanelli was supposed to have taken place. From 1482 to 1484 Columbus is supposed to have made several voyages to the coast of Guinea, and he claims to have measured the length of a degree at the equator; and during this same period he made to João II of Portugal the same proposals that he made later to the Spanish rulers. João II rejected them, although in 1484 he is supposed to have sent a secret mission to learn the truth of Columbus' claims. Late that year or early the next, angered at the conduct of João II, Columbus fled secretly with his young son (his wife being already dead) to Spain. In 1485 he left Diego at La Rábida (two of whose monks, Pérez and Marchena, encouraged his plans), went to Seville, saw the two dukes of Medina Sidonia and Medina Celi, and lived awhile with the latter. Early the next year he went to Córdoba, was well received by the sovereigns (who granted him an audience in April or May), and followed them in November to Salamanca, where he was permitted to appear before a royal commission appointed to examine his pretensions. The university does not appear in the proceedings, but there were favorable conferences held in the monastery of San Estéban. Early in 1487 he returned to Córdoba, received certain sums from the royal purse, as a gratification or for services rendered, and began in November or December his affair with Beatriz Enríquez de Arana, who was neither noble nor rich, nor ever became his wife. During 1488 occurred an exchange of letters between Columbus and João II, and possibly a brief visit of Columbus to Portugal. In July he received a further gratification from the Spanish rulers; and on August 15 of this same year, 1488, his mistress Beatriz Enríquez de Arana gave birth to their son Ferdinand. The Spanish rulers, in May, 1489, ordered him to court, which was probably at Baza, where they were conducting a siege. During 1490, however, he was in dire want and is supposed to have sold books and made maps for a living; and the royal commission finally rejected his plans. In discouragement he left the court, and started for France to offer his services to Charles VIII, going first to La Rábida to get his son Diego. Here he was encouraged to give up his plan of going to France and to continue his efforts in Spain. He met Pero Vázquez de la Frontera (who gave him much valuable information about islands beyond the Sargasso Sea) and Alonso Martín Pinzón (who had been to Rome and obtained information about the island of Cypangu), and the latter agreed to aid him. Pérez then wrote to the court, and Pinzón is supposed to have done likewise. Pérez, summoned by the Queen, easily arranged for Columbus' recall, and late in the year began the celebrated Santa Fé conferences, in which Columbus named his conditions: a peerage, the office of admiral, and that of Viceroy of the lands he should discover, etc. Columbus was present at the fall of Granada, Jan. 2, 1492. Later in the same month the Commission of Santa Fé rejected his proposals as chimerical, and Columbus left Granada with renewed intention of going to France. But Luís de Santángel intervened, and Columbus was immediately recalled. Matters now moved more rapidly. By the Capitulations of Santa Fé (April 17, 1492) he was authorized to search for and take possession of certain islands, but no mention was made of the Indies or of India. By the Capitulations of Granada (April 30) the titles and offices of Columbus were confirmed and made hereditary, but he was to be invested with them only after the discoveries had been made. This document and its confirmation (Act of April 23, 1497) both fail to make any mention of India. After various delays, some of which were due to the unwillingness of sailors or others to embark on such an expedition, Pinzón, whom Columbus for a while seems to have neglected, threw his influence into the movement, and the expedition was organized: three vessels (*Santa María*, *Pinta*, and *Niña*), 120 men (of whom 90 for the crews), baggage, merchandise for trading, provisions, and a little artillery.

The expedition set sail from Palos, Aug. 3, 1492, made a short stay in the Canary Islands, and sailed from Gomera on September 6. At the moment of sailing Columbus gave his captains and pilots written instructions not to sail during the night after they should have proceeded 700 leagues, as he expected to find land before they had gone 750 leagues. There were various symptoms of revolt during the month; and when on October 4 or 5 (despite Columbus' not having announced the full distance sailed each day) they had gone farther than the 750 leagues mentioned by Columbus, the crews mutinied and wished to return to Spain. Pinzón's energetic attitude, when consulted by Columbus, restored order, and they proceeded. October 7, on Pinzón's advice, they changed their course, which thitherto had been due west, and steered somewhat south of west. The sailors again became terrified, but Columbus succeeded in calming them, and told them that having come so far on his way to *las Indias*, he intended to go through at any cost. This is the second time that the words *las Indias* appear in the Las Casas version of Columbus' log. They were never used in the negotiations that led to his being authorized to make the expedition, which spoke consistently of his going to "discover and take possession of certain islands in the sea of whose existence Columbus knew." Nor is their presence in his log proof that he was really

CHRISTOPHER COLUMBUS

FROM THE BUST IN THE CAPITOLINE PICTURE GALLERY, ROME

looking for India by a western route, for the usage of the times when Las Casas made his résumé of the log applied the words *las Indias* to the Antilles as well as to India. In the early morning hours of Oct. 12, 1492, land was discovered, and at daybreak they disembarked on an island called by the natives Guanahani. Columbus took possession of it and called it San Salvador. There is some uncertainty concerning the exact situation of this island. Columbus was certain that Guanahani was not the marvelous island of Cypangu. After considerable cruising and doubting he finally decided that Cuba must be Cypangu, and disembarked October 28. Further explorations, including the determining of the longitude and latitude of the island, forced him on November 2 to the conclusion that Cuba was not Cypangu, but a projection of Asia. In further explorations Pinzón became separated from Columbus, and on November 22 discovered the island of Haiti. Columbus rejoined him on December 5 and named the island Española. Although the log does not say so, Columbus himself says elsewhere (as do also his son, his brother, and Las Casas) that he recognized it as being Cypangu, and he continued in that belief until his death. On December 26 they built the fort of La Navidad and left 37 men, with ample provisions, as a garrison. December 28 the *Santa María* was wrecked, and all on board went to the *Niña*. The return voyage was begun Jan. 4, 1493. In the Azores, which they reached February 15, Columbus wrote his first account. March 4 he reached Lisbon, where he wrote his second account. On invitation of the King of Portugal, Columbus went to see him on March 9, and on the 15th disembarked at Palos and dispatched a courier to the "Catholic Kings," who were at Barcelona. On the 30th they acknowledged the receipt of his letters and invited him to come to them at Barcelona. In their letter they spoke of his discoveries as having been made in *las Indias*. This royal letter is the first official document in which this expression appears. In bulls of May 3 and 4, 1493, the Pope sanctioned the rights of the "Catholic Kings" to the islands and lands discovered by Columbus, who was spoken of as having been sent to discover distant islands and lands situated in seas that no one had yet sailed. There was in these bulls no mention of the route to India.

Every assistance was promised Columbus towards equipping a second expedition. Seventeen vessels were soon ready, carrying 1500 persons, and on Sept. 25, 1493, they set sail. The island of Dominica was reached on November 3, and on the 27th Columbus anchored off the fort of La Navidad, which was found deserted. The garrison had been killed by the natives, whom the outrages committed by the white men had provoked beyond endurance. Abandoning this, Columbus founded a new town (Isabella), and the next two years were spent in an attempt to establish a form of government and in several exploring expeditions into the interior of Española and the neighboring islands. Many causes united to disturb the peace of the colony, and Columbus at length determined to return to Spain, where his enemies were actively trying to undermine the confidence of the sovereigns in him. Landing at Cádiz on June 11, 1496, he proceeded directly to the court, where he was most graciously received and quickly restored to grace. He was promised whatever he desired for a new expedition, but there was a long delay, due largely to the persistent opposition of Fonseca, Bishop of Palencia, through whose hands everything had to pass before Columbus could secure his outfit. It was not until May 30, 1498, that six vessels were ready to sail. A more southerly route than before was followed, and the voyage was prolonged until July 31, when the three peaks of Trinidad were sighted. After a fortnight's rest in the Gulf of Paria Columbus coasted the South American mainland, which he now saw for the first time, westward as far as Margarita, and then, having first decided that Paradise must be situated in the interior of the modern Venezuela, he stood across to Española. Arriving at Santo Domingo, which had become the principal town in the Indies, he learned that a number of the colonists had rebelled during his absence and that everything was at odds. His temperament was ill suited to dealing with the turbulent crowd who defied his authority, and he could do little towards restoring peace and order. Both sides sent agents and emissaries to Spain, with the result that, on Aug. 23, 1500, Francisco de Bobadilla arrived at the island with royal orders authorizing him to supersede Columbus in the government. Without waiting to investigate the charges against him, Bobadilla arrested Columbus, treating him with heartless indignities for which no justification can be found in the surviving records of the colony. He was placed in irons, denied visits from his brothers and partisans, and in October sent back to Spain.

The news that the Admiral of the Ocean Seas had arrived home in chains served his cause better than any argument. He was promptly released and summoned to court, where every favor was shown him. King Ferdinand, however, was too shrewd to restore him to the full powers of control which he claimed by virtue of his discovery. As soon as he became convinced that there was little use in trying to secure his rights, Columbus asked for a fleet with which to continue his discoveries. This was readily granted, and in May, 1502, he set sail with four caravels to seek a route to the real East. A part of the royal grant was the condition that he should not revisit Española, but on June 29 Columbus anchored off Santo Domingo. Being forbidden to enter the harbor, he refitted as best he could outside, where he successfully weathered a storm which, curiously enough, overwhelmed a fleet on which Bobadilla and several of his bitterest enemies had set sail for Spain. Columbus proceeded westward, and between July 30, 1502, and Jan. 24, 1503, he sailed along the coast of Central America, from Honduras to Veragua, where he attempted a settlement. In April, 1503, the disheartened survivors insisted on abandoning the enterprise. With the greatest difficulty the rotten ships were brought as far as Jamaica, where, in August, they had to be beached to save their cargoes. The Admiral had been confined for many weeks to his bed, with a complication of mental and bodily ailments, from which he aroused himself at moments of special danger to show his earlier courage, enthusiasm, and skill. From Jamaica a messenger, Diego Mendez, started across to Cuba in a canoe to seek help at Santo Domingo. It was many months before the pitiful survivors learned that he had not perished on the way. He reached Española in safety, but Ovando, who had succeeded Bobadilla, delayed as long as he

could before permitting Mendez to hire a vessel to go to the rescue of the castaways on Jamaica. At last, in June, 1504, the survivors who had remained faithful to the Admiral through dangers and disasters were once more embarked on their way back to civilization. Refitting the vessel at Santo Domingo, Columbus proceeded to Spain, landing at San Lucar de Barrameda on November 7. Before the end of the month Queen Isabella, upon whom all his hopes rested, died. Columbus went to Seville, where he busied himself during such intervals of freedom from pain as he had in trying to put his affairs in order. In May, 1505, he vainly journeyed to Segovia to plead with the King for some recognition of his rights and those of his son. Thence he retired to Valladolid, where he died, May 20, 1506. His body was laid in the Carthusian monastery of Santa María de las Cuevas at Seville, but in 1542 it was removed, with that of his son Diego, to be interred in the cathedral of San Domingo, Hispaniola (Haiti). When that island was ceded to the French in 1795, a transfer was again made, to the cathedral of Havana, and at last, after Spain's loss of Cuba in 1898, the bones of father and son were taken back to Seville and placed in the cathedral there.

Columbus literature, already very voluminous, was more than doubled during the celebration of the four hundredth anniversary of his discovery of America in 1892. The chief source for information about him was for many years Navarrete's great collection of documents, published at Madrid between 1825 and 1837. This has been in a measure supplanted by a monumental work published by the Italian government, *Scritti di Colombo* (Rome, 1892). The standard English version of the *Letters* is Major's translation in the Hakluyt Society volumes for 1847 and 1870, supplemented by Markham's translation of the *Journal* in 1843. There is a convenient edition of the *Letters* edited by W. C. Ford (New York, 1892). The great critical study of Columbus' life and family is by Harrisse, in 2 vols. (Paris, 1884), the results of which were presented in English by Winsor (Boston, 1892). Later works are those of Markham (London, 1893), Adams (New York, 1892), Thacher (ib., 1903–04); Ober (ib., 1906), and especially the following works by Henry Vignaud, the distinguished counselor of the United States Embassy at Paris, which must be used to supplement and correct the great work of Harrisse previously mentioned: *Toscanelli and Columbus* (London, 1902); *Critical Study of the Various Dates Assigned to the Birth of Columbus* (ib., 1903); "Proof that Columbus was Born in 1451," in *American Historical Review* (Jan., 1907); *Etudes critiques sur la vie de Colomb avant ses découvertes* (Paris, 1905); *Histoire critique de la grande entreprise de Christophe Colomb . . . 1476–1493* (2 vols., Paris, 1911).

COLUMBUS (Colón), Diego (in It., *Giacomo*) (c. 1468–?1515). The youngest brother of Christopher Columbus. He was born probably at Genoa, and upon the news of his brother's great discovery came to Spain. He accompanied Christopher on his second voyage and late in 1494 was at the head of a commission intrusted with the government of Española in the absence of the Admiral. In 1496 he went to Spain to defend his brother against the charges submitted by some of the unruly members of the colony. He returned to Española, but fell into disgrace and was sent in chains to Spain in the year 1500. He is thought to have entered the Church a number of years before his death.

COLUMBUS (Colón), Diego (1480–1526). Eldest son of Christopher Columbus. He was born probably at Lisbon and came in 1484 to Spain with his father, who left him for some time with his friends at the convent of La Rábida, while he himself went to seek aid at the court. In 1494 he became page to the Crown Prince, Juan, and after the latter's death in 1497 he was admitted into the household of Queen Isabella, where he remained till 1504. After the death of his father he received the title of Admiral of the Indies, but was refused the viceroyalty which he claimed as his paternal right. In 1508 he married a daughter of the house of Alba, and through her influence succeeded in being made Governor of the Indies. In 1509 he arrived at Española to take possession of his office. He never desisted in his claim to the viceroyalty and to a share of the revenues from the New World due him, and in 1520 finally won his case. He was recalled, however, from his government in 1523, and though he made his peace again with the court, did not return to the New World. He died at Montalbán in 1526. His son Luís (c. 1520–72), born at Santo Domingo, received the title of Admiral of the Indies in 1529. He finally abandoned all claims of the family to the viceroyalty and received in compensation an estate in Jamaica and one near Veragua, with the titles of Duke of Veragua and Marquis of Jamaica. In 1563 he was banished on account of his dissolute life to Orán, where he died. With Diego Colón (died 1578), a nephew of Luís and a great-grandson of Christopher, the male line of the great Admiral became extinct. The present dukes of Veragua trace their descent from a sister of the last Diego.

COLUMBUS, Ferdinand (Fernando Colón) (1488–1539). A natural son of Christopher Columbus by Beatriz Enríquez de Arana, of Córdoba. In 1498 he became page to Queen Isabella. He accompanied his father on his last voyage to the New World, and in 1509 he sailed for Española with his brother Diego, who had been made Governor of the Indies. Returning to Spain, he settled down as a cosmographer and writer on navigation. He traveled extensively in Italy, the Netherlands, Germany, and France, and in 1522 visited England. Two years later he was a member of the board of arbitration selected to decide on the conflicting claims of Spain and Portugal to the Molucca Islands. His political career was an active one and mainly in line with his profession as geographer. Two years before his death he founded a school of mathematics and education at Seville. His library of more than 12,000 volumes he left to the chapter of the cathedral at Seville. Ferdinand is best known as the probable author of a life of his father, upon which all subsequent biographies of Christopher Columbus have been based. We possess this work only in the form of the Italian translation published at Venice in 1571, the original having been lost. Ferdinand's claim to the authorship of this biography has been denied by eminent authorities and just as warmly defended; the question is still a mooted one.

COLUMBUS BARRACKS. A United States military post established in 1863 and originally an arsenal. The reservation embraces 77 acres

and is one mile from Columbus, Ohio, which is the nearest railroad station. It is an important recruiting depot for the United States army and contains quarters for 25 officers and 8 companies of infantry.

COLUM-CILLE. See COLUMBA, SAINT.

COL'UMEL'LA (Lat., dim. of *columna*, column). A descriptive term employed in several groups of plants, but especially in mosses and molds. In the mosses the columella is a central axis of sterile tissue extending through the capsule; while in the molds it is the bulging wall at the base of the sporangium, which extends more or less into the cavity of the sporangium.

COLUMELLA, LUCIUS JUNIUS MODERATUS. The most learned of Roman writers on practical agriculture. He was born at Gades (Cadiz), in Spain, and flourished about the middle of the first century. For some time he resided in Syria, but lived chiefly at Rome, and died, most probably, at Tarentum. His great work, *De Re Rustica*, in 12 books—the tenth, *On Gardening*, is in dactylic hexameters—is addressed to one Publius Silvinus and treats of arable and pasture lands, culture of trees, fruits, vegetables, grain, vines, olives, etc., care of domestic animals, birds, and bees, respective duties of masters and servants, and the like. A supplementary treatise relates to trees. This ancient *Book of the Farm* is written in good Latin, and the information is copious, though in some points of questionable accuracy. The best complete edition of Columella is by Schneider, in *Scriptores Rei Rusticæ* (Leipzig, 1784–97); for text of books x and xi, see Lündstrom (ib., 1903, 1907). Consult Barbaret, *De Columellæ Vita et Scriptis* (Nancy, 1888); Becher, *De Columellæ Vita et Scriptis* (Leipzig, 1897).

COLUMN (from Lat. *columna*, column, connected with AS. *holm*, island). In architecture, a vertical support, usually round or polygonal, and having a height much greater than its diameter. A complete or typical column consists of a base (q.v.), shaft, and capital (q.v.). The capital forms at once an ornamental topping for the column and an intermediate member between the vertical lines of the shaft and the horizontal architrave (q.v.) or the impost and spreading spandrel (q.v.) of the arcade, which rests upon it; while the base in like manner mediates between the shaft and the horizontal surface in which the column stands. The shaft is therefore the essential part of the column; for some columns lack bases, as the Greek Doric, and some are without capitals, as in certain late Gothic examples. The shaft is commonly round in section, but its section may be any regular geometrical figure. A square or rectangular column is, however, generally called a *pier;* and whenever the shaft of a vertical support is very massive, or is built up of masonry of several pieces of stone in each course, it is generally called a pier rather than a column. If, on the other hand, each course or horizontal division is composed of a single stone, called a *drum*, the support is termed a column rather than a pier. But this distinction is not always observed, for the vast pillars of masonry which flank the central aisle of the Hypostyle Hall at Karnak, though not composed of drums, are universally called columns. When the shaft is of complex plan, having a central core surrounded by a number of subordinate shafts, as in Romanesque and Gothic architecture, the whole is called a clustered column or, more commonly, a clustered pier. The word *pillar* is frequently but loosely used in the senses both of column and pier; for its meaning and proper use, see that term. A column may be of any material—stone, marble, brick, wood, or metal; but ordinary squared or rough supports of timber are properly called *posts*. Columns of stone or marble are *monolithic* when the shaft is a single piece; only in the rarest instances are base, shaft, and column hewn all of one piece. Columns carry the superstructure by means either of horizontal beams or lintels, called architraves (q.v.), or arches. In the latter case a block, called an impost block or supercapital, is sometimes interposed between the capital and the springing or impost of the arch, as in Byzantine architecture; sometimes the interposed feature comprises a square section of an entire entablature—architrave, frieze, and cornice—as in many late Roman examples. In both Greek and Roman architecture, and the modern styles derived from them, certain forms of column are uniformly combined with particular forms of entablature, according to more or less well-defined rules; such a specific combination is called an *order* (see ORDERS OF ARCHITECTURE); but no such uniform combinations are found in Egyptian, Oriental, or mediæval architecture. Various types of column and their characteristic capitals are shown in the accompanying plate. Some of the special forms, uses, and types of columns, including the metal supports in modern steel construction, are briefly mentioned and explained at the end of this article.

Historical. In the earliest Chaldean architecture the column seems to have played no part whatever; even in the later Assyrian palaces it was used only in a subordinate function, for small secondary supports, probably of wood, as shown in the relief pictures. It was the Egyptians who, lacking good timber but having abundant stone, first developed columnar types of architecture, placing massive columns in rows spaced as far apart as was practicable to span with stone lintels. While they used one undeviating type of cornice (q.v.), the forms and proportions of the columns varied greatly, both as to the shaft, which was round, quatrefoiled, or clustered in section, and the capital, of which the most important types were the lotus bud (or papyrus bud), either simple or clustered; the bell-shaped or campaniform, simple or multifoiled; the palmiform, and the Hathor-headed, with four masks of Hathor surmounted by a model of a shrine. A simple round disk was the only form of base used. The shaft generally swelled from the base and contracted gradually upward, and at the top was decorated by five or six bands under the capital. The round shafts were often covered with incised pictures and hieroglyphics. The great central columns of the Hypostyle Hall at Karnak (q.v.) are 75 feet high and 15 feet in diameter (see ARCHITECTURE, Plate of Temple of Karnak). The Egyptians employed columns chiefly as interior supports; the Greeks used them both as interior and exterior supports, and developed in the Doric, Ionic, and Corinthian orders types of column and entablature, and of architectural effect, which, further elaborated by the Romans, have furnished models and suggestions for the architecture of subsequent ages. The earliest Greek columns, those of Crete, Mycenæ, and

Tiryns, seem to have been derived from wooden originals in tree trunks set up with the small end down, as they all taper downward. They were perhaps often of wood plated or sheathed with bronze; but a few stone columns have been found, among them those of the doorway of the Treasury of Atreus at Mycenæ, now restored and reërected in the British Museum.

The columns of the post-Homeric or historic Greek architecture were entirely different from the early types just described. For over 600 years the Greeks employed the Doric column with but slight variations, the earliest known examples, at Corinth, dating from perhaps 650 B.C. The Doric column had no base; its sturdy shaft, tapering slightly upward in a delicate convex curve (entasis) to the capital, had 16 or 20 shallow vertical channelings meeting in sharp edges or *arrises*. The capital consisted mainly of a spreading convex-profiled circular molding (echinus) supporting a plain square abacus (q.v.). The shaft was composed of drums, and the height of the column varied from less than five times the lower diameter in early examples to more than seven diameters in late examples. Those of the Parthenon are six feet in diameter at the foot, and 34.23 feet high; they are spaced somewhat over two diameters on centres. The great massiveness of the earliest examples counts against the theory that they were derived from wooden prototypes; but their origin is as yet undetermined. In the sixth century B.C. the Ionic type, indubitably derived from wooden prototypes, was introduced into European Greece from Asia, and by its more slender proportions and greater richness of detail won favor for certain classes of buildings of moderate size. This type was from 7½ to 9½ diameters in height, rising from a richly molded circular base to a capital with spiral volutes connected by a band, above a carved echinus. In Asia Minor this order was employed for temples of colossal size, e.g., that of Artemis (Diana) at Ephesus. In the fourth century the Corinthian capital, of ornate design with leaves and volutes around a bell-shaped core, was introduced as a variant of the Ionic, the column being otherwise of the slenderest Ionic type. Later the Romans developed an entirely distinct Corinthian order.

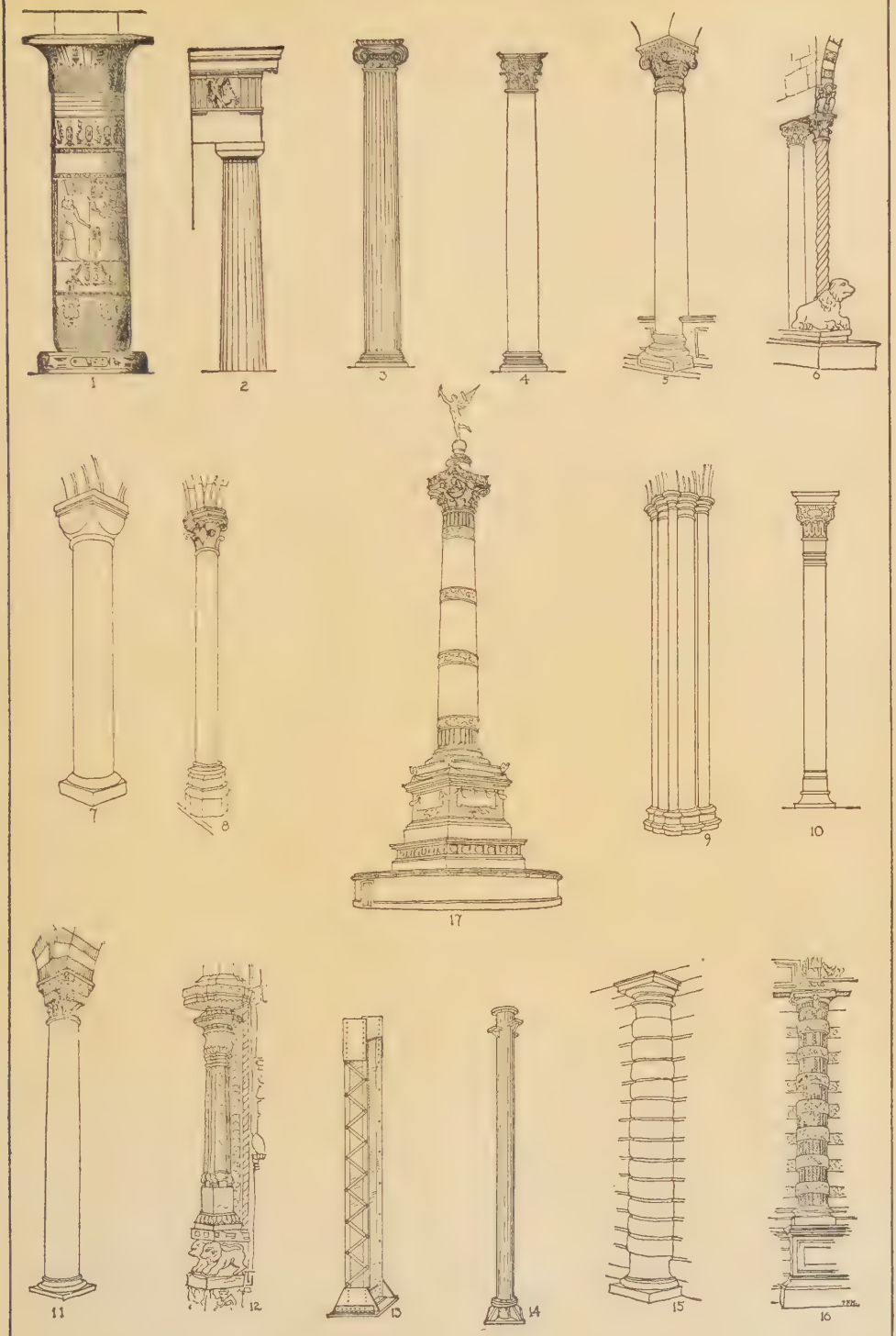
These various forms of column were used by the Greeks chiefly for exterior colonnades; but in the larger temples and other structures they appear also as interior supports, sometimes in two stories. In the temple of Apollo at Bassæ and in the Propylæa at Athens the interior columns were Ionic; those in the Tholos at Epidaurus were Corinthian; while in all three the exterior columns were Doric. In the unfinished temple of Zeus at Agrigentum, and in the tiny choragic monument of Lysicrates at Athens, engaged columns, i.e., columns partly sunk, as it were, in the walls, were used on the exterior.

The Romans developed the column into an architectural feature of far greater flexibility, variety, and splendor than the Greeks. Their Tuscan and Doric columns were variants of earlier Etruscan types; the Greek Ionic they adopted with little change; the Greek Corinthian they elaborated into a distinct order with its own entablature; and to these four they added the Composite, a variant of the Corinthian. While the proportions of these columns varied less widely than the Greek, it is a mistake to assert that they were uniform at any one time, or regulated by a rigid canon. Moreover the Romans greatly increased the variety of their columnar architecture by employing monolithic shafts of polished marble, porphyry, and granite; by superposing the orders in many-storied buildings; by the introduction of pilasters; by setting columns on pedestals; by coupling columns with pilasters; and by the use of engaged columns in combination with arcaded structures. In vaulted buildings the vaults were made to spring from huge columns surmounted by blocks of a complete entablature; and as purely decorative features small columns and pilasters were employed to flank niches and doors, and larger ones to break up and adorn the surfaces of blank walls, the piers of arches of triumph, and the like. Columns of great size, veritable towers with interior stairs and exterior sculpture, were set up as memorials (see ANTONINE COLUMN; TRAJAN'S COLUMN). In Pompeii columns were frequently built of rubble or brick, and heavily covered with stucco molded into the forms of the various orders and painted in bright colors (see POMPEII). In Roman work generally, the column really or apparently supports an entablature. Only in late work, as at Spalato (q.v.) and in Syria, were columns used as supports for arcades. This use of the column, however, became general in early Christian architecture, in the interiors of basilicas with aisles (see BASILICA), though in some examples the columns carry horizontal entablatures. The Byzantine architects used the column as a support for arches and vaults, employing monolithic shafts like the Romans, but devising wholly new types of carved, basket-like capitals, often surmounted by impost blocks. They never used the engaged column.

In Italy, through the early Middle Ages, the column and pilaster of a semiclassic type never quite passed from use; but in the early Lombard buildings the clustered pier, with four columns or shafts grouped around a central core, made its appearance as early as the eleventh century (San Ambrogio, Milan); and somewhat later the nook shaft or jamb column appeared in the splayed doorways of churches. These types of support spread through France and through Germany, especially the Rhine provinces, and by way of Normandy into England and northern Europe. Out of the Romanesque clustered pier was developed all the splendid clustered shafting of Gothic interiors. The slender shafts had no entasis or diminution; they were sometimes attached and sometimes free, and the capitals, often remotely reminiscent of the Corinthian type, were richly

1. Egyptian lotus-flower column.
2. Greek Doric column from the Parthenon at Athens.
3. Greek Ionic column from the Erechtheum at Athens.
4. Roman Corinthian column from the Pantheon, Rome.
5. Byzantine column from St. Sophia, Constantinople.
6. Italian Romanesque column, Verona Cathedral.
7. English Norman column, Ely Cathedral.
8. French Gothic column, church of Notre Dame, Chalons-sur-Marne.
9. English Gothic column, Salisbury Cathedral.
10. Moorish column, Alhambra, Granada.
11. Turkish column, mosque of Suleiman, Constantinople.
12. Hindu column, porch at Peroor, India.
13. Lattice and channel steel column with base.
14. Cast-iron column with base.
15. Rusticated Doric column, Palais du Luxembourg, Paris.
16. Banded Doric column, Palais du Louvre, Paris.
17. Memorial column, Colonne de La Bastille, Paris.

COLUMNS



TYPICAL COLUMNS

FOR NAMES AND DESCRIPTIONS SEE TEXT

carved with foliage, sometimes with grotesques. Gothic shafts were always smooth; but those of the Romanesque period were sometimes richly carved. Round piers, like very massive columns, continued to be used in place of, or in connection with, clustered columns in France and Belgium (and for a while in England), until the decline of Gothic art. Meanwhile the Moslem world had adopted the simple column, with capitals of various types (see MOHAMMEDAN ART). In China and Japan the column seldom appears, its place being taken in interiors by wooden posts; but in India the Jaina and Brahman styles, as well as the Indo-Moslem, produced an infinite variety of columns, more often polygonal than round, and carved into endlessly varied decorative forms.

The Renaissance, first in Italy, then in France, and finally throughout Europe, revived all the Roman forms of columns, devised many charming variations of the Corinthian type of capital, invented new types of shaft—rusticated, banded, and sculptured, and new arrangements of columns, especially by coupling them. The colonnades in front of St. Peter's at Rome, and in Paris those of the Louvre and of the Place de la Concorde, are among the most magnificent of all examples of columnar architecture. In modern practice the Greek as well as the Roman and Renaissance types are in use, and in the United States especially the columnar portico has been used with grandiose effect in a great number of public buildings.

A column having beveled or grooved joints between its drums is a *rusticated* column; one with alternate or occasional drums of larger diameter than the rest is a *banded* column; one projecting from or partly embedded in a wall is an *engaged* column. A column set as a mullion in an opening in the centre of the thickness of the wall is a *midwall* column. A *rostral* column is a memorial or decorative column adorned with symbolic ships' prows projecting from its shafts; *cantoned* columns are those attached to the corners of a rectangular pier. Metal columns may be of cast iron, or "built up" of bars, beams, and plates of wrought iron or steel, and are known by various names according to their form, e.g., *Z-bar* when composed of double-angle irons resembling the letter Z; *box* when built up of two or more channel bars and two plates; H-columns, I-columns, etc., when of sections resembling those letters. A Phœnix column is a circular steel column built up of flanged bars of segmental section. (See FIREPROOF CONSTRUCTION.) The bibliography of columns is practically identical with that of architecture (q.v.); see that for ORDERS OF ARCHITECTURE; and also consult Guadet, *Théorie de l'Architecture* (Paris, 1904) and Longfellow, *The Column and the Arch* (New York, 1899).

COL'UMN. As defined by the *United States Infantry Drill Regulations*, a military formation in which the elements are placed one behind another, whether these elements are files, squads, platoons, or larger bodies. When a regiment is on the march, and each company marching in column of squads, it is said to be "in column of route." The same formation may be adopted by any number of troops in a command. When the science of war was in its infancy, dense column formations were the usual order of battle, much reliance being placed upon it by every European nation except England, who invariably preferred its opposite, the "line" formation. See TACTICS, MILITARY; MARCHING; ADVANCE GUARD; ARMY ORGANIZATION; REAR GUARD. The composition and operation of a column of ships in naval warfare or manœuvres will be found treated under TACTICS, NAVAL.

COLUM'NA ROSTRA'TA. A column set up in the Roman Forum to commemorate the naval victory of Gaius Duilius (q.v.) over the Carthaginians in 260 B.C. It was of marble, adorned with the prows of the captured ships; hence the name. The column having been destroyed by lightning, a new column was erected by Claudius, with an inscription found in the Forum in 1566 and now preserved in the palace of the Conservatori. Consult *Corpus Inscriptionum Latinarum*, vol. i (2d ed., 1893), and Allen, *Remnants of Early Latin*, pp. 67–68 (Boston, 1884).

COLUMN OF JULY. See JULY, COLUMN OF.

COLUMN OF MAR'CUS AURE'LIUS. See ANTONINE COLUMN.

COLUMN OF PHO'CAS. See PHOCAS, COLUMN OF.

COLUMN OF SAINT MARK. See VENICE.

COLUMN OF TRAJAN. See TRAJAN'S COLUMN.

COLUMNS OF HER'CULES. See HERCULES, PILLARS OF.

COLUMN VENDÔME, vän'dôm'. See VENDÔME, PLACE.

COLURE, kō-lūr' (Gk. *κόλος, kolos*, docked + *οὐρά, oura*, tail). One of the two great circles of the celestial sphere drawn through the celestial pole, and in one case the equinoxes, in the other the solstices. The colures divide both the ecliptic and the celestial equator into four equal parts. The solstitial colure also passes through the pole of the ecliptic.

COLVILLE, kōl'vĭl (from the town of Colville, Wash.). A former important Salishan people, calling themselves Shwoyelphi, or Senijextee, originally occupying the country on Columbia River about Colville and Kettle rivers, northeastern Washington. The great salmon-fishing resort of Kettle Falls was within their territory, and here, in 1846, was established the Jesuit mission of St. Paul, through the influence of which nearly all the upper Columbia tribes are now Christianized. They were put upon a reservation (Colville) in 1872 and numbered 785 in 1910. See SALISHAN STOCK.

COLVIN, kŏl'vĭn, SIR SIDNEY (1845–1927). An English critic of art and books, born at Norwood, Surrey. He graduated in 1867 at Trinity College, Cambridge, was elected a fellow of the college in 1868, and, having become Slade professor of fine arts at Cambridge in 1873, held that post by successive reëlections until 1885. In 1876–84 he was also director of the Fitzwilliam Museum of the university. He was keeper of prints and drawings in the British Museum from 1884 to 1912. His contributions to periodicals on the history and criticism of literature, and more largely of the fine arts, are numerous and valuable. He was knighted in 1911. His published works include the volumes on *Walter Savage Landor* (1881) and *John Keats* (1887) in the "English Men of Letters Series"; *A Florentine Picture-*

Chronicle (1898); *The Early History of Engraving in England* (1905); editions of *Selections from the Writings of Walter Savage Landor* (1882); of the *Letters of Keats* (1887) in the "Golden Treasury Series," and of the *Papers of Fleeming Jenkin* (1887; with J. A. Ewing); *Selected Drawings from Old Masters* (1903–10); *Early Engraving and Engravers in England* (1906); *Letters of Robert Louis Stevenson* (1911). His labors in connection with the preparation of the standard Edinburgh edition (27 vols., 1894–98) of the works, and of the edition of the collected *Letters* (2 vols., London, 1900; preceded in 1895 by *Vailima Letters*) of his friend, Robert Louis Stevenson, made him an authority on that author. He also wrote the sketch of Stevenson for the *Dictionary of National Biography* (vol. liv), and was to have written the authoritative *Life*, intended for publication with the *Letters*, but was obliged to relinquish the task to Graham Balfour.

COL'VOCORESSES, George Partridge (1847–). An American naval officer, born at Norwich, Vt. After serving two years in the Civil War on the ships *Supply* and *Saratoga*, he attended the United States Naval Academy, where he graduated in 1869. He was promoted through the various grades, becoming captain in 1905 and retiring as rear admiral in 1907. During the Spanish-American War he took part in the battle of Manila Bay. He was instructor at the Naval Academy in 1886–90 and in 1893–96, and was commandant of midshipmen in 1905–07.

COL'WELL, Stephen (1800–72). An American author and philanthropist, born in Brooke Co., West Va. He graduated at Jefferson College, Pa., in 1819; was admitted to the bar of Virginia in 1821; and practiced in Pittsburgh until 1831, when he engaged in the iron business in Philadelphia and began writing for the press, particularly on questions of politics and social science. He gathered a large library, which he left to the University of Pennsylvania, where he also endowed a chair in social science. During the Civil War he was an active supporter of the Union and at its close was appointed a commissioner to revise the internal-revenue system. Besides contributions to commercial and financial periodicals, he published: *Politics for American Christians* (1852); *Position of Christianity in the United States in its Relation with our Political System and Religious Instruction in the Public Schools* (1855); *Effects of Disunion on Slavery* (1856); *The Ways and Means of Commercial Payment* (1858).

CO'LY. See Mouse Bird.

COLYN. See Colins.

COL'ZA, or Coleseed. See Rape.

CO'MA (Neo-Lat., from Gk. *κῶμα, kōma,* deep sleep, from *κοιμᾶν, koiman,* to put to sleep, from *κεῖσθαι, keisthai,* to lie; connected with Lat. *quies,* rest). A state of profound insensibility differing from natural sleep in that the patient cannot be aroused from the stupor. The patient's eyes are closed, his pupils are either large or small, his face is generally flushed and the conjunctivæ red, the breathing deep, labored, and stertorous. The different varieties of coma which the physician is called upon to distinguish are as follows: Coma due to drugs, e.g., alcohol, opium, belladonna, chloral; poisoning from illuminating gas, ptomaines, uremia, and diabetes; unconsciousness from nervous diseases, such as epilepsy and hysteria; or from brain lesions, as apoplexy, tumors or abscess of the brain, concussion, meningitis. There remain also to be mentioned voluntary coma (feigning, malingering) and transient coma, or syncope. In the coma from opium or morphine the patient should be aroused if possible and kept walking and awake by various means; but in coma from all other causes he should be kept absolutely quiet in bed. Therefore it is very necessary to know exactly what trouble must be treated, and no layman can judge of the proper remedial measures. The coma from alcoholic intoxication is so frequent and well known that very often the coma of serious conditions is mistaken for mere drunkenness.

Coma Vigil. A condition of continuous sleeplessness, associated with partial unconsciousness, occurring towards the end of a severe attack of diseases, such as typhus or typhoid fever, or delirium tremens.

CO'MA BER'ENI'CES (Lat., Berenice's hair). A small northern constellation said to have been named in honor of Berenice, the wife of Ptolemy Euergetes, but first delimited by Tycho Brahe. It lies to the south of the tail of the Great Bear and very near the equinoctial colure (q.v.). It consists of a small cluster of stars which has been the subject of careful measurement with the heliometer by Chase at the Yale Observatory, and photographically by Kretz, at Columbia University, New York. See Conon of Samos.

COMACCHIO, kō-mäk'kyō (Lat. *Comaculum*). A town in the Valli di Commachio, Province of Ferrara, in northeast Italy, situated on the southernmost of the lagoons of the Po, 3 miles from the Adriatic (Map: Italy, G 3). It is built on 13 islands that are connected by numerous bridges, and the lagoon communicates with the little port of Magnavacca, on the Adriatic. It is the seat of a bishopric, has ancient walls and an old cathedral. It was formerly an important fortress. The majority of the inhabitants are engaged in fishing for eels for the market and in the manufacture of salt. Pop. (commune), 1881, 9974; 1901, 10,877, 1911, 12,052.

CO'MAN, Katharine (1857–1915). An American economist and educator, born in Newark, Ohio. She graduated at the University of Michigan in 1880, and was professor of history (1883–1900) and then of economics at Wellesley College. Her writings, of which the most important are on economic history, include: *The Growth of the English Nation* (1894); *History of England* (1899); *English History as told by English Poets* (1902; with Katharine Lee Bates); *Industrial History of the United States* (1905, revised 1911); *Economic Beginnings of the Far West* (1912).

COMA'NA (Lat., from Gk. Κόμανα, *Komana*). 1. Comana of Cappadocia, an ancient city, situated in a deep valley of the Anti-Taurus Range, through which the river Sarus flows. It is probably identical with the Kumani of Tiglathpileser I (c.1140–1105 B.C.) and the Kammanu of Sargon II (722–705 B.C.). Comana was celebrated as the place where the rites of the goddess Ma (the Greek Enyo, or Artemis, and the Roman Bellona) were celebrated with much solemnity and great magnificence, in a spacious and sumptuous temple, to which the city was

scarcely more than an appendage. It was governed by the chief priest, who took rank next to the King. In Strabo's time more than 6000 persons are said to have been engaged in the temple affairs. The festivals attracted large gatherings. It has been suggested by Th. Reinach (*Mithridate Eupator*, 1890, p. 242) that the early development of this cult was to some extent influenced by the Cimmerians (q.v.) in the seventh century B.C. John Chrysostom died in Comana on his way from Cucusus to Pityus on the Euxine, whither he had been banished. 2. COMANA IN PONTUS, an ancient city of Asia Minor, on the river Iris, the modern Tocat-su. It was an important commercial city, and the seat of the worship of the goddess of the moon, whose cult was carried on with ceremonies analogous to those employed in the Cappadocian Comana (see above). Its ruins are still to be seen near the village of Gumenek.

COMANCHE, kō-măn′chē *or* kō-măn′chā (of unknown signification, first applied to the tribe by the Spanish Mexicans), an important tribe of Shoshonean stock, formerly ranging jointly with the Kiowa (q.v.), along the southern plains from the Arkansas River to central Texas, and extending their forays far down into Mexico. Up to the surrender of the last hostile band, in 1875, they were the constant scourge of the Mexican and Texan frontier. They are a southern offshoot of the Shoshoni proper, the language of the two tribes being the same. They are singularly deficient in religious ceremonials. They now number 1171, in western Oklahoma, their reservation having been thrown open to settlement in 1901. Consult *Handbook of American Indians* (Washington, 1907).

COMANCHE. A city and the county seat of Comanche Co., Tex., 112 miles southwest of Fort Worth, on the Fort Worth and Rio Grande and the St. Louis and Southwestern railroads (Map: Texas, C 4). It is in an agricultural region and has stockyards, brickworks, cotton gins and other establishments connected with the cotton industry. Comanche was settled in 1857 and is governed under a charter of 1876 which provides for a mayor, elected biennially, and a unicameral council. The water works are owned by the city. Pop., 1900, 2070; 1910, 2756.

COMAN′CHEAN SERIES. A division of the Cretaceous system of rocks, including all of the Lower Cretaceous beds as developed in the southern interior section of the United States and the adjoining parts of Mexico. The series is made up of three subordinate stages (*a*) Trinity, (*b*) Fredericksburg, and (*c*) Washita; the first, or Trinity, stage largely consists of sands, but the later ones are largely limestone or chalk. The beds are exposed over an extensive area in Texas, Oklahoma, and Mexico, reaching a thickness of 1000 feet or more in Texas and over 10,000 feet in Mexico. They contain lignitic coal and some bitumen. The Comanchean is given the rank of a system by some American geologists who employ the name to designate all of the strata hitherto classed as Lower Cretaceous; the Cretaceous system would then include only the part that has usually been designated as Upper Cretaceous. Consult Chamberlin and Salisbury, *Geology*, vol. iii (New York, 1907). See CRETACEOUS SYSTEM.

COMAYAGUA, kō′mä-yä′gwä. The capital of the department of the same name, Honduras, near the Río Ulua, 37 miles northwest of Tegucigalpa (Map: Central America, D 3). It is situated in a fertile valley, but has little trade. It is an episcopal see, and the cathedral, dating from the early eighteenth century, is the most notable building. Pop., about 3000. Comayagua appears first in history, under the name "Valladolid la Nueva," about the middle of the sixteenth century, and Indian relics found in the vicinity testify to its antiquity. Until 1880 it was the capital of the republic.

COMB (AS. *camb*, Icel. *kambr*. OHG. *chamb*, Ger. *Kamm*, comb; connected with Gk. *γόμφος*, *gomphos*, peg, OChurch Slav. *zadŭ*, Skt. *jambha*, tooth). Combs seem to have been used by the ancients rather for adjusting than for fastening the hair, the pin, or bodkin (*acus*), having chiefly been employed for the latter purpose. Both the Greek and Roman combs were generally made of boxwood, obtained from the shores of the Euxine; but later, ivory combs, which had long been used by the Egyptians, came into general use among the Romans. The precious metals were also used for this purpose, but this was probably rarer in ancient than in modern and mediæval times, from the circumstance of the comb not having then been used as an ornamental fastening. Of the early use of gold combs in Great Britain we have a reminder in the well-known ballad of "Sir Patrick Spens":

> "O lang, lang may their ladyes sit,
> Wi' their gowd kames in their hair."

Combs have been found in Anglo-Saxon graves of both men and women. In early times the comb had a place in the church service. Careful ritualistic directions have been found for combing the abbot's hair in the sacristy before vespers and other services. In the tombs of the martyrs in the catacombs combs of ivory and boxwood have been found, which testify to this ancient custom of the priests arranging their hair before the altar.

An ancient Irish long rack comb is in the museum of the Royal Irish Academy. The sides are hogbacked, and between them are set the pectinated portions, varying in breadth from half an inch to an inch and a quarter, according to the size of the bone out of which they were cut. The whole is fastened together with brass pins riveted. By this contrivance any damaged portion could easily be replaced.

Modern combs are made with automatic machinery from tortoise shell, ivory, horn, wood, bone, metal, india rubber, and celluloid. The material is first made into plates of the size, shape, and thickness of the comb, and then the teeth are cut. In the case of horn, a material which is becoming rarer, the horn must be cleaned and slit, heated and flattened, and sawed into strips. The edges and ends are then trimmed, and the blanks are finished; the last stage in this preliminary process being hydraulic pressing. The old method of cutting the teeth was by the *stadda*, or double saw, which had two blades of steel set parallel to each other, with a space between them equal to the thickness of the intended tooth. Combs with 50 or 60 teeth to the inch may be cut in this manner. The teeth are then thinned, smoothed, and finished by means of thin, wedge-shaped files.

By the older process of cutting, above described, the material corresponding to the spaces between the teeth is of course wasted; by the method of parting this is made available to form the teeth of a second comb. The plate of horn, tortoise shell, etc., in a modern comb-cutting machine is cut through with plungers

carrying at their lower ends cutters which cut the teeth of two combs at a time. The essential features of the cutter consist of two thin chisels inclined to each other, which represent the edges; between these, and connecting the ends, is a small cross chisel. When this compound cutter descends with sufficient force upon the plate, it will cut one of the teeth. By simple machinery the table carrying the plate is made to advance a distance equal to the thickness of one tooth while the cutter is rising, and thus the successive cuts are made. A slight pull is now sufficient to part the plate into two combs, the teeth of which only require filing and finishing. India-rubber combs are manufactured by pressing the caoutchouc to the required form in molds and "vulcanizing" or combining it with sulphur afterward. By this means a high degree of hardness can be obtained. Celluloid combs may be also molded, but a process similar to that used with horn is preferable. In making celluloid combs the teeth may be either sawed or else the combs may be twinned or parted as described above, or formed with other automatic machinery in which the entire process from the blanks may be carried on to the finishing stage. In 1905 combs to the value of $2,769,380 were produced in the United States by 42 establishments, with a capital of $1,112,260, giving employment to 1806 wage earners. For the manufacture of horn combs and the machinery used therein, consult Viall, "The Manufacture of Horn Combs," *American Machinist*, vol. xxxv, p. 740 (New York, 1911). For the manufacture of celluloid combs, consult Masselon, Roberts, and Cillard, *Celluloid*, Eng. trans. by Hodgson (London, 1912).

COMB, or **COOMB.** An old British corn measure, containing four bushels. In many localities hollows or valleys among hills are called "combs," or "coombs."

COMBA, kōm'bȧ, Emilio (1839–1904). An Italian writer, born at San Germano Chisone. As professor at the Istituto Valdese at Florence, he founded in 1873 the review entitled *Rivista Cristiana*, somewhat polemical in nature, devoted to a discussion of religious topics. The history of religious reform in Italy is well described in the interesting works entitled *Introduzione alla storia della riforma in Italia* (1881) *and I nostri protestanti* (1895–97). The *Storia dei Valdesi* (new ed., 1901) was translated into English by T. E. Comba (London, 1889).

COMBARELLES, Cavern of. See Paleolithic Period.

COM'BAT (Fr., from *combattre*, to fight, from Lat. *com-*, together + ML. *battere*, to fight, from Lat. *batuere*, to beat), Single. Among the early Norsemen a careful distinction was made between the ordinary single combat, or *einvigi*, and the *hólm-ganga*, or island duel. The former was unencumbered with rules and traditions and was a simple fight between two opponents. The other, which received its name from the fact that it was always held on the *hólm*, or island, generally of a river, was accompanied by very elaborate rites and rules and could be engaged in only under certain circumstances, to be determined by the authorities. It was regarded as a sort of court of final appeal, and at the meeting of every Parliament, or *Thing*, a place for the holding of these official duels was set aside. Many old Norse warriors were famous as fighters of hólms, some even receiving nicknames from this circumstance. The hólm was abolished by the Icelandic Parliament, about 1006, probably as the result of the recent establishment of a new court of appeal, which made it unnecessary. The hólm continued in Norway for a few years longer. Some connection may exist between the hólm and the Norman tournaments, and the modern duel, with its formal procedure, represents the same idea in an unofficial form. Consult Baigt, *Der gerichtliche Zweikampf nach seinem Ursprung und in Rolandslied in romanische Forschungen*, pp. 436–498 (1890), and Below, *Der Ursprung des Duells* (Freiburg, 1898).

COMBE, kōm, George (1788–1858). A Scottish phrenologist, born in Edinburgh. He entered the legal profession, became a writer to the signet in 1812, and continued to practice until 1837, when he resolved to devote himself to scientific pursuits. He published his *Essays on Phrenology* in 1819 (renamed in later editions *System of Phrenology*), and in 1828 *The Constitution of Man Considered in Relation to External Objects.* Combe contributed largely to the *Phrenological Journal* (20 vols., 1824–47). Besides the works mentioned, he wrote on ethics, education, politics, economics, and theology. He also traveled in America and Germany, and published *Notes on the United States of North America* (3 vols., 1841). In his day his writings were popular, but they have no importance now. For his *Life*, consult Gibbon (London, 1878).

COMBE, William (1741–1823). An English author. He was born at Bristol and was educated at Eton and at Oxford, which he left without a degree. After rapidly spending a small fortune that had been left him, he settled in London as a law student and hack writer. In 1776 he published his *"Diaboliad,* a poem dedicated to the worst man in his Majesty's dominions." By his pen he earned a precarious living, and spent a good deal of his time in prison. He wrote upward of 200 biographical sketches, 70-odd sermons, many satires in doggerel, and an immense number of magazine articles. His most famous work, however, is *Three Tours of Dr. Syntax* (1812–21), written in verse, and illustrated by Rowlandson. It is a comic account, of still undiminished humorous appeal, of the adventures of a pedagogue. Consult Hotten, *The Three Tours*, edited with a bibliography (London, 1869).

COMBE CAPELLE SKELETON. See Man, Ancient Types.

COM'BERMERE, Stapleton Cotton, Viscount (1773–1865). An English soldier. He was born at Llewenny Hall, Denbighshire, and, after serving in several campaigns in India and South Africa, joined the army in Spain, where he greatly distinguished himself, rising to the command of the entire cavalry of the allied forces. He was commander in chief of the army in Ireland from 1822 to 1825 and was then sent in the same capacity to India, where he remained for five years, during part of this time acting as Governor-General. In recognition of his distinguished services he received the title of viscount, and in 1855 was made field marshal. He had succeeded to the family baronetcy in 1809. He was constable of the Tower (1852) after Wellington. A few years after his death an equestrian statue by Marochetti was erected to his memory at Chester Castle. Consult *The Combermere Correspondence*, edited by his widow and W. W. Knollys (London, 1866).

COMBES, kôNb, François (1816–90). A French scholar and historian, born at Albi. He became professor of history at the College of Pamiers in 1844, at the Collège Stanislas in Paris, 1848, at the Lycée Bonaparte in 1853, and in the Bordeaux faculty of letters in 1860. He published: *Histoire générale de la diplomatie européenne* (1854); *Histoire de la diplomatie slave et scandinave* (1856); *Histoire des invasions germaniques en France* (1873); *Lectures historiques à la Sorbonne et à l'Institut* (1884–85); and an edition of the French correspondence of John de Witt (1873).

COMBES, Justin Louis Emile (1833–1921). A French politician, born at Roquecourbe in the Department of Tarn. He at first studied for the priesthood, but later he decided to become a physician instead. After completing his medical course he settled down as a country doctor in the little town of Pons in the Department of Charente-Inférieure. His interest in politics sprang from his interest in public hygiene and education. He was elected mayor of Pons in 1875, then a member of the Conseil-Général of the department in 1879, finally a senator in 1885, an office which he still held in 1914. M. Combes became a prominent leader of the Radical Republican party and was given the portfolio of Minister of Education in the Bourgeois cabinet of 1895. In 1903 he succeeded Waldeck-Rousseau as Premier, himself taking the portfolio of the Interior. It was during the Combes ministry that the war on the church, which had been started by Waldeck-Rousseau, was carried on with unflinching firmness. The law against the religious orders was enforced with great severity, and over 500 teaching, preaching, and commercial orders were suppressed under the Combes régime. The Premier was relentless in his opposition to these associations, which he regarded as "pernicious instruments of that monstrous theocratic doctrine which is fatal to our whole social and political conception, of which the fundamental axiom is the absolute independence of the state of all dogma, and its recognized supremacy over every religious communion." During the Combes ministry steps were also taken which were to lead later to the separation of church and state. In spite of the fact that M. Combes was upheld by the Chamber in all his acts, he resigned in 1905 because of the intense bitterness which these acts aroused among the conservatives.

M. Combes is a latter-day Voltairean, with all of his master's hatred of clericalism in all its forms. To him the Catholic church appears as the sworn enemy of modern life and culture and particularly of the Republic of France. M. Combes is therefore a statesman of one idea, anti-clericalism, for he has taken deeply to heart Gambetta's famous injunction, *Le cléricalisme, voilà l'ennemi.* Personally he is what is called in France an "austere Republican," a man simple in his private life and absolutely rigid in his adherence to the principles of the French Revolution.

COM'BINA'TION. See Permutation.

COMBINATION (ML. *combinatio,* from Lat. *combinare,* to combine, from *com-,* together + *bini,* two by two). In law, specifically the union of individuals or corporations for the promotion of their common business interests. When limited to this object, and kept free from fraud, violence, or like sinister methods, it does not fall under the ban of modern law. If it is resorted to, however, for the accomplishment of an unlawful end, it becomes a conspiracy (q.v.) and subjects its promoters to civil actions for damages as well as to criminal prosecution. Formerly combinations to raise or depress prices, as well as every form of combination in restraint of trade, were treated as conspiracies by English law.

Whether combinations by laborers to raise wages were conspiracies at common law is a question upon which the highest authorities in England differ. If not at common law, they were criminal conspiracies under a series of statutes beginning with 23 Edw. III in 1349 and closing with 40 Geo. III, c. 60, in 1800. A radical change in legislation on this topic in England began in 1825, and at present combinations of workingmen in labor organizations (q.v.) and similar associations are sanctioned by law, both in Great Britain and the United States, provided they are not accompanied by fraudulent, violent, or menacing conduct, or by boycotting or similar unlawful practices. See Conspiracy; Boycott; Intimidation; Trade-Unions; Strike.

Combinations of skill and capital, within proper bounds, have always received legal recognition; such as the combinations effected in a partnership, joint-stock association, or corporation. At present the tendency to extend these combinations and to introduce new or modified forms is very marked. Trade-unions (q.v.) among workingmen, and trusts (q.v.) among capitalists, may serve as illustrations. The legislation relating to these forms of combination, as well as their economic and political bearings, will be dealt with under the appropriate titles.

COMBING. See Carding.

COMBUSTION (Lat. *combustio,* a burning, from *comburere,* to burn, probably for **comurere,* but with *b* inserted on the analogy of *ambustus,* burned; less plausibly for **co-amb-urere,* to burn, from *com-,* together + amb, ambi, Gk. *ἀμφί, amphi,* around + *urere,* to burn), or Burning. The process by which bodies combine with oxygen and are thus seemingly destroyed. The term is, in ordinary parlance, restricted to cases in which the process of combination takes place rapidly and is accompanied by heat and light, as the combustion of wood in a fireplace, the combustion of a candle, etc. In its more scientific usage, however, the term may designate any possible case of direct combination with oxygen, whether rapid or slow, whether accompanied by light or not. By analogy, the term is also sometimes applied to the rapid union of substances with "supporters of combustion" other than oxygen, such as chlorine gas, in which a candle may burn almost as well as in air.

The light and heat of combustion are utilized for purposes of everyday life, the combustible material employed, i.e., the illuminant or the fuel, being usually some product containing carbon. Thus ordinary illuminating gas contains a number of gaseous chemical compounds of carbon. Coal and wood are mixtures of carbon compounds, the former containing even a considerable amount of free carbon. Hydrogen, too, is one of the chemical constituents of most fuels and illuminants. When combustion takes place, the carbon and hydrogen, combining with oxygen, give, respectively, carbonic-acid gas (carbon dioxide) and water vapor. These are,

therefore, the chief products of ordinary combustion.

The heat (measured in gram calories or in kilojoules, as explained in the article CHEMISTRY) that may be obtained by burning a given amount (say, the molecular weight in grams) of a substance, depends on the nature of the substance, on its state of aggregation and temperature (usually 18° C.) before the combustion, and the temperature (usually again 18° C.) of the cooled products of the combustion. All these conditions taken into consideration, every combustible chemical substance has its own characteristic "heat of combustion." The following are the heats of combustion of a few well-known compounds of carbon: ordinary alcohol, 340,000 gram calories; acetic acid (the sour principle of vinegar), 210,000; ethyl-acetic ester, 544,000; cane sugar, 1,355,000; cellulose, 680,000; urea, 152,000. The combustion of a chemical compound may be conceived as taking place in two consecutive steps: first, the compound is decomposed, i.e., every one of its molecules is broken up into its constituent atoms—a process usually involving not evolution, but *absorption* of heat; secondly, every single atom capable of so doing combines with oxygen (O) an atom of carbon (C), thus yielding a molecule of carbonic acid (CO_2), and two atoms of hydrogen (H) yielding a molecule of water (H_2O). This second step of the process is accompanied by the evolution of a quantity of heat depending upon the number of carbon and hydrogen atoms in a molecule of the combustible compound. But, owing to the absorption taking place during the first part of the process, a portion only of the heat produced during the second part actually appears in the form of sensible heat, and it is that portion which is called the heat of combustion. An exact knowledge of the heats of combustion of various substances is of great importance for theoretical as well as for immediate practical purposes. Its practical importance in comparing, e.g., different kinds of fuel, is self-evident and requires no explanation. Its theoretical importance is mainly in the fact that with the aid of it the exact amount of heat evolved or absorbed during various chemical transformations can be readily calculated. According to the first law of thermodynamics, the amount of heat evolved or absorbed during any transformation whatever, is independent of the manner in which the transformation takes place. For example, the amount of heat produced by burning one equivalent weight of ordinary alcohol and one equivalent weight of acetic acid, is the same whether we burn them directly or first cause them to combine into ethyl-acetic ester and then burn the latter. In the second case the heat absorbed during the formation of the ester must, of course, be combined with that evolved during its combustion. But this suggests a simple way of obtaining the heat of formation of the ester by merely carrying out two combustions. The total heat of combustion of free alcohol and acetic acid is 340,000 + 210,000 = 550,000 gram calories (see above); that of ethyl-acetic ester is 554,000 gram calories. The excess of 4000 gram calories must therefore represent the amount absorbed during the combination of alcohol and the acid into ethyl-acetic ester. In a similar manner the heat of any chemical reaction may be determined, if the heats of combustion of the reacting substances and the heats of combustion of the products of the reaction are known. In many cases this is the only certain way of determining with some precision the heat of reactions, as direct measurement during a reaction would often involve very great experimental difficulties, while the direct measurement of the heat of combustion is a comparatively simple matter. The heat of combustion is usually determined by chemists in the following manner: A known amount of the combustible substance is inclosed in an air-tight steel vessel filled with compressed oxygen and lined on the inside with platinum; the vessel is immersed in a calorimeter (see CALORIMETRY), and the substance is ignited with the aid of an iron wire heated by means of an electric current; the observer measures the rise of temperature in the calorimeter, and from this calculates the amount of heat produced. The importance of knowing the heat of chemical reactions is discussed in the article THERMOCHEMISTRY (q.v.).

Now, while the heat of combustion depends only on the chemical nature of the material burned, the rise of temperature caused by it depends to a very great extent on the manner in which the combustion takes place. If other gases, such as the nitrogen of the air, are present without themselves adding to the amount of heat produced, part of that amount goes to heat such gases, and, as a result, the temperature is considerably lower than if the same substance were burned in precisely the amount of oxygen gas required for its combustion. The rapidity with which a combustion takes place is another factor on which the temperature depends; for heat may be gradually dissipated by conduction even while it is being produced, and so the actual amount remaining at any moment during a slow process of combustion may be very small. Thus, when phosphorus is exposed to the air at ordinary temperatures, a slow process of oxidation (combustion) takes place, very little heat being given out at any given moment. If ignited in the air, phosphorus burns vividly, giving out much heat and light for a short time. Finally, if ignited in an atmosphere of pure oxygen, it enters into most vivid combustion, evolving for a very short time a most intense heat and a brilliant light. An analogous phenomenon may be observed when coal is burned in a furnace. So long as the door of the furnace is open and there is but little draft through the fuel, the evolution of heat is moderate and may last several hours. But when the door is shut and much air is drawn through the coal, the latter is more quickly burned; the temperature is higher because more heat is evolved during a shorter period of time, but in the long run the amount of heat produced is the same.

Since the process of combustion is a form of chemical transformation more striking and more commonly met with than any other process, it early attracted the attention of scientific observers. But since, on the other hand, it involves the consumption and formation of gases, it baffled their ingenuity for many centuries. Those light, colorless, aëriform substances had, in the first place, to be discovered; and for a long time they escaped the attention of observers, in spite of their being present everywhere and constantly interfering with experimental work. Further, the peculiar properties of gases, together with the striking appearance

of flames and fires, gave birth to the erroneous idea that material bodies are capable of losing weight by combining with certain "principles" and of gaining weight by having such "principles" taken away from them. Thus the phenomena of combustion long hampered the progress of science. But it was the same phenomena that also finally led to truer conceptions; for their correct interpretation by Lavoisier formed the corner stone upon which rests the gigantic structure of the chemistry of to-day. See FOOD; FUEL; THERMOCHEMISTRY; CHEMISTRY; SPONTANEOUS and SURFACE COMBUSTION.

COMÉDIE FRANÇAISE, kō'mā'dē' frän'sāz' (Fr., French comedy). The official name of the Théâtre Français, the national theatre of France, subsidized by the state for the advancement of dramatic art. Its history dates officially from Oct. 21, 1680, when a decree of Louis XIV amalgamated the two rival companies of the Hôtel de Bourgogne and the Hôtel Guénégaud, the latter being a fusion, after Molière's death in 1673, of the Théâtre du Marais and the Troupe de Molière. It thus maintains a practically unbroken tradition from the time of the great master of comedy and is still familiarly known as the House of Molière. In 1682 the King granted to his comedians an annual pension of 12,000 livres (about $2400), their first subsidy. In 1689 they established themselves in a new house, in what is now called the "Rue de l'Ancienne Comédie," and took the name of "La Comédie Française"; under it they played until the Revolution with a succession of such artists as Baron, Adrienne Lecouvreur, Le Kain, and Mademoiselle Clairon. For a time (1770–82) they were housed in the palace of the Tuileries itself. Later, on the performance of Chénier's antimonarchical play of *Charles IX* in 1789, violent political discussions arose among the performers, and ultimately they split into two sections: the Republican party, under the young tragedian Talma, establishing a new theatre under the name "Théâtre de la République," on the site of the present building in the Rue de Richelieu; while the Royalist section took the title "Théâtre de la Nation." In September, 1793, the latter was suddenly closed by order of the Committee of Public Safety, and the players imprisoned, though they were afterward gradually released. For a few years the rivalry continued; then in 1799, for a short time, there was an absolute interruption in the history of the Théâtre Français. In May of that year, however, the Comédie was once more reorganized and settled in the Rue de Richelieu. Napoleon, while at Moscow, Oct. 15, 1812, prescribed the regulations which, modified in 1850 and 1859, still govern the company. There is an *administrateur-général* appointed by the government. The *sociétaires* are members of the company, who, as shareholders, divide the profits according to certain rules. Before being elected as a *sociétaire,* an artist must have served in the theatre as a *pensionnaire,* upon a salary. A *sociétaire,* after 20 years of service, is allowed to retire with a pension of 4000 francs. The annual sum received from the state is 240,000 francs; and the theatre, being removed from the fear of temporary pecuniary failure, is in no sense a mere business speculation, but serves as an educator of public taste and sets a standard of dramatic training. Here many of the greatest artists of the modern French stage have won their triumphs, including Mademoiselles Mars, Rachel, Brohan, and, for a part of her career, Sarah Bernhardt, and Monsieurs Talma, Got, Mounet-Sully, and Coquelin. Early in 1900 the historic building adjoining the Palais Royal was partly destroyed by a disastrous fire, but was promptly rebuilt in improved fashion within the same lines. Consult: Matthews, *The Theatres of Paris* (New York, 1880); Lucas, *Histoire philosophique et littéraire du Théâtre-Français* (Paris, 1862–63); Bonnassies, *La Comédie Française, histoire administrative* (ib., 1874); Joannides, *La Comédie Française 1680 à 1900, dictionnaire général des pièces et des auteurs,* preface by Jules Claretie (ib., 1901); Cochrane, *The Théâtre Français in the Reign of Louis XV* (London, 1879); and, for a discussion of many of the plays of its recent repertory, Weiss, *Autour de la Comédie Française* (Paris, 1892).

COMÉDIE HUMAINE, ụ'mān' (Fr., human comedy). A series of novels by Honoré de Balzac, the first volume of which was published in 1829, but the general title of which was not announced until 1842. Its plan was to present a panorama of the entire life of his country and time. This colossal attempt was left incomplete on his death in 1850. But well-nigh 100 novels remain, dealing with innumerable types and situations characteristic of the France of the early nineteenth century.

COM'EDO MITE. See ACARUS FOLLICULORUM.

COMEDY. See DRAMA.

COMEDY OF ERRORS, THE. An early play of Shakespeare, acted at Gray's Inn, Dec. 28, 1594, and printed in 1623. It was probably suggested by the *Menœchmi* of Plautus. The plot revolves around the amusing blunders caused by the complete similarity, in person, of the twin brothers, Antipholus of Syracuse and Antipholus of Ephesus, and their twin servants, the Dromios, whom even their masters are not able to tell apart.

COME'NIUS, or KOMENSKY, JOHANN AMOS (1592–1670). A noted educational reformer of the seventeenth century, born either at or near Ungarisch-Brod, Moravia. His parents belonged to the Moravian Brethren, and Comenius became one of the leaders of that sect. Though on account of poverty he was unable to begin his education until late—he did not enter the Latin school at Strassnick until he was 16—he attended the gymnasium of Herborn, in Nassau, and later studied at Heidelberg. In the course of his study he became acquainted with the educational reforms of Ratichius (q.v.), and with the report of these reforms issued by the universities of Jena and Giessen.

The work of Comenius included three important fields of activity. His practical work, constituting throughout his life his most immediate concern, was that connected with the Moravian church. In 1614 he was ordained to its ministry, and four years later was given the charge at Fulnek, one of the most flourishing churches of that communion. In consequence of the religious wars he lost all his property and his writings in 1621, and six years later was compelled to flee from his native country on account of the proscription of all Protestants. Settling at Lissa, in Poland, he became director of the gymnasium there and was given charge of the Bohemian and Moravian churches. In 1641 he went to England to join a commission charged with the reform of the system of public education, but the

disturbed political condition of the country interfered with his project. In the following year, at the invitation of Oxenstiern, he applied himself to the task of reorganizing the Swedish schools. He elaborated his plans at Elbing, West Prussia, where he settled in 1642. In 1648 he was elected Bishop of the Moravian Brethren at Lissa, which town he made once more his residence, and where he published a number of his philological works. He subsequently visited Transylvania and in 1650 assisted in drawing up a plan for reforming the Protestant school of Sáros-Patak, Hungary. In 1654 he returned to Lissa; but in the war which soon after raged in Poland he once more lost all his property, including his manuscripts, and was compelled to flee (1657). He traveled through Silesia and Brandenburg, visited Stettin and Hamburg, and finally settled at Amsterdam, where he died.

Through all his wanderings and all his educational activities, Comenius' religious interests were cared for to the neglect of many of his great educational plans. The somewhat mystical bent of his mind, however, led the gifted reformer into extremes that render much of his writings valueless for modern times and in his last years made him an easy dupe of religious impostors.

His second great interest was in furthering the Baconian attempt at the organization of all human knowledge. He became one of the leaders in the encyclopædic or pansophic movement of the seventeenth century, and, in fact, was inclined to sacrifice his more practical educational interests and opportunities for these more imposing but somewhat visionary projects. The men of affairs who aided him with funds and gave him protection and opportunity for continuing his educational investigations and writings were more interested in their immediate practical import, and insisted, in spite of the wishes of Comenius, on his devoting his energies and original insight to the work of organizing schools and writing textbooks or works on method. In 1639 Comenius had published his *Pansophiæ Prodromus*, and in the following year his English friend Hartlib published, without his consent, the plan of the pansophic work as outlined by Comenius. The result of his life's work in this sphere, his *Pansophia*, was destroyed in manuscript in the burning of his home in Lissa in 1657. The pansophic ideas find partial expression in the series of textbooks produced from time to time. In these he attempts to organize the entire field of human knowledge so as to bring it, in outline, within the grasp of every child.

The most permanent influence exerted by Comenius was in practical educational work. Few men since his day have had a greater influence, though for the greater part of the eighteenth century and the early part of the nineteenth there was little recognition of his relationship to the current advance in educational thought and practice. The practical educational influence of Comenius was threefold. He was first a teacher and an organizer of schools, not only among his own people, but later in Sweden and to a slight extent in Holland. In his *Great Didactic* he outlines a system of schools that is the exact counterpart of the existing American system of kindergarten, elementary school, secondary school, college, and university. In the second place, the influence of Comenius was in formulating the general theory of education. In this respect he is the forerunner of Rousseau, Pestalozzi, Froebel, etc., and is the first to formulate that idea of "education according to nature," so influential during the latter part of the eighteenth and early part of the nineteenth century. The influence of Comenius on educational thought is comparable with that of his contemporaries, Bacon and Descartes, on science and philosophy. In fact, he was largely influenced by the thought of these two; and his importance is largely due to the fact that he first applied or attempted to apply in a systematic manner the principles of thought and of investigation, newly formulated by those philosophers, to the organization of education in all its aspects. The summary of this attempt is given in the *Didactica Magna*, completed about 1631, though not published until several years later. The third aspect of his educational influence was that on the subject matter and method of education, exerted through a series of textbooks of an entirely new nature. The first published of these was the *Janua Linguarum Reserata* ('The Gate of Languages Unlocked'), issued in 1631. This was followed later by a more elementary text, the *Vestibulum*, and a more advanced one, the *Atrium*, and other texts. In 1657 was published the *Orbis Sensualium Pictus*, probably the most renowned and most widely circulated of school textbooks. It was also the first successful application of illustrations to the work of teaching, though not, as often stated, the first illustrated book for children.

These texts were all based on the same fundamental ideas: (1) learning foreign languages through the vernacular; (2) obtaining ideas through objects rather than words; (3) starting with objects most familiar to the child to introduce him to both the new language and the more remote world of objects; (4) giving the child a comprehensive knowledge of his environment, physical and social, as well as instruction in religious, moral, and classical subjects; (5) making this acquisition of a compendium of knowledge a pleasure rather than a task; and (6) making instruction universal. While the formulation of many of these ideas is open to criticism from more recent points of view, and while the naturalistic conception of education is one based on crude analogies, the importance of the Comenian influence in education has now been recognized for half a century. The educational writings of Comenius comprise more than 40 titles. In 1892 the three-hundredth anniversary of Comenius was very generally celebrated by educators, and at that time the Comenian Society for the study and publication of his works was formed. Consult: Keatinge, *The Great Didactic of Comenius* (London, 1896); Laurie, *John Amos Comenius, Bishop of the Moravians: His Life and Educational Works* (ib., 1884); Quick, *Essays on Educational Reformers* (ib., 1890); Müller, *Comenius, ein Systematiker in der Pädagogik* (Dresden, 1887); Löscher, *Comenius, der Pädagog und Bischof* (Leipzig, 1889); Monroe, *Comenius and the Beginning of Educational Reform* (New York, 1900).

CO'MES (Lat. *comes*, comrade). A title of honor among the Romans. See COUNT.

COMET (AS., Lat. *cometa*, comet, from Gk. *κομήτης, komētēs*, having long hair, from *κομᾶν, koman*, to wear long hair, from *κόμη, komē*,

hair). The word "comet" had its origin in the hairy appearance often exhibited by the haze or luminous vapors, the presence of which is at first sight the most striking characteristic of the celestial bodies called by this name. The general features of a comet are: a definite point or nucleus, a nebulous light surrounding the nucleus, and a luminous train preceding or following it. Anciently, when a train preceded the nucleus—as is the case when a comet has passed its perihelion and recedes from the sun—it was called "the beard," being termed "the tail" when seen following the nucleus as the sun is approached. This distinction has disappeared from all modern astronomical works, and the latter name is given to the appendage, whatever its apparent position. Neither this luminous attendant, the tail, nor the nucleus, is now considered an essential cometary element, but all bodies in the solar system are classed as comets if they have a motion of their own and describe orbits of an extremely elongated form. There are several plain points of difference between comets and planets. The planets move in the same direction, from west to east, which is astronomically called "direct motion"; but the movements of comets are often from east to west, or retrograde. The orbits of all the planets are confined to a zone of no great breadth on either side of the ecliptic; but the paths of comets cut the ecliptic in every direction, some being almost perpendicular to it. The orbits of all the planets are nearly circular; or, more properly speaking, are ellipses of very small eccentricity. The orbits of comets, on the other hand, present great variety of eccentricity, many of them being ellipses or elongated closed orbits of various degrees of elongation; others, though very rarely, may be hyperbolas; while the majority have a form of orbit not differing sensibly from the parabola, which is the limiting form of curve to which both the ellipse and hyperbola usually approximate. Any attraction, however, of an extraneous body, like a planet, interfering with the attraction of the sun, might change the orbit from the ellipse to the hyperbola, and vice versa, or from the parabola to either. As, however, there is only one parabola corresponding to infinite sets of ellipses and hyperbolas, an interfering cause is not likely to change the orbit from an ellipse or hyperbola to a parabola. Of about 400 comets whose orbits have been obtained with more or less accuracy, 90 appear to describe elliptic orbits and are therefore probably periodical. Of the rest, about 300 orbits cannot be distinguished from parabolas, though many may in reality be ellipses, for the ellipse, when very eccentric, cannot near perihelion be distinguished from a parabola; and in six or seven cases the hyperbolic form of orbit is extremely probable. The discovery that comets are celestial bodies extraneous to our atmosphere is due to Tycho Brahe, who ascertained the fact by observations of the comet of 1577. Newton succeeded in demonstrating that their movements are subject to the same law which controls the planets in their orbits. Halley was the first, by determining the parabolic elements of a number of comets from recorded observations, to identify the comet of 1682 with one which had been observed in 1607 and with one observed by Apian at Ingolstadt in 1531, and thus confidently to predict the return, at the end of 1758 or the beginning of 1759, of a comet which would have the same parabolic elements. This prediction of the first "periodic" comet moving in a closed oval orbit simply meant that the portion of the closed orbit lying nearest the sun, and therefore the only observable portion of the orbit, would very closely resemble the parabolas or open curves in which this comet had been supposed to be moving at its earlier appearances.

For the determination of a parabolic orbit, five elements (q.v.) are necessary: (1) The inclination of the orbit to the ecliptic; (2) the longitude of the ascending node; (3) the longitude of the perihelion, or point of nearest approach of the sun; (4) the perihelion distance, or nearness of approach to the sun; (5) the date of perihelion passage. The first two of these elements determine the plane of the orbit. To determine these parabolic elements, three observations of the comet are sufficient; and by a table of such elements, calculated from recorded observations, it is possible at once to ascertain, as Halley did, whether any newly observed comet is identical with any that has been previously observed. However, to predict with accuracy the time of the return of a comet, a much more accurate calculation must be made of the orbit, taking into account the perturbations of the planets to whose influence it is subject. This difficult problem was solved, in the case of Halley's comet, by the joint work of Lalande, Madame Lepaute, and Clairaut, who announced in November, 1758, just as astronomers began to look out for the return of the comet, that it would take 618 days more to return to the perihelion than on the preceding revolution. The perihelion passage was fixed about the middle of April, 1759; but Clairaut distinctly stated that, being pressed for time, he had neglected small values which collectively might amount to about a month in the 76 years. The comet passed the perihelion on March 12, 1759, exactly a month before the time announced, but within the assigned limits of divergence from that date. The elements of its orbit proclaimed it to be the comet of the former appearances by their similarity. For the next perihelion passage, the different calculations executed by Damoiseau and De Pontécoulant fixed the 4th, the 7th, and the 13th of November, 1835. Subsequently observations indicated the 16th—i.e., a deviation of only three days from what turned out the most accurate calculation, and a deviation of 12 days from the most remote. Its last return to perihelion in 1910 was the occasion of a still more striking triumph of computational astronomy. In anticipation of its reappearance, Cowell and Crommelin instituted a series of researches into its past history and computed the effects of the planetary perturbations on its orbit with such success that, when it was first detected by Prof. Max Wolf, of Heidelberg, on Sept. 11, 1909, its predicted right ascension was found to be only eight seconds in error, while its observed declination was in exact agreement with that predicted. We have adverted to the perihelion passages of this comet in 1531, 1607, 1682, 1759, and 1835. Its earlier returns were traced back to 12 B.C. by Hind, who identified it at each appearance with some notable comet recorded in Chinese or European annals. The more careful researches of Cowell and Crommelin corrected several of Hind's identifications and carried the history of the comet back to the year 240 B.C. The recorded returns of Halley's comet, with

the dates of perihelion passage as computed by them, are given below:

B.C.	240, May 15	A.D.	912, July 20
	163, May 20		989, Oct. 9
	87, Aug. 15		1066, Mar. 27
	12, Oct. 8		1145, Apr. 6
A.D.	66, Jan. 26		1222, Sept. 10
	141, Mar. 25		1301, Oct. 22
	218, Apr. 6		1378, Nov. 8
	295, Apr. 7		1456, June 8
	373, Nov. 17		1531, Aug. 25
	451, July 3		1607, Oct. 26
	530, Nov. 15		1682, Sept. 14
	607, Mar. 26		1759, Mar. 12
	684, Nov. 26		1835, Nov. 15
	760, June 15		1910, Apr. 19
	837, Feb. 25		

There are in all about 40 comets whose periodicity is established by the fact that their return has been actually observed. The principal periodic comets, with their periods and the dates of their last-observed perihelion passages, are given below:

Name	Period in years	Last observed perihelion passage
Encke	3.30	Aug. 24, 1911
Tempel II	5.28	Nov. 10, 1904
Brorsen	5.46	March 30, 1879
Tempel-Swift	5.68	Oct. 4, 1908
Winnecke	5.89	Oct. 9, 1909
De Vico-Swift	6.40	April 27, 1901
Spitaler	6.40	Oct. 26, 1890
Giacobini	6.44	Nov. 2, 1913
Bacnard	6.52	Dec. 10, 1892
Perrine	6.53	Oct. 31, 1909
Tempel I	6.54	Oct. 4, 1898
D'Arrest	6.55	Sept. 16, 1910
Finlay	6.56	Feb. 17, 1900
Biela	6.62	Sept. 23, 1852
Wolf	6.82	Feb. 11, 1912
Holmes	6.86	March 14, 1906
Brooks	7.10	Jan. 8, 1911
Borrelly	7.20	Dec. 18, 1911
Faye	7.41	Nov. 1, 1910
Denning II	7.42	Feb. 10, 1894
Denning I	8.69	Sept. 13, 1881
Tuttle	13.67	Oct. 28, 1912
Stephen	40.09	Jan. 20, 1867
Westphal	61.12	Nov. 26, 1913
Pons-Brooks	71.56	Jan. 26, 1884
Olbers	72.65	Oct. 9, 1887
Halley	76.00	April 19, 1910

Biela's comet (q.v.) is now lost. Another comet which has not been seen lately, though it has been due to appear at least four times since 1879, is that of Brorsen. In 1881, shortly after its last appearance, its orbit intersected that of Denning's comet II near the orbit of Jupiter, and it is supposed that the perturbations which it experienced at that time have radically changed both its orbit and its period.

In June, 1770, Messier discovered a comet which remained visible a long time and enabled Lexell to ascertain the orbit to be an ellipse whose major axis was only three times the diameter of the earth's orbit and corresponded to a periodic revolution of five and one-half years. This result suggested grave difficulties. It had been found impossible to identify this comet with any previously observed, and yet it was difficult to conceive that a bright comet with so short a period of return should have previously escaped observation. What was still more remarkable, it was never seen again, though anxiously looked for in the places where Lexell's orbit would have brought it. It became popularly called "Lexell's lost comet" and gave occasion to many sarcasms by the wits of the day at the expense of astronomers, who had boasted of having found the key to the cometary movements. In the present day the explanation is complete. The comet was never seen before 1770, because its orbit previously had been totally different, its nearest point to the sun having been as distant as the path of Jupiter. Its appearance that year arose out of the fact that in 1767 it was in such close contact with Jupiter, moving in the same direction and nearly in the same plane, that the attraction of that planet entirely changed its orbit. But why has the comet not since been seen? Its passage to the point of perihelion in 1776 took place by day; and in 1779, before another return, it again encountered the vast body of Jupiter and suffered a fresh orbital derangement—the attraction of the planet deflecting it into more distant regions and so changing the form of the orbit that if it had again been visible it would probably not have been recognized as identical with Lexell's comet.

The celebrated comet of 1680, which furnished Newton with the occasion for proving that comets revolve around the sun in conic sections, and that, consequently, they are retained in their orbits by the same force as that which regulates the movements of the planets, appears to have been about the most remarkable for brilliancy of any of which we have authentic accounts. This comet is supposed to be identical with the one that appeared about the time of Cæsar's death (44 B.C.), with that which was seen in the reign of Justinian in the year 531, and with another in the year 1106, in the reign of Henry II; the period of revolution, according to the orbit calculated by Whiston, being about 575 years. In the nineteenth century the comets most remarkable for brilliancy were the comets of 1811, 1843, 1858 (Donati's), 1861, 1880, 1881, and the great comet of 1882. Spectroscopic investigation, so far as yet pursued, points to the conclusion that comets are self-luminous and do not shine merely by reflecting solar light. It has been discovered, in determining the tracks of those streams of dark bodies that cause meteoric showers, that some of the tracks coincide with the orbits of well-known comets. From this it is inferred that star showers and comets may be only different manifestations of the same thing. (See METEORS.) What the matter of the comets consists of is, of course, only a subject for speculation. The composition of the nebulosity and the tail is, at all events, something of almost inconceivable tenuity, as shown by three considerations: 1. Stars seen through them suffer no diminution of brightness, though the light must have to traverse sometimes millions of miles of the cometary atmosphere. 2. Though the thickness of the tail of a comet may be millions of miles, and its length of course much greater, the comets have never been observed to cause any sensible disturbance of the planetary motions, though approaching near enough to be themselves so much affected as to change the entire character of the orbit. 3. The curvature of the tails, and the acceleration of the periodic time in the case of Encke's comet, indicate the possibility of their being affected by a resisting medium, which has never been observed to have the slightest influence on the planetary periods, though so long observed. Even the nuclei of comets appear to be of extremely small density. This may be inferred, though with less force than regards the tails, from the two last considerations above mentioned; and, moreover, there are reliable ac-

counts of stars of a very low order of magnitude being seen through the nuclei themselves.

Instead of pointing to the sun in obedience to the law of gravitation, the tail of a comet is always directed from it and frequently assumes a curved form. It increases in length with its proximity to the sun, but does not acquire its greatest length till perihelion is passed. To explain this phenomenon, Olbers suggested that the sun was the seat of a repulsive force, which was probably electrical in its nature. This theory for a long time gained acceptance, supported as it was by Bredikhine's division of cometary appendages into three classes, according to the nature and the density of the matter composing them. According to Bredikhine, the long straight tails, as seen in the comet of 1861, are composed of hydrogen; the long curved tails, like the principal tail of Donati's comet, consist largely of hydrocarbon vapors; while the somnolent, rare, short tails of violent curvature are made up of mixed iron, sodium, and other metallic vapors. This classification has received some support from spectroscopic evidence. In 1882 Fitzgerald first propounded the theory that the tail was due to the pressure of light upon the gaseous matter composing it; but the small amount of the pressure, as calculated on his assumptions, proved an obstacle to the acceptance of the theory. In 1900 Arrhenius revived the theory, but modified it to the extent of supposing the tail to consist, not of gaseous matter, but of fine particles produced by condensation from the emanations of the comet. The light-pressure theory received confirmation in 1901 from the experiments of Nichols and Hull in America and of Lebedew in Russia.

Much speculation has been devoted to the question of the origin of comets, and several theories have been advanced to account for them. According to one theory, they are wandering bodies which travel through space from star to star; according to another, they are composed of matter which has been violently ejected from the stars during the periods of convulsion to which, arguing from the analogy of the sun, they must from time to time be subject. In any case some of these bodies occasionally visit the solar system, and if one should chance to pass close to one of the larger planets, it may have its velocity retarded to such an extent that its parabolic orbit becomes changed to an ellipse, and in consequence the comet becomes permanently retained as a member of the sun's family. By this "capture theory," which was first suggested by Laplace, the existence of the families of comets which are associated with the four outer planets is accounted for. The members of these families describe elliptic orbits the aphelion points of which lie near the orbits of one or other of the planets Jupiter, Saturn, Uranus, and Neptune. The largest of these planetary families is that which is associated with Jupiter and numbers about 30. They are all comets of short period, ranging from that of Encke's comet, viz., three and three-tenths years, to about nine years. Neptune has a family of six long-period comets, four of which, viz., those of Westphal, Pons, Olbers, and Halley, have been observed at a second reappearance; the other two, which appeared in 1846 and 1847, are expected to return in 1921 and 1927 respectively. The families associated with Saturn and Uranus are small, consisting of two and three members respectively. Besides these planetary families, there are also several well-defined groups of comets which pursue nearly identical paths and appear to have been derived from some common source in space. The most remarkable of these groups consists of the great comets of 1668, 1843, 1880, and 1882, together with a much smaller one which appeared in 1887. All five came to the sun from the direction of Sirius and are supposed to have been separated from a single parent mass by the attraction of the sun, their perihelion passages together with the major axes of their orbits, and consequently their periods, having been variously determined by the special perturbations to which each has doubtless been subject, while the remaining elements of the orbits remain virtually identical.

Comets have been alternately regarded with terror and with welcome in the popular mind. Perhaps the two most famous appearances of Halley's comet were those of 1066 and 1456. In the former year it caused universal consternation throughout Europe and was looked upon as a presage of the success of the Norman invasion of England. One celebrated record of its appearance at that time is to be seen in the Bayeux Tapestry, which is said to have been worked by Queen Matilda, the wife of William the Conqueror, and her ladies. The appearance of the comet in 1456, three years after the Turks had become masters of Constantinople, and just as they were threatening an advance into Europe, was regarded by Christendom with a superstitious dread, and to the Ave Maria was added the prayer: "Lord save us from the devil, the Turk, and the comet." At Constantinople the occurrence of a lunar eclipse at the same time increased the portentousness of the event. The discoveries of science as to the magnitude of the space filled by the bodies of comets and their prodigious velocity, together with the confessed impossibility of always predicting their approach, produced fears of another kind, which have sometimes been, especially in France, extravagantly exaggerated in the public mind. Consult: Guillemin, *The World of Comets* (London, 1881); Zöllner, *Ueber die Natur der Kometen* (Leipzig, 1883); Marcuse, *Ueber die physische Beschaffenheit der Kometen* (Berlin, 1884); Ball, *In the Starry Realm* (London, 1892); Galle, *Verzeichnis der Elemente der bisher berechneten Kometenbahnen bis zum Century* (ib., 1908); Chambers, *The Story of the Heavens* (New York, 1900); Bryant, *History of Astronomy* (London, 1907); Clerke, *Popular History of Astronomy during the Nineteenth Century* (ib., 1908); Chambers, *The Story of the Comets* (Oxford, 1909); Lynn, *Remarkable Comets* (London, 1910).

COMET SEEKER. A telescope having a wide field of view, but a rather low magnifying power, used in searching for comets.

CO'MEY, Arthur Messinger (1861–). An American chemist, born in Boston, and educated at Harvard University and the University of Heidelberg. In 1885–89 he was instructor in chemistry at Harvard and in 1889–93 professor of chemistry at Tufts College. He was engaged as an analytical and consulting chemist in Boston from 1893 to 1906, when he became director of the Eastern Laboratory of the E. I. du Pont de Nemours Powder Company. He is author of the *Dictionary of Chemical Solubilities* (1896).

COMFORT, kŭm'fẽrt, George Fisk (1833–1910). An American educator. He was born

at Berkshire, N. Y., and graduated at Wesleyan University in 1857. He was one of the leaders in organizing the American Philological Association (1869) and also in establishing the Metropolitan Museum of Art in New York City (1869–72). From 1872 to 1887 he was professor of modern languages and æsthetics in Syracuse University and in 1872 founded there the College of Fine Arts, of which he was dean from 1873 until 1893. In the latter year he became president of the Southern College of Fine Arts, at La Porte, Tex., and in 1896 organized the Syracuse Museum of Fine Arts, of which he became the director. He published: *Art Museums in America* (1869); *Modern Languages in Education* (1886); *Woman's Education and Woman's Health* (1894); *The Land Troubles in Ireland* (1898); and a series of German textbooks.

COMFREY, kŭm′frĭ (OF. *cumfirie, confire,* from ML. *confirma,* probably on account of its strengthening powers, from Lat. *confirmare,* to make firm, strengthen, from *con-,* together + *firmare,* to strengthen, from *firmus,* firm), *Symphytum.* A genus of plants of the family Boraginaceæ. The species, about 20 in number, are natives of Europe, northern Africa, and western Asia. They are perennial plants of coarse appearance, although occasionally to be seen in flower borders. *Symphytum officinale* (the common comfrey) and *Symphytum tuberosum* are natives of Great Britain, frequent in shady and moist places. *Symphytum officinale* was formerly much esteemed as a vulnerary, on account of its astringency, and decoctions of its roots were a household remedy for diarrhœa. Its young leaves and its blanched shoots are also occasionally used as boiled vegetables. The prickly comfrey (*Symphytum asperrimum*), a native of Caucasus, 6 to 10 feet in height, has been highly recommended for feeding cattle. It has been extensively tried in the United States, but its cultivation is not recommended, except when a large bulk of forage is required from a limited area of rich land. It is propagated from roots. *Symphytum asperrimum* and *Symphytum officinale* have become naturalized in the United States.

COM′ICAL GALLANT′, The, or The Amours of Sir John Falstaff. An adaptation, by John Dennis (1702), of Shakespeare's *Merry Wives of Windsor.*

COMICAL LOVERS, The, or Marriage à la Mode. A comedy by Colley Cibber (1707), based on portions of Dryden's *Secret Love* and *Marriage à la Mode.*

COMICAL REVENGE, The, or Love in a Tub. A comedy by Sir George Etherege, played and printed in 1664.

COMINES, kō′mĕn′, or **COMMINES** (Lat. *Cominæus,* Flemish *Comen*). A border town of France and Belgium, situated on the Lys, by which it is divided into two parts, one belonging to the French Department of Nord and the other to the Belgian Province of West Flanders (Map: Belgium, B 4). It has a number of textile mills and tobacco factories and manufactures cutlery. It has a belfry of the fourteenth century and a ruined castle. The celebrated mediæval chronicler, Philippe de Commines (see Commines), was born here. Pop., French portion, 1901, 8129; 1911, 8575; Belgian, 1900, 5957; 1910, 6641.

COMISO, kō-mē′sō. A city in Sicily, in the Province of Syracuse, situated about 13 miles west of Ragusa. It is 800 feet above the sea (Map: Italy, J 11). It was known in Roman mythology as the location of a fabled fountain of Diana, the water of which, when drawn by women of impure character, refused to mingle with wine. It is on the road between Catania and Licata and has two churches, a theatre, and cotton, earthenware, and soap factories. Pop. (commune), 1881, 19,333; 1901, 21,873; 1911, 26,624.

COMITÁN, kō′mē-tän′, or **COMITLÁN.** A town in the State of Chiapas, Mexico, situated on the Grijalva River, about 30 miles southeast of San Cristóbal (Map: Mexico, N 9). It has a fine Dominican cloister. The town is largely engaged in agriculture and cattle raising, but has manufactures of cotton and woolen goods, liquors, etc., and carries on a contraband trade with Guatemala and British Honduras. Comitán suffered considerably from the raids of Juan Ortega in 1855–64. Pop., 1900, 9316; 1910, 10,196.

COMITIA, kō-mĭsh′ĭ-ȧ (Lat. nom. pl., assemblies, from *com-* (*con-*), together + *ire,* to go). The formal legal or constitutional meetings of the whole Roman people, convoked by a magistrate, for the purpose of voting. The comitia are thus distinguished from *concilia,* a term strictly applicable to assemblies of any sort, but used especially of assemblies of a part of the people, and *contiones,* gatherings for receiving communications and hearing addresses only, not for voting. It was always a fundamental principle of the Roman constitution that the supreme power was inherent in the citizens, though it might be delegated by them to hereditary or to elected magistrates. All important matters, however, had to be brought before the sovereign people, who could either ratify or reject proposals, though without discussion. Such, at least in theory—and, during the best days of the Republic, in practice also—was the function of the popular assemblies. Under the force of circumstances, from time to time innovations materially altered the position of the two political parties—the patricians and the plebeians. Nowhere can the progress of the struggle between these factions be more clearly traced than in the history of the assemblies, or comitia, by which the supreme authority of Rome was wielded. It is usual to describe the Roman comitia as of three kinds—the Comitia Curiata, or assembly of the curiæ; the Comitia Centuriata, or assembly of the centuries; and the Comitia Tributa, or assembly of the tribes.

1. **Comitia Curiata.** This assembly, that of the curiæ (see Curia), is believed to have been coeval with the rise of Rome itself. At first the curiæ were probably made up exclusively of the freeholders, or patricians (q.v.), as the freeholders were afterward designated, on whom devolved exclusively the right and the duty of bearing arms. Later, plebeians were included. In the Comitia Curiata each Curia voted as a unit, according to the will of the majority of its members. The purely political importance of the Comitia Curiata declined after the political distinctions between patricians and plebeians terminated; its powers passed largely to the two other kinds of Comitia. It retained, however, to a late period its original powers over the transference of a patrician to the plebeian order and the admission of nonpatricians to patrician standing. It passed also the *lex curiata,* which

was necessary that the higher magistrates might legally have *imperium*, i.e., the executive authority essential to the proper discharge of their official duties. The Comitia Curiata was also summoned, down to late times, to witness the making of wills, or the renunciation of the *sacra* of a gens, as in adoption, or to inaugurate flamens (q.v.) and the *rex sacrorum*. It was then styled *comitia calata*, and was presided over by the Pontifex Maximus. By Cicero's time the Comitia Curiata was represented at meetings by lictors only, 30 in number.

2. **Comitia Centuriata.** As the plebeians (q.v.) increased, a reform of the constitution became necessary, which, we may well conceive, was hastened by the gradual thinning of the ranks of the old freeholders in incessant wars. The plebeians were exempt from service in the field; hence, while their political inferiority must have been galling, their immunity from the chances of war can hardly have been looked upon with equanimity by the patricians (q.v.). It was to redress this twofold grievance that the reform ascribed to King Servius Tullius (q.v.) is generally believed to have been effected. (See also, under ROME, *History of Rome during the Earliest or Regal Period.*) But the whole scheme was one skillfully devised to assign duties to the plebeians rather than to give them rights, and it was evidently the work of a statesman who was acting in the interest of the patricians. The chief authorities for the details of the arrangement are Livy and Dionysius, whose accounts, though they differ in some particulars, agree in the main. Both of them, however, describe the assembly of the centuries rather as it existed in their own day than as it was first constituted. Livy gives the whole number of the centuries, as arranged by Servius, as 194; Dionysius, as 193. The voting was by centuries, each possessing a collective vote, exactly as in the case of the curiæ in the Comitia Curiata. The 18 centuries of *equites* and the 80 centuries of the first class voted first. If they were agreed upon a question, the other centuries were not called upon to vote at all. As the centuries, though nominally "hundreds," probably contained in the first class fewer, and in some of the other classes certainly many times more, than that number, it is plain that in the Comitia Centuriata by far the largest share of power was retained in the hands of the wealthy, of whom the original burgess element would long form the main portion. In any case, the reform of Servius was originally a new military rather than a new political organization, its author intending that the privileges of the patricians assembled in the curiæ should remain as before. But, by a process easily understood, the rights of the curiæ gradually passed to the centuries, and the Comitia Centuriata became thenceforth the chief guardian of the rights of the Roman people as a whole. In later times the number of centuries in the Comitia Centuriata was increased to 373. How the centuries were arranged for voting purposes is a moot question, for which reference may be made to the exhaustive discussion by Botsford, *The Roman Assemblies*, pp. 212–228, and to the literature there cited. Only a magistrate who possessed *imperium* could preside over the Comitia Centuriata. It elected the magistrates who had *imperium* and also the censors; the right of declaring war was vested in it alone. So too it had sole jurisdiction in capital cases. Its legislative powers, which it had wrested from the Comitia Curiata, it surrendered to the Comitia Tributa.

3. **Comitia Tributa.** The tribunes of the people, now the acknowledged leaders of the democracy, took advantage of an ancient division of the original territory of Rome into tribes to establish an assembly democratic in fact, and not merely in appearance (as was the Comitia Centuriata). The tribes, 30, and afterward 35, in number, the leaders of the people succeeded at length, as early as 471 B.C., in forming into a political union entitled to exercise certain functions, chief among which was the election of the inferior magistrates, the approval and rejection of such legislative measures as affected the interests of the plebeians as a class, and the presentation to the Comitia Centuriata, through the consul, of petitions on behalf of the plebeians. At first, then, resolutions passed by the Comitia Tributa had moral force only, not legal; later, by enactments of 449 B.C. and 339 B.C. they had full force of law. In the later Republic laws were usually enacted by the Comitia Tributa. It elected the tribunes of the people and all other plebeian officials. The assembly of the tribes at first included both plebeians and patricians; later it seems to have consisted of plebeians alone. Under the first emperors the form of calling the assemblies together was still observed; but the people met no longer to control their chief ruler, but simply to receive his reports; elections to office had by this time been transferred to the Senate. Consult: Mommsen, *Römische Forschungen*, vol. i (Berlin, 1879), and *Römisches Staatsrecht* (3d ed., Leipzig, 1887); Greenidge, *Roman Public Life* (London, 1901); Abbott, *Roman Political Institutions* (Boston, 1901); Pauly-Wissowa, *Real-Encyclopädie der classischen Altertumswissenschaft*, vol. iv (Stuttgart, 1900); Botsford, *The Roman Assemblies* (New York, 1909).

COMITIUM, kō-mĭsh'ĭ-ŭm (Lat., place of assembly). A small square in ancient Rome, in the Forum, south of the Senate House. It was originally the polling place of Rome, where the Comitia (q.v.) met. It contained the old rostra, and near by was the Græcostasis, or platform for foreign ambassadors awaiting admission to the Senate. In or near the Comitium stood a number of statues, including those of the Augur Attus Navius, Pythagoras, Alcibiades, and Horatius Cocles, and the Ficus Ruminalis. Consult Platner, *The Topography and Monuments of Ancient Rome* (New York, 1911).

COMITLÁN. See COMITÁN.

COM'ITY OF NATIONS. That species of international legal courtesy by which the laws and institutions of one country are recognized and given effect to by those of another. It is often called by its Latin equivalent, *comitas gentium*. "In the silence of any positive rule," says Mr. Justice Story, "affirming, or denying, or restraining the operation of foreign laws, courts of justice presume the tacit adoption of them by their own government, unless they are repugnant to its policy or prejudicial to its interests." From the existence of so great a number of independent states on the continent of Europe, and of federated states in America, the *comitas gentium* is more called into play in these countries than in England, and it has consequently been more extensively discussed by their legal writers. The principle of the comity of nations, which, as between sovereign states,

rests upon common consent and not upon positive law, has been embodied in the fundamental law of the United States by the provision of the Constitution (Art. IV, Sec. 1) that "Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State." The apparent violation of this principle in the refusal of some States to recognize divorces granted in others comes under a well-recognized exception to the rule, to the effect that to be entitled to such recognition the act or judicial proceeding in question shall have been within the jurisdiction of the State or the court performing the act or rendering the judgment. See CONFLICT OF LAW; INTERNATIONAL LAW; and the authorities there referred to.

COMLY, SAMUEL PANCOAST (1849–1918). An American naval officer, born at Woodbury, N. J. After graduating from the United States Naval Academy, in 1869, he was promoted through the various grades, becoming captain in 1905 and rear admiral in 1909. In 1874 he was on the *Juaniata* in the *Polaris* search expedition to Greenland. In the Spanish-American War he was in the charge at San Juan, Porto Rico, and took part in the bombardment of Santiago and the destruction of Cervera's fleet. He commanded the *Alabama* in 1905–07, and was in command of the fourth division of the United States Atlantic Fleet in 1910, and later in the same year of the third division. He was retired in 1911.

COM'MA (Lat., Gk. *κόμμα, komma,* clause, piece, from *κόπτειν, koptein,* to strike). In the mathematical study of sound, in which tones are expressed in exact values by means of their vibration numbers, we find that, by reckoning upward in two different ways to a certain note, the two results show an infinitesimal difference in pitch. This minute interval, called a "comma," is only perceptible in theory and has no actual musical value in our modern "tempered" scale. By tuning upward four perfect fifths from a given note, and then two octaves and a major third from the same note, we reach apparently the same tone; but, calculating the vibrations, we find the first result exceeds the second in the proportion of 81 to 80. This difference is called the comma *syntonum,* or comma of Didymus. The difference obtained by tuning upward 12 fifths and seven octaves from a given tone is $\frac{531441}{524288}$, and is called the comma *ditonicum,* or comma of Pythagoras. These same figures result as the difference between six whole tones above a note and its octave.

COM'MA BACIL'LUS. See CHOLERA.

COMMA BUTTERFLY. A North American nymphaline butterfly (*Grapta,* or *Polygonia, comma*), one of the angle wings, reddish brown with darker spottings, and a light mark, shaped like a comma, on the hinder wing. It is widely distributed and common, feeding upon nettles, and is injurious to hops. See HOP INSECTS.

COM'MANDANT' (Fr. *commandant,* pres. part. of *commander,* to command, ML. *commandare,* to command, from Lat. *com,* together + *mandare,* to enjoin). A relative title, incident to a military command and applied to the commander of a garrison, fortified post, or military school without any regard to his absolute rank. The mounted service school at Fort Riley, Kans.; the Coast Artillery School at Fort Monroe, Va.; the United States Military Academy at West Point; Sandhurst, Hythe, and Kneller Hall, England, are all governed by officers of varying ranks, holding the local title of commandant.

In the United States navy the title of commandant is applied to the commanding officer of a navy yard or naval station. The commandants of the principal navy yards are line officers of the rank of rear admiral; lesser stations are commanded by captains or officers of less rank. To the commandant is given full jurisdiction over all vessels lying at the yard, and he is responsible for all building and repair work. He is also responsible for the proper organization of the working forces; for the effective organization of the yard force for protection against fire; and for the care and management of all machinery, equipment, etc., under his control. He is assisted by an officer of the rank of captain, or of less rank when the commandant is not a rear admiral, who acts as his executive officer and is called the *captain of the yard. Master Commandant* was formerly the title of officers in the United States navy next junior in rank to captains. In 1838 Congress enacted that *master commandants* should thereafter be known as and styled *commanders* (see COMMANDER); the latter title had previously been recognized in the pay bill of March 3, 1835. The title of master commandant was a relic of the days of transition from the time when the fighting on board ships was done by soldiers commanded by an officer of the land forces to that when the fighting and navigating forces were combined. The titles of *sailing master, master, master's mate,* etc., were evidently of pretransition origin; master commandant, on the contrary, was evidently a recognition of a new state of things in which the master mariner had become the *naval commander.*

COMMAND'ER. The title of officers of the United States and British navies next junior in rank to captains. In the United States navy it was established by law in 1838. (See COMMANDANT.) A commander may serve as commanding officer of a division, or of a ship of the second or third rate, or as executive officer of a ship of the first rate. The pay of a commander is $3500 per annum, with an addition of 10 per cent for each five years of service, provided the total amount does not exceed $4500; the pay on sea duty is 10 per cent more.

COMMANDER, LIEUTENANT. See LIEUTENANT COMMANDER.

COMMANDER, LYDIA KINGSMILL (MRS. HERBERT N. CASSON). An American lecturer and woman-suffrage leader, born at Clinton, Ontario, Canada. She was educated at the Collegiate Institute, Strafford, and at Western University, London (both in her native province), and at Meadville (Pa.) Theological School. In 1897 she was ordained a Congregational minister and became pastor of the Free Congregational Church, Baraboo, Wis. In the following year she joined the coöperative colony at Ruskin, Tenn., and also became associate editor of the *Coming Nation.* From 1899 to 1902 she was a member of the editorial staff of the New York *Journal,* and in the latter year she edited the *Bellamy Review* and *Fair Play.* After 1902 she engaged in lecturing and literary work, serving as official lecturer of the New York City Humane Society. She was also speaker at the International Congress of Women at Berlin in 1904 and at Toronto in 1909. She became known especially as a leader in intro-

ducing the more strenuous type of woman-suffrage propaganda in the United States. Besides magazine articles she is author of *Married in the Making* (1903) and *The American Idea* (1907).

COMMANDER IN CHIEF. A relative military title, pertaining to an officer in supreme local military command, as commander in chief of the troops in the field. In the United States it is primarily the absolute rank and title attached to the office of President, and also the military title of many governors of States. Under the sixty-third article of the German Constitution of 1871, the Emperor is the supreme commander in chief of the army and navy. In England the rank, in its permanent sense, has been abolished, and an Army Council appointed, headed by the Secretary of State for War, who is responsible to the crown and to Parliament for the conduct of military affairs.

COMMANDER ISLANDS. A group of islands of the maritime territory of Siberia, situated in Bering Sea, east of Kamchatka, between lat. 54° 32′ and 55° 24′ N., and long. 165° 45′ and 168° 12′ E. (Map: Asia, Q 3). The group consists of the two large and inhabited islands of Bering (607 square miles) and Mednj (180 square miles) and two uninhabited islets. The climate is comparatively mild; but the inhabitants, descendants of Russians and Aleuts, are few in number. The Russian government protects the fur seal, for these islands and the American Pribiloff Islands are the sole remaining breeding grounds.

COMMANDER OF THE FAITHFUL (Ar. *'Amīr al-Mu'minīn*). A designation assumed by the Caliph Omar, the father-in-law of Mohammed, who conquered Syria, Phœnicia, Persia, Egypt, and Jerusalem, and "organized a complete military-religious commonwealth." The title was retained by his successors in the caliphate.

COMMAND'ERY. A regular assembly of Knights Templars. It confers the degrees of Knight of the Red Cross, Knight Templar, and Knight of Malta. The term was first applied, about 1260, to the property of military and religious orders, administered by members of those organizations, who were known as commanders. These had charge of the income of the estates belonging to the orders and had authority to receive gifts and alms. They were accountable to the Grand Commander, who, in the case of Knights of St. John of Jerusalem, resided at Jerusalem.

COMMANDING OFFICER. 1. The officer in actual command of a vessel of war. He is an officer of the line or executive corps, and is usually addressed by the courtesy title of "captain," without regard to actual rank, if he is permanently in command and not merely in temporary charge during the absence of a senior. The regular commanding officer, upon leaving the ship for a temporary absence, is succeeded by the next line officer in rank, but the latter must not alter the regulations established by his superior except in case of urgent necessity. Upon the commanding officer of a modern battleship there rests a responsibility the like of which is placed upon few men. He is answerable for the safety of the ship and of the crew, for the preservation of the battery, engines, boilers, and other machinery in condition for instant use, and for the conduct of all those placed under him, so far as he can control it. He is required to know every detail of construction of his ship and of her equipment as well as of the organization of the crew. He has as an assistant an executive officer, who has charge of the organization of the *personnel*, a first lieutenant who has charge of the hull and equipment; a navigating officer, who has charge of the navigation and navigating apparatus; an ordnance officer, who has charge of the guns and ordnance stores; a senior engineer, who has charge of the propelling and other machinery, including the electric plant; also a surgeon and a paymaster, the latter having charge of the accounts of the men and officers and of the provisions and clothing for the men. 2. In the military services throughout the world the senior officer of a regiment, corps, post, or any detachment where there is not any higher local military authority is regarded as the commanding officer. Regimentally the officer commanding the regiment is spoken of and referred to as the commanding officer.

COMMANDITE, kŏ'män'dēt', Société en, or Limited Partnership. See Société en Commandite.

COMMANDMENTS OF THE CHURCH. Certain rules imposed by the Roman Catholic church on all its members, under pain of grave sin. They number five or six, differing slightly in different countries; but in general they require the observance of Sundays and festivals of obligation by attendance at mass and rest from servile work, the observance of days of fasting and abstinence, the reception once a year at least of the sacraments of penance and holy communion, contribution in proportion to one's means to the support of pastors, and the observance of regulations in regard to marriage.

COMMELIN, kŏm'lăn', Hieronymus. (?–c.1598). A Flemish printer, born at Douai. He worked at Geneva and later at Heidelberg. The best specimens of his press are the admirable editions of the ancient classics and the Church fathers, to the text of which, often determined by a collation of manuscripts, he added learned critical notes from his own hand.

COMMELIN, Jan (1629–92). A Dutch botanist, born in Amsterdam. He was a professor of botany in the University of Amsterdam and founded in that city the botanical gardens which soon became the most celebrated in Europe. In description of the contents of these gardens he wrote several volumes. He wrote: *Horti Medici Amstelodamensis Rariorum tam Orientalis quam Occidentalis Indiæ Plantarum Descriptio et Icones* (1697).

COMMEM'ORA'TION (Lat. *commemoratio*), or Encænia (Lat., Gk. *ἐγκαίνια, engkainia*, feast of renovation or consecration, a name for Easter). The great festival of the Oxford academic year, corresponding in some respects to the Commencement of American colleges. It usually takes place on the third Wednesday after Trinity Sunday, in the Sheldonian Theatre—which, like Sanders Theatre, Harvard, and the Kent Theatre, Chicago, is a university building. From time immemorial, public exercises have been held to mark the "act" or period when degrees were conferred on the members of the university. At the present day the proceedings consist of a Latin oration in honor of founders and benefactors (from which the name of the whole ceremony is derived); the conferring of degrees, not only in course, but

also *honoris causa*, on distinguished strangers, who are introduced to the vice chancellor in a short Latin speech; and the recitation, at least in part, of the Newdigate or English prize poem, and the Latin and English prize essays, the three prizes being the gift of the chancellor. The large area or floor is occupied during the proceedings by masters of arts and their male friends; in raised stalls in a semicircle around one end of this area sit the vice chancellor, doctors, and proctors; while the galleries are filled by the undergraduates and women. The undergraduates, until 1876, used to occupy a separate upper gallery; but the license claimed by them of making unofficial and often very witty comments on the proceedings—a survival of the privileges of the *Terræ Filius*, or licensed jester of mediæval times—finally reached a point where it was thought better to discourage it to some extent by breaking up the compact body of students and distributing them among the women present. Commemoration Day itself is only the culminating point of a week of gayety, marked by concerts, balls, theatrical representations, etc., which make Oxford a very attractive place to the visitor; but of late years the glories of this season have tended more and more to be eclipsed by those of the "Eights Week," when the college eight-oared races are rowed, early in May. See OXFORD UNIVERSITY.

COMMEMORATION ODE. An ode by James Russell Lowell, read at exercises held at Cambridge in 1865, in commemoration of the Harvard men who had served in the Civil War.

COMMENCE'MENT (OF., Fr. *commencement*, from OF. *comencer*, Fr. *commencer*, It. *cominciare*, to begin, from Lat. *con-*, together + *initiare*, to begin, from *initium*, beginning, from *inire*, to enter, from *in*, in + *ire*, to go). In American colleges, the name given to the concluding exercises of the college year, when degrees are conferred upon the bachelors, masters, and doctors completing their respective courses of study. The term is applied loosely to the graduating exercises of academies, secondary schools, etc. The custom originated in the mediæval universities, though the appropriate term was "inception." The inception involved two elements: (1) the recognition of the graduate or new teacher by his old master and other members of the profession; (2) the formal entrance of the newly licensed teacher upon his work by the actual performance of its duties. Hence an essential feature of the exercises was that the recipient of the bachelor's degree should "incept," or teach, and that the recipients of the higher degrees should defend a thesis. At Oxford this occasion was called Commemoration (q.v.); but at Cambridge it was, and is yet, called Commencement. The "inceptor" was there called "commencer," i.e., one who commenced teaching. The ceremony and the term were a part of the inheritance received by Harvard College from Cambridge University, and thus became general among American colleges. This exercise in Colonial days was held in the fall, at the commencement of the college year, and the term is often, though erroneously, supposed to refer to this fact. As the mediæval bachelor "incepted," or taught, the graduate of the American college delivered an oration or dissertation before receiving his degree. With the larger colleges even this modification of the old custom is now commonly abandoned, and in many places the Commencement exercises include only the address by the president or some distinguished educator and the conferring of degrees. See UNIVERSITY; DEGREE; COLLEGE; CURRICULUM.

COMMEN'DAM (ML., acc. sg. of *commenda*, trust, from Lat. *commendare*, to intrust, from *com-*, together + *mandare*, to intrust, from *manus*, hand + *dare*, to give; originally used in the phrases *in commendam dare*, to give in trust, or *in commendam mittere*, to send in trust). A term in ecclesiastical law to denote a benefice which, being void, is *commended* to the care of some sufficient clerk to be supplied until it may be conveniently provided with a pastor. In former times bishops frequently held livings *in commendam* in order to appropriate the revenues. The practice has wellnigh ceased in Europe and does not exist in the United States. In the Church of England commendams were abolished in 1836.

COM'MENDA'TION (Lat. *commendatio*, from *commendare*, to intrust). In feudal customs, the act by which a free man became a vassal. See FEUDALISM.

COMMENDATION OF OUR LADY, BALLADE IN. A ballad improperly attributed to Chaucer, according to Tyrwhitt; but really the same poem as the *Invocation of Our Lady*, ascribed to Lydgate.

COMMEN'SALISM (ML. *commensalis*, eating at the same table, from Lat. *com-*, together + *mensa*, table). A sort of partnership or association of two different kinds of organisms by which they endure each other's presence, do each other no harm, and in many cases are of mutual advantage; such are said to be commensals, or messmates. This occurs chiefly among marine invertebrates and is different from parasitism. Many commensals are quite free to separate, yet never dwell apart, and often could not maintain a separate existence. Others grow together so completely that they cannot separate if they would, yet are not parasites, because each retains its form and faculties, while a true parasite changes these in such a manner that it is no longer capable of obtaining food until it has been elaborated for it by the functions of its host. The most familiar example of commensalism is the small crab so often met with inside the shells of oysters—the pinnothere, or oyster crab. Similar crabs inhabit various bivalves the world over, to the mutual satisfaction of guest and host. Within the shelter of the mollusk's pearly house the little crab is safe from its enemies, yet can dash out whenever it observes any prey in the offing and bring it home to be devoured; and the crumbs may be welcome to the oyster. The most striking examples, perhaps, are found among cœlenterates and crustaceans. In the midst of the trailing tentacles, covered with stinging cells, of the Portuguese man-of-war and several jellyfishes, live small fishes, comparatively safe from pursuit of their foes; small fishes also seek refuge among the tentacles of sea anemones and within holothurians. Mollusks live in the burrows of sea urchins that move about in the sand and in the holes made by the crustaceous *Gebia*—a reversal of the oyster and crab.

Certain Dromia crabs carry sponges, ascidians, or sea anemones on their backs or claws. The anemones serve to conceal, and, by means of their nettling organs, protect the crab, while

they get fragments of the crab's food, or, by being transported from place to place, come in contact with more food than if they were stationary. One hermit crab (q.v.) always bears an anemone upon its claw, which is so placed that it blocks the entrance to the shell when the crab retreats within. If the anemone dies or is removed, the crab is at pains to find and transfer a new anemone to its claw. A still more curious case is that of a polyp (*Gemmaria americana*), found in deep water off the Newfoundland coast and allied to the sea anemones, which attaches itself to the shell of a kind of hermit crab, and by budding gradually covers the entire shell with a colony. "It possesses the power of dissolving the shell so that no trace of it can be found. As the polyp colony increases in size as fast as the crab grows, there is no need for the latter to change its abode, while its neighbors and competitors must frequently expose themselves to the discomforts and dangers of house hunting." Consult: Van Veneden, *Animal Parasites and Messmates* (New York, 1876); *Cambridge Natural History*, vol. iii (London, 1865); Semper, *Animal Life* (New York, 1881). For fishes as commensals, consult: Jordan and Evermann, *Fishes of North and Middle America*, pp. 924, 966 (Washington, 1900); Harrington, "On Nereids Commensal with Hermit Crabs," in *Transactions of New York Academy of Sciences*, vol. xvi (1897); for crustaceans, Calman, *The Life of Crustacea* (New York, 1911).

COMMEN'SURABLE (Lat. *commensurabilis*, from *com-*, together + *mensurare*, to measure, from *mensura*, measure, from *metiri*, to mete or measure). Two magnitudes which are of the same kind, and each of which contains a third magnitude an integral number of times, are said to be commensurable; e.g., a foot and a yard are commensurable, an inch or a foot being a common measure. The number 15 and 35 are commensurable, each being divisible by 5.

Magnitudes which have no common measure, i.e., are not multiples of the same unit, however small that unit is taken, are said to be incommensurable; e.g., the side and diagonal of a square are incommensurable. The diameter and circumference of a circle are incommensurable; 2 and $\sqrt{2}$, $\sqrt{5}$ and $\sqrt{7}$ are incommensurable. Numbers like $\sqrt{2}$, that are not commensurable with ordinary rational numbers, are also called incommensurable. In arithmetic, numbers prime to one another are sometimes said to be incommensurable with respect to one another, since they have no common measure except the unit of counting, which, used as a multiplier or divisor, does not change the number affected. See MULTIPLE; IRRATIONAL NUMBER.

COM'MENTARIES, CÆSAR'S. The title of the two extant works of Julius Cæsar, the account of the Gallic War (*De Bello Gallico*) and of the Civil War (*De Bello Civili*). The former is a concise narration of the author's campaigns in Gaul, published in 51 B.C., in seven books, to which an eighth book was added by Aulus Hirtius. The memoirs of the Civil War were afterward extended by other writers to embrace the Alexandrine, African, and Spanish wars. See COMMENTARII.

COMMENTARIES ON THE BIBLE. See EXEGESIS.

COMMENTARII, "Commentaries," a Latin term applied by the Romans to notes or memoranda, and then to record books of various sorts, such as the *Commentarii domestici*, or family memoirs; the accounts drawn up by men of distinction of events in which they had played a part (see COMMENTARIES, CÆSAR'S); the registers of municipal towns; the *Commentarii principis*, a register of accusations brought before the Emperor, and of his decisions in such cases; the *Commentarii pontificum, augurum*, and *decemvirorum*, collections of decrees and responses.

COMMENTRY, kô'mäN'trē'. A town in the Department of Allier, France, 8 miles southeast of Montluçon, on the Œil (Map: France, S., G 2). It stands in the centre of one of the most important coal fields of France, and since 1850 has risen from a mere village to a busy and populous town, whose inhabitants are mostly engaged in the coal mines and iron works. There are, besides, saw mills and manufactures of mirrors and cutlery. Pop., 1901, 11,169; 1911 (commune), 10,112.

COM'MER, FRANZ (1813–87). A German musician, born at Cologne, in which city he studied music with Leibl and Klein. After holding a position as organist of the Carmelite church there, he went to Berlin in 1832 to study with A. W. Bach, A. B. Marx, and Rungenhagen. He was *regens chori* at the Catholic Hedwigskirche; singing teacher at numerous schools, and founder (with Küster and Kullak), in 1844, of the Berlin Tonkünstlerverein. He was, in addition, royal music director and a senator of the Berlin Akademie. Together with Robert Eitner he founded in 1868 the Gesellschaft für Musikforschung, of which he was the first president. He edited a number of collections of old music and composed numerous masses, cantatas, and choruses.

COM'MERCE (Lat. *commercium*, commerce, interchange, from *com-*, together + *merx*, merchandise, from Lat. *merere*, to gain, Gk. *μέρος, meros*, share). In its general acceptation, a term denoting international traffic in goods, or what constitutes the foreign trade of all countries as distinguished from domestic trade. The first foreign merchants of whom we read, carrying goods and bags of silver from one region to another, were the Arabs, the reputed descendants of Ishmael and Esau. Their trade was by land. The first maritime carriers of goods were the Phœnicians, who dwelt on a narrow strip of land on the eastern shore of the Mediterranean, and were the founders of the great emporiums of Tyre and Sidon. The Phœnicians established an easier and securer passage between Egypt and Syria than had before been known. The corn and wine of the Nile, and the oil, silk, dyes, and spices of western Asia flowed through their hands. From carriers they became merchants, and to merchandise they added manufactures. They traversed the shores of the Mediterranean, established colonies in the Greek islands, and founded Carthage, one of the most noted commercial cities of the ancient world. The power of the Phœnicians disappeared with the rise of the Greek cities—Athens, Corinth—and of their colonies, of Carthage, and of Alexandria, the great seaport founded by Alexander the Great.

While Rome was giving laws and order to the half-civilized tribes of Italy, Carthage, operating on a different base and by other methods, was opening trade with less accessible parts of Europe. The strength of Rome was in her legions, but that of Carthage in her ships;

and her ships could reach realms where legions were powerless. Her mariners had passed the mysterious Pillars of Hercules into the Atlantic and established the port of Cadiz. They founded Carthagena and Barcelona and had depots and traders on the shores of Gaul. This prosperity of their commerce led to wars with Rome, which ended in 146 B.C. with the destruction of Carthage. In the same year the Romans captured and burned Corinth, which was then an important commercial city. In 273 A.D. land commerce suffered a disastrous blow, when Palmyra was in great part destroyed by the Romans.

Growth of Commerce. The repeated invasions of Italy by the Goths and Huns gave rise to the founding, for defense and for trade, of the city of Venice, about the middle of the fifth century—a city that for more than 1000 years stood foremost in the trade of the world. The Venetians traded with Constantinople, Greece, Syria, Egypt, India, and Arabia, and their vessels carried the products of the East to the ports of western Europe. They had possessions on the coast of Greece and became rulers in the Ionian Islands and in Cyprus. Their rivals, the Genoese, planted colonies on the shores of the Hellespont and the Black Sea, the most flourishing of which was Kaffa (the modern Feodosia), in the Crimea, a great emporium of the commerce between Europe and Asia. A vast commerce was carried on in the Middle Ages by the towns of the Hanseatic League, situated on the shores of the North Sea, and the Baltic, and the rivers flowing into them. When the chief objects of commerce were the skilled products of the East, the South German cities—Nuremberg and Augsburg—through which trade flowed inland, vied with Venice as centres of the Eastern trade. The ports of France and Spain were busy distributing centres. At the close of the Middle Ages Antwerp, having outstripped Bruges and Ghent, became the greatest mart in Christendom. The inventions and discoveries of the fifteenth century transferred the centres of trade successively to Lisbon, Amsterdam, and London. The mariner's compass made distant voyages possible on the open sea. By 1487 the Portuguese had explored the whole western coast of Africa, and in 1497 Vasco da Gama passed round the Cape of Good Hope, to land in India in the following year. Before the end of the century Columbus had thrice crossed the Atlantic, and Cabot, sent out by England, had discovered North America. Nearly all this daring enterprise had for its prime object the finding of some easy route to the fabulously wealthy East, to India and China. But a century elapsed before the English fixed their first establishment or factory in India. The discovery of the New World, however, was destined eventually to change the course and the nature of trade.

From such rapidly spreading exploration and colonization there necessarily arose new wants, new products, new manufactures, and rapidly increasing trade; interrupted more or less by wars, but in the main marching steadily and rapidly on. The nineteenth century witnessed an extension of the commercial relations of mankind to which there is no parallel in history. The history of commerce in the past century would be an epitome of the world's economic development during its most intense and active period, and any enumeration of the causes of the tremendous strides which commerce has made must be partial. The progress of colonization in the widest sense, and the improvement of the means of transportation, are primary factors which cannot be overlooked. In the nineteenth century the greater part of the North American continent was opened up to occupation, Australia and South Africa were peopled by men of white race, while large portions of Asia were brought under the influence of Western rule or Western ideas. This, together with the great increase of population in Europe, has greatly augmented the productive power and consuming power of widely distant parts of the earth, dependent upon commerce for the supply of their mutual wants. Application of steam to transportation alike by land and by water has intensified the progress of colonization as we have here used the term, and made possible the commerce which has resulted from it.

In 1819 the Atlantic Ocean was first crossed by a steam vessel, and regular transatlantic steam communication was inaugurated in 1838. Since then the increase of steam navigation has been rapid, particularly in the last 50 years, until now the greater part of maritime navigation is carried on by steamships. Their far greater bulk and greater speed have led to the gradual displacement of the old sailing ships and have greatly multiplied the potentialities of foreign commerce. The railway has been a factor of the greatest consequence in the development of sea-borne traffic. Before its advent it was only the produce of coast regions, or of those parts adjacent to inland waterways, which could participate in the foreign trade. But the railroad has utterly changed

YEARS	Imports	Exports	Combined Imports and Exports
1613	£2,141,151	£2,487,435	£4,628,586
1662	4,016,019	2,022,812	6,038,831
1703	4,526,579	6,644,103	11,170,682
1770	11,002,000	12,142,000	23,144,000
1800	28,258,000	34,382,000	62,640,000
1855	143,542,850	116,691,310	260,234,160
1890	420,885,695	327,880,676	748,766,371
1905	565,775,602	330,257,726	896,043,328
1912	744,896,514	487,434,002	1,232,330,516

IMPORTS AND EXPORTS

COUNTRIES	Imports	Exports
Argentina	$371,384,000	$463,578,000
Australia	371,825,000	310,792,000
Austria-Hungary	722,030,000	554,973,000
Belgium	899,472,000	753,001,000
Brazil	308,409,000	363,274,000
Canada	670,000,000	355,755,000
China	350,906,000	274,822,000
France	1,534,515,000	1,280,816,000
Germany	2,544,557,000	2,131,718,000
British India	522,389,000	784,503,000
Italy	695,592,000	462,456,000
Japan	307,844,000	261,258,000
Netherlands (1911)	1,332,874,000	1,090,848,000
Norway	135,671,000	87,084,000
Russia	532,768,000	734,905,000
Spain	189,029,000	188,966,000
Sweden	198,320,000	192,960,000
Switzerland	381,966,000	262,020,000
United Kingdom	3,080,022,000	2,371,073,000
United States	1,766,689,000	2,362,696,000

this condition. Of great importance, too, has been the influence of the telegraph in transmitting orders and other communications between distant points without loss of time. These developments have made it possible to transport long distances not only goods whose weight formerly debarred them from a place in foreign commerce, but also more perishable goods which, under the slower transportation of earlier days, could not be handled.

Some notion of the rapid development of commerce can be gained from the statement that the aggregate exports and imports of the United States, which in 1791 were $43,000,000, reached, in 1850, $318,000,000, and in the year ending Dec. 31, 1912, had reached a total of $4,129,000,000. For a comparison with earlier dates, we may select a few figures for Great Britain and Ireland, which show the development of commerce in the past 400 years, as shown in the first table on the preceding page.

World's Commerce. The aggregate commerce of the world was computed in 1890, for the total of exports and imports, at approximately $17,500,000,000. The foregoing statement, which gives the figures, so far as they are available, for the trade of 1912, gives some notion of the relative positions occupied by some of the leading nations, as shown by the second table on the preceding page.

Commerce of the United States. Turning now more especially to the commerce of the United States in recent years, we present a few figures showing the origin and destination of imports and exports, and the character of the goods imported. In the following table the figures for 1895, the year showing the smallest trade of the last decade of the nineteenth century, are given for comparison with those of the year 1912.

FISCAL YEAR ENDING JUNE 30

COUNTRIES	Imports 1895	Exports 1895	Imports 1905	Exports 1905	Imports 1912	Exports 1912
United Kingdom	$159,100,000	$387,100,000	$175,811,000	$523,396,000	$272,940,000	$564,372,000
Germany	81,000,000	92,000,000	118,268,000	194,220,000	171,380,000	306,959,000
France	61,600,000	45,100,000	89,830,000	76,337,000	124,548,000	135,388,000
Total Europe	383,700,000	627,900,000	540,773,000	1,020,972,000	819,585,000	1,341,732,000
North America	133,900,000	108,600,000	227,229,000	260,570,000	334,072,000	516,837,000
South America	112,200,000	33,500,000	150,795,000	56,894,000	215,089,000	132,310,000
Asia	79,000,000	17,300,000	161,982,000	128,504,000	225,468,000	117,461,000
Oceania	17,400,000	13,100,000	25,388,000	33,079,000	36,464,000	71,936,000
Africa	5,700,000	6,400,000	11,343,000	18,540,000	22,585,000	24,043,000
Total grand divisions	$731,900,000	$806,800,000	$1,117,513,000	$1,481,745,000	$1,653,264,000	$2,204,332,000

The following expresses the same matter in percentages of the total imports and exports:

COUNTRIES	1895		1905		1912	
	Imports	Exports	Imports	Exports	Imports	Exports
Europe	52.41	77.76	48.39	67.23	49.57	60.87
North America	18.29	13.45	20.33	17.16	20.20	23.45
South America	15.32	4.15	13.49	3.75	13.01	6.00
Asia	10.61	2.15	14.50	8.46	13.64	5.33
Oceania	2.39	1.62	2.27	2.18	2.21	3.26
Africa	.78	.79	1.02	1.22	1.37	1.09

It will be observed that while relatively the share of Europe in the import trade of the United States remains fairly constant, the share of Europe in the export trade shows a steady decline. This decline is indicative of the gradual change in character of American exports from raw materials to manufactures.

The character of imports into the United States in general is shown in the following table:

IMPORTS INTO UNITED STATES, CLASSIFIED BY CHARACTER

	FOODSTUFFS IN CRUDE CONDITION		FOODSTUFFS WHOLLY OR PARTLY MANUFACTURED		CRUDE MATERIALS FOR USE IN MANUFACTURING		MANUFACTURES FOR USE IN FURTHER MANUFACTURING		MANUFACTURES READY FOR CONSUMPTION		MISCELLANEOUS	
	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total
1850	$18,011,000	10.38	$21,465,000	12.37	$11,711,000	6.75	$26,163,000	15.08	$95,312,000	54.93	$845,000	.49
1860	35,743,000	10.11	53,771,000	15.26	37,073,000	10.48	23,613,000	6.67	199,878,000	56.52	3,536,000	1.00
1870	53,981,000	12.38	96,253,000	22.08	53,118,000	12.18	54,545,000	12.51	173,034,000	39.69	5,024,000	1.16
1880	100,297,000	15.01	118,125,000	17.69	131,861,000	19.74	110,779,000	16.59	196,587,000	29.43	10,303,000	1.54
1890	128,480,000	16.28	133,332,000	16.89	170,637,000	21.62	116,924,000	14.81	230,685,000	29.23	9,251,000	1.17
1900	97,916,000	11.52	133,027,000	15.65	276,241,000	32.50	134,221,000	15.79	203,126,000	23.90	5,407,000	.64
1910	144,776,000	9.30	181,566,000	11.66	566,270,000	36.37	285,138,000	18.31	367,723,000	23.62	11,471,000	.74
1912	230,358,000	13.93	196,100,000	11.86	555,986,000	33.63	293,739,000	17.77	360,018,000	21.78	17,061,000	1.03

The most important articles imported were coffee ($117,826,000), sugar ($115,515,000), India rubber and gutta-percha ($102,941,000). The most striking facts brought out by the table are

the increase in importation of crude materials for use in manufacture (from 6.75 per cent of the total in 1850 to 33.63 per cent in 1912) and the decline in the relative importance of manufactures ready for consumption (from 54.93 per cent in 1850 to 21.78 per cent in 1912).

The evidence offered by the statistics of imports as to the change in character of American economic life is corroborated by the statistics of exports. Manufactures ready for consumption increased from 12.72 per cent of the total in 1850 to 30.98 per cent in 1912. As indicative of the same tendency, we may note the increase in exportation of partly manufactured goods from 4.49 per cent of the total in 1850 to 16.04 per cent in 1912. Other points of interest brought out by the table are the rise of exports of crude foodstuffs from 1850 to 1880 and their subsequent steady decline. This is indicative of the history of American wheat culture. The steadiness of the relative position of crude materials among exports is largely due to the dependence of European countries upon American cotton, of which the exports in 1912 amounted to $565,849,000.

EXPORTS FROM THE UNITED STATES, CLASSIFIED BY CHARACTER

	FOOD STUFFS IN CRUDE CONDITION OR ANIMALS		FOOD STUFFS PARTLY OR WHOLLY MANUFACTURED		CRUDE MATERIALS FOR USE IN MANUFACTURING		MANUFACTURES FOR FURTHER USE IN MANUFACTURING		MANUFACTURES READY FOR CONSUMPTION		MISCELLANEOUS	
	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total
1850	$7,535,000	5.59	$20,017,000	14.84	$83,984,000	62.26	$6,060,000	4.49	$17,162,000	12.72	$,739,000	.10
1860	12,166,000	3.85	38,624,000	12.21	21,600,900	68.31	12,641,000	3.99	35,811,000	11.33	988,000	.31
1870	41,852,000	11.12	50,919,000	13.53	213,439,000	56.64	13,711,000	3.66	56,329,000	14.96	363,000	.09
1880	266,108,000	32.30	193,352,000	23.47	238,787,000	28.98	29,044,000	3.52	92,774,000	11.26	3,878,000	.47
1890	132,073,000	15.62	224,756,000	26.59	304,566,000	36.03	46,454,000	5.50	132,527,000	15.68	4,915,000	.58
1900	227,347,000	16.59	318,126,000	23.21	325,589,000	23.75	152,890,000	11.15	331,955,000	24.22	14,854,000	1.08
1910	109,828,000	6.43	259,259,000	15.16	565,934,000	33.09	267,765,000	15.66	499,215,000	29.19	8,079,000	.47
1912	99,899,000	4.60	318,838,000	14.69	723,008,000	33.31	348,149,000	16.04	672,268,000	30.98	8,155,000	.38

Bibliography. *Commerce and Navigation of the United States*, issued annually by the Bureau of Statistics, Department of Commerce; the monthly *Summary of Commerce and Finance*, which contains important monographs on special topics; *Consular Reports*, issued daily and monthly, and *Commercial Relations*, published annually, by the Bureau of Foreign Commerce, State Department, give information regarding trade conditions abroad, gathered by the consuls of the United States. The preliminary section of *Commercial Relations* is a review of the world's commerce and is also published separately. Similar official publications are issued by other governments. The consular reports of Great Britain, France, the German Empire, Austria, Italy, and Belgium are to be especially noted, as well as the annual *Statistical Abstract of Foreign Countries* issued by the British Board of Trade.

Among historical and descriptive works, the following will be found useful: Cunningham, *The Growth of English Industry and Commerce* (Cambridge, 1890); Gibbins, *History of Commerce in Europe* (London, 1891); Levi, *History of British Commerce, 1763–1878* (ib., 1880); Day, *A History of Commerce* (New York, 1907); Greenwood, compiler, *Classified Guide to Technical and Commercial Books* (ib., 1905). Among works on commercial geography are Chisholm, *Handbook of Commercial Geography* (London, 1890), and Bartholomew's *Atlas of the World's Commerce* (London, 1906). See BALANCE OF TRADE; EXCHANGE; FOREIGN MONEY; LABOR AND COMMERCE, DEPARTMENT OF.

COMMERCE. A city in Hunt Co., Tex., 90 miles northeast of Dallas, on the St. Louis, Southwestern, and the Texas Midland railroads (Map: Texas, E 3). It is the seat of East Texas Normal College. Commerce carries on a trade in cotton, grain, and cattle, and there are planing, flour, and cottonseed-oil mills, railway repair shops, machine shops, bottling works, and lumber yards. The city contains a public park and owns its water works. Pop., 1900, 1800; 1910, 2818.

COMMERCE COURT. A court created by Act of Congress in 1909 to have jurisdiction in all cases for the enforcement of orders of the Interstate Commerce Commission, other than for the payment of money. The court consisted of a presiding judge and four associate judges, having the rank and tenure of judges of the circuit court. It was believed by the framers of the act that the establishment of such a court would expedite the disposal of cases in its jurisdiction and relieve the circuit courts of a work for which they are not well adapted. Shortly after the organization of the Commerce Court friction arose between it and the Interstate Commerce Commission, the court claiming power to review the findings of the commission as to questions of fact as well as to determine questions of law. By decision of the Supreme Court in 1912 the powers of the Commerce Court were limited to questions of law. The court early acquired a reputation for undue friendliness to the carriers and a reactionary attitude towards the commission. Its position was further compromised by the scandals arising out of the conduct of one of its members, R. W. Archbald (q.v.), and his impeachment in 1912. A bill to abolish the Commerce Court was passed by both houses in 1912, but was vetoed by President Taft. Shortly after the inauguration of President Wilson the court was abolished.

COMMERCIAL COURT. A court constituted of judges of the King's Bench Division, in England, for the trial of commercial causes, i.e., of causes arising out of the ordinary transactions of merchants and traders, such as those relating to the construction of mercantile docu-

ments, the export or import of merchandise, affreightment, insurance, banking, mercantile agency, and mercantile usages. It was not established by an act of Parliament, but was devised by the King's Bench Division for the convenience of suitors and the more expeditious determination of mercantile disputes. While this court has no power to dispense with the ordinary rules of evidence, or to depart from the administration of the law in the ordinary way, it is able, with the assistance of parties and counsel, to dispose of commercial disputes with much more expedition than is possible under the ordinary judicial procedure. Commercial cases are tried by this court upon the evidence prescribed by the orders made in chambers, without difficulty or delay, and with a great diminution of the cost incidental to actions in which the ordinary modes of litigation are followed. This court is a reminder of the Court Piepoudreux, in which the primitive law merchant (q.v.) of England was administered —the court which Lord Coke declares was "incident to every fair and market, because that for contracts, and injuries done concerning the fair or market, there shall be as speedy justice done for the advancement of trade and traffic as the dust can fall from the feet." The connection of this court with merchants of the staple is disclosed by 27 Edw. III, c. 2, which declared that it was designed to give courage to merchant strangers to come with their wares into the realm, and that it should dispense justice according to the law of the staple, or the law merchant, and not according to the common law. Courts for the rapid settlement of trade disputes, called Pypowder courts, were provided for in New York in 1692 (vol. i, Col. Laws, ed. 1894) but these were later merged in the ordinary courts of justice. See COURT. Consult the article, "Merchants of the Staple," in *London Quarterly Review*, vol. xvii, p. 56 (London, 1901).

COMMERCIAL CRISES. See CRISIS, ECONOMIC.

COMMERCIAL EDUCATION. See EDUCATION, COMMERCIAL.

COMMERCIAL GEOGRAPHY. See GEOGRAPHY, ECONOMIC.

COMMERCIAL LAW. A popular term of varying and rather indefinite signification. It includes ordinarily the legal rules which relate most directly to everyday mercantile transactions, and which are based upon, or have been modified by, the usages of trade. These rules are presented in connection with the different topics of commercial law, under such titles as BAILMENT; INSURANCE; NEGOTIABLE PAPER; PARTNERSHIP; SALE; ETC. See also LAW MERCHANT; MERCANTILE LAW.

COMMERCIAL PAPER. See BILL OF EXCHANGE; NEGOTIABLE PAPER.

COMMERCIAL REGISTERS. See MERCANTILE AGENCY.

COMMERCIAL TEMPERANCE LEAGUE. See LEND-A-HAND CLUBS.

COMMERCIAL TRAVELER. A representative of a wholesale or jobbing house, sent throughout the country for the purpose of selling goods to smaller houses in the same line of trade. The commercial traveler is the legitimate successor of the old peddler, though his operations are on a larger scale, and his manner of doing business quite different. In former days, in addition to the peddler, who carried his stock of wares with him, producers frequently came into contact with the purchasers through the great fairs which were held throughout the year in the different commercial centres, and which were a means of drawing sellers and buyers together from great regions of country. The commercial traveler sells by the aid of samples, price lists, and the like, and carries with him no goods for sale. The system of employing commercial travelers is a natural outgrowth of the localization of interests in particular places and of the extension of the markets for particular commodities. It is estimated by the commercial travelers themselves that their class numbered in the United States in 1890 some 300,000 persons. It is claimed by them that since that time their number has decreased, largely through the concentration of capital and the concentration of the management of business in the hands of the so-called trusts. It is claimed by the managers of trusts that one of the chief advantages of their organization has been the saving in the cost of distribution, notably in that of selling goods. It is represented that the various factories and enterprises each employ commercial travelers, whose main duty is not to induce the would-be purchaser to buy, but to persuade him to buy a particular make of goods. As the competition between the different sellers of the same goods ceases by the combination of interests, it is obvious that, instead of sending several salesmen into a district, one can transact all the business it offers. The commercial travelers in the United States are organized in various associations for the purpose of promoting their interests as a class. Of these, perhaps the most important is the Commercial Travelers' Protective League. Consult: Allen, *Ambassadors of Commerce* (London, 1885); testimony of P. F. Dowe before the United States Industrial Commission, in vol. iv of the commission's *Report* (Washington, 1900); also Jenks, *The Trust Problem* (New York, 1900); "Commercial Travelers in Foreign Countries," in *United States Special Consular Reports*, vol. xxviii (Washington, 1904).

COMMERCIAL TREATIES. Treaties between states regulating the commercial rights of the nationals of each in the territories of the other. Such treaties determine reciprocally the rights of the citizens of the one country to resort to the other, to acquire property, to buy and sell. They establish the conditions under which debts due a foreign trader may be collected through the courts, insure him against onerous taxation, etc. Such treaties may assure the citizen of a treaty state the same privileges as those enjoyed by any other treaty state (most-favored-nation clause), or they may admit of discriminations. They may give the citizen of the treaty state privileges in trade identical with those of nationals. This policy is common, but by no means universal.

Treaties of commerce existed in antiquity before the extension of the Roman Empire to practical control of the known world. After the breakdown of the Empire the rights of foreign traders were determined chiefly by custom. In many cases arrangements between the guilds of cities in different regions assumed the form of commercial treaties. Relations between citizens and foreign traders were subject to more or less systematic regulation by the various princes. In the twelfth century, with

the revival of trade and navigation in the Mediterranean, commercial treaties between states became common. A century later a system of commercial treaties grew up in northern Europe.

The early commercial treaties were subject to great variation in content. Each of the several states competing for a particularly lucrative trade would seek to secure more favorable treaties than the other states enjoyed. Apparently before the end of the fifteenth century the principle of equalizing the position of citizens of rival nations had been established in the commercial relations between the Italian cities and the Turks. By the middle of the seventeenth century the principle had become familiar in western Europe also. Since the beginning of the eighteenth century practically every treaty of commerce has contained a clause assuring reciprocally most-favored-nation treatment.

Until modern times no attempt was made to regulate duties through treaties of commerce. The earliest treaty involving the reduction or limitation of duties was the Methuen Treaty between England and Portugal (1703). By this treaty the prohibition upon the importation of English woolens into Portugal was withdrawn, and Portuguese wines were admitted to the English markets upon payment of a duty one-third less than those imposed on French wines. The principle of reciprocal concessions in duties played an important part in the Treaty of 1786 between France and England, and a still more important part in the Treaty of 1860 between France and England. See Reciprocity.

Upon the revocation of a treaty of commerce involving reciprocal concessions in duties, the rates imposed upon importations from non-treaty nations become automatically effective. Theoretically the revocation of the treaty destroys also the rights of domicile, the rights of purchasing and selling, the right of employing the courts for the collection of debts, etc., enjoyed under the treaty by the citizen of one state in the territory of the other. In practice, the most essential provisions of an abrogated treaty are usually continued under an executive agreement until a new treaty can be negotiated. See Treaty; Reciprocity, and references under the latter.

COMMERCY, kô'mâr'sē'. The capital of an arrondissement in the Department of Meuse, France, on the Meuse, 183 miles east of Paris by rail (Map: France, N., L 4). It is a garrison town and has an interesting seventeenth-century castle, with literary associations of Cardinal de Retz, which also for a time was the residence of Stanislas, King of Poland and Duke of Lorraine. Here, too, Voltaire composed his *Semiramis*. A statue of Don Calmet, the historian, who was born near Commercy, stands in the town. Coal mining constitutes the chief industry; other trade is in hardware, forgings, steel plates, embroidery, and wines. Pop., 1901, 7726; 1911, 8876.

COMMERS, kô-mĕrs' (Ger. *Kommers*, drinking bout, from Lat. *commercium*, trade, from *com*, *together* + *merx*, merchandise). A social gathering of German students on festival occasions, such as the beginning and ending of the semiannual term (*semester*), the anniversary of the foundation of the university, etc. The main features of such meetings consist in speeches and songs, the famous collection of German student songs, *Gaudeamus igitur*, being used. Several senior students are elected as officials (*Chargierte*) and have entire charge of the affair. Certain rules of etiquette in drinking must be strictly adhered to. Beer is the sole beverage used, and generally a great quantity of it is consumed. After each speech the presiding senior calls for a salamander (*ad exercitium salamandris, bibite, tergite*). All arise and, after having emptied their glasses, pound three times vigorously with them on the tables. If a club member dies, a salamander (*Trauersalamander*) is executed in his memory at the next club commers, when all empty glasses are dashed to pieces. Each students' club arranges a large commers on the anniversary of its foundation. A great many former members visit their alma mater on this occasion, and he is especially honored who can count the most semesters since his matriculation as a student.

COM'MINA'TION (Lat. *comminatio*, threat, from *comminari*, to threaten, from *com*, together + *minari*, to threaten). The name given to a penitential service used in the primitive Church. In the early Church those who were guilty of grievous and notorious sins were put out of the Church, until, on their repentance and after long trial, they were restored to full communion. It seems that, at least from the beginning of the eighth century, there was an office of this kind for public penitents on the first day of Lent; but from various causes the penitential discipline became extinct, both in the Eastern and Western churches, and the office for Ash Wednesday (so called from the penitents formerly coming clad in sackcloth and ashes) is the only memorial of it left. The office, as used in the Church of England, is nearly the same as the older ones found in the pre-Reformation service books of Salisbury and York. The curses contained in Deut. xxvii. against impenitent sinners are read, and the congregation answers "Amen" to every sentence, as acknowledging the justice of the sentences. The penitential office of the American Book of Common Prayer retains only the concluding prayers. Consult Bingham, *Origines Ecclesiasticæ; or, the Antiquities of the Christian Church* (10 vols., London, 1708–22; later ed., 1838–40).

COMMINES. See Comines.

COMMINES, kô'mēn', Philippe de (c.1445–?1511). A French statesman and historian. He was born at the castle of Renescure, not far from Hasebrouck, received a careful education, and in 1464 attached himself to Charles the Bold of Burgundy (then Count of Charolais). In 1472 Commines entered the service of Louis XI, the rival and enemy of Charles, who made him one of his confidential advisers. He proved himself a very suitable agent for carrying out the designs of the crafty monarch; but after the death of Louis he incurred the displeasure of the regent, Anne de Beaujeu, by his adherence to the party of the Duke of Orléans (afterward Louis XII), and, after being imprisoned at Loches in an iron cage, was sentenced to the forfeiture of a part of his estates and to 10 years' banishment. This punishment, however, does not seem to have been carried out, for after a few years we find Commines again employed in important affairs of diplomacy; but though he was engaged in the service of Charles VIII and the Duke of Orléans, he failed

to win the confidence of these masters. He died at his castle of Argenton, October 18, probably in 1511. Commines's *Mémoires*, which are a complete survey of the political history of his time and depict vividly the character of Louis XI, are admirably written and afford abundant proof of an acute and vigorous mind. He seems to have looked keenly into the heart of every man who crossed him in life and with cool and severe precision to have dissected him for the benefit of posterity. Among the many editions of his *Mémoires*, the best are those by Lenglet-Dufresnoy (4 vols., London, 1747); by Mademoiselle Dupont (3 vols.), in the *Collection de la société de l'histoire de France* (Paris, 1840–47); by Chantelauze (Paris, 1881); but the best of all is the latest edition by Mandrot (2 vols., Paris, 1901–03). An English translation can be found in the Bohn Library.

COM'MISSA'RIAT (Fr., from ML. *commissarius*, one intrusted with a commission, from Lat. *commissus*, p.p. of *committere*, to commit, from *com*, together + *mittere*, to send). A department of army supply. Until 1912 the department of the United States army providing rations was known as the Commissary or Subsistence Department and supplied food only. It was administered by its chief, the commissary general. On Nov. 1, 1912, the pay, subsistence, and quartermaster's departments were consolidated, by law, under the title *The Quartermaster Corps*, its chief having the title of *Chief of the Quartermaster Corps* with the rank of major general. This consolidated corps now provides subsistence, pay, transportation, clothing, and quarters. Arms, ammunition, and other ordnance supplies are furnished by the *Ordnance Department*. Fortifications are constructed and repaired by the *Engineer Corps*.

In Great Britain the commissariat and army-service corps are responsible for both supply and transport of food. Owing to the constant demands made upon it, and its peculiar importance under the present army system, this branch of the British army is probably unrivaled by that of any other country. A similar system of commissariat to that of the United States obtains throughout Europe generally. See ARMY ORGANIZATION; FIELD COOKING; RATIONS.

COM'MISSARY (Fr. *commissaire*, ML. *commissarius*, commissary, one intrusted with a commission). Formerly an officer of the Subsistence Department of the United States army. This department was abolished by absorption into the Quartermaster Corps Nov. 1, 1912. The duties formerly performed by commissaries are now in charge of quartermasters. (See QUARTERMASTER CORPS.) Regimental commissaries and regimental commissary sergeants were retained when the consolidation was made. At military posts and stations and in the field, the *regimental commissaries*, who are officers of the rank of captain and are appointed to the regimental staff for a term of four years by the commanding officer, assisted by regimental commissary sergeants, perform their duties in the quartermaster's department at the headquarters of their regiment. *Regimental commissary sergeants* belong to the noncommissioned staff. There is one to each regiment. The duties of the commissary, in the English army, are performed by the Army Service Corps; and regimentally, by the regimental quartermaster, assisted by his quartermaster sergeant.

COMMISSION (Lat. *commissio*, commission, from *committere*, to commit, from *com*, together + *mittere*, to send). Boards created for governmental purposes, generally of a temporary nature. They have proved effective agencies for dealing with certain phases of international relations and controversies, and for this purpose are of two classes: (1) commissions of a domestic character, created under statute for carrying out provisions of treaties and conventions; (2) commissions performing international functions, in the nature of conference or arbitration boards.

Examples of the first class in the United States are the commissions created (*a*) under the Treaty of 1819 with Spain, ceding Florida, by which the government sought to adjust citizens' claims growing out of the preceding unfriendly relations; (*b*) under the Treaty of 1826 with Great Britain, to distribute the indemnity for slaves deported in derogation of Art. I of the Treaty of Ghent; (*c*) under the Treaty of 1831 with France, to distribute the indemnity paid for the Spoliation Claims; (*d*) under the Treaty of 1871 with Great Britain, to distribute the Alabama Claims award.

Commissions of the second class have been the usual agencies for effecting arbitrations and, according to their purpose and the authority of their members, may be either merely for conference or for the determination of methods of reaching settlement of disputed questions, or may themselves have the power to adjudicate the issues in controversy. In the latter case they may be composed solely of representatives of the States concerned, or they may include neutral parties selected by these States to act as umpires. During the nineteenth century arbitration as a method of settling international differences steadily increased. The United States has been a party to no less than 57 adjustments of this character, and, except for the train of circumstances resulting in the War of 1812, all differences between this country and Great Britain have been so adjusted. (See ALABAMA CLAIMS; ARBITRATION, INTERNATIONAL; BERING SEA CONTROVERSY; and consult the authorities there cited.) In England and the United States commissions are often instituted, either by legislative authority or by the executive, to assist the government by investigation or advice in matters of internal policy or as permanent organs of administration. Thus New York has instituted a Commission of Appeals with judicial functions to relieve the overcrowded calendar of the Court of Appeals; the United States government has by act of Congress created an Interstate Commerce Commission (q.v.), an Industrial Relations Commission (q.v.) etc. Many of the States have instituted Public Service Commissions (q.v.), Commissions on Prison Reform, etc.

COMMISSION, MILITARY. A certificate of authority or rank, or both. Military rank is defined in the United States Army Regulations as "that character or quality bestowed on military persons which marks their station and confers eligibility to exercise command or authority in the military service within the limits prescribed by law." To such military persons commissions are granted only by the President of the United States, confirmed by the Senate, and published through the Adjutant General's Department. Commissions in European armies are usually distributed among the graduates of the national military preparatory or training

colleges, according to the results of competitive examinations. They are usually restricted, however, even in republican France, to men of good birth or wealthy heritage. In the British army, formerly, commissions, except in the artillery and engineers, were obtainable by purchase—a condition of things which became more and more undesirable as the science of war advanced and thorough preparatory education and training became necessary. It was not until 1871 that the system was abolished by the Gladstone government in the face of great opposition, and the present condition of things inaugurated. The prices of commissions rose gradually from the time of Charles II until the Crimean War of 1854, at which period they ranged in value from £450 for a commission as ensign of infantry of the line to £7250 for that of lieutenant colonel of Foot Guards. At the present time, in the English army, first commissions are granted to successful candidates in open competitive examinations; to highly and specially recommended noncommissioned officers; to certain qualified university graduates; to graduate cadets from government military schools; to a limited number of junior militia officers. See ARMY ORGANIZATION; RANK AND COMMAND.

COMMISSIONAIRE, kŏm-mĭsh'ŭn-âr′, *Fr. pron.* kŏ'mē'syŏ'nâr′ (Fr., commissioner). An attendant at Continental hotels, employed to perform certain miscellaneous services, such as attendance at railroad and steamboat stations to secure guests, taking charge of luggage, seeing it through the customhouse, and sending it on to the hotel, etc., for all which a fee is charged. In Paris such attendants are generally respectable and intelligent and speak English with tolerable fluency. In other parts of the Continent—such as Germany and Austria—there is also a class called commissionaires, who are analogous to the American messenger boys. There, too, they are employed by companies and are uniformed, but one may not call them up by telephone or signal as here, it being their custom to solicit services upon the street. A corps of commissionaires, an association of disabled soldiers of good repute who had retired with a pension, was founded in Great Britain by Sir Edward Walter in 1859, the service of which now extends throughout the large cities. These men are employed in the most varied capacities where high qualifications are required, and may be engaged for permanent or temporary service. So great is the demand for this kind of service that several thousand men are now engaged in it, with stations in many towns of Great Britain and its colonies.

COMMIS'SIONER (from ML. *commissarius,* one intrusted with a commission). Most commonly a person appointed for public service by a commission or mandate of a political authority, but also, sometimes, any one of certain officers elected by popular vote. The term is generally employed to describe an appointive officer who has charge of some branch of a department of government and who is subject to the supervision of a higher official or public board, as a commissioner of water supply of a municipality, who is usually under the control of the mayor or common council. It is the almost invariable title of persons appointed by the government to carry on or supervise some special public work of a transitory nature, as to investigate the conditions and resources of a colony. See COMMISSION.

Commissioner of Assize, in English law, is one to whom a commission is issued by the crown, directing him to "take the assizes," i.e., to act as a justice in hearing certain actions in specified judicial circuits. It may issue to a barrister or sergeant at law as well as to a regularly appointed judge. The practice of appointing these commissioners arose during the reign of Edward I because of the lack of regular courts in the various parts of the country. By the Supreme Court of Judicature Act of 1873, one exercising jurisdiction under a commission of assize is deemed to constitute a court of the High Court of Justice, having all the powers of that court. See ASSIZE; HIGH COURT OF JUSTICE.

Commissioner of Deeds is a person authorized by the state to take acknowledgments of the execution of legal instruments and administer certain oaths voluntarily taken out of court. His powers vary in each jurisdiction and are somewhat similar to, but usually more limited than, those of a notary public. See NOTARY PUBLIC.

COMMISSIONERS OF THE NAVY. See ADMIRAL; also ADMIRALTY.

COMMISSION FORM OF GOVERNMENT. See MUNICIPAL GOVERNMENT.

COMMISSION MERCHANT. A person, called also a *factor,* employed to sell goods consigned or delivered to him by another who is called his principal, for a certain percentage, commonly called his commission or factorage. As the goods thus received are said to be consigned, the commission merchant or agent is often called a consignee. See FACTOR.

COMMIT'MENT (from *commit,* Lat. *committere,* to commit). A warrant of a justice, magistrate, or other official having police jurisdiction, ordering that a person accused of a crime be held for trial, and either directing that he be sent to prison immediately, or admitting him to bail to secure his attendance at that time. The term "commitment" is also sometimes used of the sending a person to jail to enforce obedience of an order or decree of a court; but the term is most frequently used where the person is to be detained for some temporary purpose, as above indicated. It is seldom employed where the prisoner is finally sentenced to a term in prison as a punishment, after having been found guilty of a crime, in which case the judgment of the court is usually considered a sufficient warrant for the sheriff or proper authorities to carry out the sentence. See JUDGMENT; SENTENCE; SHERIFF; WARRANT.

COMMIT'TEE (Lat. *committere,* to intrust). A group of persons, rarely less than three, to whom an organized body, legislative or otherwise, intrusts or *commits* certain matters for investigation, consideration, and decision as to their meriting the attention of the whole body. A *standing committee* is one which exercises its functions permanently and considers all matters coming within a certain allotted sphere of action. In modern parliamentary practice immense importance attaches to the work of standing committees; and so true is this that modern legislation has been by some termed "government by committee." Almost every matter brought before such bodies as the United States Congress and the legislatures of the several States is at once referred to a standing committee, which holds meetings by itself, examines the subject closely, summons witnesses, if neces-

sary, and at length reports back to the main body its findings and conclusions, with recommendation to act favorably or adversely. The committee usually formulates its conclusions in a bill recommended to be passed if action is thought desirable. The same procedure is followed in the British Parliament. The United States House of Representatives has at least 60 committees; the Senate about 50; these consist of not less than three, and, except in one or two cases, not more than 15 members. The most important committees of the House are that of Ways and Means, which considers all matters relating to the tariff, internal taxation, and, generally, the revenues of the government, and that of Appropriations, which deals with all estimates of appropriations to be made by Congress and the framing of bills for that purpose. Other important standing committees are those of Banking and Currency, Foreign Affairs, Patents, Pensions, Judiciary, and Railways and Canals. Similar committees exist in the British Parliament. The argument in favor of the system of committees is the impossibility of a large deliberative body's examining every matter within the scope of its action in detail; the objection to it is the possibility of more easily corrupting or deceiving a small body than a large one; but whatever be the argument against it as a matter of theory, the committee system is fully recognized as a necessity and is too firmly intrenched in parliamentary practice to be successfully argued against. A *select committee* is one appointed at a special time to consider and report on a given topic; when this has been done, its powers and existence cease. The *committee of the whole* is the entire body sitting in a deliberative rather than a legislative character—for the purpose, that is, of debating and consulting upon the details of a question rather than of taking legislative action upon it. In the British House of Commons there is a regularly chosen chairman, other than the Speaker of the House, who presides over all committees of the whole; in the United States Congress any member may be chosen to preside in a committee of the whole. A *joint committee* is one made up of separate committees appointed by two bodies; in the United States, owing to the dual constitution of the legislatures, it is often necessary to appoint such joint committees to bring the two bodies to a mutual understanding and make harmonious action possible. In the national Congress such committees, known as *conference committees*, are almost always necessary to eliminate the discrepancies that arise in any important project of legislation in its passage through the two houses. Such committees are by tradition restricted to reporting for final passage only such parts of the project as appear in the measure as passed in either house.

In law, a committee is a person or persons appointed by a court having equity or probate jurisdiction to take charge of the person and manage the property and business affairs of an individual who is legally incompetent by reason of lunacy, idiocy, or habitual drunkenness. The duties are much similar to those of a guardian of an infant, and the committee is under the supervision and control of the court appointing him. He must file inventories and accounts, maintain all necessary actions in behalf of his charge, and apply the income, and the proceeds of the property itself if necessary, to the support of the incompetent and his family. If the incompetent recovers, he may apply to the court to have the committee discharged and resume his personal freedom and the control of his property. The power of the committee ceases at the death of the incompetent, and his estate is administered in the usual manner. See GUARDIAN; LUNATIC; HABITUAL DRUNKARD; IDIOCY.

The term is also employed to designate a person or persons appointed to take charge of specified matters by any body organized for governmental business or social purposes, and to make a report of the result of their efforts to the appointing power. See LEGISLATURE; PARLIAMENTARY LAW.

COMMITTEE, THE. A comedy, by Sir Robert Howard, published in 1665, but played for several years previously. In 1797 Knight brought out an adaptation of it under the title of *The Honest Thieves.*

COM'MODA'TUM. In the Roman law, an informal agreement for the return to the owner of a chattel gratuitously loaned to another. The return of the thing (*res*) loaned, or of its equivalent in quantity and quality, was enforced by a real action. In our law the commodatum has taken its place as a form of bailment (q.v.).

COMMODE, kŏ'mŏd' (Fr., Commodus). A play by Thomas Corneille, played at the Louvre for Louis XIV in 1659.

COMMO'DIA'NUS. A Christian Latin poet, of the third century, supposed to have been of African extraction. His extant poems, *Instructiones per Litteras Versuum Primas* (80 pieces, in acrostic and telestic verse), and the *Carmen Apologeticum,* both of which are aimed against the heathen and the Jews, lack poetic fire and present few attractions as literary productions. Although some attempt is made to imitate the general rhythm of the hexameter, the author in reality employs a peculiar prosody, based partly on accent and partly on syllabic quantity. There is an edition by Dombart (Vienna, 1888), and an English prose translation of the *Instructiones,* in *Ante-Nicene Fathers* (Buffalo, 1886–96). See Teuffel, *History of Latin Literature* (Eng. trans., London, 1892).

COM'MODORE (probably from Sp. *comendador,* It. *comandatore,* OF. *commandeor,* Fr. *commandeur,* commander). Previous to 1862 the courtesy title "commodore" was given to all captains in the United States navy who had commanded a squadron, but no actual rank higher than that of captain existed. In July, 1862, the first captains to hold a higher office were commissioned as commodores. In 1882 the number of commodores on the active list was reduced from 25 to 10, and in 1899 the grade was abolished and the 10 commodores on the list promoted to the rank of rear admiral, the numbers in that grade being increased from 6 to 18. The title is now borne only by certain officers on the retired list and upon their death will become extinct. In the British navy captains having certain important commands are officially styled commodores (as the officer in command of the submarine flotilla), and have an increase of pay while on this duty, but there is no grade of commodore on the British Navy List. See ADMIRAL.

COM'MODUS, LUCIUS ÆLIUS AURELIUS. A Roman Emperor (180–192 A.D.). He was born in 161 A.D. and was the son of Marcus Aurelius Antoninus. Great pains were taken with his education, but to no purpose. When he was

summoned to the throne on his father's death (March 17, 180), he was successfully fighting the Marcomanni and other tribes on the upper Danube, but he hastily concluded a treaty with the barbarians and reached the capital in the autumn. The cruelty to which he was always prone was especially exhibited after a conspiracy by his sister Lucilla against his life had been discovered in 183. Nearly all who had risen to honor during his father's lifetime were sacrificed to appease his jealousy of the good and the great. Gross prodigality also marked his reign. He was proud of his physical strength and exhibited it in gladiatorial combats. For each of these exhibitions he charged the state an enormous sum. He used also to sing, dance, play, act the buffoon, the peddler, or the horse dealer. He demanded to be worshiped as a god and assumed the title of Hercules Romanus. Many unsuccessful plots were devised against his life. Finally, his mistress, Marcia, in concert with the prefect Lætus and the Imperial chamberlain, Eclectus, after they had failed in an attempt to poison him, caused him to be strangled by Narcissus, a famous athlete. The life of Commodus, written by Lampridius, is to be found in the so-called *Augusta Historia*. See AUGUSTAN HISTORY.

COM'MON (OF. *comun*, Fr. *commun*, from Lat. *communis*, OLat. *comoinis*, common). In the law of real property, the right of one person, in common with others, to take a profit, i.e., a thing of value, as the herbage or other produce or minerals or wild animals, from the land of another. The person over whose land the right is exercised may be a private owner or the state. The term is somewhat loosely employed as the equivalent of *profit à prendre* (q.v.); but such a "profit" may be exclusive or "several," in which case it is not properly characterized as a common. Blackstone, however, seems to use the term in this sense, and he enumerates four species of commons, viz., *common of pasture*, or the right of feeding one's beasts on another's land; *common of piscary*, or a liberty of fishing in another man's water; *common of turbary*, a liberty of digging turf upon another's ground; and *common of estovers*, a liberty of taking necessary wood, for the use of furniture of a house or farm, from off another's estate. These rights, with the various other *profits à prendre*, will be considered under that head. See also HEREDITAMENT; INCORPOREAL.

The term is often used to denote the common use of a piece of uninclosed ground possessed by all the inhabitants of a village or hamlet. The right of common is "disturbed," as the legal phrase is, when one who is not possessed of the right unlawfully infringes it, or when one possessed of the right exceeds his lawful use, or where one wrongfully prevents others possessed of the common right from exercising it, as where he incloses the land. In Great Britain the right of common was formerly possessed from time immemorial in almost every village with regard to certain pieces of land which were not held by any owner in fee, but might be fairly considered to belong to the community as a body. Statutes, both public and private, permitted the inclosing of such common land under various conditions, such as the consent of two-thirds of those exercising the right of common. By this legislation, and by acts of usurpation on the part of individuals, much of the common land has been lost; of late years the further inclosure of common land has been to some extent guarded against. In the United States the most frequent use of the term is as a substantive to denote a piece of ground set apart for public uses, such as open-air meetings, reviews, and for the general pleasure of the people at large. See PROPERTY, and the authorities there referred to.

COMMON, DOL. Subtle's mistress, in Ben Jonson's *Alchemist*.

COMMON, TENANCY IN. The most usual form of common ownership of lands or goods. It may be constituted of two or any greater number of persons, who may have equal or unequal shares, and whose titles and interests are distinct although undivided from those of their colleagues. Accordingly, while the tenant in common cannot claim any specific portion of the property as his own, he may, nevertheless, deal freely with his undivided share, alienating or devising it at his pleasure, or he may, by appropriate legal action, compel the partition of the property; whereupon, if it be divisible in fact, his share will be set off to him, as a separate parcel, in severalty. If it be not physically severable—as a mansion or a horse—the courts will direct its sale and the distribution of the proceeds among the several owners in the proportion of their respective interests. If the estate of a tenant in common be of an inheritable nature—as an estate in fee simple—it will, upon his death, descend, like his other real property, to his heirs. In the event of a conveyance or descent of such an interest the new holder simply takes the place of his grantor or ancestor and becomes a tenant in common with the surviving cotenants of the latter.

In its incidents the tenancy in common is at the present time not distinguishable from the estate which arose at common law by the descent of lands to two or more heirs who were entitled to share the estate. (See COPARCENARY.) Indeed, this is now in the United States the more usual method of creating a tenancy in common. It is, however, to be sharply distinguished from the other forms of common ownership, as joint tenancy, tenancy by entireties, and partnership, the two former of which are attended by the incident of survivorship, and the last of which is affected by the peculiar qualities of the partnership relation. In general, all tenants in common of a chattel or an estate are equally entitled to its possession and use, but the tenant for the time being in possession is protected by law from any forcible interference with his possession by his cotenant. The latter must wait for a "convenient" opportunity to secure the possession to which he is equally entitled.

At common law, upon a conveyance of lands to two or more persons without more being said, they took the property as joint tenants, and not as tenants in common. This presumption has generally been reversed by statute in modern times, and now such a grant will vest the property in the grantees as tenants in common, unless the deed declares that they are to take as joint tenants. See OWNERSHIP; PROPERTY; and the authorities there referred to.

COMMON ASSURANCE. The technical description of the ordinary processes for conveying the title to land. The term "assurance" was also employed, without the qualifying adjective, in such phrases as "a covenant to make further assurance" (meaning a covenant to protect the title conveyed by making or procuring the making of any further instrument which might be

necessary for that purpose), but the instrument or act of conveyance itself was always described as a common assurance. Blackstone defines common assurances as the legal evidences of the translation or transfer of real property, and comprehends under that description the four following modes of alienation: (1) by matter *in pais* or by deed; (2) by matter of record, or an assurance transacted in the King's public courts of record; (3) by special custom obtaining in some particular places and relating only to some particular species of property; (4) by devise.

By *matter in pais* is meant a transaction to be evidenced by witnesses before a jury, and it has reference to the old common-law method of conveyance by feoffment or livery of seisin. The deed referred to is the deed of grant, which has in modern times come to supersede most of the other modes of transfer. Alienation by *matter of record* includes assurance by private acts of Parliament, the King's grants, and the awkward processes by fictitious suit, known as common recovery and fine. Under alienation by *special custom*, Blackstone describes only the peculiar mode of conveyance "by surrender and admittance," whereby copyhold lands were transferred. *Devise* was employed in the same sense as that which it now bears, and included any gift of land, present or future, or of any interest in land, by last will and testament.

It will be noticed that these four modes of conveyance comprehend every form of voluntary alienation of real property, only involuntary alienations, as by forfeiture, escheat, bankruptcy, eminent domain, and the like, and the transmission of lands by descent, being omitted from the category of common assurances. See ALIENATION; CONVEYANCE; TITLE; and the names of the various common assurances referred to above. Consult the *Commentaries* of Blackstone, Stephen, and Kent, and the authorities referred to under CONVEYANCING and TITLE.

COMMON BENCH. The earlier name of the English Court of Common Pleas. See COMMON PLEAS, COURT OF.

COMMON CARRIER. See CARRIER, COMMON.

COMMON COUNCIL. The name usually applied to the local legislature in American cities. Usually a legislative body, so called, consists of only one chamber, but the term may be applied to a bicameral body as well as to one chamber in a bicameral assembly.

COMMON COUNTS. In law, in general, technical forms for stating a cause of action, used particularly in assumpsit (q.v.), in order to take advantage of proof which might vary from the particular facts and circumstances alleged and yet justify a recovery. Common counts were founded on an express or implied promise to pay money. Those in most general use were known as counts for "goods sold and delivered," "work, labor, and services," "money paid," "money had and received," "money lent," "account stated," and "use and occupation." Their names are somewhat descriptive of their purposes; thus, under the count "money had and received" the plaintiff could prove any circumstances under which the defendant received money which in law he ought to pay or return to the plaintiff. The money may have been obtained by fraud, but a fictitious promise to pay could be alleged, the fraud proved, and it was held the law implied a promise to pay on the part of the defendant. The common counts originated in England, but were abolished, together with all ancient forms of action, by the Judicature Acts. In the United States they are still used in some of the States where common-law pleading is retained, but in most States simpler and less technical forms of pleading have been substituted. See COMMON FORMS; PLEADING.

COM'MONER. In England, a term applied to all citizens except the hereditary nobility. John Hampden was called the "great commoner," and the title was also given to the elder Pitt before he was created Earl of Chatham. In Oxford University students of the second class who pay board are called "commoners," ranking between gentlemen commoners and bursars.

COMMON FEELING. See COMMON SENSATION.

COMMON FIELD SYSTEM. See OPEN FIELD SYSTEM.

COMMON FORMS. In law, the forms of personal actions in common-law pleading (each action having a general form of declaration or complaint), the allegations in which were usually fictitious, but which had a recognized meaning and which would be supported by a certain line of proof. Thus, in the action of trover (Fr. *trouver*, to find) it was alleged that the plaintiff lost a chattel and that the defendant found it, and this allegation could not be traversed or denied by the plaintiff, but plaintiff could prove any facts which in law would entitle him to the chattel and disregard the fiction of finding. These forms of pleading originated in the feudal period in England, and they arose out of the practice of granting a writ for trying the justice of some complaint for the redress of which there was no other provision in the law. The following forms of action were in general use: assumpsit, covenant, debt, detinue, replevin, trespass, trespass on the case, and trover (qq.v.). These forms were generally adopted in the United States, but have now in most of the States been superseded by simpler and less technical forms of action, usually through the enactment of codes of civil procedure. They have also been abolished in England by the Judicature Acts. See COMMON COUNTS; PLEADING.

COMMON LAW. The great body of English unwritten law (from which also is, in the main, derived the common law of the English colonies and of the United States), as distinguished from written or statutory law, from the Roman civil law, from international law, and from the systems of law administered by courts of equity and admiralty courts. Blackstone divides the civil law of England into the *lex scripta*, or statute law, and *lex non scripta*, or common law, and defines the latter as consisting of general customs, of particular customs prevailing in certain districts, and of certain laws used in particular courts. Common law is based primarily on customs growing out of the united wisdom and experience of mankind; these customs in time become recognized as reasonable, consistent, and established, are sanctioned by the courts, and are interpreted and made binding by the decisions of the final courts of appeal. While continental countries generally follow the carefully classified and codified system of the Roman civil law, the common law of England was a growth, gradual and in its origin complex—derived from the customs and precedents of Anglo-Saxons, of Normans, of the united England which followed the Norman rule, and including also some prin-

ciples and practices derived through various sources from the Roman law itself. It must be remembered that even at the time of the Norman Conquest England had a definitely established, though, of course, crude, legal system, and on that system much of the common law, though perhaps not the greater part, rests.

From its nature the common law cannot be sought in any one book or digest; its principles are discussed in the treatises of innumerable writers of textbooks and commentaries and in the records of the decisions of the courts. Commentators cannot make law, but they may discuss and record it. The real oracle of the common law is the judge, who considers and weighs precedents, measures them by the standard of reason and public policy, and sets finally the seal of authority upon them by his decision. Great importance, therefore, is attached to precedent in ascertaining the principles of the common law; it was, it is conceded, because too much importance was attached to precedent that, side by side with the system of common law, grew up, to correct and supplement it, a system of equity law. (See EQUITY.) On the other hand, the greatest jurists of the English bench have most widely recognized the fact that precedent must be tempered by reason. Lord Mansfield more than any other one judge, enlarged in this way the interpretation and application of common-law principles, insomuch that he was accused of assuming legislative rather than judicial powers. But there can be no question that his view, carried out with unswerving devotion to natural justice, to the necessities of growing and changing mercantile and legal conditions, and to the true fundamental principle of precedents, did much to make the administration of law in England pliable and efficient. We may illustrate the manner in which common custom became common law by citing the recognition by courts of the already long-established principle of primogeniture; of the similar recognition of the fact that the validity of a deed depends on its being sealed and delivered; of the recognition of the principle that wills should be less strictly construed than deeds; of the sanctioning the already existing mercantile custom that three days of grace should be given in payment of notes and bills. In all these cases the law did not make the custom or principle, but found it ready made to hand, recognized its convenience and usefulness, and sanctioned it by judicial authority.

Though based so firmly on custom and precedents, the common law is not totally inelastic. The continual growth of modern civilization, the progress of invention and manufactures, and the increased complexity of business—all have demanded from the common law recognition and an adaptation of the law to the conditions of the time. The rule generally followed as to precedents is that the courts shall always "abide by former precedents where the same points come again into litigation." But the decision of one of two courts of concurrent jurisdiction does not necessarily bind the other, nor will a new decision by a court of appeal always be supported by that very court in subsequent cases. It follows, therefore, that often precedents almost equal in number and authority may be quoted on both sides of a given question, and in such a case the power and authority of the court appealed to are called upon to decide as is consonant with justice and reason. In the United States, as each State has a final court of appeal, and as theoretically they are of equal authority, such a contradiction of precedents and decisions is frequent.

It is sometimes said that the United States, considered as one body politic, has no common law. It would, perhaps, be more accurate to say that, owing to the restricted character of the jurisdiction of the Federal courts, its common law is more indefinite and less completely developed than is that of the several States. This is largely due to the fact that, by Act of Congress, the Federal courts, when acting as common-law courts, are required generally, though not invariably, to follow the common law as it stands in the particular State where the action arises. As for the States themselves, the common law of England, as it existed at the time of the Revolution, together with such of its statutes as reasonably applied to the colonies, became at that time the common law of the States. In the United States, as in England, of course, the body of the common law has developed with growing industrial conditions, and has, on the other hand, been from time to time restricted by statutes of the States or of the United States. What we have said in regard to the common law of the States has one exception—Louisiana, which, when ceded to this country, retained in the main the system of French civil law already existing. The common law on a given point is always superseded by a statute covering that point. Thus, in the United States the order of authority of law is: the Federal Constitution; treaties with foreign powers; and acts of Congress; the constitution of the State; the statutes of the State; and finally the common law. When a statute is rescinded, the common law on that point again becomes of force, unless there be an older unrescinded statute, in which case that revives. For a sketch of common-law courts, pleading, etc., see COURT; PLEADING; ETC.

Bibliography. Consult: The commentaries of Blackstone, of Kent, of Stephen (13th ed., London, 1899), of Broom (9th ed., London, 1896); Coke, *First Part of the Institutes of the Laws of England; or a Commentary upon Littleton* (any edition); Pollock and Maitland, *History of the Laws of England* (2d ed., Boston, 1899); Stephen, *History of the Criminal Law of England* (London, 1883). For a statement of the elementary principles of the common law, consult Robinson, *Elementary Law* (Boston, 1882), and Minor, *Institutes of Common and Statute Law* (2d ed., Richmond, 1876–79).

COMMONPLACE BOOK. A sort of scrapbook for jotting down memoranda, occasional thoughts, or ideas for subsequent development. Southey, Dickens, and Charles Reade, among others, kept commonplace books, of which they made much use.

COMMON PLEA. A civil action between individuals, as distinguished from criminal proceedings, or other cases to which the government is a party. See CIVIL ACTION; PROSECUTION; COMMON PLEAS, COURT OF.

COMMON PLEAS, COURT OF. One of the great historic tribunals of the common law in England. It was instituted, as a separate jurisdiction, in the reign of Henry III, under the name of the Court of Common Bench, but its real origin lies further back, in the provision of Magna Charta that common pleas (*communia placita*) should no longer follow the

King's Court (*Curia Regis*) in its wanderings over the kingdom, but should be held in a fixed place (Magna Charta, 1217 s. 17). The rapid rise in power and influence of the court held by the King in person, or by his judges who attended him, combined with the necessity of bringing all causes, whether of a public or private nature, to the attention of a constantly moving court, constituted, for private suitors, a grave abuse. This was remedied by definitely establishing at Westminster, under the provision of the charter above referred to, a sufficient number of justices and barons of the King's Court to hear the private causes (common pleas) which could not conveniently follow the royal progresses. From this beginning down to the reform of the English judicature in 1875, the Court of Common Pleas at Westminster, as it was commonly called, shared with the Court of King's Bench the greater part of the common-law jurisdiction of England.

As distinguished from the King's Bench, the Court of Common Pleas was, as its title would seem to suggest, the popular and common court of the kingdom, having exclusive jurisdiction in all real actions, or suits relating to land, and in actions between private persons to try private rights; while the King's Bench was, for a long time at least, limited to pleas of the crown, i.e., public causes, and appeals from county courts and other inferior jurisdictions. This division of business threw upon the Common Bench the great mass of litigation, so that Sir Edward Coke called it "the lock and key of the common law," and Sir Orlando Bridgman described it as "the common shop for justice." The court was composed of a chief justice and as many common (or *puisne*) justices as the business of the court required. The number of these varied at different periods from four to eight. It was abolished by the Judicature Acts, 1873–75, and its functions transferred to the High Court of Judicature. See CURIA REGIS; COURT; EXCHEQUER; KING'S BENCH. The origin and history of the English courts of justice are concisely and accurately described by Inderwick, *The King's Peace: A Historical Sketch of English Law Courts* (London, and New York, 1895).

COMMON PRAYER BOOK. See PRAYER BOOK.

COMMON RECOVERY. At common law, a mode of alienation, or process for conveying land, through the medium of a fictitious suit in the superior courts of law. There is no reason to doubt the tradition, to which Blackstone has given the weight of his authority, that this method of conveyance was "invented by the ecclesiastics to elude the statutes of mortmain." Being incapable of taking land by feoffment or deed, there was nothing to prevent them from bringing a suit for the recovery of the land of a collusive donor, alleging that the title was in them, and if he thereupon made default, the judgment of the court in their favor operated to vest the title conclusively in them. In form it was a judicial determination that they were the owners of the land as against the defendant. In effect it was a device for enabling the defendant to transfer his interest in the land to them. Blackstone says, further, that after the invention of common recoveries they "were encouraged by the finesse of the courts of law in 12 Edw. IV in order to put an end to all fettered inheritances, and bar not only estates tail, but also all remainders and reversions expectant thereon." This refers to the famous struggle between the great landowners, seeking to tie up their estates in their families by entailing them on their issue and making them inalienable, and the lawyers and law courts, who aimed, in the interests of public policy, to defeat the attempt. The statute *De Donis Conditionalibus* (known also as the Statute of Westminster II), enacted by Parliament in 13 Edw. I (1285), provided that lands given to a man and the heirs of his body, known as conditional gifts, should not be alienable so as to defeat the inheritance of the issue therein nor so as to cut off the interests of those to whom the estate was to go upon the failure of such issue.

Several devices were tried to avoid the statute and break entails, but none of them was entirely successful until the year mentioned by Blackstone, 12 Edw. IV (1473), when, in the famous "Taltarum's Case," a common recovery was employed for the purpose. This proved to be entirely successful in barring the claims of the heir upon whom the lands were entailed, and, by a subsequent development of the action, all remainders and reversions dependent upon the fee tail were also cut off.

The process was too difficult and technical to be set forth at length here, but it may be briefly described as a collusive and fictitious suit, instituted by the person to whom the fee was to be conveyed (called the demandant) against the one who desired to bar the entail and convey the land (known as the tenant), by suing out a writ called a *præcipe quod reddat*, in which the demandant alleged that the tenant had no legal title to the land and that he, the demandant, had been turned out of it. The tenant defended the suit, but at a subsequent stage of the proceedings—which were in part conducted in open court—disappeared and had judgment rendered against him by default, and the lands were thus "recovered" by the demandant. This recovery, being a supposed adjudication of the rights of the parties, bound all persons and vested a free and absolute fee simple in the recoverer. The process was known as "suffering a common recovery." A similar but less difficult and somewhat less efficacious proceeding was known as "levying a fine." The fine was by statute, in the reign of Henry VIII, substituted for the more cumbrous and expensive common recovery as a means of barring entails, and both have now been superseded by simpler and more modern conveyances. Recoveries were occasionally employed in the early history of some of the United States, but are now everywhere obsolete, and in some States expressly abolished by statute. See FINE; COMMON ASSURANCE; CONVEYANCE; TITLE. The common recovery is fully described by Blackstone, *Commentaries on the Laws of England*, bk. ii, chap. 21. See also: Pigot, *Treatise of Common Recoveries: Their Nature and Use* (Dublin, 1792); Digby, *An Introduction to the History of the Law of Real Property* (5th ed., Oxford, Eng., 1900); Leake, *Elementary Digest of the Law of Property in Land* (London, 1874).

COMMONS. A name given to meals provided in English colleges and inns of court for their members. It is used occasionally in the United States for the college dining room when that is under college control.

COMMONS, House of. See Parliament.

COMMONS, John Rogers (1862–). An American economist, born in Hollandsburg, Ohio. He graduated at Oberlin College in 1888 and studied at Johns Hopkins University; taught economics at Wesleyan (1890), and sociology at Oberlin (1892), Indiana University (1893–95), and Syracuse University (1895–99); and in 1904 became professor of political economy in the University of Wisconsin and director of the American Bureau of Industrial Research. In 1911 he was appointed a member of the Wisconsin Industrial Commission; and in 1913 he published a report of the work of the Milwaukee Bureau of Economy and Efficiency. He wrote: *The Distribution of Wealth* (1893); *Proportional Representation* (1896; revised, 1907); *Trade Unionism and Labor Problems* (1905); *Races and Immigrants in America* (1907); *Labor and Administration* (1913). He was one of the editors of *A Documentary History of American Industrial Society* (1910).

COMMON SCHOOLS. Since instruction has, at least in modern times, been provided for the great majority of the people, the term "common schools" implies that the schools are for the masses of the people, or, where class distinctions are drawn, for the common people. The term, as used in the United States, implies, as well, that such schools are supported and controlled by the people and charge no tuition. The latter characteristic is now true for the most part of the common schools of Europe. The details of all such systems of schools are given in the article on National Education, Systems of.

Previous to the beginning of modern history no people ever contemplated the education of the masses, though with most ancient peoples, as well as during the greater part of the Middle Ages, there were schools that provided the rudiments of education for a limited class. With the Greeks and Romans this class was not a special educational class, the priesthood, as with most other ancient peoples, but included all those entitled to full citizenship. At Athens the elementary schools were private and taught gymnastics and music, the latter including reading and writing. At Rome the elementary schools were introduced at a much later date than at Athens, were also private, and gave instruction in reading, writing, and calculation. During the Middle Ages such educational efforts as were made were wholly under the auspices of the church. Schools were established and maintained by the church, until the Renaissance of the twelfth century. The mediæval schools were either singing or grammar schools. The former were the elementary schools and were designed primarily for training boys to assist in the church service. A rudimentary knowledge of reading, and often of writing, Latin, as well as instruction in singing, was given. Such schools were very numerous before the Reformation, but how numerous or how extensive is a question which research in educational history has not yet determined. In the large commercial and industrial cities of northern Europe private schools for teaching the three R's and some commercial subjects sprang up in the thirteenth and fourteenth centuries. But it is certain that after the Reformation a new impetus was given, both in Protestant and Catholic countries, to the establishment of common schools—in the one case by church and state, in the other by new teaching orders.

Until the middle of the eighteenth century the common schools still remained almost entirely under ecclesiastical direction. Later they were secularized, and attendance made compulsory. This was first accomplished on a large scale by Prussia in the latter half of the eighteenth century. In France the system of public elementary schools under the control of the state has been developed since 1833. In Scotland common schools have existed very generally since the latter part of the seventeenth century, though it was not until 1872 that these were placed entirely under the control of the state and attendance made compulsory. English common schools on any extensive scale date from the opening of the nineteenth century, and only since 1870 has there been any concerted governmental effort towards building up a common-school system.

In the United States common schools were early established in most of the colonies. Often these were private schools taught by some woman as a means of support. They were consequently called, as in England, dame schools, or sometimes, from the place where held, kitchen schools. The early colonists, however, gave greater attention to the founding of secondary or grammar schools as being of more immediate importance in the education of a ministry, this forming the chief motive to an education with them. In 1642 Massachusetts required that every township containing 50 families should have a school for all the children, the tuition to be paid either by their parents or by general provision. While in New England such common schools became free in the sense of charging no tuition during the latter part of the seventeenth century, in most of the United States the free common school is a development of the second quarter of the nineteenth century. During and since that time the system of free common schools has been systematically extended throughout all the States and Territories, and the course of instruction has been greatly enlarged. As each State has control of its own schools, there is great variety in the details of their management, but the following leading principles are the same in all: (1) a system of graded schools, embracing primary, grammar, and high schools; (2) State superintendents, who determine by examinations the qualifications of the teachers and watch over the efficiency of the instruction given; (3) uniformity of textbooks; (4) public examinations; (5) school libraries and illustrative apparatus, and in many cases textbooks supplied at public expense; (6) improved construction and furnishing of schoolhouses; (7) access to the school for all children of suitable age; (8) normal schools for the training of teachers. Some of the States have funds to aid them in supporting their schools. In the West these funds are generally large, arising from the sale of lands granted by the general government and in some instances also by the State. Such grants by the United States for school purposes amount to 68,000,000 acres, valued at more than $100,000,000. Before the Civil War there was no general and well-ordered system of common schools in the Southern States. But in their new constitutions they have made pro-

vision for them and are now pressing forward the work. In 1867 a National Bureau of Education (see EDUCATION, COMMISSIONER OF) was established by Congress for the purpose of collecting statistics and diffusing information on the whole subject, so as to aid the people of the United States in the adoption and support of the best school systems and to advance in other ways the cause of education throughout the land.

While the Massachusetts school law of 1647 had a compulsory feature, no effective system of compulsory education was ever adopted in the United States before the reform in Massachusetts that resulted from the efforts of Horace Mann (q.v.). At present (1914), 42 States, and the District of Colombia, the exceptions being in the South, have laws making education compulsory, either at a public or an approved private school. In 1910–11 there were 18,035,118 children enrolled in the common schools of the United States, out of a total of 19,636,230 enrolled in all the schools. The enrollment in the common schools is about 73 out of every 100 children of school age. The average length of the period of attendance was 101.8 days out of a total length of 156.8 days for the school term. There were more than 533,500 teachers engaged in the common schools, and the total expense of such schools was $446,726,929. See EDUCATION; NATIONAL EDUCATION, SYSTEMS OF.

COMMON SCOLD. One who, by the practice of habitual scolding, disturbs the peace of the neighborhood. Scolding, in itself, is not obnoxious to the law, and, so long as it is confined to the domestic hearth, it is *damnum absque injuria*, no matter how persistent and violent it may be. It is only when the practice is indulged in public and with such frequency and under such circumstances as to threaten a breach of the peace that it becomes a public nuisance and punishable as such. The common law took cognizance of the offense and resorted to various devices, mostly of an unpleasant nature, for the punishment of those convicted of it. Among these punishments were the stocks (q.v.), the ducking stool (q.v.), and the branks (q.v.), the last named being, during the period of its application, the most efficacious. The practice of punishing common scolds survives, sporadically, in the United States, in some of which it is recognized in the penal statutes, but the punishment has been mitigated to fine and imprisonment. Consult the authorities referred to under the title CRIMINAL LAW.

COMMON SENSATION, or COMMON FEELING. A collective name for the sensations which make up our general sense of bodily health or ill health, well-being or ill-being. It includes, e.g., the diffused sensations of the tactual sense: shuddering, shivering, tingling, tickling, creeping, goose flesh, pricking, pins and needles; sensations which can in many cases be set up as concomitant sensations to squeaking or sawing noises and the like. (See references under ANTIPATHY.) It includes, further, dizziness (see STATIC SENSE); the sensations of muscular exertion and fatigue; and the muscular and organic pains. Indeed, on the theory that pain is aroused by overintensive stimulation of any and every sensory nerve (Wundt, *Phys. Psych.*, 1910), pain would be, literally, a sensation "common" to the whole sensitive organism. Sometimes the two sensations of temperature are called common or general sensations; and the alimentary sensations of hunger, thirst, and nausea, as well as the respiratory sensations of stuffiness, of a "bracing" air, etc., are also covered by the term. It is clear that the phrases "common sensation," "common feeling," "general sense," belong to a psychology that had not yet succeeded in analyzing the more massive complexes of organic sensations and in referring them to specific organs within the body. In the present state of our knowledge there is no reason for their retention. Consult Kuelpe, *Outlines of Psychology* (London, 1909), and Titchener, *Text-Book of Psychology* (New York, 1910). See CUTANEOUS SENSATION; ORGANIC SENSATION.

COMMON SENSE. A pamphlet by Thomas Paine, published in Philadelphia, 1776, advocating the separation of the United States from England. It was thought of sufficient importance at the time to receive public notice from General Washington.

COMMON SENSE, THE PHILOSOPHY OF. There are certain beliefs that have been supposed to be current among men in all ages. Of these, illustrations are found in the belief in an external, material world, independent of any mind to perceive it, in the universality of causality, and in the eternal obligation of morality. Every man of common sense, it is held, shares such beliefs. The philosophical acceptance of these beliefs as self-evident and beyond the reach of criticism is called commonsense philosophy. (See also DOGMATISM.) Thomas Reid (q.v.) was the most distinguished advocate of common sense as the final court of appeal on all matters philosophical, and he has been generally followed more or less closely by the philosophers of the Scottish school. (See SCOTTISH SCHOOL OF PHILOSOPHY.) The untenability of this position is realized as soon as it is recognized that common opinion has often been shown to be mistaken. Common sense is the starting point of philosophy, but not its final arbiter. And yet we find in the history of philosophy that there is a strong tendency, on the part even of independent thinkers, to make their views appear as those of the ordinary man. Thus Berkeley (q.v.) claimed that his idealism was in accord with common sense. This constant attempt of the philosopher to square himself with common sense shows the strong hold that popular belief has even upon the most original thinkers. Consult: Seth, *Scottish Philosophy* (Edinburgh and London, 1890); McCosh, *Scottish Philosophy from Hutcheson to Hamilton* (London and New York, 1875); Sidgwick, "The Philosophy of Common Sense," in *Mind*, N. S., vol. iv (London, 1895). See KNOWLEDGE, THEORY OF.

COMMON TIME. See TIME.

COM'MONWEALTH' OF AUSTRA'LIA. The federal union of the self-governing states of Australia, set up by Act of Parliament July 9, 1900, and proclaimed at Sydney, Jan. 1, 1901. See AUSTRALIAN FEDERATION.

COMMONWEALTH OF ENGLAND. The official designation of the government of England from the abolition of the monarchy, February, 1649, until the establishment of Cromwell's Protectorate, December, 1653. The title is generally applied to the whole period dating from the death of Charles I, Jan. 30, 1649, to

the restoration of Charles II, May 29, 1660. See CROMWELL, OLIVER.

COMMUNE' (Fr., district, from ML. *communa, communia,* district, from Lat. *communis,* common). The smallest administrative division of France and the unit of local self-government. The commune is a legal body and can buy and sell property, contract debts, and appear in the courts. The chief magistrate is the *maire* (mayor), who is assisted by one or more deputies and a deliberative assembly, called the *conseil municipal.* The *maire* unites in himself two general classes of functions resulting from the twofold nature of the commune. As the agent of the national government, he is charged with the local promulgation and enforcement of laws and decrees; and, as a member of the municipality, he has to attend to the police, the revenue, and the public works of the commune, and in general to act as the representative of the corporation. In communes which rank as the administrative centres of a department, arrondissement, or canton, or which have a population of more than 3000, the *maire* is nominated by the central government; elsewhere the appointment is made by the prefect of the department. The councilors are elected by the votes of the communal electors and hold office for five years.

COMMUNE. A term applied in feudal times to a body of burghers holding a charter granting them certain privileges of self-government. These communes were found in France, England, Italy, and elsewhere. On the character of these mediæval communes, consult Schröder, *Lehrbuch der deutschen Rechtsgeschichte* (Leipzig, 1907).

Commune of Paris (1792). The revolutionary municipal government established in Paris in August, 1792. It acquired immediate ascendancy in the Assembly, through the personal pressure its leaders could bring to bear, and as its power increased it became more and more the instrument of the violent element of the Revolution and dictated the policy of France. Its history became the history of the Revolution itself. On this commune consult Morse-Stephens, *History of the French Revolution,* vol. ii.

Commune of Paris (1871). This is commonly referred to when the term is used without qualification. It was the insurrectionary body, or organized mob, which was in possession and control of Paris from March 18 to May 27. The German army of occupation left Paris March 3, and almost immediately signs of revolt appeared. On the 18th the Reds, as the Communists were called, with the encouragement of the Internationale (q.v.), rose against the French regular troops and, supported by the National Guard, took possession of the city. Generals Lecomte and Clément Thomas were shot. Communal elections were held, and the authority of the National Assembly, which was sitting at Versailles, was declared null. Peace negotiations with Germany were held in abeyance until the new national government could establish its authority in France, and it was intimated that Germany might find it necessary to reoccupy the abandoned fortresses. Large bodies of the French prisoners held by Germany were released to reinforce the army at the disposal of the government for the suppression of the insurrection. The army was thus raised to 150,000 men, and on April 6 active operations were begun by the government forces under Marshal MacMahon, for the capture of Paris. The military administration of the Commune was notoriously incompetent, and insubordination and debauchery rendered the forces inefficient, but the available number of the National Guard approximated 100,000, and they were well armed and possessed strong fortifications, the reduction of which was not a light task. The siege of the city was pushed with energy, for the credit of the new Republican government of France before the world hung upon its ability to maintain its authority. Before the middle of May it became evident that the Commune could not hold out much longer, and its followers began to resort to acts of vandalism. The residence and library of Thiers were destroyed, and the Vendôme Column pulled down. The government forces penetrated the defenses of the city on May 21 and obtained possession of Montmartre and now was enacted that saturnalia of violence and crime which has made the name of the Commune infamous. On May 24 the Communists set fire to the public buildings, the palace of the Tuileries being destroyed. On the same day a large number of hostages, including M. Darboy, Archbishop of Paris, were massacred. On May 27 the last hand-to-hand struggle, without quarter, was fought in the cemetery of Père-Lachaise. On the following day all resistance came to an end, and the reign of the Commune was closed. The Communal Council, the governing body of the Commune, was organized in 10 committees, of which that for finance was the most efficient. At the head was a general executive committee, the authority of which was never great. It was displaced by a committee of public safety, which was expected to exercise dictatorial power, like its Revolutionary prototype; but this, too, proved a failure. The Commune was essentially lawless. Many of those who initiated the movement were honest theorists and enthusiasts, but the forces they called into action were entirely beyond their control. There is no scientific history of the Commune. The principal work is Du Camp, *Les convulsions de Paris* (4 vols., Paris, 1878–79), conservative. Of Communist sympathies are Arnould, *Histoire populaire et parlementaire de la Commune de Paris* (3 vols., Brussels, 1878), and Lissagaray, *Histoire de la Commune* (last ed., Paris, 1896); there is an English translation by Aveling of an earlier edition (1886). Consult also Washburne, *Recollections of a Minister to France* (2 vols., New York, 1887); Simon, *The Government of M. Thiers* (2 vols., ib., 1878); Fetridge, *Rise and Fall of the Paris Commune of 1871* (ib., 1871); March, *History of the Commune of 1871* (London, 1896); Margueritte, *La commune* (Paris, 1904). See FRANCE; FRANCO-GERMAN WAR.

COMMU'NICA'TIO ID'IOM'ATUM (Lat., communication of peculiar properties). A term of ancient, and also of Lutheran, Christology, denoting that each of the two natures of Christ, divine and human, imparts its peculiar properties to the other, so that the properties of the divine Word can be ascribed to the human Christ, and the human properties to the divine Christ. Consult Thomasius, *Die Christliche Dogmengeschichte,* vol. ii (Erlangen, 1874–76). See CHRISTOLOGY.

COMMUNICATION, CONFIDENTIAL OR PRIVILEGED. See PRIVILEGED COMMUNICATION.

COMMU'NION (Lat. *communio*, participation, from *communis*, common). In ecclesiastical language, that relation, involving mutual claims and duties, in which those stand who are united by uniformity of belief in one religious body or church. To exclude from this relation and its involved rights is to *excommunicate*. The most visible symbol of this relation being the partaking together of the Lord's Supper, that rite is often called the Communion. See LORD'S SUPPER; and, for communion table, ALTAR.

COMMUNION IN BOTH KINDS. A term of theology, implying that, in the celebration of the Lord's Supper, communicants partake of both the bread and the wine. It is universally acknowledged that in the primitive Church both the bread and the cup were distributed to all who communed. Sects which, like the Manichæans, discarded the wine, were condemned as irregular. Early popes commanded the use of both kinds (e.g., Gelasius I, 492–496). As, however, there was frequent occasion to carry the consecrated elements from the church to sick persons at their homes, it became customary, for convenience, to dip the bread in the wine, administering in this way both in one. As early as the third century communion of the sick seems to have often been with bread only. In the thirteenth century Robert Pulleyn, of Oxford, approved the custom of giving to the laity the bread only, in order, as was said, to avoid the danger of spilling the wine. This view was adopted by the scholastic theologians, who taught that Christ was wholly present in the sacrament under either form, and that, consequently, one form was sufficient for a valid observance of it. Thomas Aquinas and Bonaventura, especially, advocated the administration of the communion under one form only. As this view predominated in the course of time, it became the practice of the Church in the West to withhold the cup from the laity. Against this the heretics of the Middle Ages, as the Waldenses, and especially the Hussite sect of Calixtines (Utraquists), protested, but the Council of Constance defended the custom. The Protestant churches were united in regarding the communion in both kinds as essential to the right observance of the ordinance. The practice of the Roman Catholic church was confirmed and made binding by the Council of Trent in 1563. It is defended on the ground that the cup is not necessary to the completeness of the sacrament. Since the whole Christ, as to His body, soul, and divinity, is not only in each species, but in every particle of both, he who receives the consecrated bread receives the whole Christ. See LORD'S SUPPER.

COM'MUNISM (Fr. *communisme*, from *commun*, joint, common, from Lat. *communis*, common). A system of society in which private property, at any rate, in the means of production is abolished and all or practically all goods are held in common, the needs of each individual being supplied from public sources. Communism, in its broadest sense, is the economic basis of socialism (q.v.). It is also the economic basis of anarchism (q.v.). The term is, however, usually restricted to various non-political communities organized on a basis of common ownership and to the principles upon which they rest. Communism in this sense was an early form of economic organization; in most parts of the world it probably antedated private property and still survives in many primitive societies. The Russian Mir is in large measure a communistic organization. Primitive communism was often kept alive, after the introduction of private property, by religious organizations. In ancient Palestine the Essenes and Therapeutæ held property in common. Much is said about the communism of the early Christians. A certain degree of it existed, but it seems not to have been universal, many Christians retaining their private property. In any case the institution did not long endure. The ascetic tendencies which often manifested themselves in communistic forms among heretical and orthodox sects were introduced into the West from the East. Before an inquisition at Turin in 1030 a heretic declared: "We hold all our goods in common with all men." Other heretical sects, the Catharists (eleventh century) and the Apostles (thirteenth century), held similar views. The Brothers and Sisters of the Free Spirit held that, before the fall, men were like God, that paradise must be reintroduced with community of goods and of women. Many evil stories are told of their proceedings, and they were opposed by the Inquisition, but spread in secret during the fourteenth and fifteenth centuries. With these may be compared the Adamites of the fifteenth century. The great monastic orders also present many communistic traits.

During the fifteenth and sixteenth centuries the Taborites (Hussites), the Moravians, and the Anabaptists arose and flourished in succession in central Europe. (For detailed descriptions, the reader is referred to separate articles under these heads.) The teachings of the Anabaptists were embodied, in Thuringia, in a popular movement to realize a state without government, law, or property, each to receive according to need, "omnia simul communia." This and the attempt at Münster to establish the new Zion were forcibly put down. Communistic societies with a religious basis were formed in considerable numbers in eighteenth-century Europe and became still more numerous in the nineteenth century, especially in America, many of them still surviving. The later communities, however, drew their inspiration from the philosophic social reformers, or Utopists, as well as from religion.

Of philosophic utopianism the first important example is the ideal republic of Plato. In Plato's state political functions were to be restricted to the two upper classes, the philosophers and the guardians. Among these Plato proposed that community of wives and wealth should be the rule, in order that the disorders attendant upon a régime of private interest might be obviated. Plato's scheme was far from communism in its present meaning, since the middle class of traders and artisans were to retain private property and the institution of the monogamic family, and since it premised the existence of slavery. Its influence upon modern communism was exerted through the work of Plato's imitators, Sir Thomas More and Thomas Campanella. More, influenced by Plato, proposed to retain slavery, the slaves being chiefly convicted criminals. There should be community of goods; every one should be supplied from the state storehouses. Monogamy is prescribed, and the greatest freedom allowed the individual families. Men and women are to work six hours per day. The title of More's book *Utopia* has given the name to all such pro-

posals. More has been followed by many writers. Campanella (*Civitas Solis*, Frankfort, 1623) advocated community of goods and of women, with universal duty to labor four hours a day, each person to be provided according to need. Vairasse (*Histoire des Severambes*, 1677) proposed an eight-hour working day. Among the most interested Utopistic efforts is the charming story by Cabet, *Voyage en Icarie* (1842), in which monogamy is preserved, each person working according to ability and receiving an equal reward. Cabet's attempts to realize his dreams will be mentioned later. Bellamy (*Looking Backward*, 1888) advocated wages in the form of annual credits at the public warehouse, at which goods are sold according to the quantity of labor required in their production. Hertzka (*Freiland*, Leipzig, 1890) and Sheldon (*In His Steps*, 1899) may also be classed here, as well as H. G. Wells, *A Modern Utopia* (1905). The work of Wells is especially interesting in that it represents a reaction towards an aristocratic communism. Administrative functions, in Wells's scheme, are concentrated in a body of "Samurai," bearing important analogies to Plato's upper classes of philosophers and guardians.

Mention should also be made of certain critics of the system of private enterprise who proposed communism as a remedy for its evils, although they did not elaborate ideal plans of social reorganization. Among these was Meslier (1664–1729). In his *Testament* (published in 1864) Meslier described society as a product of force, and its evils as the results, largely, of private property. The various parishes should form large families bound mutually to assist one another, each individual to have according to his needs. Morelly (*Code de la Nature*, 1755) advocated communities of about 1000 persons with common goods and distribution according to need.

The Utopists were essentially romancers and made no effort towards the realization of their ideals in practical institutions. A practical movement in the direction of communism was instituted in France by Saint-Simon and Fourier. Fourier's plan of organization, while providing for life and labor in common, sought to preserve the essentials of private property. With Louis Blanc, French communism assumed practically the character of socialism, relying upon the state rather than upon coöperative effort to effect social reform.

Among the leaders of the communistic movement in the early nineteenth century perhaps the greatest was Robert Owen. At the outset of his career Owen was merely a philanthropic manufacturer who believed that the lot of the worker could be rendered quite tolerable at no ultimate cost to other classes in society. Later he was forced to the conclusion that reforms under the existing economic system could give only temporary relief, and advocated the formation of coöperative groups of 500 to 1000 persons, owning land and tools in common and sharing the products of labor according to need. Such groups, or colonies, he believed, would be so efficient, and life in them would be so agreeable, that all workmen would desert to them, and the existing industrial system would break down of itself. In 1819 he attempted to start such a colony at Motherwell, but the funds were not sufficient. In 1824 Owen came to America, where his presence did much to start a wave of communistic thought, and where some 14 colonies were planted, none of which lasted more than a few years. During his absence (1826) some of his friends purchased 291 acres of land at Orbiston, near Glasgow, and built a large building in which all should live, each sharing in the division according to his labors. The death of one of the founders, with other difficulties, brought an end to the plan. Similar colonies at Rahaline, in the thirties, and Queenswood (1841) likewise failed, the latter after five years' existence.

Communistic Societies in America. The conditions of economic life in the United States have been especially favorable to the foundation of communistic societies, both social and religious. Cheap land and freedom from hampering political regulations have been the chief favoring conditions. In 1774, driven by religious opposition, "Mother Ann Lee" came from England with a small company of Quakers, who were called Shaking Quakers because of certain physical movements in religious exercises. The name was soon shortened to Shakers. They settled at Watervliet, near Albany, N. Y. Mother Ann died in 1784. In 1787 a covenant was adopted establishing celibacy and community of goods. Their communism grew out of their religion. Christianity, they say, does not admit of divisions into rich and poor; "mine" becomes "ours," and riches and poverty, with their misery, disappear. The Shakers have lived happily and contentedly and have had great material prosperity. They have now some 15 societies in different States, the largest being at Mount Lebanon, N. Y. They number about 700 and own much land. Their aggregate property has been estimated at $10,000,000, but it is not managed so as to yield considerable returns. (See SHAKERS.) The Harmonists, or Separatists, as they were called in Germany, left the Fatherland because of sectarian opposition and settled in 1803 at Harmony, Pa., under the leadership of George Rapp. They, too, have been very successful financially. At one time they had 1000 members, but now less than five remain. They employ outsiders to carry on their enterprises, so that they have practically become a close corporation. See HARMONISTS.

The Amana Community of seven villages in Iowa was founded by another German sect, the Inspirationists, who settled near Buffalo, N. Y., in 1842, moving to Iowa in 1855. Religion is the primary thing. They have prospered and possess fertile and well-improved lands. They number 1700 or more. (See AMANA.) In 1844 Dr. Keil founded the Bethel Community in Shelby Co., Mo. The community prospered, numbering at one time 1000 members, and formed several branch communities in the same State. It was dissolved in 1880, but some of the members removed to Oregon, where Dr. Keil had formed another community known as Aurora. This colony, however, was also dissolved in 1881. Under the leadership of Cabet a large group of French communists attempted in 1848 to form a community in Texas and later in Illinois. They were finally settled at Icaria, Iowa, where they prospered for many years, but were disbanded in 1895. See ICARIANS.

All of these communities were started by foreigners, though most of the Shakers have been Americans. An American colony of some 50 members was started by John Humphrey Noyes in 1848 at Oneida, N. Y. Later a small branch

was established at Wallingford, Conn. They believed in freedom from sin and were called "Perfectionists" (q.v.). Between 1840 and 1850, under the leadership of Albert Brisbane, Horace Greeley, Charles A. Dana, and others, Fourierism spread over the country, Greeley advocating it in the New York *Tribune*. Some 27 "phalanxes" were started in various places, most of which were short-lived. The most famous was Brook Farm (q.v.). The North American Phalanx, in Monmouth Co., N. J., was the most successful, lasting some 12 years (1843–56). Ripon, Wis., dates back to the Wisconsin Phalanx of 1844. This association paid $1.08 on the dollar when it dissolved.

In recent years a number of attempts to found communistic settlements have been made. Among these may be mentioned Ruskin Cooperative Colony, founded in 1894 and closed in 1902; the Christian Commonwealth of Georgia (1896–1900); the Freedom Colony of Kansas (1897–1905); Equality (Wash.), founded by the Brotherhood of the Coöperative Commonwealth in 1895, the name being changed to Freeland in 1905. Lack of unity and unwise management have been the chief reasons for the failure of communistic societies. The communities having the longest life have all been under the influence of religious ideals powerful enough to check dissension. Of such communities Ephrata, the Harmonists, and the Shakers have existed over a century. Of the religious communistic societies that have disbanded, the average life has been about 24 years; the Owenite societies lived on an average less than a year and a half; the Fourieristic societies, two years and a half. Societies organized in the last 25 years have endured, on an average, four years. A common cause of the failure of religious communities has been the death of the founder and failure to find another religious leader with personality sufficiently powerful to check the growth of discontent. Contrary to popular belief, the communistic societies of the last century have been troubled very little by idlers. Nor has great difficulty arisen over the apportionment of tasks. Troubles that have arisen are of a more purely personal nature: discontent with leaders, restiveness under discipline. In many communities the secession of the young, attracted away by opportunities for individual success, has been a chief cause of ultimate failure. Some of the most successful communities have been celibate, as, e.g., the Shakers, and have found increasing difficulty in securing enthusiastic recruits with the change in the spirit of the times.

The failure of most communistic societies and the very moderate success of those that survive are frequently assumed to be proof of the impracticability of any scheme of communistic organization. Socialists urge that no conclusions can be drawn from the experience of such societies. Economically they hark back to primitive conditions. They seek to be as nearly self-sufficing as possible; they make little use of modern improvements in production, and hence labor hard for small results; they attempt to cultivate asceticism, as a rule, and hence life in them becomes irksome to those who are not bound to them by strong religious convictions. The communism desired by modern socialists is that of a great state, not that of a petty community. There is no reason why a communistic state should not employ all known improvements in production, nor why life in it should be narrow and ascetic. Furthermore, a communistic state might keep within it the abler and more enterprising spirits, but a small communistic group cannot keep these from drifting away.

Bibliography. Consult Kautsky, *Communism in Central Europe at the Time of the Reformation* (London, 1897); Stammhammer, *Bibliographie des Sozialismus und Kommunismus* (Jena, 1893–99); Stegman-Hugo, *Handbuch des Sozialismus* (Zurich, 1897); Ely, *French and German Socialism* (New York, 1883); Nordhoff, *The Communistic Societies of the United States* (ib., 1875); Ely, *The Labor Movement in America* (2d ed., ib., 1890); Noyes, *History of American Socialisms* (Philadelphia, 1869); Shaw, *Icaria* (New York, 1884); Lockwood, *The New Harmony Communities* (Marion, Ind., 1902); Bushee, "Communistic Societies in the United States," in *Political Science Quarterly* (Boston, 1905); Hinds, *American Communities* (Chicago, 1908). See Socialism.

COM'MUNIS'TIC SOCIETIES. See Communism; **also Amana;** Brook Farm; Ephrata; Koreshan Ecclesia; Perfectionists; Separatists; Shakers; Zoar Community.

COMMU'NITY OF PROPERTY. In the civil law, a form of partnership or common ownership of property by husband and wife. It covers all personal property owned by either party before marriage or acquired during marriage, all realty and all profits and rents acquired or accruing during marriage. Property given to either by deed of gift in which the donor specifically makes it the exclusive property of the donee is exempt from the operation of the doctrine. The survivor takes one-half the property after their joint debts are paid and also has certain homestead rights. The heirs of the deceased spouse take the remaining half, subject to the survivor's homestead rights. This doctrine was introduced from the French and Spanish law into some of the southern and western States, including Louisiana, Washington, Texas, and California, but is generally regulated and somewhat modified by statutes. (See Husband and Wife; Ganancial System.) The expression "community property" is sometimes used to describe the holding of property in common by communistic societies, such as the Shakers. In such communities there is a sort of general partnership in all property, each adult individual owning an equal share by virtue of his membership. The ownership is in the nature of a tenancy in common and is not subject to the rules of the civil law above described.

COM'MUTA'TIONS. A military term. See Allowance; Pay and Allowances.

COMMU'TATIVE LAW. See Associative Law.

COM'MUTA'TOR. See Dynamo-Electric Machinery.

COMNE'NUS (Lat., from Gk. Κομνηνός, *Komnēnos*). The name of a family, originally from Paphlagonia, of which several members occupied the throne of the Byzantine Empire, from 1057 to 1204, and that of Trebizond, from 1204 to 1461. After the fall of Constantinople one branch of the family settled in Saxony, another in Corsica; but the attempt which has been made to trace the descent of the Bonaparte family from a branch of the Comneni is not supported by valid evidence. See Alexis; Anna Comnena; Byzantine Empire.

CO'MO (Lat. *Comum*). The capital of the province of the same name in Lombardy, north Italy, picturesquely situated at the southwestern end of Lake Como, at a distance of 28 miles north of Milan (Map: Italy, D 2). The old town is surrounded by walls which form a rectangle as in Roman times. The city is surrounded by garden-covered hills and groves and contains some very beautiful buildings. The marble cathedral, begun in 1386, belongs to different periods and is built in many styles. Begun in the Gothic at the end of the fourteenth century, the larger portion was constructed in fifteenth-century Renaissance style, mostly by Rodari, while the dome is of relatively recent origin. The interior is decorated with rare pictures and monuments; in the main entrance are placed two statues of Pliny the Elder and the Younger, natives of Como. The basilica of S. Abondio, a building of Lombard origin, rebuilt in the eleventh century and recently restored, dates from the eleventh century. Near by is the church of S. Carpoforo, also the ruined castle of Baradello. The church of Santissima Annunziata, situated on the promenade outside of the town, is also remarkable for its rich decorations of marble and gold. Adjoining the cathedral is the city hall, a large, arcaded structure, built of different-colored stone, and completed in 1215. Other noteworthy buildings are the theatre, built in 1813; the lyceum, founded in 1824; and the city museum, opened in 1897, with its collections of Roman antiquities, arms, and coins. Since the early Christian era it has been a suburban resort. Como has extensive manufactures of silk, velvet, knit ware, optical glasses, shoes, stockings, and metal work. The commerce is also of considerable importance.

The ancient Comum was a city of the Insubres, occupied by the Romans in 196 B.C., and colonized by Cæsar as a military post to repress the Alpine tribes. In the Middle Ages it was a stronghold of the Ghibellines and the "open door of the emperors into Italy." In 1127 it was destroyed by the Milanese and rebuilt by Frederick I in 1159. Later it was ruled by the Rusca family and in 1335 came into the possession of the Visconti, from which time it shared the fortunes of Milan. In 1859 it was a centre of the agitation headed by Garibaldi.

Como is the seat of a bishop and the birthplace of Innocent XI and Clement XIII, the historian Giovio, and Volta, the physician. Pop. (commune), 1881, 25,560; 1901, 38,895; 1911, 43,439.

COMO, LAKE (It. *Lago di Como*, or *il Lario*, Ger. *Comer See*, anc. *Lacus Larius*, praised by Vergil, *Georg.* ii, 159). The most beautiful and celebrated of the Italian lakes, situated in Lombardy, at the western foot of the Bergamese Alps, 30 miles north of Milan (Map: Italy, D 2). Its elevation is 650 feet; its area, about 55½ square miles; its greatest length, 43 miles; its greatest width, not quite 3 miles; and its greatest depth, 1365 feet. The southern part divides, at Bellaggio, into two arms—the eastern called Lake Lecco, the western retaining the name "Lake Como," and having the city of Como (q.v.) at its extremity. Between these two arms lies the fruitful District of Brianza. The river Adda enters the northern end of the lake and leaves at the southeastern extremity, near the town of Lecco. The beauty of Lake Como has long been extolled. The luxuriant landscapes are embellished by costly villas, with gardens, terraces, and vineyards, of wealthy families that have been attracted from many countries by the delightful region and the indulgent climate. The lake is especially the resort of the Milanese aristocracy. A number of the villas, possessing worthy art collections (including particularly several fine examples of Thorwaldsen and Canova), are opened regularly to visitors. The most attractive towns on the lake are Cernobbio, Tremezzo, Cadenabbia, Menaggio, Bellano, and Bellaggio. The steamboat service is excellent. The inhabitants along the shore are chiefly engaged in silk production and manufacturing. Fish are plentiful and of many varieties. The lake partially occupies a fold in the limestone formation of the foothills of the Alps. This depression is traceable in the contours as far as Chiavenna, for Lake Mezzola is really a continuation of Como, though now separated therefrom by the silted delta of the Adda.

COMONFORT, kō'mōn-fôrt', IGNACIO (1812–63). A Mexican statesman. He was a member of Congress in 1842 and a Senator six years later. In 1854, in the uprising against Santa Anna, he aided Álvarez, whose Minister of War he became. Soon after, upon Álvarez's abdication (1855), he became provisional President. He was proclaimed President in 1856, and instituted some important democratic and anticlerical reforms. But he was too generous to his foes and trusted too much in their pledges, and in 1858 was driven into exile. He returned to Mexico in 1861, offered his services to Juárez and the Republic for the approaching struggle between Republicans and Imperialists, and was appointed general, with the command of the fortress of Zaragoza. In 1863 he commanded an army to oppose the French invaders who intended to establish the Emperor Maximilian in power, was defeated by Bazaine near Cholula, and shortly afterward was killed in an ambuscade by bandits.

COM'ORIN. See CAPE COMORIN.

COMORN, kō'mōrn. See KOMORN.

COM'ORO ISLANDS. A group of four large and a number of smaller islands in the Mozambique Channel, midway between Africa and the northern end of Madagascar, lying between lat. 11° and 13° S. and long. 43° and 45° 30′ E. (Map: Africa, J 6). The four larger islands are Great Comoro, Johanna, Mohilla, and Mayotte. They have a total area of 760 square miles. They are of volcanic origin and mountainous; the highest peak, 8500 feet high, on Great Comoro, is still an active volcano. The soil is fertile and produces coffee, cotton, sugar, vanilla, cloves, and coconuts. Cattle are also raised to some extent. The manufactures are coarse cloths, jewelry, and cutlery. The island of Mayotte was ceded to France in 1842, and a protectorate extended over the remaining ones in 1886. The group is ruled by native sultans, who are under the supervision of a French governor residing at Mayotte. The population is estimated at about 65,000, of mixed Arabic, Malagasy, and negro descent, professing Mohammedanism, but practicing fetichism.

COMOX. A coast tribe of Salish Indians in British Columbia. See SALISHIAN STOCK.

COMPAGNI, kôm-pä'nyē, DINO (c.1260–1324). A Florentine historian and statesman of the fourteenth century. Of plebeian origin, he was a member of the silk guild, and in the rise of the populace to power he played an impor-

tant rôle as *consol* of his guild (1282–99), as reformer of the constitution (1282), prior (1289), and *gonfaloniere* (1293). As prior again in 1302, he opposed Pope Boniface and Charles of Valois, but escaped on a technicality the ruin which overtook Dante and the other *Whites* at that time. (See DANTE.) His *Cronaca delle cose occorrenti ne' tempi suoi* was written in 1310–12, probably inspired by the hopes aroused in the *Whites* by the descent into Italy of Henry VII. This narrative deals particularly with the events of 1300, the formation of the Black and White parties, the antecedent history of Florence from 1280, and the subsequent results down to 1312. Frequent errors of fact and the omission of several important episodes which Compagni must have known occasioned (1858–75) a polemic as to the authenticity of the *Chronache*. Compagni's authorship was, however, definitively established by Isidoro del Lungo (*D. C. e la sua cronaca*, Florence, 1879–87), who shows that the Chronicle is not a work of research nor of patient, dispassionate historical interpretation, but is dominated by the feelings of a great personality, which explains its inaccuracies as well as its fiery vigor, its Dantesque objectivity, its healthy emotionality. To Compagni have likewise been attributed, but inconclusively, the *Intelligenzia*, an allegorical poem in *nona rima* and some verses in the manner of the Provençal school.

COMPAGNONNAGE. See GUILD.

COMPAN'ION (Dutch *kompanje*, Fr. *compagnie*, company, crew; influenced in popular etymology by Eng. *companion*, comrade). The skylight or cover to quarter-deck hatches through which the light passes to the deck below. Companions are usually removable. With the disappearance of old-fashioned ships, the name has fallen into disuse. The *companion ladder* is the ladder leading from the quarter-deck to the deck below, and the *companionway* is the hatch (together with its deck house, if there be any) through which the companion ladder leads.

COM'PANY (from Fr. *compagnie*, OF. *companie*, It. *compagnia*, from Lat. *com-*, together + *panis*, bread). A number of persons associated together in a joint enterprise, usually of a mercantile character. A company may be incorporated by public authority, in which case it is known as a corporation aggregate, or it may be unincorporated, when it is called a voluntary association.

Any group of two or more persons acting together under joint direction for a common purpose may constitute a company, but it is only when incorporated that the association as such acquires an independent legal status as an artificial person, capable of suing and of being sued like a natural person. In England the term "company" is generally employed to describe two great classes of associations, viz., (1) joint-stock companies, instituted and organized under the Companies Acts (1862–1900), and (2) public companies, existing by virtue of special acts of Parliament for carrying on certain undertakings of public utility, such as railways, water works, and the like. These are not usually incorporated in England, but are in effect large partnerships trading on a joint stock with transferable shares. Consult *Encyclopedia of the Laws of England*, vol. iii, p. 253 (London, 1907); Lindley, *Companies* (5th ed., London); Buckley, *The Companies Act* (8th ed., London); Healey, *Joint-Stock Companies* (London). In the United States associations of either sort are almost invariably incorporated either by special charter or under general laws. See CORPORATION.

Chartered Companies. As a legal term, "company" was first employed in connection with the great chartered companies of the period of adventure and exploration in England during the fourteenth to the seventeenth century. The essence of these companies was the possession of certain exclusive privileges conferred by royal charter, either a monopoly of trade with certain countries or regions of the earth, or more or less extensive power of colonization and government; or, as was usually the case, a combination of the two. These companies were of two distinct types, viz., the trading company, to which individual merchants were admitted on certain conditions, and then traded each on his own account; and the joint-stock company, in which the trade was carried on in behalf of all its members by the managing board and officers of the company. The latter might be either incorporated (in which case it differed only in the extent of its powers and the character and range of its operations from the modern business corporation), or unincorporated (in which case it was simply a great partnership, of the type known to us as a joint-stock association). In all cases, however, it was usual to vest in the company, or in its officers or managing directors, legal jurisdiction over its members, and, in the case of the colonizing companies, a territorial jurisdiction as well. The famous company, known as the Merchant Adventurers of England, whose beginnings can be traced back to the year 1359, was originally of the type of trading companies, but was incorporated 200 years later by a charter of Elizabeth. The Eastland Company, the Russia (or Muscovy) Company, the Levant (or Turkey) Company, were of the same character. The great colonizing companies under whose auspices the first English settlements in the New World were made—as the Virginia Company, chartered in 1609; the Massachusetts Bay Company, chartered in 1629—were of a composite character, being incorporated for the express purpose of founding new colonies, but organized for trading purposes on the principles of the regular trading companies. The East India Company, on the other hand, chartered in 1600 as a trading company, pure and simple, became a joint-stock company in 1612, and the Hudson's Bay Company, incorporated by royal charter in 1670 (which, shorn of most of its ancient privileges, is still in active existence), is also for trading purposes a joint-stock association.

The extensive powers of government, and even the legal jurisdiction over their own members, formerly vested in these old trading companies, have long since been resumed by the crown. Their present significance lies in the fact that they constitute the beginnings and the foundation of the colonial empire of Great Britain. But the principles on which they were organized and conducted are, with some modifications, still recognized and acted upon in that country. Chartered companies for purposes of trade and colonization in territories not under the sway of Christian powers are still created, and some such companies of recent origin have played an important rôle in the history and politics of the past 20 years. Among these may be mentioned the North Borneo Company, chartered in 1881; the Royal Niger Company, in 1886; the British

East Africa Company, in 1888, and the British South Africa Company, in the same year. All of these companies have had qualified rights of sovereignty and powers of government vested in them, and they have all continued the rôle of the older companies in expanding the limits of the British Empire. See Anderson, *Origin of English Commerce;* Cunningham, *Growth of English Industry and Commerce;* Schanz, *Englische Handelspolitik;* Cawston and Keane, *Early Chartered Companies;* Westlake, *International Law* (London, 1880); Hall, *Treatise on the Foreign Powers Jurisdiction of the British Crown* (Oxford, Eng., 1894); and the comprehensive treatise of Bonassieux, *Les grandes compagnies de commerce* (Paris, 1892); Davis, *Corporations: Their Origin and Development* (New York, 1905); Unwin, *Industrial Organization in the Sixteenth and Seventeenth Centuries* (Oxford, 1904).

City Companies. The incorporated trades or guilds of the city of London. The origin of these companies is to be traced back to the close organization and exclusive membership of the mediæval craft or trade guilds, which appeared in England in the early part of the twelfth century. These had various privileges conferred upon them from time to time by royal charter until in the latter part of the fifteenth century they exercised all the powers of government within the city of London and, indeed, constituted its entire citizenship. Thereafter the "freedom of the city" consisted in membership, as a "liveryman," or "freeman," of one of the city companies, and the franchises of the city were exercised in this fashion until 1725, when the companies were deprived of some portion of their political authority by Act of Parliament. They were further restricted by the reform legislation of 1832 and 1867, but still retain the right of choosing the lord mayor, the sheriffs, chamberlain, and other civic officers. Though the companies have by lapse of time entirely lost their trading character, they still retain their ancient organization, many of their exclusive privileges, and, in some cases, great wealth. There survive 12 great companies and 60 lesser ones. See GUILD; LONDON; and consult Brentano, *Guilds;* Gross, *Gild Merchant;* Norton, *The City of London* (London, 1829); and *Report of the Royal Commission on the Livery Companies* (Parliamentary Papers, 1884); Ditchfield, *The City Companies of London and their Good Work* (London, 1904); Unwin, *The Guilds and Companies of London* (ib., 1908).

Modern Trading Companies. In a legal sense, the term "company" may be applied to any association of individuals for business purposes. This may be a partnership of the ordinary type, a joint-stock association—which is commonly a large partnership formed and conducted in ways prescribed by statute—or a business or trading corporation. It is in the last sense that the term is commonly employed in England. In the United States it has no such definite legal signification. Though there is no inappropriateness in applying it here to any of the three forms of association above enumerated, it usually refers to the second or third form. The expression "company law" may have reference either to the law of business corporations or of unincorporated associations. All of these forms of association for trading purposes are dealt with under their respective heads. See CORPORATION; JOINT-STOCK ASSOCIATION; PARTNERSHIP; VOLUNTARY ASSOCIATION, and the titles and authorities referred to thereunder.

COMPANY. In military organization, an aliquot part of a regiment or battalion, though not absolutely or necessarily so. In the United States all infantry regiments, the three battalions of engineers, and the coast artillery corps, are divided into companies. For duty in the field signal and sanitary troops are also organized as companies. A company of infantry has three officers, a captain, one first and one second lieutenant. Troops of cavalry and batteries of artillery generally correspond in command and organization to companies of infantry. The average war strength of companies in the United States and British armies is 100 men. On the continent of Europe the number varies from 100 to 250 men in Germany and Russia. In the former country the captain of infantry is a mounted officer and has three subaltern officers under his command. The general trend of modern military tactics is to reduce the size of the unit of command in attack formations, largely because of the vast area over which comparatively small bodies of troops are scattered, and the corresponding difficulty of their effective control; thus the importance which heretofore has attached to the regiment or battalion is likely to attach to the company and greatly alter its present formation and organization. See ARMY ORGANIZATION; TACTICS, MILITARY.

COMPANY, JOHN. The popular name for the old East India Company (q.v.).

COMPANY, SHIP'S. All persons who are regularly employed in various capacities on board a ship. In the United States navy it is also frequently used to designate the crew only. See COMPLEMENT; CREW.

COMPARATIVE ANATOMY. For definition, scope, and bibliography, see ANATOMY, and ANATOMY, COMPARATIVE. In this work all the larger topics dealing with the anatomy and physiology of men and animals have been treated comparatively and with reference to their evolution. Such is the character of ALIMENTARY SYSTEM; CIRCULATORY SYSTEM; EAR; EXCRETORY SYSTEM; EYE; FOOT; HAIR; HAND; INTEGUMENT; MUSCULAR SYSTEM; NERVOUS SYSTEM; PELVIS; REPRODUCTIVE SYSTEM; RESPIRATORY SYSTEM; SKELETON; SKULL, and similar articles, in which the reader will find the methods of comparative anatomy exemplified.

COMPARATIVE GRAMMAR. See GRAMMAR.

COMPARATIVE MYTHOLOGY. See MYTH; MYTHOLOGY.

COMPARATIVE PHILOLOGY. See PHILOLOGY.

COMPARATIVE PSYCHOLOGY. See ANIMAL PSYCHOLOGY.

COM'PARA'TOR (Lat., comparer, from *comparare,* to compare, from *com-,* together + *par,* equal). An instrument used in comparing the lengths of two graduated scales or standards of length, and in determining accurately the amount of their difference. It consists essentially of two microscopes, each fitted with cross hairs and capable of being moved by a micrometer screw, or else supplied with a micrometer eyepiece, or often both. (See MICROMETER.) These micrometer microscopes are so mounted that they may be moved both laterally and forward and backward, and through them the observer looks down on the scale which is being examined. The microscopes are then

moved so that their cross hairs are either at the end or over some division of the scale, which often is so magnified that in making a setting it is convenient to bisect the enlarged image of the mark. By means of rollers or other mechanism the platform containing the first scale is temporarily removed and a second introduced in its place. In this case the intersections of the cross hairs are probably some small distance away from the corresponding division of the other scale, and this amount, as determined with the micrometers, is their difference at that temperature. While the operation of comparing two scales does not seem particularly complicated, nevertheless, in order to secure the desired high degree of precision, elaborate precautions are taken both in the construction and manipulation of the apparatus. The temperature at which the scales are compared is of course no unimportant consideration, and in order that this should be uniform and easily determined, they are immersed in a bath of liquid whose temperature can be maintained at some constant point or measured to a high degree of precision. In the comparison of standards there must of course be an ultimate standard to which all measures of length are referred, and this bar is defined as correct at some one stated temperature, usually taken at that of melting ice. Copies of the original standard are made and serve as secondary standards whose coefficient of expansion, minute errors, and other constants are known. Such comparisons are performed by the International Bureau of Weights and Measures at Paris, where comparators, with massive pedestals to carry the micrometer microscopes, and susceptible of the most accurate results and possessing all possible refinements, are employed. (See WEIGHTS AND MEASURES.) Similar but usually less precise apparatus is found also in the various national standards bureaus and physical laboratories. The comparator in the division of weights and measures of the United States Bureau of Standards at Washington consists of a massive beam of invar steel carried on brick piers to which the micrometer microscopes are clamped. The *Mémoires du Bureau International des Poids et Mesures* (Paris) contain full and technical descriptions of the most accurate and approved apparatus and methods. Consult also Fischer, "Recomparison of the United States Prototype Meter," in *Bulletin of the Bureau of Standards*, vol. i, No. 1 (Washington, 1904), and Hallock and Wade, *Evolution of Weights and Measures and the Metric System* (New York, 1906).

COMPARETTI, kōm'pȧ-rĕt'tê, DOMENICO PIETRO ANTONIO (1835–). An Italian philologist, born in Rome. He devoted himself at first to mathematics and the natural sciences. Later, having studied Greek by himself, he became, in 1859, professor of Greek in the University of Pisa. A few years later he accepted a similar position at Florence and afterward went to Rome, where he conducted the lectures on Greek antiquities at the university and studied carefully the excavations in the Forum. Aside from his Greek studies, he is distinguished as a scholar in Romance philology and in the culture history of the Middle Ages. His most important works are: *Saggi dei dialetti greci dell' Italia meridionale* (1866); *Virgilio nel medio evo* (1872; Eng. trans., 1899); *Papiro ercolanese* (1875); *La commissione omerica di Pisistrato e il ciclo epico* (1881); *Iscrizione arcaica del foro Romano* (1900). He wrote also on Pindar, Sappho, and Hyperides, and on the Gortynian law code. (See GORTYNA.) With D'Ancona he edited *Conti e racconti del popolo italiano* (9 vols., 1870–91); with others he edited the *Rivista di filologia e d'istruzione classica*. After 1884 he was editor also of the *Museo italiano di antichità classica*.

COMPAR'ISON (OF. *comparaisun*, Fr. *comparaison*, from Lat. *comparatio*, from *comparare*, to compare). In grammar, and as applied to adjectives (q.v.), that which marks the degree in which the quality is attributed to the object, as compared with other objects. There are three degrees of comparison. The positive indicates the quality generally, without comparison; the comparative, a higher degree of the quality than is attributed to other things; and the superlative, the highest degree that is attributed to any of the things under consideration. Sometimes the positive is not regarded as a degree of comparison. There are two ways of expressing these degrees. 1. By an inflection or change of the word; as, *hard, harder, hardest; happy, happier, happiest.* This mode prevails almost exclusively in Greek and Latin. 2. By an additional word; as, *more happy, most happy.* This may be called logical comparison; the other, grammatical. In French, with the exception of a few irregular adjectives, all adjectives follow the logical method. In English the logical method is generally preferred when the grammatical would produce a word difficult or harsh in the pronunciation. This is generally the case in English when the simple adjective is of more than one syllable, but it is not always so. Thus, *eárnester, prúdenter,* would make harsh combinations; not so *políter, discréeter, háppier.* The difference is, that in *eárnester, prûdenter,* the accent being on the first syllable, two unaccented syllables of discordant character are thrown together; in *políter, discréeter,* the unaccented syllables are separated; and in *háppier,* though they come together, they readily coalesce. Thus, the laws of euphony determine this point, as they do much else in language. Carlyle and Ruskin use many comparative and superlative forms that are not generally recognized. In general, it is only adjectives of quality that admit of comparison; and even adjectives of quality cannot be compared when the quality does not admit of degrees; as, a circular space, a gold ring, a universal wish. Adverbs (q.v.) in English are compared exactly like adjectives, logical comparison predominating.

COM'PASS (OF., Fr. *compas*, compass, from ML. *compassus*, circle, from Lat. *com-*, together, *passus*, step, from *pandere*, to spread out). The mariner's compass is the most important instrument used in the navigation of a ship. Compasses are of two kinds, magnetic and gyroscopic, the latter being a development of the past few years.

THE MAGNETIC COMPASS

The action of the magnetic compass depends upon the attraction of the earth's magnetic force. The earth is a great magnet, with one pole in the neighborhood of 70° N. lat. and 97° W. long., and the other in about 73° S. lat. and 155° E. long. These poles are not points, but merely centres of magnetic areas which are constantly but slowly changing their positions. Over these polar areas a freely suspended mag-

net, balanced about its centre, hangs vertically. As we recede from the magnetic poles, the inclination (or *dip*) of the magnet decreases until, on the magnetic equator (which is nowhere more than 15° from the geographical equator), it is zero. While changing its inclination (q.v.), the magnet continues to point in the general direction of the magnetic pole. This property of a magnet is used in the construction of the mariner's compass, which is merely a magnet or bundle of magnets constrained to move in a horizontal plane about a vertical axis.

When installed on board a vessel, the compass is acted upon by the magnetism of the earth and of the ship. The vertical component of the earth's force produces the *dip*, or *inclination*, of a freely suspended magnet. The ship's force may increase or decrease this, but the ordinary mariner is concerned chiefly with the angle between the compass and the geographical meridian. This angle in naval science is called the *compass error* and is made up of the *variation* (or declination), which is the angle between the geographical and magnetic meridians at the particular locality, and the *deviation*, which is the result of the ship's magnetic force. See INCLINATION; MAGNETIC MERIDIAN.

The *variation*, or *declination* (q.v.), is due to the fact that the lines of magnetic force which affect the needle are exactly parallel to the geographical meridian in only a few places on the earth. The horizontal projection of the line of force at any point of the earth's surface is the direction of the magnetic meridian of that point, i.e., the direction pointed out by the compass needle. The angle between the magnetic and geographical meridians is the variation. The variation is constantly changing from year to year for all parts of the earth, but over some areas the change is, at times, so slow that it is practically *nil*. The increase or decrease continues until a certain maximum or minimum is reached and then reverses its character. In very few parts of the world does it reach 10′ per annum. The variation is also subject to slight monthly (or seasonal), daily, and irregular changes. The monthly change is chiefly shown in an increase or decrease of the daily change. The daily change consists of a movement towards the east for part of the day and a movement towards the west during the remainder. It is greatest near the magnetic poles and least near the magnetic equator. In the temperate regions it rarely exceeds 10′ to 15° range on any one day. Irregular changes of variation of several degrees in amount, may occur during severe magnetic storms in a few minutes of time. See DECLINATION; TERRESTIAL MAGNETISM.

Magnetic charts show the variation (declination), dip (inclination), etc. Curved lines connecting the points of equal variation are called *lines of equal variation*, or *isogonic* lines, the ones connecting points of no variation being called *agonic* lines. The lines of equal *dip* are called *isoclinic* lines, the line of no *dip* being the magnetic equator. The dip of the needle, like the variation, is constantly changing, but the changes are small and do not affect the compass as an instrument of navigation. See ISOGONIC; ISOCLINIC and ISODYNAMIC.

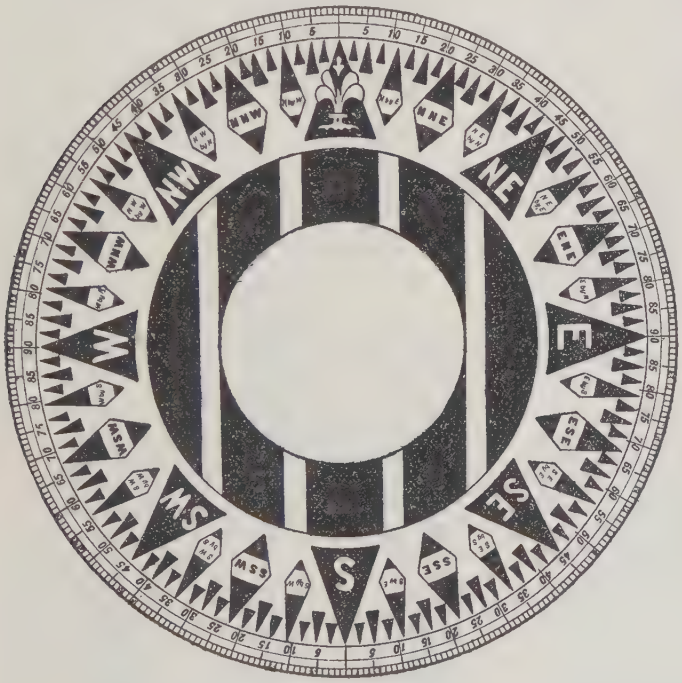
The *deviation* of the compass is produced, as has already been stated, by the action of the magnetism of the ship in which the compass is mounted. In wooden ships the small amount of iron causes correspondingly small deviations. On a nonmagnetic ship, like the specially built vessel, the *Carnegie*, there are no deviations. But iron and steel hulls produce important deviations even in well-placed compasses and excessive deviations in those badly located; it is indeed possible to so place a compass that it will point to a particular part of the ship no matter what her heading be. In mounting compasses due regard must therefore be paid to the magnetic forces of the ship as well as to the convenience of the navigator and helmsman. Standard compasses are usually placed where they are fairly accessible, but as far removed from the ship's centre of magnetic force as possible. A steering compass is necessarily placed where the helmsman can see it constantly. Its deviation is checked by comparison with the standard.

The deviation of a compass varies as the ship changes her course. A portion of the hull is permanently magnetized and acts as a permanent magnet; the rest is in a variable state of magnetization depending upon the direction in which the ship heads and upon the magnetic latitude. As it is important, in order to steer a correct course, that the deviations upon all headings should be known, they are determined by *swinging ship*. This is accomplished by successively pointing the ship in the various directions (usually every 15° to 30°) and comparing the true bearing (ascertained from tables and computation) of the sun with the magnetic bearing. This gives the *error* on each heading. Applying the *variation* to the results gives the corresponding deviations on each point upon which observations were taken. A table of these deviations is a necessary adjunct to every compass. When the deviations are considerable, as is almost invariably the case on a modern ship, it is customary to reduce them by means of correctors. The character and extent of the correction, or *compensation* (as it is commonly called), may be obtained by magnetic observations on board the ship and on shore; from these follow elaborate computations to determine the placing of the correctors. This method involves a competent knowledge of the whole theory of the magnetization of ships; moreover, it involves much labor and consumes much time. A simpler one is called the rectangular method of compensation. The deviation is determined upon adjacent cardinal points such as (magnetic) north and east. The ship is headed on north and kept on that heading by means of another compass and a single magnet, or several small ones, placed in a fore-and-aft direction in holes in a wooden block or on a tray, below the compass to be corrected. By varying the number of magnets, or by raising or lowering the tray by means of a screw, the deviation is reduced to zero and the compass made to point to magnetic north. The same process is repeated when the ship is headed east, but the magnets are placed athwartship. Next the ship is headed northeast (magnetic), and the soft-iron spherical correctors moved in or out until the needle points correctly. The operation is then complete, unless a Flinders bar is used; this consists of a soft-iron vertical bar, used to counteract the induced magnetism in soft vertical iron, and placed forward or abaft the compass as found necessary. The ship must then be swung for *residuals*, i.e., headed in directions 15° to 30° apart, and the small remaining deviations as-

certained. These may be reduced by recorrecting, but are usually too small to render that necessary: but the usual table showing them is made out for use in laying the ship's course. In addition to the deviation caused by the ship's forces when on an even keel, a further deviation is caused by rolling or inclination to one side or the other. This is corrected by a vertical magnet below the axis of the compass and at such a distance as will correct the deviation due to the heel or roll.

The theory of the correction is that the magnets (and soft-iron correctors, which are temporary magnets) are placed in a manner to offer magnetic attraction exactly opposite to that of the forces of the ship, leaving the earth's force alone to act. Unfortunately the combination of the forces of magnets and the ship does not produce magnetic zero, but forms a magnetic field which decreases the effect of the earth's magnetic field; so that when the ship's force is so great as to need powerful correctors at the compass, the latter will be *sluggish*, i.e., have poor directive force.

The magnetic compass as mounted on board ship consists of a framework supporting the needles, the top of which is called the *compass card*. Around its outer edge the degrees are marked. In all except new-type compasses the degrees are marked from 0 to 90 on each side of the north and south points. In recent compasses the degrees are marked from 0 to 360 in the same direction as the hands of a clock move. In addition to the degrees the compass is marked in *points* (11¼°), half points, and quarter points. North, east, south, and west are called the *cardinal* points; northeast, southeast, southwest, and northwest are called the *intercardinal*. Halfway between north and northeast is north-northeast; between northeast and east is east-northeast; and so on. The other points are named north by east, northeast by north, northeast by east, east by north, east by south, etc. A full list of points in proper order is given in the subjoined table. The reciting of the points of the compass in proper order is called *boxing* the compass, and the ability to do so correctly is one of the requirements of a seaman. The present practice in the navy and to some extent in the merchant service is to give all courses and bearings in degrees when accuracy is desired and in points when an approximation only is needed. Thus 135° is exactly southwest; but if a bearing were approximately southwest, then the term "southwest" would be used.



COMPASS CARD.

N.	E.	S.	W.
N. by E.	E. by S.	S. by W.	W. by N.
N. N.E.	E. S.E.	S. S.W.	W. N.W.
N.E. by N.	S.E. by E.	S.W. by S.	N.W. by W.
N.E.	S.E	S.W.	N.W.
N.E. by E.	S.E. by S.	S.W. by W.	N.W. by N.
E. N.E.	S. S.E.	W. S.W.	N. N.W.
E. by N.	S. by E.	W. by S.	N. by W.

One quadrant in quarter points is as follows:

N.	N. N.E.	N.E.	E. N.E.
N. ¼E.	N. N.E. ¼E.	N.E. ¼E.	E. N.E. ¼E.
N. ½E.	N. N.E. ½E.	N.E. ½E.	E. N.E. ½E.
N. ¾E.	N. N.E. ¾E.	N.E. ¾E.	E. N.E. ¾E.
N. by E.	N.E. by N.	N.E. by E.	E. by N.
N. by E. ¼E.	N.E. ¾N.	N.E. by E. ¼E.	E. ¾N.
N. by E. ½E.	N.E. ½N.	N.E. by E. ½E.	E. ½N.
N. by E. ¾E.	N.E. ¼N.	N.E. by E. ¾E.	E. ¼N.
			E.

The magnets, several in number, are secured to the underside of the card framework. The compass is mounted in the compass *bowl* and is supported on a pivot beneath its centre. In "liquid" compasses the framework is hollow and floats in a nonfreezing mixture of alcohol and water to reduce the weight on the pivot and to steady its motions. The "dry" compass is made as light as possible, but its whole weight rests on the pivot. The compass card shown is of the common navy type and differs from the latest pattern only in the marking of the degrees, which are marked each way from north and south instead of from 0 to 360. The compass bowl (which has an air-tight glass cover) is mounted in gimbals (so as to swing freely) in the top of a standard called the binnacle (q.v.), which contains the magnets used for compensation and carries arms to support the spherical correctors.

For the purpose of taking bearings (i.e., ascertaining the compass direction of an object), an *alidade* or *azimuth circle* is used. The former is a simple pair of sight vanes turning about a vertical axis on the binnacle cover over the compass or on the dumb compass on a standard (called a "pelorus") at the ends of the bridge. An azimuth circle is a circular metallic ring fitting over the top of the compass bowl on which it turns freely. On opposite sides it has a sighting vane and reflecting mirrors, so that the point of the compass card immediately beneath it can be seen at the same time that the observer sights at a distant ob-

ject. *A dumb* compass is a simple card or metallic plate, with graduations and marks like those on a regular compass card. It may be permanently secured to a part of the ship or mounted on pivot. See illustration in article BINNACLE.

History. The early history of the magnetic compass is involved in more or less obscurity. In a rough form it is said to have been known to the Chinese 2000 years before the Christian era, though this is more than doubtful. But the policy of the Chinese rulers and the habits of the people conspired to make the Chinese indifferent and unenterprising navigators, so that even if a knowledge of the directive property of a magnet were known to them it is not likely that they made much use of it. The earliest definite reference to it is in a work by Alexander Neckam, entitled *De Utensilibus* and written in the twelfth century. He refers to it as a needle on a pivot which, when allowed to come to rest, shows the navigator the direction in which to steer. In another work, *De Naturis Rerum* (lib. ii, c. 89), he writes as follows: "Mariners at sea, when, through cloudy weather in the day, which hides the sun, or through the darkness of the night, they lose the knowledge of the quarter of the world to which they are sailing, touch a needle with a magnet, which will turn round till, on its motion ceasing, its point will be directed toward the north" (Chappell, *Nature*, No. 346, June 15, 1876). Subsequent to this there are repeated references to the use of a magnetic needle for navigating purposes. As early as the thirteenth century it seems to have been known to the navigators of all European nations. In 1248 Hugo de Bercy speaks of an improved form in which it is supported on two floats in a glass cup, while as early as 1269 its variation from true north is said to have been noted. The division of the compass card into 32 points is a natural one and was in use in 1391, when it is mentioned by Chaucer.

THE GYRO COMPASS

Until quite recently all navigating compasses were of the magnetic type, and in the mercantile marine these are still used almost exclusively. But in naval vessels, particularly in heavily armored ships and submarines, the strong magnetic forces in surrounding structures prevent the placing of magnetic compasses in the most desirable positions, especially as many of these structures (such as turrets, guns, observation towers) are being frequently moved so that the strength and direction of their magnetic forces are changed in a manner to preclude compensation or correction. Other means have therefore been sought for directing the course of war ships, the most promising of which seemed to be the gyro compass, but it was not until about 1910 that this instrument became sufficiently developed as to reliability and convenience. It is installed on all battle ships and submarines in the United States navy, and, while not yet perfectly satisfactory, it is of the greatest utility and is being steadily improved. The principal troubles have been due to lack of sturdiness of construction, and this will be corrected. If, in addition, the master gyro mechanism be installed in duplicate or triplicate, all compass difficulties will probably be solved and the magnetic compass, except as a possible reserve, dispensed with as far as large naval vessels are concerned.

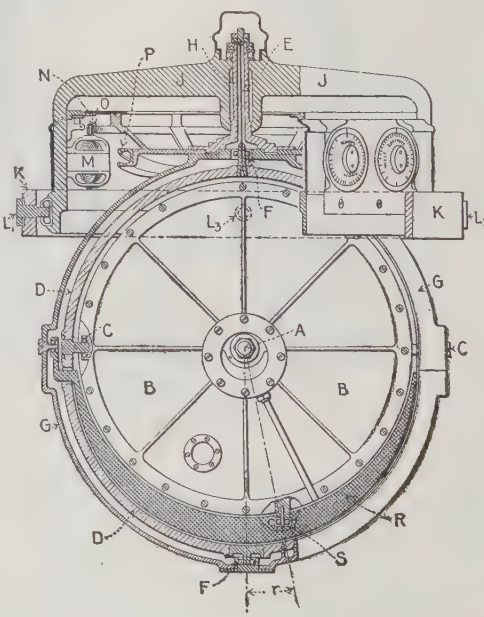
The construction of the gyro compass is founded upon the fundamental phenomena of rotation, inertia, and precession. The underlying principles may be stated in three laws as follows:

1. A spinning mass may be moved in any direction without the slightest resistance, response, or reaction, so long as the path of movement is a straight line; but if the path be other than straight, new phenomena at once manifest themselves in the form of automatic motion, provided the mass is free to move in directions other than that of its spin.

2. When a spinning mass receives a force which tends to change its plane of rotation, it not only resists such force, but the mass will manifest motion at a different angle from the impressed force and seemingly unrelated to it. This motion is known as precession, and its explanation follows directly the application of Newton's first law.

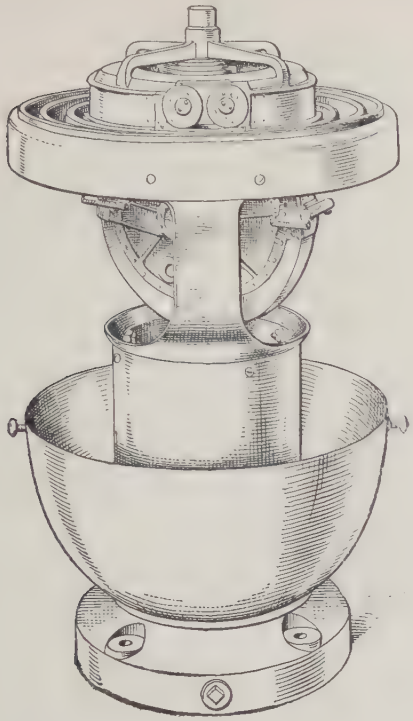
3. Any revolving mass, such as a spinning wheel, tends to swing so as to bring its axis of rotation parallel to the axis of any externally applied force tending to make it move in a closed regular curve (such as a circle) and in such relation that the direction of rotation is the same as the direction of the applied force. From this we see that the axis of a freely suspended gyro wheel will tend to turn parallel to the earth's axis of rotation, so that its spin will be in the same direction as that of the earth.

In the United States the best-known gyroscopic compass is made by the Sperry Gyroscope Company of New York. The accompanying illustrations show the parts of this compass.

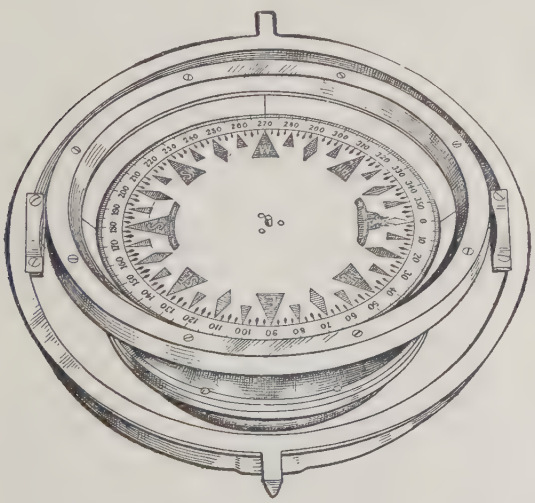


Inside the casing *B* (above) the gyroscope wheel rotates on a horizontal shaft. The casing is pivoted on a horizontal axis *C* through its centre of gravity and is carried by the frame *D*. This frame is suspended from the upper end of the vertical extension of the "phantom"

ring G by means of the torsionless wire E. By means of the bearings L_1, L_2, L_3, and L_4, and the ring K the frame J is mounted in Cardan suspension. The ring D, together with the wheel



casing, is called the *element*. On the ring D are electrical roller contacts which form connection with corresponding contacts, the latter being on the phantom. These connections control the follow-up motor M, which is carried on the frame J and which by means of the



gearing N moves the phantom in azimuth to correspond to any movement of D.

The phantom carries the compass card O, and on it is the cam P, a part of the automatic correction device, which mechanically solves the corrections necessary to be applied to the compass to allow for the course of the ship, the speed on that course, and the latitude. The bail R is supported by the phantom ring. It is attached to the gyro casing at S and is connected in such a position that it is eccentric to both the vertical and horizontal axes of the gyro. By this means oscillations of the gyro are lessened or prevented. This also produces positive orientation.

The gyro wheel revolves in a vacuum inside the casing at approximately 8500 revolutions per minute. This speed is obtained by means of an alternating current motor without commutator. At this speed the compass has a directive power of approximately 200,000 *dyne cms.*

The readings of this master compass, which is situated in the most convenient and best-protected part of the ship below decks, are transmitted to repeating compasses by means of a transmitter, which is operated by the master and forms part of its mechanism. The repeating compasses are placed wherever desired—in the conning tower, on the steering platform, bridges, etc. The transmitter controls the poles of a small motor in each repeater compass in such a manner that the armature of this motor is turned by steps to follow the dial of the master compass when it moves. In order to obtain the same reading on the repeaters as on the master, a synchronizer forms part of the installation, and by means of it all the repeaters may be set to the same reading as the master.

Messrs. Martienssen and Anschütz-Kaempfe have invented a gyroscope compass which is floated in mercury. As this compass has but two degrees of freedom and is consequently affected beyond this by the heeling or pitching of the ship, it is said to give results not so satisfactory as those of the Sperry type. Other types of gyro compasses are in use or undergoing experimental investigation.

Bibliography. Consult: *The Admiralty Manual for the Deviations of the Compass*, by Capt. F. J. Evans, R.N., F.R.S., and Archibald Smith, M.A., F.R.S. (new editions appear from time to time); *Naval Professional Papers* (U. S. Navy), No. 22 (Washington, 1886); Cornwell, *Compass Disturbances in Iron Ships* (1887); Bowditch, *The American Practical Navigator* (Washington—new editions at short intervals); Lyons, *Treatise on Electromagnetic Phenomena and the Compass and its Deviations Aboard Ship* (New York, 1901–03); Smith, *Practical Compass Adjustment* (Seattle, 1903); Diehl, *Deviations of the Compass, Practical Problems* (Washington, 1902); publications of the Superintendent of Compasses, United States Navy. For gyro compasses, see article on "Engineering Applications of the Gyroscope," in *Journal of the Franklin Institute* (May, 1913).

COMPASS, Solar. An instrument for determining at any place an accurate north and south line. It has a latitude range of about 35° and may be adjusted to the latitude of any place in the United States. It has a latitude arc, a declination arc, and an hour arc, each to be duly adjusted for an observation, and has been found of much service in running important boundary lines and other government surveys. One of its recommendations is its avoidance of the perplexities caused by local attraction. It is the invention of William A.

Burt, of Michigan. For illustration, see Plate of ENGINEERING INSTRUMENTS.

COMPASSES. A mathematical instrument for transferring or marking off distances (and for this purpose often called "dividers") or for drawing circles. The common compasses, or dividers, are composed of two rods or legs joined together by a pivot joint at one end and pointed at the other; when adapted to drawing arcs, the lower part of one of the legs admits of receiving a pen or pencil.

Beam compasses consist of points sliding on a bar, to which they may be clamped at any distance from each other. They are used for lengths greater than the pivot compasses can expand, and when delicately made can be used for more accurate dividing. See GRADUATION.

Proportional compasses have a point at each end of each leg, and the pivot between, thus forming a double pair of compasses opposite to each other. If the pivot is midway between the ends, the opening of each pair of points will be equal. If its distance from one pair of points be double that from the other, the openings will be as two is to one, and so on for any ratio. To adapt them for variable proportions, the pivot is made a clamping screw, which moves in an elongated slot in the legs and may be fixed at any point.

Triangular compasses have three legs, so that the vertices of a triangle may all be transferred at once.

Bullet or *club compasses* have a ball in place of one point, adapted to turning in a hole. See also CALIPERS; ELLIPSE (ellipsograph, or oval compasses).

COMPASS PLANT (*Silphium laciniatum*). A large plant, called also "resin weed," because it abounds in resinous matter. It grows on the prairies, and the edges of its stem leaves are said always to point directly, or nearly, north or south. When cultivated in gardens or growing in shade, this property does not always appear. The same phenomenon is exhibited by the stem leaves of prickly lettuce (*Lactuca scariola*). In this plant the leaves are usually considered as vertical, but this is brought about by a twist near their bases. The peculiar arrangement of the leaves of these plants is due to their adaptation to light. Both surfaces of the leaves are equally sensitive to light, and only by presenting their edges vertically and their tips to the north and south are they able to secure equal illumination to both sides of the leaves.

COMPENSATION. In English and American law, pecuniary reparation for loss sustained or for injuries suffered. The usual measure of damages in actions at law, whether based on tort, or wrong, or on breach of contract. (See DAMAGES.) In the civil-law systems of the continents and of Latin America, and in Scots law, a counterclaim or set-off. The principle applied is that, where two parties are mutually indebted, their debts shall extinguish each other if equal, and, if unequal, leave only a balance due. In order to avail one's self of the principle of compensation, the set-off or counterclaim must be pleaded, as it does not operate ipso jure; but, when pleaded, it is held to operate from the period when mutual claims existed, the interest on either side being stopped from that time.

Compensatio injuriarum is a defense against actions of damages for slander or the like. It is not a bar to an action, but a set-off or counterclaim. In the common-law system of England and the United States it is not permissible to set off one trespass or other wrong against another, but each injury must be compensated by a separate action; and in Scotland the leaning recently has been in the same direction. See CONTRACT; TORT; and consult the authorities there referred to.

COM'PENSA'TION (Lat. *compensatio*, equalization, from *compensare*, to equalize, from *com-*, together + *pensare*, to weigh, frequentative of *pendere*, to weigh). A term used in physical experiments to describe methods where sources of error or other conditions are neutralized by the introduction of factors which act in an opposite direction by an equal amount, and compensate for the original error. For example, a flint-glass convex lens, in addition to refracting rays of light, also separates them into their spectral colors. This can be compensated by combining with the convex lens a concave lens of crown glass which has less refraction but greater dispersive power. Such a lens, being opposite in its effect to the first lens, will unite the rays, but does not destroy the deviation. (See ACHROMATISM.) In the case of the pendulum (q.v.), an increase in temperature causes it to lengthen, and consequently oscillate more slowly. Compensation is here effected by raising its centre of oscillation with any increase in length due to a rise in temperature and thus keeping constant the distance between its point of support and its centre of oscillation. In a chronometer the balance wheel is compensated by constructing its rim of two metals with different coefficients of expansion. An increase in temperature tending to expand the wheel is compensated by the rim being brought nearer the centre, it being curved inward by the uneven expansion of the metals. See WATCH, for further description and illustration of a compensating balance wheel.

COM'PETENCE, or **COM'PETENCY.** As a law term, used in the sense both of authority and of legal ability. It is in the former sense that it is employed in the law of France and of other Latin countries as the equivalent of our term "jurisdiction," the competence of a tribunal being its authority or jurisdiction over a given person or proceeding.

In English and American law the word is specifically used to denote the legal fitness or eligibility of a witness to be heard, or of a judge or juror to participate in the trial of a cause. Competency, in the legal sense of the term, does not refer to mental or physical ability, but to purely legal grounds of qualification —as that a judge or juror shall not be personally interested in the issue to be tried; that a witness shall not be so related to the transaction on which the suit is based as to be incapacitated by law from giving evidence thereof. Such facts as the credibility of a witness, the relevancy of his testimony, or even his actual knowledge of the transaction in question, have no bearing upon the question of his competency. He may be competent to participate as a witness and may yet be utterly untrustworthy or ignorant of the facts involved in the issue. So, not having been an actual, percipient witness of the facts to which he is called upon to testify, he may have his testimony excluded as mere hearsay, without thereby having his

legal competency questioned. In that case it is not the witness, but the evidence offered by him, that is "incompetent." Competency, whether of judge or juror or witness, is always presumed until it is impeached and the contrary shown. The question is one for the court, which may inquire into the facts for the purpose of arriving at a judgment upon it. The law as to the competency of witnesses will be considered under the title WITNESS. See also EVIDENCE: JUDGE; JURY; and the authorities there referred to.

COM'PETI'TION. In the broadest sense of the term, rivalry for a common object, such as the means of livelihood, a position of supremacy, a unique honor. Competition in this sense is coextensive with life; most of the acts grouped under the rubric "the struggle for existence" are competitive. Competition may arise between groups or between individuals. Group competition may be illustrated by the struggle between evergreen and deciduous trees for the soil of certain mountain slopes, between cattle and sheep for grazing grounds, between states or nations for territory or power. Of the last, familiar examples are the competition of Dutch and Portuguese for the control of the Indies, of the French and English for the control of the Mississippi valley, of Athens and Sparta for Hellenic hegemony. The Kansas-Nebraska struggle was a competition between the supporters of slavery and its enemies. Racial competition is manifest in the conflict between Germans and Poles for the possession of the land in certain Polish provinces.

The term "competition" is often employed, by way of analogy, to describe mere rivalries of technique. Thus there is said to be competition between the Bessemer and the open-hearth methods of steel manufacture, between electricity and steam as motive power, between the telegraph and the long-distance telephone. Often such competition is underlain by competition between individuals or groups, but this is not necessarily the case.

In political economy "competition" is confined to rivalry in supplying an economic demand, or the acquisition of an economic good or service. It is thus twofold, seller's competition and buyer's competition. The former exists when more than one seller offer the same commodity, or commodities meeting the same need. Thus competition exists, not only between those who offer beef for sale, but also between the latter and those who offer any satisfactory substitute for beef. Competition is, however, limited in its effectiveness where the products offered by rivals are not practically identical technically.

Competition in the economic sense of the term is especially characteristic of the modern epoch. While competition between merchants engaged in foreign trade antedates written history, the competition between retail dealers and between producers was closely regulated, by custom or mutual agreements, or occasionally by law, until a comparatively recent period. With the expansion of trade after the great discoveries in the fifteenth and sixteenth centuries, the structure of customary and regulated prices in western Europe began gradually to disintegrate. The process of disintegration was hastened by the formation of national states and the loss of control by the cities over local prices. The wages of labor were slow to respond to the influence of competition until the application of capital to industry broke down the earlier handicraft system. From the Industrial Revolution (q.v.) the progress of competition has been rapid. In the field of wholesale prices its sway is complete, and the same thing is true of prices of capital shares dealt in on the exchanges. In retail trade competition is subject to a greater or less limitation through custom, the ignorance or indifference of the buyer, or through agreements among dealers. In the supplying of agricultural products competition operates practically without restraint; and the same thing is true of a great variety of manufactures. In other parts of the manufacturing field competition is regulated by agreements between producers, or in some cases by a unification of a majority of the industry under a common control. Ocean transportation is essentially competitive; land transportation is largely subject to regulation by private agreement or by public authority. In the capital market competition is the prevalent regulator. In the labor market competition is subject to restraint, universally through the half-conscious solidarity of labor, and in part of the field, through labor organizations or through public regulations. Furthermore, there are a number of fields in which the earlier ideals of fair price act to restrain competition. Thus physicians' fees are rarely determined by direct competition, but rest partly upon mutual agreement, partly upon custom, and partly upon a sense of inherent justice. Such vestigial instances of an earlier economic order are, however, of minor importance, as compared with the conscious restrictions upon competition imposed by trades unions, combinations of employers, and state action.

Even where competition is restrained, its influence is powerful. The trade-union cannot often raise wages much above the level prevailing in industries where competition is active in determining the wages contract. The most powerful capitalistic organizations are limited in their price policy by the possibility that new competitors will spring up. Such possible competition, known in political economy as "potential competition," often escapes popular notice; it is none the less perhaps the most powerful regulator of the prices fixed by trusts and other semimonopolistic enterprises. Where the price of a commodity or a service is stereotyped by custom, as in the case cited above of physician's fees, competition takes the form of a multiplication of those providing the service, and hence regulates average incomes, if not prices. When the income is fixed by law, as in many public services, competition determines the personal quality of the candidates chosen. When railways operate under agreements as to fares, competition appears in the quality of service provided.

In view of the development of monopolistic combinations in recent decades, it is often asserted that the era of competition is already past. This opinion is not commonly shared by the economic historian, who finds far less competition in earlier periods than is popularly believed to have been prevalent, and who finds in the present institutions competition everywhere, often disguised under its various protean forms. From the view point of economic history, the present economic system is un-

doubtedly best described as one of competition, tempered everywhere by elements of monopoly.

In pure economic theory the concept of competition is employed as a premise in the construction of logical systems of economics. There is no attempt to demonstrate the existence of unrestrained competition; in fact, such an attempt would be foreign to the spirit of pure economics. What is sought is a convenient clue to the baffling problems of price and the distribution of income; and this clue has commonly been found in competition. Assuming perfect competition, what prices and incomes would continue to exist? The results of such an analysis are unreal, but they throw light upon the tendencies of an economic system in which competition is widely prevalent, as the present. By successive approximations, allowing for friction and monopoly, the theoretical structure is made to conform more nearly to reality. Among superficial critics of economics the view is current that this employment of competition as a logical premise is tantamount to the erection of competition into an ideal, a proper object of economic policy. As a matter of fact, there is no unanimity among economists who employ this method as to the social utility of competition.

Competition was indeed regarded as an ideal by the early economists, both French and British. The hampering effects of public regulation of industry in the eighteenth century produced a powerful reaction in the minds of such profound students as Quesnay, Turgot, and Adam Smith. These writers would have supported the practical elimination of all state interference in industry as well as the suppression of all combinations to restrain free competition. The argument for such extension of the sway of competition was a plausible one. If subject to no restraint, each capitalist would place his capital where it would yield the highest returns, each laborer would seek the point where he would receive the highest wages. The highest profits and the highest wages, however, could be paid only by such industries and under such methods as would yield the largest amount of valuable products. Thus the free play of self-interest, under competition, would yield a maximum of production in society. The more capable producers would underbid the less capable in the sale of goods, and hence the productive powers of society would be concentrated in the most efficient hands. Under active competition prices could not rise above costs to the most numerous class of producers; exceptional rewards could be gained only by those who succeeded in introducing new methods; and sooner or later these methods would become general, fixing a new and lower level of costs. Among workingmen, if competition leveled down the wages of the privileged minority, it would level up the wages of the unprivileged majority; and all workers would share in the benefits of the abundance and cheapness of commodities produced by an efficient system.

In a century of experience with the competitive system it has become clear that while much of the good that the system was expected to develop has actually been realized, many evils also have arisen out of it. The supplanting of inferior methods by superior ones has been accompanied by untold hardship to the laborers employed under the former methods. Again, in the matter of the labor contract, competition has often been only one-sided, laborers competing for jobs, with no effective competition of employers for men. Under such a system the interests of labor have naturally suffered. In many cases competition has not expelled the inferior employer from the field, but has forced him to cut wages and drive his working force all the more ruthlessly. In the market for commodities competition has often had the effect of stimulating the progress of adulteration rather than that of improvement. Perhaps the heaviest indictment against the system of free competition has been the development of cutthroat methods; such, e.g., as underselling an efficient but poor competitor until he is driven from the field, and then recovering the cost of the competitive struggle through monopoly prices. Competition of this character, it is generally recognized, leads inevitably to monopoly and should be restrained in the interest of the competitive system itself. There are, further, certain businesses, such as railway transportation, in which competition produces endless discriminations among patrons. Those who are so powerful that their business is worth striving for, and those who have established themselves at strategic points where several routes compete, are favored at the expense of those who are poorer or less favorably situated. Railway competition, it is widely believed, is more injurious to society than railway monopoly.

Competition, finally, entails heavy burdens upon society through the excessive duplication of plant, the distribution among many of the services that could be performed by one, through advertising calculated, not to create a demand for a commodity, but to attract customers away from competitors who would otherwise supply them.

In view of the recognized defects of the competitive system it is not surprising that few economists hold to the doctrine of the sufficiency of competition as a regulator of economic life. In many instances competition itself needs to be regulated, either by mutual agreement or by law; in other instances, especially in matters pertaining to the wages contract, the force of competition needs to be supplemented by positive social regulations. In a part of the economic field—the natural monopolies—it would be desirable to abolish competition altogether.

Literature. The subject of competition is treated, more or less incidentally, in almost all authoritative treatises on political economy (q.v., for bibliography). There is no important work treating of competition in all its aspects. For the inadequacy of competition as a regulator of wages, consult Webb, *Industrial Democracy*, part iii (new ed., London, 1902). For the illegitimate forms of competition now prevalent, consult Eddy, *The New Competition* (New York, 1912). See MONOPOLY; TRUSTS; RAILWAYS; TRADE-UNIONS; POLITICAL ECONOMY.

COMPIÈGNE, kôn'pyâ'ny' (Lat. *Compendium*). A town in the Department of Oise, France, on the river Oise, a little below its junction with the Aisne, and 33 miles east-southeast of Beauvais (Map: France, N., H 3). The town is picturesque and has a remarkable Gothic hôtel de ville, with museum and library, and a magnificent palace built by Louis XV.

It contains a library, a picture gallery, and a museum of Cambodean antiquities. The park is extensive, and adjoining the gardens is the beautiful forest of Compiègne, extending over about 30,000 acres, which in the past has served as a royal hunting ground. The industries of the place are rope making, boat building, manufacture of hosiery, sweetmeats, pipe, chemicals, and hats. There is considerable trade in wool, grain, and cattle. Pop. (commune), 1901, 16,503; 1911, 17,046. Compiègne is mentioned in the times of Clovis under the name of *Compendium*. It was at the siege of this town, in 1430, that Jeanne d'Arc, the Maid of Orléans, was captured; Louis XIII signed treaties with Sweden and Holland here in the seventeenth century; in 1810 Napoleon and Maria Louisa of Austria first met here, on the occasion of their marriage. See De Bicquilley, *Quelques recherches historiques sur les origines de Compiègne* (1875).

COM'PITA'LIA, or LUDI COMPITALICII (Lat., Compitalian games, from *compita*, crossroads). An annual festival in Rome, held between December 17 and January 5, in honor of the *Lares Compitales*, the divinities presiding over places where two or more roads meet, in country or in city. Even slaves had a part in the festival, which seems later to have included public games. Macrobius has a strange story, that Tarquinius Superbus restored the festival, which had been neglected, and sacrificed boys as a part of the services. Human sacrifices, he continued, did not survive the Tarquins, for after their expulsion garlic and poppies were offered. Consult Fowler, *Roman Festivals of the Period of the Republic* (London, 1899), and Wissowa, *Religion und Kultus der Römer* (2d ed., Munich, 1912).

COMPLAINT. At the common law, a formal accusation of a crime preferred before a magistrate or other public authority charged with the duty of making inquiry into its commission. The charge must be specific, and the complaint must state the facts constituting the crime as well as those upon which the complainant relies to establish its commission. The term is also employed in England to denote the accusation laid before a justice of the peace or courts exercising a summary jurisdiction in cases where proceedings are commenced on information and not by indictment.

In the system of code pleading, which has in many of the United States superseded the system of common-law pleading, the first pleading in a civil action, corresponding to the declaration at common law and to the bill in equity, is known as the "complaint." It is thus defined by the New York Code of Civil Procedure (sec. 481): "A plain and concise statement of the facts constituting each cause of action without unnecessary repetition." See INFORMATION; DECLARATION; BILL; PLEADING.

COMPLAINT', THE. A collection of poems in blank verse, by Edward Young (1742), better known under their secondary title, *Night Thoughts*. They were written after the death of his stepdaughter and her husband, who are referred to under the names of Narcissa and Philander.

COMPLAINT OF MARS AND VENUS, THE. A poem by Chaucer, written about 1380, containing an introduction and two separate poems, "The Complaint of Mars" and "The Complaint of Venus." At the conclusion the author says it was taken from the French of "Graunson."

COMPLAINT OF PITY, THE. "How Pitie is dead and buried in a gentle Herte," a poem by Chaucer (1367).

COMPLEAT ANGLER, THE. A famous work on angling, by Isaak Walton (1653). It is written in a pleasing style; parts being in the form of conversations between Piscator, Venator, and Viator—a fisherman, a huntsman, and a pedestrian—interspersed with a few quaint old songs. See ANGLING.

COMPLEMENT (Lat. *complementum*, that which fills up, from *complere*, to fill up, from *com-*, together + *plere*, to fill; connected with Gk. *πιμπλάναι*, *pimplanai*, Skt. *pūr*, *par*, to fill, Lith. *pilnas*, OChurch Slav. *plŭnŭ*, OIr. *lōn*, full, Goth. *fulls*, OHG. *fol*, *foll*, Ger. *voll*, AS., Eng. *full*). In mathematics, that which completes a given magnitude or increases it to the value of a fixed magnitude. In angular measure it signifies the angle which, added to a given angle, produces 90°; e.g., 30° is the complement of 60°, 1° is the complement of 89°, 45° is the complement of 45°, 100° is the complement of −10°, and 0° is the complement of 90°. Such pairs are called complementary angles. The arithmetic complement of an integer is the difference between the integer and the next higher power of 10; e.g., 40 is the arithmetic complement of 60, 1 is the arithmetic complement of 99, 375 of 625, and 7 of 3. The complement logarithm, or "cologarithm," of a number, is the logarithm of the reciprocal of the number, or 10 less than the complement of the logarithm (of the given number). See LOGARITHM.

If through any point on the diagonal of a parallelogram lines are drawn parallel to the sides, four parallelograms are formed. The two of these that are not bisected by the given diagonal are called complements of the given parallelogram.

COM'PLEMENT. In nautical language, all persons designed to be on board a ship for the purposes of navigating or fighting her, or to enable her to carry on the service for which she is intended. The complement includes the officers and crew; but the latter terms apply to the persons actually on board, while the former applies to all who *should* be on board if there are no vacancies.

COM'PLEMEN'TARY COLORS. Colors which, when combined, produce white light. Examples of pairs of such colors are given in the following table:

Red	Green-blue
Orange	Cyan blue
Yellow	Ultramarine-blue
Greenish yellow	Violet
Green	Purple

These colors may be observed readily with a simple polariscope, where polarized light from a Nicol's prism (q.v.) falls upon a prism of calc-spar and glass, in which, by virtue of the doubly refracting power of the calc-spar (see LIGHT, *Double Refraction*), there is furnished a double image of the aperture through which the polarized light from the Nicol passes. If a strip of selenite be interposed between the polarizing prism and the crystal, the two images referred to will be different in color, one shade being complementary to the other. These strips of selenite may be of various thicknesses and

will thus produce various colors. This follows from the well-known principle that, when plane-polarized light is transmitted through a thin plate of a doubly refracting medium, the ordinary and extraordinary rays when examined with a doubly refracting analyzer will give images brightly colored, which where they overlap are white, showing that the two colors are complementary. If two complementary colors are combined—and it must be remembered that the colors themselves, not the pigments, are here meant—then white light is produced. This can be accomplished best, perhaps, with the Maxwell color disk where a disk of cardboard composed of segments of complementary colors is rapidly rotated. The impressions of the two colors follow each other so rapidly that the sensations are blended, and if the colors are used in the right proportions we have a gray tint produced, as the luminosity of the two colors either singly or jointly is not so great as that of a white surface with which it would be compared. Complementary colors vary with the light by which they are viewed and are different when seen by artificial illumination from what they are in the daytime. The explanation is to be found in Young's theory where the color sensation is considered to be furnished by three groups of nerves corresponding to the red, green, and violet-blue waves. If all of these nerves are stimulated together, the sensation produced is that of white light. Consequently a certain red acts on the red nerves, while its corresponding complementary color, green blue, would stimulate the other sets of nerves, and the result of all acting together would be the sensation of white light. For a thorough discussion of this subject, which may be appreciated by the general reader as well as the student of physics, consult Rood, *Modern Chromatics*, a new edition of which was published (New York, 1899) under the title of *A Text-Book of Color*. See COLOR and the authorities there cited; VISUAL SENSATION.

COMPLEX'ION (OF., Fr. *complexio*, from Lat. *complexio*, combination, from *complecti*, to entwine, from *com-*, together + *plectere*, to weave). The color of the skin, existing in the epidermis and dependent upon certain pigment cells. Those persons most exposed to the weather and least under the influence of civilization are usually of the darkest color. Light hair is the usual accompaniment of white and thin skin, while dark hair and dark complexions commonly go together. There does not appear to be any anatomical difference in the skins of persons of light and dark complexions; the differences are the result of temperature, climate, and exposure. The more decided differences in skin color which may be called racial—the white of the Caucasian, the brown or olive of the Mongolian, the yellow or tawny of the Malayan, the red of the Amerind, and the black of the African and Australian—are apparently connected with deep-seated physiologic processes as well as hereditary causes; they are discussed elsewhere. See SOMATOLOGY.

COMPLEX NUMBER. The steps in the growth of the number system of algebra may easily be illustrated by the roots of equations, thus:

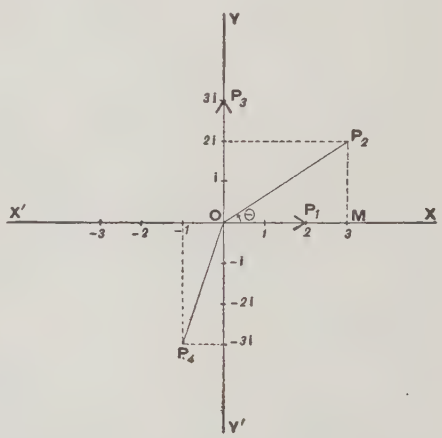
The solution of the equation $x - 3 = 0$ is 3, a positive integer which may be represented graphically on a straight line. The solution of the equation $3x - 2 = 0$ is $\frac{2}{3}$, a fraction which may also be represented graphically on a straight line. The solution of $x^2 - 2 = 0$ is $\sqrt{2}$, a surd which may be represented by the diagonal of a square whose side is 1. The solution of $x + 2 = 0$ is -2, a negative number, which may be represented on a straight line in the opposite direction from that of the positive number. But the solution of

$$x^2 + 2 = 0 \text{ is } \pm\sqrt{-2} \text{ or } \pm\sqrt{2}\cdot\sqrt{-1},$$

called an "imaginary number." The symbol $\sqrt{-1}$ is commonly called the "imaginary unit" and is represented by i. All numbers containing the factor i are called "imaginary numbers," as opposed to real numbers; e.g.,

$$\pm i,\ \pm 2i,\ \pm 3i,\ \ldots .\ \tfrac{2}{3}i,\ \pm\sqrt{2}.i$$

are imaginaries. The algebraic sum of a real number and an imaginary is called a complex number; e.g., $1 + i$, $2 - 4i$, and in general $a + bi$. A complex variable is generally expressed by $x + yi$, in which x and y are real



variables. Complex numbers are represented graphically in a plane. In the figure the real numbers are laid off on the axis XX' in the usual way, and the coefficients of i on the axis YY'. The points in the plane corresponding to these coördinates represent the complex numbers. Thus, P_1 on the axis represents the real number 2, P_2 represents the complex number $3 + 2i$, P_3, represents $3i$, and P_4 represents $1 - 3i$. Any point and the origin uniquely determine a line segment, or vector, called the modulus of the complex number, and this may also be taken to represent the number. In the figure the moduli are OP_1, OP_2, OP_3, OP_4. In general, the modulus of a complex number $a + bi$ is the diagonal of a rectangle of sides a and b; hence its absolute value is $\sqrt{a^2 + b^2}$. Thus, the modulus of $3 + 2i$ (OP_2 in the figure) is $\sqrt{9 + 4}$ or $\sqrt{13}$. The convention as to the direction of i is a reasonable one; for since multiplying $+1$ by -1 revolves it through 180° to the position -1, therefore its multiplication by one of the two equal factors of -1, viz., $\sqrt{-1}$, may be interpreted as revolving it through 90°. There are other sufficient reasons for this convention, which will be evident to one who studies the subject. The complex number is a directed magnitude; i.e., it has both extension and direction in its plane. This is best understood by considering the number $a + bi$ in

the form $r(\cos\theta + i\sin\theta)$, in which r is the modulus $\sqrt{a^2+b^2}$, and θ is the amplitude. In the figure $\cos\theta = \frac{a}{\sqrt{a^2+b^2}}$, $\sin\theta = \frac{b}{\sqrt{a^2+b^2}}$ (See TRIGONOMETRY.) This method of representing the complex number as a directed magnitude in a plane was at one time thought to be due to Argand, and hence the figure is often called "Argand's diagram." Two complex numbers which differ only in the sign of the imaginary part are called conjugates; e.g., $2 + 3i$ and $2 - 3i$, or, in general, $a + bi$ and $a - bi$. Complex numbers are subject to the associative, commutative, and distributive laws, and, when combined by the fundamental operations of algebra, yield no number not already defined in this article. For $x + yi$ represents real numbers when $y = 0$, imaginaries when $x = 0$, and complex numbers when x, y are real and not zero. Hence $x + yi$ becomes a convenient form for representing general numbers; and instead of saying that every equation has a root, which may be real, imaginary, or complex, we may say that every equation has a root $x + yi$. If, in plotting the successive moduli of a sum, the second modulus is drawn from the end of the first, the third from the end of the second, and so on, the result is a broken line which may be closed by connecting the last point with the origin. This vector is called the sum. Since no side of a polygon is greater than the sum of the remaining sides, the modulus of the sum of any number of complex numbers is not greater than the sum of their moduli. This is expressed symbolically thus:

$$|N_n| \leqq |N_1| + |N_2| + \ldots |N_{n-1}|$$

Multiplying the expression $r(\cos\theta + i\sin\theta)$ by $r'(\cos\theta' + i\sin\theta')$ and applying the formulas for the functions of the sum of two angles (see TRIGONOMETRY), the product is $rr'[\cos(\theta+\theta') + i\sin(\theta+\theta')]$. Hence the product of the moduli of two complex numbers is the modulus of their product, and the sum of the amplitudes is the amplitude of the product. Similarly for n complex numbers. For brevity, let $r\mathrm{cis}\theta \equiv r(\cos\theta + i\sin\theta)$, then $r_1\,\mathrm{cis}\theta_1 \cdot r_2\mathrm{cis}\theta_2 \cdot \ldots r_n\mathrm{cis}\theta_n = r_1 \cdot r_2 \ldots r_n\mathrm{cis}(\theta_1+\theta_2+\ldots\theta_n)$. This is known as De Moivre's theorem. If each of the above numbers equals the first one of them, $(r_1\mathrm{cis}\theta_1)^n = r_1{}^n\mathrm{cis}_n\theta_1$ or the nth power of the complex number. The quotient of $r_1\mathrm{cis}\theta_1$ by $r_2\mathrm{cis}\theta_2 = \frac{r_1}{r_2}\mathrm{cis}(\theta_1 - \theta_2)$, and $\sqrt[n]{r_1\,\mathrm{cis}\theta_1} = \sqrt[n]{r_1}\cdot\mathrm{cis}\,\frac{1}{n}\theta$.

By observing the changes in the modulus and amplitude, the results of any of these operations may be represented graphically. The variation of a function of a complex variable $x + yi$, due to the variation of x and y, is very important in the theory of equations and functions. Thus the fundamental proposition that every equation has a root is a consequence of Cauchy's theorem which asserts that the number of roots of any equation comprised within a given plane area is obtained by dividing by 2π the total variation of the amplitude of the function corresponding to the complete description, by the complex variable of the perimeter of the area.

The first appearance of the imaginary is found in the *Stereometria* of Heron of Alexandria (third century B.C.). Diophantus (supposed to have flourished in the third century A.D.) met these numbers in his algebraic work, but failed to give an explanation. Bhaskara (born 1114) recognizes the imaginary, but pronounces the roots involving $\sqrt{-1}$ to be impossible. Cardan (1545), in his *Ars Magna*, was the first mathematician who had the courage to use the square roots of negative numbers in computation. Bombelli, Girard, and Descartes (q.v.) formulated rules for the use of such quantities as $a + b\sqrt{-1}$, but founded no theory. Wallis (1685) made the first attempt to give a geometric interpretation. Euler (1770) still regarded these quantities as impossible. Thus it was reserved for Casper Wessel (1797), a Norwegian surveyor, to invent a graphic treatment of complex numbers. His method is contained in a memoir, presented to the Royal Academy of Science and Letters of Denmark, entitled *On the Analytic Representation of Direction*. For the early development of the subject, however, credit must be given to Argand, Gauss, Servois, and others, since Wessel's article (published in 1799 by the Royal Academy of Denmark) did not appear in French until 1897, 100 years after its presentation. Gauss did much to establish the underlying principles. Argand's memoir (1806), unquestionably an original and independent production, supplied the graphic theory that lay neglected in the work of Wessel. François Servois, Gergonne, and Cauchy did much to correct the errors of their predecessors and to generalize the theory of directed lines.

Complex number, being the most general type of algebraic number, has come to occupy a place of very high importance in modern analysis. It has led in recent times to the establishment of the theory of functions (q.v.) and quaternions (q.v.). Consult: Beman, "A Chapter in the History of Mathematics," in the *Proceedings of the American Association for the Advancement of Science* (Salem, 1897); Cauchy, *Cours d'analyse* (Paris, 1821); Warren, *A Treatise on the Geometric Representation of the Square Roots of Negative Quantities* (Cambridge, 1827); Chrystal, *Algebra*, part i (Edinburgh, 1889); Hankel, *Vorlesungen über die complexen Zahlen* (Leipzig, 1867); Durège, *Theorie der Functionen einer complexen veränderlichen Grösse* (ib., 1873), trans. by Fisher and Schwatt as *Elements of the Theory of Functions of a Complex Variable* (Philadelphia, 1896); Wessel's work above mentioned.

COMPLU'VIUM. See ATRIUM; IMPLUVIUM.

COMPONÉ, kŏm-pō'nā (Fr., composed), or GOBONY. In heraldry, a term describing a field or charge bearing a row of small squares, consisting of alternate metals and colors.

COMPOSITÆ, kŏm-pŏz'ĭ-tē (Lat. nom. pl., from *compositus*, p.p. of *componere*, to put together, from *com-*, together + *ponere*, to put, from *po-*, Gk. *ἀπό, apo*, off + *sinere*, to allow). The largest family of angiosperms, comprising approximately 1000 genera and over 13,000 species. This family is regarded as the culmination of the plant kingdom, i.e., the ranking family of plants. The nearest approach to it in number of species is the family Leguminosæ, with approximately 11,000 species. The familiar representatives of the family are such plants as the sunflower, aster, goldenrod, thistle, dandelion, etc. The name of the family is derived from the fact that the older botanists regarded the head of the flowers as a single flower, which they called a "compound flower." This so-called compound flower is really a community of flowers organized

together in a single structure called the *head*. Investing this head and resembling the calyx of an ordinary flower, is the *involucre*, which is a collection of bracts of various forms, colors, and relations to one another. The numerous small flowers stand upon a broad *receptacle*, which is ordinarily flat, but may be hemispherical to cylindrical. In some cases there are bracts upon this receptacle, among the flowers, in addition to the bracts upon the involucre that surround the whole head. These bracts of the receptacle are called *chaff*, and when they do not occur the receptacle is said to be *naked*.

There are two kinds of flowers which most commonly occur together in the same head. The outermost flowers usually have conspicuous petals and are called the *ray flowers*. The inner flowers, much the more numerous, form the *disk* within the ray flowers and are inconspicuous and tubular. In the sunflower, e.g., the yellow ray flowers are very conspicuous as contrasted with the numerous small flowers of the broad disk; while in the dandelion all the flowers have conspicuous corollas, so that there is no distinction between ray and disk flowers; in other cases there are no ray flowers, all the flowers being inconspicuous and tubular. These two kinds of flowers have been used to divide the Compositæ into two great series: *Tubuliflorœ*, those that have tubular flowers and also usually ray flowers; and *Liguliflorœ*, those that have no tubular flowers, all the flowers having conspicuous corollas, which are strap-shaped (ligulate).

The ordinary rôle of a calyx in protecting the more delicate parts within is taken by the involucre, and therefore, in the Compositæ the calyx is very much modified, being called the *pappus*. Familiar forms of pappus are a crown of delicate plumes, as in the dandelion and thistle down; a cluster of coarse bristles; barbed teeth as in Spanish needles, beggar-ticks, etc.; ordinary scales; or merely an inconspicuous crown. These various kinds of pappus have to do with the distribution of seeds, the plumed forms being carried about by the wind and the barbed forms catching in the fur of animals.

The stamens are very characteristic, the five filaments being distinct, but the anthers forming a tube. The anthers shed their pollen on the inside of the tube, through which the stigma is pushed by the elongation of the style, much as a swab is pushed through a cylinder. By this means the pollen is brought to the surface of the head, so that an insect moving about upon the head becomes dusted with it. The carpels are two in number, but mature as a dry seedlike fruit (*achene*) containing a single seed. The position of the achene indicates the advanced rank of the family, inasmuch as all the flower parts seem to rise from its apex (an epigynous flower).

There is great differentiation of flowers among the Compositæ in reference to the occurrence of stamens and pistils. All the flowers in a head may not have both of these organs. Among the Tubuliflorœ the most common situation is to find the ray flowers without stamens, or with neither stamens nor pistils (neutral), while the tubular disk flowers have both. In some cases the disk flowers are "sterile," and the ray flowers "fertile." In one group of the Tubuliflorœ the heads are differentiated, all the flowers of a head being either staminate or pistillate, and these two kinds of heads may occur on different plants. The two great series of Compositæ referred to are further divided into 13 tribes, whose names may be found in any manual. In the flora of the United States 10 of these tribes are represented, 9 of them belonging to the Tubuliflorœ.

It is somewhat remarkable that the largest family of angiosperms contains so few plants that have been found to be of economic importance. Aside from a certain number of species cultivated for their flowers or foliage, some of the most economically important species of Compositæ are lettuce, salsify, artichoke. Of course, chicory, dandelion, tansy, chamomile, etc., are common plants, but cannot be regarded as of economic importance. Medicinal properties are claimed for quite a number of species, as arnica, wormwood, elecampane, coltsfoot, etc.

COMPOSITE NUMBERS. See PRIMES.

COMPOSITE ORDER. See COLUMN; ORDERS OF ARCHITECTURE.

COMPOSITE SHIPS. Ships built with iron or steel frames and wooden planking. In some cases the framing is stiffened by keel plates, stringers, deck plates, longitudinals, etc. The planking is bolted to the frames and sometimes additionally pinned edgewise to the planks on each side. It is almost invariably sheathed with copper as a protection against fouling—indeed, it is chiefly to provide against fouling that ships are composite built. This method of construction never had much vogue in the mercantile marine; in the navies of the world it is rapidly falling into disuse on account of the galvanic action of the copper upon the plating and propeller shafts and struts, and because ships need docking sufficiently often for other reasons than fouling of the bottom to render the superiority of coppered ships in this respect of less importance than their inferior strength and increased cost. See SHIPBUILDING.

COM'POSI'TION (from OF., Fr. *composition*, from Lat. *compositio*, connection, from *componere*, to put together). In painting, that ordered arrangement of light and shade, of color and line, which shall directly impress the beholder with the thought and idea the artist wishes to express. The most important requisite of composition is unity. Every object must form a harmonious part of the whole and be in distinct relation to the rest of the picture. As Millet said: "A work should be all of a piece, and people and things should be there for an end." Whatever their color or shape, all objects in the picture should be seen under like conditions of light, shade, and atmosphere. There should be some object or objects of special interest, to which the remainder of the picture should be strictly subordinated.

The subject treated and the individuality of the artist usually determine the composition of a picture. There are, however, some generally accepted maxims in regard to linear composition which should be mentioned. The perpendicular line is one of dignity and severity, and its predominance in a picture produces a simple, majestic effect (e.g., the early Italian portraits). The predominance of the horizontal line produces an effect of repose or solemnity, as is seen in the composition of most landscapes. The flowing or waving line is the line of beauty and grace, and it is for this reason that the drawing of the human figure is esteemed so important.

There have been many theories of composition, more or less arbitrary. The Italians generally use the pyramidal composition, in which the Madonna forms the apex of the pyramid, with a

balanced group of standing or kneeling saints on either side. As art advanced, they also used the oval composition, in which the figures form a circle on the canvas (e.g., Raphael's "Madonna della Sedia"), the arch (Correggio's "Coronation of the Virgin"), the diamond shape (Sistine Madonna), and others. In landscape the themes of composition were even more numerous. In modern composition there is greater freedom, the artist following his own inclination. Nevertheless, he usually leans upon some well-established principles, although he may not be conscious of them, since analysis is the work of the critic rather than of the artist. Millet is an excellent example of a free and original method of composition in the modern sense. Consult: J. C. Van Dyke, *Art for Art's Sake* (New York, 1901); Blanc, *Grammaire des arts de dessin* (Paris, 1882); Burnett, *Practical Treatise on Painting* (London, 1880).

COMPOSITION AND RESOLUTION OF FORCES AND MOTIONS. See MECHANICS.

COMPOSITION WITH CREDITORS. In law, an arrangement made by an insolvent debtor with several or all of his creditors, by which they accept the payment of a percentage of their claims in full satisfaction and discharge of the whole. An agreement between a debtor and a single creditor that the latter will discharge the former from all liability upon the former's payment of a part of the debt is void by common law, because, it is said, this payment is no consideration for the creditor's promise to relinquish the balance of the debt, being only a payment of what the debtor already owed and was legally bound to pay. An agreement between a debtor and several or all of his creditors possesses an additional element. Such an agreement is binding upon all, it is said, because each creditor promises to release the balance of his claim, over and above the percentage paid to him, in consideration of such payment and also in consideration of the promises of other creditors to do likewise. It is held to be the substitution of a new agreement with different parties for an old debt. If any of the creditors entering into such a composition agreement stipulates secretly with the debtor for a preference to himself, his stipulation is void. Bankruptcy statutes often provide for and regulate composition proceedings between the bankrupt and his creditor. See BANKRUPTCY; CONTRACT.

COM'POST (OF. *composte*, It. *composta*, Portug. *composto*, mixture, from Lat. *componere*, to put together). A mixture of fertilizing materials which has been subjected to fermentation. Composts are usually prepared by mixing animal manures or other readily putrescible substances with peat (q.v.), straw, leaves, road scrapings, mud, loam, etc., with a view to causing fermentation and chemical changes, which will render these substances more active as fertilizers than they were in their original condition. Similar results are sometimes brought about by the use of ashes, lime, marl (qq.v.), alkali salts, etc. Frequently also preservative substances, such as gypsum, kainit, superphosphate (qq.v.), etc., are added to prevent the loss of ammonia or of nitrogen in the free state, which is likely to occur during fermentation. Composting is thus not only a means of rendering the constituents of various more or less inert materials more available as plant food, but also of preventing loss of the most valuable constituent of manures, viz., nitrogen. A compost which was formerly quite popular consists of alternate layers of barnyard manure, 1 part, and peat, 1–5 parts, the proportion of the latter depending upon the fermentative power of the manure. In this mixture the peat prevents the loss of ammonia and the valuable manure liquids, and the manure sets up a fermentation in the peat which greatly increases the availability of the inert nitrogen in which this material is comparatively rich. When lime, ashes, or lime and salt mixtures are substituted for manure in the peat compost, the alkaline character of these substances promotes the decomposition of the peat in much the same way as the manure. The fermenting compost heap has been utilized for the reduction of bones and ground mineral phosphates; and meat, fish, slaughterhouse refuse, etc., are sometimes incorporated in it, but composts containing any considerable amount of the latter substances are likely to be very offensive. Moreover, these materials are less benefited by the process than more inert substances. Composting is an effective means of "killing," i.e., destroying the germinating power of cottonseed intended for use as a fertilizer. This is done in Furman's formula for cotton, which formerly had considerable celebrity and is as follows: Barnyard manure, 750 pounds; cottonseed, 750 pounds; acid phosphate, 367 pounds; kainit, 133 pounds. The plan of composting these materials, which well illustrates the methods of composting in general, is briefly as follows: Put down on an impervious dirt floor first a layer of manure, then of cottonseed, and lastly of acid phosphate, in the proportions given, distributing the kainit throughout the different layers. Repeat the layers to any desired extent and cover the heap with absorbent earth. The heap should be kept moderately moist, and if made in the autumn should stand until spring, when it is dug down, mixed, and applied. Although composting furnishes a valuable means of converting waste materials of the farm into more active and better-balanced fertilizers, the labor involved is so great as to render the practice of doubtful economy for general agricultural purposes, especially since the general introduction of the more concentrated and active commercial fertilizers. (See MANURES AND MANURING.) Composts have been recommended especially for use on grass lands and on stiff soils or on those deficient in humus. They find their greatest usefulness, however, in horticultural operations—for plant beds, potting, and for use on vines, fruits, etc., which might be injured by more concentrated fertilizers. Perennial plants, or those having long periods of growth, will utilize the fertilizing matter of composts to the best advantage. Composts are not so well suited to the forcing of quick-growing crops as commercial fertilizers. For further information regarding composts, consult: Dana, *Muck Manual for Farmers* (4th ed., New York, 1858); Storer, *Agriculture in Some of its Relations with Chemistry* (7th ed., ib., 1897); Johnson, *Peat and its Uses as Fertilizer and Fuel* (ib., 1866); Sempers, *Manures: How to Make and How to Use Them* (Philadelphia, 1893); Brooks, *Agriculture* (Springfield, Mass., 1901); Thorne, *Farm Manures* (New York and London, 1913).

COM'POSTEL'LA, ORDER OF SAINT JAMES OF, or ORDER OF SAINT JAMES OF THE SWORD. An order of knighthood in Spain. To defend the multitude of pilgrims that thronged to the shrine of St. James at Compostella (Santiago), in

Galicia, Spain, from the Moors, 13 noblemen formed themselves into a military order, under the auspices of the Pope, in 1175. With time the order rose to immense power and wealth. It fought valorously in all the Moorish wars and exercised great political influence. But its rich towns and abbeys tempted Ferdinand and Isabella, who took possession of its property in 1493 and held it until 1522, when a papal bull vested the permanent grand mastership in the crown.

COMPOUND, Chemical. See Chemistry.

COM'POUND ANIMALS. Such animals as are made up of a number of morphological units, called *persons*, which are organically connected throughout life. The connection results from a budding process, in which the buds never become separated from the parent stock. Compound animals are found among protozoans, sponges, cœlenterates, certain flatworms (planarians and tapeworms), bryozoans, some annelids (*Syllis*), and tunicates. The degree of connection varies. When it is loose, the complex is called a "stock"; when close, a "corm," as in sponges. Most compound animals are sessile, but the siphonophores, flatworms, and some tunicates swim free. The opposite of this term is "simple animals."

COMPOUND BLOWPIPE. See Oxyhydrogen Blowpipe.

COMPOUND FRACTURE. A fracture of a bone accompanied by a wound which opens from the surface of the body to the break in the bone. Infection of the bone being thus rendered possible, a compound fracture is more serious than a simple fracture. See Fracture.

COMPOUNDING OF FELONY. The offense of taking value for forbearing to prosecute a felony. This offense is punishable with fine and imprisonment. Compounding of informations upon penal statutes and compounding of misdemeanors are also illegal and are punishable in a lighter degree. In Great Britain the compounding of misdemeanors is permitted in some cases with the leave of the court, especially in the case of a misdemeanor affecting private (and not public) rights. Accepting a promissory note signed by a party guilty of larceny, as a consideration for not prosecuting, is enough to constitute the offense; but the mere retaking of stolen goods by the owner is not an offense, unless it is agreed that the thief is not to be prosecuted. A note or other obligation given in consideration of stopping a criminal prosecution or an agreement not to prosecute is void. See Criminal Law, and the authorities there referred to.

COMPOUND INTEREST. See Interest.

COMPOUND MICROSCOPE. See Microscope.

COMPOUND PIER. See Clustered Pier.

COM'PRADOR' (Sp., Portug., purchaser). In China, Japan, and the Philippines, a man who contracts for the supply of provisions to ships.

COMPRESSED AIR. See Power Transmission; Air Compressor; Compressed-Air Engine; Compressed-Air Locomotive; Pneumatic Tools; Pneumatic Dispatch.

COMPRESSED-AIR ENGINE. An engine using as a motor fluid air to which a degree of energy has been imparted by compression by mechanical means. When atmospheric air is compressed in an air compressor (see Air Compressor), energy is stored in it which is available for work in a piston motor just as in the energy stored by heat in steam. Any form of engine which will operate with steam as a motive fluid will also operate with compressed air as a motor fluid; i.e., a steam engine will become a compressed-air engine simply by disconnecting the steam boiler and substituting a receiver or reservoir of compressed air. Compressed air is, however, employed to replace steam only under those conditions in which it is necessary to transmit the motor fluid to motors located at scattered points some distances from the source of supply; and where the exhaust steam would be objectionable, while the exhaust air is not, as in mines or confined chambers or submarine vessels; and where the energy must be carried on a vehicle without heat, as on street railways. The reason for this is that while it is not possible to convey steam through pipes or to carry it in inclosed vessels for long distances without a great loss of energy due to condensation, it is practicable to do this with compressed air, with a comparatively small loss of energy if the air be heated before it is delivered to the motors at the end of its journey. Hence compressed-air engines are practically always motors of special forms for performing special operations and are usually of small size. For descriptions of the various special forms of compressed-air engines in common use, see Drill: Pneumatic Tools; Power Transmission; Street Railway.

COMPRESSED-AIR LOCOMOTIVE. A locomotive engine in which air under pressure takes the place of steam as the propulsive force. Compressed-air locomotives occupy a rather limited field of usefulness, their chief applications being street-railway propulsion on a limited scale, mine, quarry, and tunnel haulage, and haulage around cane plantations, saw mills, cotton presses and warehouses, textile works, and powder mills, where the risk of fire has to be carefully avoided. Structurally, a compressed-air locomotive has the same form of propelling mechanism as a steam locomotive, but in place of the boiler there are tanks for holding compressed air, these tanks being recharged at intervals at a stationary air-compressor plant. A brief description of the use of compressed-air locomotives for street-railway propulsion and for mine haulage will give a fair idea of the two distinctive classes of these motors.

Street Railway Motor Cars. Numerous attempts have been made in the United States to employ compressed air for propelling street-railway cars; but, with the exception of a few short lines operating under special conditions, these attempts have all resulted in commercial failures. Probably the most extensive experiments have been conducted in New York City, on some of the railway lines crossing the city from east to west. In all of these experiments a motor-driven car has been employed carrying the tanks underneath the seats or under the floor of the car. In Europe the Mekarski system of compressed-air street-car locomotion has been used apparently with considerable success in Paris, France, and Berne, Switzerland. A special feature of the Mekarski system is the heating of the air, to maintain it at a constant temperature, by passing it through superheated water at 330° F. The air thus becomes saturated with steam, which subsequently partly condenses, its latent heat being absorbed by the expanding air. The pressure used at Berne in the car reservoirs is 440 pounds per square inch. The engine is constructed like an ordinary steam

tramway locomotive and drives two coupled axles spaced 5.2 feet apart. It has a pair of outside horizontal cylinders, 5.1 by 8.6 inches; four coupled wheels, 27½ inches in diameter. The total weight of the car, including compressed air, is 7¼ tons. The storage tanks consist of 10 sheet-iron cylinders with an aggregate capacity of 64¼ feet of compressed air. The cars will run for 4 miles without refilling the reservoirs. On the Paris lines the pressure used is 547 pounds, and the cars make trips of 7 miles without refilling the reservoirs.

Mining Locomotives. As generally constructed, the air for mining locomotives is stored in one or two steel tanks having a cubic capacity designed for the length of run, weight of train, grades, etc. These tanks usually occupy the space that the boiler does on an ordinary steam locomotive. The air from the main tank or tanks is conducted through copper-pipe connections to an auxiliary reservoir of suitable diameter. The pressure in this auxiliary tank can be regulated (usually 150 pounds) anywhere from 30 pounds up to 300 pounds, as required. The air is reduced and controlled from the main tank by a reducing valve and stop valve, and can be regulated to any pressure at a moment's notice; when once set, a constant pressure is maintained in the auxiliary reservoir. The air is fed to the engine cylinders from the auxiliary reservoir. Compressed-air locomotives for industrial uses are built substantially the same as mining locomotives. Electric locomotives have largely replaced the air-propelled types.

From the preceding it will be seen that the two types of compressed-air locomotives are the compressed-air motor car for street-railway propulsion and the compressed-air locomotive proper for mine, plantation, and factory haulage. In both forms the original prime motive power is usually steam, or a head of water whose energy, as it comes from the boiler or hydraulic motor, is employed to drive the air compressors; and, as transformed and stored in the compressed air, to propel the car motor or locomotive proper. See Air Compressor; Compressed-Air Engine.

COMPRESSED-AIR TREATMENT. A term applied to the use of air under pressure for therapeutic purposes. The treatment is administered in one of the following two ways: (1) by causing the patient to enter an air-tight chamber, in which air is forced under pressure till the desired density is obtained; (2) by causing the patient to enter a cabinet in which he is seated in such a position as to receive into his mouth the end of a tube which, passing through the front of the cabinet, connects the cavity of his lungs with the outside atmosphere, while an apparatus on the roof of the cabinet is so arranged as to pump air out of the cabinet. In the air-tight room the pressure upon all parts of the patient's body, including the lung cavity, is the same. In the cabinet the pressure within the lung cavity is many times greater than on the rest of the body, thus causing great expansion of the lungs and chest. The latter treatment relieves collapse of pulmonary vesicles and consolidations in many cases; the former treatment is said to cause increased absorption of oxygen and an improved function of the mucous membrane of the respiratory tract. Both methods of treatment are used in cases of tuberculosis, and the former also in chronic bronchitis and asthma, at certain water cures. See Aërotherapeutics; Tuberculosis; Caisson Disease.

COMPRESSIBILITY (from Lat. *compressus*, p.p. of *comprimere*, to compress, from *com*, together + *premere*, to press). That property of bodies by which they admit of being pressed into less space than they otherwise occupy. It is measured by the relative change of volume produced by the application of unit pressure. The particles composing bodies are in all cases at greater or less distance from one another; and whatever brings the particles closer together diminishes the volume or bulk of the body. This may be effected by various agencies, as, e.g., by the withdrawal of heat, but the effect is called compression only when it is caused by mechanical force, as by pressure or by percussion. All bodies are compressible, but in different degrees. Solids and liquids were at one time believed to be incompressible; more accurate experiments, however, have proved that this is not the case; water, e.g., subjected to a pressure of 15,000 pounds to the square inch, loses one-twentieth of its volume, and under greater pressures the loss of volume is still greater. The law connecting the pressure and volume of solids or liquids at constant temperature is as yet unknown; it will probably remain unknown until the molecular condition of substances in these states of aggregation is more perfectly understood than it is to-day. Gases are strikingly compressible, and by means of a common air pump a very large amount of air can be forced into the space of one cubic inch. The variation of the volume of a gas with the pressure is expressed by the law of Boyle and Mariotte as long as the pressure is moderate. Under greater pressures gases follow approximately the law of Boyle and Mariotte as modified by Van der Waals. See Gas; Molecules—Molecular Weights.

COMPRES'SOR. An instrument used on shipboard for temporarily checking the running of the anchor chain. It consists usually of a curved arm pivoted at one end and arranged to be swung across the underside of the chain pipe through the deck and grip the chain by pressing it against the lip of the pipe. The term was also applied to an attachment to old-type guns for checking the recoil by squeezing two or more surfaces together and thus increasing the friction.

COMPRESSOR, Air. See Air Compressor.

COM'PROMISE MEASURES OF 1850, or Omnibus Bill. A name popularly given to a series of measures passed by the United States Congress in 1850, directed to a general settlement of certain questions arising out of the struggle over slavery. The affirmance of American rights in the Oregon territory, by the Treaty of 1846 with England, and the acquisition of still larger territories from Mexico by the Treaty of Guadalupe-Hidalgo (q.v.), made urgent the problem of providing suitable governments for this territory, and at the same time made acute the controversy between North and South over the securing of acceptable provisions concerning slavery in the statutes organizing such governments. One phase of this controversy ended with President Polk's approval, Aug. 14, 1848, of a bill providing for the erection of territorial government in Oregon with a prohibition against slavery. With reference to the territory acquired from Mexico, the problem was complicated by the fact that Mexico had abolished slavery in her dominions, by the question whether the line of the Missouri Compromise (q.v.) extended to the Pacific, and also by the question whether Congress might admit into the Union

a State which had not passed through the Territorial stage of organization. The necessity of an early decision was emphasized by the sudden peopling of much of this Territory, incident to the discovery of gold. Under such circumstances Henry Clay offered in the Senate, on Jan. 29, 1850, a general scheme of adjustment, which provided that California should be admitted as a State with her free constitution; that Territorial governments should be created in the other portions of the Mexican cession without reference to slavery; that trading within the District of Columbia in slaves brought there for purpose of sale should be forbidden; that there should be a more stringent fugitive-slave law; and that Texas should release all claims on New Mexico in return for the assumption by the national government of the old Texan debt. These proposals were attacked both by the Southern friends of slavery and by the more extreme antislavery element at the North. After several weeks of heated debate, including the last speech of Mr. Calhoun (q.v.) and the famous Seventh of March speech of Mr. Webster (q.v)., the whole matter was referred to a committee of 13, from which committee, on May 8, Mr. Clay reported three bills. The first provided, in addition to details as to the debt and boundary of Texas, for the admission of California with its antislavery constitution, and for the Territorial organization of Utah and New Mexico (then including the present Arizona) in such form that slavery should be allowed in those Territories. The second bill provided for a modified fugitive-slave law. The third bill provided for the abolition of the slave trade in the District of Columbia. Three months even then were occupied with animated and protracted discussions, with the result that the whole scheme of compromise seemed to have proved a failure. Mr. Fillmore, however, having succeeded to the presidency upon the death in July of President Taylor, adopted a policy more favorable than had his predecessor to the measures proposed, with the result that practically the whole of Clay's plan eventually became law, although divided into several statutes. The Senate passed the bill for the organization of Utah on August 1, that concerning Texas on August 9, that for the admission of California on August 13, that concerning New Mexico on August 15, the new fugitive-slave law on August 26, and, finally, the law prohibiting the slave trade in the District of Columbia on September 16. Before the end of September all these bills had passed the House and had been signed by the President. The arrangement thus effected was accepted by both parties in the campaign of 1852, in the "finality" planks of their platforms, and the slavery question was generally regarded as settled. The quiet was broken abruptly, however, and the whole controversy renewed with increased bitterness when Stephen A. Douglas (q.v.) introduced his bill for the organization, in 1854, of Kansas and Nebraska, and thus precipitated the battle anew both on the fields of Kansas and in the halls of Congress.

In the first volume of Rhodes, *History of the United States from the Compromise of 1850* (new ed., New York, 1901), a careful review is given of all the circumstances connected with this famous compromise, including sketches of the chief participants in the debates. A shorter review of the situation is given in the fifth volume of Schouler, *History of the United States under the Constitution* (Washington, 1889). The lives of statesmen of the period should also be consulted. See SLAVERY.

COMPTOM'ETER. See CALCULATING MACHINES.

COMP'TON, EDWARD (MACKENZIE) (1854–). An English actor, born in London. He made his first appearance at the new Theatre Royal, Bristol, in 1873, and his first appearance in London at Drury Lane in 1877. He accompanied Adelaide Neilson on her American tour, returning in 1880. In 1881 he organized the Compton Comedy Company, and with this organization during a period of 30-odd years he built up a repertory of more than 50 plays. In 1911 he was associate manager of the Kennington Theatre, and in 1912 and 1913 he toured as Nobody in *Everywoman.*

COMPTON, HENRY (1632–1713). An Anglican bishop of Oxford (1674) and of London (1675). He was born at Compton Wyngates and was educated at Oxford. He was the tutor of the daughters of James II, Mary and Anne, who through his teachings became attached to the Protestant faith. In 1686, at the instigation of James, he was suspended by the high court of ecclesiastical commission from further exercises of episcopal functions, on the alleged ground of having permitted the preaching of controversial sermons within his dioceses. This suspension was reversed in 1688. Compton was one of the active leaders of the revolution of 1688, and he used his influence to have William and Mary crowned King and Queen of England. He presided over the Upper House of Convocation in 1689 and assisted in the revision of the liturgy.

COMPTROLLER, kon-trōl'er, or **CONTROL'LER** (OF. *contreroleur,* Fr. *contrôleur,* from ML. *contrarotulator,* keeper of a check roll). An officer who keeps financial accounts or sees that they are properly kept and audited. In the United States Treasury Department the Comptroller of the Treasury supervises and reviews the actions of the various auditors of the Treasury, upon appeal, advises the heads of departments as to constructions of laws, and countersigns all warrants of the Secretary of the Treasury. The Comptroller of the Currency has charge of the execution of the laws relating to the issue and regulation of the national bank currency and has a general supervision of the national banks. By the Banking Act of Dec. 23, 1913, the Comptroller is made a member of the Federal Reserve Board, having supervision over the reserve system created by the law. State and municipal comptrollers in the United States have duties similar to those of the Federal officials.

COM'PURGA'TION (Lat. *compurgatio,* purification, from *compurgare,* to purify, from *com-,* together + *purgare,* to purge, from *purus,* pure + *agere,* to perform). An ancient method of proof in legal proceedings, generally known in England as the "wager of law." It consisted in the purgation, i.e., the purging or clearing, of a defendant by the sworn oaths of a certain number of other persons. The procedure was singular in this, that the witnesses swore, not to their knowledge of the fact in issue, but to their belief that the defendant was telling the truth. The number of compurgators was often 12; but it varied according to the rank of the person accused and according to the seriousness of the crime or action. It was seldom employed when the proof of the crime was accessible.

When it had been allowed and proof of the man's guilt was afterward obtained, the compurgators usually suffered the same penalty as the accused. The procedure was available in many forms of civil suit and in criminal proceedings. Compurgation was employed as a part of the regular procedure of the ecclesiastical courts throughout Europe in the Middle Ages. It existed among the Anglo-Saxons and was in use in the courts of the common law in England until it was gradually superseded by the jury system. Though long obsolete, it was revived in England in an action of debt as late as 1824 (Ring *v.* Williams, 8 Barn. and Cress. 5387). It was not until 1833 that it was finally abolished by Act of Parliament (2 and 3 Will. IV, c. 42, § 13). In other European countries, except Spain, it was in use later than in England; in Italy it was employed in a clerical court in November, 1904. It never existed in the legal procedure of the United States or of the English Colonies in America. See JURY; OATH; PROOF; WITNESS. The procedure is elaborately discussed by Blackstone, *Commentaries on the Laws of England.* See also Inderwick, *The King's Peace: A Historical Sketch of English Law Courts* (London, 1895); Stephen, *History of the Criminal Law of England* (ib., 1883); Pollock and Maitland, *History of English Law* (2d ed., Boston, 1899); Lea, *Superstition and Force* (4th ed., Boston, 1892).

COM'STOCK, ANTHONY (1844–1915). An American reformer, born in New Canaan, Conn. He was educated at high schools in his native State and during the Civil War served in the Union army from 1863 to 1865. Afterward he became an active worker in the Young Men's Christian Association in New York City and upon the organization of the Society for the Suppression of Vice in that city (1873) was appointed chief special agent. Thereafter he attained considerable prominence by his vigorous crusade against such books, papers, pictures, and establishments as he considered injurious to the public morals. He published: *Frauds Exposed* (1880); *Traps for the Young* (1883); *Gambling Outrages* (1887); *Morals Versus Art* (1887); and magazine articles relating to similar subjects.

COMSTOCK, CYRUS BALLOU (1831–1910). An American soldier and military engineer. He was born in West Wrentham, Mass., graduated at West Point in 1855, was appointed lieutenant engineer, and from 1859 to 1861 was assistant professor of natural and experimental philosophy at the Military Academy. After serving in the construction of the defenses of Washington and with the Army of the Potomac in 1862 he became chief engineer of that army. He was subsequently engaged in the siege of Vicksburg, was chief engineer of the Army of the Tennessee in 1863, was assistant inspector general of the Division of the Mississippi in 1863–64, and senior aid-de-camp to General Grant in 1864–66. At the close of the war he was brevetted major general of volunteers and brigadier general in the regular army, and from 1866 to 1870, was aid-de-camp to the general in chief, with the rank of colonel. Afterward for several years he was superintending engineer of the geodetic survey of the Northern and Northwestern lakes. In 1888 he became colonel in the engineer corps and was retired from active service in 1895. He was promoted on the retired list to be brigadier general in 1904. His publications include: *Notes on European Surveys* (1876); *Survey of the Northwestern Lakes* (1877); *Primary Triangulation United States Lake Survey* (1882); *A Comstock Genealogy* (1907).

COMSTOCK, GEORGE CARY (1855–). An American astronomer, born at Madison, Wis. He graduated at the University of Michigan in 1877 and in law at the University of Wisconsin (1883). He also studied mathematics and astronomy and in 1881 was appointed assistant astronomer at the Washburn Observatory of the University of Wisconsin. In 1885 he was made professor of mathematics at the Ohio State University, but in 1887 returned to the University of Wisconsin as associate director of the observatory, of which he was afterward made head director. He became a member of many scientific bodies. His works include: *Method of Least Squares* (1890); *Publications of the Washburn Observatory; Observations of Double Stars,* vols. vi–xii (1896–1906); *Text-Book of Astronomy* (1900); *Text-Book of Field Astronomy for Engineers* (1902; 2d ed., 1908).

COMSTOCK, JOHN HENRY (1849–). An American entomologist, born at Janesville, Wis. He was educated at Cornell University, where he became first instructor, then assistant professor, and, in 1882, professor of entomology and general invertebrate zoölogy. From 1878 to 1881 he was United States entomologist. In 1891 he became nonresident professor of entomology at Leland Stanford Junior University. His investigations deal with the morphology, classification, and economic relations of insects. In this work he has been assisted by his wife, Anna Botsford Comstock, who is herself an entomologist and prominent in the educational movement emanating from Cornell University towards the general extension of nature study. His important publications include: *Report on Cotton Insects* (1879); *Annual Report of the Entomologist* (1879–81); *Introduction to Entomology,* part i (1888); *Evolution and Taxonomy* (1893); *A Manual for the Study of Insects,* with his wife, Anna Botsford Comstock (1895); *The Wings of Insects,* with J. G. Needham (1897); *Insect Life* (New York, 1901); *How to Know the Butterflies of the Eastern United States,* with his wife (1904); *The Spider Book* (New York, 1912).

COMSTOCK, JOHN LEE (1789–1858). An American author of textbooks. He was born at Lyme, Conn., and after a common-school education took up the study of medicine. He served as assistant surgeon in the War of 1812 and at its close settled in Hartford, where he devoted himself to writing and the preparation of textbooks on the various sciences and history. His *System of Natural Philosophy* (1831) reached a sale of 900,000 copies, while other popular works from his pen were an *Introduction to Mineralogy* (1832); *History of the Precious Metals* (1849); *History of the Greek Revolution* (1828).

COMSTOCK, THEODORE BRYANT (1849–). An American geologist, born at Cuyahoga Falls, Ohio. He graduated at the Pennsylvania State College in 1868 and at Cornell in 1870 and in 1873 accompanied Capt. W. A. Jones's Wyoming and Yellowstone Park expedition as geologist. From 1875 to 1879 he was professor of geology and paleontology at Cornell, where he established the department of economic geology. He acted in 1879–84 as general manager of a mining company at Silverton, Cal., and from 1884 to

1889 occupied the chair of mining engineering and physics at the University of Illinois. He was assistant State Geologist of Arkansas in 1887–88 and of Texas in 1889–91; in the latter year he founded the Arizona School of Mines, which he directed until 1895, and from 1893 to 1895 was president of the University of Arizona. In 1886 he was elected secretary of the geological and geographical section of the American Association for the Advancement of Science. He published *The Scientific Value of the Yellowstone Park* (1874); *Outline of General Geology* (1878); *Classification of Rocks* (1877); and many papers dealing with the geology and mineral deposits of Colorado, Texas, Wyoming, and other parts of the West.

COMSTOCK LODE. A remarkable compound-fissure vein, rich in gold and silver, located in Storey Co., Nev., on the eastern slope of Mount Davidson, a northeastern spur of the Sierras, at a point about 20 miles east of the California State line. Its discovery in 1859, when it received the name "Washoe," created great excitement and led to the building up of Virginia City. The vein is about 4 miles in length and varies in width from zero at the ends to 3000 feet at the middle point. It occupies a zone of displacement in igneous rocks, chiefly andesites of Tertiary age. The ore, which is of high grade, containing both silver and gold in proportion of three of the former to two of the latter, occurs in great pockets known as bonanzas, chiefly along the eastern portion of the vein. The excavations along this fissure vein have been carried to great depths, approximating 3500 feet, until operations became difficult through the inflow of hot water with a temperature of 170° F. The Sutro Tunnel, with a length of 4 miles, was driven with a view to draining this water, but with only partial success. The richness of the ore of this lode may be realized from the value of the product, the total value during the years 1860–90 having been $340,000,000; the greatest output for a single year was $38,000,000 in 1877. Since 1890 the production has declined.

Besides its economic value, the Comstock Lode is of great interest in other directions. One of the earliest classifications of igneous rocks (q.v.) was attempted in connection with the study of the geologic relations of the ore bodies by Von Richthofen in 1868; and Van Hise, Iddings, and Becker have at a later period perfected the modern classification of igneous rocks with the aid of considerable information derived from the Comstock Lode and Sutro Tunnel. Also many important observations have been made on the relation between the size of grain and the rate of cooling, and upon the rate of development of crystallization in igneous rocks. Again, experiments have here been carried on by Carl Barus with the object of determining the temperature variations and electric manifestations in the deeper workings. For more precise information on the geologic features and methods of mining of the Comstock Lode, the reader is referred to the following works: Becker, "Geology of the Comstock Lode and Washoe District," with folio atlas; being *Monograph of the United States Geological Survey*, vol. iii (Washington, 1882); Lord, "Comstock Mining and Miners," *Monograph of the United States Geological Survey*, vol. iv (ib., 1883); Reid, *Structure and Genesis of the Comstock Lode* (Berkeley, Cal., 1905).

COMTE, kônt, Isidore Auguste Marie François Xavier, known generally as Auguste Comte (1798–1857). A celebrated French philosopher, the founder of the positive philosophy, or positivism (q.v.). He was born at Montpellier, and educated at the Ecole Polytechnique in Paris, from which he was expelled for his part in a protest of students against one of the instructors. From 1816 he supported himself by tutorial work. In Paris he met Saint-Simon, with whose theories he was at first greatly charmed, but from whose influence he broke away in 1824. In the following year he married Caroline Massin, but the union was unhappy. In 1826 he began a course of lectures at his own house on his system of philosophy and had among his hearers such men as Humboldt and Blainville. Excessive work, however, ruined his health, and after the third lecture he became insane, was taken to an asylum, and tried to commit suicide. He soon recovered the use of his faculties and took up his studies and lectures again. In 1836, he got a position as examiner for entrance to the Ecole Polytechnique, which he held for some 10 years; afterward he was largely supported by his pupils and admirers. John Stuart Mill, with whom Comte had been in correspondence for some time, induced some wealthy English friends to advance about $1200 to Comte in 1845. In 1848 Littré headed an appeal for a public subscription for the benefit of Comte, who subsisted on the proceeds of it for the remainder of his life. In 1845 he met Clotilde de Vaux, whose husband was serving a life sentence, and conceived an extravagant affection and admiration for her. The relation was broken by her death a year later, after which Comte had a second attack of mental alienation. His death took place on Sept. 5, 1857.

Comte published a number of important philosophic works, the most famous being his *Cours de philosophie positive* (6 vols., 1830–42), of which a condensed English translation by Harriet Martineau, approved by the author, appeared in 1853. Other works were: *Traité élémentaire de géométrie analytique* (1843); *Traité d'astronomie populaire* (1845); *Système de politique positive* (4 vols., 1851–54; Eng. trans., London, 1875–77); *Catéchisme positiviste, ou sommaire exposition de la réligion universelle* (1852). Comte's central and governing doctrine is that the human race, like the individual, necessarily passes through three intellectual stages: (1) the theological, in which a supernatural origin is sought for all phenomena, and the *deus ex machina* is the only explanation of events; (2) the metaphysical, in which the sensuously supernatural is set aside, and an effort is made to demonstrate the existence of "abstract forces or entities supposed to inhere in various substances and capable of engendering phenomena"; (3) the positive, in which the mind affirms the futility of both theological and metaphysical inquiries, abandons all vain search after the causes and essences of things, and "restricts itself to the observation and classification of phenomena, and to the discovery of the invariable relations of succession and similitude which things bear to each other—in a word, to the discovery of the laws of phenomena." Theology and metaphysics are alleged to be in their dotage, and all the anarchy of modern life to arise from the presence of these disturbing elements. To deliver us from their hurtful influence, Comte

employs the principles of positivism to organize a new social doctrine, which shall embrace the entire wants of man as an intellectual and emotional being. He thus aims at being the founder, not only of a new philosophy, but also of a new religion, and even assumed the title of *Fondateur de la réligion de l'humanité*. See POSITIVISM; and consult: Littré, *Auguste Comte et la philosophie positive* (Paris, 1877); Mill, *Comte and Positivism* (London, 1865); Caird, *The Social Philosophy and Religion of Comte* (Glasgow, 1885); Gruber, *August Comte, sein Leben und seine Lehre* (Freiburg, 1889); the first volume of Fiske, *Outlines of Cosmic Philosophy* (Boston, 1874); Levy-Bruhl, *La philosophie d'Auguste Comte* (1900, Eng. trans., 1903); L. de Montesquieu Fezensoc, *Le système politique d'Auguste Comte* (1907).

COMTE DE BOURSOUFLE, kôNt de bo͝or'-so͝o'fl', LE (Fr., The Count of Boursoufle). A comedy by Voltaire, produced in public, posthumously, in 1862. It had been privately acted, however, at the Château de Cirey in 1734, and again at the Château d'Anet in 1747, under the title of *Quand est-ce qu'on me marie?* It was drawn from Vanbrugh's *Relapse*.

COMTE DE PARIS, *de pȧ'rē'*. See PARIS, LOUIS PHILIPPE ALBERT D'ORLÉANS, COMTE DE.

COMUM. See COMO.

CO'MUS (Lat., from Gk. Κῶμος, *Kōmos;* compare *κῶμος*, revel, or band of revellers). A Greek god of revelry, who first appears clearly personified in the third century A.D. (See PHILOSTRATUS, 3, 4.) Philostratus describes Comus as a winged youth slumbering in a standing attitude, his legs crossed, his countenance flushed with wine, his head sunk upon his breast, his left hand feebly grasping a hunting spear, his right hand an inverted torch. Milton, in his poem "Comus," has represented Comus as born from the loves of Bacchus and Circe, "much like his father, but his mother more"; a sorcerer, who gives to travelers a magic draught that changes the human face into the "brutal form of some wild beast," and makes them, hiding from them their own foul disfigurement, forget all the purities of life, "to roll with pleasure in a sensual sty."

COMYN, kŭm'ĭn. A family which rose to great power and eminence in Scotland after the Norman Conquest. The name is also spelled Comin, Comines, or Cumin.—ROBERT DE COMYN, the founder of the family, was probably from Flanders and followed William the Conqueror to England. He was made Earl of Northumberland in 1068. In 1069 he was sent to reduce the provinces of the North. He seized Durham, but the people rose against him, and he perished in the flames of the Bishop's palace. The family became most prominent in the thirteenth century.—WILLIAM COMYN, who died in 1233, obtained the earldom of Buchan by marriage. WALTER, one of his sons by his first marriage, became Earl of Monteith. After the accession of Alexander III of Scotland, Walter practically ruled the kingdom till 1255. He died in 1258.—ALEXANDER, Earl of Buchan, his half-brother, by marrying a daughter of the Earl of Winchester, acquired, in 1270, the high office of Constable of Scotland, with great estates in Galloway, Fife, and the Lothians. He was the most powerful noble in Scotland until his death, in 1289. Within a quarter of a century, however, this great house suffered such utter misfortune that, in the words of a contemporary chronicle, "there was no memorial left of it in the land, save the orisons of the monks of Deer" (a monastery founded by William Comyn, Earl of Buchan, in 1219). The Comyns perished in the memorable revolution which placed Bruce on the throne of Scotland. Their chief, the Lord of Badenoch, was in 1291 an unsuccessful competitor for the crown, as a descendant, through King Donald Bane, of the old Celtic dynasty. His son, Red JOHN COMYN, was one of the three wardens of Scotland and distinguished himself by his gallant resistance to the English. He fell under Bruce's dagger, before the altar of the Franciscan Friars at Dumfries, in 1306; and his kindred went down, one after another, in the struggle to avenge him.—JOHN COMYN, Earl of Buchan, was defeated by Bruce in a pitched battle near Inverary in 1308, and his earldom was laid waste. He fled to England, and died in 1313, leaving no children. The possessions of the family, both in Scotland and England, were taken by the King. Consult Douglas, *Peerage of Scotland* (Edinburgh, 1764), and Burton, *History of Scotland* (8 vols., Edinburgh, n.d.).

CON. An Italian preposition, meaning 'with,' much used in musical terminology; thus, *con spirito, con brio.* The form *col*, a contraction of *con* and *il*, means 'with the.'

CONACHAR, kŏn'ȧ-kär. A character in Scott's novel *The Fair Maid of Perth.*

CONAN'ICUT. An island of the State of Rhode Island at the mouth of Narragansett Bay (Map: Rhode Island, C 4). It is about 8 miles long by 1 mile wide and comprises the township of Jamestown. The village of the same name lies on the east coast of the island, about 2½ miles nearly due west of Newport. At the northern extremity of the island is Conanicut Park. The township was incorporated in 1678 and was named in honor of King James II. Pop. (of township), 1910, 1175.

CO'NANT, CHARLES ARTHUR (1861–1915). An American expert on banking and finance. He was born in Winchester, Mass., studied in public schools and with private tutors, and from 1889 to 1901 was correspondent in Washington, D. C., for the New York *Journal of Commerce.* He did important work for the gold standard and the gold-exchange standard and aided in the development of a monetary system in the Philippines. An Imperialist, on this and the monetary issue, he left the Democratic party. He was treasurer of the Morton Trust Company of New York City in 1902–06; was a member of the New York Chamber of Commerce committee on currency reform (1906) which recommended a central bank; and in 1910 was American delegate to The Hague Conference on Bills of Exchange. He wrote many articles for periodicals and encyclopædias on American banking and on Latin-American finance and trade, and published: *A History of Modern Banks of Issue* (1896; 4th ed., 1909); *Alexander Hamilton* (1901); *Wall Street and the Country* (1904); *The Principles of Money and Banking* (1905; also French trans.).

CONANT, HANNAH O'BRIEN CHAPLIN (1809–65). An American biblical scholar. She was born in Danvers, Mass., the daughter of a clergyman, and in 1830 was married to Thomas Jefferson Conant. In 1838 she became the editor of *The Mother's Journal.* She assisted her husband, translated from the German Strauss's *Baptism in Jordan* (1844), Neander's commen-

tary on Philippians (1851), and Uhden's *The New England Theocracy* (1859), and wrote *The Earnest Man*, an excellent biography of Adoniram Judson (1855), and a *Popular History of English Bible Translation* (1856).

CONANT, THOMAS JEFFERSON (1802–91). An American biblical scholar. He was born at Brandon, Vt., graduated at Middlebury College (Middlebury, Vt.) in 1823, and was professor of Greek, Latin, and German in Waterville College (now Colby College) in 1827–33. From 1835 to 1850 he was professor of biblical literature and criticism in the Baptist Theological Seminary at Hamilton, N. Y. He translated (1839) Gesenius' Hebrew Grammar, with the additions of Roediger, which became a standard textbook in English. With Moses Stuart (q.v.), a later translator of Gesenius, he had a long controversy. He was professor of Hebrew and biblical exegesis in Rochester Theological Seminary from 1851 until 1857 and then devoted himself to Bible revision for the American Bible Union until 1875. He published in 1864 a treatise on the term *βαπτίζειν* in the New Testament, which is a classic statement of the philological evidence for immersion. Dr. Conant was one of the American committee on the revision of the Bible. He published critical editions, with revised versions of *The Book of Job* (1856), *The Gospel by Matthew* (1860), *The New Testament* (1866), *The Book of Genesis* (1868), *The Book of Psalms* (1872), *The Book of Proverbs* (1872), *Isaiah i.–xiii.* (1874), and *Historical Books of the Old Testament* (1884).

CONA'TION (Lat. *conatio*, attempt, from *conari*, to attempt). An endeavor, a striving to attain something. The attempt, e.g., to recall a name which has slipped from memory is a conation. There is a difference of opinion among psychologists as to whether conation is an ultimate aspect of consciousness or a complex of sensation (q.v.) and affection (q.v.).

There are two typical cases of conation—the consciousness accompanying muscular exertion, and the state of active attention. (See ATTENTION.) The similiarity of these two experiences has led some psychologists to deny that there is anything more in conation than the strain sensations following upon muscular contraction *plus* a pleasantness or unpleasantness. In attention there are, further, the sensations or ideas attended-to and those attended-from. But it is also maintained, on the other hand, that conation is a simple "attitude" which mind assumes towards its objects, a peculiar "mode of being conscious." It is said to be common to desire, yearning, longing, craving, wishing, and willing; indeed, to all consciousnesses which have an inherent tendency to pass beyond themselves. On this definition conation is a self-determination of consciousness. In desire, e.g., consciousness endeavors to pass from the want of an object to its possession; or, if an unpleasantly toned idea enters consciousness—say the idea of an embarrassing situation—a conation arises, and consciousness makes a forcible effort to eject the unpleasant idea. These two views are not necessarily mutually exclusive, although they arise from two radically different methods of psychology. The first analyzes consciousness without regard to the offices of knowing and willing which mind fulfills, i.e., without reference to the relation of mind to the "outside" world; the second sets consciousness into relation with its objects, and seeks to discover the "behavior" of mind towards the world. Or, in other words, the first scrutinizes the "feeling of effort" or "endeavor" in an analytic way, and finds only sensations of strain and an affective quality; the second assumes that mind takes positive "attitudes" towards its objects—that it is not only a sequence of occurrences, but a self-determining cause, directing its own contents, an agent in much the same sense that friction is an agent in the production of electricity. Consult: Stout, *Analytic Psychology* (London, 1896); Titchener, *Text-Book of Psychology* (New York, 1910); *Experimental Psychology* (ib., 1901); James, *Principles of Psychology* (ib., 1890). See DESIRE; EFFORT; FATIGUE; WILL.

CON'ATY, THOMAS JAMES (1847–1915). An American Roman Catholic prelate. He was born in Ireland and was educated at Montreal College (1863–67), College of the Holy Cross (1869), and Montreal Theological School (1872). He was pastor of the Church of the Sacred Heart, in Worcester, Mass., in 1880–97 and in 1896 was appointed rector of the Catholic University, Washington, with the title of domestic prelate to the Pope (1897). In the autumn of 1901 he was made Bishop of Samos *in partibus*, still retaining his university position. In 1903 he was appointed to the see of Monterey and Los Angeles. In 1893 he organized the Catholic Summer School at Plattsburg, N. Y.

CON'CAN (Skt. *Kōnkana*), or **KONKAN.** A territory in the Presidency of Bombay (q.v.), British India (Map: India, B 5). It is a long strip of country, about 300 miles long by 40 miles broad, running south from the Damanganga River, between the coast of the Arabian Sea and the Western Ghats. Prior to 1818, when it was annexed by the British, it was a Mahratta principality. The modern districts of Thana (pop., 1891, 819,000; 1901, 809,000; 1911, 882,309) and Ratnagiri (pop., 1891, 1,106,000; 1901, 1,167,000; 1911, 1,203,638) are comprised in its area.

CON'CAVE (Lat. *concavus*, hollow, from *com-*, together + *cavus*, hollow; connected with Gk. *κύαρ, kyar*, hole, from *κύειν, kyein*, to conceive, to contain). A surface is said to be concave when its centre of curvature is towards the observer, convex when its centre of curvature is in the opposite direction to the observer. (See LENS, MIRROR.) In geometry a plane polygon is said to be concave if any side produced cuts the polygon. A spherical polygon is said to be concave if any side produced cuts the polygon so as to leave part on one hemisphere and part on the other. A solid is said to be concave if any face produced cuts the solid.

CONCEAL'MENT (from *conceal*, from OF. *conceler*, Lat. *concelare*, to hide, from *com-*, together + *celare*, to hide). As a legal term, the improper suppression or withholding of facts, the covering up of crimes, or the secretion of a person or property. The effect of the concealment of facts is dealt with under such titles as DECEIT; EQUITY; FRAUD; INSURANCE (qq.v.). As an element in criminal offenses, concealment has been considered in the articles on ACCESSORY; BIRTH, CONCEALMENT OF (qq.v.). The concealment of goods which are subject to revenue duty, or the secretion of property for the purpose of preventing its being taken in legal process, and the concealment of a debtor to avoid the service of summons on him, are the sub-

jects of statutory provisions, which should be consulted.

CON'CENTRA'TION CAMPS, or DISTRICTS. In the mobilization schemes of countries whose territories are contiguous, an important feature is of necessity the district within which the mobilized forces concentrate. In the *Field Service Regulations, United States Army, 1913,* a *Concentration Camp* is defined as a place, near the scene of intended operations or near an embarkation point, where troops are assembled for *immediate* use against the enemy or for transport to an oversea theatre of operations. A *mobilization camp* is a place where troops are assembled to be raised to war strength, equipped and prepared for service. (See MOBILIZATION.) The term "concentration camp" was used in a different sense in the Cuban insurrection (1896–98), during which the Spaniards concentrated all Cuban noncombatants within fixed limits; and similarly, in the British-Boer War of 1899–1902, the British collected the women and children of combatants in the field, as well as all noncombatant men, and established them in camps which were popularly known as concentration camps. In 1902 concentration camps were temporarily established by the American military authorities as an incident of the campaign in Mindanao, in the Philippines.

Another example of the concentration camps was found during the internal troubles in Mexico in 1914, when the national forces pursued by revolutionists crossed the Rio Grande and took refuge in the United States. The national soldiers, accompanied by women and children, were received by the United States military forces and collected in concentration camps, where they were disarmed, no opportunity being given for any belligerent action or return to Mexico for hostile purposes.

CONCENTRATION MARCHES. Marches of concentration are made for the purpose of assembling, at a certain time and place, bodies of troops from different localities. Such marches require an accurate computation of the time required for marching and of the road space occupied by the troops. The condition of the roads, weather, etc., must be considered. A column of troops on the march should not be cut by another. If the heads of two columns meet at a distance from the enemy, the senior commander has the right of way; if near the enemy, the senior determines what measures are to be taken. If a column in march overtakes another at a halt, it may pass on, provided its commander be the senior, or the other commander gives his consent. In either case the column which advances first is accompanied by its combat train; the field train waits for the other column with its combat train to pass, but precedes the field train of the latter column. Consult *Field Service Regulations, United States Army, 1913.*

CONCEPCIÓN, kŏn-sĕp'sē-ōn' (Sp., conception). The capital of the province of the same name, Chile, situated on the Biobio River, 6 miles from its mouth (Map: Chile, C 11). The streets of the city are clean and paved. The chief buildings are the cathedral, the town hall, the agricultural school, and a normal school. Concepción is a bishopric. A railroad runs to Talcahuano, on the Bay of Concepción, the port of the city. The city is in a fertile district and has an active trade. Pop., 1907, 55,330. Concepción was founded in 1550, on the site of the present Penco, and built in its present situation in 1754, after the destruction of the former town in 1751 by an earthquake. During the Spanish occupation it was the second largest city of Chile. A disastrous earthquake occurred in 1835, after which the city was rebuilt on a more pretentious plan. In 1818 the independence of Chile was declared here.

CONCEPCIÓN, or VILLA CONCEPCIÓN. A city of Paraguay, capital of the department of the same name, on the Paraguay River, 125 miles north by east of Asunción (Map: Paraguay, F 8). Its chief industry is the export trade in *yerba maté,* or Paraguay tea. Pop., 1900, 15,000.

CONCEPCIÓN. A seaport town of Panay, Philippines, in the Province of Iloilo, capital of the District of Concepción, situated on the east coast of the island. It has a good harbor and large sugar manufactories. Pop., 1903, 4565.

CONCEPCIÓN. The largest town of Luzon, Philippines, in the Province of Tarlac, 12 miles south of Tarlac (Map: Luzon, D 5). It has an important sugar industry; rice, tobacco, and corn are also raised in the surrounding country. Pop., 1903, 12,593.

CONCEPCIÓN DEL URUGUAY, kŏn-sĕp'sē-ōn' del o͞o'ro͞o-gwä'ē, or **CONCEPCIÓN.** A town in the Province of Entre Rios, Argentina, situated on the Uruguay River (Map: Argentina, F 10). It is the seat of a national college and a normal school. The town has transportation facilities by rail and water, the river being navigable for large vessels, and controls an important trade in cattle and packed meat. Pop., 1895, 6111. Concepción del Uruguay was founded in 1778, by Tomás Rocamora, and was formerly known as Arroyo de la China.

CON'CEPT (Lat. *conceptus,* thought, from *concipere,* to conceive, from *com-,* together + *capere,* to seize). In traditional formal logic a concept is an idea of a characteristic or characteristics belonging to more than one person or thing. Conception stands opposed to "simple apprehension," which deals with individuals singly. But traditional logic has proved unsatisfactory to many philosophers from the time of Kant (q.v.); hence they have taken the term "concept" and changed its meaning to correspond to their views of the function of thought. Thus Kant maintained that the understanding supplies to experience certain forms or principles of connection, such as causality; these he calls "pure concepts," designating the concepts of traditional logic "empirical concepts." For Hegel a concept is the unity which thought in its highest stage achieves, a unity in which contradictories are merged and harmonized. For the pragmatist a concept is a methodological device to which experience resorts when perplexed. "Feeling," says James, "must have been originally self-sufficing; and thought appears as a superadded function, adapting it to a wider environment than that of which brutes take account." Out of the "aboriginal sensible muchness attention carves its objects. We say *what* each part of the sensible continuum is, and all these abstracted whats are concepts." Consult Richter, *The Development of the Concept, Historic and Genetic* (Lancaster, Pa., 1908).

CONCEP'TION. See EMBRYOLOGY, HUMAN.

CONCEPTION, in Psychology. See IDEA.

CONCEPTION, IMMACULATE. See IMMACULATE CONCEPTION.

CONCEPTION OF OUR LADY, Sisters of the. An order of nuns, founded in 1484, in honor of the Immaculate Conception, by Beatrix de Silva, sister of James, first Count of Portalegre, in Portugal. It was confirmed in 1489 by Pope Innocent VIII, who granted the sisterhood permission to follow the rule of the Cistercians; but after the death of the foundress, in 1489, Cardinal Ximenes put the nuns under the direction of the Franciscans and imposed on them the rule of St. Clara. The order subsequently spread into Italy, France, and Belgium. The habit consists of a white gown, a blue mantle, and a scapular on which is worn the image of the Virgin. The Franciscan Sisters of the Immaculate Conception in the United States were established by sisters from Italy in 1891 at Little Falls, Minn. They have two mother houses, conduct four hospitals, an orphanage, a school, and numbered (1913) 74 professed sisters and 13 novices.

CONCEP'TUALISM. A philosophical theory which is in some sense intermediate between mediæval realism and nominalism (qq.v.) and maintains that, while universals have no real existence in the external world, they do exist as ideas or concepts in the mind and are thus something more than mere words. This was Abélard's view. See Abstraction; Berkeley; Logic; Idea.

CONCERT. (For derivation, see Concerto.) A public performance of musical compositions which do not require scenic representation. Before the last quarter of the seventeenth century concerts in the modern sense of the term were unknown. On special occasions musical performances took place at the courts of royalty and the palaces of the nobility, but no admission fee was charged and only invited guests attended. The only opportunity of hearing music performed was offered to the general public in the religious service and the production of oratorios in the churches. The first concerts to which an audience was admitted on payment of a fee were those established by John Banister in 1672 in London. After his death in 1679 Thomas Britton continued the practice. The establishment of the *Concerts spirituels* (q.v.) in Paris in 1725 marks a turning point in the history of the concert. After the model of the French institution numerous organizations devoting themselves to the performance of orchestral works sprang up in Germany, France, and England. Public performances of larger choral works with orchestra date from the foundation of the Berlin Singakademie (q.v.) in 1790. Regular concert tours by celebrated virtuosos were unknown before 1750. Consult: E. Hanslick, *Geschichte des Konzertwesens in Wien* (Vienna, 1869); K. F. Pohl, *Mozart und Haydn in London* (Vienna, 1867); A. Schering, *Geschichte des Instrumentalkonzerts bis auf die Gegenwart* (Leipzig, 1905).

CON'CERTAN'TE, *Ital. pron.* kŏn'chĕr-tän'tâ (It. p.p. of *concertare,* to perform a concert). An Italian word used to describe an orchestral composition in which two or more instruments or solo voices are in turn given prominent solo parts. See Concerto.

CONCERTINA, kŏn'sĕr-tē'nâ (from It. *concerto,* concert). An hexagonally shaped musical instrument, the sounds of which are produced by free, vibrating tongues of metal, as in the accordion. The scale of the concertina is very complete and extensive, beginning with the lowest note of the violin, g, and ascending chromatically, for three and a half octaves to c^4. There are two tongues for every tone, so that any note can be produced either by pulling the bellows open or by pressing them together. Wheatstone, of London, invented the concertina in 1829. The instrument is capable of a great range of expression, and concertina playing by skilled performers comes rightly under the head of artistic music.

CONCERT MASTER. The leader of the first violins in an orchestra. Through the ever-increasing demands made upon the technique of orchestral players by modern composers the position of concert master has become one of great importance and responsibility. The leader is not only responsible for uniformity of bowing from all the violins and occasional solo parts demanded by the score, but he is generally supposed to take the conductor's place in case of emergency. In large modern orchestras the player at the first desk of each of the groups of strings acts as a secondary concert master for his particular group.

CONCERTO, kŏn-chĕr'tô (Fr. *concert,* from It. *concerto,* concert, from It., Lat. *concertare,* to vie, from *com-,* together + *certare,* to contend; less probably from *conserere,* to join together, from *com-,* together + *serere,* to join). A musical composition for a solo instrument, with orchestral accompaniment, calculated to exploit the resources or possibilities of the instrument and thus to give the performer an opportunity to display the highest technical skill (see Cadenza) as well as intellectual grasp and musical culture. The concerto belongs to the cyclical or sonata (q.v.) group of musical compositions and differs from a symphony or overture only through the special prominence given to the solo instrument. It consists, like the symphony or sonata, of three or four movements, each of which, like the whole, requires a clear development and treatment of motives and a strict adherence to the rules of form. The earliest concertos were written for two or more instruments, being thus really in concertante (q.v.) style. From the beginning of the eighteenth century the pianoforte and the violin have been the solo instruments mostly used for the concerto. Among the oldest violin concertos are those by Tartini and his pupils. The French and Germans afterward improved on these and fixed the forms, which all the great masters of modern times have adhered to. Occasionally concertos are also written for more than one solo instrument, but they do not differ in structure from the usual concerto. The two most famous examples are the triple concerto for piano, violin, and 'cello by Beethoven and the double concerto for violin and 'cello by Brahms. Consult A. Schering, *Geschichte des Instrumentalkonzerts bis auf die Gegenwart* (Leipzig, 1905).

CONCERTO GROSSO. An instrumental form originated by Corelli (q.v.) about the year 1680, employing generally three solo instruments (two violins and one violoncello), with accompaniment of the string orchestra. It really was the precursor of the modern *concerto* (q.v.). The solo instruments, however, were not treated so much individually, rather as a smaller group, complete in itself, against the larger instrumental body. The form was that of the older overture (q.v.) or suite (q.v.). When in the course of the eighteenth century the sonata form (q.v.) obtained a position of predominance among mu-

sical forms, the concerto grosso was gradually displaced by the concerto for one solo instrument with accompaniment of the full orchestra. The double and triple concertos differ from the older concerto grosso inasmuch as the solo instruments are no longer treated as a group, but as so many individual and distinct instruments intended to display the highest skill of the virtuoso. Consult A. Schering, *Geschichte des Instrumentalkonzerts bis auf die Gegenwart* (Leipzig, 1905).

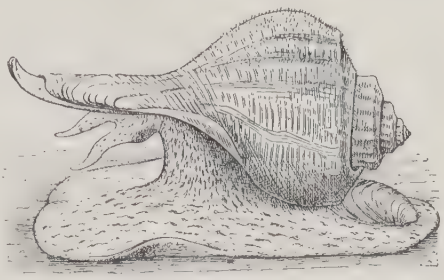
CONCERT PITCH. See PITCH.

CONCERTS DU CONSERVATOIRE, kôN'sâr' dụ kôN'sĕr'vȧ'twȧr'. The foremost concert institution of Paris, having grown out of the annual pupils' concerts of the conservatory. They were established as symphony concerts of the first rank by Habeneck in 1828. Originally six concerts were given, which gradually were increased to nine. Since 1866 two series are given, each programme being repeated on two successive Sunday afternoons. The orchestra consists of 84 players under Georges Marty (q.v.), who has been the conductor since 1901. Consult A. Dandelot, *La Société des Concerts du Conservatoire de 1828–1897* (Paris, 1897).

CONCERTS SPIRITUELS, spē'rē'tụ-ĕl'. The chief concert institution of France in the eighteenth century. As the opera and all theatres were closed on 24 religious holidays during the year, Philidor (q.v.) in 1725 instituted these concerts. For the first three years all operatic music and works by native French composers were excluded, but after 1728 every form of music by any composer was admitted, and the foremost artists of the time appeared at these concerts. Their reputation and success grew so steadily that they served as models for similar institutions in Germany. The Revolution put an end to these concerts in 1791. Under the old name, but with a different purpose, the concerts spirituels were resumed in 1805. Since then the programmes have been made up exclusively of sacred music and presented only during Holy Week. Consult M. Brenet, *Les concerts en France sous l'ancien régime* (Paris, 1900). See CONCERT.

CONCERTSTÜCK, kŏn-tsĕrt'shtụk' (Ger. concert piece). A composition for a solo instrument with orchestra, really a concerto (q.v.) in one movement. While the first movement of a concerto generally is cast strictly in sonata form (q.v.), the concertstück is more free as to form, approaching the form of the fantasia (q.v.). The first movement of Schumann's beautiful concerto for piano and orchestra, op. 54, was originally written as a concertstück.

CONCH, kŏnk (Lat. *concha,* Gk. *κόγχη, konchē,* Skt. *śankha,* shell). The name of many large univalve mollusks. Originally and properly it belongs to the big carnivorous strombs and especially to the great rose-lined stromb (*Strombus gigas*) of the West Indies and Florida Reefs and especially abundant in the Bahamas. Shiploads of these shells are sent to Europe and the United States every year to be ground up for porcelain, burned into lime, calcined for medicinal purposes, or used as ornaments; many are perforated at the apex and serve as dinner horns on Southern plantations. Cameos of an inferior sort are cut in it; and from it are derived, especially in the Bahamas, pink "conch pearls" of value. It is because many of them made an occasional industry of gathering these mollusks and searching for pearls that the poorer sort of people of southern Florida and neighboring islands are called "Conchs." The Indians used the columella of this shell as material for fine beads; and their remains, as



A CONCH (*Sycotypus canaliculatus*).

The attitude is that of creeping towards the left. Beneath the protruding siphon tube two tentacles show the place of the head, the lower one showing the black dot of the eye. On the rear of the expanded foot is the operculum.

well as those of many other large mollusks, abound in the coastal shell heaps. In the East Indies the term is applied often to other large spiral shells, especially those of the closely allied family Tritonidæ. These are often perforated and fitted with mouthpiece and finger holes and so turned into sonorous musical instruments. This is the shell adopted by artists in representations of sea myths—

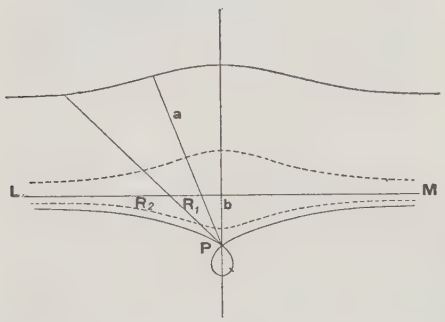
> "Have sight of Proteus rising from the sea,
> Or hear old Triton blow his wreathéd horn."

In the Northern States "conch" means either of two large, pear-shaped univalves of the Atlantic coast, *Fulgur carica* and *Sycotypus canaliculatus,* which frequent the sandy bottoms near shore and are cast up on beaches in great numbers. Both are carnivorous and do great damage to oyster beds. The former, which has a spiral row of short horns defining the whorls, is more common southward, while the latter, distinguished by the squarish channels between the whorls, is nearly confined to the region between Cape Cod and New Jersey. Both are abundant about Long Island and on the southern New England coast, where they are confused under the name "periwinkle" or "winkle." The "sea necklaces," consisting of parchmentlike hollow disks apparently strung upon a long cord, which attract attention on beaches in midsummer, are the egg cases of these mollusks, which have been torn from their attachment to some rock or seaweed and floated ashore. It was from the column of these shells that the Indians made their white wampum. Consult Ingersoll, "Natural History of Economic Mollusks of the United States," in *United States Fish Commission Bulletin for 1889.* See MOLLUSK and the authorities there cited.

CONCHITA, kŏn-chē'tȧ. An opera by Zandonai (q.v.), first produced in Milan, Oct. 14, 1911; in the United States, Sept. 28, 1912 (San Francisco).

CONCHOID (kŏn'koid) (Gk. *κογχοειδής, konchoeidēs,* mussel-shaped, from *κογχή, konchē,* shell + *εἶδος, eidos,* form) **OF NIC'OME'DES.** A "shell-shaped" curve invented by Nicomedes (180 B.C.). It is related to the problems of trisecting an angle (see TRISECTION PROBLEM), of constructing two geometric means between two given straight lines, and of duplicating the

cube. The curve may be constructed by drawing a straight line LM for the directrix, and through any point P as the pole drawing a pencil of lines cutting LM in R_1, R_2, ... The conchoid is the locus of points found by laying off a constant length each way from R_1, R_2, . . . on these rays. This constant length is called the "modulus." The curve differs in general shape according as the modulus is equal to, greater than, or less than the distance of the fixed point from the fixed straight line. The figure shows the forms of the curve in the last two cases. The loop occurs when the modulus is greater



than the perpendicular distance from P to LM. When the modulus equals this distance, P is a cusp on the curve. The directrix LM is an asymptote to the two branches of the curve. If the foot of the perpendicular from the pole to the directrix is taken as the origin, and the distance is called b, and the modulus a, the equation of the conchoid is $(y + b)^2 (a^2 - y^2) - x^2y^2 = 0$. Its order is the fourth, and its class the sixth unless P is a cusp, in which case its class is the fifth. (See CURVE.) P is, in general, a double point, and the curve meets its asymptote at four consecutive points at infinity. The curve may easily be described mechanically, and is frequently used in architecture as a bounding line of the vertical section of columns. Consult Klein, *Vorträge über ausgewählte Fragen der Elementargeometrie* (Leipzig, 1895), trans. as *Famous Problems of Geometry* (Boston, 1897), and any work on analytic geometry.

CONCHOLOGY, kŏn-kŏl'ŏ-jĭ. See MOLLUSCA.

CONCHOS, kŏn'chŏs, RIO (connected with Sp., Lat. *concha*, shell). A river in Mexico, in the State of Chihuahua, rising on the southern border of the east of the Sierra Madre, flowing in a northerly direction through the table-land of that region, and joining the Rio Grande del Norte at Presidio del Norte after a course of about 350 miles (Map: Mexico, G 3). It receives a number of confluents from the west, but no important tributary from the east.

CONCIERGE, kôn'syârzh' (Fr., doorkeeper). The French title of the janitor of an apartment house. He is an important functionary in the life of most French, German, and the largest Russian cities. He sits in his little office by the main entrance and exercises a certain supervision over all who pass in or out, opening the door to those who enter after a certain hour of the night (in Vienna as early as 10 o'clock).

CONCIERGERIE, kôn'syâr'zh'rĕ', LA. A Paris prison, famous as the place of confinement of political prisoners during the French Revolution. It forms a part of the Palais de Justice towards the river and was originally the residence of the concierge of the old palace. Among the famous prisoners confined in the Conciergerie and taken thence to the guillotine were Malesherbes, Madame Roland, Danton, Desmoulins, and Robespierre. Here Marie Antoinette was confined before her execution, in a small cell, afterward changed into a chapel. In 1840 Napoleon III was for a time an inmate of the prison.

CONCILIUM. See COMITIA.

CONCINI, kôn-chē'nē, CONCINO. A favorite of Marie de' Medici of France. See ANCRE.

CON'CLAVE (Fr., Sp., Portug., It., Lat., room which may be locked, from *com-*, together + *clavis*, key, Gk. *κλείς, kleis*, key, from *κλεῖν, klein*, to shut). Either the place where the cardinals assemble for the choice of a pope, or the assembly itself. In 1179 a Lateran Council decreed in its first canon that a two-thirds vote of the cardinals was essential for a choice. This decree was developed, and the regulations, which are substantially still in force, established by Gregory X at the Council of Lyons in 1274. These rules are intended to provide against unnecessary delay or precipitation in election and against any external interference with absolute freedom of choice. A part of the Vatican is devoted to this use and is divided into a number of small apartments. Only one door is open, and that is under the strict supervision of officials designated for the purpose. Since 1848 food is prepared in the conclave, and the cardinals are not allowed to leave the place, or to receive or send out letters, until a new pope is chosen. Though directive legislation has varied from time to time, the present form may be said to have been fixed in its essential features since the end of the thirteenth century. When a pope dies, the College of Cardinals possesses supreme authority. Cardinals only may vote, but noncardinals are not excluded from candidature. All are sworn to secrecy. No voting by proxy is allowed. As to place, there is hardly any restriction. Formerly each cardinal in the name of the Catholic country which he represented had the right of excluding a candidate not acceptable to his government. This privilege he could exercise only once during the election. It it not possible to determine how old this concession was. Pius X prohibited, Jan. 20, 1904, under pain of excommunication, any elector to receive in any guise whatever a proposed veto against any possible nominee. The cardinals take an oath to this effect. A two-thirds vote is necessary to elect. Consult: any authorized manual on canon law; Wernz, *Jus Decret* (Rome, 1899); Thurston, "Conclaves, Past and Present," *Month*, vol. cii (London); *La Revue des Deux Mondes* (March 15, 1904). See POPE.

CONCOM'ITANCE (ML. *concomitancia*, from Lat. *concomitari*, to accompany, from *com-*, together + *comitari*, to accompany, from *comes*, companion), SACRAMENTAL. In the Roman Catholic church, a term which implies that the body and blood of Christ sacramentally accompany each other, so that under either form, whether wine or bread, both are sacramentally received. Hence the laity in that communion, although they are not permitted to take the cup, still are held to receive Christ's body and blood. See COMMUNION IN BOTH KINDS.

CONCOM'ITANT VARIATION, METHOD OF. See INDUCTION.

CONCONE, kŏn-kō'nâ, GIUSEPPE (1810–61). An Italian vocal teacher, born in Turin. He is widely known for his vocal exercises—solfeggi

and vocalizzi—which are unusually attractive for works of their kind and at the same time excellent for their special purpose. For about 10 years Concone resided in Paris as a teacher. Returning to Turin in 1848, he was at the time of his death organist and choir master of the court choir.

CONCORD, kŏn'kẽrd. A town in Middlesex Co., Mass., 20 miles by rail northwest of Boston; on the Concord and Sudbury rivers, and on the Boston and Maine Railroad (Map: Massachusetts, E 3). It has manufactures of rubber goods, chairs, woolens, and harness. The town contains the Massachusetts Reformatory, a fine public library, the old North Bridge, and many other places of historic interest. The government is administered by town meetings, and the municipality owns and operates its water works and electric light plant. Pop., 1900, 5652; 1910, 6421.

Concord, settled in 1635, is the oldest interior town in Massachusetts and by the time of the Revolution had come to be one of the great centres, not only of intellectual life, but also of political influence and power. In August, 1774, the Middlesex Convention, the first county convention assembled in Massachusetts, was held here, every town being represented; and on October 11, under the stimulus of the Revolutionary agitation, the first Provincial Congress, presided over by John Hancock, met at Concord to consider the question of resisting the tyrannies of George III. Later large quantities of ammunition and military supplies were stored here, and in an attempt made by the British to destroy them, on April 19, 1775, occurred the memorable fight which precipitated the War of the Revolution. (See LEXINGTON.) In 1787, during Shays's Rebellion, a body of insurgents entered Concord and prevented the sitting of its courts. The town is chiefly notable for having been the home of a distinguished coterie of writers and thinkers, including Emerson, Thoreau, A. Bronson Alcott, Louisa M. Alcott, Hawthorne, and William Ellery Channing, "the poet." Consult Hurd, *History of Middlesex County* (Philadelphia, 1890), and Emerson, *Historical Discourse Delivered in 1835* (Concord, 1835).

CONCORD. A city, capital of New Hampshire, and the county seat of Merrimack County, 75 miles by rail north-northwest of Boston; on the Merrimac River and on the Boston and Maine Railroad (Map: New Hampshire, G 7). It has wide streets, shaded and well paved, and a good water supply, owned and operated by the municipality. Among the principal buildings are the State House, built of granite, United States Government building, courthouse, and city hall, State prison, State Hospital for the Insane, the Margaret Pillsbury Hospital, Odd Fellows' Home, State Historical Society, Home for the Aged, Orphans' Home, State library, and St. Paul's School (Episcopal) for boys. There are several parks: White's, Rollins, Fiske, Contoocook River, and Penacook. In the State-House park are statues of Daniel Webster, John Stark, and John P. Hale, and at Penacook a monument to Hannah Dustin. In the vicinity are extensive quarries of fine-grained white granite, the quarrying of which is one of the leading industries. The car shops of the Boston and Maine Railroad are situated here. The manufactures include carriages, silverware, harness, furniture, flour, cotton and woolen goods, leather belting and leather hose, pianos, shoes, etc. Under the charter of 1909 Concord is governed by a mayor, chosen every two years, six aldermen at large, elected for four years, three assessors, and nine ward aldermen, chosen for two years. The mayor and aldermen at large constitute a board of public works, which has extensive powers. The police and fire departments, each with a chief, are controlled by the board of aldermen. The water works are managed by a board appointed by the mayor. The school board is chosen by popular election. Pop., 1900, 19,632; 1910, 21,497; 1920, 22,167.

Concord was founded in 1725, on the site of Penacook, the chief village of the Penacook Indians, and bore that name until 1733, when it was incorporated as Rumford. It suffered greatly in all the Indian wars and was the scene of a massacre in 1746. In 1765 Rumford was renamed "Concord." On the adoption of a State constitution it became the capital of New Hampshire and in 1853 was incorporated as a city. Consult: Moore, *Annals of Concord, N. H.* (Concord, 1824); Bouton, *The History of Concord* (ib., 1856); City History Commissions, *History of Concord* (ib., 1903).

CONCORD. A city and the county seat of Cabarrus Co., N. C., 21 miles northeast of Charlotte, on the Southern Railroad (Map: North Carolina, B 2). It is the seat of the Jackson Training School and the Scotia Seminary. There are foundries and machine shops, and extensive manufactures of cotton. First incorporated in 1793, Concord is governed at present under a charter of 1851, revised in 1891, which provides for a mayor, elected biennially, and a city council. The water works and electric light plant are owned by the city. Pop., 1890, 4339; 1900, 7910; 1910, 8715.

CON'CORD, IN MUSIC. See CONSONANCE.

CONCORD, BOOK OF (trans. of Ger. *Concordienbuch,* Lat. *Liber Concordiæ*). A collection of confessions of faith published in 1580, generally accepted by the Lutheran church. Its contents are: (A) The three ecumenical creeds —the Apostles', the Nicene, and the Athanasian. (B) The six particular confessions of the Lutheran church—(1) the Augsburg Confession; (2) the Apology of the Augsburg Confession; (3) the Schmalkald Articles; (4 and 5) the Larger and Smaller Catechisms of Luther; (6) the Formula of Concord. The last-named division, the Formula of Concord, appeared in 1580, after protracted conferences, and was acceded to by 86 of the states of the German Empire, but rejected by some of the states and by Bremen and Frankfort among the free cities. Its topics are: The Rule of Faith and the Creed; Original Sin; Free Will; Justification; Good Works; The Law and the Gospel; The Third Use of the Law; The Lord's Supper; The Person of Christ; The Descent of Christ into Hell; The Customs of the Church; Predestination and Election; and an appendix concerning heresies and sectaries. The best editions are: in German, Jubilee edition (St. Louis, 1880); in Latin, that of S. F. Francke (Leipzig, 1847); in English, that of H. E. Jacobs (Philadelphia, 1882). Consult Schaff, *Creeds of Christendom,* vols. i and iii (New York, 1878); Curtis, *History of Creeds and Confessions* (Edinburgh, 1911).

CONCORD, TEMPLE OF (so called). A Doric temple at Girgenti, the ancient Agrigentum, in Sicily, and one of the most perfectly preserved of ancient temples. Its 34 columns are still standing.

CONCOR'DANCE (ML. *concordantia*, agreement, from Lat. *concordere*, to agree, from *com-*, together + *cor*, heart). A book arranged in alphabetical order and showing in what passages all, or at least all of the more important, words in any work occur. For writings of universal import from which passages are continually being adduced to prove or support principles affecting our daily life and action, such a handbook is indispensable. The necessity for such a book upon the Bible was doubtless early felt, but tradition assigns the first Bible concordance to the famous St. Anthony of Padua (q.v.). It was entitled *Concordantiæ Morales in Sacra Biblia* (best ed., De la Haye, Paris, 1641), and was published early in the thirteenth century. In 1244 Cardinal Hugo de Saint-Cher published his *Concordantiæ Jacobi*, so called because made in the convent of St. James in Paris. Both these works were of course based on the Vulgate, as were several similar ones before the invention of printing. The earliest printed concordance to the Vulgate is by Joannes de Segovia and Sebastian Brant (Basel, 1496), and it is the basis of that published and edited by Robert Stephens (Paris, 1555). A concordance to the Greek Bible (Old and New Testament) was made by Euthalius of Rhodes about 1300; it has never been printed, but a manuscript copy was seen in Rome in the seventeenth century. One to the Septuagint was compiled by Conrad Kircher (Frankfort, 1607), and to the Greek New Testament by Xystus Betuleius (Basel, 1546), which, as amended by Robert Stephens and his son Henry, was published by the latter (Paris, 1594). Rabbi Isaac Nathan finished in 1448 a concordance to the Hebrew Bible (Venice, 1523), which in amended form by Marius de Calaris was published (Rome, 1621–22); another was begun by the elder and finished by the younger Johann Buxtorf (Basel, 1632). The first work of this kind in English was a concordance to the New Testament printed and in all probability prepared by Thomas Gibson (London, 1535); but the first concordance to the entire English Bible was by John Marbeck (London, 1550). Luther's German Bible had to wait till 1610 before a concordance to it appeared at Frankfort. The author was Conrad Agricola.

But all these works are now superseded by the vastly better modern works. For the Hebrew Bible the standard concordance is that by Julius Fürst and Franz Delitzsch, in Latin (Leipzig, 1837–41); but just as good for all practical purposes will be found *The Englishman's Concordance to the Hebrew Old Testament* (London, 1843; 4th ed., 1873), compiled by Tregelles, B. Davidson, and others. For the Septuagint, the best is by Hatch and Redpath (London, 1892–97); for the Vulgate, two recent works are by V. Coornaert (Bruges, 1892), and by Peultier, Etienne, and Gantois (Paris, 1902). To the Greek New Testament the best concordance in Latin is by C. H. Bruder (Leipzig, 1842; 5th ed., Göttingen, 1900); in English by W. F. Moulton and A. S. Geden (London and New York, 1897). To Luther's Bible the standard is M. G. Büchner's (Jena, 1740; 23d ed., Berlin, 1899). To the Authorized Version of the English Bible Alexander Cruden was the first to prepare a concordance which met with wide acceptance (London, 1737), and it has been reprinted so often, complete or in condensation, that Cruden has become a household word. Three others, however, are excellent—Robert Young, *Analytical Concordance to the Bible* (Edinburgh, 1879), often reprinted, Walker, *Comprehensive Concordance* (Boston, 1894), and James Strong, *The Exhaustive Concordance* (New York, 1894), which takes account of every word and is surely the most ambitious work of its kind.

Other books than the Bible have been furnished with concordances by the patient and long-continued labors of scholars. To enumerate a few: *Dante*, E. A. Fay (Boston, 1889); *Omar Khayyam* (Fitzgerald's), J. R. Futtin (London, 1899); *Chaucer*, the Chaucer Society (begun London, 1872); *Shakespeare*, Mrs. Mary Cowden Clarke (London, 1845), or, better, John Bartlett (New York, 1894); Milton, *Poetical Works*, G. L. Prendergast (Madras, 1857); C. D. Cleveland (London, 1867); *Pope*, E. Abbott (ib., 1875); Cowper, *Poetical Works*, J. Neve (ib., 1887); *Gray*, Albert S. Cook (ib., 1909); *Burns*, J. R. Reid (Glasgow, 1889); *Wordsworth*, Lane Cooper (London, 1911); *Shelley*, F. S. Ellis, (ib., 1892); *Dickens*, G. A. Pierce (ib., 1898), and M. Williams (ib., 1907); *Tennyson*, D. R. Brightwell (ib., 1869), and A. E. Baker (Taunton, 1911); *Browning* (*a Phrase Book*), Marie A. Molineux (New York, 1896).

CONCOR'DAT (Fr., agreement). A term used to designate a compact dealing with ecclesiastical affairs between the Pope, as head of the Roman Catholic church, and the temporal ruler of a state. Concordats commonly relate to things which are neither purely spiritual nor purely temporal, but mixed matters, in regard to which the action of the two powers can with difficulty be dissociated. Concordats may be framed either in the form of a treaty, to which both the contracting powers are consenting parties, or enacted by proclamation issued only by one party, most commonly by the Pope, embodying in the form of a decree the regulations resulting from the terms of agreement previously arrived at. The difference is only in form. It is a settled doctrine of Roman Catholic canonists, and especially of those of the Ultramontane (q.v.) school, that the Pope never absolutely cedes purely spiritual powers. Thus, in the presentation to bishoprics, while the King "nominated" or "elected," the Pope always reserved to himself the power of "canonical institution." There have been many famous concordats, of which the following are the most important: 1. *Concordats with Germany.*—The well-known Concordat of Worms in 1122, respecting investitures, is commonly regarded as the first concordat strictly so called. Similar agreements took place on the question of the *Regalia* (q.v.), between the Roman see and the emperors Otho IV, Frederick II, and Rudolph of Hapsburg. A more comprehensive compact on Church matters is that of which the foundation was laid at Constance in 1418, and which was subsequently modified by the "Frankfort" or "Princes' Concordat," by the Concordat of Aschaffenburg, and by that of Vienna, which last, although practically disregarded by Joseph II and his successor, Leopold II, continued in use till the dissolution of the Holy Roman Empire in 1806. Its place was supplied, under Pius VII and his immediate successors, by separate concordats with Bavaria, 1817; Prussia, 1821: Baden, Württemberg, and other minor states, 1818; Hanover, 1824; and Saxony, 1827. The last German concordat was that concluded at Vienna, Aug. 18, 1855. This provided for the fullest papal authority in the Austrian domin-

ions. The Church was to control education and to exercise a censorship over the press. The ecclesiastical courts were accorded special privileges. The Emperor was to nominate bishops, but only with the advice of the existing bishops and archbishops. The Church might acquire new property, but once acquired, it could not be sold or mortgaged without the consent of both Pope and Emperor. This concordat, so favorable to the papacy, was set aside in 1868 in all the dominions of the Emperor of Austria. 2. *With France.*—The Pragmatic Sanction, ascribed to St. Louis, but really of later date, has some of the characteristics of a concordat; but the first proper concordat is that of Bologna, concluded by Francis I with Leo X in 1515 and 1516, which continued in force, although with more than one conflict of the two powers, till the Revolution. In reëstablishing the Church in France, Napoleon Bonaparte, as First Consul, concluded with Pius VII the celebrated Concordat of 1801, which he afterward compelled the Pope, then a captive at Fontainebleau, to modify by a new act in 1814. Both were ignored at the Restoration; but an attempt to produce a substitute in 1817, and again in 1819, led to no result. 3. *With Italy.*—In Italy an agreement regulating the election of bishops was concluded with Nice and Savoy by Nicholas V in 1415; and a formal concordat was made with Sardinia by Benedict XIV in 1740. The ecclesiastical affairs of Naples were anciently regulated by the terms of what was called the *Monarchia Sicula;* but a formal concordat was made by Pius VII in 1818. 4. *With Spain.*—Charles I concluded a concordat for his Spanish kingdom with Adrian VI and Clement VII; and a further concordat was made by Clement XII and Philip V in 1737. 5. *With Portugal.*—Benedict XIV made a concordat with Portugal in 1741 and again in 1886. Besides these, the papacy has from time to time made many similar concordats with various small powers, especially with South American states in the nineteenth century. The age of concordats has passed away with the establishment of the preponderance of the state over the church, and for the most part concordats have been abrogated, such as that with France and with Austria. But several of the concordats still remain in force, as, e.g., that with Spain and with Bavaria.

Consult: Séché, *Les origines du Concordat* (Paris, 1894); Cardinal Cavagnis, *Institutiones Juris Publici Ecclesiastici* (Rome, 1906). The texts of the various concordats will be found in the collections of Münch (Leipzig, 1830); Nussi (Mainz, 1870); Walter (Bonn, 1862); Balve (Munich, 1863); often with extensive commentaries. See Austria-Hungary; Constance, Council of; Germany; Holy Roman Empire; Investiture; Napoleon I; Pius VII.

CONCORDE, kôn'kôrd', Place de la (Fr., Square of Concord). The largest square in Paris, the starting point of the Champs Elysées, bounded by the Rue de Rivoli, the Tuileries Gardens, and the Seine. It is associated with many historical occurrences. On it, on May 30, 1770, occurred a panic caused by fireworks, resulting in the death or injury of over 3000 persons. On the spot now occupied by the obelisk stood the guillotine by which more than 2800 persons died between Jan. 21, 1793, and May 3, 1795. In 1871 the Versailles troops engaged in a fierce struggle with the Communists on the square. The present name of the place, previously the Place Louis XV, was given in 1799. It was again called Place Louis XV from 1824 to 1830, when the name now in use was restored. Architecturally the square is one of the finest in the world. It is adorned with an obelisk from Luxor, presented by Mehemet Ali in 1831, with striking fountains, and eight figures representing the principal towns of France, and at night is brilliantly illuminated by 20 large bronze clustres of lamps. It commands a fine view of the Champs Elysées with the Arc de Triomphe, of the Madeleine, and of the Chambre des Députés, approached by the Pont de la Concorde.

CONCORDIA, kŏn-kôr'dê-â. A river port in the Province of Entre Rios, Argentina, situated on the right bank of the Uruguay (Map: Argentina, F 10). It has oil mills and slaughterhouses and exports large quantities of salt meat, leather, and Paraguay tea. Pop., 1895, 12,694.

CONCORDIA, kŏn-kôr'dĭ-â. A city and the county seat of Cloud Co., Kans., 202 miles west-northwest of Kansas City, on the Missouri Pacific, the Union Pacific, the Atchison, Topeka, and Santa Fe, and the Chicago, Burlington, and Quincy railroads, and on the Republican River (Map: Kansas, E 3). The city contains Nazareth Academy, St. Aloysius' School, St. Joseph's Hospital, and a Carnegie library. Concordia has abundant water power, is in a fertile agricultural country, and has valuable deposits of coal and building stone. There are grain elevators, flouring mills, a cold storage and ice plant, creameries, produce-packing plants, plow and wagon works, brick and cement-block plants, etc. The water works are owned by the municipality. Pop., 1910, 4415.

CONCORDIA (Lat., from *con-*, together + *cor*, heart). A Roman divinity, the goddess of harmony. Many temples were built in her honor, the oldest of them by Camillus in 367 B.C., after the passing of the Licinian Laws. (See Agrarian Law.) It stood in the Forum between the Temple of Saturn and the Mamertine Prison, at the foot of the Capitoline Hill, and was built of white marble with a richly carved cornice. Within the temple were many masterpieces of Greek sculpture. It contained, besides, paintings and a collection of precious stones. It was twice rebuilt, in 121 B.C. and under Augustus, but only scanty ruins now remain. The temple sometimes served as a meeting place for the Senate, and Cicero there delivered his last oration against Catiline. The goddess was represented as a matron, holding in her right hand a saucerlike vessel (*patera*) or an olive branch, and in her left the horn of plenty. Her symbols were two hands clasped together, and two serpents entwined about a wand. On the worship of such abstract conception as deities, consult Fowler, *Roman Festivals* (London, 1899). For the temple, consult Hülsen-Carter, *The Roman Forum* (Rome, 1906).

CONCRES'CENCE (Lat. *concrescentia*, growing together, from *concrescere*, to grow together, from *com-*, together + *crescere*, to grow; connected with Lat. *creare*, to create). The growing together of young plant organs by reason of mutual contact or pressure when forming. The term has also been applied to the apparent union of neighboring organs, such as the flower parts. In these cases, however, each organ begins its development independently, and those which appear to be united are lifted by the growth, underneath the separate rudiments, of a

region of tissue which belongs equally to all. See TERATOLOGY; FLOWER.

CONCRETE'. An artificial stone made of gravel, broken stone, or other inert material, sand, and cement, which when mixed with water soon set into a hard, dense mass. It is of very remote origin, specimens having been found in the earliest structures. In ancient Rome it attained a high degree of use, particularly in the walls of buildings, many of which are now in existence. While fundamentally any cementitious material may be used in its manufacture, the term is now exclusively applied to the artificial stone in which the binder is a hydraulic cement, i.e., one that will set under water. (See CEMENT.) Its particular advantages are its cheapness and availability as compared to stone masonry and the ease with which it may be cast into any shape or form, due to its plastic nature during manufacture. Of late years its use has greatly increased because of the invention of reinforced concrete, i.e., concrete in which steel is imbedded to supplement certain strength deficiencies in the concrete itself. In the year 1913, in the United States alone, over 80,000,000 barrels of cement were used in the manufacture of concrete.

As it closely approximates the natural stone in appearance and strength, and as it is much cheaper than any but the cheaper grades of stone, concrete is used in all classes of masonry structures, such as foundations, dams, walls, arch bridges, breakwaters, piers, pavements, reservoirs, locks, docks, etc. In under-water work it is much more widely used than natural stone because of the much greater ease in placing. Reinforced concrete can be made into much lighter forms of construction and is thus available for practically all classes of work in which timber, stone, or structural steel is used.

Constituents. The component parts of concrete are water, cement, and stone of varying size, the latter known as the *aggregate* and divided into fine and coarse aggregate. Since the comparatively recent development of Portland cement, it has been practically exclusively used for concrete, natural cement being used only in mortars and in concrete where strength or quality is not the prime requirement. In Europe and in rare instances in the United States a pozzuolanic cement is sometimes used for special work. Portland cement is now manufactured under a universally adopted specification and is of a uniformly high grade. It is invariably tested at the mill, but it is the custom for the purchaser to make his own tests on all large and important work. It is delivered to the work in cloth or paper sacks holding 0.95 cubic feet (98 pounds), more rarely nowadays in barrels holding 3.8 cubic feet (391 pounds), or still more rarely in bulk in car-load lots. The fine aggregate is generally a natural sand, though sometimes a crushed stone, reduced to sand size, is used. Sand must be clean and free from impurities and should pass certain tests as to its fitness for concrete material. The coarse aggregate may be any inert material, but is generally crushed rock or gravel, although broken brick, shards, cinders, and slag have been successfully used. It must be as hard, dense, and stable as possible and should break into round rather than flat pieces. The water must be clean and free from impurities.

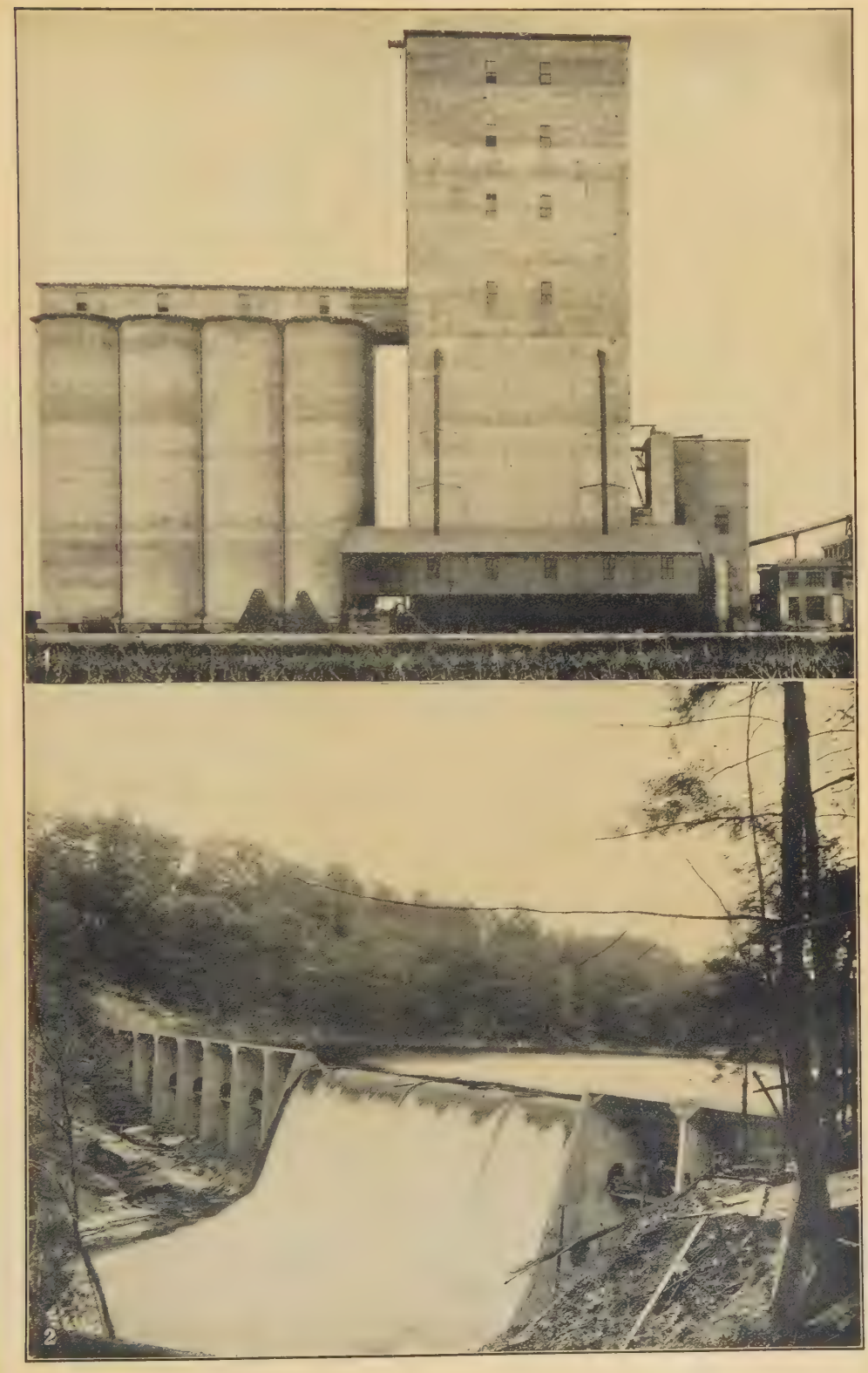
The strength of concrete depends largely on its density, and that in turn depends upon the gradation of the sizes of the various elements that make it up. A theoretically perfect concrete is one in which the cement completely surrounds the sand, making a mortar which completely fills the voids in the stone. This ideal condition results when there is such a gradation in sizes that all the voids in one class of material are filled with the particles of the next smaller material. The sizes of the particles of the various elements follows: cement, less than 0.005 inch; sand, ⅛–¼ inch; stone, ¾–3 inches. In one class of concrete, known as rubble or cyclopean concrete, large stones, even up to derrick size, are used. These are only for heavy mass work and are dumped into the wet concrete before it is set, care being taken that each stone has at least a 1-inch coating of mortar.

In high-class work great effort is made to analyze and grade the aggregate so that the ideal progression of sizes is achieved, but in general practice the best that can be done is to select as well-graded material as is commercially possible and then to proportion the material to give the densest concrete. These proportions vary from one part cement, one part sand, and two parts stone, all by volume (known as a 1 : 1 : 2 mixture), to one part cement, three parts sand, and seven parts stone (a 1 : 3 : 7 mixture), the strength increasing with the amount of cement. The most generally used mixes are a 1 : 2 : 4 for reinforced-concrete work and a 1 : 3 : 5 for mass concrete. The amount of water to be used varies with the material, the temperature, and the humidity, but is generally from 16 to 25 per cent by volume. A greater proportion is sometimes used to make easier working, but it tends to reduce the initial strength of the concrete.

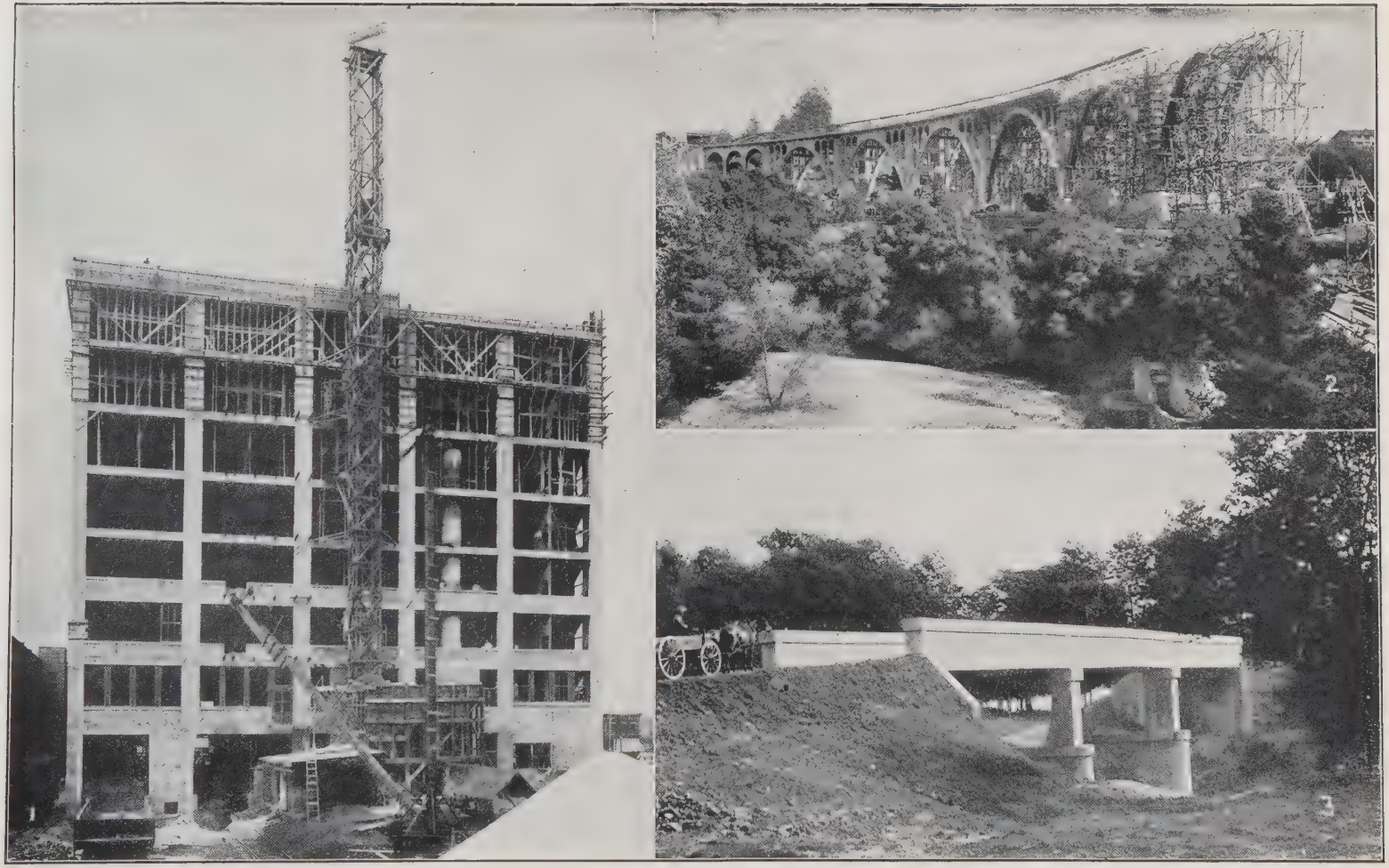
Manufacture. The manufacture of concrete is generally a field operation, though sometimes separate units are shop cast, as noted below. It is mixed wet and placed in the forms which give it its desired shape; after it sets into a hard stone, the forms are removed. Formerly only hand mixing was the rule, the various ingredients being thrown on a board and turned and mixed by spading until they were thoroughly combined. Now the machine mixer is almost universal, and hand mixing is resorted to only in small work.

Machine mixers are power-driven devices which turn and stir the ingredients until they may be delivered in a thoroughly mixed condition. They are of two general types, the continuous mixer and the batch mixer. The former takes the sand, cement, and stone, with water, at one end and delivers the concrete from the other end in a continuous stream. Their general design is a trough in which a screw paddle works the material together and through the trough. The batch mixer, as its name implies, takes a definite amount of the materials and mixes and delivers the concrete batch before taking another batch. Its general type is a drum (cubical, doubly conical, or cylindrical), mounted on a horizontal axle on which it revolves. It is provided with interior baffles or blades which assist the mixing process. A third type of mixer, which has recently come into the market, mixes the concrete by the force of compressed air in an air-tight drum into which the ingredients are placed.

Placing. The concrete is taken from the mixer and placed in the work by wheelbarrows,



1. A REINFORCED-CONCRETE GRAIN ELEVATOR AT CHICAGO, ILLINOIS
2. A REINFORCED-CONCRETE HOLLOW DAM AT CUYAHOGA FALLS, OHIO



1. A REINFORCED-CONCRETE BUILDING UNDER CONSTRUCTION AT CHICAGO, ILL. Method of building is shown; new concrete in upper floors being supported by struts, which are removed in lower floors where concrete has hardened. Note tower for placing of concrete
2. A REINFORCED-CONCRETE ARCH BRIDGE IN COURSE OF ERECTION AT PASADENA, CALIFORNIA
3. A REINFORCED-CONCRETE GIRDER BRIDGE. Woodland Bridge, Watseka, Ill.

locomotive-drawn cars, derricks and buckets, cableways and buckets, chutes or belt conveyors, the particular method depending upon the size of the work and the local conditions. In underwater work it is placed through long tubes, called "tremies," which reach from above the water to the place where the concrete is being laid, or by bottom-dumping buckets, which are not opened until the concrete is reached. It cannot be deposited through open water because the various ingredients would separate before reaching the proposed place of deposition.

Forms. One of the most important features of concrete work is the design and construction of the molds, technically called "forms," in which the concrete is laid. These must be of the proper shape and size to give the required finish, must be strong enough to withstand the hydraulic pressure of the wet concrete, and finally must be so arranged as to be easily taken down and used, for the sake of economy, in other work. Generally they are of wood, but in extensive work steel forms are sometimes used.

Strength. Concrete, like natural stone, is very strong in compression and weak in tension, so that, unaided by any other material, it is of value only to carry direct loads. Its strength, then, is measured by its compression resistance. This resistance increases with the proportion of cement in the mixture and with the age of the concrete. When first made, concrete is a semiliquid mass of no strength, and it reaches an initial set in the course of a few hours and a definite resistive quality in about 24 hours. Thereafter its usual increase in strength is in the following ratio, assuming a 100 per cent strength in 2 years: 7 days, 50 per cent; 1 month, 67 per cent; 6 months, 90 per cent; 1 year, 98 per cent; 2 years, 100 per cent. Some tests have been made over longer periods than two years, and although they are not conclusive as to further increase in strength, it is generally assumed that there is no retrogression after that period. The accompanying tables give some average values for the compression strength of different mixtures of good concrete for one month and six months:

COMPRESSIVE STRENGTH OF CONCRETE IN POUNDS PER SQUARE INCH

MIXTURE	AGE	
	30 days	6 mo.
1:1½:3	2500	3800
1:2 :4	2000	3000
1:2½:5	1800	2600
1:3 :6	1600	2400
1:4 :8	1100	1700

The strength of concrete varies also with the kind of materials used, poor cements, weak stone, dirty sand, and impure water materially reducing its resistive quality. The set is always retarded by freezing; below 40° F. the setting is very slow, but proceeds until freezing, when the setting process practically ceases. A concrete which is frozen before setting will resume the setting process after thawing out. In order to avoid trouble in winter work good practice demands that the water and aggregate be thoroughly heated before being placed in the forms and, in extremely low temperature, the inside of the forms be artificially heated until the concrete has set. By taking such precautions concrete has been successfully laid in temperatures as low as 30° F. below zero.

Reinforced Concrete. Reinforced concrete (known in Europe as concrete steel, armored concrete, béton ferré, béton armé, etc.) is concrete in which steel has been placed to supplement the strength deficiencies of the concrete. Its initial use was about 1860, but it is only since about 1900 that it has been generally employed. Now it is one of the most popular structural materials.

The action of the reinforcing steel in reinforced concrete may be explained by the accompanying

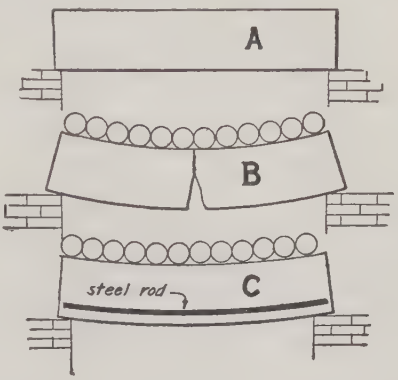


diagram. In this *A* represents a beam; when loaded, this beam will deflect downward in proportion to the load, and if it be of concrete, the concrete on the lower plane of the beam will crack in tension, under a very low load, as shown at *B*, and the beam will fail. If, however, a steel bar be placed, as shown at *C*, the steel, which is very strong in tension, will take the pulling force in the bottom of the beam, which will bend slightly under the same load as in *B*, but will not crack or break.

By virtue of the judicious combination of these two materials reinforced concrete can be used for the same purposes and in the same general disposition of members as can steel or wood, materials which are equally strong in tension and compression. At the same time the reinforced concrete possesses superior qualities of wear and longevity and is often much cheaper. In consequence it is being rapidly adopted for all structural purposes, such as for buildings, bridges, dams, wharves, docks, pipes, etc.

Normally it is built in the field. Forms, of wood or steel, outlining the shapes of the finished elements of the structure are first erected, and in them are placed the steel rods, so disposed as to take up the tensile stresses, and then the concrete is poured around the steel in the forms. After it has set, the forms are taken down and there is left a monolithic structure of concrete members reinforced with steel rods, which in good design should be tied together at every connection to insure the monolithic character. In a special type of reinforced-concrete construction the various members of the structure are cast as separately molded members in a casting yard and, after having set hard, are erected and tied together with concrete and steel joints, in a somewhat similar manner to the erection of timber and steel structures.

Concrete Blocks. Another very common application of concrete is the concrete block. This

is generally small, say 8 × 8 × 16 inches, with openings running vertically to reduce the weight, save material, and provide interior air space, which is cast of a sand and cement mortar in specially made machines. It is used largely in minor building operations, being set up in the wall with mortar joints. Its advantages are the ease and cheapness with which it can be made and the usual easy accessibility of the materials which make it up. Poor manufacture and materials very easily degrade the quality of the block, and as they are generally made by small operators on a small scale, they are very apt to prove weak and dangerous. When properly made, however, they are most satisfactory.

For some classes of heavy construction, such as dams, breakwaters, dock, etc., concrete is cast in a yard in large blocks of derrick size and set in place as in stone-masonry practice. These are not called "concrete blocks," that term being reserved for the small hollow building block noted above.

Wear. Since concrete is a field-made product subject to the lax workmanship and untoward conditions that that implies, and since its ingredients all necessarily require the closest inspection, it is not invariable in quality. When well made and of proper constituents, it is an admirable building material; it is highly fire and weather resisting, water-tight, and of long life. So far as the records show there is no limit to the continuance of these qualities in a good concrete. On the other hand, there is a great deal of poor concrete made, and this is subject to the attack of all kinds of deteriorating influences which bring about its gradual decay. The only safeguard is competent supervision of the making of the concrete.

Surface Finish. The texture of the face of concrete is in part affected by the nature of the form against which it is cast, but normally concrete has a dead, mouse-colored surface which requires some further treatment in any exposed work. This treatment may be the use of specially selected aggregate which is worked to the surface during laying, the tooling of the hardened surface as in stone masonry, or the scrubbing of the surface with brick or a wire brush to bring out the aggregate. At considerable expense various natural building stones may be faithfully imitated in concrete by some one of these methods.

Bibliography. Taylor and Thompson, *Concrete: Plain and Reinforced* (New York, 1912); Hool, *Reinforced Concrete Construction* (ib., 1913); Turneaure and Maurer, *Principles of Reinforced Concrete Construction* (ib., 1910); *Engineering News* (ib.); *Engineering Record* (ib.); *Concrete and Cement Age* (Detroit).

See CEMENT; MORTAR; BRIDGE; BUILDING; FOUNDATION; VIADUCT.

CONCRETE, REËNFORCED. See CONCRETE.

CONCRETE TERM. In logic, any name, whether substantive or adjectival, which denotes a thing and connotes a quality. See CONNOTATION; DENOTATION.

CONCRE'TION (Lat. *concretio*, coalescence, from *concrescere*, to grow together). A term used in medicine to denote a formation of solid, unorganized masses within the body, either by chemical precipitation from the secretions, or by the accidental aggregation of solids introduced into the system from without. If composed of precipitates in the urinary bladder, gall bladder, or salivary ducts, concretions are called calculi. (See CALCULUS.) They may also be found in former cavities in the lungs, as well as in tubercular joints, in which cases they are composed of lime salts. They may be found in the fingers and toes of gouty patients, appearing in nodules projecting from the sides of the joints, and termed tophi, or crabs' eyes. These nodules are frequently composed of urate of sodium. Concretions composed of fecal matter are frequently found in the vermiform appendix, in cases of appendicitis; very rarely a fruit seed is the basis and centre of such a concretion. Concretions have been formed upon pieces of catheter in the urinary bladder and upon beans in the nostrils. Concretions formed of balls of hair, concretions of Epsom salts swallowed undissolved, and concretions of cholesterin (q.v.) have been found in the intestines. See BEZOAR.

CONCRE'TIONARY STRUCTURE. A method of aggregation observed in some rock masses, particularly in the finer-grained sediments like chalk, limestone, and clay, whereby certain constituents have been collected together to form rounded symmetrical bodies that may closely simulate the work of human hands. They are variable in size and shape, but usually take the form of balls, disks, ovate and botryoidal masses which range from an inch or less to several feet in diameter. In any one rock their substance is likely to be uniform. The most common materials that form concretions are calcium carbonate, clay ironstone, and silica. The flints found in the chalk formations of England and France are an example of siliceous concretions, as are also the chert nodules found in many limestones, e.g., the corniferous limestone of New York State. Lime concretions are illustrated by the smooth, rounded, and sometimes perforate objects that accompany recent clays, which are not infrequently taken for fossils, so striking is their resemblance to organic forms. Clay ironstone occurs abundantly in concretions in association with the coal measures from which it may be mined as a valuable iron ore. The nodules of that material not infrequently show a system of radiating cracks which have been filled by a deposit of calcium carbonate, forming a network of white veinlets that inclose rounded or polygonal areas of the black iron carbonate. Such masses are called septaria (q.v.); when cut and polished, they exhibit a mosaic pattern which is quite ornamental.

The origin of such nodules and concretions is regarded by most geologists as referable to processes acting subsequently to the formation of the stratum in which they occur; i.e., they were not primarily incorporated in the sediments, but have been built up layer after layer in place. The agency is probably water—the body of ground water that is constantly circulating through the rocks and carrying on the work of solution and precipitation of mineral materials. In most cases the deposition began about some nucleus of foreign matter, like a grain of quartz, a fossil plant, or shell. The principle involved in such selective precipitation has never been satisfactorily explained, but it bears some analogy to the force of crystallization. According to Dr. George P. Merrill, the formation of clay nodules may result from purely mechanical processes, of which he cites an instance that came under his observation. In that case, however, the materials were of the same kind as

those forming the sediment, whereas in true concretionary structure they are usually of contrasting character to their immediate surroundings. Another type of concretionary structure is exemplified by oölite (q.v.).

CONCU'BINAGE (from OF., Fr. *concubine*, from Lat. *concubina*, concubine, from *concumbere*, to lie with, from *com*, together + *cubare*, to lie). In general, the cohabitation as husband and wife of a man and woman who are not lawfully married to each other. Specifically, a form of polygamy in which the primary matrimonial relation is supplemented by one or more secondary and inferior relations of the same kind. It was used, technically, in the former sense, in the common-law action for dower, in the allegation that the woman claiming dower was not a wife lawfully married to the party in whose land she seeks to be endowed, but his concubine. In the United States the term has been applied, under the Edmunds acts of 1882 and 1887, to the polygamous relations of the Mormons, at which the acts were aimed. In its general sense, as denoting merely unlawful cohabitation, concubinage, however abhorrent to the moral sense of the community, is not in most jurisdictions obnoxious to the criminal law. In its special sense, however, as signifying a plurality of wives, it comes under the penalties of bigamy and polygamy (qq.v.).

The earliest Roman laws were distinguished for the strictness with which they treated marriage. They not only upheld thoroughly the principle of monogamy, but they fettered marriage itself with many burdensome forms. Hence arose the practice of a free unmarried man entering into a less strict relation with a single woman—a sort of permanent cohabitation. The offspring of such a connection, called "natural" children, had not the rights of legitimate children, but they were recognized by the father. Augustus, with a view to promote regular marriages and check the growing licentiousness, enacted a comprehensive marriage law (*Lex Julia*), which discouraged concubinage, restricting it to women of low rank or those who had lost their station. Christianity required the complete sanctity of marriage and taught that concubinage was sinful, and we find the Synod of Toledo legislating against it as far back as 400 A.D. The ancient laws of the Germans recognized, along with regular marriage, an informal connection of the sexes. In the Middle Ages a similar connection became customary, called a left-handed, or morganatic marriage. See MARRIAGE, and consult the authorities there referred to. See HETÆRÆ.

CONCUR'RENCE (ML. *concurrentia*, concurrence, from *concurrere*, to run together, from *com-*, together + *currere*, to run) and **COL'LINEAR'ITY** (from Lat. *com-*, together + *linea*, line). If several lines have a point in common, they are said to be concurrent. The common point is called the vertex of the pencil of lines. If several points lie on one straight line, they are said to be collinear. The line is called the base of the range of points. That portion of geometry concerned with concurrent lines and collinear points is called the theory of concurrence and collinearity. Some of its fundamental propositions are:

If a transversal intersects the sides of a triangle ABC in the points X, Y, Z, the segments of the sides of the triangle are connected by the relation $(AZ : ZB) \cdot (BX : XC) \cdot (CY : YA) = -1$. Conversely, if the points are so taken that the relation holds, then the three points are collinear. (This relation is known as Menelaus' theorem.)

If the three lines AO, BO, CO drawn from the vertices of the triangle ABC are concurrent in O and meet the opposite sides in X, Y, Z, it follows that $BX \cdot CY \cdot AZ = -CX \cdot AY \cdot BZ$, and conversely (Ceva's theorem).

If three lines perpendicular to the sides of a triangle ABC at X, Y, Z are concurrent, then $BX^2 - XC^2 + CY^2 - YA^2 + AZ^2 - ZB^2 = 0$.

Conversely, if this relation holds, the perpendiculars are concurrent.

If the lines joining the vertices of two triangles are concurrent, their corresponding sides intersect in three collinear points. (This proposition, known as Desargues's theorem, is true for any rectilinear figures.)

The opposite pairs of sides of a hexagon inscribed in a conic intersect in three collinear points (Pascal's theorem).

The lines joining the opposite vertices of a hexagon circumscribed about a conic are concurrent (Brianchon's theorem).

The polars of a range of points with respect to a circle (q.v.) are concurrent, and conversely.

If from any point on a circle perpendiculars are drawn to the sides of an inscribed triangle, the feet of these perpendiculars are collinear. (The base of this range is called Simson's line.)

From these and other similar theorems many properties of elementary geometry follow at once; as, the altitudes of a triangle are concurrent, the medians of a triangle are concurrent, etc. The theorems of Pascal and Brianchon lead to numerous theorems in modern geometry. Consult: Cremona, *Elements of Projective Geometry*, trans. by Leudesdorf (Oxford, 1885); Casey, *Sequel to Euclid* (Dublin, 1888); McClelland, *Geometry of the Circle* (New York, 1891); Veblen and Young, *Projective Geometry* (Boston, 1911).

CONCURRENT JURISDICTION. The jurisdiction that exists where two or more courts possess the equal and coördinate right of taking cognizance of a single cause. Thus, in the United States, a justice's court and a city court may often take cognizance of the same matter; or a court of common pleas and a superior court may do the same. In criminal cases it is an established rule that, when one court has brought an offender before it, the court having concurrent jurisdiction is thereby debarred from taking cognizance of the case. In civil trials it is the privilege of the person appealing to the law—i.e., in most cases, the plaintiff—to choose before which of the two coördinate courts he wishes to bring the matter. The phrase "concurrent jurisdiction" is used in opposition to *privative*, or exclusive, jurisdiction, i.e., where only one court has the right of hearing and determining the matter at issue.

In the political system of the United States, with its Federal courts exercising jurisdiction over the same persons as are subject to a local State jurisdiction, the occurrence of cases of concurrent jurisdiction is very common. Where it exists, a decision of a State court may, in a proper case, be taken up to the Supreme Court of the United States for review. See COURT; JURISDICTION.

CONCUSSION OF THE BRAIN (Lat. *concussio*, shock, from *concutere*, to shake together,

from *com-*, together + *quatere*, to shake). The name given to a group of symptoms which result from injuries to the head, but are not due to fracture or to perceptible laceration of vessels or brain substance. The condition has been widely discussed and extensively studied by many means of experimentation, but authorities still disagree as to whether it is due to laceration of minute blood vessels, to molecular changes in the brain cells, or to a change in the disposition of the cerebrospinal fluid. Surgeons deny that concussion of itself is fatal, and autopsies show almost invariably some apparent lesion of vessels or brain substance in those fatal cases which have simulated concussion, but which were really instances of contusion or laceration. The symptoms vary in mild and severe cases. In the former, when the patient is "stunned" by a fall or a blow on the head, there are dizziness, disturbances of vision and noises in the ears, loss of strength, so that the patient falls, the face is pale and covered with a cold perspiration, the respiration is shallow, the pulse feeble and often slower than normal. In graver cases these symptoms become intensified, or the most extreme symptoms may develop instantly. There is complete unconsciousness, the body is cold and relaxed, the pupils widely dilated and unresponsive to light, the respiration scarcely distinguishable, the pulse weak, irregular, and slow. Vomiting is also frequent. This condition may last for several hours or even for a day or more, after which reaction slowly occurs, and recovery is complete. Frequently the symptoms of contusion or hemorrhage may follow, and the subsequent history becomes that of severe brain injury. Protracted symptoms of concussion are usually regarded as suggestive of a more serious injury. The treatment is expectant; it consists in the application of warmth to the body, stimulation of respiration and pulse if necessary, and in keeping the patient in absolute quiet. A surgical operation is, of course, not indicated in pure concussion, but only in such cases as give symptoms of gross brain lesions. See SHOCK.

CONDAMINE, CHARLES MARIA DE LA. See LA CONDAMINE.

CONDÉ, kôn'dā', FAMILY OF. One of the great families in France, and a branch of the house of Bourbon. It took its name from the town of Condé. (See CONDÉ-SUR-L'ESCAUT.) The first to bear the title of Prince de Condé was Louis, the youngest son of Charles de Bourbon, Duke of Vendôme. (See below.) The family became extinct in 1830. It gave many famous men to France, of whom the following are the most noted:

LOUIS I DE BOURBON, Prince de Condé (1530–69), appears in 1549 as gentleman of the royal bedchamber. He distinguished himself at the siege of Metz (1552), and in the battle of Saint-Quentin (1557). But the court was under Guise influence, and no Bourbon could expect advancement. Condé, who had early imbibed Protestant ideas, threw in his lot with the Huguenots on the accession of Francis II in 1559. He took part in the conspiracy of Amboise, formed by the Huguenots for the overthrow of the Guises. The capture and imprisonment of the chief Huguenot leaders followed, and Condé escaped execution only through the opportune death of the King. The balance of power rested in the hands of Catherine de' Medici (q.v.), who liberated Condé and made him Governor of Picardy. After the Massacre of Vassy (1562) Condé and Coligny took up arms against the Guise faction, but they were defeated at Dreux in the same year, and Condé was taken prisoner. He was, however, liberated in the year following by the pacification of Amboise. Owing to fresh persecution, the Huguenots again took up arms in 1567; an unsuccessful attempt to seize the person of the King was followed by the indecisive battle of Saint-Dénis, in which the Catholic leader, the Constable de Montmorency, was slain, and in 1568 another treaty of peace was made. Condé, however, learning of court intrigues against his liberty, renewed the conflict. The battle of Jarnac (March 13, 1569) resulted most disastrously for the Huguenots. Condé rashly exposed himself and was wounded and taken prisoner. While his wounds were being dressed, he was assassinated by Montesquieu, a Swiss mercenary captain, possibly at the command of the Duke of Anjou, whom Condé had offended. "He was distinguished," says the Duc d'Aumale, "by great ardor and gayety, the desire and the gift of being pleasant, by a resolute character, a proud soul, and a great and generous heart." Of the four sons who survived him, the eldest, Henri I (1552–88), joined the Huguenot cause, but renounced his religion to save his life at the time of the Massacre of St. Bartholomew. He again took up arms for Protestantism in 1585 and was excommunicated by Pope Sixtus V. After several successful encounters with the forces of the League, Condé was wounded at Coutras (Oct. 20, 1587) and died a few months later, not without grave suspicions of foul play on the part of his wife and attendants. The legitimacy of his only son, Henri II (1588–1646), was a matter of great dispute; but finally he was allowed to succeed to the titles and estates of his father, and, for a time at least, was looked on as the heir presumptive to the French crown. This contingency was removed by Henry IV's second marriage and the birth of the Dauphin Louis (1601). After a life at court, devoted to the aggrandizement of his family and marked by opposition to the Huguenots, Henri II de Condé died in 1646. He was the father of the Great Condé.

LOUIS II DE BOURBON (1621–86) is known in history as the Great Condé. After a thorough education in the Jesuit seminary at Bruges the young Prince, who was known as the Duc d'Enghien during the lifetime of his father, was introduced at court, and the next year, at the age of 18, was made Governor of Burgundy. To further his father's political aims, he was forced, in 1641, to marry the niece of Richelieu, much against his inclination. Meanwhile he had entered the military service and distinguished himself in the Netherlands, but his great triumph came in 1643, when, at the battle of Rocroi, he outmanœuvred the Spanish infantry, raised the siege, and inflicted a severe defeat on the enemy. Other successes followed, and Condé was promoted and sent to Alsace, in the summer of 1643, to coöperate with Turenne. After the victory of Freiburg, the capture of Philippsburg, Mainz, and other cities on the Rhine, Condé returned in triumph to Paris for the winter, but in 1645, after the defeat of Turenne by Mercy, he again took the field and by his splendid dash and energy won a series of victories culminating in that of Nördlingen in 1645, where Mercy was killed. Associated with the Duke of Orléans in

the Netherlands in 1646, Condé won several brilliant victories. The death of his father in the same year made him head of the Condé family, gave him possession of vast estates and a large fortune, and made him the highest personage in the state after the King and the Duke of Orléans. Though feared by Mazarin, Condé was given the chief command in the Netherlands and made captain general of the French forces. The victory at Lens in 1648 added to his fame, and he was recalled to Paris to suppress the rising of the Fronde (q.v.). After many intrigues, plots, and counterplots the court returned to Paris. Condé's haughtiness of manner and dictatorial measures, however, soon alienated the Queen and nobles, and by the advice of Mazarin he was arrested, with other members of his family. The threatened advance of Turenne, the murmurs of the Fronde, and the activity of friends soon secured Condé's release. The discomfiture and flight of Mazarin again brought Condé to the front, but the failure of the court to fulfill its promises and the suspicions he entertained that his assassination was contemplated roused him to fresh rebellion in 1651. His former ally, Turenne, was now on the side of the court, and after Condé had won the battle of Bléneau (April, 1652) and advanced on Paris, he was met by Turenne at the head of the royal troops. A bloody and indecisive conflict ensued, the net result of which was so to weaken the Frondeurs that most of them consented to a treaty of peace. Condé, however, rejected the proffered terms, and after a vain effort to retrieve his cause and seize Paris, went over to Spain. In the war which followed he acted as commander in chief of the Spanish forces in Flanders, but, despite his brilliant strategy, could gain no advantage over Turenne, who opposed him, and he was finally badly defeated in the battle of the Dunes (June 14, 1658) by the allied French and English forces. When the Peace of the Pyrenees was made (1659), Condé was pardoned and again entered the service of France. In 1673 he commanded in the Netherlands and the next year fought a drawn battle at Seneffe with William of Orange. This was the great general's last important battle, though in 1675 he succeeded Turenne, on the latter's death, in command of the army on the Rhine. Disabled by gout, he resigned his post and retired to his estate at Chantilly. There he devoted himself to religious exercises varied by the pursuit of literature and the society of his friends. He was intimate with Molière, Racine, Boileau, Bossuet, and La Bruyère. He died at Fontainebleau on Dec. 11, 1686, and his friend Bossuet pronounced the now famous *Oraison funèbre* over his bier. Though proud, and acting always from motives of selfish ambition, Condé was without doubt one of the greatest men of his time. The only surviving son of the Great Condé, Henri Jules (1643–1709), inherited some of the ability of his father, while his grandson, the Duke de Bourbon, known as *Monsieur le Duc*, was a prominent figure at the time of the Regency.

Louis Joseph de Bourbon, Prince de Condé (1736–1818), the son of the Duke de Bourbon, was born in Paris, Aug. 9, 1736. He distinguished himself in the Seven Years' War. At the outbreak of the Revolution he showed himself a strong supporter of the monarchy, and in 1792 took up arms against the Republic, organizing on the Rhone a body of *émigrés*, which coöperated with the Austrians and was known as "the army of Condé." After the Peace of Campo Formio (1797), he entered the Russian service and in 1801 fought in that of England. His last years were spent at Chantilly. He was the author (1798) of an *Essai sur la vie du grand Condé*. His son Louis Henri Joseph (1756–1830) was the last of the Condé princes. He was wounded at the siege of Gibraltar in 1782 and later served under his father against France. His eldest son was the hapless Duc d'Enghien (q.v.), executed in 1804 by order of Napoleon. After the Restoration, Condé settled his fortune on the Duc d'Aumale, son of Louis Philippe, but in 1830 seemed to have thought of changing this will. Before doing so, however, he was found strangled, and it was judicially decided that he had committed suicide.

Consult: Duc d'Aumale, *Histoire des princes de Condé XVIe and XVIIe siècles* (7 vols., Paris, 1863–96); vols. i and ii translated into English by R. B. Borthwick (London, 1872); Lord Mahon, *Life of Louis, Prince of Condé* (ib., 1845); Fitzpatrick, *The Great Condé and the Period of the Fronde* (2d ed., ib., 1874); Crétineau Joly, *Histoire des trois derniers princes de la maison de Condé* (Paris, 1866); Muret, *L'Histoire de l'armée de Condé* (ib., 1844); Piépape, *Histoire des princes de Condé au XVIIIe siècle* (ib., 1911); Williams, *The Love Affairs of the Condés* (London, 1912).

CONDELL, kŭn'dĕl, Henry (?–1627), and **HEMING,** John (?–1630). English actors, whose names are forever linked with Shakespeare's. They both belonged to Shakespeare's company, and, with Burbage, were joint owners of the Globe Theatre. The great dramatist, as a token of lifelong friendship, bequeathed to them and Burbage 26s. 8d. to buy rings. And they in turn collected and edited his plays, "to keepe the memory of so worthy a friend and fellow alive" (first folio, 1623).

CONDEMNATION. See Eminent Domain.

CONDENSED MILK. See Milk.

CONDENS'ER (from Lat. *condensare*, to thicken, from *com-*, together + *densus*, thick, Gk. *δασύς, dasys*, thick). Any device for reducing gas or vapor to a liquid or solid form. The name is applied specifically to a variety of apparatus used in the arts besides appliances for condensing gases and vapors, as the part of a cotton gin which compresses the lint; a machine which takes the wool coming from the carding engine and rolls it into slightly twisted threads or slubbings ready for spinning; the arrangement of steam pipes used in sugar mills to evaporate the water in the cane juice preparatory to concentration. Condensers in steam engineering are apparatus for condensing the exhaust steam from an engine. They are invariably employed on ocean-going steam vessels and generally on coasting, river and fresh-water steamers, often in stationary power plants and seldom or never on locomotives or portable engines. The two distinct forms are the surface condenser and the jet condenser. The surface condenser consists essentially of a closed vessel containing a nest of tubes through which a current of cold water is passed and around which the exhaust steam circulates, thus keeping the condensed water separate from the cooling water, which is frequently salt or dirty. In the jet condenser the exhaust steam flows into an air-tight chamber, where it meets a spray of cool water which condenses it, and the condensed water and cooling or

injection water combined are then pumped out. This form of condenser is frequently used where a supply of fresh water is available for cooling purposes or where a very limited quantity of water of any kind is available and the cooling or circulating water is to be used over again. A modification of the jet condenser, known as the barometric or siphon condenser, is now used extensively. The condensing vessel is placed at the top of a pipe over 32 feet in height, whose lower end is immersed in water so that it forms the tube of a water barometer. The exhaust steam flows into the tube containing this water column at the top, meeting there the spray or injection of cooling water which condenses it. Gravity tends to empty the water in the vessel, because the combined waters then drop down the pipe and become part of the water column, some of which flows out at the lower end. Hence a Torricellian vacuum is maintained at the top of the column except so far as the vapor of water is present, and entrained air. A dry-air pump is used with this apparatus to take away the air that comes to the condenser with the steam and collects at the top of the barometric column. See STEAM ENGINE.

CONDENSER. A form of electrical apparatus used to accumulate a charge of electricity. A condenser in its simplest form consists of two conductors which are separated from each other by an insulating medium or dielectric. The name dates from the time of the fluid theory of electricity, when it was believed that a certain amount of the electric fluid could be collected or condensed on a conducting surface. The principle of the apparatus is illustrated in the Franklin plate, which consists of a plate of glass with pieces of tin foil on each side. If a positively charged body or the positive conductor of an electric machine is connected with one of the tinfoil coatings, it will communicate to it by conduction a positive charge of electricity. If now the opposite plate is connected with the ground, the negative electricity is held bound, while the positive is repelled and passes to the ground. Accordingly we have accumulated equal amounts of positive and negative electricity on the tin foil, and if the two surfaces are connected a bright spark results and the equilibrium is restored. Otherwise the charge remains on the surface of the conductors until it is dissipated by leakage. The energy which is stored up in the condenser is expended in producing the spark. The amount of electricity that can be accumulated depends upon the capacity of the condenser and the potential of the charge. The Leyden jar consists of a Franklin plate in a cylindrical form, and as it is more compact and has greater capacity, it is more often used. In practice, however, the usual form of condenser consists of sheets of tin foil separated from each other by paraffined paper, or in the case of standard condensers sheets of mica, with the alternate sheets of tin foil connected together to give considerable capacity. The apparatus may be arranged so as to afford various amounts of capacity, and is much used in cable testing and other branches of electrical work. The unit of capacity is the farad (q.v.), but condensers are generally constructed to give capacities in fractions or multiples of a microfarad ($\frac{1}{1000000}$ farad), which is the unit ordinarily employed. See ELECTRICITY.

CONDER, CLAUDE REIGNIER (1848–1910). An English army officer and writer on the topography and archæology of Palestine. He was educated at University College, London, and entered the Royal Engineers. In 1872–78 and 1881–82 he commanded the survey of Palestine. He afterward served in Egypt (1882), in Bechuanaland (1884–85), on the Transvaal Border as British Commissioner, at the headquarters of the Ordnance Survey (1887–94), in Irish relief work (1895), and on the Irish Ordnance Survey (1900–05). He contributed to Smith's *Bible Dictionary.* Among his important works are: *Tent Work in Palestine* (1878); *Judas Maccabæus* (1883); *Heth and Moab* (1883); *Memoirs of the Palestine Survey* (1883, 1890); *Primer of Bible Geography* (1884); *Palestine* (1891); a translation of the Tel el-Amarna tablets (1894); *The Latin Kingdom of Jerusalem* (1897); *The Hittites and their Language* (1898); *The Rise of Man* (1908); *The City of Jerusalem* (1909). He published in 1869 a series of illustrations for Bunyan's *Pilgrim's Progress* and made illustrations as well as maps and charts for his own books.

CONDER, JOSIAH (1852–). An Anglo-Japanese architect, born in London. He was educated at the Kensington Art Schools, in the Slade life classes of University College, and at the Royal Institute of British Architects. In 1876 he was engaged by the Japanese government as professor of architecture to the Imperial Japanese Engineering College of Tokyo, and as architect in the Public Works Department. He was also lecturer on architecture at the Imperial Tokyo University. In 1884 he received the fourth-class decoration of the Rising Sun and in 1894 the third-class decoration of the Sacred Treasure. Finally he was retired with a life pension and with the office of honorary consulting architect to the Imperial Japanese government. His publications include: *Landscape Gardening in Japan* (1893); *The Floral Art in Japan* (1899); *Paintings and Studies by Kawanabe Kyosai* (1911).

CONDÉ-SUR-L'ESCAUT, kôn'dā' sụr lĕs'kō' (Fr., Condé on the Scheldt, from Gall. *condat,* confluence + Fr. *sur,* on + *Escaut,* Scheldt). A town in the Department of Nord, France, at the confluence of the Haine and the Scheldt, 8 miles northeast of Valenciennes, of which it is the entry port (Map: France, N., J 2). It dates from the Roman period and gave its name to the noble family of Condé. It has an interesting castle, a church, an arsenal, and strong fortifications constructed by Vauban. It has belonged to France since 1678. It manufactures starch, chicory, leather, soap, and boats. Pop. (commune), 1901, 4960; 1911, 5213.

CONDÉ-SUR-NOIREAU, nwä'rō'. A town in the Department of Calvados, France, on the Noireau and Drouance rivers, 33 miles southsouthwest of Caen by rail (Map: France, N., E 4). Among its notable features are the two venerable churches of St. Sauveur and St. Mark, and a bronze statue of Dumont d'Urville, the famous navigator, a native of the town. It is a busy industrial centre, with cotton-spinning factories, manufactures of cutlery, leather, thread, cotton and linen fabrics, oils, and ironworking, and an important trade in cattle, honey, and other agricultural products. Pop., 1901, 6591; 1911, 5604.

CONDILLAC, kôn'dē'yàk', ETIENNE BONNOT DE (1715–80). A French philosopher. He was born at Grenoble and in 1768 became a member of the French Academy of Sciences. He never

attended the meetings of the Academy after his reception as a member and passed his life mostly in great retirement. He died at his estate near Beaugency. In 1746 he published his *Essai sur l'origine des connaissances humaines*, a work which represented the views of Locke (q.v.). In his later works he carried out the sensational side of Locke's philosophy with great consistency. He believed that "the ego of each man is only the bundle of the sensations he experiences and of those which memory recalls." He later, in his *Traité des sensations*, illustrated his view by describing an imaginary consciousness, possessed by a marble statue, growing as it receives one by one various sense faculties. In addition to his first essay, he wrote: *Traité des systèmes* (1749); *Recherche sur l'origine des idées que nous avons de la beauté* (1749); *Traité des sensations* (1754); *Traité des animaux* (1755); *La logique* (1781), besides 13 volumes of textbooks he had prepared when tutor to the Duke of Parma, grandson of Louis XV. Several editions of his collected works have been published (1798, 1803, 1822). Consult: Dewaule, *Condillac et la psychologie anglaise contemporaine* (Paris, 1892); Lewes, *History of Philosophy* (London, 1880); Réthoré, *Condillac ou l'empirisme et le rationalisme* (Paris, 1864); Robert, *Les théories logiques de Condillac* (ib., 1869).

CON'DIMENTS (Lat. *condimentum*, from *condire*, to season, from *com-*, together + *-dere*, Skt. *dhā*, to put). Seasoning agents, or substances employed at table for the purpose of imparting a flavor or seasoning to the ordinary solid or liquid food. The greater part of condiments are necessary to sustain the proper functions of the alimentary system and, besides gratifying the appetite, minister to the wants of the structure. The principal condiments are saline substances, such as common salt; acidulcus bodies, such as acetic acid or vinegar; oily condiments, such as butter and olive oil; saccharine substances, such as sugar and honey; and aromatic and pungent condiments, such as mustard, ginger, pepper, and pickles.

CONDI'TION (OF. *condicion*, Fr. *condition*, from Lat. *condicio*, agreement, from *condicere*, to agree, from *com-*, together + *dicere*, to say). The popular name in American college parlance for a deficiency on the part of a student in examinations. It derives its force from the fact that the student is permitted to go on with his class only on *condition* that the deficiency be made good within a given time, failing which his name is dropped from the college rolls.

CONDITION. In natural science and metaphysics, that in default of which a phenomenon does not occur. (See CAUSALITY.) In logic it denotes any qualification of the universal validity of a statement. See LOGIC.

CONDITION and **CONDITIONAL.** As a legal term, "condition" signifies a provision in a contract, conveyance, grant, or will, that an estate or interest in property, or a personal obligation, shall depend upon the happening of an uncertain event. The term is also applied to the event itself. If the condition is set forth in words, it is called an *express* condition; if it is inferable from the circumstances of the particular case, it is called an *implied* condition. In English law conditions are also classified as conditions *precedent* and conditions *subsequent*. An example of the former is the grant of an estate to A upon condition that he marry B; or the contract to charter a ship upon condition that it is in the port of Amsterdam. Here the event named must happen before the estate vests in A, or the contract obligation on the part of the hirer of the ship arises. An example of a condition subsequent is the grant of an estate to A upon condition that he continues to reside in a particular place; or the purchase of a piano upon condition that it shall "stand up to correct pitch" for a year. Here the estate in A, or the obligation of the purchaser to keep and pay for the piano, is annulled upon the nonperformance of the condition. Impossible, illegal, or repugnant conditions are void. Accordingly, says Blackstone, "if they be conditions subsequent, the estate shall become absolute in the tenant, for he hath by the grant the estate vested in him, which shall not be defeated by a void condition. But if the condition be precedent, he shall take nothing by the grant, for he hath no estate until the condition is performed."

A provision in a contract which is intended to operate as a condition in favor of one party may contain a binding promise of the other party. For example, A agrees to sell and deliver to B at a named time, place, and price a certain quantity of merchantable corn; and A tenders unmerchantable corn at the agreed time, place, and price. B has the right not only to reject the corn, because the condition precedent to deliver merchantable corn has not been performed by A, but also to recover from A damages for breach of contract to deliver the agreed corn. Such a provision in a contract may be called a promissory condition. Of this class are the mutual promises of the seller to deliver the goods and of the buyer to pay for them—engagements which are sometimes called "concurrent conditions." Promissory conditions have been confused with warranties (see WARRANTY) by many judges and writers, but the English Sale of Goods Act of 1893 makes a sharp distinction between the terms and has done much to clear up the confusion in this branch of the law. See SALE.

Another and distinct class of provisions in contracts may be styled *casual* or *contingent* conditions, because they are intended to prevent any obligation attaching to either party until their performance. An example of this class is afforded by an agreement for the sale of described goods to arrive by a specified ship. Here, if the ship does not arrive, or, if arriving, it has not the described goods on board, neither party is bound.

The word *conditional* frequently appears in standard legal phrases, some of the more important of which are the following: *Conditional acceptance* (of a bill of exchange) is an acceptance in which payment by the acceptor is dependent upon the fulfillment of a condition therein named; *conditional advance note* is a note given by the master of a ship to a seaman, payable after the ship sails upon condition that the seaman goes with the ship; *conditional allotment, conditional application*, is the allotment of shares in a company, or the application for shares, made upon a specified condition. In the former case the applicant is not bound to take the shares unless he has assented to the condition, nor in the latter case unless the condition is performed. Consult: Blackstone, *Commentaries on the Laws of England;* Benjamin, *Treatise on the Law of Sale*

of Personal Property (7th ed., Boston, 1899); Burdick, *Law of Sale of Personal Property* (2d ed., Boston, 1901).

CONDITIONAL FEE. At common law, an estate granted to a man and the heirs of his body. This limitation to a particular line of heirs, to the exclusion of collateral lines, was interpreted by the courts merely as a condition diverting the estate in the event that no issue was born answering the description of the grant, and the fee thus came to be known as a conditional fee. The condition being performed by the birth of issue, such estates became absolute and might then be alienated to strangers and the expectations of the issue defeated. As conditional fees were a device of the great landowners to preserve their estates intact for their lineal descendants, they procured the enactment of a statute by Parliament forbidding such alienation and preserving the interests of the issue as well as of persons to whom the property was to go on failure of issue. This was the famous statute of Westminster II (1285), known as the Statute *De Donis Conditionalibus* ('concerning conditional gifts'), which had the effect of converting such estates into fees tail and of preventing the evils at which it was aimed until, by the ingenuity of the lawyers and judges, other means were devised for barring entails and alienating such estates. See CONDITION; COMMON RECOVERY; FEE TAIL; FEE SIMPLE; FINE. Consult the authorities referred to under FEE SIMPLE and FEE TAIL.

CONDITIONAL IMMORTALITY. The doctrine advanced by certain theologians that the immortality of the soul is conditional only upon faith in Christ and that immortality is not inherent in the race. See ANNIHILATIONISM.

CONDITIONAL LIMITATION. A fee-simple estate limited or qualified (*a*) so as to come to an end on the happening of a collateral event, or (*b*) so as to shift from one owner to another on such an event. The expression "conditional limitation" is used in both these senses by different law writers of great authority, and it is therefore impossible to affix to it a precise definition. The first use of the phrase identifies it with the limited or qualified fee simple; as a gift of land to A and his heirs so long as they shall continue to live on the premises, or so long as St. Paul's Church shall stand, or until the happening of any other event. Under the early common law the donor of such an estate had an interest left—notwithstanding the estate conveyed was a fee simple—known as a "possibility of reverter," and, upon the happening of the event specified in the deed, the property would revert or return to the donor or his heirs. This contingent interest remaining in the donor of a qualified fee has been referred to the feudal relation of lord and tenant, which might subsist between the grantor and grantee of a fee, and it has been supposed that the Statute *Quia Emptores* (1290), which did away with this feudal relation, thereby destroyed also the grantor's possibility of reverter and converted every qualified fee into an absolute fee. But it has been held, nevertheless, in several States, including New York and Massachusetts, that qualified fees of this type are still good, and that they will revert to the grantor and his heirs on the happening of the event on which they were conditioned, and these decisions are likely to be followed in other States. But neither at the common law nor today has the grantor of such a fee any interest which he is capable of alienating to any other person prior to the return of the estate to him.

The second meaning of the expression "conditional limitation" makes it a convenient phrase for the commoner terms "executory devise" and "shifting use." While at the common law a gift of a fee simple, even though qualified as above described, was supposed to exhaust the whole power of alienation, if not the entire interest, of the donor, leaving him no capacity to give the property over, on the happening of a future contingency, to another; yet, as a result of the Statute of Uses (passed in 1527) and the Statute of Wills (enacted in 1532), it became possible to make a fee which should, upon a specified future event, shift to another. Thus, if land be devised by will to X and his heirs on condition that they shall forever maintain their citizenship in New York, with the further proviso that in the event of a failure to comply with the condition within the lives of the donor's children the property should go over to a charity, the last-mentioned gift might take effect as an executory devise, or conditional limitation on the prior gift. Such limitations on fees are now very common and may, under modern statutes, usually be effected by a simple deed of grant, without invoking the aid of the Statute of Uses. See DEVISE; ESTATE; FEE SIMPLE; FEUDAL SYSTEM; SUBINFEUDATION; USE; WILL; and the authorities referred to under those titles.

CONDOM, kôn'dôn'. A town in the Department of Gers, France, on the river Baise, here crossed by two bridges, 25 miles north-northwest of Auch (Map: France, S., E 5). The town, founded in 721 (Condomus), is irregularly built, but has handsome suburbs. It has a fine Gothic cathedral of St. Pierre (1506–21), adjoined by the remains of an old cloister, now used as a municipal building. There is a very considerable trade in grain, flour, wine, sawmill products, paints, drugs, and especially in Armagnac brandy, and manufactures of cotton, and cotton yarn. Bossuet was at one time Bishop of Condom. Pop., 1901, 6578; 1911, 6380. Consult U. Chevalier, *Répertoire des sources topobibliographiques* (Montbéliard, 1894–99).

CONDONATION (Lat. *condonatio*, from *condonare*, to pardon, from *com-*, together + *donare*, to give, from *donum*, Skt. *dāna*, gift, from Lat. dare, Gk. δίδόναι, *didonai*, OChurch Slav. *dati*, Lith. *duti*, Skt. *dā*, to give). In law, forgiveness of an act, by a husband or wife, which entitles the forgiving party to a divorce. Condonation may be either expressed or implied. If the parties have cohabited after a knowledge of the offense complained of, this is an implied condonation of the offense, and bars complaint unless the offense shall have been subsequently repeated. An act once condoned is, in the eyes of the law, as though it had never been committed, unless the guilty party repeats the offense, in which event the old offense becomes a valid ground of complaint. In other words, condonation is always conditional upon the discontinuance of the condoned misconduct. See DIVORCE.

CON'DOR (Sp., from Peruv. *cuntur*, condor). Any one of several species of large American vultures. Usually applied to the great vulture (*Sarcorhamphus gryphus*) of the Andes, one of the largest of known flying birds, the albatross and the California condor sometimes ex-

ceeding it. Its dimensions, however, have often been far overstated, the truth being that it varies in length from 44 to 55 inches, and in expanse of wing from 8½ to 10½ feet. The wings are long and extremely powerful; the tail short and wedge-shaped; the general color black, showing brightest in old males, which have much white in the wing. The young are brownish. Around the lower part of the neck of both sexes there is a broad white ruff of downy feathers, above which the skin is bare and exhibits many folds. The head of the male is crowned with a large, reddish, cartilaginous comb, and the neck is furnished with a dilatable wattle. The beak is thick and strong, straight at the base, but the upper mandible is strongly curved at the extremity. The condor feeds mostly on carrion. Its voracity is enormous. Tschudi mentions one in confinement at Valparaiso which ate 18 pounds of meat in a single day and seemed next day to have as good an appetite as usual. Condors often gorge themselves so that they cannot fly and, if attacked, must disgorge in order to escape. They inhabit regions 10,000 or 15,000 feet above the level of the sea, where they are usually seen in small groups, and where they breed. They make no nest, but lay their eggs on the bare rocks. To these haunts they return, after their descent into the plains for food. The height to which the condor soars in the air exceeds that of any other bird and is often far above the clouds.

Closely related to the condor, but distinguished by differences in the cartilaginous comb, bare neck, and shape of the bill, are the king vulture, or king of vultures (*Gypagus papa*), of the warm parts of America, and the Californian vulture (*Pseudogryphus californianus*). The king vulture is about the size of a goose and derives its name from its driving away other vultures from prey at its pleasure. Its plumage is finely colored, reddish above, white beneath, with bluish gray ruff and black quills and tail. The Californian vulture is often longer and of greater expanse of wing than the condor, but is usually not so heavy a bird. It is duller colored, and has less white on the wings. Its range was restricted to the Pacific coast region, from Oregon southward; it was nowhere really common, and it has now become extinct, except in southern California. Like other American vultures, it has no voice, the only sound that it utters being a hoarse hiss or sort of weak snorting. All these large American vultures belong to the family Cathartidæ, which includes the turkey buzzards and is less falconine than the Old World vultures. See VULTURE and Plate of VULTURES; EXTINCT ANIMALS.

The first satisfactory account of the condors was given by Humboldt. Consult for South American condor: Darwin, *A Naturalist's Voyage* (London, 1860); Stejneger, *Riverside Natural History*, vol. iv (Boston, 1885); Lucas, *Annual Report of United States National Museum*, 1889 (Washington, 1891); Adams, *The Condor*, vol. ix (California, 1907); Beebe, *Zoölogical Society Bulletin, No. 31* (New York, 1908). For California condor, Finley, *The Condor*, vols. viii, ix, x (California, 1906; 1907; 1908); Beebe, *Zoölogical Society Bulletin, No. 32* (New York, 1909).

CONDORCANQUI, kōn'dôr-kän'kwē, José Gabriel. See Tupac Amaru II.

CONDORCET, kôn'dôr'sā', Marie Jean Antoine Nicolas Caritat, Marquis de (1743–94). A French mathematician and philosopher of the Physiocratic school. He was born at Ribemont, was educated by the Jesuits, won distinction for mathematics in his youth, and became an active member of the Academy of Sciences in 1769. Gifted with a keen intellect and wonderfully universal sympathies, he became allied with the advanced thinkers and shared in the economic and religious propaganda of Turgot, D'Alembert, and Voltaire. An ardent supporter of the American Revolution of 1776, he wrote many papers concerning the United States, viz., *Lettres d'un citoyen des Etats-Unis sur les affaires présentes* (1788); *Lettres d'un Bourgeois de Newhaven à un citoyen de Virginie* (1787); *Réflexion sur l'esclavage des nègres* (1781), an interesting document on the question of negro slavery. He took an active part in the *Encyclopédie*, and, on the strength of his graceful *Eloges des Académiciens de l'Académie Royale des Sciences morts depuis 1666 jusqu'en 1699* (1773), he was made the perpetual secretary of the Academy of Sciences in 1777. He became a member of the French Academy in 1782. His *Eléments du calcul des probabilités* (1785), revised and enlarged in a posthumous edition (1804), was his most important contribution to mathematics. From this time politics claimed him in increasing measure. In 1786 he married Sophie de Grouchy, sister of the famous marshal, a brilliant woman of considerable talent, who later translated into French Adam Smith's *Theory of Moral Sentiments* (1798). He wrote a life of *Turgot* (1786) and of *Voltaire* (1787), and was chosen member of the National Assembly from Paris, becoming secretary of that body, and in February, 1792, its president. He composed several of its most important addresses and elaborated a scheme of public instruction which is the foundation of the present system of education in France. It was in this report (April 21 and 22, 1792) that he suggested five degrees of education: (1) primary schools; (2) secondary schools; (3) institutes; (4) lycées; (5) the Society of Arts and Sciences. Though finding Louis XVI guilty, he refused to vote for his execution. He was active in framing the constitution submitted to the Convention in February, 1793, but his opposition to the Terrorists led them to proclaim him an outlaw. Friends found him a refuge with a Madame Vernet, who said "the Convention could declare him outside the law, but not outside humanity." Fearful of being tracked hither and endangering his protectress, he escaped, was captured at Clamart by the Terrorists, and died in prison at Bourg-la-Reine, March 29, 1794, from apoplexy, exhaustion, or poison. While with Madame Vernet he wrote the *Esquissé d'un tableau historique des progrès de l'esprit humain*, a declaration of human perfectibility through emancipation from priests and rulers, narrow in its sensationalist philosophy and fanatic in its antispiritualism. His argument was based upon a succinct survey of the progress of humanity in the past, which led him to conclude that three distinct advantages were to be acquired by the human race: the destruction of inequality among men, the advance of equality in a given people, the amelioration of man himself. Condorcet's *Works* (Paris, 1847–49) contain a *Life* by Arago.

Consult: Morley, *Critical Miscellanies* (London, 1893); Cahen, *Condorcet et la Revolution française* (Paris, 1904); H. Sée, "Condorcet, ses idées et son rôle politique," in *Revue de Synthèse Historique* (1905); Eugène Caillaud, *Les idées économiques de Condorcet* (1909); Tallentyre, *The Friends of Voltaire* (London, 1906).

CONDOTTIERI, kŏn'dŏt-tyā'rē (It., pl. of *condottiere*, captain, leader). The name given in Italy in the Middle Ages to the leaders of companies of military adventurers who offered their services to any party in any contest for pay, and often practiced warfare on their own account for the sake of plunder. The name is frequently applied also to the members of their companies. These mercenaries were called into being by the frequent feuds of the Italian states during the Middle Ages. Among the most celebrated of their leaders were Sir John Hawkwood (c.1320–94), the commander of the famous White Company, who, after taking an important part in the wars between England and France, crossed into Italy and became captain general of Florence; Carmagnola (c.1390–1432), who fought in the pay of Milan and Venice and was executed at the latter city in 1432; and Francesco Sforza (1401–66), who in 1450 made himself Duke of Milan, to the exclusion of the lawful heirs of the Visconti. Venice began to employ condottieri in 1143, but their time of greatest activity was in the fourteenth and fifteenth centuries. Machiavelli paints them in the most unfavorable light and states that sometimes battles were fought by two condottieri in which no one was killed except by accident. Consult: Ricotti, *Storia delle compagnie di ventura in Italia* (2 vols., Turin, 1893); Block, *Die Condottieri: Studien über die sogenannten "unblutigen Schlachten"* (Berlin, 1913); Semerau, *Die Condottieri* (Jena, 1909).

CONDUCTING TISSUE. In botany, the system of vessels through which water and foods move from one part of the plant to another. See CONDUCTION.

CONDUCTION (Lat. *conductio*, union, from *conducere*, to lead together, from *com-*, together + *ducere*, to lead, connected with Goth. *tiuhan*, AS. *tēon*, OHG. *ziohan*, Ger. *ziehen*, to draw). In botany, a term applied to the transfer of water, foods, and other materials from one part of the plant body to another. In the smaller plants a sufficient amount of water can be supplied to cover evaporation and other needs, and the foods can be transferred, by relatively slow processes of diffusion and osmosis (qq.v.). In the larger plants, however, the amount of water and foods to be moved, and the relatively great distances to be traversed, have brought about the development of a system of tissues, arranged in elongated strands or in layers, specially adapted to facilitate transfer and known as the conducting system. These are for water chiefly the xylem, or wood, bundles, and for foods chiefly the phloëm, or bast, bundles, or perhaps the latex vessels. The xylem and phloëm bundles are usually associated, running side by side in the stems, the xylem either towards the centre, or with a phloëm bundle also on the central side of it, or surrounded by the phloëm. In the roots the primary xylem bundles are between the phloëm bundles, but by secondary thickening with age the same position as in stems is reached. So frequent is this association that the two bundles are usually described as regions of one fibrovascular bundle (q.v.). These bundles form a connected system of strands, continuous, through the stem, from youngest root to youngest leaf. In the leaves the bundles run in the larger ribs and constitute the smaller veins, becoming more and more slender. The final branches join with others to form a fine network, or end blindly among the green tissues, the xylem bundles being the last to disappear.

The Xylem and Water Conduction. The essential elements of the xylem are the tracheæ or tracheids, with which parenchyma cells and wood fibres are usually associated. The tracheids are cells whose walls have become unequally thickened as they mature; their protoplasm finally disappears, leaving only the empty cell wall. The tracheæ are similar, except that a large number of the end walls, where the elements of a row abut, have been resorbed, so that the cell chambers, empty as they finally become, communicate freely. The tracheæ, where best developed, are thus long tubes, half a millimeter ($\frac{1}{50}$ inch) or less in diameter, and 1 to 3 meters (3 to 10 feet) long. The remaining elements of the xylem are of less importance for conduction. (See MORPHOLOGY.) Through the xylem bundles the water absorbed by the roots travels to the leaves and other surfaces, from which it is evaporated. The water first enters the root hairs or the adjoining surface cells of the root (see ABSORPTION and ROOT); thence it traverses the cortex and enters the tracheary tissue and travels along it to its destination. Proofs that the xylem bundles are the path of the transpiration stream are found by girdling and by the use of colored solutions. When the xylem bundles are severed, the leaves wilt promptly, while all the other tissues of the stem may be cut without such a result. A solution of indigo carmine or eosin stains only the xylem strands when the cut end of a leafy shoot is plunged into it. It has further been shown that the water travels chiefly in the cavities of the tracheæ, though doubtless a portion traverses the walls themselves, and all must pass through many partition walls in its course. The movement is not at all like that of water in pipes or blood in vessels. The force concerned in the movement of water is not certainly known. In the smaller plants root pressure (q.v.) may cooperate, or under some circumstances may be sufficient; but it is not adequate to account for the rise in tall trees. Capillarity is to be excluded, since the conditions under which surface tension operates to raise water in small tubes are not present. Evaporation and the suction set up thereby play an important part; and probably the most important factor is the osmotic action in the living cells of the leaf. But no satisfactory explanation of the observed facts has as yet been found.

The Phloëm and Food Conduction. The essential elements of the phloëm are sieve cells and companion cells (parenchyma); often bast fibres accompany them. Sieve cells, like tracheæ, lose their living contents as they mature. The end walls, and often certain areas of the lateral walls, where they abut upon a like cell, become resorbed in spots and perforate. The perforate area is known as a sieve plate. Through the perforations the contents may pass freely. It has been shown that when the perforations in a membrane amount to less than 1 per cent of the area, there may pass through it 60 per cent of

the gases and solutes which could do so were the whole area open, provided they are being freely removed from the other side. In life the content of the sieve is a slime, in which are abundant the various foods, both proteid and carbohydrate. In addition to this evidence as to their function, girdling experiments have shown that when the phloëm bundles are severed the growth of parts beyond is hindered or stopped. Other tissues of the bundles participate in the transfer, but no decisive division of labor can be made out, beyond the fact that the sieve cells are most efficient.

Latex Vessels. The latex vessels are irregularly branched tubes (the branches sometimes connected into a network), containing a milky or colored sap called latex (q.v.). They are found in only 10 of the large families of plants, both monocotyledons and dicotyledons, in which they are believed to serve for the conduction of foods. The reasons for this are as follows: 1. The latex always contains, among a great variety of substances, foods whose amount varies much from time to time, and these variations seem to be correlated with variations in growth and development. 2. The latex vessels are developed early among the growing tissues where foods are needed. They have abundant branches in the leaves and special relations to the cells where food is made.

The mode by which the foods are transported in sieve cells and latex vessels is not known. The contents are under pressure from the turgor (q.v.) of adjacent living cells. Bending and the consequent mechanical compression would facilitate mixing of the contents. But diffusion movements are probably the main agency.

CONDUCTION OF HEAT. See HEAT.

CONDUC'TOR (Lat., leader, from *conducere*, to lead together). In music, the person who directs the chorus or orchestra, or both combined, and who is responsible for the interpretation of the works performed by the artists under his direction. A good conductor must be a thorough musician. He must have had careful training in all branches of musical composition, must be familiar with the compass and peculiarities of the voice and all orchestral instruments; must be a good score reader, and a man of broad musical culture, familiar with the styles of various epochs and masters. In addition, he must be gifted with poetic temperament, an unusually fine ear, a forceful, magnetic personality that commands instant obedience, and great coolness and presence of mind. That he be also a fine performer on some instrument is not essential; two of the world's greatest conductors, Wagner and Berlioz, were wretched performers. The principal work of the conductor is not done in public during performances, but during rehearsals. His preparation really begins at home. He must make himself thoroughly familiar with the score of the work he is to conduct. This is best done at the pianoforte. He must have a clear idea of the form of the work, of the melos (q.v.), of the different phrases. Before he conducts the first rehearsal he has decided on the interpretation of the work and knows exactly what he wishes each performer to do.

The first rehearsal of a new work (especially if performed from manuscript) is largely taken up with correcting mistakes in the parts. Here the conductor's ear must be on the alert. During rehearsal the conductor can convey his instructions to the singers and instrumentalists by means of the spoken word, audible beating of the rhythm, and by singing or playing to them. In choral works the chorus is rehearsed separately with the piano. The soloists also rehearse privately, with the conductor at the piano, before rehearsals with full orchestra begin. In studying instrumental works, like symphonies, a careful conductor often rehearses the strings and wind instruments separately. After the performers have become thoroughly familiar with the conductor's intentions, they are ready to be guided during the public performance by his baton and by signals given with the hand or eyes. By that time the conductor practically knows the score by heart. It lies before him more for occasional reference than actual reading. People in general know very little about the real responsibility and importance of the conductor. Berlioz does not exaggerate when he says that a poor singer or instrumentalist can ruin only his or her part, but a poor conductor can ruin the whole performance.

While the essential functions of the conductor have been pretty much the same at all times, the manner of conducting has varied greatly. The custom of beating time with a baton can be traced to the remotest antiquity, when oarsmen were directed by such means. When the baton was introduced for beating time in music is not known. An ancient manuscript is preserved in Paris, showing Heinrich von Meissen, a minnesinger, who died in 1318, directing a group of vocal and instrumental performers by means of a baton. We know nothing of the mode of conducting between that time and 1600. The earliest operatic performances were conducted from the harpsichord. In the recitative the leader struck the few chords upon the instrument, and in the concerted pieces he led. This he did by nodding the head, stamping the foot, and using one arm or even both arms. When the opera reached France and Germany, this mode of conducting was naturally employed in these countries also. In Italy this method maintained itself up to the first half of the nineteenth century. In Germany we find before 1700 that at performances of sacred works in churches the organist was assisted by a time beater. This time beater was not a conductor; he only indicated the time. But shortly after the beginning of the eighteenth century the Italian operatic method was adopted for the church, and the organist was the sole director, as is still the custom in churches of to-day. The earlier symphonic works were also conducted from the harpsichord. When the number of wind instruments increased, it was found that the tones of the harpsichord could not be heard by all players, and the time beater again made his appearance. In this manner Haydn and Mozart conducted their symphonies, they sitting at the harpsichord while some one else beat time. Beethoven conducted with the baton, and the first violin or concert master assisted.

Interpretative conducting may be said to have begun with Stamitz (1719–61) and his pupil Cannabich (1731–98), whom Mozart called the best conductor he ever heard. Cannabich developed the *crescendo* and *diminuendo* of the orchestra, one of the great means of expression. Gossec (1738–1829) must also be mentioned among the early conductors who developed orchestral technics. But these men were exceptions at their time. Interpretative conductors as a class did not exist before the beginning of

the nineteenth century. Among these the greatest were Spohr, Weber, and Mendelssohn in Germany, and Habeneck, a German by birth and training, in France. With Wagner and Berlioz begins the school of modern conducting, which is the culmination and natural development of the work begun by the four eminent conductors just mentioned. At first all the great modern conductors were German. France soon followed, a little later Italy and Russia, still later England. The beginning of this century marked the advent of the guest conductor who goes on extended tours like the great instrumentalists and vocalists, frequently with his entire orchestra. Among the best treatises on conducting are: Wagner, *Ueber das Dirigieren* (vol. viii of his collected works, Leipzig, 1888); Berlioz, *Treatise on Modern Instrumentation*, trans. by Bennett (London, 1882). Consult A. Chybinski, *Beiträge zur Geschichte des Taktschlagens* (Leipzig, 1912); H. Löbmann, *Zur Geschichte des Taktierens und Dirigierens* (Düsseldorf, 1913); G. Schünemann, *Geschichte des Dirigierens* (Leipzig, 1913).

CONDUCTOR and **INSULATOR OF ELECTRICITY.** The property of electrical conductivity is possessed in some degree by all known substances. There is, however, an enormous difference between the conductivity of those that are used as conductors and those that are used as insulators, the former having many million times the conductivity of the latter. The substances at the lower end of the scale are therefore of sufficiently low conductivity to serve for covering and supporting wires made of the good conductors, without permitting any serious escape of an electric current when the wires are charged.

In transmitting electricity from point to point, through telegraph or electric-light lines, e.g., those substances possessing the greatest conductivity, such as copper and iron, are selected to form a path for the current, and these are surrounded with materials which have the least conductivity or offer the highest resistance, such as air, rubber, porcelain, and glass, in order to confine the current and compel it to travel to the end of the line. When a conductor is so surrounded or so placed on nonconducting supports that it prevents the electricity communicated to it from passing into the ground or escaping, it is said to be insulated.

As the difference between conductors and insulators is merely one of degree, there is, even under the best conditions, a loss in the transmission of electricity over a line of wire proportionate to the amount of leakage through the insulation and the resistance to travel offered by the wire itself, since the slight effort required of the current to force its way ahead through the wire causes some of it to escape through the insulation in the same way that water forced through a long pipe will escape in small quantities at weak points. It is, indeed, extremely necessary to prevent conductors buried in the earth from having any connection with water or dampness, and, if the insulation of the conductor is defective in a damp spot, a certain proportion of the current will leave the conductor and travel through the earth. Chemically pure water is a nonconductor, but, as found in the earth, water is an excellent conductor on account of the materials it holds in solution.

The electrical conductivity and its reverse, the resistance of materials, are, therefore, subjects of great importance to electricians; and the selection of materials of high conductivity or low resistance for wires, and materials of high resistance for insulators, receives careful attention. The best conductors are gold, copper, silver, aluminum, brass, iron, and all other metals. The best insulators, or the worst conductors, are dry air, glass, mica, porcelain, paraffin, rubber, silk, gutta-percha, and almost all the hydrocarbons. The intermediate substances are many liquids and damp substances, carbons, minerals, and compound substances. The conductivity of all substances is greatly affected by changes of temperature. An increase of temperature increases the resistance of all the metals, while it has the opposite effect in other substances. Glass loses its insulating properties at a red heat, and so do wax, sulphur, amber, and shellac when fused.

Glass, if not the most perfect insulator, far exceeds others in hardness and durability and is much employed as insulation for light electrical apparatus. Hard rubber or vulcanite enters into the construction of much electrical apparatus on account of its high resistance. Paraffined paper is also employed for condensers (q.v.), while for the armatures of dynamos and motors mica is used. See ELECTRICITY.

CONE (Lat. *conus*, Gk. *κῶνος*, *kōnos*, cone, Skt. *śāna*, whetstone, from *śā*, to sharpen). A solid formed by a conical surface and a plane cutting all of the elements of this conical surface. A conical surface is generated by a line called the generatrix passing through a fixed point and tracing a fixed curve called the directrix. If the line is unlimited, it generates two conical surfaces, on opposite sides of the point (vertex), called the "nappes" of the cone. A cone whose base is a circle is called a "circular cone." If the vertex is on a line perpendicular to the base of a circular cone, through its centre, the cone is called a "right circular cone." A right circular cone may be generated by rotating a right-angled triangle about one of its perpendicular sides. The line from the vertex to the centre of the base is called the "axis." If the axis makes with the base an angle other than 90°, the cone is called "oblique." If a plane cuts a cone between the vertex and the base, the cone is said to be "truncated"; if the cutting plane is parallel to the base, the lower part is called a "frustum" of the cone, the section made by the cutting plane being called the "upper base." Three curves, called "conic sections" (q.v.), may be formed by planes cutting a right circular cone at various angles to the base. The mensuration of the cone was well known to the Greek geometers, the subject being most carefully studied by Archimedes (q.v.).

CONE, HUTCHINSON INGHAM (1871–). An American naval officer, born in Brooklyn, N. Y. He was brought up in Florida and graduated at the Florida Agricultural College in 1889 and at the United States Naval Academy (Annapolis) in 1894. He served on the *Baltimore* at Manila in the Spanish-American War, commanded a flotilla of torpedo boats from Hampton Roads to San Francisco in 1908, was fleet engineer in 1908–09 of the Atlantic Fleet in its trip around the world, and in 1909 became head of the important Bureau of Steam Engineering with rank of rear admiral. He contributed to periodicals articles on such subjects as machinery and fuels for naval vessels.

CONE, IN BOTANY. See CONIFERÆ.

CONE, Orello (1835–1905). An American theologian and author, born at Linclean, N. Y. He was educated at St. Paul's College, Mo., was professor of biblical languages and literature at St. Lawrence University from 1866 to 1880, and president of Buchtel College in 1880–96. In 1900 he returned to St. Lawrence University to take the chair of biblical theology. He edited the *International Handbooks of the New Testament*, and published: *Gospel Criticism and Historical Christianity* (1891); *The Gospel and its Earliest Interpretations* (1893); the particularly valuable *Paul, the Man, the Missionary, and the Teacher* (1898); and *Rich and Poor in the New Testament* (1902).

CONE, Spencer Houghton (1785–1855). An American Baptist clergyman, born at Princeton, N. J. He studied for two years (1797–99) at Princeton; was at first an instructor in private schools in Burlington, N. J., and Philadelphia, Pa.; and later became an actor, and played in Philadelphia and other cities with success for seven years (1805–12). He accepted a clerical position on the Baltimore *American* in 1812, and became publisher of the Baltimore *Whig*. In 1814, upon his removal to Washington, D. C., to be a Treasury clerk, he became a Baptist minister. In 1815 and 1816 he was chaplain to the House of Representatives, and in 1823 was called to the Oliver Street Baptist Church, New York City. In 1841 he took charge of the Broome Street Church, where he remained during the remainder of his life. From 1832 to 1841 he was president of the Baptist Triennial Convention for the United States. He was president of the American Bible Union from its formation to his death, and from 1837 until 1850 he was president of the American and Foreign Bible Society.

CONE FISH (so called from its shape). A small, somewhat globular sea fish (*Monocentris japonicus*) of the family Berycidæ, dwelling on the coasts of China, Japan, and the Philippines, and called by the Japanese "matskasa," or pine-cone fish. It is about 5 inches long, and the body is covered with large scales in appearance like a coat of mail carelessly put together. See Colored Plate of Philippine Fishes.

CONEGLIANO, kō'nā-lyä'nō. A city in the Province of Treviso, northern Italy, situated on the stream of Monticano, 35 miles north of Venice (Map: Italy, G 2). It is commanded by a huge castle and has a cathedral containing a fine altarpiece by Cima (1492), a native of Conegliano. In the Loggia Municipale are monuments to Dante, Victor Emmanuel, Garibaldi, and the victims of the War of Liberation. The town is noted for its wine. It also engages in silk spinning and has a technical and a wine-making school. In 1808 Marshal Moncey was named Duke of Conegliano by Napoleon. Pop. (commune), 1881, 8938; 1901, 9796; 1911, 13,007.

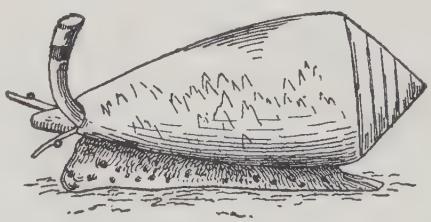
CONEGLIANO, Da. See Cima, Giovanni Battista.

CONEGLIANO, Duke of. See Moncey.

CONE-NOSE, or Kissing Bug. A bug of the predatory family Reduviidæ; specifically *Conorhinus sanguisugus*, called "giant bedbug" in the southern United States, where it is a pest in houses. It is three-quarters of an inch long, black with red patches, or spots, on the sides of the thorax, at the base and apex of the wing covers, and bands on the sides of the abdomen. The young much resemble large bedbugs (to which they are allied), and all ages are fierce biters and bloodsuckers, preying upon insects and flying into houses at night and attacking sleeping persons and animals. The kissing bug seems to breed in the nests of mice and is prevalent from the central Mississippi valley to the tropics. The name "assassin bugs" has been given to the whole family by Comstock, because of their cannibalism and rapacity; and to certain species, especially *Melanolestes picipes* and *Reduvius personatus*, which were especially abundant in the Eastern States during the summer of 1898, was due the "kissing-bug" excitement, busily fostered by the newspapers. Of the two "kissing bugs" above mentioned, the latter, according to Howard, is a cosmopolitan form which, in the Northern States, is found in basements and cellars of dirty houses and preys upon bedbugs and cockroaches. When immature, it covers itself with dust and presents a very odd appearance. The "thread-legged" bugs of the family Emesidæ, which rob spiders of their prey, are near relatives. Consult "Insects to which the Name 'Kissing-bug' Became Applied during the Summer of 1899," in *Bulletin, United States Department of Agriculture, Division of Entomology*, N. S. 22 (Washington, D. C., 1900).

CONEPATE, kō'nā-pä'tā (Nahuatl *nepatla*, subterranean dwelling). The name in Mexico of the large white-backed skunk (*Conepatus mapurito*), called in South America "mapurito." See Skunk.

CONE SHELL. The popular name of a genus (*Conus*) and family (Conidæ) of gastropod mollusks, of the order Streptoneura, having a shell of remarkably regular conical form; the spire on the base of the cone, and sometimes rising from it to a sharp point, sometimes almost flat; the aperture narrow and straight, without protuberance or fold, extending from the base of the cone to its apex. The head of the animal has a proboscis capable of much extension; the mantle is scanty and narrow, forming an elongated siphon in front; the shell is covered with an epidermis. These mollusks are carnivorous; they inhabit shores and banks of sandy mud, chiefly within the tropics, a few only occurring in the Mediterranean. The shells of many species are very beautiful and much prized by collectors. Cone shells first appear in Cretaceous rocks and become more abundant in later formations.



A CONE (WALKING TOWARDS THE LEFT).

The siphon is protruded and held upright; and the eyes are seen on the tentacular eyestalks springing from the head.

The young cone shells are elongated and have high spires, which in the adults are more or less completely shortened through envelopment by the outer whorls. These elongated spires are also characteristic of the adult stages of the early ancestors of the cones, of Cretaceous and Tertiary time, especially of the genus *Conorbis*, of the Eocene. The genus *Conus* has some doubtful representatives in the Cretaceous, about 150

species in the Tertiary, in the rocks of which age it is common and beautifully preserved, and it is at present approaching the maximum of its evolution. See Colored Plates of MARINE GASTROPODS.

CONES'SI BARK. See WRIGHTIA.

CON'ESTO'GA (Iroquois). Formerly an important tribe of the Iroquoian stock, occupying the country on the lower Susquehanna and about the head of Chesapeake Bay in Pennsylvania and Maryland, and claiming dominion over several smaller tribes on both sides of the bay. The name is said to mean 'people of the forked roof poles.' The French called them "Andastes," while to the Virginia tribes and the Southern colonists they were known as "Susquehannas." They lived in palisaded villages, and when first known were a powerful people, bidding defiance to the invading Iroquois, by whom, however, they were at last overcome about 1675. A part fled south through Virginia and took refuge in North Carolina, under the name of "Meherrin." Others were deported to the Iroquois country, whence they were afterward allowed to return, and settled at Conestoga, near Lancaster, Pa. Here they rapidly wasted away, until 1763, when the few that remained were massacred by a mob during the excitement provoked by the Indian wars.

CONEY, kō'nĭ *or* kŭn'ĭ (OF. *conin,* Lat. *cuniculus,* Gk. *κόνικλος, koniklos,* or *κύνικλος, kyniklos,* rabbit; of Iberian origin). The old English name for the rabbit, used in the Bible as the translation of the Hebrew word *shaphen,* the local name for the Syrian hyrax, or daman (see HYRAX), and since applied to other mammals which superficially resemble either Lepus or Hyrax. The pika (q.v.) is known to hunters and miners in the western United States as the "coney," though it looks more like a guinea pig than a rabbit. In Jamaica the hutia (q.v.) is generally called the "Indian coney."

CONEY ISLAND. An island, included in the Borough of Brooklyn, New York City, and the most popular seaside resort in the vicinity of the metropolis; situated off the south shore of Long Island, 9 miles southeast of the Battery (Map: Greater New York, G 12). It is nearly 5 miles long, and from a few hundred feet to three-fourths of a mile wide, and is separated from the mainland by Coney Island Creek, a narrow tidal inlet, Gravesend Bay, and Sheepshead Bay. For a long period it was considered comparatively worthless; but as soon as its fine beach became recognized as a safe place for bathing, and regular communication by boat and railroad was established, the sporadic bathhouses and cheap hotels were replaced by more permanent structures, and its growth has been extraordinary. It is now reached by steamboat service from Manhattan, by the Long Island Railroad, and by various trolley lines and elevated roads. There are several sharply differentiated districts. West Brighton is the centre for the mass of visitors and for the cheaper amusements and embraces the district usually referred to by the name "Coney Island." About three-quarters of a mile to the east is Brighton Beach, where there are a large hotel, a theatre, and the Brighton Beach Race Track, while still farther to the east is Manhattan Beach, which extends to the end of the island. Here are a large hotel, baths, and a residential district under development. At the western end of the island is the select residential district called "Sea Gate," the fine clubhouse of the Atlantic Yacht Club, and a lighthouse on Norton's Point.

CONFAR'REA'TION (Lat. *confarreatio,* from *confarreare,* to marry by an offering of spelt, from *com-,* together + *farreus,* made of spelt; from *far,* spelt; connected with OChurch Slav. *bŭrŭ,* AS. *bere,* Eng. *barley*). A form of celebrating marriage, of peculiar solemnity and of great antiquity, among the Romans. It was a customary form, originally restricted by law to the patricians, among whom it originated. It retained its superior sanctity and validity long after it had been extended to the plebeians, and after simpler and less conventional forms of marriage had come to be recognized. Its specialty consisted in the employment of certain words in the presence of witnesses, and in the performance of a religious ceremony in which *panis farreus* (bread made of spelt) was used. Many of the high offices of state, especially such as were of a priestly character, were open only to those who were born of parents thus married. See MARRIAGE.

CONFEC'TIONERY (from ML. *confectionarius,* confectioner, from Lat. *confectio,* preparation, from *conficere,* to make up, from *com-,* together + *facere,* to make). Preparations of sugar, or of material of which sugar is the principal ingredient, with the addition of attractive colors, flavoring extracts, nuts, fruits, and sometimes fat, starch, glucose, and gelatine, used as sweetmeats.

Where confectionery is pure its use in reasonable quantities involves no danger to health, as sugar is required as a food element, especially in processes of growth and for its antiseptic and other properties. Unfortunately a certain proportion of the cheaper kinds of candy are adulterated and colored with poisonous ingredients. The common adulterants used are terra alba, kaolin, and other mineral substances intended to give weight and volume to the mass, but national and State laws are endeavoring to restrict such practices. Most organic coloring materials used in candy making are harmless, but neither mineral colors nor coal-tar dyes should be used. The best flavors are true fruit extracts, essential oils like peppermint, etc. Artificial flavors are inferior and undesirable.

Until the beginning of the nineteenth century the art of making sweetmeats was practiced chiefly by physicians and apothecaries, who used sugar and honey to conceal the taste of their medicines. Medicated candies are still largely made by drug manufacturers, and such drugs as sulphate of quinine are not infrequently seen with chocolate coatings. During the earlier half of the nineteenth century the art of candy making was an English specialty. In 1851 an international exhibition was held in London, and the unique collection of candies there exhibited attracted to this industry the attention of other nations, especially Germany and France. The latter soon excelled all other countries in the art of making chocolate bonbons and still maintains its supremacy, which perhaps might be disputed in America. In the United States, as early as 1816, there were 20 candy factories in the city of Philadelphia and probably as many more in New York. The candy manufacture of the State of New York in the census year 1840 was valued at $386,142, and in Pennsylvania the product amounted to $227,050. In the next 10 years, with the introduction of machinery, the growth was most rapid. Previous to 1845 each

candy dealer made his own goods by hand, the assortment being limited to stick and molasses candy and sugarplums and a few imported fancy candies. In 1845 the first machinery, in the form of a revolving steam pan, was introduced by Sebastian Chauveau, of Philadelphia, and the following year a lozenge-making machine was invented by Oliver R. Chase, of Boston, and put into operation in his candy factory. Since that time new forms of machinery have constantly been added to such an extent that the manufacture of candy forms a separate and important industry which has undergone extensive development. A machine for printing on candies was invented by Daniel G. Chase in 1866, which produced the so-called "conversation lozenges." The increased consumption of chocolate soon led to its use combined with sugar and other materials in confections that were widely demanded.

The growth of the confectionery industry in the United States as represented by the large factories has been very great. In addition, an enormous amount of candy is made every year by small establishments from which statistics are not obtainable, and it is noteworthy that many small manufacturers through the excellence of their product are often able to build up a reputation and profitable business in a few years. In 1850 there were in the United States 383 large factories, employing 1733 hands and producing $3,040,671 worth of goods. In 1900 the number of large factories was 4297, with an invested capital of over $35,000,000; 33,583 persons were employed, and the value of the product was $81,290,543. In 1909 the United States Census of Manufactures reported the product of 1944 establishments, 12 of which produced each over $1,000,000 worth of candy, as valued at $134,795,913, with an invested capital of $68,326,471. The industry gave employment to 44,638 wage earners. This was independent of the chocolate industry (see CHOCOLATE), with which confectionery is closely allied.

In 1884 the National Confectioners' Association of the United States was organized. It includes the leading manufacturers of the country; and one of its purposes is "to advance the standard of confectionery in all practicable ways and absolutely to prevent harmful adulterations." In most States the sale of candy containing harmful or poisonous ingredients is forbidden by law and many local pure-food laws and ordinances take cognizance of such practices, especially where school children are likely to be affected.

Bibliography. Consult Neil, *Candies and Bonbons and How to Make Them* (Philadelphia, 1913); Grillen, *Modern Practical Gum Work Manual* (New York, 1911); François, *Les aliments sucrés industriels*, with bibliography (Paris, 1912).

CONFEDERACY, THE. A comedy by Vanbrugh (1705), said to have been adapted from Dancourt's *Bourgeois à la mode.*

CONFEDERACY, UNITED DAUGHTERS OF THE. A woman's patriotic society organized in Nashville, Tenn., in 1894, for the preservation of the memory of Southern devotion and suffering during the Civil War. The society admits to membership the direct female relatives and lineal female descendants of those who served honorably in the Confederate service, or who in some other direct way aided the Confederacy. The organization is subdivided into local chapters, of which there were, in 1914, 1380 in the Southern States and elsewhere. These are governed by State divisions, which in turn are controlled by a general organization. Annual reunions are held, usually in November. The membership in 1914 was over 80,000.

CONFED'ERATE STATES OF AMERICA. The name adopted by the federation of those 11 commonwealths of the United States of America which seceded from the Union in 1861 and were arrayed against the national government during the Civil War (q.v.). None of the theories of "State sovereignty" was inconsistent with membership in a properly federated union, and even the extreme advocates of those views recognized the advantages of the essential features of the existing system of national government. Thus, the convention of South Carolina, at the time of the adoption of its ordinance of secession, Dec. 20, 1860, expressed a strong desire for the early formation of a new confederation by the States at that time contemplating secession. Three weeks later the convention of Mississippi, at a time, as Davis wrote, "when the last hope of preserving the Union of the Constitution was extinguished," indorsed this proposal, as did also the convention in Florida on Jan. 10, 1861. On the following day the convention of Alabama made the proposition more specific by inviting the other Southern States to send delegates to a convention to be held at Montgomery, Ala., on February 4, in order that they might consult "as to the most effectual mode of securing concerted and harmonious action in whatever measures may be deemed most desirable for the common peace and security." Similar action was taken by the convention of Georgia, on January 19, and by that of Louisiana, on January 25, with the result that at Montgomery on the appointed day there gathered delegates from these six States, who organized as a provisional Congress of the Confederacy. By this body for one year, and thereafter by the more representative bicameral body which succeeded it, were directed the affairs of the new confederation, these bodies undertaking quite as complete an exercise of the more essential functions of a national government as had hitherto been undertaken by the old national Congress. Technical objections were dispelled by the exigencies of the situation, and the Congress was recognized as actually possessing, and as entitled to exercise, the powers of general government throughout the States then and thereafter represented in its membership. The authority and influence thus acquired was enhanced by the presence in its sessions not only of many men who had rendered efficient service in a similar capacity at Washington, but also of men who were at the time recognized as leaders of Southern thought and action, such as Wigfall of Texas, ex-President Tyler, Roger A. Pryor, and James M. Mason, of Virginia; Rhett and Barnwell, of South Carolina; Campbell, of Mississippi; Toombs, Cobb, and Stephens, of Georgia; and McRae and Curry, of Alabama. In the first instance the Congress, as originally organized, was particularly a constituent body, and among its first acts was the adoption, on February 8, in behalf of the six States represented, of a temporary constitution of government, to have force for "one year from the inauguration of the President, or until a permanent constitution or confederation between the said States shall be put in operation, whichsoever shall first occur." The convention, however,

went further and assumed to act as the legislative body of this new government, on the following day enacting that all laws of the United States in force in the Confederate States on Nov. 1, 1860, and not inconsistent with the constitution of the Confederacy, should be continued in force until repealed or altered by the Confederate Congress. To the same end provision was made for the continuance in office, at least for a time, of all administrative officials, and in order to hasten the detailed organization of the new national government, the more important congressional committees, upon war, finance, and foreign affairs, were forthwith appointed. The provisional Congress furthermore assumed the function of naming the chief executive officers, and on February 9 chose, as provisional President of the Confederacy, Jefferson Davis (q.v.), of Mississippi, and as provisional Vice President, Alexander H. Stephens (q.v.), of Georgia. Mr. Davis had already been appointed to the chief command of the Mississippi troops, and, although seeming strongly to prefer the military service, he relinquished his plans and undertook promptly the duties of the civil office which had come to him thus unsolicited, and in which he was to become recognized as the leader of the Confederacy. His first important act as President, the choice of a cabinet, was controlled rather unduly by political and geographical considerations. Each of the States represented, except that which secured the presidency, was allotted a cabinet officer, as was also Texas, which at that time was practically, although not formally, in the control of the Secessionists. The result was a group of high officials, among whom only two were recognized as men of especial ability—the noted Robert Toombs (q.v.), of Georgia, who became Secretary of State, and Judah P. Benjamin (q.v.), of Louisiana, a man of considerable repute as a barrister, who became Attorney-General. The executive departments were promptly organized, although the activity of some, particularly that of the navy, soon became limited, and the administration of public affairs proceeded thenceforth along lines familiar to Americans, and without unusual incident except such as naturally arose from the instability of the government, from the gradual overshadowing of the civil branches of government by the military, and from its final collapse.

The formal inauguration of Mr. Davis as President occurred on Feb. 18, 1861, when, in the course of his inaugural address, he said: "We have entered upon the career of independence, and it must be inflexibly pursued. Through many years of controversy with our late associates of the Northern States we have vainly endeavored to secure tranquillity and obtain respect for the rights to which we were entitled. As a necessity, not a choice, we have resorted to the remedy of separation, and henceforth our energies must be directed to the conduct of our own affairs, and the perpetuity of the Confederacy which we have formed. . . . With a constitution differing only from that of our fathers in so far as it is explanatory of their well-known intent, freed from sectional conflicts, which have interfered with the pursuit of the general welfare, it is not unreasonable to expect that States from which we have recently parted may seek to unite their fortunes to ours under the government which we have instituted. For this your constitution makes adequate provision; but beyond this, if I mistake not the judgment and will of the people, a reunion with the States from which we have separated is neither practicable nor desirable." The constitution of which President Davis thus spoke was intended only for temporary use, and the convention accordingly, on March 11, 1861, adopted and submitted to the various States for ratification, the permanent constitution of the Confederate States. In large measure this instrument was identical with the Constitution of the United States, although between the two there were natural divergences of theory as well as some differences of detail. Thus, the President was made ineligible for reëlection, and his term was fixed at six years; a qualified membership in Congress of cabinet officers was made possible; special prohibitive duties were forbidden; ordinary appropriations were made dependent upon a two-third vote in each house; and the President was empowered to veto specific portions of an appropriation bill, while approving other portions. Where opportunity offered, the phrases of the new constitution were so turned as to express the views of the Southern leaders as to sovereignty and as to the proper position of commonwealths in any union or federation. Thus it was specifically stated that each State was "acting in its sovereign and independent character," that legislative powers were "delegated" thereby, rather than "granted," and that citizens of one State might "sojourn" in another State with their slaves without losing any right of property therein. The new constitution was, as the New York *Herald* then said, "the Constitution of the United States with various modifications and some very important and most desirable improvements."

The provisional Congress also made provision for the formation of a permanent army of the Confederacy, proceeded early to establish various sources of public revenue, and promptly attempted to secure from foreign governments both material assistance and formal recognition. The character and work of the army thus organized formed possibly the most distinctive feature in the work of the Confederacy. (See CIVIL WAR.) The development of a system of public finance was hampered by the prevalent opposition to internal taxes, while the small quantities of dutiable goods imported made the customs duties an inappreciable element in the public revenue. To meet this exigency, special war taxes were levied, repeated issues of treasury notes were made, and very large amounts of bonds were authorized by the new government. Produce loans also were resorted to—the bulk of the subscriptions for which were made in cotton—and subsidies or loans to the central government were made by some of the States, so that the first year was passed with a semblance of financial stability. A considerable sum was realized from the placing of a foreign loan based on cotton, which loan was effected in the spring of 1863. With the increase of the bond issues, and especially with the abnormal expansion of the currency, prices were forced upward, credit became unsettled, the gold and silver in general circulation were driven out of the country by the enormous issues of paper money, and financial demoralization became pronounced towards the close of the war, when the price of a gold dollar was 60 times its price at the beginning of the war, when boots sold at $200 a pair, and when the price of coffee had increased nearly

200 times, on account of the scarcity produced by the blockade, and the price of cereals nearly 90 times. Normal business was thus completely deranged, while the rage for speculation and the spirit of gambling naturally pervaded the transactions of daily life. The action of the Confederate Congress in February, 1864, in passing a law requiring note holders to fund their notes before a certain date, after which notes would be taxed a third or more of their face value, practically wrecked the government's credit. In seeking to enlist the aid of foreign governments, the steps taken by the Confederacy early gave occasion for critical relations between England and the United States (see TRENT AFFAIR), and led also to serious diplomatic complications in the later years (see ALABAMA CLAIMS), although the efforts of this character were to a considerable degree successful, and at times reached such a point as to foreshadow foreign intervention, or at least recognition to an extent that would have made the success of the Confederacy, if not imminent, certainly far less improbable.

The early months of the Confederacy were marked, in addition to the rapid steps of organization and of preparation for conflict, by an effort at peaceable adjustment. In response to a call of the Virginia Legislature, a peace convention met at Washington in February, 1861, and delegates from seven slaveholding States, including Tyler and Rives of Virginia, Caruthers of Tennessee, and Clay of Kentucky, took part in its futile proceedings. During the following month there were active at Washington three formally appointed commissioners of the Confederate Congress—Messrs. Crawford of Georgia, Forsyth of Alabama, and Roman of Louisiana—who endeavored, largely through the mediation of Justice Campbell of the Supreme Court, to secure recognition and to arrange some reasonable basis of at least a temporary settlement, pending more formal negotiations. This effort also proved abortive through a misunderstanding, involving charges of breach of faith, as to the relief of Fort Sumter. With the withdrawal of these commissioners from Washington and the disappearance of any possibility of voluntary recognition by the Northern government, the position of the Confederacy was more clearly defined. Its strength, moreover, was increased by the secession of Virginia on April 17, of North Carolina on May 20, and of Tennessee on June 8, so that there were 11 States in the new union when its Congress met for its third session on July 20, 1861, at the new capital of the Confederacy, Richmond, Va. Upon the 6th of November were held the first general elections under the permanent constitution, resulting in the choice by a unanimous electoral vote of Davis as President, and Stephens as Vice President. The fourth and last session of the provisional Congress closed on Feb. 18, 1862, when the new Senate and House assembled, including in their membership such men as Clay and Yancey of Alabama, Hunter of Virginia, and Wigfall of Texas. Upon the 22d Davis was formally inaugurated as President for a term of six years, but the remaining years of his service were distinguished not so much by his administrative services as by the conflict between the civil and military elements, and by such controversies as that over the suspension of the writ of habeas corpus, the whole situation gradually becoming more and more abnormal, and being to some extent typified by the studied omission to provide for the creation of a supreme court. The course of the President in his official career provoked at the time much severe criticism and later occasioned a variety of comment. Of his election one recent writer says that "the choice was the best that could have been made," while another equally competent critic describes the situation as follows: "The strongest and most self-assertive spirit of the senatorial clique, having been chosen President, at once began to quarrel with his associates and to drive them from his counsels; there was no popular strength in the provisional Congress to resist him; and even before the inauguration of the permanent government the Confederacy had become a military despotism of the executive." Such a tendency was increased by the custom of holding secret sessions of Congress and by the practice of cabinet officers exercising their right to sit in Congress, as well as by the gradual lowering of the political morale and independence of that body. This unfortunate condition of affairs was further complicated by personal controversies among officials, both civil and military, in the highest stations, so that the later months of the administration of the Confederacy were such as to indicate the approach either of internal crisis or of complete dissolution, and such as to make the collapse of the government, on the fall of its capital, a natural and inevitable event. The first Congress under the permanent constitution had held four sessions, and the second Congress had held two sessions, the final adjournment of the body having been taken on March 18, 1865. The cabinet officials who served the Confederacy were as follows: Secretary of State, Robert Toombs, of Georgia, Feb. 21, 1861; R. M. T. Hunter, of Virginia, July 30, 1861; Judah P. Benjamin, of Louisiana, Feb. 7, 1862. Secretary of the Treasury, Charles G. Memminger, of South Carolina, Feb. 21, 1861; George A. Trenholm, of South Carolina, June 13, 1864. Secretary of War, L. P. Walker, of Alabama, Feb. 21, 1861; Judah P. Benjamin, of Louisiana, Nov. 10, 1861; G. W. Randolph, of Virginia, March 17, 1862; James A. Seddon, of Virginia, March 22, 1862; John C. Breckenridge, of Kentucky, Feb. 15, 1865. Secretary of the Navy, Stephen R. Mallory, of Florida, March 4, 1861. Attorney-General, Judah P. Benjamin, of Louisiana, Feb. 21, 1861; Thomas H. Watts, of Alabama, Sept. 10, 1861; George Davis, of North Carolina, Nov. 10, 1863. Postmaster-General, John H. Reagan, of Texas, March 6, 1861.

While the political organization of the Southern Confederacy was thus almost identical with that prevailing at the North, the outbreak of the war served to accentuate in important respects the marked difference between the two sections, particularly in those features which were of especial importance in time of war. Not only did the population of the Union States exceed that of the seceding States in the proportion of five to two, but the discrepancy was even greater in material resources. In general wealth, in foreign commerce, in internal improvements, and in manufactures, especially of fabrics and of *matériel* of war, the North was vastly superior to the South. Thus, the value of the improved lands of the seceding States was estimated at less than $2,000,000,000, while the value of those in the Union States was nearly $5,000,000,000. In the South were 150 fabric factories, with a product valued at $8,000,000,

while in the North there were 900 such factories, with a product valued at $115,000,000. In the South some 2000 persons were employed in the manufacture of clothing, while in the North 100,000 persons were so engaged. During the year 1860 the imports of the South were valued at $31,000,000, and those of the North at $331,000,000. It was thus apparent that the South was "dependent on Europe and on the North for everything but bread and meat." The South, indeed, seemed fairly supplied with foodstuffs, but the destruction of the crops by the advancing Northern armies, the lack of transportation facilities, and the paper-money policy with its attendant repressive measures, brought it about that at the end of 1864 there was a "general distress for food" and "an actual prospect," as a leading Southerner stated it, "of starving the Confederacy into submission." In addition to these serious obstacles to success, the South was seriously embarrassed by the lack of powder mills and of suitable ironworks. Only one plant, the Tredegar Iron Works at Richmond, was capable of turning out the larger types of field guns, and it was not until the close of the war that operations were well under way for equipping the South with suitable ammunition and arms plants. Its railway system was poorly developed, and the railways inadequately equipped. Moreover, such minor supplies as leather were very limited and at times quite unavailable, and throughout all branches of activity were apparent the very unusual difficulties under which the Confederacy was obliged to carry on its work of administration and of warfare. The conditions prevailing at the end of such a struggle and the results of the termination of such a conflict appeared more tangibly in the following years of Reconstruction, where the energies of the defeated were directed towards the economic regeneration of the South as well as to its political reorganization. Suffice it to say, the desperate efforts made by the South to maintain itself in a struggle against overwhelming odds left that section, at the close of the War, a complete wreck financially and industrially. See also SLAVERY and RECONSTRUCTION, and the articles on the various States mentioned.

Bibliography. Important works by Southerners are: J. Davis, *Rise and Fall of the Confederate Government* (2 vols., New York, 1881); A. H. Stephens, *Constitutional View of the War between the States* (2 vols., Philadelphia, 1870); and the several works of E. A. Pollard, especially his *Lost Cause* (New York, 1867). There is a short bibliography in A. B. Hart, *Guide to American History*, sec. 209 (Boston, 1890), and a paper, "Materials for the History of the Government of the Southern Confederacy," in the *American Historical Society Papers* (New York, 1890). A recent and valuable work on financial and industrial matters, by J. C. Schwab, is *The Confederate States of America* (New York, 1901; contains a full bibliography). Consult also: J. D. Bulloch, *The Secret Service of the Confederate States in Europe* (New York, 1884); Callahan, *Diplomatic History of the Southern Confederacy* (Baltimore, 1901); J. L. M. Curry, *Civil History of the Government of the Confederate States* (Richmond, 1901).

CONFEDERATE VETERANS, UNITED. A patriotic society organized in New Orleans, La., in 1889. Its objects are to unite in a general federation all associations of Confederate veterans now or hereafter in existence; to gather authentic data for an impartial history of the war between the States; to preserve relics and mementos; to cherish the ties of war friendships; to aid veterans and their widows and orphans; and to keep alive the memory of the dead. Membership is extended to all surviving soldiers or sailors of the Confederate service. The local organizations called camps, in 1914, were about 1170 in number, and were organized in three departments, as follows: the Army of Northern Virginia Department; the Army of Tennessee Department; and the Trans-Mississippi Department. The badge worn on the lapel of the coat is a square miniature Confederate flag. Membership in 1914 was about 55,000. The *Confederate Veteran*, Nashville, Tenn., is the official organ.

CONFEDERATE VETERANS, UNITED SONS OF. A patriotic society organized in Richmond, Va., in 1896. Its objects include: the cultivation of friendships among its members; the encouragement of the writing of war incidents; the collection of original data for an impartial history of the Confederate side; the preservation of relics and mementos; the perpetuation of an accurate record of the services of every Confederate veteran; the support of pensions, soldiers' homes, and other agencies for the relief of needy Confederate survivors, their widows and orphans; and the erection of monuments and memorials. Membership is restricted to male descendants of Confederate soldiers or sailors who served "to the end of the war, or who died in prison or while in actual service, or who were killed in battle, or who were honorably retired or discharged." The unit of organization is the camp, which consists of: subdivisions of States (brigades); State organizations (divisions); and groups of State divisions (departments), viz., Army of Northern Virginia Department; Army of Tennessee Department; and the Trans-Mississippi Department. Annual reunions are held. The publications consist of the minutes of its conventions, copies of the constitution, separate reprints of the reports of the historical committee, etc. The membership in 1914 was about 50,000. The Mississippi Division in 1902 purchased Beauvoir, the home of Jefferson Davis, and turned it over to the State for use as a soldiers' home.

CONFED'ERA'TION (Lat. *confœderatio*, from *confœderare*, to unite in a league, from *com-*, together + *fœderare*, to make a league, from *fœdus*, league; connected with Lat. *fides*, faith, from *fidere*, to believe, Gk. *πείθειν*, *peithein*, to persuade, Goth. *bidjan*, OHG. *bittan*, Ger. *bitten*, to request, AS. *biddan*, Eng. *bid*). An alliance of nations, states, or princes, according to Woolsey (*Introduction to International Law*, sec. 104), a union more or less complete of two or more formerly independent states. The New England Confederation (1643–84) is the earliest example of confederation in America. In 1777 the Continental Congress adopted the Articles of Confederation, setting forth the great principles of government which, with such additions as were necessary "in order to form a more perfect union," were later embodied in the Constitution of the United States. Most of the Latin-American republics have come into being on a basis of confederation. In 1815 the German Confederation was formed to replace the Holy Roman Empire, which confederation had been dissolved in 1806. The North German Confederation (1866–70) preceded the estab-

lishment of the German Empire, by whose original constitution all the states of Germany "form an eternal union for the protection of the realm and the care of the welfare of the German people." The Swiss Confederation, comprising at present 22 autonomous cantons, had its origin in 1291 in the union of the cantons of Uri, Schwyz, and Lower Unterwalden.

CONFEDERATION, ARTICLES OF. See UNITED STATES.

CONFEDERATION, GERMAN. See GERMANY.

CONFEDERATION OF THE RHINE. A league of German princes formed in 1806 under the protection of Napoleon. The first to seek the French alliance were the Electors of Bavaria and Württemberg, who, in recompense for their services, were elevated to the dignity of kings by the Peace of Presburg, Dec. 26, 1805. At Paris on July 12, 1806, 16 German princes formally signed an act of confederation, dissolving their connection with the German Empire and allying themselves with France. These princes were the Kings of Bavaria and Württemberg, the Arch-Chancellor Dalberg, the Elector of Baden, the Duke of Cleves and Berg (Joachim Murat), the Landgrave of Hesse-Darmstadt, the Princes of Nassau-Usingen, Nassau-Weilburg, Hohenzollern-Hechingen, Hohenzollern-Sigmaringen, Salm-Salm and Salm-Kyrburg, the Duke of Arenberg, the Princes of Isenburg-Birstein and Liechtenstein, and the Count of Leyen. The princes justified their conduct by enumerating the vices of the constitution of the German Empire, promised to aid Napoleon in his wars with an army of 63,000 men, and called upon the other princes of Germany to imitate their example. The Arch-Chancellor Dalberg was made Prince Primate of the confederation, with his seat at Frankfort. During the years 1806–08 other German sovereigns enrolled themselves as members of the confederation, and at the close of 1808 it embraced a territory of 122,236 square miles, contained a population of 14,608,877 souls, and kept up an army of 119,180 men. The disasters which overtook the French army in the Russian campaign acted like a solvent on the confederation, and it vanished in 1813, not, however, to be returned to its original princes, but to be delivered, by the foolish diplomacy of Talleyrand (q.v.), to Prussia. Consult: Rambaud, *La domination française en Allemagne, 1804–11* (Paris, 1876); Seeley, *Life of Stein* (3 vols., Cambridge, 1878); and the general histories of Ranke, Pertz, Oncken, and Treitschke. See GERMANY.

CON'FERENCE (ML. *conferentia*, from Lat. *conferre*, to carry together, from *com-*, together + *ferre*, to bear). The assemblage of persons gathered for the purposes of consulting upon any course. There have been many international conferences, such as those of Geneva in 1864, of London in 1864, 1867, and 1871, of The Hague, 1899, and the Balkan Conference at London in 1912–13. An ecclesiastical conference was held at Hampton Court Palace, at the instance of James I, in 1604. It was composed of prelates of the Church of England and dissenting ministers, the object being to establish a scheme of "comprehension" or common creed. This conference led to the translation of the Bible known to English readers as the Authorized Version. Another conference was held in 1661, the Savoy House Conference, when some alterations were made in the Prayer Book. Similar conferences were once frequent in the Roman Catholic church, and in other churches there are pastoral and other conferences. The annual meeting of the Wesleyan Church of England is called the "Annual Conference"; and the title is used for annual or other stated sessions in the Methodist Episcopal, the Evangelical, and some Baptist denominations. Under the name of "Evangelical Church Conference," delegates from the Reformed churches in the German states and Austria meet for the consideration of questions affecting church matters.

CONFER'VA (Lat., a kind of water plant, from *confervere*, heat, from *com-*, together + *fervere*, to be hot). A general term sometimes applied to certain simple filamentous green algæ. Also the name of a genus of the Chlorophyceæ (q.v.).

CONFES'SIO AMAN'TIS (Lat., The Lover's Confession). A long poem of over 30,000 lines by John Gower (1393). It is a conversation between Genius, the representative of Venus, and a lover, in which a series of tales, illustrating the effects of the various vices, is introduced.

CONFES'SION. In the theology of the Church, Eastern and Western, an acknowledgment of sins to God in the presence of a priest in order to obtain absolution. The practice of confession is taught by the Church to be of divine institution, being a part of that sacramental system which extends the benefits of the Incarnation and Atonement in the scheme of redemption to individual souls. It is explicitly mentioned in the New Testament (Matt. xvi. 19; xviii. 18; John xx. 22, 23; 2 Cor. v. 17–21) and is specifically included in the power of binding and loosing from sin conferred on the Apostles and transmitted to their successors. No formal scriptural precept is alleged for it, but it is contended that sufficient witness to its explicit use and value is contained in the practice and discipline of the Christian Church from early times and in the passages above cited. Though the Apostle James recommends that Christians should confess their "faults one to another," yet open and public confession appears to have been required in cases where persons guilty of gross apostasy desired to be reinstated in their full relationship to the Church. Open or public confession, which was part of the discipline of public penance, ceased when that discipline went into disuse. Private confession has been retained, and its defenders hold it to have been at all times in use. A general law for the Western Church was enacted by the fourth council of the Lateran in 1215 (can. xxi, *omnis utriusque sexus*) requiring that every Christian who has attained the years of discretion should confess to a priest approved for the purpose, at least once in the year. Confession is one of the three "acts of the penitent"—contrition, confession, and satisfaction—which the Council of Trent declares to be parts of the sacrament of penance. The sinner is required to confess each and every mortal sin, in thought, word, and deed, which, after diligent examination of his conscience, has occurred to his memory. To conceal one deliberately vitiates the confession, since the soul cannot be restored to the friendship of God while consciously unrepentent of any sin. He is exhorted, but not required, also to confess venial sins (q.v.), especially if they be habitual. Confession, in order to be fruitful, must be accompanied by contrition and a purpose of amendment. It commonly embraces the sins committed since the

last confession, but may include a longer period and even the entire life. In the latter case the confession is called general. It is called "auricular," as being made to the private "ear" of the priest, and is ordinarily spoken, but in cases of necessity may be made in writing, by signs, or by an interpreter. Priests cannot validly, except *in extremis*, receive confessions in any place without the "approbation" of the bishop of the place, which may be given absolutely or with restrictions. Confession is prescribed in the ritual of the Greek, the Russo-Greek, the Coptic, the Syrian, and the other Oriental churches. In most of these churches the practice is obligatory, but in some it has gone into disuse. The Lutheran church professes (according to the eleventh article of the Augsburg Confession) "that private confession must be retained in the Church; but that full and particular statement of *all* sins is not necessary, because, according to Ps. xix. 12, it is impossible." In the Apology of the Augsburg Confession it is said to be "impious" to abolish the practice of private confession to the priest; but in practice the Lutheran church has widely departed from these rules. The Reformed church in Germany has always been more inclined to general confession, and the United church also substitutes for private confession certain devotional exercises previous to communion. The Church of England has retained the general doctrine of the Western Church on confession. In the Morning and Evening Prayer in the Book of Common Prayer and in the Communion Office general forms of confession and absolution are retained which latter explicitly states that Christ "hath given power and commandment to His Ministers to declare and pronounce to His people being penitent the Absolution and Remission of their sins." Private confession is provided for in the office for the visitation of the sick, and in one of the exhortations in the Communion Office people are invited to come to receive the "benefit of absolution." The American Prayer Book does not contain the provision in the visitation of the sick, but makes provision in the visitation of prisoners for a "particular confession." No office is set forth because it does not lie in the scope of common prayer. See ABSOLUTION; PENANCE; CONTRITION. Consult Lea, *A History of Auricular Confession and Indulgences in the Latin Church* (Philadelphia, 1896). Casey, *Notes on a History of Auricular Confession* (Philadelphia, 1899), is a Catholic criticism on Lea's work. For the Church of England, see Carter, *The Doctrine of Confession in the Church of England* (London, 1885).

The *sigillum confessionis* ('seal of confession') means the obligation of a confessor or priest not to divulge the secrets of the confessional. This custom of secrecy is traceable in the fourth and fifth centuries, but was made binding by Innocent III (1198–1216), and its violation by a priest makes him subject to the severest penalties that can be inflicted by the Church. See PRIVILEGED COMMUNICATION.

CONFESSION (Lat. *confessio*, from *confiteri*, to confess, from *com-*, together + *fateri*, to acknowledge; connected with *fari*, Gk. *φῆναι, phēnai*, to speak). In law, a purely voluntary declaration made by one who has committed a crime that he is guilty of the offense with which he is charged. If made before a magistrate or in the court of judicial proceedings before a court, such confessions are "judicial"; if made anywhere else, they are "extrajudicial." An entirely voluntary confession is admissible in evidence; but not so if procured through inducements, threats, promises, or hope of escape or favor. A prisoner's confession when the *corpus delicti*, i.e., the essential element of the crime, is not otherwise proved is not sufficient to warrant conviction. It is generally provided by statute that a confession in a capital case must be corroborated by evidence in order to justify a conviction. Whether an alleged confession is admissible, as having been made voluntarily, is a question for the court; what weight it is entitled to is a question for the jury. See ADMISSION; also CRIMINAL LAW, and consult the authorities referred to there.

CONFESSION (the tomb of a confessor or martyr). In church architecture, the recess, ambulatory, or chapel beneath the central altar, containing the relics of the saints, and corresponding to the subterranean tombs of the martyrs in the catacombs over which churches were erected. Such confessions gradually grew in size between the fourth and seventh centuries, until they developed into the crypt (q.v.).

CONFESSION, AUGSBURG. See AUGSBURG CONFESSION.

CONFES'SIONAL (ML. *confessionalis*, relating to confession, from Lat. *confessio*, confession). The seat, recess, or booth in which the priest sits to hear confession in a Roman Catholic church. These booths are distributed throughout the interiors of churches, in the nave and aisles, and are slight, closed structures made of wood. The confessional commonly has a door in front, through which the priest enters, and an opening on one or both sides, like a small window, with a grating of wire or zinc, for the penitents to speak through as they kneel.

CONFESSION AND AVOIDANCE. Pleadings are said to be in confession and avoidance, in common-law practice, when they expressly or by a reasonable implication admit the allegations of the pleading to which they are interposed, and show some justification or excuse which will deprive them of the legal effect of supporting the plaintiff's claim of a right to recover. The admission must be sufficiently comprehensive to give color to the matter adversely alleged, i.e., must show it to be prima facie, or apparently, true. Any pleading after the declaration may be by way of confession and avoidance of the last pleading of the opposite party. Thus, if the defendant should plead a release by plaintiff, the latter might in his replication admit that he gave a release, but allege that it was obtained from him by coercion or fraud. This might be denied by the opposite party, and then the cause would be at issue. See PLEADING.

CONFESSION D'UN ENFANT DU SIÈCLE, kôn'fĕ'syôn' dụ nän'fän' dụ syĕk'l', LA (Fr., The Confession of a Child of the Century). A work of fiction by Alfred de Musset (1836), founded upon the author's love affair with George Sand.

CONFESSION OF JUDGMENT. A method of allowing judgment to be entered against a person upon his acknowledgment in proper form that a claim is, or is about to become, due and owing to another, and consenting that the latter may enter judgment for the amount named. A judgment thus obtained is equally valid and binding as though it had been secured by legal process. While the weight of advantage is with

the person obtaining the judgment, in the saving of the time and expense of litigation, this device may also be of advantage to the debtor in saving him the annoyance and costs of suit involved in the ordinary process. It is commonly resorted to in cases where the debtor desires to prefer a certain creditor and give him the priority over other creditors and the additional security which a judgment affords.

It differs from *cognovit* (q.v.) in the fact that it may be made without the institution of an action, and in the further fact that it is generally limited to debts, in the usual sense of that term, and is not available for the liquidation of claims founded on torts. However, as intimated above, a confession of judgment may be equally valid for a claim not yet accrued, as for future advances.

In a few of the States of the United States it is customary to give a promissory note at the time of its inception the form and character of a confession of judgment, whereby the holder of the note is authorized at maturity, or at a specified time thereafter, to enter up judgment thereupon without further process. This extension of the principle is not, however, generally favored. See JUDGMENT; WARRANT OF ATTORNEY.

CONFESSIONS, LES, lâ kôn'fĕ'syôn' (Fr., The Confessions). A remarkable autobiography, of great frankness and dramatic strength, by Jean Jacques Rousseau, composed between 1766 and 1770. The work, in 12 books, was published in 1781 and 1788, after the author's death, contrary to his intention of suppressing it during the lifetime of the persons referred to in it.

CONFESSIONS OF AN ENGLISH OPIUM-EATER. A work by Thomas De Quincey (1821). It describes the effects of opium eating and is an example of impassioned prose which has few, if any, equals in English.

CONFESSIONS OF SAINT AUGUSTINE, THE. A work by St. Augustine in 13 books, of which the first 10 are autobiographical. The remaining three are exegetical, treating the first portion of Genesis.

CONFIDENTIAL COMMUNICATION. See PRIVILEGED COMMUNICATION.

CON'FIRMA'TION (Lat. *confirmatio*, from *confirmare*, to strengthen, from *com-*, together + *firmare*, to make firm, from *firmus*, firm). A sacramental rite admitting to the status of a communicant and to full membership in the church. It follows baptism and in the ancient church the rite was administered immediately after baptism, which is still the custom in the Greek and African churches. In the Roman Catholic church, for the last 300 or 400 years the bishops have interposed a delay of seven years after infant baptism; the Anglican church has no specific rule as to age, 14 to 16 years being the custom. Lutherans administer the rite at about the same age. The ceremony in the Eastern and Western churches consists in the imposition of hands by a bishop or the anointing with oil blessed by a bishop, accompanied by an invocation of the Holy Ghost as the Comforter and Strengthener. The effect of the rite as administered through the bishop is held to be the bestowing of the Holy Ghost to dwell within the individual and to work in a "seven-fold gift"—wisdom, understanding, counsel, might, knowledge, godliness, and holy fear. Both in the English and Lutheran churches the ceremony is made the occasion of requiring from those who have been baptized in infancy, a renewal in their own persons of the baptismal vow made for them by their godfathers and godmothers, who are thereby released from their responsibility. The Lutheran church, having no bishops, administers confirmation through its parochial clergy. In Western theology confirmation is held to be one of the seven sacraments. In the Roman Catholic church in its administration unction and the sign of the Cross are used, in addition to the imposition of hands. See SACRAMENT.

CONFIRMATION. In old English law, a conveyance of an estate or right in lands to one who has the possession or some estate therein, the object being to confirm or render sure and indefeasible an estate which, but for such confirmation, is defective and voidable. It may be illustrated by the case of a disseisin, where the disseisee, or rightful owner, confirms the estate of the disseisor, who is in adverse possession of the land, vesting an absolute and indefeasible title in the latter. A confirmation was effected by deed and was nearly equivalent to a release (q.v.), by which it has been superseded. The confirmation is now, as a separate mode of conveyance, obsolete, though the term is still sometimes employed to describe the release of an outstanding claim to land to the party in possession. See CONVEYANCE.

CONFISCATION (Lat. *confiscatio*, from *confiscare*, to confiscate, from *com-*, together + *fiscus*, basket, treasury). The forfeiture of lands or goods to the crown or state. At Rome *bona confiscata* were goods forfeited to the Emperor's treasury. Though sometimes employed in English and American law as synonymous with *forfeiture* for crime, confiscation is, at common law, a term of much more limited signification, and should probably be confined to the cases of the seizure by the crown of waifs (*bona waviata*), or goods scattered by a thief in his flight, and of goods found in the possession of a felon and disclaimed by him. See ESCHEAT; FORFEITURE.

Under certain statutes, however, the state exercises the right to confiscate goods for violation of law, as in case of false entries of goods under customs and other revenue laws, and for violations of excise and internal revenue laws of the United States. The seizure and sale of real property by the state for nonpayment of taxes is a similar proceeding.

Both international law and municipal law recognize the right of the sovereign authorities to confiscate the goods of an alien enemy found within the state, but the right is in fact seldom exercised in modern times.

CONFLICT OF LAWS. An opposition or contrariety between the laws of different jurisdictions affecting the rights of the same individual. In the decision of legal controversies every court regularly applies its own law (*lex fori*), i.e., the law prevailing within its jurisdiction; but exceptionally, and not infrequently, justice requires, and the domestic law itself authorizes, the application of foreign law. The cases in which the question arises whether domestic or foreign law should be applied are figuratively termed cases of conflict; and "conflict of laws" is the title under which it is customary to set forth the rules by which such conflicts are adjusted. Because this branch of the law has been of international growth, and because the rules applied in the different nations are in the main similar, it is sometimes described as "international private law." Apart from other objections, this term is too narrow; for

the rules in question apply not merely to conflicts between the laws of different nations, but also to conflicts between different cantonal or provincial laws within the same state, and to conflicts between the laws of different states within the same empire or federation. To a New York court, the law of New Jersey is as foreign as that of England or of France, and the same rules govern its application. This branch of modern law was developed on the continent of Europe in the Middle Ages; and because in the later Middle Ages all purely local rules, whether of written or unwritten law, were termed "statutes" (*statuta*), it was first known as the doctrine of "collision of statutes." It took form as a body of judicial usages, but its development was largely controlled by the writings of leading jurists. Until the sixteenth century the authoritative writers were Italians (Bartolus and Baldus); from the sixteenth to the eighteenth century they were French (Dumoulin, D'Argentré, Bouhier, and Boullenois), or Dutch (Burgundus, Rodenburg, P. and J. Voet, and Huber); in the nineteenth century the most important treatises were those of the American, Story, and the German, Savigny.

Since Savigny, the effort of writers and of courts has been to determine by what local law each class of legal relations is properly governed. A substantial consensus exists on many of the chief points. 1. Domestic relations are regularly governed by the law of the husband's and father's domicile (*lex domicilii*). 2. Succession, whether testamentary or *ab intestato*, is governed by the law of the decedent's domicile. On the continent of Europe this is generally true of the entire estate, including realty; in England and in the United States the law of the domicile governs the distribution of the personalty only. On the Continent the law of the domicile also governs the liquidation and division of a bankrupt's estate; in England this is true as regards the personalty only. Everywhere the property relations of husband and wife (at least as regards personalty) are governed by the law of the matrimonial domicile. 3. Real property (except on the Continent in the above cases) is governed by the law of the jurisdiction in which it lies (*lex rei sitæ*). 4. Movable things, except in the cases mentioned above, are also governed by the law of the site, i.e., rights vested by the law of the site are respected everywhere and are not affected by the removal of the thing to another jurisdiction. 5. Contractual obligations are governed, so far as the relations between the creditor and the debtor are concerned, partly by the law of the place where the contract was concluded (*lex loci contractus celebrati*), and partly by the law of the place where the obligation is to be performed (*lex loci solutionis*). As regards transfers or assignments of the creditor's claim, however, the law governing transfers of personal property may prevail over the proper law of the contract; and claims (choses in action) regarded as assets of an estate will regularly be governed by the law of the creditor's domicile in the cases mentioned in No. 2.

Back of all these matters lie questions of *capacity*, (*a*) to take and hold property, real or personal, and (*b*) to act with legal result. The question of capacity to take and hold property rarely arises to-day except as regards corporations. This capacity is primarily determined by the law of the state in which the corporation was created; but it may be diminished or denied by the law of the place in which the property is situated. Questions of capacity to act are similarly determined as regards corporations, i.e., capacity must be accorded by the law of the state in which the corporation was created and also by the law of the state in which the corporation attempts to act. As regards natural persons, capacity to transmit property by will or to marry is generally determined by the law of the domicile; capacity to transfer personal property or to contract debt by the law of the place of the act (*lex loci actus*). In the United States, however, capacity to marry is governed by the law of the place of marriage. The sufficiency of the forms observed in legal acts is usually determined by the *lex loci actus*.

As regards wrongful acts, no action of tort can be maintained unless the act was wrongful (tortious) by the law of the place where it was done; and it is commonly held that it must also be tortious according to the law of the place where suit is brought (*lex fori*).

It should be noted that some European countries (Italy, Belgium, and Germany) substitute for the law of the domicile, in nearly all cases, the law of the state of which the person is (or in the case of a deceased person, was) a citizen or subject (*lex ligeantiæ, lex civitatis*); but the dominant theory makes allegiance immaterial in matters of private law.

To all the above rules there is a series of exceptions.

Foreign law cannot be applied unless the domestic law permits its application. If the domestic legislator has expressly declared that a certain law is to govern all cases coming before the domestic courts, or if the purpose of the law would be thwarted by admitting exceptions, foreign law cannot be applied. Nor will foreign law be applied when its application would contravene the settled policy of the domestic law.

Finally, foreign law is applied only as regards questions of right, not as regards remedies—a rule which, properly construed, means that rights are to be enforced according to the methods prescribed by the domestic law.

Foreign law is said to be a question of fact. According to the sounder theory, this does not mean that it is a question for the jury; it means that the court is not bound to know foreign law and may demand evidence concerning it.

A foreign judgment is recognized as conclusive on the facts and on the law when it is a final judgment on the merits of the case by a competent court, i.e., by a court having jurisdiction. Whether the foreign court had jurisdiction is, however, a question which the domestic court will investigate, and will decide on principles of general jurisprudence, i.e., according to its own view of those principles.

Consult: Story, *Commentaries on the Conflict of Laws* (8th ed., ed. by Bigelow, Boston, 1883); Wharton, *Treatise on the Conflict of Laws;* or, *Private International Law* (2d ed., Rochester, 1905); Westlake, *Treatise on Private International Law* (3d ed., London, 1890); Dicey, *A Digest of the Law of England with Reference to the Conflict of Laws*, American notes by J. B. Moore (Boston, 1896). Two valuable German treatises, those of Savigny and Bar, have been translated into English—the former by Guthrie, under the title *Private International Law* (2d ed., Edinburgh, 1880), the latter by Gillespie.

under the title *International Law, Private and Criminal* (Boston, 1883).

CONFLUEN'TES. The ancient name of Coblentz (q.v.).

CONFORM'ITY (Fr. *conformité*, from Lat. *conformis*, like, from *com-*, together + *forma*, shape). In geology, the succession of two series of sedimentary or igneous strata in regular order uninterrupted by any interval of erosion. Such strata are said to be "conformable" and bear evidence of having been laid down continuously and without disturbance. The term "conformability" is frequently used as a synonym of conformity. See UNCONFORMITY; GEOLOGY.

CONFRONTÉ, kŏn-frŏn'tā; *Fr. pron.* kŏN'-frŏN'tā' (Fr., confronted). In heraldry, a term which signifies "facing or fronting one another." It is the same as "combatant." See HERALDRY.

CONFUCIUS, kŏn-fū'shĭ-ŭs (Latinized form of Chinese *Kung-fū-tze*, the Master Kung) (c.551–478 B.C.). The most famous of all the sages of China. He was born in the State of Lu in the province which is now called "Shan-tung," where his descendant of the seventy-sixth generation is now living. His lineage is traced by native tradition to Hang Ti, one of the early mythical rulers of China, although Confucius himself was the son of a soldier, Kung Shuh-Liang Heh, who was in command of the District of Chow. China at that time had the feudal system of government, very similar to feudal Europe. When a very old man, over 70 years of age, Heh wedded Chang Tsai in 552, and about a year later had as a son the future sage. When Confucius was but three years old, he lost his father, but the boy was most carefully educated by his mother, though the family was left in reduced circumstances, and trained according to the highest ideals of China. At an early age he gave evidence of his exceptional abilities and his regard for ancient customs, while his thirst for learning was insatiable. When only 17 years old, he was manager for a wealthy landowner of Lu, and two years later he married. As in the case of other great teachers, however, notably Buddha, and, later, Rama Krishna of India, Confucius seems to have been little adapted for family life. He had one son, who was born in 531, and, it would seem, two daughters. After four years he parted from his wife, but doubtless with unbroken friendship on both sides. The real life work of Confucius began when he was 22, and from that time till his death, a period of 51 years, he led the life of a teacher, migrating frequently from place to place. His conduct on the death of his mother, which occurred in 527, is significant as showing the bent of his mind. With a filial devotion very rare at that epoch, he erected a large mound over her as she lay in the same grave with his father, and for 27 months remained in entire seclusion. This time was probably not wasted. Doubtless his meditations during this period of mourning had considerable influence on his subsequent teachings. The effect of his rigorous observance of the ancient ceremonial custom of mourning for parents had an effect on all who knew him and heightened their respect for his words. By the time Confucius had reached the age of 30 he had formulated to his own satisfaction the tenets of his philosophy. In 517 he gained his first pupils of importance, and he was enabled to visit Lo-yang, the capital of the district, where he had an interview with Lao Tsz', the founder of Taoism. On his return to Lu in the following year he found the city in a state of anarchy, and on the expulsion of the Governor, who was his friend, Confucius retired with the ex-official to the neighboring State of Tsi. Here, however, he could not find a congenial home, for his teachings were not acceptable, and he returned to Lu, where he remained for the next 15 years, carefully keeping himself aloof from all factional strife and never slackening his devotion to his mission. At last his moral worth received its reward, and at the age of 52 Confucius was appointed Governor of Chung-tu, and this honor was followed by others higher still. Through the machinations of the Governor of Tsi, however, who was afraid that the wise counsels of Confucius would make the State of Lu supreme in China, the influence of the master in Lu was so weakened that he left the country after four years, at that time 56 years of age. For 13 years he wandered from place to place and did not return to Lu until in his sixty-ninth year. His last years were spent in well-earned retirement; but they were full of sorrow, marked by the deaths of his son and his two best-loved disciples, Yen Hui and Tsz' Lu. In 478 the teacher himself died, saddened by the fear lest he had failed to accomplish his mission. Herein he was wrong. The news of his death spread throughout the land and called attention anew to his purity of life and teaching, so that the name of Confucius has ever since been the highest and most honored in the land to which he gave his lifelong devotion. By the irony of fate he was deified after his death, and, like Buddha, Confucius, who had little belief in the supernatural, became a divinity.

Confucius was, as he himself said, not a reformer, but a conserver. This is strikingly evident in his services to the literature of China. Although he is sometimes called a prolific author, he was in reality but a careful though voluminous editor, and he may, if this is clearly understood, be termed the founder of Chinese literature. Thus he established the canon of four of the "five classics," the *Shih Ching*, or 'Book of Poems,' the *Li Ching*, or 'Book of Rites,' the *I Ching*, or 'Book of Changes' (originally a cosmological work), and the *Shu Ching*, or 'Book of Historical Documents,' for which Confucius is said to have composed a preface, although merely a list of books which the *Shu Ching* once contained now remains. His one independent work, apart from his apothegms which were recorded by his disciples, is the *Ch'un Tsin*, or 'Spring and Autumn.' This is an extremely dry annalistic history, very meagre in content and information, and altogether untrustworthy as a source of Chinese history, and records the events in the State of Lu from 721 to 480 B.C., a period of 242 years.

Confucius was in no real sense of the word a religious teacher, in fact, did not concern himself with religion. His doctrines were entirely ethical and political. His attitude towards the supernatural may be summed up in his own words: "Respect the gods! but have as little as possible to do with them," and it is recorded that he spoke but seldom of four subjects—marvels, feats of strength, rebellions, and spiritual beings. In harmony with this attitude he expresses no opinion concerning the immortality of the soul. He inculcates ever the duty, which he himself had observed so faithfully, of honor to parents and of obedience to temporal power. In this way the individual becomes absorbed

in the family and the family in the state, which was regarded by Confucius as the highest concept on earth. For a state to be prosperous, mercy and all other virtues are necessary, and these qualities are to be manifested by the entire body of citizens. If the emperor was a wicked man and a bad ruler, Confucius taught that he need not be obeyed and that his subjects were free to depose him, which principle the Chinese many times afterward put into effect. The teachings of Confucius are, consequently, wholly worldly in character, and the dry maxims in which he expressed his views are permeated by a utilitarian philosophy which is devoid of any touch of idealism. His attitude towards women is the one generally current in the Orient. Metaphysical speculation, like religious investigation, is absent from his system, which sums up its principles in the five cardinal virtues—humanity, uprightness, decorum, wisdom, and truth. Confucius may perhaps be said to be China incarnate in his lack of originality; but with his devotion to the practical and his moral principles as patriot, sage, and teacher, he ranks among the foremost men that the world has ever seen. The most valuable account of Confucius is contained in the *Lun Yü*, or 'Philosophical Dialogues,' which record his conversations, while the *Ta Hsüeh*, or 'Great Learning,' and the *Chung Yung*, or 'Doctrine of the Mean,' are important sources for the study of his system of philosophy.

As illustrations of the maxims of Confucius, the following characteristic ones may be cited: Learning without thought is labor lost; thought without learning is death of the mind. Riches and honor are what men desire; yet, except in accordance with right, they should not be enjoyed: poverty and degradation are what men dread; yet, except in accordance with right, they should not be avoided. What the superior man seeks is in himself; what the small man seeks is in others. The foundation of all good is the virtue of individual men. Confucius also enunciated the Golden Rule, although in negative terms, as follows: "What ye would not that others should do unto you, do ye not unto them." Despite the negative form of this maxim, it is to all intents and purposes closely parallel to the Golden Rule as given by Christ.

Some one has said that, no matter of what religion a Chinese may be, he is ex officio a Confucianist. This is as true of China to-day as it ever was in the past. At present there is a strong movement going on in Republican China to have Confucianism recognized as the state religion. It is significant to note that Yuan Shï-K'ai revived the former Imperial ceremonies in connection with the veneration of the master. This was done, however, not for the purpose of sanctioning Confucianism exclusively, but by such means to hold the people in the present period of change true to the old standards of ethics and morality.

Consult: Plath, *Confucius und seiner Schüler Leben und Lehren* (Munich, 1867–74); Von der Gabelentz, *Confucius und seine Lehre* (Leipzig, 1888); Haug, *Confucius der Weise Chinas* (Berlin, 1880); Dvorak, *Chinas Religionen*, Band i, *Confucius und seine Lehre* (Münster, 1895); Legge, *Life and Teachings of Confucius* (London, 1887); Douglass, *Confucianism and Taoism* (ib., 1879); Huan Chang Chen, *The Economic Principles of Confucius and his School* (New York, 1911). For the original sources, Legge's translations of the *Lun Yü*, *Ta Hsüeh*, and *Chung Yung* in the first volume of his *Chinese Classics* (Hongkong and London, 1861) should be consulted as of the first importance. The same scholar's translations of the *Texts of Confucianism* (comprising the *Shu Ching*, *Hsiao Ching*, *I Ching*, *Li Ching*, and portions of the *Shih Ching*), vols. iii, xvi, xvii, xviii of the *Sacred Books of the East* (Oxford, 1879–95), are also of value.

CONFUSION (Lat. *confusio*, a mixing together, from *confundere*, to mingle or mix together, from *com-*, together + *fundere*, to pour, pour out) OF GOODS. The intermingling of the goods of two or more several owners so as to be indistinguishable. This may occur voluntarily, or by agreement of all the parties concerned—as in the common case of the deposit of grain in a common storage elevator; or accidentally, as when, in case of fire or shipwreck or innocent mistake, goods are inextricably mingled together; or the confusion may be malicious and willful, as when one person takes gold belonging to another and throws it into the melting pot with his own. In the first two cases the law adjusts the rights of the parties by making them tenants in common of the mixture, in the proportion of their respective contributions thereto, and, where the portions confused are of unequal value, in the proportion of their respective values. In the case of a willful confusion, however, the common law originally adopted the stringent rule of giving the entire mass to the innocent party, and this principle would still be applied in some common-law jurisdictions. The present tendency, however, in England as well as in the United States, is to adopt the milder rule of the Roman or civil law, either making the parties tenants in common of the mixture, as in the other cases referred to, or permitting the innocent party to recover the value of his share at the time of the confusion. Compare ACCESSION. Consult Schouler, *Treatise on the Law of Personal Property* (Boston, 1896).

CONGAREE (kŏn'gȧ-rē') **RIVER.** A river of South Carolina, formed by the junction of the Broad and the Saluda rivers, 1 mile northwest of Columbia (Map: South Carolina, D 3). It flows southeast and, joining the Wateree, forms the Santee. It is 60 miles long and navigable to Grandby, 2 miles below Columbia. Above that city it furnishes considerable water power.

CONGÉ D'ÉLIRE, kôn'zhȧ' dȧ'lêr' (Norman-French, Fr., permission to elect). The name given in England to the King's warrant or permission to a dean and chapter of a cathedral to proceed to the election of a bishop or archbishop to a vacant see. Since the passing of the Statute 25 Hen. VIII, c. 20, with the exception of short periods in the reigns of Edward VI and Mary, the congé d'élire has always been accompanied by a letter missive from the King, mentioning the person to be elected by name, so that in reality it is an appointment by the crown. If the dean and chapter delay the election beyond 12 days, the appointment is effected by letter patent from the crown; if they elect another than the person named, they incur the penalties of a præmunire, i.e., loss of civil rights, forfeiture of their goods, and imprisonment during the royal pleasure. The same penalties are imposed upon any bishop or archbishop who neglects to assist in the consecration and investment of a bishop so elected, within 20 days after the royal announcement of his

election. Consult Stephen, *Commentaries*, vol. iii (London, 1886).

CONGEN'ITAL DISEASE (Lat. *congenitus*, born with, from *con-*, together + *gignere*, to beget). A term used to denote any disease with which an infant enters the world. Congenital diseases may be acquired from the mother during pregnancy or during the act of delivery. In the former class belong syphilis and, according to some authorities, smallpox. The latter class is to be separated into two subdivisions: (1) diseases obtained by infection from the parturient canal of the mother, as syphilis, gonorrhœa, septic peritonitis, purulent ophthalmia, and pyæmia; (2) conditions due to accidents occurring during delivery of the infant, such as asphyxia, atelectasis (unexpanded lungs), and cephalhæmatoma (tumor of the scalp containing bloody fluid). Infants may also develop an acute fatty degeneration as well as tumors and malformations of various kinds before birth.

CONGER, kŏn'gẽr (Lat., from Gk. γόγγρος, *gongros*, conger), or CONGER EEL. A marine eel (*Leptocephalus conger*) of the family Leptocephalidæ, having the form of the typical eels, but no scales. The head is pointed and the mouth deeply cleft. The teeth in the outer series of either jaw are placed closely together so as to form a cutting edge. The dorsal fin commences much nearer the head than in the fresh-water eel and is confluent with the anal around the tail. The conger grows to a length of 8 feet and a weight of 25 or 30 pounds and is almost cosmopolitan. "Congers feed chiefly by night and prey upon crustaceans, cuttles, and various kinds of fish. . . . Their favorite resorts are either hollows or crevices in the rocks or sandy bottoms, in which they can bury themselves; and in such situations they are sometimes left by the ebbing tide. The flesh of these eels is of a highly gelatinous nature and is said to be largely employed in soups." American fishermen usually call them sea eels. Several Oriental species are known; and the name is sometimes applied to other similar fishes, as those of the genus *Synaphobranchus*. The conger passes through a metamorphosis, "the young being loosely organized, transparent, and band-shaped, with a very small head. The body grows smaller with age owing to the compacting of the tissues." This larval form was mistakenly described as a different genus, *Leptocephalus*. This name, being the older, has displaced the long-used generic term *Conger*. It is estimated that the number of eggs deposited by a single female in an aquarium has been as great as three and a third millions. See EEL; and Plate of EELS, CONGERS, AND MORAYS.

CONGER, EDWIN HURD (1843–1907). An American politician and diplomat, born in Knox Co., Ill. He graduated in 1862 at Lombard University (Galesburg, Ill.) and at the Albany Law School in 1866 and in the latter year was admitted to the bar of Illinois. He served in the Federal army during the Civil War, was brevetted major, and in 1868 set up as a stockman and banker in Iowa. From 1885 to 1891 he was a member of Congress, and at the close of the latter year was appointed Envoy Extraordinary and Minister Plenipotentiary to Brazil. In 1898 he was transferred to the embassy in China. He was the only representative of a foreign power who, during the siege of Peking from June 28 to Aug. 14, 1900, was able to send a communication to his government, and he took a leading part in the peace negotiations after the siege. In 1905 he was appointed Ambassador to Mexico, but resigned the same year.

CONGES'TION (Lat. *congestio*, accumulation, from *congerere*, to carry together, from *com-*, together + *gerere*, to carry). An abnormal increase of blood in the vessels, due to increased pressure in the arteries or obstruction to the emptying of the veins. Emotion or exercise, by causing the heart to beat more rapidly; alcohol, or other drugs, by expanding the arteries as well as stimulating the heart; local irritation, by cold, a blow, or a burn—may cause congestion of the active variety, with the production of a rosy color. A tight garter, a stooping posture, or the swelling of a finger from injury may cause passive congestion by obstructing the veins, in which case the color of the congested part is bluish or purple. In certain diseases in which the heart becomes weak and circulation fails, as pneumonia, typhoid fever, and septic conditions, the blood gravitates to the most dependent parts of the body, and "hypostatic congestion" of the lungs, liver, and skin results mechanically. Congestion occurs during many diseases.

CONGLETON, kŏn'g'l-ton. A market town of Cheshire, England, beautifully situated on the Dane River and the Macclesfield Canal, about 26 miles south of Manchester (Map: England, D 3). Its chief industries consist of manufactures of silks, ribbons, and towels, salt, furniture, nails, iron and brass work, and stone. Coal is mined, and there are a number of corn mills. Pop., 1901, 10,706; 1911, 11,309. Congleton appears in the *Domesday Survey*, and received a charter from the Earl of Lincoln in the thirteenth century.

CONGLETON, HENRY BROOKE PARNELL. See PARNELL, HENRY BROOKE.

CONGLOM'ERATE (from Lat. *conglomeratus*, p.p. of *conglomerare*, to roll together, from *com-*, together + *glomerare*, to roll into a ball, from *glomus*, ball). A sedimentary rock (commonly called "pudding stone") composed of pebbles cemented together by finer-grained rock material. The cementing substance is commonly lime carbonate or an oxide of iron; quartz also occurs and makes a very hard, durable material which is sometimes used for millstones. The millstones quarried in the United States are mainly a quartz conglomerate that is found along the eastern slopes of the Appalachians from New York to North Carolina. Conglomerates form along shores, and the pebbly beaches which are now forming will, when consolidated, produce conglomerates. Since conglomerates can form only in shallow water (where the force of the waves is sufficient to move pebbles), their occurrence within the strata of the earth's crust indicates an encroachment of the sea upon the land. Such an encroachment occurs during and after a subsidence of the land beneath the sea, when deposits of sediment are laid down. Conglomerates, therefore, generally lie at the base of geological formations and serve to separate these formations from one another. They are also common in glacial deposits, consisting of pebbles that have been carried along by the ice and sorted out by the streams that issued from the glaciers. Such conglomerates are

characterized by angular and subrounded pebbles that may show striations and groovings from abrasion while they were transported along the bed of the glacier. Glacial conglomerates are cemented usually by calcium carbonate in the form of calcite or aragonite.

CONGO, kŏn'gō, or **KONGO** (from the African tribe of *Mosicongo*). The largest and, excepting the Nile, the longest river of Africa and one of the great rivers of the earth. It drains most of Central Africa west of long. 32° E., from lat. 8° N. to 13° S. It is formed by the union of two great streams—the Lualaba, from the south, whose sources on the Zambezi water parting are believed to be the ultimate fountain head of the Congo; and the Luapula (also known as the Kuvua) from the southeast, which drains Lake Bangweolo, the ultimate source of this branch of the Congo being the Chambezi affluent of Bangweolo. The drainage system is extended farthest east, however, by the eastern tributaries of Lake Tanganyika which send the waters of a large area within 500 miles of the Indian Ocean, to Tanganyika, through the Lukuga outlet to the Congo and down that river to the Atlantic. Below the Lukuga several minor streams are received by the Congo, mainly from the eastern side, until, at the equator, in long. 24° 30′ E., at a point about 80 miles below Stanley Falls, the Congo is joined by the Lomami, which has a parallel course on the west. Eastward of this point the Congo begins its great bend towards the west. About 60 miles below the entrance of the Lomami, the Aruwimi enters the Congo from the east, and still farther downstream there join at intervals from the north the rivers Rubi, Mongala, Ubangi (all great rivers, the Ubangi being larger than any rivers of Europe excepting the Volga and Danube), Sanga, Likuala, and Alima, besides smaller streams; and from the south the Lulonga, Ruki, and Kasai. Below these, throughout the lower 500 miles of the river's course, only small tributaries are received. Between the Atlantic and the great lakes the basin of the Congo consists of three successive terraces. The three zones thus formed are: 1. A narrow coastal strip lying between the sea and the coastal ranges; its elevation rises gradually to about 2000 feet. 2. A vast central zone of depression lying between the Atlantic ranges and Mitumba Mountains. 3. An elevated zone at the eastern end of the basin. It is in the descent from the plateau near the west coast that the chief impediments to navigation occur. The basin has a great tropical forest extending east of the Congo between the Aruwimi and the Nile system, and there are large forest areas to the south of the northern bend of the Congo; but the greater part of the country consists of rolling savannas interspersed with timber. The river is navigable for ocean steamers from its mouth to Matadi, a point about 100 miles upstream, where navigation is interrupted by falls and rapids; and also by steamboats from Stanley Pool to Stanley Falls, for a distance of over 1000 miles farther. The length of the navigable waters of the Congo system is estimated at about 6000 miles. The completion of the Matadi Railroad, about 250 miles in length, from Matadi to Stanley Pool, around the falls and rapids which interrupt navigation between those points, has placed the middle course of the river in communication with its estuary, and the building of the railroad between Stanleyville (at Stanley Falls) and Ponthierville, 75 miles, finished in 1906 and circumventing the upper rapids, has extended steam transportation 200 miles farther up the river. The Congo has a length of about 3000 miles and drains an area of more than 1,400,000 square miles.

CONGO, Belgian, formerly Congo Free State. A colony founded in 1882 as an independent state under the sovereignty of King Leopold II of Belgium. Annexation to Belgium was accomplished by means of the Treaty of Nov. 28, 1907. Situated approximately between long. 12° and 30° E. and between lat. 14° S. and 6° N. (Map: Africa, G 5), it is bounded on the north by French Equatorial Africa and the Anglo-Egyptian Sudan, on the east by British East Africa, German East Africa, and Northern Rhodesia, on the south by Northern Rhodesia and Portuguese West Africa, and on the west by Portuguese West Africa, the Atlantic, and French Equatorial Africa. The boundaries of the colony, with the Congo and Ubangi rivers on the west, and Lakes Tanganyika, Moero, Albert Edward, and Albert, on the east, are all well defined, and the area is estimated at about 909,654 square miles.

The surface of Congo is a depressed plateau basin, which is unbroken by mountains except in the western part near the Atlantic, and in its southeastern corner. It rises on its borders to elevations of 6000 feet and more. The river valleys are occupied by dense forests, while the remainder is composed of wooded savannas and arable land. The chief river is the Congo (q.v.), which, together with its tributaries, drains nearly the entire territory. The climate is hot and moist, but the annual white death rate has been reduced to about 6 per cent. The normal temperature ranges from 60° to 90° F., and not infrequently an exceedingly hot day is followed by a chilly night. The climate in the interior is not so injurious to Europeans as that of the coast region. In the elevated portions of the colony, like the Katanga District, the climate is perfectly salubrious.

The flora of Congo is very rich and varied, the forests being full of rubber vines (one tree) and others yielding gums and resins. Among the cultivated plants are the coffee, cotton, yam, papaw, pineapple, cassava, corn, rice, peanut, sweet potato, banana, bean, tobacco, sorghum, and Kafir corn. The fauna includes the elephant, hippopotamus, buffalo, antelope, chimpanzee, and crocodile. Elephants are numerous, but their slaughter is now prohibited, and ivory exports, which are abundant, are chiefly from earlier accumulations by the native population. Iron, tin, and coal occur in many localities, while copper is confined to rich deposits in the southeast (Katanga). Gold is also found there. Katanga is the richest mineral region in the colony.

The natural agricultural possibilities of the colony are very great, but the unhealthful climate, which practically forbids white immigration, largely retards systematic agricultural development. Rubber, gathered for many years under compulsion by the natives, is the chief product and export. The development of the rubber industry is shown by the following export figures (special trade): 1898–1900, 3,725,596 kilos annual average, valued at 27,941,970 francs; 1901–05, 5,396,775 kilos annual average, valued at 44,055,539 francs; 1906–10, 4,246,595 kilos annual average, valued at 43,367,338 francs; 1910, 3,416,784 kilos, 51,015,-

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formed colonies where agricultural and other instruction is given.

Ethnology. The natives of the Congo represent two principal physical types, Pygmies and Negroes. The Pygmies are sprinkled over the greater part of the equatorial forest, often living in close contact with dominant Negro peoples, e.g., with the Bakuba in the southwest and the Mangbettu in the northeast. The Negroes represent considerable differences of a minor character, and in the northeast an infusion of Ethiopian and Nilotic blood is practically certain. Linguistically the Bantu stock predominates, but in the northeast Sudanese languages are spoken. Up to date there is no satisfactory evidence of distinct Pygmy tongues, the Pygmies having adopted the speech of neighboring Negro populations.

Finds during recent years indicate the one-time existence of a Stone age, but throughout the Congo the art of smelting iron is now practiced with great skill. Industrial development reaches its high-water mark in the Kasai District, where the Bakuba (Bushongo) produce wonderfully beautiful wood carvings and pile cloth of plushlike appearance. Pottery and basketry likewise flourish. Economically the Congolese Negroes are mainly dependent on hoe agriculture, though hunting and fishing are not unimportant. In several regions, notably among the Bakongo, Balunda, Bakuba, and Mangbettu, powerful monarchies have developed in historical times. The social organization of the Congolese is imperfectly known; the Bakuba (Bushongo) have maternal descent, while the Azande are reported to be patrilineal. Religious practices and beliefs seem to centre in fetishism. See Colored Plate of DARK RACES OF AFRICA with the article AFRICA.

History. The Congo Free State was established as a neutral independent sovereignty. In 1876 King Leopold II of Belgium had organized, with the cooperation of the leading African explorers and the support of several European governments, the International African Association (q.v.), for the promotion of African exploration and colonization. In the following year Henry M. Stanley called attention to the Congo country and was sent there by the association, the expense being defrayed by Leopold. By treaties with native chiefs rights were acquired to a great area along the Congo, and posts were established. After 1879 the work was under the auspices of the Comité d'Etudes du Haut Congo, which developed into the International Association of the Congo. This organization sought to combine the numerous small territories acquired into one sovereign state and asked for recognition from the civilized governments. On April 22, 1884, the United States government, having decided that the cessions by the native chiefs were lawful, recognized the International Association of the Congo as a sovereign independent state, under the title of the Congo Free State, and this example was followed by Austria-Hungary, France, Germany, England, Italy, the Netherlands, Portugal, Russia, Spain, and Sweden. The international conference on African affairs which met at Berlin, 1884-85, determined the status of the Congo Free State. By the Act of the Conference, signed Feb. 26, 1885, the Congo Free State was declared neutral and open to the trade of all nations, the Powers reserving for 20 years the right to decide as to the taxation of imports; the navigation of the Congo and its affluents was to be free, under the supervision of an international commission; religious freedom and equality of treatment of all settlers were guaranteed; and war was declared upon the slave trade. The United States refrained from ratifying this act, on the ground that it would thereby be committed to certain international engagements. The new state was placed under the personal sovereignty of Leopold II, who by will, four years later, bequeathed it to Belgium. On July 31, 1890, the territories of the Congo Free State were declared inalienable.

The central government of the state was located at Brussels and was constituted by the King of Belgium and a Secretary of State, the latter being head of the departments of Foreign Affairs, Finance, and the Interior. The King's power was not limited by a constitution, but was somewhat circumscribed by the General Act of Berlin of 1885 relative to the organization of the Congo Free State. The direct administration was in the hands of a governor-general at Boma, assisted by a vice governor-general. According to the agreement of 1890, between Belgium and the Congo Free State, the former obtained the right of annexing the latter after a period of 10 years. In 1901 the question of annexation came up before Parliament, and the right of annexation was reserved to the King alone.

In accordance with the tariff reservation in the Act of 1885, the international conference at Brussels in 1890 authorized the Congo Free State to levy duties on certain imports in order to provide the needed revenue. By the Treaty of 1891 the United States established relations with the Congo Free State, providing for commercial intercourse and a consular system and for the arbitration of any dispute under the treaty. Several separate treaties with the European states having colonial possessions in Africa adjoining the Congo Free State have defined its boundaries. There is a difference of opinion in regard to the success of the work done by Belgium on the Congo. Largely as the result of agitation carried on in England, a Belgian commission of inquiry was dispatched to Boma in the fall of 1904 to examine into the charges of oppression, cruelty, and restriction of trade brought against the Belgian authorities. The report of the commission presented November, 1905, showed the existence of widespread evils. The natives were the victims of a crushing system of forced labor imposed with particular severity in the territories under the control of the concessionary commercial companies. Nevertheless forced labor, though in a modified form, was declared necessary for the salvation of the country. The native police employed by the companies were guilty of revolting atrocities, and armed punitive expeditions were carried on by the companies against recalcitrant villages. The great decrease in population was ascribed to the prevalence of epidemics, the sleeping sickness, and emigration following on the extinction of the ivory trade. Reforms were declared necessary, but at the same time the commission pointed out the civilizing work that had been accomplished. Cannibalism was practically extinct, and human sacrifice was rare. Towns had been built on the banks of the Congo, and railroads and telegraph lines extended. A reform committee subsequently drew up a

scheme of reforms, part of which was accepted by King Leopold and issued as decrees in June, 1906. The most important of these reforms were the following: The natives were secured in the possession of their lands, but the right of determining rightful possession rested exclusively in the state. The natives were allowed to pay taxes in kind or in labor, forced labor not to exceed 40 hours per month. A native less than 14 years old could not be compelled to sign a contract for more than two years of ordinary work and for more than three years of domestic service. Punitive expeditions, which could be ordered only by the Governor-General or the district commissioners or their representatives, were not to be resorted to until after persuasion had been tried, and in no case was the direction of police or military operations to be confided to natives. The King also denied the right of any foreign power to interfere in the administration of the affairs of the Congo State. This settlement, however, soon proved unsatisfactory. The reforms were but partly enforced; several native riots occurred; consular and missionary reports continued to insist that the natives were treated with great cruelty. The British government became restive, and even the United States Senate urged President Roosevelt to use his good offices. As a result of this agitation, the semi-independence of the Congo Free State came formally to an end, and on Nov. 29, 1910, a treaty was signed ceding the Congo Free State outright to Belgium. It now became Belgian Congo. New reforms were started by the Belgian government; the natives were permitted to pay their taxes in silver instead of rubber; their right to the free disposition of the fruits of the soil was recognized, and in the meantime railway construction was undertaken on a large scale, a considerable portion of which was already completed by 1913. The thoroughness of the Belgian reforms has been much questioned. The Congo Reform Association as late as 1912 insisted that Belgium, despite the assurances of the colonial administration, was simply playing with reform and pointed out, in a memorial to the British government, the great reduction in population, the social and economic misery in the Congo. Sir Edward Grey stated, however, that no action could be taken, and in 1913 the association formally disbanded, leaving Belgium without any organized opposition.

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government and "Evangelical" in their type of Protestant doctrine, and stand in recognized relations of denominational fellowship one with another within the bounds of the respective countries of their location and to some extent in international fraternal union. In this sense it is proper to speak of the Congregational denomination of the United States, or of England and Wales.

The Congregational polity, in its modern history, had its origin in the Reformation age, and was due to the belief that the Bible contains an authoritative revelation of the will of God concerning church organization, no less than a God-given revelation of religious truth. In working out the details of the Congregational system its early expounders conceived that they were simply reproducing the divinely appointed model of the Apostolic churches. Few modern Congregationalists hold, however, that the minutiæ of church government are matters of revelation, or that any one form of church organization was divinely appointed for all times, countries, and stages of civilization; though Congregationalists generally believe that their polity embodies the broad scriptural principles of fraternal equality, individual responsibility, and full-rounded independent Christian manhood. They deem it, also, peculiarly consonant with the democratic tendencies and high individual intelligence of modern civil society. As indicated in the name, Congregationalism believes the basic element in the visible organized Church to be the local congregation of Christian disciples. It holds that congregation competent to designate its own officers, admit members to communion, discipline the erring, state its faith in language of its own choosing, and order its worship as seems best suited to its need. Each local congregation modern Congregationalism regards as a democracy, where affairs of concern are decided by the votes of the membership, normally under the moderatorship of the pastor—if there be a pastor in office. Like all democratic bodies, however, a Congregational church makes large use of committees, which report results rather than processes for the consideration of the body as a whole and act as the executive arms of the congregation.

Congregationalism holds to the autonomy of the local church. It rejects the judicial system of Presbyterianism, or the supervision of any form of episcopacy, as an undue interference with the rights of the local body. But Congregationalism in America, and increasingly in Great Britain, rejects pure independency. Though one church or body of Christians has no judicial authority over another, each owes fraternal counsel to its neighbors, and no act of large importance in any single congregation should be done without seeking the advice of the representatives of sister churches. Illustrated in various ways in different countries, mutual responsibility and helpfulness are distinguishing features of the Congregational polity.

The Local Church. The local church is held by Congregationalists to be a company of professed disciples of Christ, who have some intelligent acquaintance with Christian truth and personal experience of the saving work of Christ. Hence admission to church membership is based on evidence of intelligent determination to lead a Christian life. Such a company of Christians is knit together into a church by the covenant which they make with God and one with another, to walk as those who have God for their Father and Christ for their Saviour, and to join in public worship, seek the welfare, and submit to the discipline of the particular local body of believers of which they are members. In early Congregationalism, and in American practice to the present day, this covenant, which each local congregation may express in whatever way seems best to it, was written; in Great Britain written covenants are now rare. In addition to a written covenant it is usual for American Congregational churches of the present day to have a brief confession of faith, assent to which is required of would-be members. Such local confessions, though not unknown, are unusual in Great Britain. Examination of candidates for membership as to their knowledge of Christian truth has prevailed since the beginnings of Congregationalism; but the local confession of faith, though occasionally exemplified in New England during the seventeenth and eighteenth centuries, attained general use in America during the doctrinal discussions of the opening years of the nineteenth century. Each local church is free to express its faith in its own language, and such confessions, like the examination of candidates for church membership, have steadily tended towards greater catholicity and simplicity. While Congregationalism recognizes no creed statement as binding on a local church save that which the church may itself adopt, Congregationalists have never hesitated, in their representative gatherings, to adopt confessions of faith. These have the value of a testimony to the common faith of the churches and have never been regarded as creed tests. Thus, the exiled London Congregationalists put forth a confession in 1596; the Cambridge Synod, representing the churches of New England, approved the doctrinal parts of the Westminster Confession in 1648. Ten years later, a meeting representative of the Congregational churches of England put forth a modified form of the Westminster Confession, known, from the place of their assembly, in the Savoy, in London, as the "Savoy Declaration"; and meetings of the delegates of the Massachusetts churches in 1680, and of those of Connecticut in 1708, set their approval, save for slight changes, on this work of the Savoy Synod. The "Congregational Union of England and Wales" put forth a statement of "Principles of Religion" in 1833; the "National Council of the Congregational Churches of the United States" adopted the "Burial Hill [Plymouth, Mass.] Declaration" in 1865; in 1883 a commission appointed by the National Council three years before reported a creed that has had wide acceptance among American Congregationalists; and in 1913 the National Council adopted a brief creed prepared by a special commission appointed by the National Council in 1910.

Doctrinal Position. The doctrinal position of early Congregationalism was that of general Puritan or Presbyterian Calvinism. It was not on doctrinal grounds that the founders of New England left their homes. They were wholly one theologically with the Puritan party of the English Civil War, with which they and the English Congregationalists were alike associated. Historically considered, American and English Congregational theological develop-

ment has been along Calvinistic lines; but, as in other Protestant bodies, the peculiar problems of seventeenth century debate have ceased to arouse interest. Calvinistic and Arminian interpretations of the way of salvation, as far as there is present significance in either interpretation, are regarded as alike acceptable. The doctrinal position of modern Congregationalism is that common Protestantism which is known as "Evangelical." Its ministry and churches, as a whole, however, while holding broadly to the system of Christian doctrine characteristic of historic Protestantism, have been more disposed in recent years than many Protestant bodies to welcome the new interpretations of Christian truth, and of its sources, which current theological discussions in Europe and America have presented.

Officers and Support. Early Congregationalism, following what was believed to be the Scripture model, held that a completely organized local church should have five classes of officers—a "pastor" and a "teacher," both of whom should preach and administer the sacraments; a "ruling elder," who should aid in church discipline; "deacons," to care for the poor and assist at the Lord's Table; and "widows," to aid in nursing among the sick. But little of this elaborateness of organization survived the end of the seventeenth century, and by that time the officers of a Congregational church had become reduced almost universally to a pastor and several deacons. The development of the nineteenth century added to these officers in practically every church a clerk, a treasurer, and a Sunday-school superintendent; and, in churches of size, a "prudential committee," to serve with the other officers as advisory to the pastor. Recently the order of deaconess was adopted. Assistant pastors are becoming efficient aids to the pastoral service. Since the cessation of teachers and ruling elders, the pastors and assistant pastors have been generally the only paid officers of Congregational churches. In the earliest Congregationalism everywhere, and in English Congregational practice always, the expenses of the church were met by some form of voluntary payment or by the rental of sittings in the place of worship. Modern American Congregationalism employs these voluntary methods exclusively. But during most of the Colonial history of New England the intimacy of relationship between church and state was such that church expenses were assessed upon the taxable property of all inhabitants not specially exempt, and such assessments were collectible like any other taxes. This continued the practice in Connecticut till 1818 and in Massachusetts until 1834. When there was but one church in a township, its pecuniary affairs were settled in the meeting of the legal voters of that township. Where two or more churches existed in the township, it was subdivided territorially into districts for voting and tax raising, known as "societies," "parishes," or "precincts." The New England feeling that there should be no taxation without the consent of those taxed led, during the last third of the seventeenth century, to the assumption by the legal voters, by whom the minister's salary was assessed and paid, of a right to concur in or reject the choice of a minister by the membership of the church, and established a dual system of entrance to the local pastorate, the election of the church requiring the confirmation of the "society." In the general usage of New England, and to some extent in other parts of the United States, this system has survived the loss of the right of public taxation for ecclesiastical purposes and prevails at the present time. The ownership of the buildings used by the church and the determination and payment of the salary to its minister remain under the control of a voluntary local legal business corporation, admission to which is secured by election, by renting sittings in the church edifice, or in a variety of ways; and this corporation, still known as the "society" or "parish," has a concurrent authority in the choice of a minister. English practice has known nothing of this institution; and outside of New England the temporalities of the church have been largely placed in the hands of trustees chosen by the membership of the church, or the church itself has held title to its property and administered its pecuniary affairs. Even in New England the "society" is falling into disuse in many places, the church itself securing the incorporation permitted by statute and assuming all the rights previously shared with the "society."

Worship. Early Congregationalism, in its sharp reaction from the imposition of a written liturgy, characteristic of the days of Elizabeth and the Stuarts, went to the extreme of rejecting all written liturgy as unscriptural. Modern Congregationalism entertains no such hostility, and a considerable degree of modification of the public services of Congregationalism, by responsive reading, united repetition of the Lord's Prayer and the Apostles' Creed, and development of the musical aids to worship, has taken place in recent years. In accordance with its fundamental principle of local autonomy, Congregationalism recognizes the full right of each local church to order its worship as it sees best. But, whatever minor modifications have taken place, Congregational worship remains essentially nonliturgical. It makes the sermon central, and includes, as it has always done, the elements of preaching, free prayer, the reading of the Word of God, and singing. Till about the middle of the eighteenth century in America, and in the early Congregational practice of Great Britain, only metrical translation of portions of Scripture were deemed appropriate to be sung in public worship, and the aid of musical instruments was rejected till about the same period; but since then full freedom in the use of hymns and musical aids has prevailed.

Fellowship between the Churches. While each congregation is autonomous, Congregationalism believes that it is the duty of each local church to consult neighboring churches in matters of importance. This feature of Congregational practice has attained a larger development in America than in England and is chiefly manifested by the "advisory councils," which American Congregationalism has employed since the time of the first settlers on New England soil. Though given a place in the theoretic exposition of early English Congregationalism, the "advisory council" of America has no exact counterpart in modern British usage. Such ecclesiastical acts as the formation of a church, the settlement or dismissal of a pastor, and the consideration of cases of discipline from which quarrel and division have

resulted, are judged by American Congregationalism to demand the advice of neighboring churches. At the request of a church, or of a party in a divided church, the representatives of neighboring churches meet in an "advisory council"—a temporary body assembled to consider the particular case. Its composition depends solely on the "letter missive" of invitation, and may be drawn from a distance, though usage regards a council, the majority of the membership of which is not from the vicinage, as seriously irregular. Its authority is not judicial, but its advice is seldom disregarded. On completing its work, an "advisory council" is dissolved, and the minutes are left with the church with which it met. No member of the council is taken from the church which calls it. The council does not report to any other organization than the church which asks its advice.

Early Congregationalism in England and America recognized the desirability of gatherings representing the communion as a whole in occasional important exigencies. Thus, the ministers and delegates of the New England churches gathered at Cambridge, Mass., in 1637, when the supposed heresies aroused by Mrs. Anne Hutchinson were considered, and again in 1646–48, when English religious politics induced them to formulate their system of church government in the "Cambridge Platform." The favor which English Congregationalists experienced from Cromwell induced an assembly at the Savoy Palace, London, in 1658, which set forth Congregational faith and practice. Besides these general gatherings, meetings of representatives of colonies and districts were held as necessity required. Massachusetts called such assemblies to consider the proper recipients of baptism in 1662 and to find remedies for the declining state of religion in 1679–80. Connecticut summoned such a gathering in the height of the excitement of the "Great Awakening" in 1741. Less formal and distinctly ecclesiastical, but nevertheless a factor of weight in the religious life of the Province, was the annual convention of ministers of Massachusetts which met, from early Colonial days, at the time of the May election.

Permanent Organizations. Local stated meetings of ministers for discussion of matters of ecclesiastical interest existed in England under the Commonwealth, and were introduced into Massachusetts in 1690. By 1705 there were five such associations in the Province, by which candidates for the ministerial office were examined and licensed; and in 1708 the system was extended to Connecticut, where, besides these local gatherings, an association representative of the whole Colony was formed that has assembled annually from 1709 to the present time. Similar State bodies were organized in Vermont in 1795, in Massachusetts in 1803, in New Hampshire in 1809, and have since extended everywhere where Congregationalism has gone in America. These State bodies are now prevailingly designated "conferences." Minor local meetings, often coextensive with county lines in their constituency, are universal in American Congregational practice. During the early part of the nineteenth century, however, the feeling was strongly manifest that these stated meetings, which were at first of ministers only, should be made really representative bodies by the admission of delegates of churches. This has been universally accomplished. In each State, and in most subdivisions of States, where Congregationalism is organized, there is now a body meeting for discussion at least once a year, and composed of the pastors and the elected delegates of the churches. The State bodies are designated prevailingly "conferences," and the smaller local bodies "associations." The pressing questions of the decade previous to the Civil War led to the gathering at Albany, in 1852, of the first convention representative of American Congregationalism as a whole that had assembled since 1648; and at Boston, in 1865, a similar representative council was held. In 1871 the "National Council of the Congregational Churches of the United States" was formed. This body has since met regularly every third year, and can hold special sessions at any time at the request of any five State organizations of churches. By a change in its constitution, adopted in 1913, it now meets biennially. Its membership is elected by the local and State bodies into which the churches are grouped, and the number of delegates chosen is proportionate to the number of local churches and of the communicants in the bodies by which they are appointed. The decisions of the National Council, like those of the smaller bodies into which the Congregational churches of the United States are grouped, are not mandatory or judicial; but the free discussion of matters of common concern, their investigation by competent committees, and the recommendation of courses of action by vote, have much weight with the churches. The churches of Canada are not constituents of this National Council, but are organized in the "Congregational Unions" of "Ontario and Quebec" and of "Nova Scotia and New Brunswick."

In the United States Congregational churches are normally united by permanent representative bodies of three kinds, the larger in a true sense superior to the smaller: (1) the local "association"; (2) the State "conference"; (3) the National Council. The usage of Great Britain is much less developed. Independency is more nearly the condition of English than of American Congregationalism. As has been pointed out, English Congregationalism does not have the "advisory council." But an approximation to the American system of mutual responsibility and helpfulness exists in the county and district associations, in which English Congregational churches have long been grouped. Some of these bodies may have come down from the days of the Commonwealth; but their modern development began in Hampshire in 1781, whence they rapidly extended over England. By these "associations," or unions, the good standing of Congregational churches and ministers is certified, church advancement is superintended, and denominational fellowship variously expressed. Besides their coöperation in these local associations, the Congregational churches of Great Britain are federated in two larger bodies—the Congregational Union of Scotland, organized in 1813, and the Congregational Union of England and Wales, formed in 1832. The semiannual meetings of the last-named assembly are the most influential events in modern English Congregational life.

The sense of mutual fellowship characteristic of modern Congregationalism has its further illustration in the formation of an "Interna-

tional Congregational Council," representative, by appointed delegates, of the churches of all lands into which Congregationalism has penetrated. Its first meeting was held at London in 1891, its second at Boston in 1899; and its third in Edinburgh in 1908.

Missionary Agencies. The benevolences of Congregationalism have called into being a large number of denominational agencies. In the United States organized home missions began with the formation of the Missionary Society of Connecticut in 1798 and the Massachusetts Missionary Society in 1799. Similar local societies have been formed in the States where Congregationalism is strongly represented, and they serve as auxiliaries to the national Congregational Home Missionary Society, founded in 1826, to which a large share, not merely of the westward extension of Congregationalism, but of the maintenance of the feebler churches in the older States, is due. A second society by which Congregational effort is carried forward within the territory of the United States, Porto Rico, Alaska, and the Hawaiian Islands, is the American Missionary Association, organized in 1846 by antislavery sympathizers, which now maintains an extensive educational and evangelistic work, chiefly among the negroes of the South, but also among the mountain whites, the Indians of the West, the Eskimos of Alaska, and the Chinese of the Pacific coast. The Congregational Education Society, founded in 1815, has for its work the strengthening of schools and colleges in the newer portions of the land, and the assistance of worthy and needy candidates for the ministry. The work of the Congregational Church Building Society and of the Congregational Sunday-School and Publishing Society is indicated by their titles. Congregational foreign missionary effort reaching forth from the United States is under the direction of the American Board of Commissioners for Foreign Missions, founded in 1810, and now carrying on work in India, Turkey, China, Japan, Micronesia, Africa, Austria, Spain, and Mexico. By an agreement effected in 1913 with these national Congregational societies for home and foreign work, the membership of the National Council is the majority membership of each, and all are under the supervision of a commission of that council. In Great Britain the work of home missions is under the charge of the Congregational Church Aid and Home Missionary Society, and that of foreign evangelization of the London Missionary Society, founded in 1795. Canadian Congregationalism has its own Foreign Missionary Society.

Theological Seminaries. In order to secure a proper training for their ministers, the early New England Congregationalists established Harvard and Yale, and the course of instruction in both of those institutions of learning was long regulated by the design of equipping men for the ministry. But by the first quarter of the eighteenth century the ordinary course of collegiate instruction was increasingly felt to be inadequate for the needs of ministerial training, and the result was the foundation at Harvard, in 1721, of the Hollis professorship of divinity, and the beginnings of a similar professorship of divinity at Yale in 1746—a professorship that was not fully established there until 1755. Even more influential in the ministerial training of the eighteenth century than the instruction of these professors was the custom, which grew into increasing prominence as the century went on, of taking a few months of training supplemental to the college course, under the guidance of some eminent pastor, before applying for ministerial licensure. Such household theological seminaries were presided over by many of the prominent pastors of New England; and among such instructors Jonathan Edwards, of Northampton, Mass.; Joseph Bellamy, of Bethlehem, Conn.; Charles Backus, of Somers, Conn.; and Nathaniel Emmons, of Franklin, Mass., were conspicuous.

The immediate cause of the establishment of theological seminaries, in the modern sense of the term, in America was the passage of Harvard College to the control of the party soon to be known as Unitarian, in 1805. Deprived thus of control of their chief seat of ministerial training, the conservative Congregationalists of eastern Massachusetts began at once to plan for separate schools of theological instruction. Two independent designs for the establishment of a theological seminary—the one begun by representatives of the older type of New England Calvinism, and the other by men of the Edwardean sympathies—were happily combined, after much effort, in 1808, and resulted, in September of that year, in the establishment of Andover Theological Seminary, at Andover, Mass. Conspicuous in the teaching force of this institution, from its foundation to his resignation in 1846, was Leonard Woods, its first professor of theology; while Moses Stuart, from 1810 to 1848, was eminent for his services in the study of the Old Testament and in introducing the theology of Germany to the knowledge of American students. Even more conspicuous as a theological leader at Andover was Edwards A. Park, who taught in the institution from 1836 to 1881 and, from 1847 to the year last mentioned, occupied its chair of theology. Andover Seminary under its first instructors occupied a theological position which represented a union on broad and generous lines of the various shades of conservative New England opinion, in opposition to the Unitarian movement of its day. Under Professor Park the Edwardean theology was even more emphasized and developed. For 30 years past Andover has been distinguished by a cordial welcome to the newer phases of theological discussion, especially as developed in Germany. In 1908, while preserving its name and separate organization, it removed to Cambridge and entered into affiliation with Harvard University.

A second theological seminary was that established at Hampden, Me., in October, 1816, but which was removed to Bangor, Me., in 1819, where it has since continued, and from which place it takes its name. Its most eminent theological instructor in the past was perhaps Enoch Pond, whose connection with it extended from 1832 to 1870.

In 1822 the corporation of Yale College—now Yale University—carried into execution a plan which had been entertained by them for a considerable time, by establishing a department of theology in the college, which has since been known as "Yale Divinity School" and is a coordinate department of Yale University. Its first professor of theology, from its foundation to his death in 1858, was Nathaniel W. Taylor,

whose type of doctrine, though belonging essentially to the historic Edwardean school, yet modified the characteristic teachings of that school in some particulars to such an extent as to receive the name "New Haven theology," and subjected its author to much criticism from the stricter representatives of the Edwardean party. Other conspicuous teachers of the Yale Divinity School have been Eleazar T. Fitch, from its foundation to 1852; Samuel Harris, professor of systematic theology from 1871 to 1895; Timothy Dwight, professor of New Testament Greek from 1858 to 1886, and president of Yale University from 1888 to 1900; and George Park Fisher, its professor of Church history from 1861 to 1901.

The differences of opinion awakened by the theology of Nathaniel W. Taylor, already alluded to, led to the foundation of a school at East Windsor, Conn., in 1834, then called the "Theological Institute of Connecticut," but much better known as "Hartford Theological Seminary" since its removal to Hartford in 1865. Its founder and first professor of theology was Bennet Tyler, who occupied its most conspicuous chair until 1857. The chief leader among its later instructors was Chester D. Hartranft, who became president in 1888, and under whom its curriculum and equipment were greatly developed. He was succeeded in 1903 by William D. Mackenzie.

Almost contemporary with the founding of the Hartford Seminary was the establishment of a theological department in connection with Oberlin College, opened under the title of Oberlin Theological Seminary, in 1835. Its most distinguished instructors have been Charles C. Finney, the eminent revivalist, whose services to it continued from 1835 to 1875; and, since his death, James H. Fairchild, who was connected with Oberlin College, as an instructor in various departments, from 1838 to his decease in 1902, and held the office of president from 1866 to 1889. Oberlin is at present distinguished by the hearty reception there given to the theology of the Ritschlian school.

The growing needs of the Middle West led to the organization, in 1854, and to the complete establishment in 1858, of Chicago Theological Seminary, an institution prevailingly conservative in its broader evangelical type of theology, of which it has long been a leader in a region which looks to Chicago as its centre. Conspicuous in its teaching force have been Samuel C. Bartlett, its professor of biblical literature from 1858 to 1877, when he became president of Dartmouth College; Franklin W. Fisk, its professor of sacred rhetoric from 1859 to his death in 1901; and George N. Boardman, its professor of theology from 1871 to 1893.

The Pacific Theological Seminary was established at Oakland, Cal., in 1869, and is now located at Berkeley, in the same State. The youngest of the Congregational theological schools was organized at Atlanta, Ga., in 1901.

The Congregational College of Canada was founded in 1830 as a "Congregational Academy," at Toronto, and was removed to Montreal in 1864, where it is now located as a theological school in affiliation with McGill University.

It will thus be seen that, of the American Congregational theological seminaries, Yale and Oberlin are departments of a university or a college; three others, Andover, Montreal, and Pacific, are affiliated or in close geographical connection with universities; and four, Bangor, Hartford, Chicago, and Atlanta, are independent foundations. While some of them originated in doctrinal discussion, and they still represent in several instances somewhat dissimilar points of view, the general tendency of modern Congregational development has been to an increasing similarity in doctrinal position and in methods of instruction, so that good fellowship instead of schism exists among all these theological seminaries at the present time.

In Great Britain, as in America, theological education has long commanded the attention of Congregationalists. Soon after the passage of the Toleration Act by the English Parliament, Congregational and Presbyterian Dissenters about London established a "fund" to aid feeble churches and to educate candidates for the pastoral office (July 1, 1690). The union of representatives of the two polities proved but temporary, and in 1695 the "fund" was divided, and a "Congregational Fund Board" organized. This board still exists. By its influence, and that of eminent Congregationalists like Philip Doddridge, many "academies" and "colleges" were organized in the eighteenth century. These had at first the twofold object of training an educated ministry and of providing a general education for lay students who were debarred from university privileges by their "dissent" from the Establishment. To some extent these two aims are still sought by the Congregational "colleges" of Great Britain; but with the removal of disabilities from the pathway of Nonconformists who are seeking a general education these "colleges" are laying increasing and in some instances exclusive emphasis on ministerial training. They correspond to the "theological seminaries" of the United States.

The Congregational "colleges" of Great Britain, at the present time, are the following: 1. *New College*, London, tracing its origin to 1696 and now affiliated with the University of London. 2. *Western College*, Bristol, founded as the Western Academy, in 1752. 3. *Yorkshire United Independent College*, Bradford, dating from 1756. 4. *Cheshunt College*, Cheshunt, founded by the Countess of Huntingdon at Talgarth in 1768 and now affiliated with the University of London. 5. *Hackney College*, founded by Rev. Matthew Wilks and Rev. George Collison at Hackney in 1803 and now at Hampstead. It is affiliated with the University of London. 6. *Lancashire Independent College*, Manchester, founded at Blackburn in 1816. 7. *Mansfield College*, Oxford, founded as Spring Hill College at Birmingham in 1838 and greatly strengthened by its significant reestablishment at Oxford in 1886. 8. The *Congregational Institute*, Nottingham, opened in 1861. 9. The *Congregational Memorial College*, Brecon, combining a number of institutions, the oldest of which dates from 1755, and giving special attention to Welsh students. 10. *Bala-Bangor Independent College*, Bangor, dating from 1843 and largely Welsh in its constituency. 11. The *Theological Hall of the Congregational Churches in Scotland*, Edinburgh, tracing its origin to the Congregational Academy founded at Glasgow in 1811. Congregational students are also supported by separate funds in the *Presbyterian College* at Carmarthen.

History. Modern Congregationalism had its rise in the discussions consequent upon the Eng-

lish Reformation. Its earliest advocates may properly be described as forming the radical wing of English Puritan Protestantism. But, besides the characteristics which they shared with the Puritan party, they showed several non-Puritan peculiarities. They denied the existence of a national church; they denied that church membership belonged to all baptized inhabitants of the kingdom; they held each church competent to regulate its own affairs. These peculiarities are so similar to those of the Continental Anabaptists, that some influence from Anabaptist sources in Congregational beginnings seems probable; but the dissimilarities existing between Anabaptists and Congregationalism are so considerable that this influence must have been indirect and unconscious. The founders of Congregationalism thought they were simply reproducing the system of the New Testament. Though a church essentially Congregational in organization existed in London as early as 1567, Congregationalism first came to significance in the work, and especially in the writings, of an erratic but earnestly reformatory young graduate of Cambridge, Robert Browne. Convinced that reforms such as he desired were unattainable within the Establishment, Browne organized a Congregational church at Norwich in 1580 or 1581. Compelled to seek refuge in Holland, Browne put forth several tracts in 1582, in which he urged the duty of immediate separation from the Church of England—a characteristic that gave the name "Separatists" to these early Congregationalists. He also set forth Congregational principles with great distinctness. By 1587 Congregational preaching by Henry Barrowe, a London lawyer, and John Greenwood, like Barrowe a Cambridge graduate, had gathered a following in London and brought upon its teachers and disciples the hostility of the government. The organization of a Congregational church in London, in 1592, was followed by the martyrdom, by hanging, of Barrowe, Greenwood, and John Penry, in 1593, and the exile of the greater portion of its membership, who found a home in Amsterdam, with Francis Johnson as their "pastor" and Henry Ainsworth as their "teacher."

Meanwhile a movement to secure earnest Puritan preaching was begun, about 1590, in the country region of their residence some 150 miles north of London, by Richard Clyfton, rector of Babworth, and William Brewster, a layman of Scrooby. Ecclesiastical opposition deepened the movement into Separation, and it was stimulated by the coming of Rev. John Robinson, in 1604, and Rev. John Smyth, apparently the following year. Churches were formed on the Congregational model at Scrooby and Gainesborough, probably in 1606, though the year is uncertain. Governmental opposition compelled both to seek refuge in Holland, and that of Scrooby, with Robinson as its "pastor" and Brewster as its "ruling elder," found a home at Leyden in 1609. Thence a minority of its membership emigrated to New England in 1620, founding Plymouth, now in Massachusetts, in December of that year. Here the Separatist colony passed through severe struggles successfully under the leadership of Brewster, and with William Bradford, Edward Winslow, and Myles Standish as its foremost men in civil affairs.

This "Pilgrim" emigration, as it was called, was Separatist, and Plymouth Colony numbered only about 300 in population by the close of its first decade. It would have amounted to little had it not been unexpectedly and greatly reinforced. The policy of Charles I impelled English Puritans to seek new homes across the ocean, and the result was the establishment of a Puritan colony at Salem in 1628. Acquaintance with the Plymouth Separatists brought recognition of the large similarity of their views, and when a church was formed at Salem, in 1629, it was organized on the Congregational model. The example thus set was followed in the formation of the succeeding Massachusetts churches. The flood tide of Puritan immigration ran strong till the political situation altered in England in 1640; and it brought to New England such men as John Winthrop in 1630, Rev. John Eliot in 1631, Rev. John Cotton in 1633, and Rev. Richard Mather in 1635, giving to Massachusetts a strong and numerous Congregational population. Slightly divergent views regarding the extent of the franchise, combined with an ardent desire to secure a fertile territory, and more personal motives, led emigrants from Massachusetts, under Rev. Thomas Hooker and John Haynes, to settle in Connecticut in 1634–36; and in 1638 another company, under Rev. John Davenport and Theophilus Eaton, founded New Haven. In 1643 the four Congregational colonies united in a confederacy for mutual protection.

The settlement of New England was followed by a time of planting and developing institutions. The right to vote was restricted in Massachusetts to church members from 1631 to 1664 and in New Haven from 1639 to 1665. No such limitation ever obtained in Plymouth or Connecticut colonies. Schools received the early attention of the settlers, and the founding of Harvard in 1636, followed by the establishment of Yale in 1701, bore witness to the desire for a learned ministry always characteristic of Congregationalism, and were evidences of that interest in education which marks the denomination to the present day. Congregational polity was expounded in treatises by Cotton, Hooker, and Mather, and authoritatively defined by the Cambridge Synod in 1648. Missionary labors among the Indians, begun in 1646 by John Eliot in Newton, Mass., and by Thomas Mayhew on Martha's Vineyard, were considerably successful, resulting, by 1674, in six churches, and bringing about 4000 savages in some measure at least under the influence of the gospel, though these results were robbed of permanance by the dying of the Indian race. The chief intellectual monument of this missionary activity is Eliot's Indian version of the Bible of 1663. The most important internal discussion of seventeenth-century New England Congregationalism was that regarding the "Half-Way Covenant"—the question being whether persons who had themselves been baptized in infancy because of their parents' church membership could in turn bring their own children to baptism when they themselves were subjects of no conscious regenerative change. The decision of a meeting of Massachusetts and Connecticut ministers at Boston in 1657, and of a convention of the Massachusetts churches in 1662, was that such baptized, but not consciously regenerate, parents could bring their children to baptism and transmit the church status they themselves possessed, but

could not come to the Lord's Table or vote in church affairs. Hence the nickname "half-way." Though never universally adopted, the "Half-Way Covenant" was practiced by most New England churches till about the opening decade of the nineteenth century.

Though the majority of the Puritan party in England remained Presbyterian during the seventeenth century and controlled the Westminster Assembly, English Congregationalism had five sturdy champions in that convention; and in the army, as well as among the people as a whole, it grew in favor as the struggle against the King continued. Under the sympathetic rule of Cromwell it reached its widest extension in seventeenth-century England. After the Restoration it suffered the disabilities imposed on Dissenters in general, until partially relieved by the Toleration Act of 1689. Yet, in spite of the labors of such men as Isaac Watts and Philip Doddridge, and the founding of "academies" for ministerial as well as general training, the course of English Congregationalism in the eighteenth century, like the religious life of England as a whole, was one of spiritual decline, until awakened by the new spiritual impulse that came forth from the great Wesleyan revival. Quickened thus, the Congregational churches of England grew in numbers throughout the latter half of the eighteenth century, awakened to fresh zeal for missionary service at home, and a new interest in missions abroad, and became increasingly conscious of their denominational unity and desirous that that unity should find expression.

In America the latter half of the seventeenth and the three opening decades of the eighteenth century saw a steady decline of the spiritual enthusiasm in which the churches of New England had been planted. New England life grew provincial in every respect. From this state of relative decadence the churches of New England were powerfully aroused by a series of "revivals" beginning at Northampton, Mass., under the ministry of Jonathan Edwards in 1734, and extending throughout New England in 1740–42, in connection with a visit of Rev. George Whitefield. The movement, known as the "Great Awakening," stirred the spiritual life of the churches profoundly, but was so accompanied by physical demonstrations and other evidences of excitement as to lead to much division of judgment as to its merits. Partly owing to this division, and partly in consequence of the distraction accompanying the struggle for the political possession of Canada and for American independence, the "Great Awakening" was followed by a period of comparative religious inactivity, lasting till about 1790.

The second half of the eighteenth century, however, witnessed the rise of a native modification of the historic Calvinistic theology—the "New England Theology"—under the leadership of Jonathan Edwards, father and son, of Samuel Hopkins, Joseph Bellamy, and Timothy Dwight. This theology won its way gradually and by 1800 was dominant in Connecticut and Vermont and largely represented in the rest of New England. Parallel to this Edwardean development, though with much smaller following, there ran a "Liberal" movement, represented especially in eastern Massachusetts, and corresponding to similar modifications of doctrine among the Dissenters, especially those of Presbyterian lineage, in England. This "Liberal" theology, already manifest in the preaching of Jonathan Mayhew and Charles Chauncy before the American Revolution, was little discussed during the excitement of that struggle; but when doctrinal debate again attracted attention and was stimulated by a great series of "revivals," beginning about 1790, it was found that a considerable number of Congregational churches had drifted out of sympathy with historic Christianity. Under the lead of men of ability like William Ellery Channing, the "Liberal" movement strengthened, while the cleavage between it and more conservative Congregationalism grew to separation. The year 1815, when "Unitarian" became the popular designation of the new "Liberal" denomination, may be assigned as the approximate date of the schism; though Harvard College had come under the recognized dominance of the "Liberal" party in 1805. The Unitarian division was almost strictly local, but wholly or partially involved about one-tenth of the Congregational churches then existing in the United States. The loss of Harvard College as an agency for ministerial training led the conservative majority of the churches to seek new methods of ministerial education. As a result, theological seminaries were opened at different places and times. See section *Theological Seminaries.*

Congregationalism entered Canada by way of Nova Scotia in 1753. There was a feeble church in Newfoundland as early as 1645, which died and was not revived, and Congregationalism did not reappear there until 1775.

The beginning of the nineteenth century was marked by a rapid broadening and deepening of the activities of American Congregationalism. The rise of home and foreign missions has already been indicated in speaking of the benevolent agencies of Congregationalism. With the settlement of the West, Congregationalism ceased to be confined to New England and the adjacent sections of New York. Its spread was at first slow, because of a distrust engendered by the Unitarian schism, as to its adaptability to meet frontier conditions, and a lack of denominational consciousness which led to ready affiliation with Presbyterianism. But through the efforts of men like Rev. Dr. Leonard Bacon, of New Haven, denominational consciousness was awakened; and, from the fourth decade of the nineteenth century, the planting of distinctly Congregational churches and colleges in the West has gone rapidly forward. This westward extension was greatly aided by the Albany Convention of 1852. After the Civil War Congregationalism entered the South, but has never had a relatively large following in that section of the United States.

Congregationalism during the nineteenth century has witnessed a gradual theological development. The Edwardean school was ably carried on in somewhat divergent directions by Nathaniel W. Taylor at Yale and by Edwards A. Park at Andover. By the middle of the century the influence of Horace Bushnell was becoming felt in a direction away from the Edwardeanism then dominant; and the last three decades have seen increasing welcome given to what is popularly termed "The New Theology." This tendency has met with strenuous opposition; but the division of feeling has at no time been sufficient really to threaten

the denomination with schism. Nineteenth-century American Congregationalism has had its conspicuous preachers in abundance, of whom Lyman Beecher and his son, Henry Ward Beecher, Charles G. Finney, and Richard Salter Storrs may be mentioned as illustrations. It has been ready to adopt new methods of Christian work—its most successful recent contribution being the "Young People's Society of Christian Endeavor," founded by Rev. Francis E. Clark in 1881. Its spirit is warmly missionary, and it desires to coöperate broadly with all who are trying to advance the Redeemer's Kingdom.

English Congregationalism during the last century has been marked by much the same traits; but its existence in the face of an ecclesiastical establishment has led it to emphasize the characteristic principle of independence more proportionately than American Congregationalism. Its struggle has been largely one for equality of privilege in education and exemption from disabilities. Its most important recent educational foundation is Mansfield College, Oxford, of which Rev. Dr. A. M. Fairbairn was principal from its opening in 1886 to 1909. The same tendencies to express denominational unity in organizations for mutual helpfulness have been manifest in England as in America, though in less marked degree. Their illustration in county associations and in larger unions has already been mentioned.

Statistics. The total number of Congregational churches in America in 1645 appears to have been 53. About 120 English Congregational churches were represented in the Savoy Convention of 1658. In 1760 Rev. Dr. Ezra Stiles enumerated the churches of this order in New England, to which region they were then almost exclusively confined, as 530. By 1816 American Congregationalism numbered about 1020 churches and not far from 100,000 communicants. The most recent statistics available (1912, in the *Year Book* of 1913) give the churches of the United States as 6064, ministers as 5944, members as 743,026, and Sunday-school enrollment as 675,677. Their benevolent contributions were $2,363,584, and their home expenditures $9,307,618. The eight Congregational seminaries in the United States had, in 1912–13, 489 theological students. The churches and preaching stations of Great Britain numbered 5036, ministers and local preachers 7752, and church members 491,142. Canada and Newfoundland reported 223 churches and preaching stations, with 12,572 members. Congregationalism in Australia and New Zealand counts 443 churches and preaching stations, with 22,999 members.

CONGREGATIONALISM IN 1912–13 (BASED ON STATISTICS IN THE "YEAR BOOK" OF 1913)

COUNTRIES	Churches Chapels and Stations	Members	Sunday-School Scholars
England and Wales	4,732	452,489	652,751
Scotland	216	35,991	35,148
Ireland	77	2,242	4,767
Channel Islands	11	420	499
Nova Scotia	26	752	651
New Brunswick	8	336	98
Quebec	30	2,802	2,160
Ontario and Northwest	143	8,351	5,289
American Zulu Mission	26	2,406	2,225
British Guiana	55	4,448	4,171
China	4	606	342
India	41	5,215	360
Jamaica	48	3,354	1,635
Japan	103	16,105	7,524
Natal	51	1,419	1,320
Newfoundland	16	331	362
New South Wales	85	5,283	8,007
New Zealand	44	3,799	4,755
Queensland	48	2,290	4,012
Sierra Leone	17	695	574
South Australia	84	5,133	5,044
Syria	1	83	....
Tasmania	47	968	1,654
Victoria	91	4,097	7,223
West Australia	44	1,429	2,427
West and South Africa	384	20,513	9,170
United States	6,064	743,026	675,677
Mission Sunday-schools	....	.....	41,553
American Board (foreign)	2,080	83,152	78,651
London Missionary Society	1,730	84,071	90,451
Totals	16,306	1,491,806	1,648,720

The foreign missionary activities of the United States and Canada in 1912–13 were represented by 615 missionaries, assisted by 4993 native laborers, carrying on missions in 113 foreign stations, with 629 churches organized, and an enrollment of 83,152 communicants, of whom 3625 had been added during the previous year. Statistics for the London Missionary Society, through which the outreaching work of the English Congregational churches is maintained, show that during 1912–13 it employed 474 missionaries, assisted by 7262 native laborers, in 97 stations, and ministering to 84,071 communicants, of whom 2144 were received during the year then closing.

Bibliography. The student who wishes to investigate the history of Congregationalism thoroughly will look for guidance to the bibliography of 7250 titles of publications relating to Congregationalism issued between 1546 and 1879, which was given by Rev. Dr. H. M. Dexter as an appendix to his *Congregationalism of the Last Three Hundred Years* (New York, 1880). So closely is Congregationalism interwoven with the origins of New England that any good history of New England gives much regarding its spread and workings. General sketches of American Congregationalism are those of Rev. Dr. A. E. Dunning, *Congregationalists in America* (New York, 1894); and Prof. Williston Walker, *A History of the Congregational Churches in the United States* (ib., 1894). The characteristics of Congregational religious life are treated by Rev. Dr. George Leon Walker, *Some Aspects of the Religious Life of New England* (Boston, 1897). The reader specially interested in the beginnings of Congregationalism will be aided by the work of Rev. Dr. Dexter, above cited; also, John A. Goodwin, *The Pilgrim Republic* (ib., 1888); Rev. Dr. John Brown, *The Pilgrim Fathers of New England* (London and New York, 1895); Prof. Edward Arber, *The Story of the Pilgrim Fathers* (London, 1897); Rev. Dr. Fred. J. Powicke, *Henry Barrow, Separatist* (ib., 1900). Henry M. and Morton Dexter, *The England and Holland of the Pilgrims* (Boston, 1905); Champlin Burrage, *The True Story of Robert Browne* (Oxford, 1906); and his *The Early English Dissenters* (Cambridge, 1912). The doctrinal peculiarities of American Congregationalism have been compactly sketched by Prof. George N. Boardman, *A History of New England Theology* (New York, 1899), and by Prof. Frank Hugh Foster, *A Genetic History of the New England Theology* (Chicago, 1907).

The best history of English Congregationalism is that of R. W. and A. W. W. Dale, *History of*

English Congregationalism (London, 1907). The five volumes of Rev. Dr. John Waddington, *Congregational History* (London, 1869–78; new ed., 1880), treat the story at much length to the date last mentioned. Contemporary English Congregationalism is well discussed by Rev. Dr. A. H. Bradford, *The Pilgrim in Old England* (New York, 1893). The story of Scotch Congregationalism is well and briefly told by Rev. James Ross, *A History of Congregational Independency in Scotland* (Glasgow, 1900).

The main documents relating to the polity and beliefs of Congregationalism are collected by Prof. Williston Walker, *The Creeds and Platforms of Congregationalism* (New York, 1893). Brief manuals of its usages are those of a committee of the National Council, entitled *The Council Manual for a Congregational Church* (Boston, 1896); of Rev. George M. Boynton, *The Congregational Way* (ib., 1902); and of the Rev. Asher Anderson, *Congregational Faith and Practice* (ib., 1906). For matters relating to national councils, consult the works of Rev. E. Lyman Hood, *The National Council of the Congregational Churches of the United States* (Boston, 1901), and of Rev. Asher Anderson, *National Council Digest* (ib., 1906). English and American Congregational statistics are given in their respective *Year Books*.

CONGREGATIONAL METHODIST CHURCH, The. A body formed in May, 1852, in Monroe Co., Ga., by ministers and laymen who had withdrawn from the Methodist Episcopal church and wished to establish a church with Methodistic doctrines, but giving the people a voice in their own government. In 1852 the first district conference was held and a Book of Discipline adopted; in 1855 the first general convention was held. Since 1881 many churches have joined the Congregational body, and in 1913 the Congregational Methodists reported 333 churches and 15,529 members. In government it is not strictly Congregational, since it has semiannual district conferences, annual State conferences, and quadrennial general conferences, and it is admissible to carry an appeal from one to another. It admits both white and colored persons, the latter being separately organized. A publishing house is maintained at Ellisville, Miss. The official organ is *The Messenger*. The only educational institution under the auspices of the denomination is the Atlanta Bible School. Consult *Religious Census of the United States* (1910).

CONGREGATION OF CLUNY. See Cluniacs.

CONGREGATION OF THE HOLY CROSS. See Holy Cross, Congregation of the.

CONGREGATION OF THE MISSION. See Lazarists.

CON'GRESS (Lat. *congressus*, conference, from *congredi*, to meet together, from *com-*, together + *gradi*, to step). In international affairs, an assembly either of sovereign princes or of delegates of sovereign states for the purpose of considering matters of common interest. In the United States, where the term has now a specific meaning as applied to the National Legislature (see United States), it had a similar origin, the first Congress being that of the delegates from the various British Colonies, who met on Oct. 7, 1765, for the purpose of considering their grievances. Previous to signing a treaty of peace, a meeting of plenipotentiaries usually takes place, to which the name of a congress is sometimes applied, though the term seems more properly to be reserved for those more important meetings at which extensive schemes of future policy are determined. The period of secular diplomatic congresses opened with the Congress of Münster and Osnabrück, which closed the Thirty Years' War by the Peace of Westphalia in 1648 (q.v.). Since then, omitting those diplomatic bodies whose object was simply to arrange terms of peace at the close of a war, the most important European congresses have been those of Vienna (1814–15), Paris (1856), Berlin (1878), and the International Peace Conference at The Hague (1899). An international "Pan-American" congress, to discuss industrial and commercial questions, was held at Washington, from October, 1888, to April, 1890. In the winter of 1901–02 a similar congress assembled at Mexico and discussed at great length the question of international arbitration. The international conference at Algeciras that defined the attitude of the Great Powers towards Morocco was held in 1905. See Berlin, Congress of; Paris, Treaties of; Vienna, Congress of.

CONGRESS, United States. The legislative branch of the Federal government of the United States. It was instituted by the Constitution, which prescribes its membership and defines its powers. It has no general legislative power, such as is enjoyed by the British Parliament and, in a lesser degree, by the legislatures of the several American States; but it has only such functions and authority as the Constitution, expressly or by necessary implication, has conferred upon it. Acting in conjunction with the President and the Federal judiciary, it exercises the sovereign power of the people of the United States in so far as that power has been committed to the central government.

Congress is composed of two "houses," or chambers—a Senate and a House of Representatives. It is not, however, as is generally assumed to be the case, modeled upon the British Parliament, with its House of Lords and House of Commons, nor is its bicameral form due to any general agreement on the part of the framers of the Constitution that that type of legislature was theoretically preferable to a legislature of a simpler type. The Continental Congress, under whose direction the War of the Rebellion was waged, had after the adoption of the Articles of Confederation, as before, only a single chamber. But this was not of a popular character, and it is not the House of Representatives, but the Senate, which represents it in the present Congress. These first American congresses represented not the people of the Colonies and States, but the Colonies and States themselves, and it was to preserve the weight and dignity of the States among themselves, and especially of the smaller and less populous States as against the larger and more influential ones, that the Senate was instituted as a counterweight to the popular branch of the National Legislature.

The Senate is composed of two Senators from each State, and its membership has accordingly varied from 22 in the first Congress (when 11 States constituted the Union) to 96 at the present time (1914). The Constitution, as amended in 1913, prescribes that Senators shall be chosen by the people of the several States for a term of six years, and constitutes them a permanent and continuing body by pro-

viding a method of classification, whereunder the term of one class shall continuously overlap that of another, the terms of one-third of the members expiring every two years. Senators must be 30 years of age and residents of the State for which they shall be chosen. The presiding officer of the Senate is the Vice President of the United States, but he has no part in its deliberations and no vote unless the Senators are equally divided. The rule of the Congress of the Confederation which preceded the Constitution, that the voting should be by States, each State represented having one vote, was not retained in the creation of the Senate, it being provided by the Constitution that each Senator shall have an individual vote. Senators receive a compensation fixed by Congress, of $7500 a year, with a small allowance for stationery and mileage.

The House of Representatives is not a permanent or continuing body, but its entire membership is renewed simultaneously every second year. Its members are chosen by popular vote, and it is provided that they shall be apportioned among the several States included in the Union according to their respective numbers. The Constitution, as adopted, provided that for the purpose of apportionment the population of a State should be determined by adding to the whole number of free persons three-fifths of the whole number of slaves. The basis of apportionment fixed by the Constitution for the first enumeration was one Representative for every 30,000 inhabitants, with the proviso that each State should have at least one Representative. The first House numbered 65, and successive enumerations and apportionments have varied the number of Representatives as follows: in 1793, 105; 1803, 141; 1813, 181; 1823, 213; 1833, 240; 1843, 223; 1853, 233; 1863 (during the Civil War), 243; 1873, 293; 1883, 325; 1891, 357; 1901, 386; 1910, 435. The basis of apportionment under the thirteenth census (1910) is one Representative to every 212,407 inhabitants. This furnishes the following representation for the several States:

Alabama	10	Nebraska	6
Arizona	1	Nevada	1
Arkansas	7	New Hampshire	2
California	11	New Jersey	12
Colorado	4	New Mexico	1
Connecticut	5	New York	43
Delaware	1	North Carolina	10
Florida	4	North Dakota	3
Georgia	12	Ohio	22
Idaho	2	Oklahoma	8
Illinois	27	Oregon	3
Indiana	13	Pennsylvania	36
Iowa	11	Rhode Island	3
Kansas	8	South Carolina	7
Kentucky	11	South Dakota	3
Louisiana	8	Tennessee	10
Maine	4	Texas	18
Maryland	6	Utah	2
Massachusetts	16	Vermont	2
Michigan	13	Virginia	10
Minnesota	10	Washington	5
Mississippi	8	West Virginia	6
Missouri	16	Wisconsin	11
Montana	2	Wyoming	1

It is further provided by the Constitution that Representatives shall be at least 25 years of age and residents of the States in which they are chosen. They receive an annual salary, determined by Congress, the amount of which at present is $7500. The House of Representatives chooses its own presiding officer, called the Speaker, from among its members. He receives a salary of $12,000. In the process of time this has become an office of great power and importance, ranking, perhaps, next after that of the President in influence and authority. This aggrandizement of the Speaker of the House of Representatives has resulted from the control over legislation, which, as the leader of the dominant political party in the House and under the committee system which has come to prevail in Congress, he has gradually acquired. He does not, upon becoming Speaker, lose his right to vote or otherwise to participate in the proceedings of the House.

Under the Constitution the two houses of Congress have in most respects an equal voice in legislation, the only important exception being the requirement that all revenue bills shall originate in the popular branch of the Legislature. Each house is made the sole judge of the elections, returns, and qualifications of its own members, though the times, places, and manner of holding elections for Senators and Representatives are left to the legislatures of the several States, until provided for by law of Congress.

The ample legislative powers of Congress, which are enumerated in Sec. 8 of Art. I and Sec. 3 of Art. IV of the Constitution (q.v.), are limited by the veto power of the President. Every bill intended to have the force of law must be submitted to him, after passing the two houses separately, and, if vetoed by him, will fail to take effect, unless passed a second time and by a two-thirds vote of each house. If any bill shall not be returned by the President within 10 days after it shall have been presented to him, it shall become a law in like manner as if he had signed it, unless its return be prevented by the adjournment of Congress. The Constitution provides for an annual meeting of Congress on the first Monday in December unless a different date is duly appointed by law. The President is empowered by the Constitution to call an extra session of Congress or of either house.

In addition to their legislative powers, each of the two houses of Congress is endowed by the Constitution with important functions in the government. The House of Representatives has the sole power of impeachment, and the Senate the exclusive authority to try impeachments. In addition to this, the Senate exercises, in conjunction with the President, important executive powers in the ratification of treaties and in the confirmation of his appointments to all important offices of the government, including the members of his cabinet, the judges of the Supreme and other Federal courts, and even officers of the army and navy.

The large increase in the number of Representatives and the growth in volume and complexity of the matters with which they have to deal have necessitated the reference of all bills to standing committees. These conditions have made it impossible for the House to give deliberate consideration to any but the most important measures of legislation, and it follows that the real process of legislation—the discussion, the sifting, the shaping of bills—is done mainly in the committee rooms. The committees, therefore, being deliberately made up with reference to the carrying out of party policy, have acquired virtual control over the legislation of the House, their action on bills submitted to them being usually final and conclusive.

The "committee system," as it is called, was

adopted by the House of Representatives at an early period of its history. The members of the 57 standing committees are chosen by the majority and minority parties in caucus, subject to the approval of the House. These committees vary in size and are made up of members of all parties, the dominant party having an effective majority in each. The principal committees of the House are those on Rules, Appropriations, Ways and Means, Foreign Affairs, Judiciary, Commerce, Elections, Military Affairs, and Naval Affairs. The Senate, because of its smaller membership and its tradition of dignity and deliberation, has to a larger extent than the House retained the character of a deliberate assembly, and a much larger part of the work of legislation is still actually performed by it. It has also adopted the committee system; but its committees perform the more legitimate function of sifting and shaping the bills for their more convenient consideration by the Senate. They are appointed by vote of the Senate and, like those of the House, hold office during the life of the Congress for which they are chosen. The most important of the Senate committees is that on Foreign Affairs, though those on Appropriations, Ways and Means, the Judiciary, and on Military and Naval Affairs, also play an important rôle in shaping legislation. For a history of the United States Congress, see UNITED STATES.

The leading authorities on the position of Congress in the American scheme of government are: Woodrow Wilson, *Congressional Government* (Boston, 1885), and Bryce, *The American Commonwealth* (London, 1893). See also the authorities referred to in CONSTITUTION OF THE UNITED STATES.

CONGRESSIONAL CEMETERY. A handsome cemetery near Washington containing monuments to such members of Congress as have died during their terms of office. See WASHINGTON.

CONGRESSIONAL LIBRARY. See LIBRARY OF CONGRESS.

CONGRESSIONAL RECORD. The journal of the United States Congress. Up to 1799 the Senate sat with closed doors, and no reports of its proceedings were published. Since that time an official record of the proceedings of each house is required to be published. The so-called "executive sessions" of the Senate are secret. The journal now known as the *Congressional Record* was called from 1789 to 1824 the *Annals of Congress;* from 1825 to 1837 the *Register of Debates;* from 1834 to 1874 the *Congressional Globe.* Since 1875 its present name has been used. The *Record,* however, is not an accurate transcript of the actual proceedings. Members are allowed to revise their remarks before they appear in type; and they also frequently receive from the House "leave to print" speeches which they have never delivered, but which appear in the *Record* as though a part of the proceedings of the session.

CONGRESSMAN AT LARGE. A member of the United States House of Representatives elected by the voters of the entire State, and not, as is customary, by those of congressional districts. Such Congressmen are elected under the apportionment acts of Congress, and the election of a Congressman at large is merely a device adopted to give each State the proper number of representatives under the acts until the State should be redistricted. Some States have had two such members, and several one. According to a congressional Act of 1911, the ratio of congressional representation is one Representative for every 212,407 of the population.

CONGREVE, kŏn'grēv, RICHARD (1818–99). An English philosophical writer and essayist, born at Leamington. He studied under Arnold at Rugby and afterward at Wadham College, Oxford, of which he became successively scholar, fellow, and tutor, but resigned after having become definitely a disciple of Comte. In 1855 he published a good edition of Aristotle's *Politics* (1855). Among his other publications are: *The Roman Empire of the West* (1855); *The Catechism of Positive Religion,* trans. from Comte (1858; 3d ed., 1891); *Elizabeth of England* (1862); *The Irish Crisis* (1881); *Historical Lectures* (1902). He was early one of the foremost exponents of English Positivism.

CONGREVE, WILLIAM (1670–1729). A brilliant English dramatist. He was born at Bardsley, Yorkshire, and educated at Kilkenny, and at Trinity College, Dublin. He returned to England and was entered at the Middle Temple, but did not take kindly to law. His first publication was a novel, entitled *Incognita,* really a dramatic intrigue put into narrative. His first play, *The Old Bachelor,* was produced at Drury Lane in January, 1693, and its success was remarkable. In November he brought out *The Double-Dealer,* which was a comparative failure; but his comedy, *Love for Love,* performed in 1695, was a great success and brought to its author money and fame. *The Mourning Bride,* a blank-verse tragedy, was acted in 1697. Its success exceeded even that of his comedies, but it has long since been forgotten. Three years after, he produced a comedy, entitled *The Way of the World,* which failed completely and disgusted him with the theatre. In other respects Congreve was a fortunate man. He held various offices, which together yielded him an income of £1200. Congreve affected to despise his theatrical triumphs and cultivated the manners of the fine gentleman—an eccentricity which laid him open to rebuke when he was visited by Voltaire. In his later days he was afflicted with gout and blindness. He died in London, 1729, and was buried in Westminster Abbey. As a comic dramatist, Congreve has been variously estimated. He was gross, but his age was gross. His plots are intricate, but they were so intended. His world is composed of wives, gallants, and husbands—and the husbands are hoodwinked. The characters have no heart, no generosity, but they play their parts brilliantly. Indeed, the wit of Congreve's dialogue is unsurpassed in our later drama. Famous essays on Congreve and the art he represents are: Hazlitt, *Lectures on English Poets and English Comic Writers* (London, 1846); Lamb, "On the Artificial Comedy of the Last Century," in *Essays of Elia* (ib., 1875); Leigh Hunt, critical notice, prefixed to *The Dramatic Works of Wycherley, Congreve,* etc. (1849), which he edited; Macaulay, review of Hunt, entitled *Comic Dramatists or Leigh Hunt* (London, 1848). Consult: Congreve's *Comedies,* ed. Ewald (London, 1887); id., ed. Street (ib., 1895); Gosse, *Life of Congreve* (ib., 1888), which contains a bibliography by J. P. Anderson, and "William Congreve" (New York, 1913), selected plays edited by William Archer in *Masterpieces of the English Drama Series.*

CONGREVE, Sir William (1772–1828). An English engineer, the inventor of the Congreve rocket (1805). (See Artillery.) He was educated at Trinity College, Cambridge, received a commission in the artillery, and became controller of the Royal Laboratory at Woolwich. He became a member of Parliament for Gatton in 1812 and later for Plymouth in 1820. His invention brought him many honors and the friendship of George IV.

As a result of Congreve's invention, rockets with a head forming a projectile became part of the equipment of the British army, and, though later supplanted by the Hale rocket, the Congreve rocket was used as late as 1860. There were four general types—a three-pounder, six-pounder, 12-pounder, and 24-pounder. The rocket was formed by a case of sheet iron to which was secured a cylindrical conical head forming the projectile, and the latter, being hollow, could be filled with a bursting charge, if desired, with a fuse ignited by the main charge of the rocket. At the lower end of the iron case which carried the rocket charge there was a base provided with vents and a socket for a stick. The rocket was fired from rocket tubes mounted on a tripod. These rockets were large and heavy, and, while they did little direct damage, by their brilliancy and noise in flight when first introduced they exercised an important moral effect. The Congreve rocket was invented about 1805 and was used as early as 1807. On several occasions these rockets were fired against the French fleet, and at the battle of Leipzig they served to frighten the French and throw a portion of them into confusion, but otherwise did no damage.

Sir William Congreve is also famous for a celebrated and ingenious attempt to realize perpetual motion, based on the capillary action of water and absorbent material such as a sponge, which was mounted on an endless band passing over an inclined plane. This was surrounded by a band of links of lead which served to squeeze out the water from one side after it was absorbed on the other. His publications include: *The Congreve Rocket System* (1807; Ger. trans., 1829); *Mounting of Naval Ordnance* (1812); *Description of the Hydropneumatical Lock* (1815); *A New Principle of Steam Engine* (1819).

CON'GRUENCE (Lat. *congruentia*, from *congruere*, to agree). In geometry, plane figures which can be superposed so as to coincide throughout are said to be congruent. This is the Euclidean definition of equality and indicates both equality of area and similarity of form. The symbol $\cong$ for congruence signifies these two properties, being composed of the old letter *s* for (*similis*) and the sign of equality. The symbol is more common in Germany than elsewhere. In general it is not necessary actually to superpose the figures. If the equality of certain parts is known, the equality of the other parts can be established; e.g., if two sides and the included angle of one triangle are equal to the corresponding parts of another, the triangles are congruent, since the remaining parts are also equal and similarly placed. Congruence is related to axial and central symmetry (q.v.) and constitutes an important theory of geometry. Congruency, in modern geometry, relates to a system of elements satisfying a twofold condition. Of all possible lines, those particular lines which satisfy a given condition are together called a complex, and those which satisfy two conditions are called a congruency; e.g., all lines which intersect a given circle form a complex, and all which intersect two given circles form a congruency. The order of a congruency is the number of its rays coplanar with a given plane; the class of a congruency is the number of its lines concurrent in a given point.

In the theory of numbers two integers are said to be congruent with respect to a third, called the "modulus," when their difference is exactly divisible by the modulus. Thus, 12 and 7, 27 and 12, are congruent with respect to 5 as a modulus, since (12—7) and (27—12) are divisible by 5. This relation is expressed thus: $12 \equiv 7 \pmod 5$, $27 \equiv 12 \pmod 5$, and, in general, $a \equiv b \pmod c$. When two integers are congruent with respect to a third, either is called the residual of the other with respect to this modulus. A few fundamental theorems of congruences are: (1) If $a_1 \equiv a'_1$, $a_2 \equiv a'_2$, . . . $a_n \equiv a'_n$ (to the same modulus), then $a_1 + a_2 + \ldots a_n \equiv a'_1 + a'_2 + \ldots a'_n$. (2) If $a \equiv a'$, then $na \equiv na'$. (3) If $a \equiv a'$, $b \equiv b'$, then $ab \equiv a'b'$. (4) If $a \equiv a'$, then $a^n \equiv a'^n$. (5) If $a_1 \equiv a'_1$, $a_2 \equiv a'_2$, . . . , then $G(a_1, a_2, \ldots) \equiv G(a'_1, a'_2, \ldots)$, G designating any rational integral function of a_1, a_2, ...

In algebra the congruence of functions is considered in addition to the congruence of numbers. When the elements considered are of the form $ax + b$, the congruence is called linear. When the elements are of the form $ax^2 + bx + c$, the congruence is called quadratic, and so on. To solve a congruence is to find the values of the unknown quantity which satisfy the congruence. Thus, to solve the quadratic congruence $x^2 \equiv 39 \pmod{49}$ is to find the number whose square gives a remainder 39 when divided by 49. These numbers are 23, 26.

Bibliography. As to geometry, consult: Henrici, *Geometry of Congruent Figures* (London, 1888); Plücker, *Neue Geometrie des Raumes gegründet auf die Betrachtung der geraden Linie als Raumelement*, ed. by Clebsch (Leipzig, 1868); and as to algebra, Salmon, *Modern Higher Algebra* (Dublin, 1876); Pund, *Algebra mit Einschluss der elementaren Zahlentheorie* (Leipzig, 1899); Pascal, *Repertorium der höheren Mathematik* (Ger. ed., ib., 1902), with bibliography; Weber and Wellstern, *Encyklopädie der elementaren Algebra und Analysis* (ib., 1903) and *Encyklopädie der elementaren Geometrie* (2d ed., ib., 1907), also with bibliography.

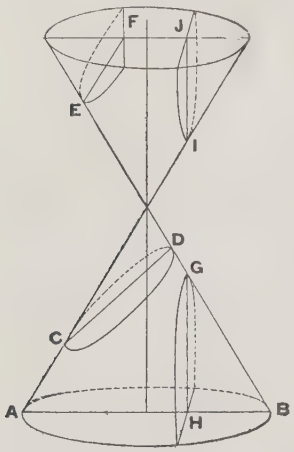
CONI, kō'nē. See Cuneo.

CONIBO, kō-nē'bō. An important tribe of Panoan stock (q.v.), ranging along the middle Ucayali River, northeastern Peru. For a long time they repelled the missionaries, but are now completely Christianized. In their daily life, however, they cling to their old customs, although they learn Spanish readily and are good house servants. They live chiefly by boating, fishing, and gathering sarsaparilla. They paint their faces in red and blue and wear silver rings in their lips and noses. Consult Galt, in *Report of the Smithsonian Institution* for 1877.

CONICEIN. See Coniine.

CON'IC SECTIONS. Curves which may be formed by various sections of a cone (q.v.). In the figure, which represents the two nappes of a right circular cone, *AB*, a section perpendicular to the axis, is a circle; *CD*, a section oblique to

the axis, cutting all the elements of the conical surface on one side of the vertex, is an ellipse; *EF*, a section parallel to the element *CI*, is a parabola; and *GH*, *IJ*, a section cutting both nappes, gives the two branches of a hyperbola. These curves were discovered by Menæchmus in the fourth century B.C. and were known for a long time as Menæchmian triads. The Greeks extensively cultivated the theory of the conic sections. Archimedes contributed to the knowledge of the subject by determining the area of the parabola and by other discoveries. The great work of Apollonius (q.v.) was the classic Greek treatise on the subject. He studied conic sections by the aid of pure geometry, in somewhat the same manner that Euclid (q.v.) treated the elements of the science. Since the invention of coördinate geometry (see ANALYTIC GEOMETRY), new interest has attached to these curves, and the properties of conics form the basis of instruction in analytic geometry. Indeed, the subject is not often treated by pure geometry at present, the analytic method being much simpler. See CIRCLE; ELLIPSE; PARABOLA; HYPERBOLA; CURVE; MATHEMATICS.



CONID'IA (Neo-Lat. nom. pl., from Gk. *κόνις*, *konis*, dust). Aërial spores of fungi, formed in chains or clusters upon a special branch of the mycelium (*conidiophore*). They are formed by the rounding off of a cell or a succession of cells at the tip of a branch, as distinct from the formation of spores within a spore case (*sporangium*). Conidia behave sometimes as spores (producing new plants directly) and sometimes as sporangia (producing and discharging spores). See FUNGI.

CONID'IOPHORE (Neo-Lat. *conidium* + Gk. *-φόρος*, *-phoros*, from *φέρειν*, *pherein*, to bear). The special branch of the body of a fungus (*mycelium*) which bears conidia (q.v.). See FUNGI.

CONIF'ERÆ (Lat. nom. pl. of *conifer*, cone bearing, from *conus*, cone, Gk. *κῶνος*, *kōnos* + *ferre*, to bear). The greatest of the four living groups of gymnosperms. The species are all trees or shrubs and are characteristic of the temperate regions, being almost entirely absent from the tropics except at high altitudes. Prominent representatives of the group are the pines, spruces, hemlocks, firs, larches, cedars, cypresses, redwoods, junipers, arbor vitæ, and yews. The habit of the trees is characteristic, a central shaft extending continuously to the very top, while the lateral branches spread horizontally, usually reduced in length towards the top of the tree, resulting in a conical outline. Another peculiar feature is the "needle leaf," which seems to be poorly adapted for foliage. It is very slender and firm, being well organized to endure cold. In some of the conifers, however, as in species of *Podocarpus*, the leaves are quite broad and flat; while in others, as in the arbor vitæ, they consist of closely appressed and overlapping disklike bodies. As the leaves have no regular period of falling, the trees are always clothed with them and are commonly called evergreens. There are a few exceptions to this evergreen habit, however, as in the case of the common larch or tamarack, which sheds its leaves every season. The branches of conifers are apt to occur in two forms, as may be seen in the pines. There are the elongated axes, which bear only scales, known as the long shoots; and also short, spurlike, dwarf branches, which bear the clusters of needle leaves. This disposition of the foliage leaves is by no means common to all conifers or even to all ages of the pines. In many conifers, as in spruces and in seedling pines, the needles occur on the long shoots. The structure which gives name to the group is the conelike strobilus which bears the seeds and which sometimes becomes very large. This, when mature, consists of heavy overlapping scales, at the base of which, upon the upper side, the seeds are found. The strobili which are made up of the stamens are never so prominent or permanent and hence are not usually noticed. The pollination of conifers is effected by the wind, and hence the pollen is very light and powdery and is produced in enormous quantities. In the pines the pollen grains are assisted in this wind transportation by the development of a pair of wings, which are outgrowths from the outer coat of the spore. Sometimes strong winds carry the pollen far from the forests which produce it, and the fall of this yellow powder in places in which the phenomenon is rare gives rise to accounts of "showers of sulphur."

Structure. The tissues of the stems of conifers are very characteristic. The woody bundles are arranged to form a hollow cylinder, as in the dicotyledons, and hence are able to increase in diameter during each growing season. It is only the primitive bundles, however, which are made up of true vessels. All of the secondary bundles, which form the whole mass of wood, consist of tracheids, i.e., thick-walled cells resembling true vessels, but not fitted together end to end so as to form more or less continuous vessels. These tracheids are also distinguished, as in all gymnosperms, by bearing upon their walls bordered pits, i.e., thin spots which appear to be bounded by two concentric circles. They are also packed together very closely and with remarkable regularity, so that the wood is very uniform and fine-grained, and hence easily split.

Classification. There are two great families of conifers, the Pinaceæ and the Taxaceæ. The former has true cones, by whose scales the ovules are concealed, and whose seeds ripen dry. In general, the cones ripen dry and hard, but sometimes, as in junipers, they become pulpy, the whole cone forming the so-called "berry." This family (Pinaceæ) is much the larger one, and contains four well-marked tribes. Chief among these are the Abietineæ, containing the pines, spruces, hemlocks, firs, larches, etc., the genus *Pinus* with its 70 species being by far the largest genus of conifers. The Cupressineæ contain the various cypresses and cedars; the Taxodineæ contain the bald cypresses, redwoods, and their allies; while the Araucarineæ include the Araucarian or Norfolk pines

of the Southern Hemisphere. The other family, the Taxaceæ, has exposed ovules, and the seed either ripens fleshy or has a fleshy investment. It includes two tribes—the Podocarpineæ, genera of the Southern Hemisphere (the genus *Podocarpus*, with 40 species, being the second largest of the conifers), and the Taxineæ, including the yews (*Taxus*) and their allies.

Some of the conifers, as the pines and junipers, are very widely distributed, while others, like the gigantic redwoods (*Sequoia*) of California and the bald cypress (*Taxodium*) are now very much restricted. The greatest displays of much restricted ("endemic") genera occur in the China-Japan region and in the Australasian region.

Fossil Forms. Conifers are certainly very ancient, for undoubted fossil remains occur from the Permian on, and the total amount of fossil material is enormous. This material was named first upon the basis of external appearance, and the literature of paleobotany is full of names suggestive of affinities with living genera. It has been found that superficial resemblances are misleading, and that even leaf-bearing twigs and cones cannot be relied upon to determine affinities. For example, a number of Cretaceous conifers were referred with confidence to the genus *Sequoia* which have now been discovered to be Araucarians. In recent years the development of our knowledge of vascular anatomy has given a means of determining conifers such as was never possessed before. As a consequence, the enormous amount of Mesozoic material is beginning to be understood. In outlining the fossil history of Conifers, it is necessary to consider the six tribes separately, for they are the real units of conifer classification.

In 1901 competent opinion decided that there was no sure evidence of the Abietineæ (pines and their allies) below the Cretaceous. Later investigations not only discovered pines in the Jurassic, but also discovered that they were already differentiated into their two main series. More recently undoubted pines were discovered in the Triassic of Sweden, so that at present the Abietineæ can be traced to the lowest Mesozoic in a position to be connected with the Paleozoic gymnosperms. Modifications in character can be traced from the living pines through the Cretaceous pines and the still more ancient *Prepinus* to the Paleozoic Cordaitales. It is evident, therefore, that the Abietineæ are as old as any tribe of conifers can be, and that *Pinus* is its oldest genus.

The Araucarineæ (Araucarians) are rival claimants with the Abietineæ for antiquity, and the question as to the relationship of these two tribes is under discussion. It is now known that there existed an extensive Araucarian flora during the Mesozoic, and that this was in all probability the dominant type of conifers at that time. The Araucarians ranged from Greenland to Patagonia in one hemisphere, and from Spitzbergen to Cape Colony in the other, but apparently became almost extinct at the opening of the Tertiary, and are now restricted to South America and the Australasian region, having disappeared from North America, Europe, Africa, and practically all of Asia. In our own country the Atlantic coastal plain evidently supported during the Mesozoic an abundant Araucarian vegetation, and many of the forms that had been referred to other tribes upon superficial evidence have proved to be Araucarians. An abundant and world-wide Araucarian flora during the Jurassic period would suggest the existence of the tribe in much earlier times, and the evidence is accumulating that the Araucarians existed during the earliest Mesozoic, relating them also in time with the Paleozoic Cordaitales. The general impression that the Araucarians are the oldest of conifers seems to have arisen from the abundance of the peculiar Araucarian type of wood in the Paleozoic. This has since been discovered to belong to the Paleozoic group Cordaitales, so that there is no evidence at present that the Araucarians existed during the Paleozoic. There are three alternatives under consideration as to the relationship that exists between Araucarineæ and Abietineæ: either (1) the Araucarineæ were derived from the Abietineæ near the beginning of the Mesozoic; or (2) the Abietineæ were derived from the Araucarineæ at the same early period; or (3) the two tribes originated independently from the Cordaitales.

There is no doubt that the remaining four tribes are much younger than the two just considered. The Taxodineæ (bald cypress, *Sequoia*, etc.) are not known to have existed before the end of the Cretaceous. Claims have been made for the occurrence of *Sequoia* in the Lower Cretaceous and even in the Jurassic, but much doubt has been thrown upon these determinations by the fact that a number of Mesozoic sequoias have proved to be Araucarians. In this state of uncertainty the only safe conclusion is that the Taxodineæ are not older than the Cretaceous, and that the most certain remains are those of the Tertiary. The same statement may be made for the Cupressineæ (cypress, junipers, etc.), for although cypress-like twigs and cones have been described from the Jurassic, there is no reliable evidence of the tribe earlier than the Upper Cretaceous. There is general agreement that these two tribes were derived from the Abietineæ during the course of the Mesozoic.

The two remaining tribes are the Taxineæ (yews, etc.) and the Podocarpineæ (podocarps). Neither of these tribes has been recognized farther back than the Cretaceous, and, so far as this negative evidence can be relied upon, they are comparatively modern tribes among the gymnosperms, certainly much younger than the Abietineæ and Araucarineæ. It is entirely possible that older representatives of these tribes existed, and that they have not been recognized among coniferous remains. The present geographic distribution of the two tribes is sharply contrasted, the podocarps belonging almost exclusively to the Southern Hemisphere and the taxads as exclusively to the Northern. This associates the podocarps with the Araucarians, and the taxads with the other tribes of conifers. It is altogether probable that this association also indicates the phylogenetic connections.

Bibliography. Solms-Laubach, *Fossil Botany* (Oxford, 1891); Scott, *Studies in Fossil Botany* (London, 1909); Coulter and Chamberlain, *Morphology of Gymnosperms* (Chicago, 1910).

CONIINE, kō′nī-īn (from Lat. *conium*, Gk. *κώνειον, kōneion*, hemlock), $C_8H_{17}N$. The active alkaloid principle of hemlock, the seeds of the spotted hemlock plant (*Conium maculatum*, Linné). Being a volatile substance, coniine may be readily obtained from the seeds by distilling with water which contains a little soda in solution; coniine then passes over with the water in the form of a yellowish oil, but, when purified by

redistillation, it is obtained as a colorless, transparent, oily liquid having a penetrating hemlock-like odor, communicating a burning sensation if applied to the tongue and acting as a very energetic poison. It has a powerful alkaline reaction and precipitates metallic oxides from many salts. Strong sulphuric acid causes its compounds to assume first a purple-red and then an olive-green color, while nitric acid gives a blood-red color that fades into an orange. It is moderately soluble in water, its solutions having the property of turning the plane of polarized light to the right. It is sparingly soluble in carbon disulphide, but mixes in all proportions with alcohol. If pure, it boils at 167° C. The coniine sold commercially contains small amounts of j-conicein, an alkaloid closely allied to coniine and having the formula $C_8H_{15}N$. Coniine may be freed from conicein with the aid of ordinary dextrotartaric acid.

The chief physiological effect of coniine is a powerful depression of all motor nerves, beginning at their periphery and gradually ascending to the spinal cord. As a result, all motion, voluntary and reflex, is paralyzed, although the muscles are not affected. This leads to enfeeblement of the respiration and finally causes death by asphyxia. The symptoms of coniine poisoning are increasing heaviness in the legs and feebleness in the arms, dimness of vision, dilated pupils, difficulty in swallowing and breathing, and, finally, loss of the voice. As coniine has no action on the brain, consciousness is preserved until the end. The following illustration will give an idea of the rapidity of its action: One drop placed in the eye of a rabbit killed it in nine minutes; three drops employed in the same way killed a cat in a minute and a half; while five drops poured into the throat of a small dog began to act in 30 seconds, and in as many more motion and respiration had ceased. In a case of coniine poisoning emetics and the stomach pump should be employed as early as possible; the patient's feet should be kept warm, a stimulant injected subcutaneously, and artificial respiration employed. Coniine is but rarely used as a therapeutic agent in medicine; it is extremely doubtful whether it has any useful effect at all, except perhaps in spasmodic diseases, like whooping cough, lockjaw, or epilepsy. Chemically coniine has been shown to be the dextrorotary modification of a-propylpiperidine. The artificial preparation of coniine was the first synthesis of an optically active alkaloid. See ALKALOIDS; HEMLOCK.

CO'NINCK. See KONINCK.

CON'INGSBY, or THE NEW GENERATION. A novel by Benjamin Disraeli (1844).

CO'NINGTON, JOHN (1825–69). An English classical scholar, born at Boston, Lincolnshire. He studied at Rugby, under Dr. Arnold, in 1838–43, and at Magdalen College, Oxford, in 1843–46, and in 1846 became a scholar of University College. In 1849 he read law with much unwillingness for six months, at the London Inns of Court, and thereupon returned to the university. He contributed articles to the *Morning Chronicle* of London during 1849–50. In 1854 he was elected to the chair of the Latin language and literature at Oxford, that professorship having just been founded by Corpus Christi College. His tenure of the post, continued until his death, was markedly successful, and his "imposing personality" extended his influence far beyond his large circle of immediate pupils. His interests in connection with Latin studies were comparatively restricted. He cared little for ancient history, antiquities, or for many authors, even such great writers as Lucretius, Cæsar, Livy, and Cicero. But as a minute and careful interpreter of the more strictly literary aspects of Vergil, Horace, and Persius, and as an accurate, fluent, and generally very readable translator of all three, he gained a justly high repute. His translation (1866) of the *Æneid* in the ballad metre of Scott, though questioned by scholars as a representation of the manner of Vergil, is a vital piece of work and has been much read. The renderings (1863) of the *Carmina* of Horace, and in particular of the *Saturæ, Epistolæ,* and *Ars Poetica* of the same author (1869), won the critical esteem of the learned. His most important work is his edition of Vergil, begun in conjunction with Goldwin Smith, and finished by Prof. Henry Nettleship (*P. Vergill Maronis Opera—The Works of Virgil, with a Commentary,* 3 vols., 1858–70; 4th ed., 1881–84). His edition of Persius, with a remarkably idiomatic prose translation, appeared in 1872 (twice revised by H. Nettleship). He was also a Greek scholar of fine attainments and knew by heart the dramas of Æschylus, whose *Agamemnon* and *Choëphori* he edited (the former, with a verse translation and notes, 1848; the latter, 1857). Consult *The Miscellaneous Writings of John Conington,* ed. by J. A. Symonds (London, 1872), which contains a memoir by Prof. H. J. S. Smith.

CONINXLOO, kō'nĭŋks-lō'. A family of Flemish painters, of whom the most celebrated was GILLES III VAN CONINXLOO (1544–c.1607). He was born at Antwerp and studied under Pieter Coek, Lenaert Kroes, and Jan Mastaert. He practiced his art in France, but in 1587, on account of religious persecution, emigrated to Frankenthal and passed his later life in Amsterdam. Recent criticism reveals him as one of the most important Dutch landscape painters of the transition from the sixteenth to the seventeenth century. His development can be clearly followed in such pictures as "The Judgment of Midas" (Dresden) for the early period; two landscapes in the Ambrosiana, Milan—"Latona" (Hermitage, St. Petersburg), and a "Landscape with Venus and Adonis," showing his progress at Frankenthal; and a number of forest scenes with hunters or shepherds (Liechtenstein Gallery, Vienna, Stuttgart, Strassburg, Graz), illustrating his last manner. Martin van Cleef is said to have painted many of the figures for his landscapes, most of which were engraved by Nicolaes di Bruyn and Londerseel. Coninxloo exercised a strong influence on Jan Bruegel, Schonbroeck, Savery, and other Flemish and Dutch landscape painters of the transition period.

CO'NIUM. See HEMLOCK.

CON'JUGAL RIGHTS. The rights which a husband or wife possesses to the companionship, society, service, and affection of the other. For any unlawful invasion of these rights by a third party, the injured spouse has a claim against the wrongdoer. One who alienates the affection of a wife from her husband is liable to him in damages; and in many of the United States the same liability is incurred by a woman who alienates a husband's affections from his wife. A spouse who violates conjugal rights may thereby afford the other a valid ground for divorce. Such misconduct, however, does not give to the innocent spouse the right to inflict chastisement, or

to imprison the offender, or to obtain a decree for restoration of the conjugal relation. Both in England and in the United States the courts have declared that they have no jurisdiction to compel cohabitation where one party to the marital relation withdraws from the society of the other without justifiable cause, nor to enforce a restitution of conjugal rights withheld. In England, however, an ancient action, known as a suit for the restitution of conjugal rights, may still be maintained, but its only consequence is to furnish to the successful plaintiff grounds for a judicial decree of separation from the defendant. See COHABITATION; HUSBAND AND WIFE; MARRIAGE; DIVORCE; and authorities there referred to.

CONJUGA'TÆ, or POND SCUMS. See ALGÆ; CHLOROPHYCEÆ.

CON'JUGATE (Lat. *conjugatus*, p.p. of *conjugare*, to join together, from *com-*, together + *jugare*, to yoke, from *jugum*, yoke; connected with Gk. *ζυγόν*, *zygon*, OChurch Slav. *igo*, Lith. *jungus*, Goth. *juk*, Icel. *ok*, AS. *geoc*, Eng. *yoke*, OHG. *joh*, Ger. *Joch*, Skt. *yuga*, yoke). A term signifying "united in pairs" and having various uses in mathematics. Conjugate *roots* are numbers, real or imaginary, such as $a + \sqrt{b}$ and $a - \sqrt{b}$, or $a + bi$, $a - bi$, satisfying a given equation. (See COMPLEX NUMBER.) Conjugate *angles* are any two angles whose sum is 360°, as 10° and 350°, 400° and −40°, 180° and 180°. Conjugate *points* with respect to a conic are points each of which lies on the polar of the other. (See CIRCLE.) A conjugate *hyperbola* is one which has for its transverse and conjugate diameters the conjugate and transverse diameters of a given hyperbola. The equations of an hyperbola and its conjugate hyperbola are related thus: If $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is the equation of the given hyperbola, then $\frac{x^2}{a^2} - \frac{y^2}{b^2} = -1$ is the equation of its conjugate. Conjugate *lines*, with respect to a conic, are lines each of which passes through the pole of the other. Conjugate *axes* or diameters of a conic are diameters which are conjugate lines with respect to the conic. Conjugate *triangles* with respect to a conic are triangles such that the sides of each are the polars of the vertices of the other and the vertices of each are the poles of the sides of the other. Conjugate *points* in a harmonic range are a pair of points harmonically separating two others. Thus, if A, P, B, Q, are four collinear points such that $AP : PB = AQ : BQ$, P and Q are called harmonic conjugates. Similarly in a harmonic pencil of four rays O ($APBQ$), OP and OQ are conjugate rays. (See ANHARMONIC RATIO.) Conjugate *elements* of a determinant (q.v.) are those elements which are symmetrically situated with respect to the principal diagonal. Certain forms of quantics are also called conjugate.

CONJUGATE FOCUS. See LIGHT.

CON'JUGA'TION (Lat. *conjugatio*, combination, from *conjugare*, to yoke together), IN PLANTS. A kind of fertilization, in which there is no visible difference between the male and the female cells (*gametes*). It is restricted to certain low forms of algæ and fungi (qq.v.). See FERTILIZATION.

CONJUGATION. A term in grammar applied to a connected view or statement of the changes of form that a verb (q.v.) undergoes in its various relations. (See INFLECTION.) The forms usually included under this term are those that serve to mark: 1. Person, or the distinction between the speaker, the spoken-to, and the spoken-of: as (I) *write*, (thou) *writest*, (he) *writes*. 2. Number; as (John) *writes*, (they) *write*. 3. Tense, or time; as (I) *write*, *wrote*, *have written*, *shall write*. 4. Mood, or the manner in which the action is presented. When the action is simply asserted, it is the indicative mood, as (he) *wrote;* when put as a supposition or condition, it is the conditional or subjunctive mood, as *if he wrote*. The imperative mood expresses a command or request, and is generally used only in the second person, as *write*. The infinitive mood expresses the action without limitation of any kind—*to write;* as it makes no affirmation, it is, strictly speaking, not a verb, but a kind of abstract noun. The two participles —the one expressing the action as in progress (*writing*), the other as completed (*written*)— may be classed with the infinitive, as not affirming anything. The infinitive and the participles are sometimes called verbals. In opposition to the infinitive and the participles, the other parts of the verb are called finite. 5. Voice, or distinction between active and passive (see VERB); as (he) *wrote* (the letter), (the letter) *was written* (by him).

In English, and in most modern European languages, the greater part of these distinctions are indicated by separate words; in Sanskrit, Greek, and Latin they were nearly all indicated by prefixes and suffixes, or other modifications of the word itself. The nature and origin of these modifications are considered under the head INFLECTION. All verbs do not take the same changes, even in the same language. Although the suffixes, e.g., may have originally been the same, yet they underwent, in course of time, different kinds of corruption or obliteration, depending upon the nature of the sounds in the root verb. This leads to the verbs of a language being arranged in different classes or conjugations. In Latin, e.g., grammarians recognize four conjugations, and verbs that cannot be brought into any class are called irregular verbs.

In English there are two distinct types of the inflections of verbs; thus, *I love* becomes in the past tense *I loved*, and in the passive voice *I am loved;* while *he shakes* becomes *he shook* and *he was shaken*. Verbs that, like *love*, take *d* (or *ed*—sometimes *t*) in their past tense and past participle form one class or conjugation, and those resembling *shake* in their changes form another. The former class is by far the more numerous; but the latter includes the most commonly used and oldest verbs in the language. The mode of change seen in *shake*, *shook*, *shaken* is believed to be more ancient than the other, and is therefore sometimes called the "old" conjugation, but more generally the "strong" conjugation, the other being the "new" or "weak." The terminology "regular" and "irregular" is incorrect. The verbs belonging to the old conjugation are all of Saxon origin and are primitive or root verbs; while derivative verbs belong to the other class. Verbs of the weak conjugation are pretty uniform in taking *d* or *ed*, although after certain sounds the *d* is of necessity pronounced as *t* and is sometimes replaced by that letter in writing—*dreamt*. For the vowel change in the strong conjugation, see ABLAUT. For further information on the conjugation of English verbs, consult: Lounsbury, *English Language* (rev. ed., New York, 1894); Emerson, *History of the English Language* (ib., 1894); Skeat, *Prin-*

ciples of English Etymology, vol. i (London, 1887); *Science of Etymology* (Oxford, 1912); Kaluza, *Historische Grammatik der englischen Sprache* (2d ed., 2 vols., Berlin, 1906); Jespersen, *Growth and Structure of the English Language* (Leipzig and New York, 1905); Krapp, *Modern English* (New York, 1909); Kittredge and Farley, *Advanced English Grammar* (Boston, 1913); and for language in general, Strong, Logeman, and Wheeler, *Introduction to the Study of the History of Language* (New York, 1891). See GRAMMAR; INFLECTION.

CONJUNC'TION (Lat. *conjunctio*, from *conjungere*, to join together, from *com-*, together + *jungere*, to join; connected with Lat. *jugum*, yoke). One of the *parts of speech*, or classes into which grammarians divide words. Conjunctions serve the purpose of connecting sentences, parts of sentences, and single words; as "Day ends, *and* night begins." William *and* John learn Latin. Charles *and* James carried the basket between them." In the first sentence *and* connects two separate affirmations into one compound sentence. The same is true in the second —the separate affirmation being, "William learns Latin," and "John learns Latin." In the third sentence *and* connects only the two words "Charles" and "James," as it cannot be affirmed of either of them alone that he "carried the basket." In most cases, however, it can be shown that, logically at least, two affirmations are involved, and that the conjunction really connects the affirmations. Conjunctions may also connect paragraphs. It is not easy to distinguish conjunctions from adverbs. In fact, conjunctions were all originally other parts of speech; and the greater part of them are still really adverbs and owe their conjunctive effect to their signification as adverbs. In *and* and *but*, whatever may have been the original meaning, we now attend only to the conjunctive effect; *or* is a shortened form of the pronominal adjective *other;* and *nor* is *or* with the negative prefixed. In such a sentence as "I believe that you are wrong," *that* is the demonstrative pronoun, equivalent to—I believe *this*, viz., "you are wrong." This is clearly seen in the corresponding words in other languages: Ger. *dass*, Fr. *que*, Lat. *quod* (for the relatives were originally demonstrative pronouns). All the rest might be called adverbial conjunctions, or conjunctive adverbs; as, "He is industrious; *therefore* he is happy"—i.e., "he is happy *for that*." This adverb, or adverbial phrase, expressive of the cause of the happiness, by referring us back for its meaning to the former assertion, has the effect of connecting the two assertions in the mind. Again, "The messenger arrived *while* he was speaking." Here *while* is equivalent to *at the time at which* (he was speaking). As an adverbial phrase, this simply indicates the time of the act of "arriving"; but as it also expresses that the speaking was going on at the same time, it thus conjoins the two assertions.

The most important distinction among conjunctions will be seen in the following pair of sentences:

> The sun went down, *and* the moon rose.
> The moon rose, *as* the sun went down.

The first (compound) sentence contains two simple sentences or assertions, linked together, yet each standing on an independent footing; the two are joined on terms of equality and are therefore said to be *coördinate*, and the conjunction is called a coördinating conjunction. In the second (complex), the last clause, though a grammatical sentence, contains no logical proposition, no assertion made for its own sake, but merely states a fact as a modifying circumstance with regard to the assertion contained in the first clause. The sentence of the second clause is therefore *subordinate* to that of the first, and the conjunction that marks the relation is a subordinating conjunction. Other kinds of conjunctions are *comparative*, which express equality or difference of degree (e.g., *as, than, just as, as if*, etc.); *conditional*, expressing a condition (*if, unless*, etc.); *copulative* (q.v.), *adversative* (*but, though*), which contrast; *illative* (*therefore*), where the second sentence or clause is an inference from the first; *temporal*, where a time relation is expressed; and so forth.

CONJUNCTION. In astronomy, one of the aspects (q.v.) of the planets. Two heavenly bodies are in conjunction when they have the same longitude, i.e., when the same perpendicular to the ecliptic passes through both. If they have at the same time the same latitude, i.e., if they are both equally far north or south of the ecliptic, they appear from the earth to be in the same spot of the heavens and to cover one another. This phenomenon is called an eclipse in the case of the sun and moon, and an occultation in the case of the moon and a star. The sun and moon are in conjunction at the period of new moon. In the case of inferior planets, like Mercury and Venus, which revolve in orbits interior to that of the earth, there is an inferior conjunction when the planet is between the earth and the sun, and a superior when the sun is between the earth and the planet. In general, a heavenly body is in *conjunction* with the sun when it is on the same side of the earth and in a line with the sun; and it is in *opposition* to the sun when it is on the opposite side of the earth, the earth being in a line between it and the sun. Planets are invisible when in conjunction with the sun, except in rare cases when an inferior planet passes over the sun's disk and may be seen as a dark speck on its surface. The foregoing has reference to *geocentric* conjunctions, or such as are seen from the earth. *Heliocentric* conjunctions are analogous planetary arrangements, such as could be seen by a supposed observer on the sun. In observing a conjunction, eclipse, or occultation, from the earth's surface, it is usual to reduce the observation to what it would be if made from the earth's centre. By this means the exact time of conjunction is more accurately fixed, and it becomes unnecessary to specify the station at which the observation was originally made, the time merely requiring a local correction to render it available at any other station where it may be needed. *Grand conjunctions*, in astrology, are those where several stars or planets are found together. Chinese history records one in the reign of the Emperor Tehuenhiu (2514–2436 B.C.), which astronomers calculate to have actually taken place.

CONJUNC'TIVI'TIS (Neo-Lat., from *conjunctiva*, connective membrane, from Lat. *conjunctivus*, connective, from *conjungere*, to join together), OPHTHALMIA, or OPHTHALMITIS. An inflammation of the conjunctiva, or the mucous membrane that covers the external surface of the eyeball, and the internal surface of the eyelids. The disease occurs in several distinct varieties, which are separately described below:

Acute Catarrhal Conjunctivitis. The symp-

toms of this variety are redness of the surface of the eyes (the redness being superficial, of a bright scarlet color, and usually diffused), sensations of uneasiness, stiffness and dryness, with slight pain, especially when the eye is exposed to the light; an increased discharge, not of tears, except at the beginning of the attack, but of mucus, which at first is thin, but soon becomes opaque, yellow, and thick; pus (matter) being seen at the corner of the eye, or between the eyelashes along the edges of the lids, which it glues together during the night. The disease results from exposure to cold, damp, and dust containing bacteria; it may be transmitted by contact with articles used by those having the disease; or may follow or occur during measles, smallpox, scarlet fever, influenza, hay fever, or coryza.

Chronic Catarrhal Conjunctivitis. This is probably the most common disease of the eye and usually occurs in adults, generally involving both eyes. It often lasts a long time, frequently on account of the continuance of the causes which led to its appearance. Among the most important causes are: acute catarrhal conjunctivitis, improper hygienic surroundings, irritation by dust or smoke, insufficient sleep, abuse of alcohol, and eye strain. The conjunctiva is red and smooth, the secretion is but slightly increased.

Follicular Conjunctivitis. This is an obstinate form of chronic catarrhal conjunctivitis and may be recognized by the small follicles or granular swellings which form upon the lower lids. It closely resembles trachoma (see *Granular Conjunctivitis*, below), commonly called "granular lids," and some even maintain that they are identical.

Acute Purulent Conjunctivitis of Adults, or *Gonorrhœal Ophthalmia.* This differs from catarrhal conjunctivitis in the severity of its symptoms and in its exciting causes. It is a violent form of inflammation of the conjunctiva, is accompanied with a thick, purulent discharge on the second or third day, and is very apt to occasion loss of vision. It begins with the same symptoms as catarrhal ophthalmia, but the conjunctiva becomes intensely swollen, red, and elevated from the sclerotic projecting around the cornea. Similar swelling takes place in the mucous membrane lining the eyelids, causing them to project forward in large, livid, convex masses, which often entirely conceal the globe of the eye. These symptoms are accompanied by severe pain, tenderness of the eye, and slight fever. When the disease is unchecked, it is liable to produce ulceration or sloughing of the cornea, with the escape of the aqueous humor and protrusion of the iris; and, even when these results do not follow, vision is often destroyed by permanent opacity of the cornea.

The disease is unquestionably contagious and arises from the application of gonorrhœal discharge or matter to the surface of the eye by means of towels or fingers, and hence is most common in persons suffering from the disease from which this variety obtains its specific name.

Purulent Conjunctivitis of Infants, or *Ophthalmia neonatorum.* This usually appears about the third day after birth. It is apt to be overlooked until it has made considerable progress. The disease gives rise to the same symptoms and, if not checked, progresses in much the same way as in adults. It is, however, more amenable to treatment, and with proper care sight is seldom impaired, provided the disease has not extended to the cornea before medical aid is sought. *Ophthalmia neonatorum* is the result of gonorrhœal infection of the eyes from the mother during birth. It is practically preventable by the use of Credé's method of cleansing the eyes immediately after birth, and putting one drop of a 2 per cent solution of silver nitrate into each eye. This is a routine practice in many of the maternity hospitals and has done much in these institutions and among the better classes to diminish the frequency of the affection.

Diphtheritic Conjunctivitis and **Croupous Conjunctivitis.** These are forms caused by the bacillus of diphtheria.

Phlyctenular Conjunctivitis, called also *Pustular Conjunctivitis*, or *Scrofulous Ophthalmia.* This occurs in children, especially of the lower classes, who suffer from the tuberculous or so-called scrofulous diathesis or constitution. The cornea is generally involved in the process. The most prominent symptom is extreme intolerance of light, the lids being kept spasmodically closed. When they are forcibly separated, a slight vascularity, usually stopping at the edge of the cornea, is observed, and at or about the line of separation between the cornea and sclerotic small opaque pimples or pustules appear. Treatment consists in improving the general health and in appropriate local applications. This form of disease, being dependent on constitutional causes, is often very obstinate and is liable to recur.

Granular Conjunctivitis, *Trachoma,* or "granular lids." This is a contagious affection of the eye, most frequently carried by towels, etc., used in common by many persons, and therefore found chiefly in crowded and dirty houses, in schools, barracks, etc. It occurs very frequently in Arabia, Egypt, and the lowlands of Europe. In this country the negro race is seldom affected. The disease has been called Egyptian ophthalmia on account of its importation into Europe from Egypt during the wars of Napoleon. It is accompanied by itching and burning of the lids, pain, flow of tears, and, in the advanced cases, with poor vision. The lids are swollen, the upper drooping; there is a variable amount of mucopurulent discharge. The conjunctiva of the lids and fornix, or fold between lids and eyeballs, is red, thickened, and covered with many small papillæ, or velvety elevations, or by granules which are round, translucent, and yellow or grayish. After a time scar tissue forms, and the papillæ and granules disappear. The disease may be acute, but usually begins gradually and lasts for years. The dangerous complications are ulceration of the cornea alone or accompanying a condition known as *pannus.* In the latter, new tissue containing blood vessels gradually forms until the cornea is covered partially or wholly. If this disappears later, sight will be restored; otherwise the new tissue causes permanent opacity, an accident which may also result from corneal ulceration. Entropion (q.v.), trichiasis (q.v.), ectropion (q.v.), or symblepharon, a cicatricial adhesion of the conjunctiva of the lid to that of the eyeball, may follow trachoma. Among numerous other varieties of conjunctivitis two forms require mention, viz., simple follicular conjunctivitis, and vernal catarrh, both of which are accompanied by the appearance of granules or follicles and are frequently mistaken for true trachoma.

The treatment may require either local applications or surgical interference. Prevention is most important. Persons having the disease should exercise great care that others may not use their towels or other toilet articles which might serve to convey it, and in public institutions cases should be carefully watched for and isolated.

CONJURY, kŭn'jĕr-ĭ (from *conjure,* OF., Fr. *conjurer,* from Lat. *conjurare,* to swear together, from *com-,* together + *jurare,* to swear, from *jus,* law). Incantation, bewitchment, or magic. Specifically, the casting of spells, or evil enchantment, characteristic of Afro-American folklore. See MAGIC.

CONKLIN, EDWIN GRANT (1863–). An American zoölogist, born at Waldo, Ohio, and educated at Ohio Wesleyan and Johns Hopkins universities. He was professor of biology at Ohio Wesleyan (1891–94) and professor of zoölogy at Northwestern (1894–96), the University of Pennsylvania (1896–1908), and Princeton (after 1908). He became coeditor of the *Journal of Morphology,* the *Biological Bulletin,* and the *Journal of Experimental Zoölogy.* He was president of the American Society of Zoölogists in 1899 and president of the American Society of Naturalists in 1912.

CONK'LING, ROSCOE (1829–88). An American politician. He was born at Albany, N. Y., and, after receiving an academic education, at the age of 17 began the study of law in the office of Spencer and Kernan at Utica. His first identification with politics was in 1848, when he won some reputation as a campaign speaker by making a number of speeches in behalf of Taylor and Fillmore. In 1850 he was admitted to the bar, and in the same year became district attorney of Albany County by appointment of Governor Fish. In 1852 he returned to Utica, where in the next few years he established a reputation as a lawyer of ability. Up to 1852, in which year he stumped New York State for Gen. Winfield Scott, the Whig candidate for the presidency, Conkling was identified with the Whig party, but in the movement that resulted in the organization of the Republican party he took an active part, and his work, both as a political manager and an orator, contributed largely towards carrying the State for Frémont and Dayton, the Republican nominees, in 1856. In 1858 he was elected mayor of Utica, and in the same year was chosen a Representative in Congress, serving throughout the period of the Civil War, except in the Thirty-eighth Congress (1863–65), during which interval he acted as a Judge Advocate of the War Department. He was again a member of Congress in 1865–67. In his career in the House of Representatives Conkling won national distinction as a debater and orator. He was an enthusiastic supporter of the Lincoln administration in its conduct of the war, but vigorously opposed the passage of the Legal Tender Act in 1862. He was a member of the Committee of Ways and Means, and the Special Committee of Fifteen on Reconstruction, delivering one of the strongest speeches in support of the Fourteenth Amendment. His renown as an orator and prominence in the legislative councils of the Republican party secured him in 1867, at the age of 38, an election to the United States Senate to succeed Judge Ira Harris. Conkling's career in the Senate was brilliant, but, like all the rest of his political life, erratic and marked by strong personal likes and dislikes, by which, rather than by regard for the welfare of the nation or of his party, he was frequently controlled. Through the eight years of Grant's administration he stood out as the spokesman of the President and one of the principal leaders of the Republican party in the Senate. He was active in framing and pushing through Congress the reconstruction legislation, and was instrumental in the passage of the second Civil Rights Act, in 1875, and of the act for the resumption of specie payments, in the same year. In the Republican National Convention at Cincinnati in 1876, Conkling first appeared as a presidential candidate, receiving 93 votes. He was one of the framers of the bill creating the Electoral Commission to decide the disputed election of 1876, but, when its judgment was announced, declined to vote for its affirmation. Himself an opponent of civil service reform, Conkling was entirely out of sympathy with the reform element in the Republican party. The first break with the administration occurred in April, 1877, when the Secretary of the Treasury, John Sherman, appointed a commission to investigate the affairs of the customhouse. The investigation brought to light extensive irregularities in the service, showing in particular that the Federal officeholders in New York constituted a large army of political workers, and that their positions were secured by and dependent upon their faithful service in behalf of the men holding the principal government offices in the city. President Hayes decided upon the removal of Chester A. Arthur, the collector, Gen. George H. Sharpe, the surveyor, and A. B. Cornell, the naval officer of the port, and in October, 1877, sent nominations of their successors to the Senate. Senator Conkling defended the displaced officials, and, through his influence in the Senate, secured the rejection of the new nominations. He succeeded in blocking all the efforts of President Hayes and Secretary Sherman until January, 1879, when, a new lot of nominations having been made, they were confirmed in spite of Conkling's continued opposition. Early in 1880 Senator Conkling became the leader of the movement for the nomination of General Grant for a third term in the presidency. How much of his advocacy was due to his regard for Grant, and how much to his hostility to the two other leading candidates—Sherman, with whom he had come into conflict during Hayes's administration, and Blaine, whose bitter political and personal enemy he had been for 24 years—can never be known. The convention, by a combination of the Blaine and Sherman interests, nominated James A. Garfield. Conkling and the famous "306" remained faithful to Grant to the last and were allowed to name the candidate for Vice President. The result emphasized Conkling's hostility towards Blaine and eventually led to the former's quarrel with Garfield and consequent retirement from political life. Immediately after Garfield's inauguration, Conkling presented to the President a list of men whom he desired to have appointed to the Federal offices in New York. Garfield's appointment of Blaine as Secretary of State, and of Windom as Secretary of the Treasury, instead of Levi P. Morton, whose appointment Conkling had urged, angered Conkling and made him unwilling to agree to any sort of compromise with Garfield on the New York appointments. Without consulting him, the President nomi-

nated for the collector at New York William H. Robertson, an anti-Conkling man. Robertson's nomination was confirmed by the Senate, in spite of the opposition of Conkling, who claimed the right of Senators to control Federal patronage in their States. Conkling and his colleague, Thomas C. Platt, immediately resigned their seats in the Senate and appealed to the New York Legislature to justify their course by reëlecting them. After an exciting canvass Conkling and Platt were defeated, and Warner Miller and E. G. Lapham were chosen in their stead. The remainder of his life Conkling spent in the practice of law in New York City. In 1882 he was nominated by his friend, President Arthur, to succeed Ward Hunt as an associate justice of the United States Supreme Court, but he declined. Consult *Life and Letters*, edited by A. R. Conkling (New York, 1889).

CONN. An irresponsible, gay-spirited fellow, the leading character in Dion Boucicault's play *The Shaughran.*

CONN, Herbert William (1859–1917). An American zoölogist and bacteriologist, born at Fitchburg, Mass. He took his baccalaureate degree at the Boston University and his doctorate at Johns Hopkins University, and soon afterward became professor of biology at Wesleyan University in Connecticut. From 1889 to 1897 he was director of the Marine Biological Laboratory at Cold Spring Harbor, L. I. He is considered an authority on the bacteriology of dairy products, in connection with which he published many papers (1890–1905) under the auspices of the Agricultural Station at Storrs, Conn. In 1905 he became bacteriologist of the Connecticut State Board of Health and director of the State laboratory. His works include: *Evolution of To-Day* (1886); *The Living World* (1891); *The Study of Germ-Life* (1897); *Classification of Dairy Bacteria* (1899); *The Method of Evolution* (1900).

CONNAUGHT, kŏn'nạt (Ir. *Connacht*). The northwestern and smallest of the four provinces of Ireland, bounded north and west by the Atlantic Ocean, east by Ulster and Leinster, and south by Munster (Map: Ireland, B 3). It contains the counties of Galway, Leitrim, Mayo, Roscommon, and Sligo. Area, 6571 square miles. Pop., 1841, 1,420,900; 1891, 719,500; 1901, 646,932; 1911, 595,040.

CONNAUGHT, Arthur William Patrick Albert, Duke of, Prince of the United Kingdom (1850–). The third son of Queen Victoria. He entered the Military Academy at Woolwich in 1866 and in 1880 became a major general. He was created Duke of Connaught and Strathearn and Earl of Sussex in 1874 and took his seat in the House of Lords. In 1879 he married Princess Louise Marguerite of Prussia. He served in Egypt in 1882, became a general in 1893, and from 1893 to 1898 was in charge of the permanent camp at Aldershot. In 1896 he represented Queen Victoria at the coronation of the Czar Nicholas II and in 1903 was the representative of Edward VII at the coronation durbar at Delhi. He succeeded Lord Roberts as commander in chief of the forces in Ireland in 1900, became field marshal in 1902 and inspector general of the forces in 1904, and was commander in chief in the Mediterranean in 1907–09. In October, 1911, he arrived in Quebec as Governor General of Canada. In 1914 Prince Alexander of Teck, Queen Mary's brother, was appointed as his successor. The Duke's children include the Crown Princess of Sweden (born 1882), Prince Arthur (born 1883), who married the Duchess of Fife in 1913, and Princess Victoria Patricia (born 1886), popularly known as "Princess Pat."

CONNEAUT, kŏn'nē-ạt'. A city on Conneaut Creek, Ashtabula Co., Ohio, 68 miles by rail northeast of Cleveland, noted as the landing place of the first white settlers of northern Ohio in 1796 (Map: Ohio, J 2). It is on the Lake Shore and Michigan Southern, the New York, Chicago, and St. Louis, and the Bessemer and Lake Erie railroads, and has a good harbor at the mouth of the creek, where there is a lighthouse. It is an important ore and coal port, being noted for its exceptional facilities for handling large cargoes. There are extensive railroad shops and manufactories of canned goods, self-sealing packages, bricks, shovels, leather, lumber, etc. Conneaut also exports molding sand and farm produce. The city contains three hospitals, a Carnegie library, and a public park. The electric-light plant is owned and operated by the city, which was first incorporated in 1832. It is governed by a mayor, elected biennially, assisted by a council. Pop., 1890, 3241; 1900, 7133; 1910, 8319.

CONNECTICUT, kŏn-nĕt'ĭ-kŭt (Algonquin *Quinni-tuk-ut*, long river). One of the original thirteen States of the United States; a north Atlantic coast State and the southwesternmost of the New England States (Map: United States, L 2). It is included between lat. 40° 59′ and 42° 3′ N. and long. 71° 47′ and 73° 43′ W., and is bounded on the north by Massachusetts, on the east by Rhode Island, on the south by Long Island Sound, and on the west by New York. It has an extreme length from east to west of nearly 105 miles, and an average length of about 95 miles; an extreme width from north to south of 76 miles, and an average width of 57 miles, with a total area of 4965 square miles, of which 145 square miles are water surface. Connecticut is one of the smallest States in the Union, only two States being smaller, but it ranks thirty-second in population. The boundary lines between Connecticut and the adjoining States are somewhat irregular, since they depend on old grants and surveys which were very unsystematic.

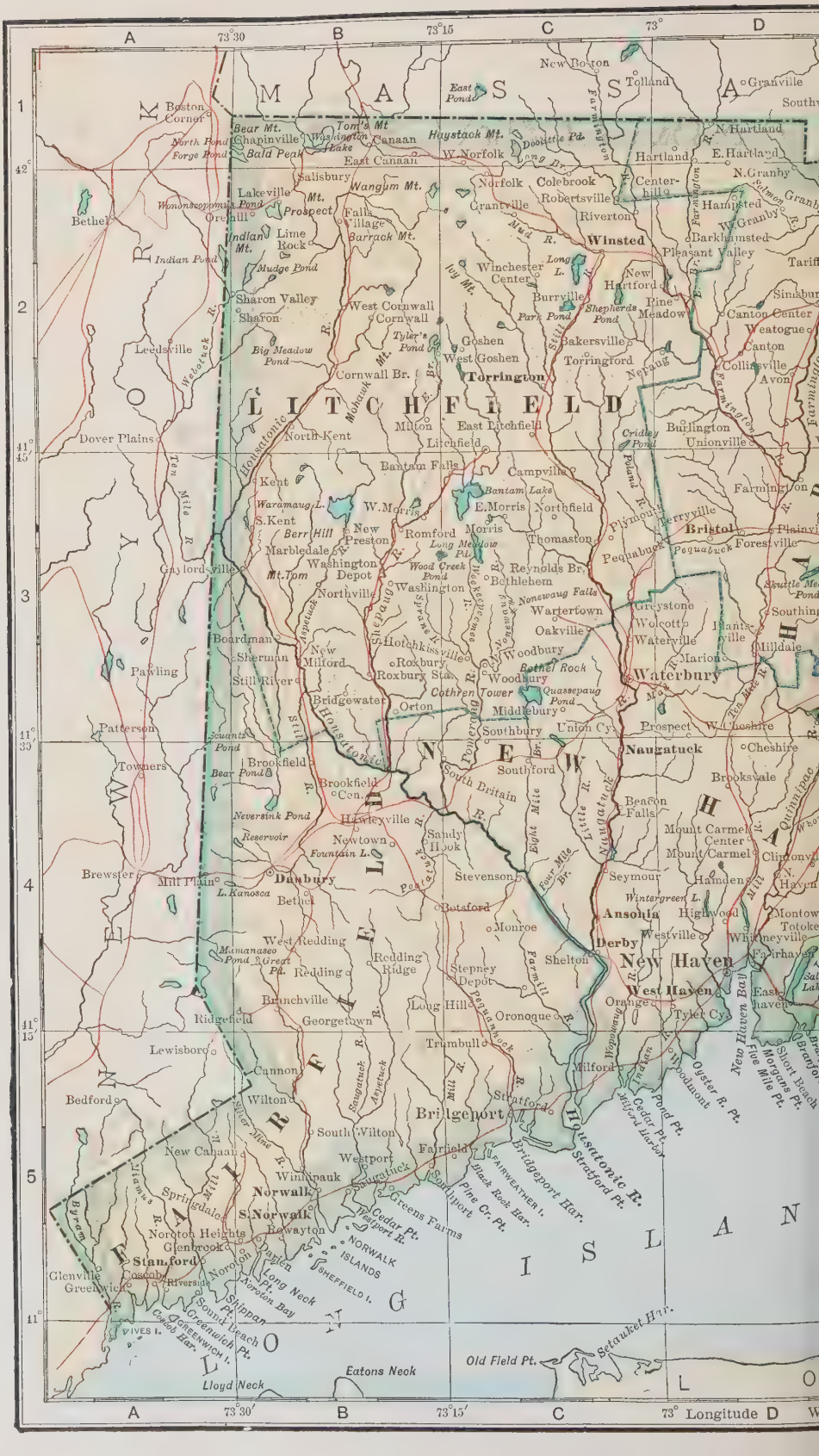
Topography. The area of Connecticut may be divided into three parts, a western highland and an eastern highland and between them a central lowland. The central lowland is everywhere less than 500 feet in altitude, with the exception of a longitudinal hill range, which in its southern part is broken into detached portions arranged in echelon, and two or three shorter hill ranges near the western border. From the northern boundary of the State, as far as Middletown, that central lowland is traversed by the Connecticut River. From Middletown to Long Island Sound the Connecticut River traverses a corner of the eastern highland in a narrow gorge. The Connecticut River is a tidal estuary from its mouth to a point beyond Hartford; and, at the northern boundary of the State, the flood plain of the Connecticut has an altitude less than 60 feet. With the exception of the hill ranges above referred to, the whole central lowland is an area of very slight relief. In strong contrast with the central lowland the western and eastern highlands are exceedingly rugged, showing substantially no level tracts ex-

cept the narrow flood plains and terraces of the rivers. The highest altitudes of the State are near the northwest corner, Bear Mountain attaining an altitude of 2355 feet, and Gridley Mountain an altitude of 2200 feet. Both of these are in the town of Salisbury. The culminating points of the eastern highland are only about half as high as those of the western highland. Bald Hill in Union is 1285 feet in altitude, and Snow Hill in Ashford 1213 feet. The rivers flow through these rugged highlands in narrow valleys. Both the eastern and western highlands rise pretty abruptly from the surface of the central lowland, so that from points in the lowland the view either eastward or westward is bounded by what appears to be a mountain wall. In spite of the absence of level country in the highlands, it is noteworthy that from almost any point of view the sky line appears straight and almost horizontal. Most of the culminating points of the highlands, and also the summits of the hill ranges within the central lowland, may be conceived to touch an imaginary inclined plain sloping gently southeastward from the northwest corner of the State. The topography accordingly suggests that the eastern and western highlands are both remnants of an uplifted and tilted peneplain, in which have been carved by erosion the broad central lowland and the narrow highland valleys. The topographic difference between the highlands and the lowland results from the geological structure, the highland rocks being strong and the lowland rocks weak. The eastern and western highlands are simply the south end of the general highland of central and western New England. While the whole area of Connecticut appears at one time to have been eroded nearly to a base-level plain, the surface of the region farther north seems never to have been so completely peneplained, some isolated summits, like Wachusett and Monadnock and the great mountain mass of the White Mountains, having never been degraded to the general level. Between the highlands of New Hampshire and Vermont the Connecticut River flows in a narrow valley, the soft rocks which have permitted the erosion of the broad central lowland of Connecticut not extending so far north as the northern boundary of Massachusetts.

The coast of Connecticut is very broken and irregular and consists of a succession of rocky points and gravel or sandy beaches. It possesses a number of good harbors, and the larger rivers have estuary-like mouths. The coast waters are shallow, but usually deep enough to permit vessels to come close to land. Numerous small rocky islands skirt the shores; the largest island on this coast being Fisher's Island, off the mouth of the Thames, which, while geographically belonging to the Connecticut coast, politically belongs to New York.

The hydrography of Connecticut is simple in general outline, the streams for the most part following the slope of land from the north towards the south. Since this slope is but a continuation of the higher land to the north, the main streams rise north of the Connecticut boundary, and the waters flow in a generally southerly direction across the State and empty into Long Island Sound. There are three main river systems—the Housatonic-Naugatuck in the west, the Connecticut in the middle, and the Thames in the east. The streams tributary to these main rivers are numerous, and some of them are of considerable size. In the southern part of the State there are many small streams which have a southerly direction and flow straight to the Sound. Few of these small streams are more than 25 miles in length in a direct course. The Connecticut watercourses have in general deeply cut their paths through the highlands, so that on the main streams the fall is less than might be expected from the neighboring elevations. The smaller streams, however, and the larger ones in their upper courses, furnish a large supply of water power.

Geology. The rocks of the highlands are highly crystalline. Gneisses and mica schists are the most abundant, though in the western part of the State there are some bands of crystalline limestone or marble, and in various parts of the State are found some crystalline rocks of more basic constitution than the prevalent gneisses and schists. The gneisses often grade into granite and are often cut by intrusive masses of granite. These crystalline rocks are all pre-Triassic in age, but how much is pre-Cambrian and how much is Paleozoic is not known. So complete has been the metamorphism that no vestiges of fossils have yet been found in any part of the crystalline areas of Connecticut. Some of the formations of the western part of the State have been traced into the adjacent States of Massachusetts and New York, and their stratigraphic position has been fairly well established. The marbles of the western border are of Cambrian and Ordovician age. Certain others of the rocks of the western highland have been definitely recognized as respectively pre-Cambrian, Cambrian, and Ordovician. In regard to most of the rocks of the western highland, and all, or nearly all, the rocks of the eastern highland, nothing more definite can be said than that they are pre-Triassic. The area of Connecticut was doubtless affected by the orogenic movements of pre-Cambrian, post-Ordovician, and post-Carboniferous times, and how much of the disturbance and metamorphism which the rocks have suffered is due to each of these revolutions cannot now be determined. The last of these orogenic movements left mountain areas of considerable elevation in eastern and western Connecticut; between which lay a broad geosynclinal depression, where now is the central lowland of the State. In this trough were deposited the Triassic rocks which are now the surface rocks of that area. These rocks are chiefly red sandstones, varying into shales and conglomerates. None of the deposits are marine. How much respectively is estuarine, fluvial, lacustrine, pluvial, and æolian, is not definitely known. About the middle of the period of Triassic deposition was an epoch of vulcanism. Intrusive sheets of igneous rock came to be intercalated among the lower strata, while three great lava sheets at comparatively short intervals found their way to the surface, each in its turn to be covered by later sediments. The second of these lava sheets was a massive one, several hundred feet in thickness. At the close of the Triassic a broad geanticlinal uplift, whose axis was near the western border of Connecticut, uplifted and tilted the sandstones, giving them a general dip to the east. This elevation was accompanied with considerable faulting of the strata. During the later Mesozoic the area of Connecticut suffered a great amount of erosion, and, by the close of Mesozoic time, the crystalline and the Triassic areas alike were reduced to a peneplain. In early Tertiary time this


A
B
C
D
73°30
73°15
73°
42°
41°45
41°30
41°15
41°
Longitude
LITCHFIELD
FAIRFIELD
NEW HAVEN
MIDDLESEX
NEW LONDON
MASS.
Boston Corner
New Boston
Tolland
Granville
East Pond
Bear Mt.
Tom's Mt.
Haystack Mt.
North Pond
Forge Pond
Bald Peak
Washington Lake
Chapinville
Canaan
East Canaan
W. Norfolk
Doolittle Pd.
Hartland
N. Hartland
E. Hartland
Salisbury
Wangum Mt.
Norfolk
Colebrook
Center-hill
N. Granby
Lakeville
Mt. Prospect
Falls Village
Barrack Mt.
Grantville
Robertsville
Riverton
Hamsted
Bethel
Indian Mt.
Lime Rock
Winsted
W. Granby
Barkhamsted
Pleasant Valley
Indian Pond
Mudge Pond
Winchester Center
Long L.
New Hartford
Sharon Valley
Sharon
West Cornwall
Cornwall
Burrville
Pine Meadow
Park Pond
Shepherds Pond
Canton Center
Weatogue
Canton
Leedsville
Big Meadow Pond
Tyler's Pond
Goshen
Bakersville
West Goshen
Torringford
Torrington
Cornwall Br.
Collinsville
Avon
Dover Plains
North Kent
Milton
East Litchfield
Litchfield
Cridley Pond
Burlington
Unionville
Bantam Falls
Campville
Bantam Lake
Kent
Waramaug L.
W. Morris
E. Morris
Northfield
S. Kent
Berr Hill
New Preston
Romford
Morris
Thomaston
Bristol
Plainville
Marbledale
Long Meadow Pd.
Pequabuck
Forestville
Gaylordsville
Washington Depot
Mt. Tom
Wood Creek Pond
Reynolds Br.
Bethlehem
Northville
Washington
Nonewaug Falls
Wartertown
Greystone
Southington
Boardman
Sherman
New Milford
Hotchkissville
Roxbury
Roxbury Sta.
Woodbury
Oakville
Wolcott
Waterville
Plantsville
Milldale
Pawling
Still River
Bridgewater
Bethel Rock
Woodbury
Cothren Tower
Quassepaug Pond
Waterbury
Orton
Middlebury
Union Cy.
Prospect
W. Cheshire
Patterson
Scouts Pond
Southbury
Naugatuck
Cheshire
Towners
Brookfield
Bear Pond
Brookfield Con.
South Britain
Southford
Brookvale
Beacon Falls
Neversink Pond
Reservoir
Hawleyville
Sandy Hook
Newtown
Fountain L.
Mount Carmel Center
Mount Carmel
Clintonville
Brewster
Mill Plain
Danbury
L. Kanosca
Bethel
Stevenson
Seymour
Hamden
N. Haven
Wintergreen L.
Botsford
Ansonia
Highwood
Montowese
Totoke
West Redding
Monroe
Derby
Westville
Whitneyville
Mamanasco Pond
Great Pd.
Redding
Redding Ridge
Stepney Depot
Shelton
New Haven
Fairhaven
Branchville
West Haven
East Haven
Ridgefield
Georgetown
Long Hill
Orange
Tyler Cy.
Oronoque
Lewisboro
Trumbull
Milford
Cannon
Wilton
Stratford
Bedford
Bridgeport
South Wilton
Fairfield
New Canaan
Westport
Winnipauk
Norwalk
Sprigdale
S. Norwalk
Cedar Pt.
Greens Farms
Pine Cr. Pt.
Southport
Black Rock Har.
Bridgeport Har.
Stratford Pt.
Housatonic R.
Noroton Heights
Rowayton
Glenbrook
Stamford
Noroton
Darien
Long Neck
Pt.
Noroton Bay
Glenville
Greenwich
Cascob
Riverside
Shippan Pt.
Sound Beach
Greenwich Pt.
Cos Cob Har.
Eatons Neck
Lloyd Neck
Old Field Pt.
Setauket Har.
Oyster R. Pt.
Morgans Pt.
Five Mile Pt.
New Haven Bay
Short Beach
Pond Pt.
Cedar Pt.
Milford Harbor
Woodmont
Housatonic R.
Pequonnock R.
Farmill R.
Mill R.
Naugatuck R.
Eight Mile R.
Four Mile Br.
Wepawaug R.
Saugatuck R.
Aspetuck R.
Still R.
Pomperaug R.
Shepaug R.
Weantinoge R.
Weekeepeemee R.
Nonewaug R.
Mad R.
Long R.
Ivy Mt.
Mohawk Mt.
Mt. Tom Br.
Still R.
Nepaug R.
Farmington R.
Pequabuck R.
Plymouth R.
Poland R.
Terryville
Shuttle Meadow Pond
Quinnipiac R.
Mill R.
Wintergreen L.
Tyler Mill Br.
Hop R.
Salmon R.
Tariffville
Simsbury
Farmington
Avon
Collinsville
Canton
Weatogue
Canton Center
Barkhamsted
Pleasant Valley
Hamsted
W. Granby
N. Granby
N. Hartland
E. Hartland
Granville
Tolland
New Boston
East Pond
Doolittle Pd.
Farmington R.
Center-hill
Robertsville
Riverton
Winsted
Long L.
Winchester Center
New Hartford
Burrville
Pine Meadow
Shepherds Pond
Park Pond
Still R.
Nepaug R.
Torringford
Bakersville
Goshen
West Goshen
Torrington
Cornwall Br.
Ivy Mt.
Mohawk Mt.
Tyler's Pond
Cornwall
West Cornwall
Sharon
Sharon Valley
Big Meadow Pond
Leedsville
Housatonic R.
Waramaug L.
Kent
Bantam Falls
Campville
Bantam Lake
Milton
East Litchfield
Litchfield
Cridley Pond
Burlington
Unionville
North Kent
Dover Plains
Tear Mile R.
Housatonic R.
Aspetuck R.
Still R.
Pomperaug R.
Shepaug R.
Weantinoge R.
Weekeepeemee R.
Nonewaug R.
Mad R.
Long R.
Ivy Mt.
Mohawk Mt.
Mt. Tom Br.
Still R.
Nepaug R.
Farmington R.
Pequabuck R.
Plymouth R.
Poland R.
Terryville
Bristol
Plainville
Forestville
Shuttle Meadow Pond
Southington
Milldale
Plantsville
Wolcott
Waterville
Greystone
Wartertown
Nonewaug Falls
Bethlehem
Reynolds Br.
Washington Depot
Mt. Tom
Wood Creek Pond
Long Meadow Pd.
Pequabuck
Marbledale
Berr Hill
New Preston
Romford
Morris
Thomaston
S. Kent
W. Morris
E. Morris
Northfield
Gaylordsville
Northville
Washington
Oakville
Woodbury
Roxbury
Roxbury Sta.
Hotchkissville
New Milford
Boardman
Sherman
Pawling
Still River
Bridgewater
Bethel Rock
Woodbury
Cothren Tower
Quassepaug Pond
Waterbury
Orton
Middlebury
Union Cy.
Prospect
W. Cheshire
Patterson
Scouts Pond
Southbury
Naugatuck
Cheshire
Towners
Brookfield
Bear Pond
Brookfield Con.
South Britain
Southford
Brookvale
Beacon Falls
Neversink Pond
Reservoir
Hawleyville
Sandy Hook
Newtown
Fountain L.
Mount Carmel Center
Mount Carmel
Clintonville
Brewster
Mill Plain
Danbury
L. Kanosca
Bethel
Stevenson
Seymour
Hamden
N. Haven
Wintergreen L.
Botsford
Ansonia
Highwood
Montowese
Totoke
West Redding
Monroe
Derby
Westville
Whitneyville
Mamanasco Pond
Great Pd.
Redding
Redding Ridge
Stepney Depot
Shelton
New Haven
Fairhaven
Branchville
West Haven
East Haven
Ridgefield
Georgetown
Long Hill
Orange
Tyler Cy.
Oronoque
Lewisboro
Trumbull
Milford
Cannon
Wilton
Stratford
Bedford
Bridgeport
South Wilton
Fairfield
New Canaan
Westport
Winnipauk
Norwalk
Sprigdale
S. Norwalk
Cedar Pt.
Greens Farms
Pine Cr. Pt.
Southport
Black Rock Har.
Bridgeport Har.
Stratford Pt.
Housatonic R.
Noroton Heights
Rowayton
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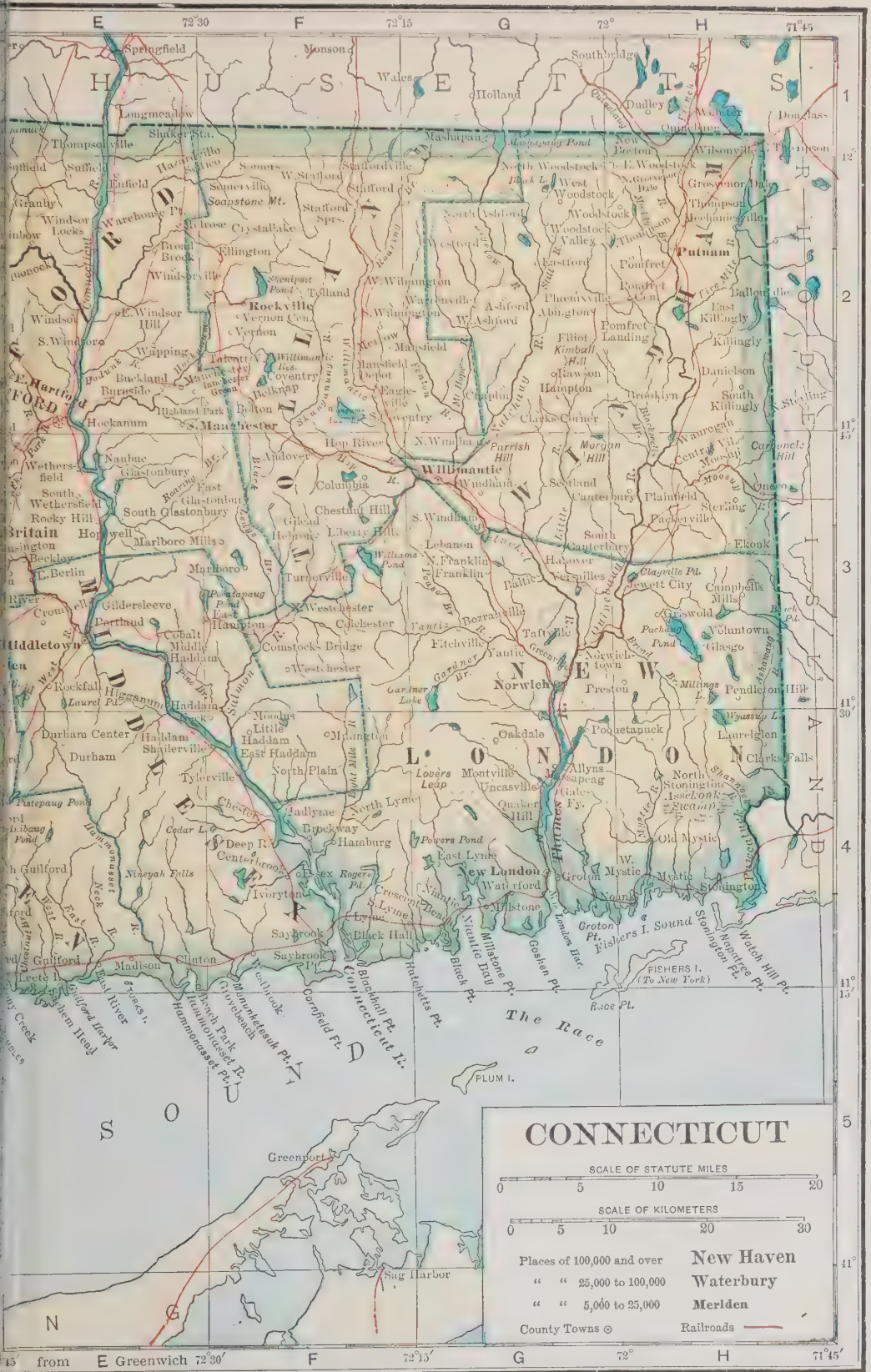
Pequonnock R.
Farmill R.
Mill R.
Naugatuck R.
Eight Mile R.
Four Mile Br.
Wepawaug R.
Saugatuck


CONNECTICUT
SCALE OF STATUTE MILES
0 5 10 15 20
SCALE OF KILOMETERS
0 5 10 20 30
Places of 100,000 and over New Haven
" " 25,000 to 100,000 Waterbury
" " 5,000 to 25,000 Meriden
County Towns ⊙ Railroads
HARTFORD
NEW HAVEN
NEW LONDON
WINDHAM
MIDDLESEX
TOLLAND
LITCHFIELD
Long Island Sound
The Race
Fishers I. Sound
FISHERS I. (To New York)
PLUM I.
Connecticut R.
Thames
Housatonic R.
Naugatuck R.
Willimantic R.
Quinebaug R.
Shetucket R.
Pachaug Pond
Gardiner Lake
Lovers Leap
Powers Pond
Williams Pond
Mashapaug Pond
Springfield
Monson
Southbridge
Wales
Holland
Dudley
Webster
Douglass
Thompsonville
Shaker Sta.
Longmeadow
Suffield
Enfield
Somers
W. Stafford
Stafford
Stafford Springs
Somersville
Soapstone Mt.
Warehouse Pt.
Melrose
Crystal Lake
Ellington
Broad Brook
Windsorville
Windsor Locks
Granby
Tolland
Rockville
Vernon
Vernon Cen.
W. Willington
Willington
W. Ashford
Ashford
Warrenville
North Ashford
Westford
Eastford
Pomfret
Pomfret Cen.
Putnam
Thompson
Mechanicsville
Grosvenor Dale
North Woodstock
E. Woodstock
West Woodstock
Woodstock
Woodstock Valley
Thompson Br.
Phoenixville
Abington
Pomfret Landing
Elliot
Kimball Hill
Hampton
Brooklyn
East Killingly
Killingly
South Killingly
Danielson
Ballouville
Windsor
E. Windsor Hill
S. Windsor
Wapping
Buckland
Burnside
Talcottville
Willimantic
Coventry
Belknap
Bolton
Highland Park
S. Manchester
Manchester
Hockanum
E. Hartford
Mansfield
Mansfield Depot
Eagleville
Storrs
Storrs
Chaplin
Clarks Corner
Scotland
Canterbury
Plainfield
Sterling
Packerville
Wauregan
Central Village
Moosup
Oneco
Carbonelle Hill
Sterling
Wethersfield
Naubuc
Glastonbury
East Glastonbury
South Glastonbury
Rocky Hill
Hopewell
Marlboro Mills
Marlboro
Turnerville
Portland
Cobalt
Middle Haddam
Haddam
Higganum
Rockfall
Laurel Pl.
Durham Center
Durham
Haddam Shaileville
East Haddam
Moodus
Little Haddam
Millington
North Plain
Tylerville
Chester
Cedar L.
Deep R.
Centerbrook
Ivoryton
Essex
Roger Pl.
Nineyah Falls
Hamburg
Brockway
Radlyne
North Lyme
Cobalt
Comstock Bridge
Westchester
Colchester
Chatham Hill
Gilead
Hebron
Columbia
Chesterfield
Liberty Hill
Lebanon
N. Franklin
Franklin
Bozrahville
Fitchville
Yantic
Taftville
Norwichtown
Norwich
Preston
Versailles
Hanover
Baltic
Scotland
South Canterbury
Ekonk
Claytville Pt.
Hewett City
Campbells Mills
Griswold
Voluntown
Glasgo
Pachaug Pond
Pendleton Hill
Wyassup L.
Laurelglen
Clarks Falls
Pachaug R.
Oakdale
Pachetapuck
Montville
Uncasville
Allyns
Massapeag
Gales Fy.
Quaker Hill
Lovers Leap
North Stonington
Assekonk Swamp
Shunock R.
Old Mystic
W. Mystic
Mystic
Stonington
Groton
New London
Waterford
Niantic
Millstone
Millstone Pt.
Goshen Pt.
Groton Pt.
Watch Hill Pt.
Stonington Pt.
Napatree Pt.
Black Pt.
Hatchetts Pt.
Race Pt.
Black Hall
Saybrook
Saybrook Pt.
Clinton
Madison
Guilford
Leete I.
Guilford Harbor
Broad River
Stony Creek
Thimble Islands
Branford
Stony Creek
Pistapaug Pond
Hammonasset R.
Hammonasset Pt.
Meetinghouse Pt.
Grovehead
Cornfield Pt.
Gallbrook
Menunketesuk Pt.
Branch Park
Blackhall Pt.
Connecticut R.
Saybrook Pt.
Old Saybrook
Old Lyme
Lyme
Crescent Beach
S. Lyme
Niantic
Niantic Bch
Millstone Pt.
Goshen Pt.
Groton Pt.
Fishers I. Sound
Stonington Pt.
Napatree Pt.
Watch Hill Pt.
Greenport
Sag Harbor
Gardiners I.
Plum I.
Fishers I.
Block I.
Montauk Pt.
Long Island
Sound
Atlantic Ocean
Rhode Island
Block Island
Fishers I.
Watch Hill
Westerly
Pawcatuck R.
Pawcatuck
Stonington
Mystic
Groton
New London
Waterford
Niantic
Millstone
Old Lyme
Lyme
Old Saybrook
Saybrook
Clinton
Madison
Guilford
Branford
Stony Creek
Thimble Islands
Leete I.
Guilford Harbor
Broad River

peneplain was uplifted so as to attain in the northwestern corner of the State an altitude of about half a mile, from which it sloped gently towards the southeast. The present topography was carved in Tertiary time out of this tilted peneplain. The broad central lowland was excavated in the weak Triassic rocks. The outcrops of the lava sheets and of the intrusive sheets of igneous rock determined the location of the hill ranges of the central lowland. The faulting of the strata broke the continuity of those outcrops and gave the resultant ridges their echelon arrangement. In the regions of the hard crystalline rocks the streams have been able to excavate only narrow valleys, and the culminating points of the dissected plateau retain approximately the altitude of the tilted peneplain.

Connecticut was covered by the ice of the Glacial period. While the rocks everywhere bear the characteristic marks of glacial scouring, it is not believed that the general topography of the State was in any considerable degree altered by glacial erosion. The effects of glacial deposition, covering the whole area of the State with an irregular mantle of drift, are seen in innumerable lakes and ponds. Disturbances of drainage by glacial deposition have resulted in the formation of numerous waterfalls. A very remarkable example of change of drainage due to the events of the Glacial period is shown by the streams in the western part of the central lowland. Prior to the Glacial period a single river flowed southward from near the northern boundary of the State to New Haven Bay. The course of that river is now represented by parts of the Farmington, Pequabuck, Quinnipiac, and Mill. The inlets and harbors of the Connecticut coast are due to a slight post-Glacial depression which drowned the south ends of the valleys.

Climate and Soil. In Connecticut the average annual temperature decreases from about 50° F. on the south coast to about 48° in the northeast and 46° in the northwest. In midwinter the average temperatures decrease from about 30° along the south coast to 24° in the north. In all portions of the State the temperature usually descends below zero at times during the winter and may even fall as low as —10° or —15° F. In midsummer the average temperature is about 72° along the south coast, but increases to 74° in the middle interior, and decreases again to about 70° in the northwest. During the summer extreme temperatures ranging from 90° to 100° F. may be expected in all parts of the State.

The prevailing winds in Connecticut are from the westward. In the winter the prevailing wind throughout most of the State is from the northwest, and in midsummer from the southwest. The prevalent southwest winds during the summer months considerably lower the land temperatures on the south coast and to some distance inland, while the prevalent northwest winds during the winter carry the inland cold air to the coast. The monthly mean value of relative humidity varies from about 60 to about 80 per cent, and is generally a little less in the spring than at other times of the year, though the variation is very irregular. Throughout most of the State the average rainfall during the year is from 45 to 50 inches. The precipitation is extremely irregular, but on the average not very unequally distributed among the months of the year. The snowfall varies very much from year to year, but on an average for a series of years about 40 inches fall on the south coast, and there is a rather regular increase towards the northern part of the State to 50 inches in the northeast corner and to 60 inches in the northwest corner.

The valley land of Connecticut is usually a rich alluvial deposit. The higher ground is mostly covered with glacial till, affording a stony soil, much of which is well adapted for forestry, fruit growing, and pasturage. The northern part of the Connecticut River valley, as far south as Middletown, has a rich, deep, loamy soil, often with a clay subsoil. In the southern part of the State the soil is sandy, as also along the coast, which extends for about 100 miles and is broken by numerous small bays.

Mining. Connecticut has small importance as a producer of minerals, the total value of the mineral products being less than $4,000,000 annually, and of this approximately 80 per cent is derived from quarries and clay products. An inconsiderable quantity of iron ore is mined, and a small quantity of pig iron is made, but aside from that there is in the State no metal mining nor any production of mineral fuel. The quarrying industry in 1912 yielded products valued at $1,467,458, compared with $1,215,462 in 1911. The principal stone quarried is designated in the trade as granite, although much of the material quarried under the name of granite is gneiss. Quarrying of trap rock is also an important industry, and the value of the output of this in 1912 was about 75 per cent of that of granite or gneiss. Granite is quarried in every county, but the principal operations are in New Haven and New London counties, and there are others of considerable importance in Windham and Fairfield counties. Trap rock is produced chiefly in Hartford and New Haven counties. In addition to granite and trap rock, commercial quarries of red sandstone are operated at Hartford, Middlesex, and New Haven counties, and some marble has been produced in Litchfield County. Clay-working establishments are located chiefly in the Connecticut River valley. The product consists chiefly of common brick, which represents nearly 90 per cent of the total output of clay. Clay products were valued in 1912 at $1,507,787, compared with $1,284,106 in 1911. Lime, valued at $371,356, was produced in 1912, compared with the value of $328,904 for the product of 1911. The lime-producing counties are Fairfield and Litchfield in the extreme western part of the State. Connecticut is the third State in the Union in the production of feldspar. The output in 1912 amounted to 19,075 short tons, valued at $94,097, compared with 16,497 short tons, valued at $73,557 in 1911. Other commercial mineral products are infusorial earth, mineral waters, quartz, sand-lime brick, sand, and gravel. The total value of the mineral products of the State in 1912 was $3,716,480, compared with $3,151,588 in 1911.

Agriculture. Practically all the soils of the State are derived, either directly or indirectly, through the glaciation of the numerous varieties of underlying rock. The highland portions have been chiefly swept bare of the finer soil-forming material at all of the higher altitudes and upon the more precipitous slopes. The lower slopes and the more gently rolling portions of the highlands are deeply covered with complex glacial débris known as "till." This gives rise

chiefly to stony, sandy loams and stony loams, with smaller areas of heavier loam. Within the Connecticut River basin and in all the smaller valleys found within both portions of the highland, there were deposited gravels, sands, sandy loam, and clays at the time of the recession of the glacial ice. These more level portions constitute some of the best agricultural lands within the borders of the State. Upon the sandy loams and the loamy soils the tobacco industry, the market gardening, and a considerable part of the fruit industry are carried on. The upland soils are chiefly used for grazing and the production of grass and corn. Extensive areas are too steep in slope or too rocky for any other occupation than that of forestry or pasturage. The growing horticultural interests of the State are located chiefly upon the deeper areas of the glacial loams in the highland portions. That agriculture has not progressed in recent years is shown by the figures of the thirteenth census taken in 1910, compared with those of the census of 1900. In 1910 the total number of farms in the State was 26,815, while in 1900 it was 26,948—a decrease of 133 in the decade. Of the total land area of approximately 3,084,800 acres, there were in 1910 in farms 2,185,788 acres, while in 1900 there were 2,312,083—a decrease of 126,295 acres in the decade. The improved land in farms in 1910 was 988,252, while in 1900 it was 1,064,525 acres—a decrease of 76,273 acres. The average acres per farm in 1910 were 81.5, compared with 85.8 in 1900. The total value of farm property in 1910 was $159,399,771, compared with the value in 1900 of $113,305,580. This valuation includes land, buildings, implements and machinery, domestic animals, poultry, and bees. The average value of all property per farm in 1910 was $5944, and in 1900, $4205. In 1910 the average value of land per acre was $33.03, and in 1900, $22.68. Of the total number of farms in the State, in 1910, 24,183 were operated by owners and managers, and 2632 by tenants. In 1880 about 10 out of every 100 farms in the State were operated by tenants. This proportion increased during the next 20 years, until in 1900 about 13 farms in every 100 were operated by tenants. In the succeeding decade the movement was reversed, and the tenancy in 1910 was a little less frequent than in 1880. Of the farms owned in 1910, 13,080 were free from mortgage and 9958 were mortgaged. The average debt per farm in 1910 was $1309, and the average equity per farm was $2874. The largest number of Connecticut farms are from 50 to 99 acres. Changes during the last decade have been in the direction of increases in the relative number of smaller farms at the expense of the relative number of larger ones. In 1910 three out of every four Connecticut farmers were native whites, and one out of every four was a foreign-born white. The native white farmers numbered 19,841, and the foreign-born 6861. The negro and other non-white farmers numbered 113. Of the foreign-born white farmers, 1538 were Germans, 1164 Irish, 676 Russians, 675 Swedish, 551 English, 544 Austrian, 396 Canadian, 319 Italian, 191 Hungarian.

The general character of the agriculture of the State is indicated by the fact that only about nine per cent of the total value of crops is contributed by the cereals, while nearly one-third is contributed by hay and forage, nearly one-sixth by tobacco, and about one-sixth by potatoes and other vegetables, the remainder, representing in value about 22 per cent of the total, consists mostly of forest products, fruits and nuts, flowers and plants, and nursery products. The acreage, production, and value of the principal crops in 1909 and in 1913 are shown in the table below. The figures for 1909 are from the thirteenth census, while those for 1913 are estimates made by the United States Department of Agriculture.

PRODUCTS		Acreage	Product bu.	Value
Corn	1913	61,000	2,348,000	$1,966,000
	1909	52,717	2,530,542	1,693,939
Oats	1913	11,000	308,000	169,000
	1909	10,207	273,804	161,188
Rye	1913	7,000	135,000	124,000
	1909	7,601	137,692	123,848
Potatoes	1913	24,000	2,208,000	1,921,000
	1909	23,959	2,684,414	1,882,197
Hay	1913	379,000	432,000*	8,683,000
	1909	401,322	549,366	7,224,500
Tobacco	1913	18,400	28,520,000†	5,989,000
	1909	16,042	28,110,453	4,415,948

* Tons † Pounds.

As will be noted from this table, by far the most important product of the State is hay and forage, and the second in value is tobacco. Potatoes, with an acreage of about 50 per cent above that of tobacco, show a value hardly one-third as great. The acreage of corn decreased very greatly from 1879 to 1889, but since the latter date it has shown considerable increase. Oats decreased in acreage from 1870 over 72 per cent, although there was a slight increase from 1899 to 1909. During the last decade the increases in acreage are in tobacco, corn, and oats; decreases in acreage are in rye, buckwheat, hay and forage, and potatoes. The cultivation of tobacco was begun in 1640, if not earlier, and it is confined chiefly to the valleys of the Housatonic and Connecticut rivers. The tobacco, which is of a superior quality and of a mild flavor, is used chiefly for wrappers for cigars made from the stronger-flavored Havana tobacco.

The growing of vegetables is one of the most important agricultural industries. The value of the vegetables other than potatoes and sweet potatoes in 1909 was $1,965,635, and the acreage devoted to this was 16,250. The raising of flowers and plants and nursery products is also relatively important. To these, 1330 acres were devoted in 1909, and the output was valued at $1,308,937. The orchard fruits produced in 1909 were 1,874,000 bushels, valued at $1,327,000. Apples contributed more than four-fifths of this quantity, and peaches, nectarines, and pears most of the remainder. Small fruits in 1910 were valued at $316,752. Of these, strawberries were by far the most important.

The total value of live stock on the farms, including domestic animals, poultry, and bees, in 1910 was $14,164,000, of which domestic animals contributed $13,133,000. Cattle numbered 195,318, valued at $6,730,287; horses, 46,341, valued at $5,739,400; mules, 416, valued at $72,721; swine, 52,372, valued at $472,741; sheep, 22,418, valued at $112,349. Poultry of all sorts numbered 1,265,702, valued at $988,653. The number of dairy cows on the farms in 1910 was 122,853, and the amount of milk reported in that year was 45,750,000 gallons. Butter made on the farms was valued at $1,078,000.

Fisheries. The fisheries of the State are of

great commercial importance, ranking third among the New England States in the value of their product. The total value of fish in 1908 was $2,981,720. Of this product, oysters were the most valuable. Of these there were taken for market purposes 1,394,600 pounds, valued at $1,167,650, and for seeding purposes, 2,553,500 pounds, valued at $1,415,290. Next in order of value were menhaden, 28,636,000 pounds, valued at $93,350; lobsters, 661,300 pounds, valued at $84,280; cod, 820,300 pounds, valued at $26,720; flatfish and flounders, 707,100 pounds, valued at $21,260; and swordfish, 240,100 pounds, valued at $14,600. Among other fish taken in considerable quantities were alewives, mackerel, shad, weakfish, clams, and eels. There were 952 independent fishermen engaged in fishing in different parts of the State, and 1195 wage-earning fishermen were employed. The vessels engaged in fisheries numbered 237 and were valued at $795,364. The cash capital invested in the fisheries of the State was $572,290.

Manufactures. Connecticut is one of the most important of the manufacturing States. This prominence is due to several causes, the chief of which are the early establishment of a number of important industries in the State and the unusually large amount of capital available for investment in manufacturing industries. Additional causes are the comparatively abundant water power and its geographic location near New York City, with which many of the manufacturing centres of the State have direct water-transportation facilities. Bridgeport, New Haven, and New London are seaports of considerable prominence and afford ample opportunities for domestic coastwise commerce. In addition, the main line of the most important railroad system in New England, the New York, New Haven, and Hartford, crosses Connecticut and gives direct and adequate connection with all parts of the country. The growth and concentration of the population of the State have been closely related to the increase in the importance of its manufacturing industries. In 1849 an average of 50,731 wage earners, representing 13.7 per cent of the total population, were employed in manufactures, while in 1909 an average of 210,792 wage earners, or 18.9 per cent of the total population, were so engaged. In 1849 the total value of the manufactures of the State, including the products of the neighborhood and hand industries, amounted to $47,115,000, while in 1909, exclusive of the value of the products of the neighborhood and hand industries, it reached $490,272,000. These figures represent increases of 315.5 per cent in the number of wage earners, and 940.6 per cent in the value of products. During this period the gross value of the products per capita of the total population of the State increased from $127 to $440. In spite of this fact the State's proportion of the total value of products manufactured in the United States fell from 4.6 per cent in 1849 to 2.8 per cent in 1899 and 2.4 per cent in 1909.

The rank of Connecticut among the States in regard to the value of its manufactured products was twelfth in 1909, as compared with eleventh in 1899, and fifth in 1849. The most important data in relation to the manufactures of the State in 1909 in comparison with 1904 will be found in the table below. In this table, because of lack of space, only industries the value of whose products exceeded $2,000,000 in 1909 are included.

From this table it will be noted that in Connecticut in 1909 there were 4251 manufacturing establishments which gave employment to an average of 233,871 persons during the year and paid out $135,756,000 in salaries and wages. Of the total number of persons employed, 210,792 were wage earners. The value of the products, turned out by these establishments was $490,272,000, to produce which materials costing $257,259,000 were used. The value added by manufacture was thus $233,013,000, which represents the net wealth created by manufacturing operations during the year.

In general this table brings out the fact that the manufacturing industries of the State as a whole showed greater development during the more recent five-year period (1904–09) than during the preceding five-year period (1899–1904), although a marked increase is shown for both periods in all items except in the number of establishments from 1899 to 1904. During the later period the number of establishments increased 22.3 per cent, the average number of wage earners 16.1 per cent, the value of products 32.8 per cent, and the value added by manufacture 31.1 per cent.

Although a few industries predominate in importance, there is, on the whole, a wide diversity in manufacturing activities. The leading individual industries, measured by value of products, are those connected with brass and iron manufactures. They include the making of rolled brass and copper, which composed the major portion of the product, and of brass ware, in the manufacture of which Connecticut is particularly prominent. The State ranks first in the combined value of brass and bronze products, reporting 44.6 per cent of the total for the United States. The leading manufacturing industry in the State, however, is connected with textile manufactures. These include cotton goods; silk and silk goods; woolen, worsted, and felt goods; and hosiery and knit goods. These four branches in 1909 gave employment to an average of 34,992 wage earners, or 16.2 per cent of the total for all manufacturing industries in the State. The value of the products amounted to $70,460,000, or 14.4 per cent of the total value of manufactured products. Of the total value of products for these branches of the textile industry, 34.4 per cent was contributed by the cotton mills, 29.9 by the silk mills, 27.5 by the woolen and worsted mills, and 8.2 per cent by the hosiery and knitting mills.

The industries relating to foundry and machine-shop products are of greater importance than is indicated by the statistics. Some machine shops manufacture a distinctive product and are assigned to other classifications. The most important product is hardware, of which more than two-fifths of the total value reported for the United States in 1909 is reported from Connecticut. Some of the largest establishments, other than those producing hardware, were engaged in the manufacture of textile and metal-working machinery and internal-combustion engines.

The manufacture of firearms and ammunition is one of the State's most important manufacturing industries. It is now mainly centralized in New Haven and Bridgeport. The increase in the value of products was much greater from 1899 to 1904 than from 1904 to 1909, being 57.2 per cent and 12.3 per cent respectively for the two five-year periods. Connecticut is the lead-

COMPARATIVE SUMMARY FOR 1909 AND 1904

ALL INDUSTRIES COMBINED AND SELECTED INDUSTRIES

INDUSTRY	Census	Number of establishments	PERSONS ENGAGED IN INDUSTRY				Primary horse power	Capital	Salaries	Wages	Cost of materials	Value of products	Value added by manufacture
			Total	Proprietors and firm members	Salaried employees	Wage earners (average number)		Expressed in thousands					
STATE — All industries	1909	4,251	233,871	3,468	19,611	210,792	400,275	$517,547	$25,637	$110,119	$257,259	$490,272	$233,013
	1904	3,477	198,046	2,918	13,523	181,605	304,204	373,284	17,040	87,943	191,302	369,082	177,780
Automobiles, including bodies and parts	1909	28	4,444	8	621	3,815	3,937	12,131	634	2,878	4,856	11,668	6,812
	1904	7	1,131	4	62	1,065	1,283	3,713	86	748	1,163	2,644	1,481
Boxes, fancy and paper	1909	38	2,074	20	205	1,849	1,306	2,337	262	748	1,386	2,911	1,525
	1904	37	2,186	24	130	2,032	1,149	1,837	158	764	1,432	2,768	1,336
Brass and bronze products	1909	80	17,890	47	1,026	16,817	50,034	47,873	1,478	9,667	47,864	66,933	19,069
	1904	64	16,490	29	1,079	15,382	38,915	40,571	1,506	8,196	37,913	53,916	16,003
Bread and other bakery products	1909	431	2,611	467	275	1,869	658	2,532	169	1,222	4,463	7,310	2,847
	1904	327	2,376	355	270	1,751	557	2,260	183	1,019	3,446	5,898	2,452
Clocks and watches, including cases and materials	1909	16	6,195	5	339	5,851	4,273	9,846	415	3,030	2,098	7,390	5,292
	1904	13	6,137	2	370	5,765	3,699	8,288	364	2,939	2,116	7,060	4,944
Copper, tin, and sheet-iron products	1909	48	2,655	27	153	2,475	1,526	4,091	213	1,049	1,565	3,604	2,039
	1904	43	2,359	37	153	2,169	1,504	3,077	192	911	1,049	2,705	1,656
Corsets	1909	17	7,177	15	519	6,643	1,566	6,931	876	2,520	6,676	2,815	6,139
	1904	13	4,784	12	360	4,412	1,507	3,925	480	1,418	2,684	5,591	2,907
Cotton goods, including cotton small wares	1909	52	14,887	26	501	14,360	58,137	39,243	778	5,666	11,960	24,232	12,272
	1904	52	13,479	18	350	13,111	47,950	31,159	516	4,653	10,203	18,425	8,222
Cutlery and tools, not elsewhere specified	1909	82	8,094	45	502	7,547	14,135	13,758	751	3,980	3,310	10,717	7,407
	1904	71	6,170	43	374	5,753	8,658	8,090	479	3,098	2,830	8,336	5,506
Dyeing and finishing textiles	1909	10	1,817	3	95	1,719	5,851	5,375	198	872	1,480	3,562	2,082
	1904	10	1,496	2	88	1,406	4,883	4,562	162	640	927	2,215	1,288
Electrical machinery, apparatus, and supplies	1909	41	4,120	7	608	3,505	4,457	9,852	813	1,603	5,211	9,824	4,613
	1904	32	1,942	10	225	1,707	2,505	4,184	278	724	2,754	4,940	2,186
Firearms and ammunition	1909	10	9,205	1	671	8,533	9,391	21,681	1,048	4,968	10,066	19,948	9,882
	1904	13	8,049	9	347	7,693	5,125	11,776	562	4,601	8,311	17,762	9,451
Flour-mill and gristmill products	1909	98	288	122	21	145	3,616	1,277	22	72	1,731	2,024	293
	1904	86	311	98	46	167	3,108	1,336	39	86	1,690	1,982	292
Foundry and machine-shop products	1909	403	42,101	202	4,163	37,736	49,167	89,715	5,144	21,332	24,820	65,535	40,715
	1904	349	32,545	204	2,513	29,828	32,248	57,909	3,148	15,417	15,362	44,816	29,454
Gas, illuminating and heating	1909	28	1,211	...	285	926	4,100	16,016	286	557	1,005	3,446	2,441
	1904	26	849	1	208	640	2,237	11,036	190	330	826	2,558	1,732
Hats, fur-felt	1909	80	5,877	59	601	5,217	5,619	7,144	574	3,384	4,849	10,400	5,551
	1904	56	5,664	57	449	5,158	3,729	3,352	427	2,696	3,954	8,663	4,709
Hosiery and knit goods	1909	21	3,524	2	182	3,340	3,540	6,464	324	1,363	3,049	5,801	2,752
	1904	24	3,703	7	102	3,594	3,642	5,815	163	1,305	2,825	5,371	2,546
Liquors, malt	1909	19	588	9	104	475	2,530	5,310	218	426	1,375	4,426	3,051
	1904	22	518	17	107	394	2,171	3,956	205	315	818	2,927	2,109
Lumber and timber products	1909	393	4,219	443	281	3,495	15,153	6,109	288	1,907	3,918	7,846	3,928
	1904	176	2,496	206	181	2,109	7,275	3,372	168	1,128	2,479	4,792	2,313
Musical instruments, pianos and organs, and materials	1909	17	2,469	5	160	2,304	2,559	5,627	312	1,251	3,022	5,538	2,516
	1904	17	2,715	6	126	2,583	2,224	5,226	240	1,337	2,402	5,273	2,871
Needles, pins, and hooks and eyes	1909	8	2,825	4	173	2,648	3,190	3,209	220	1,311	1,697	4,236	2,539
	1904	13	2,463	7	130	2,326	1,654	2,835	158	1,055	1,182	3,062	1,880
Paper and wood pulp	1909	51	1,920	24	176	1,720	19,509	7,195	351	924	3,303	5,527	2,224
	1904	50	1,933	29	154	1,750	18,021	5,893	236	843	2,738	5,039	2,301
Printing and publishing	1909	363	4,103	295	930	2,878	3,425	6,322	855	1,736	1,769	6,370	4,601
	1904	328	3,426	285	613	2,528	2,530	4,768	632	1,502	1,276	5,066	3,790
Silk and silk goods, including throwsters	1909	47	9,385	37	645	8,703	8,564	19,730	996	3,749	11,834	21,063	9,229
	1904	43	8,157	38	327	7,792	7,821	16,676	479	3,124	9,098	15,624	6,526
Silverware and plated ware	1909	31	6,812	5	584	6,223	5,751	17,247	967	3,446	7,232	15,837	8,605
	1904	22	4,161	2	305	3,854	3,500	10,569	450	2,099	3,640	8,126	4,486
Slaughtering and meat packing	1909	28	523	28	63	432	590	1,967	62	239	3,949	4,572	623
	1904	26	426	29	26	371	461	733	22	204	2,809	3,218	409
Tobacco manufactures	1909	265	1,861	289	59	1,513	48	1,370	57	908	1,064	2,738	1,674
	1904	226	1,593	253	73	1,267	24	1,174	70	766	852	2,350	1,498
Typewriters and supplies	1909	8	3,510	...	576	2,934	2,034	8,468	486	1,898	1,041	4,016	2,975
	1904	6	1,611	...	104	1,507	1,113	2,291	132	809	355	1,637	1,282
Wirework, including wire rope and cable	1909	28	1,557	20	117	1,420	1,517	2,487	197	684	1,648	3,345	1,697
	1904	29	1,417	20	136	1,261	2,410	2,444	210	575	1,249	2,600	1,351
Woolen, worsted, and felt goods, and wool hats	1909	56	8,140	31	320	7,789	17,518	20,011	564	3,485	12,838	19,363	6,525
	1904	59	7,748	39	280	7,429	14,949	15,031	416	2,998	10,073	15,483	5,410

ing State in the total value of the products of these industries. In 1909 the combined products of industries related to silverware formed over one-third of the total value for the country. Plated ware comprises the principal part of this industry. In 1904 and 1909 over two-thirds of the total value of plated ware in the United States was reported from Connecticut. Other manufacturing industries of great importance are those connected with the manufacture of corsets, automobiles, cutlery and tools, hats and fur-felt; electrical machinery, apparatus, and supplies; lumber and timber products; and clocks and watches, including cases and materials. In the last-named industry the State ranked first in the total value of products in 1909. Nine of the 16 establishments in the State were engaged primarily in the manufacture of clocks. This branch of the industry in Connecticut dates from early in 1800. Much of its early development took place in that State, where it has been largely centralized. The automobile industry showed greater rates of increase from 1904 to 1909 in value of products and in value added by manufacture than any other of the important industries of the State. Increases were also shown in the manufacture of silverware and plated ware, corsets, electrical machinery, apparatus and supplies, typewriters and typewriter supplies, and paint and varnish.

As is shown by the preceding table, the average number of persons engaged in manufactures during 1909 was 233,871, of whom 210,792 were wage earners. Wage earners included 157,659 males and 53,133 females. The wage earners under 16 years of age numbered 5421, of whom 2935 were male and 2486 female. The largest number of persons were engaged in manufactures relating to foundry and machine-shop products, 42,101; in the manufacture of brass and bronze products there were engaged 17,890; in the manufacture of cotton goods, 14,887; in the manufacture of silk and silk goods, 9385; and in the manufacture of firearms and ammunition, 9205. For the great majority of wage earners employed in the manufacturing industry in the State, the prevailing hours of labor ranged from 54 to 60 hours a week, only 8.4 per cent of the total number being employed in establishments where the prevailing hours are less than 54 a week, and but 1.4 per cent in establishments where more than 60 hours a week prevail.

In 1909, 68.2 per cent of the total value of products was reported from cities and boroughs having over 10,000 inhabitants, and 65.7 per cent of the average number of wage earners were employed in these places. The figures indicate that not only has a considerable change taken place during the last decade in the relative importance of the manufacturing industries of the different groups of cities and boroughs having over 10,000 inhabitants, but the combined industries of such places have gained considerably on those of the districts outside. The most important manufacturing city in the State is Bridgeport, in which in 1909 were 25,775 wage earners and a product valued at $65,608,806. In New Haven there were 23,547 wage earners and a product valued at $51,071,397; in Waterbury, 20,170 wage earners and a product valued at $50,349,816; in Hartford, 14,627 wage earners and a product valued at $40,667,598; in New Britain, 13,513 wage earners and a product valued at $22,021,241. Other cities in which the value of the manufactured products exceeded $10,000,000 in 1909 were Ansonia, Meriden, Torrington, Naugatuck, and Danbury. Every city and borough for which figures are available, except New London, shows an increase in the value of products in the decade 1899 to 1909. New London shows a decrease of 4.8 per cent from 1904 to 1909, due to the decline in shipbuilding. Bridgeport shows an increase in 1909, as compared with 1904, of 47.1 per cent in value of products and 32.2 per cent in the average number of wage earners. The gain in value of products was due largely to the increases in the output of automobiles, corsets, electrical machinery, foundry and machine-shop products, and gold and silver reducing and refining. New Haven shows an increase of 28.8 per cent in the value of products in 1904 to 1909, Waterbury 55.6 per cent, and Hartford 56.6 per cent.

Of the 4251 manufacturing establishments in 1909, only 93, or 2.2 per cent, had a value of product exceeding $1,000,000. These establishments, however, employed an average of 95,373 wage earners, or 45.2 per cent of the total number in all establishments, and reported 49.3 per cent of the total value of products and 44.7 per cent of the total value added by manufacture. Of the 93 establishments whose products in 1909 exceeded $1,000,000 in value, 13 were engaged in the manufacture of brass and bronze products, 4 in the manufacture of cotton goods, 3 in the manufacture of cutlery and edged tools, 14 in the manufacture of foundry and machine-shop products, 6 in the manufacture of silk goods, and 5 in the manufacture of silverware and plated ware.

Education. Connecticut has always been among the most progressive of the States in educational matters. Primary education was provided for at public expense from the earliest Colonial period, and the establishment of Yale University in 1701 afforded opportunities for higher education. The percentage of illiteracy in the State is low. In 1910, of the total population of 10 years or over of 901,026, 53,665 were illiterate, or 6 per cent. The illiterates in 1900 numbered 40,972, or 5.9 per cent. The increase in the decade in both number and percentage was due to the influx of foreign-born whites. In 1910 only 1707 persons of native parentage were illiterate, while the foreign-born white persons numbered 49,202 illiterate. The percentage of illiteracy among foreign-born whites was 15.4, compared with 16.3 in 1900.

The total school population according to the thirteenth census was, in 1910, 298,454. Of these 192,497 attended schools, or a percentage of 64.5 of all persons of school age. The report of the State Superintendent of Education for the school year 1911–12 shows a school population in 1911 of 255,692, and the number of scholars registered during 1911–12 was 197,852, which was greater than the number at the end of the previous year and much larger than the number at the end of the preceding year. Of the total number of children of school age, about 30,000 were from 4 to 7 years old, and were therefore not influenced by the compulsory-attendance law. The average number of days on which each child attended school was 160. The total number enrolled in the high schools of the State in 1911–12 was 15,322. The approved high schools numbered 55. The total number of teachers in 1911–12 was 5491, of whom 361 were men and 5130 women. The average wages per month for

women teachers was $57.87, and for men teachers $125.01. The estimated value of school property in 1913 was $20,982,007. The total expenditure for schools in 1912 was $6,122,367, or a cost of $34.98 for each child in attendance, and an expenditure per child of school age of $21.30, an advance of $6.50 in 10 years. Rural schools are under the supervision of trained men, in accordance with the supervision law passed in 1903. This law made possible the payment by the State of three-fourths of the salary of the supervisor in towns having less than 11 teachers, and one-half the salary in districts formed by the union of two or more towns having in all from 25 to 50 teachers. Decided beneficial results have followed this supervision of rural schools. Experimental trade schools were established in 1909. One of these is at New Britain and another at Bridgeport. These schools include departments of day school, continuation school, half-time school, evening school, vocational school, and special courses. There are normal schools at New Britain, Willimantic, New Haven, and Danbury. The Legislature of 1913 authorized the boards of education or school committees of any town or city to establish vocational guidance as a part of the educational system of these towns and cities. The same Legislature authorized the establishment and maintenance of schools with instruction in trades, useful occupations, and avocations in towns and cities.

There is no State university. The institutions for higher education are Trinity College (Protestant Episcopal), Hartford; Wesleyan University (nonsectarian), Middletown; and Yale University (nonsectarian), New Haven. The Connecticut College for Women (q.v.) at New London was founded in 1911. There is also a State agricultural college at Storrs. This is coeducational. There are schools of science, law, art, and medicine at Yale University. The Congregationalists have divinity schools at New Haven and Hartford, and the Protestant Episcopalians one at Middletown.

Militia. The organized militia of the State consists of two regiments and a separate company (colored) of infantry, two troops of cavalry, a battery of field artillery, a company of signal troops, and two companies of coast artillery corps, an ambulance company, and a field hospital. The total strength in 1913 was 2457 enlisted men and 184 officers. The official designation is the Connecticut National Guard.

Population. The population of the State from its early settlement to the present time is shown by the following figures: In 1637, 1800; in 1688, 17,000; in 1755, 133,000—3500 slaves; in 1787, 202,000; in 1800, 251,002; in 1840, 309,978; in 1860, 460,147; in 1890, 746,258; in 1900, 908,420; in 1910, 1,114,756. The estimated population on July 1, 1914, was 1,202,688; 1920, 1,380,631. The increase in the decade 1900–10 was 206,336, or 22.7 per cent. The increase in the previous decade (1890–1900) was 21.7 per cent. The population per square mile in 1910 was 231.3 compared with 188.5 in 1900 and 154.8 in 1890. That a very large proportion of the population of the State is urban is shown by the fact that, in 1910, 999,839 persons lived in places of 2500 or more inhabitants, while only 114,917 were classed as rural. The urban population increased 25.9 per cent in the decade 1900–10, while the rural population gained only 0.8. The percentage of the population in places of 2500 or more in 1910 was 89.7 per cent. The native white population of native parentage in 1910 was 395,649. Native whites of foreign or mixed parentage numbered 374,489. Foreign-born whites numbered 328,759, compared with 237,396 in 1900. The percentage of native whites of native parentage of the whole population in 1910 was 35.5, compared with 41 per cent in 1900. The percentage of foreign-born whites in 1910 was 29.5 per cent, compared with 26.1 in 1900. The negro population in 1910 numbered 15,174, compared with 15,226 in 1900. Of the foreign-born white population, 58,457 were born in Ireland, 56,953 in Italy, 54,120 in Russia, 31,126 in Germany, 23,642 in Austria, and 22,422 in England. Of the total population of the State, in 1910, 563,642 were male and 551,114 were female. The total number of males of voting age was 347,692, compared with 280,340 in 1900. The largest cities in the State with their populations in 1910 and 1900 are as follows: New Haven, 1910, 133,605; 1900, 108,027—Bridgeport, 1910, 102,054; 1900, 70,996—Hartford, 1910, 98,915; 1900, 79,850—Waterbury, 1910, 73,141; 1900, 45,859—New Britain, 1910, 43,916; 1900, 25,998—Meriden, 1910, 27,265; 1900, 24,296—Stamford, 1910, 25,138; 1900, 15,997—Norwich, 1910, 20,367; 1900, 17,251. Nearly all these cities show an unusually large percentage of gain in the decade 1900–10.

Transportation. The transportation facilities of the State have to a large extent aided its development in manufactures. Bridgeport, New Haven, and New London are seaports of considerable prominence and afford ample opportunities for domestic coastwise commerce. Other ports of entry are Fairfield and Stonington. From several of these cities there are lines directly in connection with New York City. The railroad system of the State reached an early development and has in recent years been little extended. The main line of the most important railroad system in New England, the New York, New Haven, and Hartford, traverses the State and gives direct connection to all parts of the country. This corporation also controlled nearly all the electric railways, of which construction in recent years has been large until the order of dissolution issued from the Federal Department of Justice in 1914. The total length of the New York, New Haven, and Hartford Company's lines within the State, including tracks of all kinds, was, at the beginning of 1914, 1885 miles. The only other railroads of importance whose lines are within the State's borders are the Central New England Railway Company, with a mileage of 98, and the Central Vermont Railway Company, with a mileage of 80. The South Manchester Railway is a small line having about three miles of trackage. In January, 1912, there were eight companies operating electric railways in the State, and the miles of single track were 996. There is, in general, a good system of roads, in the care of which communities are assisted by the State. The Connecticut River is an important highway of commerce and transportation, and improvements in the river below Hartford have been carried on by the United States government in recent years. In 1911 the Federal government completed improvements in Bridgeport harbor, and in the same year a 12-foot channel in the harbor of New Haven was completed. In the latter harbor breakwaters were also built and a 12-foot anchorage basin.

The Public Utilities Commission has general charge of the regulation of railroad rates in the State.

Finance. The finances of the State have for several years been in an unsatisfactory condition. The expenditures have greatly exceeded the receipts and it has been necessary to resort to loans and bond issues. The total receipts for the fiscal year ending September 30, 1913, amounted to $7,192,045. In this is included a loan of $1,745,000, which was necessary to meet current expenses. The balance at the beginning of the fiscal year was $2,186,245. The expenditures for the period amounted to $9,062,857. The expenditures in excess of receipts amounted to $1,870,812. The balance in the treasury at the end of the fiscal year 1913 was $315,431. The bonded debt of the State amounted at the end of the fiscal year 1913 to $7,064,100, and the temporary loans as noted above to $1,745,000, making a total debt of $8,809,100. In 1906 the State had no debt, but a surplus of $265,270. This shows an increase for six years in the State's indebtedness of $8,759,138. In the latter part of 1913 the treasury issued $4,000,000 in 4% bonds in order to pay temporary loans and future expenditures. To some extent the condition results from delays in payments of taxes. There is no penalty for deferred payments and this delay has been injurious to the State. The chief sources of revenue are the taxation of railroads and insurance companies, savings banks, general taxes, and inheritance tax. From the last-named source there was received in 1913 $840,312. The chief expenditures are for education, public works, and the support of State institutions. The treasurer, comptroller, and tax commissioner of the State constitute a board of equalization of taxes.

Banks. On June 14, 1912, there were 78 national banks in the State. Their resources amounted to $127,596,241; deposits subject to check, $65,957,004; and savings deposits, $2,404,558. Of the seven State banks the resources amounted to $15,213,735; and deposits subject to check, $10,466,079. The savings banks numbered 85, with 595,360 depositors. In the number of depositors in the savings banks Connecticut is surpassed only by Massachusetts and New York, the resources amounting to $315,248,206 and the deposits to $280,311,885. In addition to these banks there were 37 loan and trust companies, with deposits subject to check amounting to $24,513,743, and savings deposits amounting to $8,815,816.

Charities and Corrections. The charitable and correctional institutions of the State are under the control of the State Board of Charities. The penal institutions include the Connecticut State Prison at Wethersfield and the various county jails. The reformatories include the Connecticut State Reformatory at Cheshire, the Connecticut School for Boys at Meriden, the Industrial School for Girls at Middletown, the House of the Good Shepherd at Hartford, and the Florence Crittenton Mission at New Haven. Provision for the insane is made by the Connecticut Hospital for the Insane at Middletown, the Norwich Hospital for the Insane at Norwich, and the Hartford Retreat at Hartford. There are in addition a number of private sanitariums for mental and nervous diseases. Other institutions are the Connecticut Colony for Epileptics at Mansfield, the School for Imbeciles at Lakeville, the American School for the Deaf at Hartford, and the Mystic Oral School at Mystic. There were 25 public hospitals in the various cities in the State and nine sanitariums for tuberculosis and special hospitals. Provision for disabled soldiers is made at Fitch's Home for Soldiers at Noroton and a Woman's Relief Corps Home at Cromwell. There are, besides these institutions mentioned, a large number of private homes for the aged, temporary homes for children, and private homes for the young. The Legislature of 1911 provided for the transfer from the State prison to the reformatory at Cheshire, subject to the approval of the directors of this institution, all male prisoners under 25, sentenced to less than five years' imprisonment. The same Legislature provided that a contract for convict labor may not be made for longer than four years. A prisoner in the State prison sentenced for an attempt to murder by assault or an attempt to poison may be paroled after two years. The expenditures of the State for delinquents, defectives, and dependents in 1912 were $1,381,707. The expenditures for lands, buildings, and equipment were $487,300, or a total expenditure of $1,869,007. The State Board of Charities is authorized to visit and inspect all institutions, public or private. It includes some of the functions of a prison commission and those of a lunacy commission, and may correct any abuses, providing that this is done in such a manner as not to conflict with any personal, corporate, or statutory rights. The members of the board receive no remuneration for their services, but their actual expenses are paid. The State has adopted the policy of placing in private families children committed to reformatory schools, as well as orphans.

Government. The constitution of the State was approved by the people in 1818. Thirty-five amendments had been adopted up to 1914. Amendments originate in the House of Representatives, and a proposed amendment must be continued to the next General Assembly and be published with the laws which may have been passed at the same session; and if two-thirds of each house at the next session of the Assembly shall approve the amendments proposed, they are transmitted to the town clerk in each town in the State. He shall present the amendment to the inhabitants for their consideration at a town meeting, and if a majority of the electors present at such meeting shall have approved the amendments, they are valid to all intents and purposes as a part of the constitution.

Executive.—The executive power in the State is vested in the Governor, who holds office for two years. The other executive officers are Lieutenant Governor, Secretary, Treasurer, and Comptroller. The salary of the Governor was increased in 1912 to $5000 a year and that of Lieutenant Governor to $1500.

Legislative.—The legislative power of the State is vested in two houses, the Senate and the House of Representatives. The official title of both houses is the General Assembly. The Senate is composed of not less than 24 and not more than 36 members, who are elected biennially on the Tuesday after the first Monday in November. The House of Representatives consists of electors residing in towns from which they are elected. Every town which contains a population of 5000 is entitled to send two representatives. The population of each town is determined by enumeration made under the au-

thority of the United States census next before the election of representatives is held. There are 35 senators and 258 representatives. Senators and representatives are elected for a two-year term, and receive for the regular session $300 each and mileage. Only mileage is allowed for extra sessions. Up to 1911 there was no limit to the duration of the session of the Legislature. In that year a constitutional amendment was adopted which provided for an adjournment *sine die* not later than the first Wednesday after the first Monday in June, following its organization.

Judiciary.—The judicial power of the State is vested in the supreme court of errors, a superior court, judges of the court of common pleas, district courts, police courts, and the judge of probate. Judges of the supreme court of errors and of the superior court are appointed by the General Assembly upon the nomination of the Governor. There are one chief justice of the supreme court of errors and four associate justices. The superior court consists of six judges. There are courts of common pleas for Hartford, New Haven, New London, Fairfield, and Litchfield counties, each with one judge, except in New Haven County, where there are judges respectively for the civil and criminal sides. There is a district court in Waterbury, and borough courts and justices of the peace in various towns and cities.

Suffrage and Elections.—Every male citizen of the United States who shall have attained the age of 21 years, and who shall have resided in the State for a term of one year next preceding, and in the town in which he may offer himself to be admitted to the privileges of an elector at least six months next preceding the time he may so offer himself, and shall sustain a good moral character, shall, on his taking such oath as may be prescribed by law, be an elector. Each person admitted to be an elector must be able to read in the English language any article of the constitution or any section of the statutes of the State before being admitted an elector.

The general election for Governor, Lieutenant Governor, Secretary, Treasurer, Comptroller, and members of the General Assembly, is held on the Tuesday after the first Monday in November, every two years. In 1905 a constitutional amendment was adopted providing for the use of voting machines and other mechanical devices for voting. In 1909 the Corrupt Practices Act and the Australian Ballot Law were amended. The Legislature of 1913 passed statutes making provision for the election of United States Senators in accordance with the seventeenth amendment to the Constitution.

Local Government.—Each town annually or biennially, as the electors may determine, selects such officers of local government as the laws may prescribe. Sheriffs are elected in the several counties every four years. There is no legislative provision for the commission form of government in towns and cities, but in 1911 the town of Bristol adopted a city charter which contained some features usually found in a commission form of government, including provisions for the initiative and referendum.

Miscellaneous Statutory Provisions. — No county, city, town, borough, or other municipality is permitted to subscribe to the capital stock of any railroad corporation, or to become a purchaser of the bonds, or to loan its credit directly or indirectly in aid of any such corporation. Real estate acquired by a married woman's services or conveyed to her for a consideration may be held for her own use. The husband is trustee of a wife's personal estate, which upon his death falls to her or her devisees, legatees, or heirs, as though she had never been married; and married women may convey by devise the same as single persons, except that a husband (if he have not abandoned her) must unite in conveying by deed. Divorce may be had for fraudulent contract, adultery, desertion, and neglect of duty for three years, habitual intemperance, cruelty, imprisonment for life, and for certain crimes; previous residence required. The sale of liquor is regulated by each town in accordance with local-option laws. The registration of voters is required in the State, and women are allowed to vote in elections for school officers. The legal rate of interest is 6 per cent. Judgments outlaw in 17 years; notes and accounts in six years. The eight-hour day is a maximum for mechanics in State institutions except in unavoidable emergencies. No minor under 16 and no woman of any age is permitted to be employed in a mercantile establishment, unless it is manufacturing or mechanical, more than 58 hours a week, except under certain conditions; and no child under 16 can be employed unless he has a certificate of elementary education. No child under 16 is permitted to run or adjust certain dangerous machinery. The Legislature of 1911 passed an elaborate measure forbidding blacklisting. Physicians are required to report to the State Commission of Labor cases of occupational diseases. In 1911 a measure was passed requiring the registration of airships and the licensing of aëronauts. This is probably the first State law dealing with aëronautics. The same Legislature passed an elaborate act providing for sanitation in tenements, boarding and lodging houses, and several other measures providing for the purity of milk and other food and regulating the sale of liquors and drugs. Tobacco must not be sold or given to minors under 16. Any combination to increase prices of necessities is punishable by a maximum fine of $1000 or by imprisonment or by both. The Legislature of 1913 created a State civil service commission to consist of three members appointed by the governor. This commission is required to classify all officers and places of employment in the State service which come under the provision of the Civil Service Act, which was passed at the same session. The same Legislature passed a measure providing for workmen's compensation in case of injury.

Religion. Connecticut was in its early days a refuge for the English Nonconformists. For a long time the Congregational church had almost the entire field to itself. The Unitarian movement made less progress in Connecticut than in other New England States. With the emigration to Western States of large numbers of the descendants of the original Colonial stock and the incoming of large numbers of foreigners —especially Irish and French-Canadian—a still greater religious change has taken place. In 1913 the Catholic population numbered 438,483; non-Catholic, 778,248.

History. In 1614 Adriaen Block, a native of Holland, discovered and explored the Connecticut River, but it was not till 1633 that the Dutch of New Amsterdam began a trading post at Suckiaug (Hartford). Two years earlier the

soil from Narragansett Bay to the Pacific Ocean was granted by the Earl of Warwick to Lord Saye and Sele, and others, but the transfer apparently had no legal basis. In 1633 traders from Plymouth visited the site of Windsor. Wethersfield in 1634, and Windsor and Hartford in the following year, were settled by emigrants from Massachusetts Bay. In 1635 the Saye and Sele patentees sent over John Winthrop, Jr., to act as Governor. He built a fort at Saybrook, preventing the Dutch from getting control of the Connecticut, and gave the settlers in the upper valley a conditional permission to remain. Desire for a more democratic government caused a new exodus from Massachusetts, and in 1636 Hartford, Windsor, and Wethersfield received their chief bodies of immigrants. In 1638–39 the three towns united in an independent commonwealth and adopted a thoroughly democratic constitution. The Massachusetts system of town government, transplanted to Connecticut, attained its fullest development in the three upper settlements, with which Springfield (Agawam) remained nominally associated till 1641. War with the Pequots, the most powerful of the Indian tribes, in 1637, led to their extermination, and the progress of colonization was never again hindered by the enmity of the natives. In 1638 New Haven was founded by a Puritan colony under the Rev. John Davenport, and from 1638 to 1640 Milford, Guilford, and Stamford on the mainland and Southold on Long Island were settled. Together with Branford these towns were united, between 1643 and 1651, into one "jurisdiction," known subsequently as the New Haven Colony, as opposed to the upper settlements, which constituted the Connecticut Colony. The laws of the Old Testament were made the rule for all courts. A somewhat similar code of laws in Connecticut gave rise in after years to the nickname "blue laws" (q.v.), although Connecticut, unlike New Haven, did not restrict the franchise and the holding of office to church members. In 1644 Connecticut bought the colony of Saybrook from Saye and Sele, and gradually (1644–62), by purchase and colonization, acquired the greater part of the present State and a considerable portion of Long Island. In 1657 John Winthrop, Jr., was chosen Governor of Connecticut, and by his skill in diplomacy procured, in 1662, a charter from Charles II granting absolute autonomy to that Colony. By this charter New Haven was incorporated with Connecticut, in spite of the most vehement opposition on the part of the former. New Haven, nevertheless, was forced to submit (1664). In October, 1687, Sir Edmund Andros came to Hartford and demanded the charter from the General Assembly, but it was carried away and secreted till 1689. (See CHARTER OAK.) From 1687 to 1689, however, the Colony was subject to the despotic rule of Andros. In 1708 the Congregational church system was established by the adoption of the Saybrook platform, and this was supplemented by the Act of 1742. Though other denominations were tolerated, church and state for a long time remained closely connected, and secular and religious affairs were under the control of the same authorities. In 1754 Connecticut bought from the Indians a large tract of land in the Wyoming valley in Pennsylvania and proceeded to settle it, but was compelled in 1782 to surrender it to Pennsylvania. In 1786 the Colony relinquished its charter rights to the territory west of its present limits and received in return the Western Reserve (q.v.). Emigration to the western lands, as well as to Vermont and New York, was active.

The passage of the Stamp Act was vigorously denounced by the General Assembly; in May, 1776, the Colony was declared released from its allegiance to England, and in October Connecticut was constituted an independent State. It contributed more than 30,000 men to the Revolutionary army, and its Governor, Jonathan Trumbull, was one of Washington's most trusted advisers. In 1777 the British burned Danbury and in 1779 pillaged New Haven. Forts Griswold and Trumbull, at New London, were taken on Sept. 6, 1781, by Benedict Arnold, and the town was destroyed. In the framing of the Federal Constitution Connecticut took a prominent part, and to its delegates was due the adoption of that feature of the Constitution which provides for State representation in the upper house of Congress and proportionate representation in the lower. Connecticut was always a stronghold of federalism; it strongly opposed the War of 1812, and its capitol was the meeting place of the celebrated Hartford Convention (q.v.). In 1818 a new constitution was framed, church and state were separated, and the franchise was widely extended. The General Assembly was divided into a Senate and a House of Representatives. The conservative and theocratic character of the government became greatly modified as the State developed from an agricultural region into a commercial and industrial centre. The shrewdness of the Connecticut trader and the preëminent ingenuity of the Connecticut mechanic raised the State to a high degree of prosperity. During the Civil War Connecticut gave to the Union cause nearly 60,000 troops and the services of her great War Governor, Buckingham. Progress was rapid after the war. In the matter of public instruction the State took one of the foremost places in the Union, if not the foremost, devoting the entire proceeds from the sale of its public lands to the support of the free schools. In the readjustment, however, of the balance of political power in conformity with changed political conditions, no like spirit of progress was shown, and in 1901 the necessity of electoral reform was discussed at length in the press of the State. Representation in the lower house being based on the old township divisions and not on population, it happened that great cities like New Haven and Bridgeport were dominated by rural communities with one-tenth their population. In many cases a state of things prevailed not far removed from conditions in England before the Reform Bill of 1832. The agitation resulted in the calling of a constitutional convention, which met in January, 1902, and drew up a scheme of redistribution which was submitted to the people on June 16. The measure provided for one representative from every town with a population of less than 2000, two representatives for towns between 20,000 and 50,000, three for towns between 50,000 and 100,000, and four for all cities over 100,000, with one additional for every 50,000 inhabitants above that number. The effect of the measure would have been to deprive some towns of one representative each and to assign these to the large towns. The plan, however, satisfied neither the conservatives nor the advocates of reform, and was voted down. In 1907 there was submitted to the people a con-

stitutional amendment providing for a revised constitution. This, in effect, was the old constitution with the amendments included in the body of the document instead of being added as an appendix. The only change was in the term for judge of probate, which was made four years. The amendment was defeated. In the presidential election of 1908 Taft received 112,815 votes; Bryan, 68,225. G. L. Lilley, Republican, was elected Governor. On October 6 of that year a new stone bridge between Hartford and East Hartford, costing $3,000,000 and said to be the finest structure of its kind in the world, was dedicated with appropriate ceremonies. Governor Lilley died April 2, 1909, and was succeeded by Lieutenant Governor Frank B. Weeks. On Jan. 20, 1910, Frank B. Brandegee was reëlected United States Senator. Simeon E. Baldwin, former Chief Justice of the State, was elected Governor. This was the first election of a Democratic governor in the State since 1893. In January, 1911, George P. McLean was elected United States Senator to succeed Morgan G. Bulkeley. The Democrats in 1912 renominated Governor Baldwin. The Republicans nominated Judge J. P. Studley, and the Progressives Henry Knox Smith, former United States Commissioner of Corporations. In the election of November 5, 1912, Wilson received 74,561 votes; Taft, 68,324; Roosevelt, 34,129; Debs, 10,056. For Governor, Baldwin received 78,274; Studley, 67,531; Smith, 31,020. The Democrats elected representatives in all five districts and all the State officers. In national elections Connecticut has been in general Federalist, Whig, and Republican; but it cast its vote for Monroe in 1820, for Van Buren in 1836, for Pierce in 1852, for Tilden in 1876, for Cleveland in 1884, 1888, and 1892, and for Wilson in 1912. The State has seven votes in the electoral college.

COLONIAL GOVERNORS

Connecticut Colony

	Years		Years
John Haynes	1639–40	John Webster	1656–57
Edward Hopkins	1640–41	John Winthrop	1657–58
John Haynes	1641–42	Thomas Welles	1658–59
George Wyllys	1642–43	John Winthrop	1659–76
John Haynes	1643–44	William Leete	1676–83
Edward Hopkins	1644–45	Robert Treat	1683–87
John Haynes	1645–46	Edmund Andros	1687–89
Edward Hopkins	1646–47	Robert Treat	1689–98
John Haynes	1647–48	Fitz John Winthrop	1698–1707
Edward Hopkins	1648–49	Gurdon Saltonstall	1707–24
John Haynes	1649–50	Joseph Talcott	1724–41
Edward Hopkins	1650–51	Jonathan Law	1741–50
John Haynes	1651–52	Roger Wolcott	1750–54
Edward Hopkins	1652–53	Thomas Fitch	1754–66
John Haynes	1653–54	William Pitkin	1766–69
Edward Hopkins	1654–55	Jonathan Trumbull	1769–76
Thomas Welles	1655–56		

New Haven Colony

	Years		Years
Theophilus Eaton	1639–57	William Leete	1661–65
Francis Newman	1658–60		

STATE GOVERNORS

		Years
Jonathan Trumbull	Federalist	1776–84
Matthew Griswold	"	1784–86
Samuel Huntington	"	1786–96
Oliver Wolcott	"	1796–98
Jonathan Trumbull	"	1798–1809
John Treadwell	"	1809–11
Roger Griswold	"	1811–13
John Cotton Smith	"	1813–17
Oliver Wolcott	"	1817–27
Gideon Tomlinson	"	1827–31
John S. Peters	Whig	1831 33
H. W. Edwards	Democrat	1833 34
Samuel A. Foote	Whig	1834–35
H. W. Edwards	Democrat	1835–38
W. W. Ellsworth	Whig	1838–42
C. F. Cleveland	Democrat	1842–44
Roger S. Baldwin	Whig	1844–46
Isaac Toucey	Democrat	1846–47
Clark Bissell	Whig	1847–49
Joseph Trumbull	"	1849–50
Thomas H. Seymour	Democrat	1850–54
Henry Dutton	Whig	1854–55
W. T. Minor	Know-Nothing	1855–57
A. H. Holley	Whig	1857–58
W. A. Buckingham	Republican	1858–66
Joseph R. Hawley	"	1866–67
James E. English	Democrat	1867–69
Marshall Jewell	Republican	1869–70
James E. English	Democrat	1870–71
Marshall Jewell	Republican	1871–73
Charles R. Ingersoll	Democrat	1873–76
R. D. Hubbard	"	1876–79
C. B. Andrews	Republican	1879–81
H. B. Bigelow	"	1881–83
Thomas M. Waller	Democrat	1883–85
Henry B. Harrison	Republican	1885–87
Phineas C. Lounsbury	"	1887–89
Morgan G. Bulkeley	"	1889–93
Luzon B. Morris	Democrat	1893–95
O. Vincent Coffin	Republican	1895–97
Lorrin A. Cooke	"	1897–99
George E. Lounsbury	"	1899–1901
George P. McLean	"	1901–03
Abiram Chamberlain	"	1903–05
Henry Roberts	"	1905–07
Rollin S. Woodruff	"	1907–09
George L. Lilley	"	1909
Frank B. Weeks	"	1909–11
Simeon E. Baldwin	Democrat	1911–15
M. H. Holcomb	Republican	1915–21
Everett J. Lake	"	1921–

Consult: Trumbull, *The Colonial Records of Connecticut* (Hartford, 1850–59); Levermore, *The Republic of New Haven* (Baltimore, 1886); Norton, *The Governors of Connecticut* (Hartford, 1905); Morgan, *Connecticut as a Colony and as a State* (4 vols., ib., 1904); *Public Acts* (ib., 1911); *Register and Manual* (ib., 1912); Stoughton, *Corner Stone of Colonial Commerce* (Boston, 1911); Rice and Gregory, "Manual of the Geology of Connecticut," in *Bulletin No.* 6 *of the Connecticut Geological and Natural History Survey.*

CONNECTICUT COLLEGE FOR WOMEN. An institution for the higher education of women at New London, Conn., chartered on April 4, 1911. It owes its foundation to the wish and purpose of the people of Connecticut to provide within the State adequate facilities for the higher education of women. Its scope of instruction includes the humanities, sciences and arts, and it gives the degrees of A.B. and B.S. At a later date it is proposed to introduce graduate curricula leading to the A.M. degree. Instruction is given in music and in the fine and applied arts. The college campus comprises 340 acres in the northern limits of New London. The academic group of buildings is designed to be the centre of the general scheme of the building plan of the college. It will comprise the college hall, the library, convocation hall and chapel, museum, science buildings, and arts buildings. In convenient proximity to the central group will be ranged the residence group and the buildings needed in the athletic and social activities of the students. The architectural style for the buildings is in general the domestic Tudor, with the associated Collegiate Gothic for certain of the larger edifices. The college has received generous gifts of money, including a benefaction from Hon. Morton F. Plant, who provided for general maintenance by a gift of an endowment of $1,000,000 and for the housing of students by a building fund of $100,000, for the erection of the Plant and Blackstone dormitories. The trustees in June, 1913, authorized the erection of an initial group of five buildings adequate for the use of the college at the outset.

Construction on these buildings began in the spring of 1914. The official date for the opening of the college is September, 1915. The president is Fred H. Sykes, A.M.

CONNECTICUT LAKES. A chain of four lakes in Coos Co., N. H. (Map: New Hampshire, G 1). The "First," or Connecticut, Lake is 4 miles long, 2¾ miles wide, and 1618 feet above the sea. Four miles northeast is the "Second" Lake, 2¾ miles long, 1 mile wide, and 1882 feet above the sea. The "Third" Lake, about 7 miles farther north and ½ mile from the Canadian boundary, is 2028 feet above the sea, and has an area of about ¾ of a square mile. "Fourth" Lake, a mere pond, the last of the chain and the source of the Connecticut River (q.v.), is northwest of the "Third" Lake, near the Canadian boundary line, and 2551 feet above the sea. For some description of these lakes, consult Bacon, *The Connecticut River and the Valley of the Connecticut* (New York, 1906).

CONNECTICUT RIVER. A river of the United States, rising in the beautiful Connecticut lakes (q.v.), in northern New Hampshire, 2551 feet above sea level (Map: Connecticut, F 4). It flows southwest and south, forming the boundary between New Hampshire and Vermont, and enters Massachusetts near South Vernon, Vt. From this point it continues nearly due south across the State and enters Connecticut, where at Middletown it turns towards the southeast and, completing its course across the State, empties into Long Island Sound at Saybrook. The Connecticut River, the longest in New England, is 375 miles long and drains an area of about 11,083 square miles; in the lower part of its course (from Deep River) its width varies from 750 feet to half a mile, but generally does not exceed a quarter of a mile. Its mean discharge at Hartford is about 19,000 cubic feet per second. It is navigable to Hartford, 49.5 miles, for large steamers, and by means of the Windsor locks small boats may ascend to Holyoke. Fluctuations due to the tide are 3.4 feet at Saybrook, 1.8 feet at Middletown, and about 1.2 feet at Hartford. At Deep River (12 miles from the Sound) the water is distinctly brackish, but 2 miles farther up it is virtually fresh. Usually the river is closed by ice from about the middle of January to about the middle of March. The river falls rapidly at places and furnishes extensive water power. The principal falls and their heights are: Holyoke, 59 feet; Turner's, 41 feet; Bellows Falls, 54.5 feet; Olcott, 36 feet; and the Fifteen-Mile Falls. The principal tributaries from New Hampshire are the upper and lower Ammonoosuc and the Ashuelot; from Vermont, the Passumpsic, White, and West. In Massachusetts the chief tributaries from the east are the Chicopee and the Miller; from the west, the Deerfield and the Westfield. The only considerable affluent in Connecticut is the Farmington River, which rises in Massachusetts and empties into the main stream 6 miles above Hartford. The chief towns on its course are Wells River, Bellows Falls, Walpole, Brattleboro, Greenfield, Northampton, Holyoke, Chicopee, Springfield, Hartford, and Middletown. Consult Bacon, *The Connecticut River and the Valley of the Connecticut* (New York, 1906), and for a detailed description of the river below Hartford, the Report on the "Connecticut River up to Hartford," by the Engineering Corps of the United States War Department, in *House Document No. 1294*, 61st Congress, 3d session (1911).

CONNECTIVE TISSUE. The most widely distributed tissue of the body. Its function, in whatever modification it occurs, is to support and connect the tissues of the animal frame. It originates in the middle or mesoblastic layer of the embryo, and the differentiation which occurs and which distinguishes the different forms of connective tissue takes place mainly in the intercellular substance. Thus the intercellular substance may be soft and gelatinous, as in mucous connective tissue, or dense and firm, as in fascia and tendon, or hard, as in bone. The cells of connective tissue begin as small, round mesoblastic cells. Either directly from these cells or under their influence there is formed between the cells an intercellular substance, which, as stated, varies in character, and during the formation of which various changes take place in the cells themselves. Connective tissue has a relatively poor blood supply, is scantily furnished with nerves, but abounds in lymphatics.

The principal types of connective tissue are as follows: 1. White fibrous connective tissue. 2. Yellow elastic connective tissue. 3. Developmental forms of connective tissue, (*a*) mucous and (*b*) embryonal. 4. Cartilage. 5. Bone and dentine. 6. Adipose tissue or fat. 7. Neuroglia, the connective tissue of the nervous system. Of these forms of connective tissue, fat, cartilage, bone, and neuroglia (see NERVOUS SYSTEM) represent the more highly specialized types and will be found described in articles under their respective names. The remaining represent those forms of connective tissue to which the term usually refers. *White Fibrous Connective Tissue.*—This constitutes the subcutaneous connective tissue and intermuscular septa, where it is known as areolar tissue; it also forms the ligaments, tendons, and the framework of all the organs. Its cellular elements consist of fixed connective-tissue cells and the so-called wandering cells. The fixed cells are mainly irregular or fusiform in shape, with very little cell body. Much less numerous are the so-called plasma cells of Waldeyer and the granule cells. Some connective-tissue cells, such as many of those found in the choroid coat of the eye, are densely pigmented. The wandering connective-tissue cells are probably identical with the white blood corpuscles. (See BLOOD.) In the intercellular substance two kinds of fibres are found, white fibres and yellow elastic fibres. The former occur in broad wavy bundles composed of minute fibrils; the elastic fibres are narrow, glistening, apparently homogeneous bands which branch and anastomose. There is much variation in the relative number of cells and fibres, the softer tissues being more cellular, the more dense tissues, such as tendon, being almost entirely composed of fibres. *Yellow Elastic Tissue.*—This may occur almost pure in some parts of the body, as in the *ligamentum nuchæ*. (See NECK.) In such tissue, instead of the fine delicate fibres described above, the fibres are large and coarse. *The Developmental Forms of Connective Tissue.*—The mucous tissue constitutes the Wharton's jelly of the umbilical cord, the embryonal connective tissue found in fœtal life. In mucous tissue the cells are stellate, with long branching processes which anastomose with those of other cells. The intercellular substance

is gelatinous, with only a few fibres. In the adult an example of mucoid connective tissue is seen in the vitreous humor of the eye. Here the cells have disappeared, and only the jelly remains.

CON'NELLEY, WILLIAM ELSEY (1855–). An American author, born in Johnson Co., Ky. He became the director of the Kansas State Historical Society and published several works on the early history of Kansas, Indian traditions, and folklore. Among these are: *Wyandot Folk-Lore* (1899); *Kansas Territorial Governors* (1900); *John Brown—the Story of the Last of the Puritans* (1900); *Doniphan's Expedition* (1907); *Quantrill and the Border Wars* (1909); *The Ingalls of Kansas* (1909); *Eastern Kentucky Papers* (1910); *Life of Preston B. Plumb* (1913). He was greatly assisted in his researches by his knowledge of the Indian languages, as exemplified in his publication of a vocabulary of the Wyandot tongue.

CON'NELLSVILLE. A city in Fayette Co., Pa., 57 miles southeast of Pittsburgh, on the Baltimore and Ohio, the Pennsylvania, the Western Maryland, and the Pittsburgh and Lake Erie railroads, and on the Youghiogheny River (Map: Pennsylvania, B 8). It has a park, fine municipal and public library (Carnegie) buildings, and is the seat of a State hospital (miners). The city is the centre of the Connellsville coke region, the most important seat of coke production in the United States. Until 1903 the coke output of this region was from 40 to 50 per cent of the total output of the United States. The estimated output in 1912 was 20,000,837 short tons. The city contains also machine and car shops, and glass works, steam-pump factory, railroad repair shops, etc. Settled in 1770, Connellsville was erected into a township and named (in honor of Zachariah Connell, the founder) in 1793 and was incorporated as a borough in 1806. It is governed by a mayor, who holds office for three years, and a common council. Connellsville contains the grave of Edward Braddock, the Irish general with whom Washington fought in the French and Indian Wars. Pop., 1890, 5629; 1900, 7160; 1910, 12,845; 1920, 13,804.

CONNEMARA, kŏn'nĕ-mä'rȧ (Ir. *Conmacne-mara,* seaside of the descendants of Conmac, the second of the three sons of Maeve, the English Mab, reputed Queen of Connaught in the first century A.D.). A district, 30 miles long by 15 to 20 broad, in the west of Galway, Ireland, between the bays of Kilkieran and Ballinakill. The name is often applied to the whole western part of County Galway (Map: Ireland, B 3). It has most fertile territory, though the coast is rocky, with abundant fishing, but the land has never been developed. Building stone and a green variety of marble, well adapted for decorative work, are extensively quarried. Peaks of mountains attain 2700 feet and are known to contain rich ore deposits.

CON'NER, DAVID (1792–1856). A United States naval officer, born in Pennsylvania. He entered the United States navy as a midshipman in 1809 and during the War of 1812 served as lieutenant on the *Hornet* in her engagements with the *Peacock* and the *Penguin.* He became commodore of the West India and home squadron in 1843 and, at the outbreak of the Mexican War, blockaded the Gulf ports. In his flagship, the *Raritan,* he led the attack on Vera Cruz in 1847 (see VERA CRUZ, CAPTURE OF) and landed General Scott's army of invasion. Commodore Conner was the first United States naval officer to use steamships in warfare. He was commandant of the Philadelphia Navy Yard at the time of his death.

CONNERSVILLE. A city and the county seat of Fayette Co., Ind., 57 miles east of South Indianapolis, on the Cincinnati, Hamilton, and Dayton, the Cleveland, Cincinnati, Chicago, and St. Louis, and the Fort Wayne, Cincinnati, and Louisville railroads, and on the White Water River (Map: Indiana, D 3). Among its features are a Carnegie library, a high-school building, Roberts Park, and Fayette Sanitarium. Connersville manufactures automobiles, pianos, paper, gloves, brick, blowers, carriages, mirrors, furniture, triple signs, overalls, and flour. The water works are the property of the city. Connersville was incorporated in 1813 and is governed by a mayor, elected biennially, and a council. Pop., 1900, 6836; 1910, 7738.

CONNOISSEUR, kŏn'nĭs-sēr' *or* -sōōr' (Fr., one who knows). A person who, without being an artist, is sufficiently acquainted with any fine art to pass competent judgment upon it. The Italians call such persons *cognoscenti.* See DILETTANTE.

CONNOISSEUR, THE. A weekly publication conducted by George Colman the Elder and Bonnel Thornton from the early part of 1754 to 1756. In it the first published work of William Cowper appeared, entitled *Keeping a Secret.*

CON'NOLLY, JAMES BRENDAN. An American author, born in South Boston, Mass. From 1890 to 1895 he acted as clerk and surveyor with the United States Engineering Corps at Savannah, Ga. He took an active interest in athletics and in 1896 won the first Olympian championship of modern times. In the Spanish-American War he served with the Ninth Massachusetts Infantry, and in 1907–08 he served in the United States navy. His writings, dealing chiefly with the sea, include: *Jeb Hutton* (1892); *Out of Gloucester* (1902); *The Seiners* (1904); *The Deep Sea's Toll* (1905); *The Crested Seas* (1907); *An Olympic Victor* (1908); *Open Water* (1910); *Wide Courses* (1912); *Sonnie-Boy's People and Other Stories* (1913).

CONNOR, RALPH. The pen name of Rev. Charles W. Gordon (q.v.).

CON'NOR, SELDEN (1839–1917). An American soldier. He was born in Fairfield, Me., and in 1859 graduated at Tufts College. At the beginning of the Civil War he enlisted in the First Vermont Volunteers, but later joined the Nineteenth Maine Volunteers, of which he became colonel, and was severely wounded in the battle of the Wilderness. In 1864 he was commissioned brigadier general of volunteers, but in 1866 was mustered out of service. He was Governor of Maine in 1876–78. Subsequently he was United States pension agent (1882–86), in 1890 became president of the Society of the Army of the Potomac, in 1896–99 was senior vice commander in chief of the Order of the Loyal Legion, and in 1897 was again appointed pension agent. His address on *Hannibal Hamlin* was published in 1909.

CON'NOTA'TION (from Lat. *connotare,* to connote, from *com-,* together + *notare,* to note, from *nota,* mark, from *noscere,* to know; connected with Gk. *γιγνώσκειν, gignōskein,* Eng. *know*) OF A TERM. In logic, the quality or totality of qualities an object must possess in order to be appropriately designated by a given term. Thus, the connotation of the term "ani-

mal" consists of all those qualities (organized physical constitution, sensitiveness, etc.) which any object must possess if it is properly to be called an animal. In earlier logical theory, under the influence of Platonic realism, it was assumed that connotation was unvarying; but more recently it has been recognized that the connotation of a term varies from individual to individual and from time to time. Synonyms of connotation are intension, comprehension, depth. (See DENOTATION.) A *connotative term* is one which has a connotation and is said to *connote* the qualities by virtue of which objects have a right to be designated by the term and to *denote* the objects possessing these qualities.

CO'NODONTS (from Gk. *κῶνος, kōnos,* cone + *ὀδούς, odous,* tooth). Minute fossil teeth of uncertain affinities, found in rocks of Ordovician to Permian age of North America and Europe. They are very small, shining objects, with more or less extended bases, from which arise one or many slender, sharp, short, or long denticles. They thus vary in form from conical to pectinate according to the number and length of the denticles. The material of which they consist is red, brown, or white calcite or phosphate of lime. Associated with the toothlike forms are minute plates of the same material, that probably belonged to the same organisms. Conodonts were first described by Pander, in 1856, from the lowest fossiliferous (Cambrian) rocks of Russia and were by him regarded as fish teeth. Since then they have been found in England, the United States, and Canada, and various opinions have been expressed regarding their affinities. Newberry described a number from the Carboniferous shales of Ohio and compared them to the teeth of myximoid fishes. Other authors have considered them to be the spines of crustacea or the lingual teeth of naked mollusks. These opinions are all less well supported by facts than is that of Zittel and Rohon, that conodonts are the teeth of annelids allied to the Nereidæ. In the same rocks with conodonts are often found jaws of annelids, described as *Prioniodus, Polygnathus,* etc. Consult: Pander, *Monographie der fossilen Fische des silurischen Systems* (St. Petersburg, 1856); Hinde, "On Conodonts from the Chazy and Cincinnati Groups," etc., in *Quarterly Journal Geological Society,* vol. xxxv (London, 1879); Newberry, *Paleontology of Ohio,* vol. ii (Columbus, Ohio, 1875); Zittel and Rohon, "Ueber Conodonten," in *Sitzungsberichte der königlich-bayerischen Akademie der Wissenchaften* (Munich, 1886). See WORM, FOSSIL; ANNULATA.

CO'NOID (Gk. *κωνοειδής, kōnoeidēs,* cone-shaped, from *κῶνος, kōnos,* cone + *εἶδος, eidos,* shape). A conoidal surface is a skew surface generated by the motion of a straight line which always meets a fixed straight line, is parallel to a fixed plane, and touches a given curve or obeys some other law. Commonly speaking, a conoid is a solid generated by the revolution of any conic section about one of its principal axes. For example, the earth is practically a particular form of conoid. Speaking more technically, the term is used to designate quadrics of revolution, as the surfaces of paraboloids, ellipsoids, and hyperboloids. Cones, cylinders, and conoids are special forms of ruled surfaces. Wallis (1663) effected the cubature of a conoid with horizontal directing plane, whose generatrix intersects a vertical directing straight line and vertical directing circle.

CON'OLLY, JOHN (1794–1866). An English alienist. He was born at Market-Rasen, Lincolnshire, and studied medicine at the University of Edinburgh. In 1839 he became director of the Middlesex Asylum at Hanwell. Immediately after his installation he abolished all the devices theretofore employed to confine and restrain the insane by means of strait-jackets, straps, and similar appliances. During the period in which he was connected with the institution (1839–51) he succeeded in completely revolutionizing the treatment of mental disease, and his so-called "no-restraint system" found rapid extension everywhere. Among his principal works may be mentioned: *Construction and Government of Lunatic Asylums* (1847); *The Treatment of the Insane without Mechanical Restraints* (1856); *Essay on Hamlet* (1863).

CO'NON (Lat., from Gk. *Κόνων, Konōn*). A distinguished Athenian commander. He first came into prominence in 413 B.C., when he was chosen admiral for the year. In 407 B.C. he was appointed one of 10 generals to succeed Alcibiades, but was defeated by Callicratidas at Mitylene. In 405 he was defeated by Lysander at Ægospotami, but succeeded in escaping with eight ships to Cyprus. In 394 he commanded the combined fleets of Persia and Athens which defeated the Spartans at Cnidus. By this victory he restored to the Athenians control of the sea. He afterward rebuilt the Long Walls of Athens and the fortifications of the Piræus. In 392 he was sent as envoy to the Persian Tiribazus, by whom he was thrown into prison and, according to some, put to death. According to the more probable account, he escaped, and died at the court of Evagoras in Cyprus.

CONON OF SAMOS. A Greek astronomer and mathematician, of the third century B.C. His work on Astronomy included a collection of the solar eclipses observed by the Chaldæans. His studies in conic sections formed the basis of book iv of the famous work on that subject by Apollonius of Perga (q.v.). He is best known, however, in connection with the cluster of stars known as the *Coma Berenices.* When Ptolemy III Euergetes was making war on Syria, his wife, Berenice, to insure his safe return, consecrated her hair in the temple of the deified Arsinoë, on the promontory of Zephyrium. When the hair was reported missing from the temple, Conon declared it had been placed among the stars: to prove his assertion he pointed out the constellation still known as *Coma Berenices,* which had not previously been distinguished. The story was treated by Callimachus, and by Catullus in his sixty-sixth poem.

CO'NOSCOPE (from Gk. *κῶνος, kōnos,* cone + *σκοπεῖν, skopein,* to view). A polariscope adapted to the study of crystals, having a revolving stage for regulating the position of the crystal section under examination, two Nicol's prisms (polarizer and analyzer) for production of double polarized light, a strongly convergent lens system below the stage to cause the light to enter the crystal in a cone of rays, and a similar system above the stage to correct the divergence of the rays, so that the eye may focus them for the retina. A conoscope is chiefly used to examine the so-called interference figures of crystals. The mineralogical or petrological microscope is constructed so as to be used either as a stauroscope or a conoscope. See POLARISCOPE.

CON'QUEROR, THE. A surname popularly

given to William, Duke of Normandy, on becoming King of England.

CONQUEST (from OF. *conqueste*, Fr. *conquête*, Sp., Portug., It. *conquista*, from ML. *conquista*, conquest, from Lat. *conquirere*, to procure, from *com-*, together + *quærere*, to seek). The forcible extension of sovereignty by one state over the territory of another as the result of successful war. Though it is denied, by advocates of natural justice, that this carries with it inherent rights of appropriation in territory, and destruction of national life, conquest has been one of the strongest agencies in molding civilization, and, in its influence upon the relationship of nations, it belongs to the realm of international law as well as to that of history.

Military conquest is developed from mere occupation of territory when the victorious state exercises continuously sovereign powers over the territory affected, and such conquest is deemed to be completed in the legal sense by the conqueror's signifying by some formal act his intention of adding it to his dominions, such as the publication of a diplomatic circular or a proclamation of annexation. The conditions justifying such acquisition and insuring immunity from interference by other states are: 1. A situation where, in order to redress a wrong or in self-protection, it becomes necessary to strip an aggressor of a portion of his territory. 2. The completion by treaty of the title which possession by conquest has given. 3. A general acquiescence in the act of the conqueror by neutral states. The changes in the map of Europe wrought by Napoleon's conquests and annexations were not accepted by the nations affected, and, by the Congress of Vienna, a return to the original conditions was made.

Title by conquest is, in principle, to be distinguished from title by cession, by the fact that, whether ratified by treaty or not, it rests avowedly on force, whereas the cession of territory is, in theory at least, always a voluntary act on the part of the ceding power. Thus, the acquisition of Porto Rico by the United States, as the result of the late war with Spain, was due to its conquest by the military and naval forces of the United States, while the acquisition of the Philippine Islands was disguised as a voluntary cession thereof by Spain. Indeed, it is usual for conquering nations in modern times to require as a condition of peace that the defeated nation shall recognize the title of the former to the conquered territory by a treaty of cession. The title is then, in legal theory, referred to the cession rather than to the act of conquest upon which it is really based.

Unless otherwise defined by treaty, the following rules govern the status of property and of the inhabitants of conquered territory: All public property passes to the conqueror absolutely. Except in the case of rebellion, private property rights remain undisturbed, and the conqueror is bound to make laws to insure the enjoyment of such rights, appropriate to the new political system imposed. Political laws and systems, being based upon reciprocal relations between citizens and the body politic, are destroyed, and, in the absence of treaty stipulations, political and civil rights of the inhabitants depend upon the provisions of the new régime. Absolute allegiance is due the conqueror. Municipal laws regulating the private relations of individuals are not abrogated, however, but continue in force by the implied acquiescence of the new sovereign, until superseded by new enactments. Consult Lawrence, *Principles of International Law* (London and New York, 1897), and also the authorities referred to under INTERNATIONAL LAW. See ALLEGIANCE; CESSION; CITIZEN; TITLE.

CONQUEST, IDA (1876–). An American actress, born in Boston. She made her début at the Tremont Theatre, Boston, in 1892, with Alexander Salvini, in a performance of *Rohan the Silent*. She is the daughter of a merchant of Boston, where she pursued her dramatic studies, and, when a child, played the part of Little Buttercup in *Pinafore* at the Boston Museum. She afterward appeared in *The Charity Ball* and *Americans Abroad*, under Daniel Frohman's management; *Liberty Hall* and *Under the Red Robe*, with the Empire Theatre Company, which she joined in 1895; *Too Much Johnson*, in which she played with the author, William Gillette, in London, and Gillette's *Because She Loved Him So*, produced in Boston in 1898. From 1901 to 1911 she appeared in many successful productions. Among the more notable are: *The Second in Command* (1901), *Ivan the Terrible* (1904), *Man and Superman* (1906), *Little Eyolf* (1910). Consult Strang, *Famous Actresses of the Day in America* (Boston, 1899).

CONQUEST OF GRANADA, grȧ-nä'dȧ, THE. 1. A tragedy by Dryden (1672), also called *Almanzor and Almahyde*. 2. A brilliant historical sketch by Washington Irving (1829).

CONQUEST OF MEXICO, THE. A noted historical work by W. H. Prescott (1843), containing the life of Hernando Cortés and an account of ancient Mexican civilization.

CONQUEST OF PERU, THE. An historical work by W. H. Prescott (1847), containing an account of the Incas and their civilization.

CONQUISTADORES, kŏn-kēs'tȧ-dō'rȧs (Sp., conquerors). A collective term for the Spanish conquerors of America, such as Cortés, Almagro, and Pizarro.

CON'RAD I (?–918). King of the Germans from 911 to 918. On the death of Louis the Child there was no Carolingian who had a legitimate claim to the throne in Germany. Consequently Conrad, who had some kinship with Arnulf, was elected. The sources for his election are few and conflicting, and consequently false statements about his origin have been readily accepted. Conrad favored and was supported by the Church, but could not command the obedience of the great dukes who were almost independent. He died Dec. 23, 918, and was buried at Fulda. On his deathbed he enjoined his brother to carry the royal insignia to his mortal enemy, Duke Henry of Saxony, with whom he had been continually at war since 912 A.D. Consult Stein, *Geschichte des Königs Konrad I* (Nördlingen, 1872), and Dümmler, *Geschichte des ostfränkischen Reiches*, vol. iii (Leipzig, 1888).

CONRAD II (c.990–1039). King of the Germans and Roman Emperor from 1024 to 1039, known as the Salic. He was the grandson of Otto, Duke of Carinthia, and was elected King of the Germans in 1024, after the extinction of the Saxon Imperial line, becoming the founder of the Franconian dynasty. Immediately after his election he commenced a tour through Germany for the purpose of administering justice. In 1026 he crossed the Alps, chastised the

rebellious Italians, was crowned at Milan as King of Italy, and in the following year was anointed Emperor of the Romans by the Pope. He was soon recalled to Germany by the outbreak of formidable revolts, which he succeeded in suppressing. In 1032–34 he secured the Kingdom of Burgundy and added it to the Empire. In 1036 a rebellion in Italy again compelled him to cross the Alps; but his efforts to restore his authority were this time partially unsuccessful, and he was forced to grant various privileges to his Italian subjects. Shortly after his return he died, at Utrecht, June 4, 1039. Conrad was one of the most remarkable of the earlier monarchs of Germany. He repressed the power of the great feudal nobles and, by keeping the great duchies in his own family, strengthened the position of the crown. Consult Bresslau, *Jahrbücher des deutschen Reiches unter Konrad II* (Leipzig, 1879–84), and Pflugk-Harttung, *Untersuchungen zur Geschichte Kaiser Konrads II* (Stuttgart, 1890).

CONRAD III (1093–1152). King of the Germans from 1138 to 1152. He was the son of Frederick of Swabia and the founder of the Hohenstaufen (q.v.) dynasty. Conrad, with his elder brother, Frederick, supported Henry V against his enemies, and in return that monarch granted Conrad, in 1115, the investiture of the Duchy of Franconia. He subsequently (1128–35) contested the crown of Italy with the Emperor Lothair of Saxony, but without success. On the death of Lothair the princes of Germany, fearing the increasing preponderance of the Guelph party and attracted by Conrad's brilliant courage and noble character, offered him the crown, and he was accordingly elected at Aix-la-Chapelle, March 7, 1138. He was immediately involved in a quarrel with Henry the Proud, Duke of Bavaria and Saxony, and this was the origin of the conflict that continued for centuries between the Welfs, or Guelphs, the partisans of Duke Henry, and the Waiblings, or Ghibellines, the supporters of the Franconian house. (See GUELPHS AND GHIBELLINES.) In 1146 St. Bernard of Clairvaux began to preach a new crusade, and in the fall of 1147 Conrad set out for Palestine at the head of a large army (see CRUSADE), in company with his old enemy, Welf of Bavaria. He died Feb. 15, 1152. Consult Bernhardi, *Jahrbücher des deutschen Reiches unter Konrad III* (2 vols., Leipzig, 1883), and Jastrow, *Deutsche Geschichte im Zeitalter der Hohenstaufen*, vol. i (Berlin, 1893).

CONRAD IV (1228–54). King of the Germans from 1250 to 1254. He was the son of Frederick II and was born at Andria, in Apulia, April 26, 1228. He was elected King of the Romans in 1237, but was never crowned. Frederick II died in 1250, and Conrad and William of Holland contended for the Imperial throne. Unable to make head against the increasing anarchy in Germany, Conrad retired to Italy in 1251, and succeeded in reëstablishing the power of the Hohenstaufen in Naples in the face of the hostility of the papacy. He died of fever, May 21, 1254. Consult: Schirrmacher, *Die letzten Hohenstaufen* (Göttingen, 1871); Jordan, *Les origines de la domination angevine en Italie* (Paris, 1909); Winkelmann, *Kaiser Friedrich II* (2 vols., Leipzig, 1889–97).

CONRAD, kōn'rät, JOHANNES (1839–). A German political economist. He was born in West Prussia and was educated at Berlin and Jena. He became professor of political economy at Jena (1870) and Halle (1872), and took a prominent part in the proceedings of the second commission appointed to revise the civil code of Germany. In 1878 he became editor of the *Jahrbücher für Nationalökonomie und Statistik*, and associate editor of the *Handwörterbuch der Staatswissenschaften* (1889–95; 2d ed., 1898 et seq.). His works include: *Das Universitätsstudium in Deutschland während der letzten fünfzig Jahre* (1884; Eng. trans. by Hutchison, with preface by James Bryce, 1885); *Grundriss zum Studium der politischen Oekonomie* (1896–1909); *Leitfaden zum Studium der Nationalökonomie* (1901).

CON'RAD, JOSEPH (1856–1924). An English novelist, the son of a Polish revolutionist. Known by his two first names, his real surname was Korzeniowski. He passed his youth in Poland. On the death of his father, Conrad, then only 13 years old, wandered to Marseilles, where he joined the French merchant navy and rose to be captain. Subsequently he became mate of an English ship. Though he did not learn English until comparatively late in life, he became the master of a style extraordinarily idiomatic and strong, and particularly notable for its descriptive resource. His successive books strengthened his reputation with exacting critics. Aside from their sheer narrative interest, his novels are vivid transcripts from seafaring life in the East, and skillfully note the changes effected in the Western character under Oriental influences. He has embodied his experiences in the Malay Archipelago and elsewhere in novels, fresh in subject and in style. They comprise: *Almayer's Folly* (1895); *An Outcast of the Islands* (1896); *The Nigger of the Narcissus*, published in the United States as *The Children of the Sea* (1897); *Tales of Unrest* (1898); *Lord Jim* (1900); *The Inheritors*, with F. M. Hueffer (1901); *Typhoon* (1902); *The Mirror of the Sea* (1906); *Point of Honor* (1908); *Chance* (1913); *'Twixt Land and Sea* (New York, 1913). Consult his volume of reminiscences, *A Personal Record* (1912), and R. Curle, *Joseph Conrad* (Garden City, 1914).

CONRAD, ROBERT TAYLOR (1810–58). An American judge and dramatist, born in Philadelphia, Pa. While a student he wrote *Conrad of Naples*. He wrote also for the press, and in 1832 began the *Daily Intelligencer*, which was soon merged in the Philadelphia *Gazette*. Failing health compelled his retirement from editorial work, and he became judge of the Court of Criminal Sessions, continuing until its dissolution, when he resumed his literary work and became editor of *Graham's Magazine* and associate editor of the *Philadelphia North American*. From this work he was called to be mayor of his city, and in 1856–57 was judge of the Court of Quarter Sessions. His *Aylmere, or the Bondman of Kent*, a drama, was played by Edwin Forrest. In 1852 this was published with other poems. He wrote also *Our Battles in Mexico* (1850).

CONRAD, TIMOTHY ABBOTT (1803–77). An American paleontologist, born in New Jersey. He was geologist in 1837 and paleontologist from 1838 to 1841 to the State of New York, and published a number of valuable works. His writings include: *American Marine Conchology* (1831); *Fossil Shells of the Tertiary Formations of the United States* (1832); *Monography of the Family Unionidæ of the United States*

(12 parts, 1835–59); *Check List of the Invertebrate Fossils of North America* (1866).

CONRÄDER, kŏn'rä-dĕr, GEORG (1838–1911). A German historical painter. He was born in Munich, studied under Foltz and Piloty at the academy there, and first attracted attention by his "Tilly in the Grave-Digger's Dwelling"; "On the Eve of Breitenfeld" (Kunst Halle, Hamburg), a spirited composition, showing the influence of Piloty. Other important works of his are: "The Destruction of Carthage" (Maximilianeum, Munich), "Hauer Painting Charlotte Corday in Prison," "The Death of the Emperor Joseph II," and two other large ceremonial pictures, containing many portraits, in the National Museum at Budapest.

CONRADIN (kŏn'rä-dēn') **OF SWABIA** (1252–68), King of Jerusalem and Sicily. The son of Conrad IV, and the last descendant of the Imperial house of Hohenstaufen (q.v.). At his father's death he was only two years old. Innocent IV immediately seized upon the young Prince's Italian possessions, on the plea that the son of a prince who died excommunicated had no hereditary rights; and other enemies of the house of Hohenstaufen were only too glad to follow the Pope's example. His uncle Manfred took up arms in his behalf, drove the papal forces from Naples and Sicily, and declared himself King till the young Prince came of age. This antagonism between the papacy and the Hohenstaufen induced Clement IV to offer the crown of the Two Sicilies to Charles of Anjou (q.v.). Charles immediately invaded Italy, and met his antagonists in the plain of Grandella, where the defeat and death of Manfred, in 1266, gave him undisturbed possession of the kingdom. The Neapolitans, however, detested their new master and sent deputies to Bavaria to invite Conradin, then in his fifteenth year, to come and assert his hereditary rights. Conradin accordingly made his appearance in Italy, and, being joined by the Neapolitans in large numbers, gained several victories over the French, but was finally defeated, and, together with his relative, Frederick of Baden, taken prisoner near Tagliacozzo, Aug. 23, 1268. The two unfortunate princes were executed in the market place of Naples, on October 29. His unfortunate fate and his poetical ability have made him prominent as a hero of drama. Consult Schirrmacher, *Die letzten Hohenstaufen* (Göttingen, 1871); Jordan, *Les origines de la domination angevine en Italie* (Paris, 1909); Hampe, *Geschichte Konradins von Hohenstaufen* (Innsbruck, 1894).

CONRART, kôn'rär', VALENTIN (1603–75). A French writer, born in Paris. A careful student of modern languages, he became an authority on matters of style. He gathered about him a weekly circle of littérateurs, who read and discussed original works. In 1635, under the auspices of Richelieu, this company was organized by royal letters patent as the French Academy, of which Conrart became perpetual secretary. He wrote little—a few poems, letters, and brief *Mémoires* (edited 1825 by Monmerqué), besides compiling copious extracts from contemporary writers, and published almost nothing. Hence the well-known verse from the *First Epistle* of Boileau: "J'imite de Conrart le silence prudent." Consult Kerviler and Barthélemy, *Conrart, sa vie et sa correspondance* (Paris, 1881).

CONRIED, kŏn'rēd, HEINRICH (1855–1909). A theatrical manager. He was born in Bielitz (Austria), and received his education at the Realschule in Vienna. Beginning life as an actor, he soon undertook the management of various dramatic and operatic concerns. He came into prominence when he assumed the management of the Irving Place Theatre in New York. In 1903 he succeeded Maurice Grau (q.v.) as director of the Metropolitan Opera House. His first season was notable through the first production of *Parsifal* outside of Bayreuth, excepting an isolated production at Amsterdam in 1901. By Dec. 31, 1913, when the copyright of *Parsifal* expired, the work had been represented 43 times at the Metropolitan Opera House. For his advancement of art he was decorated by the emperors of Germany and Austria and the kings of Italy and Belgium.

CON'RING, HERMANN (1606–81). A German physician, jurist, and miscellaneous writer, born at Norden, East Friesland. He studied at Helmstedt and Leyden, in 1632 was appointed professor of natural philosophy at Helmstedt, and in 1636 professor of medicine. He subsequently held the chair of politics. In 1664 he was granted a pension by Louis XIV of France, and in 1669 was appointed by the King of Denmark a Councilor of State. He was a determined opponent of alchemy and contended for the pharmaceutical value of chemistry and for Harvey's theory of the circulation of the blood. His *De Origine Juris Germanici* (1643) was the pioneer work on the history of German law; and his *Exercitationes de Republica Imperii Germanici* (1674) was an important contribution to the literature of the civil law. A six-volume edition of his works was prepared by Göbel, with a biography (Brunswick, 1730). Consult Stobbe, *Hermann Conring, der Begründer der deutschen Rechtsgeschichte* (Berlin, 1870), and Goldschlag, *Beiträge zur politischen und publizistischen Tätigkeit H. Conrings* (Berlin, 1884).

CONSALVI, kŏn-säl'vē, ERCOLE, MARCHESE (1757–1824). A papal diplomatist and reformer of abuses in the Papal States. He became chamberlain to Pope Pius VI in 1783, and auditor of the Rota Romana in 1792, in which office he displayed great administrative ability. As secretary of the conclave at Venice, in 1799, he contributed mainly to the election of Pius VII, who in 1800 made him a cardinal and Secretary of State. In this capacity he concluded with great diplomatic skill the concordat with Napoleon in 1801; but having afterward incurred the displeasure of the Emperor by his stout resistance to the encroachments of France on the rights of his sovereign, Napoleon demanded his removal from office in 1806. After the Emperor's downfall the Pope sent him as his representative first to London, to meet the allied princes assembled there; then to the Congress at Vienna, where by his tact and moderation he succeeded in securing the restoration of the Papal States, the government of which he assumed as Secretary of State, continuing in office until 1823. His clever management of the relations to the European Powers resulted in the conclusion of concordats with most of them under conditions most favorable to the papal authority, and he made his domestic policy memorable by beneficial reforms and the suppression of abuses in various branches of administration. The sciences, literature, and especially the fine arts, are much indebted to his liberal patronage. For his *Life*, consult Crétineau-Joly, ed. by Drochon (Paris, 1895).

CONSANGUINITY (Lat. *consanguinitas*, from *consanguineus*, having the same blood, from *com-*, together + *sanguis*, blood). The relationship which subsists between persons who are of the same blood, i.e., who are descended from a common ancestor. It is either direct, which is the relationship between ascendants and descendants, or collateral, between persons who have a common ancestor but are in a different line of descent; as cousins, who have the same grandparents on either their fathers' or mothers' sides, but who are the issue of different children of those grandparents.

For legal purposes different degrees of consanguinity are established. Thus, in the direct line, a child is in the first degree from its parents, a grandchild in the second degree, and so on. In the collateral line degrees are established beginning with brothers and sisters and extending to the most distant collateral relatives. The method of computing degrees varies in different jurisdictions according as they follow the civil or canon law in this particular. By the civil law the degrees are separately numbered downward to each party, the common ancestor not being counted. Thus by this rule brothers would be in the second degree, uncle and nephew in the third, and so on.

By the canon law, where the parties are equally removed from the common ancestor, consanguinity is computed by the number of degrees between them and the common ancestor, and by this rule brothers would be in the first degrees and others correspondingly one degree less than under the civil law.

The question of consanguinity is important, and sometimes controlling, in determining a person's legal rights, qualifications, or disabilities, especially as to entering into certain relations with another or acting in certain capacities. Thus the law prohibits marriage between certain relations; judges and jurors and other officers are sometimes disqualified from serving in their particular capacities because of relationship with persons who may come before, or deal with, them in public matters; and consanguinity within the prohibited degree is the gravamen of the crime of incest. It is the controlling factor in the laws of inheritance and descent, which, although they vary somewhat in different jurisdictions, are always based on relationship; and blood relatives always take in preference to collaterals. See AFFINITY; COLLATERAL; MARRIAGE; SUCCESSION; HEIR.

CON'SCIENCE (Lat. *conscientia*, from *conscire*, to be conscious, from *com-*, together + *scire*, to know). A term that has been used to name various factors in moral experience. Thus the recognition and acceptance of a principle of conduct as binding is called "conscience." Again, the judgment of approval or disapproval of individual acts as right or wrong has been called "conscience." Still again, the satisfaction that follows action regarded as right, and the dissatisfaction and remorse resulting from wrong conduct, have been called "conscience." In earlier ethical theories conscience was regarded as a faculty, having moral jurisdiction, either absolute or as a representative of God in man's soul. See ETHICS; CASUISTRY.

CONSCIENCE, COURTS OF. English courts for the recovery of small debts, constituted by special local acts of Parliament in London, Westminster, and other trading districts. These courts were also called *courts of requests*. The first of these, the Court of Conscience for London, was created in the ninth year of Henry VIII, but others were subsequently established and their jurisdiction and procedure minutely regulated by Parliament. They were freely resorted to for the small cases within their jurisdiction, which was originally limited to 40s., but afterward extended to £5. With the reorganization of the county courts in 1888 (the County Courts Act, 51 and 52 Vict., c. 43) the courts of conscience lost their importance and were, with a few exceptions, abolished. See COURT.

CONSCIENCE, kôn'syäns', HENDRIK (1812–83). A Belgian novelist of French extraction, distinguished for his pictures of Flemish village life. He was born in Antwerp, Dec. 3, 1812, and was largely self-educated. He entered the army in 1830, left it in 1836, and in 1837 published his first novel in Flemish, *In the Wonderful Year 1566*, which won him great success, but left him in debt to his printer. His patriotic courage, which led him to use Flemish as a medium for literary expression, won him the distinction of being known as the pioneer and first great classic author of the literature of Flanders. Patronage secured him a post in a government office. He wrote *Phantasy* (1837), a collection of fantastic tales, and *The Lion of Flanders* (1838). Finding office work irksome, he abandoned it for gardening, which in turn he gave up for a sinecure at the Royal Academy of Painting. In 1845 he was appointed associate professor in the University of Ghent and instructor in Flemish to the royal children. In 1868 he was made custodian of the Wiertz Museum. These posts and others were rewards for unflagging efforts to revive and stimulate a literary interest in Flemish. He died in Brussels, Sept. 10, 1883. Among other well-known works of Conscience, most of which are translated into French and German and a few into English, are: *How One Becomes a Painter* (1843); *The Poor Nobleman* (1851); *The Good Luck to be Rich* (1855); *Duke Karl's Justice* (1876); *Benjamin of Flanders* (1880). His historical novels, written under the influence of Walter Scott, do not compare with his other works that give a very delicate and clean-cut portrayal of Flemish family life. The publication of his one hundredth volume in 1881 was the occasion for a national celebration throughout the Kingdom of Belgium, so popular was he among his countrymen. For his biography, consult Eeckhoud (Brussels, 1881) and Pol de Mont (Haarlem, 1883).

CONSCIENCE WHIGS. A name applied to those members of the Whig party in Massachusetts who in 1850 and thereafter refused to coöperate with those of their old associates—the so-called "Cotton Whigs"—who declared that the slavery question had been permanently settled by the Compromise of 1850. In New York the two factions were known respectively as the "Woolly Heads," or "Seward Whigs," and the "Silver Grays," or "Snuff Takers."

CON'SCIOUS LOVERS, THE. A comedy by Sir Richard Steele (1722), modeled upon Terence's *Andria*. This play was an attempt by Steele to purify the stage, and is referred to in Fielding's *Joseph Andrews* as the only fit play for a Christian to see.

CON'SCIOUSNESS. A term employed by psychology in two principal meanings. 1. In the first meaning it is the equivalent of "mental

endowment," or "the possession of mind." I am conscious of the objects and persons about me, of my own successes or shortcomings, of the validity of an argument or the beauty of a work of art, in the sense that I am mentally alive to these things, am capable of a mental reaction upon them, whether by way of mere perception or by way of critical estimate and appreciation. So, if I am sound asleep, or in stupor from a blow on the head or from the action of some drug, I am said to be "unconscious"; my mental life and reactions are in abeyance. This meaning, which would perhaps have lapsed from psychological usage were it not deeply rooted in the phraseology of philosophy and in popular parlance, must be carefully distinguished from the second and more technical meaning, according to which (2) consciousness is simply "present mind," "mind now," the total mental experience given at a particular time. "Consciousness," says Wundt, "does not mean anything that exists apart from mental processes; nor does it refer merely to the sum of these processes, without reference to their mode of interrelation. It expresses the general synthesis of mental processes, within which the single complexes are marked off as more intimate connections." It is "a comprehensive interconnection of simultaneous and successive mental processes." We may therefore define it as a cross section or temporal division of mind (q.v.); mind consists of a series of consciousnesses, more or less sharply differentiated. As we begin the day, we have the waking consciousness, followed by the getting-up consciousness, the breakfast consciousness, the work consciousness, etc., etc.

The separate complexes which enter into and compose a consciousness are termed the "contents of consciousness." Thus, the consciousness of a writer, at his desk, contains various psychological ideas, mostly in verbal form; the perceptions of sight and touch that are aroused by the act of writing; a general feeling of effort, etc. The question of the "range of consciousness," i.e., of the number of mental processes that a single consciousness can contain, has been approached experimentally and partly answered. It is found, e.g., that if an auditory consciousness be set up, by subjecting an observer (whose mind is otherwise unoccupied) to a continued series of metronome strokes, its range lies between the limits of 8 double impressions (16 strokes, rhythmically grouped in twos) and 5 eightfold impressions (40 strokes, rhythmically grouped in eights). In other words, a practiced observer can distinguish, without counting, between two successive series of 40 and of 39 strokes, if he be allowed to group by eights; whereas he cannot, however he may group them, distinguish between series of 41 and 42 strokes; these numbers exceed the maximal range of consciousness. The phrase "state of consciousness," formerly applied to mental processes like ideas, emotions, etc., now designates the mode of existence (clearness, prominence, obscurity, inhibition) of the contents of a particular consciousness; it is fully explained under ATTENTION (q.v.). Other phrases in general use are "field of consciousness" and "stream of consciousness"—the one formed after the analogy of the phrase "field of vision," the other emphasizing the essentially transient nature of conscious contents. Consult: Wundt, *Physiologische Psychologie* (1910); Titchener, *Text-Book of Psychology* (New York, 1910); James, *Principles of Psychology* (ib., 1890); Della Valle, *La psicogenesi della coscienza* (Milan, 1905). See SELF-CONSCIOUSNESS; UNITY OF CONSCIOUSNESS; EPISTEMOLOGY; PSYCHOLOGY; NOETIC CONSCIOUSNESS.

In modern philosophy consciousness first received attention from Descartes, who regarded it as the differentiating attribute of mind, which he defined as thinking substance. Spinoza classed it as one of the attributes of the one substance, the other known attribute being extension. Leibnitz ascribed it only to the more advanced monads (q.v.), the perceptions of the lower monads being unconscious. Kant elevated consciousness to the highest place among the synthetic principles which organize experience, calling it "the synthetic unity of apperception." The followers of Kant, including most recent idealists, treat it as a peculiar property of the "subject," the subject being the higher of the two terms which according to them are always distinguishable in experience; the other term is the "object." These two terms in their interrelation constitute what is technically known as the "subject-object relation." In the revolt against idealism within the last 15 years many thinkers, of whom William James is the best known, have discarded this view, and have substituted what has come to be called "the relational view of consciousness." According to James "pure experience," i.e., experience which is unreflective, is devoid of consciousness. In such experience things are not known; they simply *"are there."* But certain experiences appropriate prior experiences; and this appropriation constitutes the appropriated and the appropriating experiences into a "biographical continuum," i.e., into a self-conscious personality. This practically identifies consciousness with self-consciousness, and self-consciousness with memory. John Dewey agrees with James that in unreflecting experience there is no consciousness; for him consciousness (=awareness) is attention, and attention marks the interruption of the smoothly flowing experience by a problem: something goes wrong, and consciousness, or awareness, is the instrument which such an experience develops to rectify the trouble. There is no consciousness in naïve unsophisticated perception. A view with quite a number of supporters, more or less influenced by Dewey, is that consciousness is a mode of organic behavior, capable of being observed from the outside just as well as any other mode of organic behavior. This is sometimes called "behaviorism." So far as it differs from Dewey's view, it ascribes consciousness to percipient organisms as well as to organisms that are intelligent; but in either case the consciousness ascribed is the behavior observed. Still other thinkers, accepting the view that consciousness is a relation among objects, have attempted to identify this relation in other ways than those adopted by James, Dewey, and the behaviorists. Thus, for Woodbridge consciousness is the objective relation of meaning obtaining among things; for McGilvary it is the relation which makes an experience out of objects; for Perry it is "behavior and those elements of the environment selected by the behavior"; for Montague it is the potential energy of the brain; for Pitkin it is a relation of projection. The preceding account will show that one of the moot problems of present-day philosophy is the nature

of consciousness. Most of the literature is in periodical form. Consult: James, *Essays in Radical Empiricism* (New York, 1912); Perry, *Present Philosophical Tendencies* (ib., 1912); Marvin and others, *The New Realism* (ib., 1912), and articles in recent volumes of the *Journal of Philosophy, Psychology, and Scientific Methods* by Montague, Woodbridge, Perry, McGilvary, Singer, and others.

CONSCIOUSNESS, UNITY OF. See UNITY OF CONSCIOUSNESS.

CON'SCRIPT FATHERS. A name given to the Roman senators after the expulsion of the Tarquins, when Brutus added 100 to the number of senators, the names of the newcomers being "written together" (*conscripta*) on the rolls with those of the original councilors. The proper designation was then *Patres et Conscripti*, afterward abridged to *Patres Conscripti*.

CONSCRIPTION (Lat. *con-*, together + *scribere*, to write). A compulsory enrollment or registration of men for service in the army and navy. Originally the word related to the selection, by lot, of a portion only of the male population qualified for military service. Later the word was used, as at present, to describe compulsory military service, whether partial or universal. The methods of raising men for the army have varied, from time to time and in the different states, with the exigencies and emergencies arising, and with the characteristic political and economic ideals of the people concerned. Athens employed a compulsory citizen militia which resembled in its effect the modern European system of universal service. The young men served two or three years continuously and then passed to a class of reservists subject to call when needed. Sparta went even further. Her male citizens of military age were not only compelled to serve, but to train themselves continuously in peace for service in war, the whole nation, in fact, living as a military garrison. The Roman system depended on the annual levy, consisting of four legions of infantry, two for each consul, each legion containing 6666 men. The consuls, who in the time of the Republic were always commanders of the army, would announce by herald or written proclamation that a levy was to be made. The proper conscription was as follows: *Milites cogere, colligere, scribere, conscribere.* The Swedish armies, 1630–32, under Gustavus Adolphus, were in part composed of national regiments raised on the *Indelta* system, under which each officer and man in a territorial district received a grant of land, each district supplying recruits in proportion to its population. It was, however, to France that we owe the modern principle of universal compulsory service. One of the earliest and most serious problems of the French Revolution was the question of an adequate supply of recruits. A limited compulsory system, supplemented by volunteer enlistment, was found inadequate and was replaced in 1792 by universal conscription, under which every man was liable for active service. This plan, however, included the serious defect of granting to communes and districts the privilege of selecting the men to fill the quota. As might have been anticipated, this resulted in the selection of the most undesirable citizens of the community. The means of enforcing the law were wanting. Various schemes were tried. So long as Napoleon's victories lent encouragement, recruiting was partially successful. After 1796, however, the citizens began to grow tired of the hardships of war, and there developed an ever-increasing opposition to the severity of the conscription laws. The economists regarded military service as a waste of productive energy. In order to meet this situation adequately the now famous conscription law of Jourdan became, in 1798, the law of the country and remained practically unaltered until 1870. This law, the basis of all continental systems, definitely asserted the right of the government to require every qualified citizen to serve in the army from his twentieth to his twenty-fifth year, leaving it to the government to determine what number should be called to the colors each year. Unfortunately an otherwise effective law was weakened by the privilege of exemption from service provided there was deposited a certain sum of money sufficient to secure a substitute. This latter principle led directly to the regular and repeated employment of an undesirable class of men and was one of the underlying causes of the disasters of 1870–71. The Prussian defeat by Napoleon at Jena in 1806 resulted in the introduction by Prussia of the *Krümper* system (from *Krümperpferde*, worn-out, condemned horses attached to mounted organizations for odd jobs; applied to recruits in jest). The regiments became training schools, through which recruits were quickly passed to the reserve. A large permanent army was prohibited by the Treaty of Peace after Jena. The system required universal service with few exemptions. For the first time in modern history there existed, in preparation for war, a systematic compulsory training in time of peace. The Krümper system, modified and improved, has been and is a controlling influence in the economic as well as in the military development of continental Europe. Since 1870, with the exception of Great Britain and the United States, all the Great Powers have adopted the principle of *compulsory* short service, reserves, and certain legal exemptions, e.g., the only son of a widow, certain officials of the government, etc. In the Republic of Switzerland there is universal service, but, in marked contrast to all other continental countries, there is no standing or permanent army. All males of military age, 20 to 48, serve; but as militia only, reporting for a few weeks each year for training and then returning to their civil pursuits. The modern plan of conscription includes the following: The male population is divided into classes, by ages, the total period of liability to service being about 25 years. At any given time, assuming two years' service with the regiment, the men of 20 and 21 years of age constitute the *active* army; those of 22 and 23 form the *reserve* for that army. These two classes form the *First Line.* The *Second Line*, called the *Landwehr*, consists of all men from 24 to 36 who have passed through the active army. The *Third Line*, called the *Landsturm*, consists of men who have also been in the active army, but are now between the ages of 36 and 44. In this system the state does not offer pay as an inducement, the pay being nominal, but does assert the principle that every citizen owes a military duty to his government and that this obligation includes training in peace for service in war.

The people of the United States have always been opposed to any system of conscription, and yet in the only two wars which threatened the existence of the government, the American Revolution and the Civil War, conscription was re-

sorted to despite all opposition. As early as 1777 the germ of this idea of compulsory service was embodied in a resolution of the Continental Congress. With its ineffective supervision of the States furnishing the militia quotas for the Continental Army, commanded by General Washington, Congress found it impossible to keep the ranks full by voluntary enlistments, and therefore recommended to the States, in a resolution dated April 14, 1777, that exempted persons be *compelled* to furnish a certain number of soldiers and be *compelled* to pay the additional bounties, etc. This use of paid substitutes introduced into the ranks the lowest class of mercenaries. Before the end of the year 1777 Massachusetts and Virginia set the example of *drafting* (conscription), and General Washington commended the measure to the Pennsylvania authorities as the only sure method of raising continental troops. In the following year, and with reference to the substitution feature of the draft, General Washington wrote as follows to the President of the Massachusetts Council: "It gives me inexpressible concern to have repeated information from the best authorities that the committees of the different towns and districts in your State hire deserters from General Burgoyne's army and employ them as substitutes to excuse the personal service of the inhabitants. I need not enlarge upon the danger of substituting as soldiers men who have given a glaring proof of a treacherous disposition, and who are bound to us by no motives of attachment, instead of citizens in whom the ties of country, kindred, and sometimes property are so many securities for their fidelity." Thus General Washington soon learned that in any prolonged war demanding the ultimate resources of a state, volunteering is inadequate and the substitution feature of conscription inadvisable, if not disastrous. Brevet Major General Emory Upton, United States army, in his notable work *The Military Policy of the United States*, written in 1880 (Washington Government Printing Office, 1912), submits the results of his analysis of the American Revolution in the following words: "It may be laid down as an axiom, based upon historical proof, that any government which foregoes its rights to compulsory military service becomes more and more enslaved by depending solely upon voluntary military service induced by gifts of money, land, and clothing. . . . That neither voluntary enlistments based on patriotism, nor the bounty, can be relied upon to supply men for the army during a prolonged war. . . . That the draft, connected or not connected with voluntary enlistments and bounties, is the only sure reliance of a government in time of war." The history of the Civil War (1861–65) also proved conclusively that in any great military undertaking the government could not rely upon volunteers alone to supply the wastage of war. In the Union army conscription was provided for by the Act of Congress known as the Enrollment Act, approved March 3, 1863, under which the President of the United States was authorized to call into active service quotas from each of the States of the Union. This act contained a clause popularly known as "The Rich Man's Exemption," under which any person drafted and notified to appear might furnish an acceptable substitute to take his place in the draft, or might pay, in lieu thereof, a sum not to exceed $300 for the procuring of such substitute. A person failing to comply with these regulations was deemed a deserter and could be arrested as such. The execution of the draft law created opposition in many communities. In the city of New York the enforcement of this law culminated in the notorious *Draft Riots* during the month of July, 1863, resulting in great loss of life and destruction of property. The riots lasted four days, and order was not permanently restored until the city was placed under martial law, supported by several regiments ordered from the field into the city. As early as 1862 the government had realized the failure of the volunteer system and had concluded that conscription, no matter how unpopular, was the only surely effective method of obtaining recruits. Unfortunately the principle of substitution and bounties was authorized and resulted, as always, in discrimination against the poor man and the admission of undesirables. After the riots President Lincoln, under date of Aug. 7, 1863, wrote as follows to Governor Seymour of New York: "We are contending with an enemy who, as I understand, drives every able-bodied man he can reach into his ranks, very much as a butcher drives bullocks into a slaughter pen. No time is wasted, no argument is used. This produces an army which will turn upon our now victorious soldiers already in the field, if they shall not be sustained by recruits as they should be. It produces an army not to be matched on our side if we waste time to reëxperiment with the volunteer system, already deemed by Congress, and palpably, in fact, so far exhausted as to be inadequate." The Confederate States Congress at an earlier date than the government of the United States recognized the failure of the voluntary feature of enlistment by passing a conscription law, April 16, 1862, the first section of which was as follows: "The Congress of the Confederate States of America do enact, that the President be, and he is hereby, authorized to call out and place in the military service of the Confederate States, for three years, unless the war shall have sooner ended, all white men who are residents of the Confederate States, between the ages of 18 and 35 years at the time the call or calls may be made, who are not legally exempted from military service."

In England in 1902 an agitation for universal compulsory service was started by the organization of the National Service League, of which Lord Roberts was elected president. (On compulsory service in England, consult *Fallacies and Facts* by Lord Roberts, 1911; and Sir Ian Hamilton's *Compulsory Service*, 1910.)

The United States army has no compulsory enlistment feature for the regular army, reserves, or militia. Although the whole body of male citizens between the ages of 18 and 45 years are declared by law to be *the militia*, only a small number of such citizens, called the *organized militia*, receives any military training whatever. The enlistment of these is purely voluntary. Recent laws have attempted to give the Federal War Department a more effective control over the organized State militia, but that control in any case can be lawfully exercised only within the continental limits of the United States and ceases in all cases with the expiration of the enlistment period. Thus, the United States regular army cannot be followed and supported by a second line of trained men, in any expedition beyond the borders of the United States, unless the hasty organization of untrained

civilians into volunteer regiments may be considered such.

Considering the economic influence of universal compulsory service as practically illustrated in the case of Germany, the highest exponent of that system, we find that for 43 years, since 1871, thanks to her military efficiency, she has preserved the peace with her neighbors and thus gained the opportunity to develop her industries. The German, for two years, undergoes the most rigorous military training, learns the habit of obedience to constituted authority, practices daily the latest theories of sanitation, is schooled mentally and exercised physically, and is then returned to his civil pursuits equipped for the serious business of making a living. The government utilizes his services in many of its departments. The police force of Berlin, said to be the best in the world, is composed entirely of army men. The sergeants of this force have the educational qualifications of a high school or minor college graduate in the United States. It has been estimated that on the average the trained German soldier's expectation of life is five years better than the normal of his own class in civil life. The German business man of to-day regards the army as a peace guaranty for the further extension of his commercial ventures. It should be remembered that Germany freely elects her Legislature by popular vote; that the compulsory military system has been in operation for over a century; that although there is, as in all questions of policy, a minority opposition, there has not yet been a majority vote against the existing military system. Therefore it must be concluded that the German people have retained their military guaranty of peace because they thought it both necessary and desirable.

CONSCRIT DE 1813, kōn'skrē' de dēs wēt sān trâz, LE. An historical novel by Erckmann-Chatrian (1864).

CON'SECRA'TION (Lat. *consecratio*, from *consecrare*, to hallow, from *com-*, together + *sacrare*, to consecrate, from *sacer*, holy). The act of solemnly dedicating a person or thing to the service of God. It is one of the most widely spread of all religious ceremonies of the ancient world, having been practiced in Babylonia, Egypt, India, Judæa, Greece, Rome, Britain, and other countries. In the Old Testament we read of the consecration or dedication of the firstborn, both man and beast, to the Lord, also the dedication of the Levites, of the tabernacle and altar, of fields, houses, walls, etc. The custom of consecrating the places of public worship developed in the Christian Church as soon as persecution ceased, when, according to Eusebius, "the sight was afforded so eagerly desired and prayed for by all—the festivals of dedications and consecrations of the newly erected houses of prayer throughout the cities." Eusebius also describes the consecration of the church built at Jerusalem by Constantine in 335 A.D. The practice of consecrating religious edifices has continued in the Oriental, Roman, and Anglican churches. The forms, as found in the sacramentaries of Gelasius and St. Gregory, were at the first very simple, but they were gradually developed until, in the Roman Catholic church, the office of consecration became a long and impressive ceremony. It includes the placing in the altars of relics of the saints, the purification of the place with specially prepared holy water (called Gregorian Water because the formula for its benediction is first found in the sacramentary of St. Gregory), and the anointing of the church in 12 specified places with holy oil. (For the full form, consult the *Catholic Encyclopedia* under CONSECRATION.) The anniversary of this ceremony is kept as a festival of the first class. A church may not be consecrated until it is entirely free from debt; when the consecration is delayed, it is opened with a simple form of benediction. The ceremonies in the Eastern churches are as elaborate and not dissimilar. In the Church of England each bishop is left to his own discretion as to the form to be adopted, but that most generally used is the form sent down by the bishops to the Lower House of Convocation in 1712. The American prayer book provides a simple form of prayer, which retains the old ceremony of the bishop knocking for entrance at the door of the church. For the consecration of bishops, see BISHOP; ORDERS, HOLY; for that of the eucharistic elements, see MASS; LORD'S SUPPER.

CONSEC'UTIVES (Fr. *consécutif*, Sp., Portug., It. *consecutivo*, from Lat. *consequi*, to follow, from *com-*, together + *sequi*, Gk. ἕπεσθαι, *hepesthai*, Lith. *sekti*, Skt. *sac*, to follow, Goth. *saihwan*, Icel. *sjá*, AS. *sēon*, OHG. *sehan*, Ger. *sehen*, Eng. *see*). In music, the progressions of parallel fifths or octaves, which, according to the strict rules of harmony, are forbidden. See HARMONY, *Progression of Chords*.

CONSENT (OF. *consente*, from *consenter*, to *consent*, from Lat. *consentire*, to agree, from *com-*, together + *sentire*, to think). In law, the free will and assent of the mind of a competent person to some act or obligation affecting his legal rights or relations. The law prescribes under what conditions it is binding and when it is void or voidable. Thus, apparent consent obtained by fraud or coercion, or from an infant, or from an insane, intoxicated, or otherwise legally incompetent person, is deprived of all legal effect if such person chooses to avoid it. It is an essential element of contract and is of the greatest importance in certain cases in the law of crimes and torts, where the essence of the crime or wrong is that it was against the will of the person injured. One may legally consent to the infliction of a limited amount of bodily harm if there is no malice involved, as in friendly boxing or in football; but one cannot consent to the infliction of death or anything which will amount to a breach of the peace. See AGE; CONTRACT; CRIME; TORT.

CONSEN'TES DI'I (Lat. *consentes*, of uncertain etymology and meaning, probably from *com-*, together + **sens*, being, pres. p. of *esse*, to be, cf. Skt. *sant*, being, from *as*, to be; less probably for *consentiens*, from *consentire*, to agree). The 'co-existent gods,' the 12 chief Roman deities: Jupiter, Apollo, Mars, Neptune, Mercury, Vulcan, Juno, Vesta, Minerva, Ceres, Diana, and Venus. A colonnade in their honor, containing their statues, which stood at the northwest corner of the Forum, was restored as late as 376 A.D. Consult Hülsen-Carter, *The Roman Forum* (Rome, 1906).

CONSERVATION. The object of the conservation movement in the United States is to protect and develop the fullest usefulness of the great natural resources, which are the forests, the waters, the minerals, and the land. These are the chief bases, not only of material

well-being, but also of existence. Upon their conservation depends in the last analysis the growth, the continuity, and the efficiency of the nation.

The use of the natural resources of the United States has been accompanied by vast waste. In some stages of its history, and in many regions of its territory, waste of natural resources, particularly of the forests, has exceeded their beneficial use.

Owing to the work of the National Conservation Commission, appointed on June 8, 1908, by President Roosevelt, of which Gifford Pinchot was chairman and the late Dr. W J McGee his chief aid and adviser, the United States possesses the first inventory of natural resources to be made by any nation. This inventory, which was published in 1909 in the *Report of the National Conservation Commission* (Government Printing Office, Washington, D.C.), brought together all the information available from Federal, State, and private sources in order to take stock of the natural wealth still remaining in minerals, lands, forests, and waters. The more important features of this inventory may be summarized as follows:

INVENTORY OF NATURAL RESOURCES

Minerals. The annual mineral production of the United States exceeds $2,000,000,000 and supplies more than half the freight traffic of the country. The waste in extraction and treatment of mineral products is about $300,000,000 a year. It has available and easily accessible 1,400,000,000,000 tons of coal. The high-grade iron ores, which approximate 4,788,150,000 tons, will not last beyond the middle of the present century if consumption continues to increase at the present rate. The supply of the precious metals and of copper, lead, and zinc, silver, asphalt, quicksilver, and mica cannot be estimated closely, but is clearly exhaustible within one to three centuries, unless unexpected deposits be found. The known petroleum supply is 15,000,000,000 barrels, covering about 8000 square miles. Production increases rapidly, and loss through misuse is enormous. The supply cannot be expected to last beyond 50 years.

Enough natural gas, the most perfect known fuel, is wasted daily in the United States to supply every city of over 100,000 population. The consumption of nearly all the mineral products increases far faster than population. In 1776 less than 100 pounds of iron ore were in use by the average family. To-day the annual consumption per capita of high-grade iron ore is over 12,000 pounds. In 1812 the United States used no coal. Now it uses over five tons per capita, and the waste per capita is about three tons.

Lands. Two-fifths of continental America is in farms. Less than one-half the farm area is improved and made a source of crop production. The value of all the farms is nearly one-fourth the wealth of the United States. More than 10,000,000 people are engaged in agricultural pursuits.

The United States grows one-fifth of the world's wheat crop, three-fifths of its cotton crop, and four-fifths of its corn crop. Neither the increase in acreage nor the yield per acre of farm land has kept pace with the increase in population. Within a century it will probably have to feed three times as many people as now.

The average yield of wheat in the United States is less than 14 bushels per acre, in Germany it is 28 and in England 32 bushels. The United States gets about 30 bushels of oats per acre, England nearly 45, and Germany more than 47 bushels.

Agriculture in America has, on the whole, decreased soil fertility slightly instead of having increased it, as it has done in the older countries. The wild game and fur-bearing animals have been exterminated largely, and the same is generally true of the game birds.

Forests. Forests now cover about one-fourth of the United States. The original forests covered over one-third. Forestry, which means the conservation of the forests by wise use, is now practiced on 70 per cent of the forests publicly owned and on less than 1 per cent of the forests privately owned, or on only 18 per cent of the total forest area. Forests privately owned contain four-fifths of all standing timber in the United States.

The United States takes from the forests each year, not counting the loss by fire, three and one-half times their yearly growth. Forty cubic feet per acre are taken for each 12 cubic feet grown; and 260 cubic feet per capita are taken, while Germany takes 37 cubic feet, and France 25 cubic feet from their forests. Not less than 50,000,000 acres of forest is burned over every year, and forest fires destroy annually an average of 50 lives and $50,000,000 worth of timber. If the use and waste of the forest continues unchanged, all the mature timber now standing in the United States will be used up by 1965.

Waters. Less than 1 per cent of the rainfall, including snow, the sole source of the freshwater supply, is retained and utilized for municipal and community supply; less than 2 per cent is used for irrigation. Perhaps 5 per cent is used for navigation and less than 5 per cent for power. About $500,000,000 is invested in water works and the appurtenant catchment areas for municipal and community supply. About $200,000,000 is invested in irrigation works, but few of the reservoirs are large enough to hold the storm waters. The waste of water in public and private irrigation projects exceed 60 per cent, while not more than 25 per cent of water available for the irrigation of arid lands is actually used.

In the continental United States there are 287 navigable streams, or an aggregate of 26,226 miles, and as much more navigable if they were improved. There are 45 canals, aggregating 2198 miles, besides numerous abandoned canals.

Water power now in use in the United States aggregates 10,000,000 horse power. The amount running over government dams and not used is about 1,400,000 horse power. The amount reasonably available, to quote the late Dr. W J McGee, "equals or exceeds the entire mechanical power now in use, or enough to turn every mill, drive every spindle, propel every train and boat, and light every city, town, and village in the country."

So much for the waste of natural resources up to now. What is the possibility of further waste and misappropriation of the natural resources still under public control, and constituting the national forests, the public domain, and

the navigable streams? This can be answered best by discussing the purposes of the conservation movement, the results already accomplished, and those still to be attained.

THE CONSERVATION MOVEMENT

The conservation movement sprang directly from the forest movement in the United States. The United States Forest Service developed in 10 years, under the leadership of Gifford Pinchot, from a minor division in the Department of Agriculture to an organization administering in the public interest nearly 200,000,000 acres of forest land, employing 3000 persons and aiding indispensably in the growth and development of the West. Gifford Pinchot was the first man to see that the use and the misuse of all the natural resources are interdependent, that conservation of these natural resources is essential to the national and individual welfare, and that this welfare is threatened by two great evils—by unnecessary waste and by unregulated and selfish monopoly.

As President Roosevelt often and freely stated, the conservation idea as applied to all natural resources came to him from Gifford Pinchot. It was at the suggestion of Gifford Pinchot that President Roosevelt called the Conference of Governors at the White House May 13–15, 1908, which ended in a declaration whose keynote was the recognition of the great natural resources as the material bases on which civilization depends and on which rests the prosperity of the nation; the expressed conviction that conservation of the natural resources should engage the attention of the people and the nation and the States in earnest coöperation; and the declared wish and intention to preserve these foundations of prosperity.

The Conference of Governors was followed by the appointment of conservation commissions in nearly all the States and by the appointment of similar commissions representing great organized industries. The conservation movement dates as an avowed and recognized public policy from that historic Conference of Governors.

The purpose of the conservation movement, broadly stated, is to develop the fullest permanent usefulness of the great natural resources. This calls, first, for thrift in their protection and utilization; it calls also for drawing a clear line, and maintaining it, between the privileges of the few and the rights of the many in acquiring natural resources necessary to the public welfare. Conservation therefore is not merely an economic but also a moral issue. It has been defined by Gifford Pinchot as "the application of common sense to common problems for the common good."

More specifically the purposes of the conservation movement are as follows. With respect to minerals the conservation movement aims: 1. So to use ores reduced to minerals as to confine to a minimum the loss by rust, electrolytic action, and other waste. 2. To make the pursuit of mining more safe to the miner. 3. To exercise such control through the national government of the mineral fuels and phosphate rocks still in its possession as to check waste and prolong our supply. 4. To meet and satisfy the need for further surveys and investigations and for further researches concerning the less-known minerals.

The policy of the conservation movement with respect to lands is as follows: 1. Every part of the public lands should be devoted to the use which will best subserve the interests of the whole people. 2. The classification of all public lands is necessary for their administration in the interest of the people. 3. The timber, the minerals, and the surface of the public lands should be disposed of separately. 4. Public lands more valuable for conserving water supply, timber, and natural beauties or wonders than for agriculture should be held for the use of the people from all except mineral entry. 5. Title to the surface of the remaining non-mineral public lands should be granted only to actual home makers. 6. Pending the transfer of title to the remaining public lands, they should be administered by the government, and their use should be allowed in a way to prevent or control waste and monopoly. 7. The public-land laws, as a whole, do not subserve the best interests of the nation. They should be modified so far as may be required to bring them into conformity with the foregoing outline of policy.

The conservation movement aims to perpetuate the usefulness of the forests by the following means: 1. To get practical forestry practiced on all private forest lands in the United States by whatever legitimate steps may be necessary to that end, including more adequate provision for State coöperation in fire protection, and tax laws modified so as to encourage rather than discourage the practice of forestry. 2. To maintain under Federal control the forest resources which are the property of the nation. 3. To encourage and educate all wood users, large and small, to reduce the drain on the forests by lengthening the life of timber used by preservation treatment and other obvious economies of wood in use. 4. To face and meet the national task in forest planting in the United States, in order to restore to productivity lands laid waste by destructive lumbering so far as those lands are suitable only for forest purposes.

With respect to the waters the conservation movement holds that the paramount use should be water supply; next should follow navigation in humid regions and irrigation in arid regions. The development of power in the navigable and source streams should be coördinated with the primary and secondary uses of the water. Other things equal, the development of power should be encouraged, not only to reduce the drain on other resources, but because properly designed reservoirs and power plants retard the run off and so aid in the control of the streams for navigation and other uses. Broad plans should be adopted providing for a system of waterway improvement extending to all uses of the waters and benefits to be derived from their control, including the clarification of the water and abatement of floods for the benefit of navigation, the extension of irrigation, the development and application of power, the prevention of soil wash; the purification of streams for water supply, and the drainage and utilization of the waters of swamp and overflow lands.

The policy of the conservation movement as regards water powers recognizes these three essentials of a sound water-power policy: prompt development; prevention of unregulated monopoly; good service and fair charges to the consumer. Water power is clearly a natural monopoly, since it can be controlled and used by but one concern at one time. Therefore it is directly upon the terms upon which the right

to use a water-power site is granted that the prevention of the monopoly of water power directly depends. One of the most striking features of the water-power situation to-day is concentration and control. Sixty-five per cent of all the developed water power in the United States is controlled by 10 groups of power interests, several of which are closely related by interlocking directorates between the groups themselves. Concentration and control have gone forward very rapidly in recent years and have nearly doubled in the last two years. The 10 great groups of interests hold about one-third more power undeveloped than they have developed. In the last two years control of undeveloped power has increased more than twice as fast as control of developed power by the same interests.

RESULTS ACCOMPLISHED

Since its inception these are the more important achievements of the conservation movement:

The successful administration in the public interest of the national forests, which contain nearly one-fifth of all the standing timber in the United States, and put each year vast quantities of mature timber to beneficial use, protect the headwaters of every important Western river, and help to support half the sheep and nearly one-tenth of the cattle on the Western ranges.

A second achievement of the conservation movement was the construction of a railroad in Alaska which will lead from the coast to the Matanuska coal fields. Railroad development by the nation was first suggested by Gifford Pinchot, who throughout has advocated the prompt and legitimate development of all the resources of Alaska with benefit to her citizens and the nation.

The third great achievement of the conservation movement was the progress made toward the application of the principles of range administration within the national forests to the whole public domain.

A fourth great achievement in conservation was the defeat of selfish attempts of the organized power interests, formerly successful at nearly every point, to get and hold in perpetuity and for nothing unregulated control of the water powers of navigable streams in the national forests and on the public domain.

Perhaps the most striking example of the extent to which the public conscience was aroused against water-power monopoly was the meeting of the National Conservation Congress, held in Washington Nov. 18, 19, and 20, 1913, at which a sharp difference arose between Gifford Pinchot, leading the minority of the water-power committee, and other men, constituting a majority of the committee, as to the declaration to be made by the congress on the subject of water power. Gifford Pinchot held that the congress should recognize unregulated monopoly of water power and go on record solemnly against it. His opponents held differently. The result was that the congress went on record against unregulated monopoly of water power in a clear and vigorous declaration.

Another victory gained by the conservation movement, but one in which all danger has not yet passed, was the fight to hold what conservation has already won. This fight centred around the national forests and all they contain, but it also involved the attempt to cede not only the national forests but the whole public domain to the Western States. In Congress 14 bills were introduced aimed in one way or another to turn over to the States natural resources now under Federal control. The policy of these bills was advocated openly and strongly by many members in Congress. None of them passed.

There are two great reasons why the national forests should not be turned over to the Western States. One reason is that such a step would involve waste of money and effort and would impair the usefulness of the national forests to the people. The other reason is that the States are not ready for this task. So far as they have performed a similar task in the past they have done it in the main incompetently or, what is much more serious, not with an eye single to the public interest.

Ownership or control of the national forests by the Western States would entail the creation of many forest services instead of one. Few States have more than the mere beginnings of an efficient forest organization, and still fewer have an adequate machinery for getting and retaining, regardless of political considerations, efficient men for the work. But, beyond all that, is the fact that these national forests are a national resource on which depends the prosperity not of any one section or part of the people or of the country, but of the whole people and of the whole country. To develop their fullest usefulness to the whole people and to the whole country calls for their administration under national policies from the national point of view.

With regard to its political significance, the conservation movement is not in any sense a movement of any one party.

RESULTS TO BE ACCOMPLISHED

The conservation movement faces the necessity for further achievements before the natural resources are safe either from unregulated monopoly or from waste. These are as follows:

The passage of legislation for the development of the water powers of the national forests and the public domain and of interstate and navigable streams on terms fair to the people and to the power interests.

With respect to Alaska, the citizens of Alaska should be enabled to get coal promptly and easily for domestic use, and through railroad development by the government and through provision for the working of coal mines on a larger scale under lease, the utilization of this vast natural resource should be encouraged with benefit to the people.

The grazing lands of the public domain cover about one-sixth of the United States and produce most of our beef and mutton, leather and wool. Through wasteful use these lands have been so injured for grazing purposes that they feed only about one-half the stock which they would feed were their use wisely regulated. The improvement of the public range by regulated use is an essential and exceedingly important step in the reduction of the cost of living.

The needless pollution of streams is an increasing menace to health and in some instances to life itself. The pollution of the waters of any navigable stream or interstate stream or lake should be deemed an offense against the public, and subject to penalties adequate in amount to prevent its repetition.

CON'SERVA'TION OF ENERGY, PRINCIPLE OF. See MECHANICS; ENERGETICS.

CONSERVATION OF MATTER. See MATTER, *Properties of Matter.*

CONSERVATION OF WILD LIFE. See WILD LIFE, CONSERVATION OF.

CONSER'VATIVE. See WHIG; TORY; POLITICAL PARTIES, *Great Britain.*

CONSERVATIVE CLUB, THE. A Tory club founded in London in 1840. Its clubhouse is in St. James's Street.

CON'SERVA'TOR OF THE PEACE. An ancient office of great dignity and authority in England. It existed at common law as an incident of certain tenures of lands held immediately of the King; or the King might appoint one to be his warden or the conservator of his peace; and before the institution of justices of the peace certain officers were so appointed. Now the only official conservators of the peace are certain officers who hold this power annexed to the offices which they hold. The sovereign, by virture of his office, is the principal conservator of the peace in British realms. Several high officers of the crown, the Chancellor or Lord Keeper, the Lord High Steward, the Lord Marshal, and the Lord High Constable, when there are such officers, and all the justices of the High Court, are conservators of the peace throughout the whole kingdom and may commit breakers of the peace or bind them in cognizances anywhere. Other judges possess this power only within the limits of their own jurisdiction. The sheriff and coroner are conservators of the peace within their respective counties, and constables, tithingmen, etc., within their jurisdictions. The phrase is not in use in the United States. Consult Stephen, *Commentaries on the Laws of England* (13th ed., London, 1899).

CONSER'VATORY (ML. *conservatorium*, place for preserving anything, from Lat. *conservare*, to preserve, from *con-*, together + *servare*, to keep, Ar. *har*, to preserve). A school for the cultivation of music in all its branches. Besides strictly musical subjects, stage deportment and the modern languages used in singing (German, French, Italian) are usually included in the curriculum. Originally, however, a conservatory was not a school of music, but an orphan asylum or institution of a benevolent character for the care of children of the poor. Such children as showed a talent for music were educated in the art. At first this instruction was given to the inmates only, but subsequently day scholars also were admitted upon payment of a moderate fee. The oldest conservatory is the Conservatorio Santa Maria di Loreto in Naples, founded in 1537. Within the same century three more conservatories were established in the same city. By order of King Murat these were consolidated, in 1808, under the name Collegio Reale di Musica. Venice had four such institutions, which ceased to exist with the downfall of the Venetian Republic. To-day the Conservatory of Venice is known as the Liceo Benedetto Marcello. The success of these schools was so pronounced that soon conservatories were founded all over Italy. Among the best known are (1) the Regio Conservatorio di Musica, in Palermo, founded 1615; (2) the Liceo Musicale, in Bologna, founded 1804, noted for its magnificent library, the greater part of which was bequeathed to it by Padre Martini and Gaetano Gaspari; (3) the Regio Conservatorio di Musica, in Milan, founded 1807; (4) the Civico Istituto di Musica, in Genoa, founded 1829; (5) the Liceo Musicale, in Turin, founded 1865; (6) the Liceo Musicale Rossini, in Pesaro, established in 1882 by a gift of 2,300,000 lire from Rossini.

In France the necessity of a school for the education of singers led to the establishment, in 1784, of the Ecole Royale de Chant et de Déclamation. During the French Revolution, in 1793, owing to the scarcity of instrumental performers for the army, the course was extended, and the name was then changed to Institut National de Musique. In 1795 it was reorganized and has since been known as the Conservatoire de Musique. To-day it is beyond all question the most famous music school in the world. Prizes are awarded in all the classes. The highest honor conferred is the Grand Prix de Rome, which entitles the winner to a three years' stay in Italy with a single condition, that the holder send from time to time original compositions as evidence of his progress. Nearly all the famous French composers of the last century have been winners of this prize. (See PRIX DE ROME.) There is scarcely a musician of note in France who has not been at some time a professor in the conservatory. The directors since its foundation have been Sarette (the founder, 1784–1814); Perne (1814–22); Cherubini (1822–42); Auber (1842–71); A. Thomas (1871–96); Dubois (1896–1905); Fauré (1905–). One of the foremost of French institutions is the Schola Cantorum, established in 1896 by D'Indy, Bordes, and Guilmant. Originally intended as a training school for liturgical music, it soon expanded into a regular conservatory, espousing the cause of ultra-modern French music. D'Indy has been its director since its foundation.

The oldest among the German conservatories is that of Prague, founded 1811, which, in addition to the usual musical courses, offers also a liberal-culture course. The Vienna Conservatory was opened in 1817 by Salieri as a school for singing. It became a true conservatory in 1821. The most famous conservatory in Germany is that in Leipzig, founded by Mendelssohn and Schumann in 1843. Among its professors have been M. Hauptmann, L. Plaidy, E. F. Richter, Hiller, Gade, Moscheles, Reinecke, and Brendel. Among its pupils were Grieg, Sir A. Sullivan, Svendsen, Wilhelmj, Kirchner, Jadassohn. The oldest Berlin conservatory was founded in 1850 by Kullak, Marx, and Stern. Among its professors were Bülow, Kiel, De Ahna, B. Scholz. The Neue Akademie der Tonkunst (chiefly for piano) was opened in 1855 by Kullak. The most important of the Berlin conservatories is the Königliche Hochschule für Musik, a branch of the Royal Academy of Arts. It is divided into three parts: (1) Königliches Institut für Kirchenmusik; (2) Abteilung für musikalische Komposition; (3) Abteilung für ausübende Tonkunst. Among the professors have been Joachim, Ph. Spitta, Bargiel, Herzogenberg. The Conservatory of Cologne was founded in 1850 by Hiller. The Dresden Conservatory was founded 1856, and that of Stuttgart in the same year. The famous Königliche Musikschule in Munich, founded 1867, offers, besides the musical, liberal-culture courses. Among the other famous German conservatories of to-day are those in Würzburg, Frankfort, Hamburg, Breslau, Strassburg, Karlsruhe, Regensburg (church music). Besides these public or state conservatories there are

also a number of not less famous private conservatories, such as those of Scharwenka, Schwanzer, Klindworth, Freudenberg. Switzerland also boasts some efficient conservatories in Geneva, Zurich, Basel, Bern. One of the greatest and best-known conservatories is that in Brussels, founded 1813, among the directors of which were Fétis and Gevaert. The conservatories in Liège and Ghent are also famous. In Antwerp Peter Benoit founded, in 1867, entirely after German models, the well-known Vlaamsche Muzickschool. Nor is Holland behind in the efficiency of her conservatories. The Maatschappij tot bevordering van tonkunst was opened in 1862 at Amsterdam. Also the conservatories in Rotterdam and The Hague have risen to importance. The oldest conservatory in Russia is that of Warsaw, founded 1821; the most famous, that in St. Petersburg, established 1862. Among its professors were Zaremba, Anton Rubinstein, Leschetitzky, Wieniawski, Davidoff, and Tschaikowski. A conservatory was also founded in Moscow in 1864 by Nicholas Rubinstein.

In England we find five conservatories in London—the Royal Academy of Music (1822); the London Academy of Music (1861); the Trinity College Conservatory (1872); the Guildhall School of Music (1880). The best of all is the Royal College of Music, established originally by Sir Arthur Sullivan as the National Training School of Music (1876). Sir George Grove was the first director under the reorganized administration (1883–94). He was succeeded (1894) by C. H. Parry. All other European countries have now conservatories of more or less importance.

In the United States music has made enormous strides within the last quarter of a century, and conservatories have been founded in nearly all the larger cities. Among the best known are the Chicago College of Music (1867), the Peabody Conservatory in Baltimore (1871), the Cincinnati College of Music (1878), the New England Conservatory of Music in Boston (1882), the National Conservatory of Music of America in New York (1885), the Guilmant Organ School in New York (1898). Perhaps the most richly endowed of all is the Institute of Musical Art in New York (1905). Besides, some of the great American universities have added a complete course of music to their regular curriculum, as Harvard (W. R. Spalding), Yale (Horatio W. Parker), Columbia (C. Rübner), University of Pennsylvania (A. A. Clarke), University of Michigan (A. A. Stanley).

CONSERVATORY. In horticulture, a glass house used for the preservation of tender exotics and the display, rather than the propagation or growing, of plants which have been brought to their ornamental perfection in a greenhouse. The term is often applied loosely to any ornamental greenhouse. See GREENHOUSE.

CON'SHOHOCK'EN. A borough in Montgomery Co., Pa., 13 miles northwest of Philadelphia; on the Pennsylvania and the Philadelphia and Reading railroads, and on the Schuylkill River (Map: Pennsylvania, L 7). The more important industrial establishments include rolling mills, steel mills, foundries, furnaces, surgical-implement works, rubber works, and cotton and woolen mills, the principal products of which form the basis of extensive trade. Conshohocken was founded in 1830 and was incorporated as a borough in 1852. Pop., 1890, 5470; 1900, 5762; 1910, 7480.

CONSIDÉRANT, kôn'sē'dā'räN', VICTOR PROSPER (1808–93). A French socialist, born at Salins, in the Department of Jura. After being educated at the Ecole Polytechnique in Paris, he entered the army, which, however, he left, after attaining the rank of captain of artillery, in order to promulgate the doctrines of Fourier. After the death of his master Considérant became the head of the Societarians, or Fourieristic sect, and undertook the management of their organ, the *Phalange*. Having gained the financial support of a young Englishman, Mr. Young, he established (1832) on a large scale, in the Department of Eure-et-Loir, a Socialist colony, or *phalanstère;* but the experiment failed, and with it the *Phalange* went out of existence. In 1843 Considérant founded a new organ of cooperative doctrine, the *Démocratic pacifique,* and conducted it with great zeal, perseverance, and ability. In 1848–49 he was a member of the Constituent Assembly, but was accused of high treason and compelled to flee to Belgium. In 1852 he visited America and associated himself with Albert Brisbane and other leaders of the Fourieristic movement in America. He traveled to the Mississippi valley, in search of cheap land upon which to found a great colony. He fixed upon a tract of land in Texas, near the Red River, and, returning to Belgium, procured from Godin (q.v.) a capital of 100,000 francs with which to launch his project. In 1854 he returned to America with 200 colonists, with whom he inaugurated his colony under the name of La Réunion. The colony proved a failure, and in 1869, deserted by all his followers, Considérant returned to France. The work by which he is best known is his *Destinée sociale* (1834–45), which is, however, little more than a summary of the doctrines of Fourier. His most original work is his *Socialisme devant le vieux monde* (1849). In spite of his Socialism Considérant was a conservative in religion and an enemy of revolution. See FOURIER; FOURIERISM.

CONSIDERATION (Lat. *consideratio,* from *considerare,* to observe, from *com-,* together + *sidus,* star). In the law of contracts, a detriment or the surrender of a right by one party in exchange for the promise of the other party. In case of a bilateral contract, i.e., one in which the promises are mutual, each promise is a consideration for the other. A consideration is essential to a valid simple contract. A mere promise made without a consideration is called by lawyers a naked promise (*nudum pactum*), and on it suit will not lie. Such a promise, even though made in writing, is not a valid legal contract. The requirement of consideration as a necessary element in a simple contract is due to the historical development of the contract action of assumpsit (q.v.) as an action in tort. In that action the plaintiff was required to show that he had given up a right or suffered some detriment in reliance upon, or in exchange for, the defendant's promise, by reason of which he had been damaged. Thus, a consideration need not be in the form of a direct benefit to the contracting party, but may be something involving loss or prejudice to the second party to the contract. On the other hand, a promise to reward another for performing his legal duty cannot be enforced, since the performance of a legal duty is not the surrender of a right or any detriment in a legal sense. Thus, the promise of a debtor to pay his debt is not a consideration for a contract, as the promisor is already under a legal obligation to pay his debt. If,

however, the promise is made after the debt is barred by the statute of limitations, the promise has the effect of reviving the obligation and may be sued upon although no consideration is given for it. This is anomalous. The law takes no account of the adequacy of consideration if the contract is made in good faith; but if inadequacy results from fraud or mistake, the contract may be rendered void or voidable according to the circumstances of the case. If the consideration given is contrary to public policy, or is a promise to do an illegal act, the contract based theron is illegal and void. See CONTRACT; MISTAKE; FRAUD.

CONSIGNMENT (from Fr. *consigner*, to consign, from Lat. *consignare*, to seal, from *com-*, together + *signare*, to sign, from *signum*, sign). In mercantile law, a quantity of goods delivered by one party, called the consignor, to another, called the consignee, for custody, for transportation, for sale, or pursuant to a contract for their sale. When they are delivered to a common carrier for transportation, the consignment is generally evidenced by a *bill of lading* (q.v.). See BAILMENT; CARRIER, COMMON; FACTOR.

CONSIS'TORY (Lat. *consistorium*, from *consistere*, to stand together, from *com-*, together + *sistere*, to station, from *stare*, to stand). Properly a place of assembly, but in later Latin the word came to mean a particular place where the Council of the Roman Emperor met, and, after the time of Diocletian and Constantine, the Council itself, which became the supreme judicial tribunal of the later Roman Empire. Up to the time of Marcus Aurelius, the Roman Emperor frequently exercised in person the supreme judicial authority, which covered matters brought directly before him for decision, as well as appeals from the judgments of the provincial prætors in all parts of the Empire. In the troublous times which succeeded, this function was devolved upon a council, made up largely of jurists, which acted in his name, and whose judgments were of equal authority with statutes immediately promulgated by him. These judgments of the consistory were known as decrees (*decreta*) and formed an important part of the Imperial legislation (*constitutiones*) of the later Empire. In the membership of this Council were the Imperial officials, and its function was to deliberate on the important affairs of legislation, administration, and justice. The *form* of the Imperial consistory passed over into the early Christian Church. The bishops established their consistories, and the name was applied to the assemblies of the Roman clergy and the bishops of the suburban sees, out of which the College of Cardinals has developed. Public consistories are now held in the Vatican for formal functions, such as the giving of the hat to a cardinal, the final pleadings on the question of canonization, or the reception of an ambassador. Secret or ordinary consistories, to which none but cardinals have access, discuss a variety of administrative matters, such as the erection of new sees and the nomination of cardinals and bishops. The detailed work, however, is done in the committees, which are known as "consistorial congregations." (See CONGREGATION.) Semipublic or extraordinary consistories contain bishops in addition to the cardinals, and take a final vote on proposed canonizations. In the Greek church each bishop has his own consistory of three to seven members nominated by him and confirmed by the Holy Governing Synod. An appeal lies from the consistory to the bishop and from the bishop to the synod.

In English ecclesiastical law, the consistory, or consistorial court, is the tribunal in which the bishop exercises his ordinary legal jurisdiction. This jurisdiction was formerly very extensive, including the trial for common-law offenses of clerks, or persons entitled to claim exemption from the process of the secular tribunals (see BENEFIT OF CLERGY), and to a very recent date the cognizance of all matrimonial causes, the probate of wills, the administration of decedents' estates, etc. The reform of the judicial procedure in England in 1857 transferred the latter classes of cases to the jurisdiction of the ordinary tribunals, leaving to the consistorial courts only their more strictly ecclesiastical jurisdiction. In general, an appeal lies from the judgment of the consistory court to that of the archbishop—the Court of Arches (of Canterbury)—or the Chancery Court of York. The presiding officer of the consistory is the chancellor of the diocese, his judicial title being variously the ordinary, the official principal, and vicar general. See those titles; also ECCLESIASTICAL COURTS; CANON LAW; and consult Phillimore, *Ecclesiastical Law of the Church of England* (2d ed., London, 1895).

In the Lutheran state churches the consistory is a board of clerical officers either national or provincial, usually appointed by the sovereign and charged with various matters of ecclesiastical administration. These bodies exercise a supervision and discipline over the religion and education of the people, as well as over the clergy and the schoolmasters, and examine the candidates for the ministry for license and ordination. They have also the regulation of public worship and the administration of church property. In the Protestant churches of France the consistory exercises a more restricted jurisdiction than in Germany. In the Reformed (Dutch) church the consistory is the lowest ecclesiastical court, having charge of the government of the local church and corresponding to the session of a Presbyterian church.

CONSOLACIÓN DEL SUR, kōn'sō-lä'thē-ōn' dĕl sōōr (Sp., Consolation of the South). A town in the Province of Pinar del Río, Cuba, about 15 miles northeast of Pinar del Río (Map: Cuba, B 4). It is in the midst of the Vuelta Abajo District, one of the most famous in Cuba for fine tobacco. Pop., 1899, 3062; 1907, 3414.

CONSOLATO DEL MARE, kŏn'sō-lä'tō dĕl mä'rā (Consulate of the Sea). A code of maritime law, compiled, it is believed, at Barcelona in the fourteenth century and made up of the settled usages, as to trade and navigation, of the maritime communities of the Mediterranean. The earliest copy known was published at Barcelona, in 1494, in the Catalan language. It contains (1) a code of procedure issued by the kings of Aragon for the guidance of the courts of the consuls of the sea; (2) a collection of ancient customs of the sea; and (3) a body of ordinances for the government of cruisers of war. It enjoyed considerable authority and has passed, by legislation and by judicial adoption, into the maritime law of Europe and America. Its provisions were largely embodied in the French Maritime Code of 1681 (*Ordonnance sur la marine*). The code was translated into Italian and printed in Venice in 1549, and French, Dutch, German, and English translations have also been made. The most valuable

portion, the customs of the sea, will be found printed in English in the appendix to the *Black Book of the Admiralty* (London, 1874). Consult: Robinson, *Collectanea Maritima* (London, 1801); Pardessus, *Collection des lois maritimes antérieures au 18ème siècle* (Paris, 1828–45); Reddie, *Researches, Historical and Critical, in Maritime International Law* (Edinburgh, 1844–45); Wheaton, *History of the Law of Nations in Europe and America* (New York, 1845); Schaube, *Das Konsulat des Meeres in Pisa* (Leipzig, 1888); Valroger, *Etude sur l'institution des consuls de la mer au moyen-âge* (Paris, 1891).

CONSOLE, kŏn'sōl (Fr., probably ultimately from Lat. *consolidare*, to strengthen, from *com-*, together + *solidus*, firm). In architecture, a projection in the form of a letter S or of a single or double scroll, used to support cornices, or sometimes busts, vases, figures, etc. Consoles are often richly ornamented and are, in fact, sometimes purely decorative features, differing in this from brackets (q.v.) and corbels (q.v.), which have a structural function. The name is also applied to a table fixed against a wall, the front carried on curved supports instead of straight legs.

CONSOLIDATION (Lat. *consolidatio*, from *consolidare*, to strengthen) **ACTS.** Statutes which combine in a single act all previous statutes relating to, and coming under, the same general subject matter. As a general rule, this cannot be done by a mere collocation, or gathering together under one head, of acts of different dates in their original form; but they must be rewritten, arranged in sections, all inconsistencies and surplusage be omitted, and uniformity of expression obtained, so that the whole may be a complete and logical act. Frequently, in order to do this, amendments to many of the measures which it is proposed to bring together are passed, and then they are reënacted by the consolidation act. The meanings of various technical terms in the statutes are usually defined and explained in a sort of prefix, which is made a part of the whole and is thus binding on the courts. The acts which are consolidated, and thereby superseded, are repealed by an express provision in the same measure. Consolidation measures have proved successful in England in rendering their statute law more simple and concise. Several of the United States have followed the idea, but generally have gone further, and enacted all the existing law on a given subject, whether contained in statutes or decisions, and the result is more in the nature of a codification act than a consolidation act as known in England. See CODE; REVISED STATUTES.

CONSOLS'. A contraction of the words "consolidated annuities." In incurring the English debt, the government borrowed money at different periods on special conditions, generally the payment of an annuity of so many per cent on the sum borrowed. Great confusion arising from the variety of stocks thus created, it was thought expedient to strike an average of their value and consolidate them into one fund, kept in one account at the Bank of England. The Consolidated Annuities Act was passed in 1757.

CON'SONANCE (Lat. *consonantia*, from *consonare*, to sound together, from *com-*, together + *sonare*, to sound, from *sonus*, Skt. *svana*, sound, from *svan*, to resound), or CONCORD. In music, the simultaneous sounding of two or more tones belonging to the same major or minor triad. The effect upon the ear is entirely satisfying, so that further progression or resolution is not required, as it is in the case of dissonance (q.v.). This feeling of rest is attributed to the simple ratios existing between the number of vibrations of consonant intervals, whereas the ratios between dissonant intervals are complex. Consonant intervals are the unison, perfect fourth, fifth, and octave, as well as major and minor thirds and sixths. (See INTERVAL.) Chords formed by only consonant intervals are consonant chords. They are of two kinds, major and minor triads; the major triad consisting of tonic, major third, and perfect fifth, the minor composed of tonic, minor third, and perfect fifth. See ACOUSTICS; CHORD; HARMONY; TRIAD.

CON'SONANT. See LETTERS; ALPHABET.

CON'SORT (Lat. *consors*, partner, from *com-*, together + *sors*, lot; probably connected with Lat. *serere*, Gk. *εἴρειν*, *eirein*, Skt. *si*, to join together). A term applied to the husband or wife of a reigning sovereign, viewed in a public capacity. Whatever political influence may attach to the position, the probability that the consort will attempt to secure some share in the royal prerogative is naturally greater where the consort is the husband; and as the royal spouse is most frequently a foreigner, national legislatures have always been careful to restrict his activity to the ornamental functions of royalty. In some cases, however, the husbands of ruling sovereigns have been granted a share in the government, a notable instance being that of Ferdinand of Aragon, who on his marriage to Isabella of Castile was declared joint ruler of that country. Prince Consort was the official title of Prince Albert Saxe-Coburg-Gotha after his marriage to Queen Victoria of England.

CONSPIRACY (OF. *conspiracie*, *conspiratie*, from Lat. *conspirare*, to conspire, from *com-*, together + *spirare*, to breathe). As a criminal offense this has been judicially defined as "a combination by two or more persons, by some concerted action, to accomplish an unlawful purpose, or to accomplish a purpose not in itself unlawful, by unlawful means." It will be observed that the gist of the offense is the agreement or confederation of the conspirators; an overt act pursuant to the agreement is not necessary to the completion of the crime, although, in most cases of conspiracy, such acts are performed. This doctrine of the common law has been changed by Federal legislation and by statute in many of the United States. Under such legislation the commission of an overt act to effect the object of the conspiracy is essential to consummate the crime; but as soon as that act is done the offense of conspiracy is complete and is not in any way affected by the nature or results of the act, even though the act be such that it could not possibly accomplish the conspirator's intention.

When a conspiracy has been entered into, the conspirators become so related legally that the acts or statements of any of them in reference to the common purpose are admissible against all—each is the authorized agent of all. This rule often induces the public prosecutor to have persons indicted for a conspiracy, even when their confederation has resulted in the commission of other crimes, such as treason or murder.

Some of the more important common-law conspiracies were those to commit treason or sedition, to murder, to cheat and defraud, and to maliciously injure another. They were mis-

demeanors only. Statutory conspiracies, i.e., acts declared by legislation to be punishable as conspiracies, have been raised to the rank of felonies in some instances.

Whether conspiracy is a civil wrong of itself is a question upon which judges and writers differ. There is eminent authority for the view that it is a distinct tort—an actionable wrong, without respect to the consequences of the acts done pursuant to the confederation. The prevailing view at present, however, both in England and in the United States, is that the gist of the civil cause of action is the actual damage done to the plaintiff, not the agreement or confederation against him.

Consult: Wright, *Law of Criminal Conspiracies* (London, 1873; Philadelphia, 1887); Bishop, *New Commentaries on the Criminal Law* (Boston, 1900); id., *Commentaries on the Non-Contract Law* (Chicago, 1889); also *Encyclopædia of the Laws of England* (2d ed., London, 1907).

CONSTABLE, kŭn'stă-b'l (OF. *conestable*, Fr. *connétable*, from ML. *conestabulus, comestabulus, comistabuli*, constable, from Lat. *comes stabuli*, count of the stable). 1. An officer of great dignity and authority in the Eastern Roman Empire, whence the office passed, with varying functions but no loss of authority, to the Western nations of Europe. The Constable of France, as commander in chief of the army and navy and chief arbitrator in chivalry, became the most powerful officer and dignitary in the state after the King, and because of the danger to the crown that lurked in its greatness, the office was abolished by Richelieu in 1627. The dignity was revived by Napoleon Bonaparte, but again abolished after the restoration of the monarchy. Across the Channel the office existed with similar functions, under the title of Lord High Constable of England, but it never attained the authority which attended it in France, and it was suspended for reasons of economy by Henry VIII. It is now filled by temporary appointment on great occasions of state, as the coronation of the monarch, etc. Formerly the Lord High Constable, in conjunction with the Earl Marshal of England, held the courts of chivalry, or honor, and the courts-martial of the kingdom. But the former jurisdiction has now completely lapsed, and courts-martial are held by the ordinary military authorities. The court of the constable and marshal, therefore, while still nominally in existence, is practically obsolete. The office of constable still survives in Scotland, where it has become an hereditary dignity of the earls of Errol, but shorn of its former authority.

2. The office of constable also existed in England with the signification of warden or keeper of certain royal castles and fortified towns. In a few cases it long survived as an hereditary office, and in some others it is filled by royal appointment. Of the latter class are the constables of the Tower of London and of Windsor and Dover castles.

3. The peace officer whom we know as constable is the petty constable of English law, an officer of great antiquity—so called to distinguish him from the High Constables of Hundreds, created by the Statute of Winchester, 13 Edw. I (1285). The office has in recent years lost much of its importance in England, the institution of county and borough police having deprived it of most of its functions. In most of the United States, however, outside the cities, the constable continues to be the principal officer of the peace. As such he is invested with large powers of arresting, imprisoning, executing civil and criminal process, and often with limited judicial functions. His duties are generally defined by statute. In cities, as in English boroughs and counties, his functions have generally been transferred to the police (q.v.). Consult: Bacon, *New Abridgment of the Law*, title *Constable;* Dalton, *The Country Justice: Containing the Practice, Duty, and Power of the Justices of the Peace.* See PEACE; SHERIFF.

CONSTABLE, ARCHIBALD (1774–1827). A Scottish publisher, born at Carnbee, Fife. He became famous for the sumptuousness of his editions and the liberality shown towards his employees. He published nearly all of Sir Walter Scott's works, and his failure in 1826, with that of Ballantyne and Company, involved Scott for £120,000. Constable became publisher of the *Scots' Magazine* (1801) and of the *Edinburgh Review* (1802), and owner of the *Encyclopædia Britannica* (1812), which he enlarged. He edited the *Chronicle of Fife* (1810) and wrote a *Memoir of George Heriot* (1822). Consult Constable, *Archibald Constable and his Literary Correspondents* (3 vols., Edinburgh, 1873), and Lockhart, *Life of Scott* (7 vols., London, 1838).

CONSTABLE, HENRY (1562–1613). An English poet. He was graduated from St. John's College, Cambridge, in 1580, became a Roman Catholic and therefore found it best to live mostly on the Continent. He died at Liége, Oct. 9, 1613. He wrote many pretty pastorals and sonnets to Diana, sometimes marred by fantastic conceits. His one independent publication was *Diana*, which first appeared in 1592 in pamphlet form, to reappear in 1594 (though wrongly dated 1584) with additional poems, and to be augmented, from manuscripts, in 1813 by H. J. Todd. It is interesting for the place it takes in the early development of the sonnet in England. Constable contributed four pastorals to *England's Helicon* (1600), and sonnets to other collections. Sixteen "Spiritual Sonnets," attributed to him, were first printed by T. Park in *Heliconia* (1815). Constable's contribution to English song is slender, and the authenticity of many of the poems attributed to him is not established by evidence. It was his fortune to be associated through his poetry with Shakespeare and Sir Philip Sidney. The former pays him the compliment of borrowing from his verse; and the latter's *Apology of Poetry* (1594) is prefixed by sonnets by Constable, addressed to the author of that book.

CONSTABLE, JOHN (1776–1837). An English landscape painter, the founder of modern landscape art. He was born on June 11, 1776, in East Bergholt, Suffolk, the son of a wealthy miller. His father intended him for the clergy and afterward tried him as a miller, but the youth's taste was all for art. He first studied painting in company with a local amateur named Dunthorne, with whom he painted the scenes about his native home, always in the open air. In 1795 he went to London in order to study painting, but was recalled soon afterward. In 1799 he returned to London and entered the Academy School, where he received instruction from Farrington and Reinagle. He was greatly impressed with the works of Ruysdael in the National Gallery. At first he attempted portraits and historical subjects, according to the custom of the day, but in 1803, weary of studying pictures and of acquiring

truth second-hand, he returned to East Bergholt. From this time he painted landscapes from nature only, passing at least the summer months entirely in the country near his home.

His work, however, was too revolutionary and original to become popular in his native land, although he found a few devoted friends who believed in him and bought his pictures. Among these were Sir George Beaumont, the Mæcenas of his boyhood, Bishop Fisher, of Salisbury, and his nephew, Archdeacon Fisher, Constable's most intimate friend, and, above all, Miss Maria Bicknell, whom he afterward married. He did not sell a single landscape to a stranger until 1814, but was compelled to support himself by painting portraits and copies of paintings. But, never discouraged, he worked on in his quiet way, knowing well that the future was his. At length he found recognition in France. In 1823 three of his pictures were exhibited at the Salon, where they excited the greatest admiration and were accorded the place of honor in the exhibition. The King of France sent Constable a gold medal, and the same honor was accorded to him in the following year at Lille. At last, in 1829, came the tardy honor of membership in the Royal Academy, but accompanied by an ungracious remark on the part of the president and too late to afford satisfaction to the painter.

Constable was a simple and noble character, who bore bravely discouragement and adversity and never wavered in his ideal of art. His other great passion in life was his love for his wife, Miss Maria Bicknell, to whom, after many difficulties, he was secretly wedded in 1816. With a family of seven children, he was sometimes hard pressed for money, until he was at length relieved by his own inheritance and the ample inheritance of his wife. In 1827 he removed to his favorite Hampstead, where many of his best pictures were painted. He was greatly bereaved by the death of his wife in 1828 and died unexpectedly on March 30, 1837.

Constable was a great innovator in landscape painting, and he is, more than any other, the father of the modern school. The old Dutch masters gained their effects by giving the forms of objects, placing more weight upon drawing than upon color, in which they achieved harmony by a uniform brown tone. Constable saw that landscape is rather a problem of light and air, and that its effect depends upon the light and shadow in which the objects are seen. He was the first to paint the subtle gradations of the atmosphere and to show not only the objects themselves, but how he saw them. He laid on his colors fresh and fair, as they are in nature, applying to oil paintings the results of water color. His pictures are always harmonious in tone. He renders the effect of a landscape, suppressing unimportant details—a tendency which increases with his later years. He frequently uses the palette knife, sometimes executing the entire picture by this means. In consequence of his teachings an able group of landscape painters arose in England in the forties and fifties, the most important of whom was David Cox (q.v.). His influence upon British painting during the last three decades has been even greater. His influence on the Barbizon masters has, however, been exaggerated. See BARBIZON, PAINTERS OF.

Constable's work may best be studied in the national collections of London, which have received valuable legacies of his paintings from his descendants. In the National Gallery are the "Cornfield" (1826), "Valley Farm" (1835), "Hay Wain," and many others; in the Tate Gallery, "The Bridge at Gillingham," "Harwich; Sea and Lighthouse," etc.; in South Kensington Museum, "Deadham Mill" (1820); "Hampstead Heath" (1823); and "Water Meadows near Salisbury," besides many other paintings, water colors, and many admirable studies. He is also well represented in the English provincial museums, in the Louvre ("Hampstead Heath"); in the Metropolitan Museum, New York, by "Bridge on the Stour" and the splendid "Scene on the River Stour," called "The White Horse" (J. P. Morgan collection); in the Wilstach collection, Philadelphia, the Toledo Art Museum, and other private collections of the United States. Twenty of his chief works were published in 1833 in a series of etchings, and others in 1855, by David Lucas.

Consult: Muther, *History of Modern Painting* (London, 1896); Leslie, *Memoirs of Constable* (ib., 1843; new ed., 1896), containing Lucas's plates; Brock-Arnold, *Gainsborough and Constable* (ib., 1881); Wedmore, *Studies in English Art* (ib., 1876–80); Holmes, *Constable and his Influence on Landscape Painting* (New York, 1903); Windsor, *John Constable, R. A.* (London, 1903); Henderson, *Constable* (ib., 1905); Tompkins (ib., 1907); Bankart (ib., 1910).

CON'STANCE (Ger. *Konstanz* or *Kostnitz*). A fortified border city of the Grand Duchy of Baden, situated 1300 feet above sea level, on both banks of the Rhine where it leaves Lake Constance, about 35 miles northeast of Zurich (Map: Germany, C 5). Two old city gates mark the remains of its ancient fortifications. The cathedral, founded in the eleventh century and rebuilt in the fifteenth, has fine hand-carved oak portals and choir stalls. Here Huss was sentenced by the council to be burned at the stake. Other ecclesiastical buildings of interest are the church of St. Stephen and, on an island, the Dominican monastery in which Huss was confined. Notable secular buildings include the old Kaufhaus, containing the hall in which the conclave of cardinals met to elect a pope at the time of the famous council in 1417; the Rosgarten, the former guildhall of the butchers, containing an interesting museum; the town hall, with the ancient city archives; and the Barbarossa Inn, where Frederick of Barbarossa signed a treaty with the cities of the Lombard League in 1183. Constance has manufactures of chronometers, wool, linen, cotton, carpets, soap, and chemicals. Pop., 1900, 21,345; 1910, 27,591. The Roman *Constantia* was known at least as early as the third century. In 570 it was made the seat of a bishopric, which existed as one of the most powerful in Germany until its secularization in 1803. In 780 Constance was given municipal rights and in 1192 was made a free Imperial city. For joining the Schmalkaldic League it was deprived of its Imperial privileges in 1548 and presented to Archduke Ferdinand of Austria. In 1806 it became a part of the Grand Duchy of Baden. Consult: *Geschichte der Bischöfe von Konstanz* (Innsbruck, 1894–96); *Chroniken der Stadt Konstanz* (1890–92); A. Maurer, *Der Uebergang der Stadt Konstanz an das Haus Oesterreich* (Frauenfeld, 1904).

CON'STANCE. 1. Daughter of the Emperor and eventually the wife of King Alla, in Chaucer's *Man of Law's Tale.* 2. The mother

JOHN CONSTABLE

"THE HAY WAIN"

FROM THE PAINTING IN THE NATIONAL GALLERY, LONDON

of Prince Arthur, in Shakespeare's *King John*. 3. Nonesuch's daughter, enamored of Lovely, in Dryden's *Wild Gallant*. 4. The heroine of Brome's *The Northern Lass*. 5. Fondlove's daughter and Wildrake's mistress, in Knowles's comedy *The Love Chase*. 6. The daughter of the Provost, later proved a serf, in G. W. Lovell's *Provost of Bruges*.

CONSTANCE, or **CUSTANCE,** Dame Christian. A rich and beautiful widow in Udall's play *Ralph Roister Doister*.

CONSTANCE, Council of. The sixteenth ecumenical Church council (1414–18) called by Pope John XXIII, at the suggestion of the Emperor Sigismund, to attempt to heal the papal schism (see Schism, Western), the scandal of which was then at its height; to deal with the Hussite heresy; and to consider measures for the general reform of the Church. It was the most brilliant and numerously attended Church council ever held. Dignitaries of church and state, with large retinues, attended from all the countries of Europe; and many merchants and artisans, with a miscellaneous crowd, were attracted by the occasion. It is said that more than 18,000 priests, and in all about 100,000 strangers, were gathered in the city. The predominating influence of Pope John was nullified by a decision to vote by nations rather than by individuals, and it was proposed that all the three rival popes should abdicate. John fled from the city and attempted to dissolve the council, which then (April, 1415), under the lead of Jean de Gerson (q.v.), declared itself the highest authority of Christendom and above the Pope. John was deposed and condemned to imprisonment for life. Gregory XII voluntarily withdrew, and Benedict XIII was deposed and retired to Spain, where he spent the remainder of his life, without power or influence. The election of a new Pope was temporarily postponed. Huss was condemned after a turbulent trial, and burned at the city gate, July 6, 1415. Jerome of Prague was also condemned, and perished at the stake, May 30, 1416. The movement for reform came to nothing. A beginning had been made, when the cardinals, with the help of the French, succeeded (November, 1417) in ending the schism and electing Otto Colonna (Martin V) Pope, who brought the proceedings to an end with some slight concessions. Consult: Richtenthal, *Kronik des Konziliums in Konstanz* (Augsburg, 1533; new ed., Tübingen, 1882); Leufant, *History of the Council of Constance* (Eng. trans., London, 1730); Finke, *Forschungen und Quellen zur Geschichte des Konstanzer Konzils* (Paderborn, 1889); Creighton, *A History of the Papacy during the Reformation* (London, 1882); Wylie, *The Council of Constance* (ib., 1900). See John XVIII; Gregory XII; Martin V; Huss, John; Jerome of Prague.

CONSTANCE, Lake (named from the city of *Constance*, Ger. *Konstanz*, or *Kostnitz*, Lat. *Constantia;* German *Bodensee*, formerly *Bodemsee, Bodmensee, Bodmansee*, from the castle of *Bodman* on its shores, ML. *Lacus Podamicus, Mare Podanum*, Lat. *Lacus Brigantinus, Lacus Venetus et Acronius*). A lake of glacial origin, situated at the north base of the Alps and forming a portion of the boundary between Switzerland and Austria (Vorarlberg) on the south, and the German states of Baden, Württemberg, and Bavaria on the north (Map: Switzerland, D 1). It is on the course of the Rhine, which enters from the south and flows out in a westerly direction. Lake Constance extends northwest and southeast, and at its northwest end forks into a northern prolongation known as Ueberlinger See, which has a broad connection with the main lake; and into a southern fork, called the Lower Lake (Untersee), formerly known as the Zeller See, connected with the main lake by a narrow channel, 600 to 1600 feet wide, and only 2½ miles long. The outlet of the lake is at the foot of this arm. The height of its surface is 1309 feet above sea level; the length of the lake is about 40 miles; the greatest breadth, 10½ miles; the length of shore line, 160 miles, and the area, 208 square miles. The greatest depth is 827 feet. The water of the lake is subject to sudden rises of from 3 to 12 feet, due to the melting of the snows. A number of minor streams discharge into the lake, nearly all of them on the northeast side. Among these tributaries are the Bregenzer Ach, Leblach, Argen, Schussen, Steinach, Ach of Uhldingen, and Stockach.

The lower lake is covered with ice nearly every winter, but it is only rarely, in an extreme winter, that the surface of the main lake becomes frozen. The lake contains 26 varieties of fish, among them salmon and salmon trout, and 22 species of shellfish. In prehistory the shallows of Lake Constance were the seat of an extensive community of lacustrine culture; the remains of its pile dwellings have yielded richly of primitive artifacts which have been subjected to such exhaustive study as to establish the Lake of Constance as the most important source of knowledge of this stage of human society. Lake Constance formerly extended much farther south than at present, and even within historic times, in the fourth century, it extended as far as Rheineck (Rheinegg). The towns on the shores of Lake Constance are Bregenz, Lindau, Friedrichshafen, Ueberlingen, Constance, Arbon, and Rorschach. Steamboats navigate the lake, and railways follow its shores.

CON'STANS. In the old romances, a king of Britain, and grandfather of Arthur.

CONSTANS, Flavius Julius. A Roman Emperor (337–350 A.D.). He was the youngest son of Constantine the Great (by Fausta) and was born 323 A.D. (or 320). He was made Crown Prince (*Cæsar*) in 333 and became Emperor, together with his brothers Constantine and Constantius, on the death of their father in 337. Constans received the government of Italy, Illyricum, and Africa. In 340, however, war broke out between the brothers, and Constantine was killed near Aquileia. Constans now ruled also his brother's dominions. He was killed by a soldier of the self-proclaimed Emperor, Magnentius, January, 350.

CONSTANS, kôn'stäns', Jean Antoine Ernest (1833–1913). A French statesman, born at Béziers. He was a professor of law in 1876, when he was elected a deputy and affiliated with the Left Centre. He was Undersecretary of State in the Freycinet cabinet in 1879, and was Minister of the Interior in the Freycinet and Ferry cabinets (1880 and 1881). After serving for one year as Governor-General of Indo-China, he was compelled in 1888 to resign this position as incompatible with his duties as a deputy. From 1889 to 1892 he was again Minister of the Interior (in the cabinets of Tirard and Freycinet), and his vigorous measures served to over-

throw Boulangism. In 1897 he was elected to the Senate, and in the following year became Ambassador to Constantinople.

CONSTANT, kôn'stäN', BENJAMIN JEAN JOSEPH BENJAMIN, also written BENJAMIN-CONSTANT (1845–1902). A French historical and portrait painter. He was born in Paris, June 10, 1845, studied at the Ecole des Beaux-Arts in Toulouse, and in 1866 obtained a municipal prize entitling him to free instruction in the Beaux-Arts in Paris, where he was also a pupil of Cabanel. A journey to Morocco in 1872 strongly influenced his artistic development. Among his chief Oriental scenes are the "Last Rebels" and "Justice in the Harem," both in the Luxembourg Gallery, "Les Chérifas," and "Moroccan Prisoners" (Bordeaux). His large canvas, "The Entrance of Mahomet II into Constantinople" (Toulouse Museum), received a medal in 1876. All these works show him to be a fine colorist and a master of technique. After 1880 he changed his manner, devoting himself to mural decorations and to portraits. The most prominent examples of the former are a great plafond in the Hôtel de Ville, Paris, entitled "Paris Convoking the World," his paintings in the New Sorbonne, representing "Literature," "The Sciences," and the "Academy of Paris," and the plafond of the New Opéra Comique. He painted important mural decorations in other cities of France and was distinguished also as a portrait painter, especially in England, where he was a favorite of the aristocracy. A good example of his portraiture is "Mon Fils André" (Luxembourg), which took the medal of honor at the Salon in 1896. His more recent sitters include Pope Leo XIII and Queen Alexandra of England (1901); Lord Savile and M. de Blowitz (1902). Constant was made a member of the Institute in 1893, and was a commander of the Legion of Honor. He visited the United States several times and painted a number of portraits, now in private possession. The Metropolitan Museum of New York possesses a large mural decoration by Constant representing "Justinian in Council." Constant was a writer of repute, having contributed a number of studies on contemporary French painters. Consult Stranahan, *Modern French Painters* (New York, 1893).

CONSTAN'TA. See KÜSTENDJE.

CONSTANT DE REBECQUE, kôn'stäN' de re'bĕk', HENRI BENJAMIN (1767–1830). A distinguished French politician and novelist, born at Lausanne, Oct. 23, 1767. His family was Protestant and had taken refuge in Switzerland from religious persecution. Till 13, Constant studied at Lausanne, then successively at Oxford, Erlangen, and Edinburgh, laying the foundations of a cosmopolitan culture that explains his affinity for Madame de Staël. During his stay in England he became imbued with Whig tendencies and a deep admiration for the English system of constitutional monarchy. He was a moderate Republican during the Revolution, and after 1795 settled in Paris, where his political writings, especially his pamphlet, *De la force du gouvernement actuel de la France*, attracted great attention. In 1799 Bonaparte called him to the tribunate, but he opposed the First Consul's attack upon constitutional rights, and was exiled in 1802. His political career thus checked, he turned to literature and accompanied Madame de Staël, like him an exile, on her travels. At Weimar he met and came under the influence of Goethe and Schiller. He translated, or rather adapted, the latter's *Wallenstein*. It was during this period that he entered into his second matrimonial venture, with Charlotte von Hardenberg, his first wife, Baroness Chramm, having divorced him in 1793. He also wrote *Adolphe* (1816), a literary result of his relations to Madame de Staël, who had put her experience with him into *Delphine*. This sole novel of the versatile politician is a clear, keen, relentless analysis of the mutual degradation resulting from ill-assorted matings. It is brief, almost cruelly simple, and told in a style as precise and dry as that of a mathematical demonstration. It is considered as the original model of the psychological novel in France. Chivalrous towards Madame de Staël, he is pitiless to himself, to his father, to his former love, Madame de Charrière, and to their officious friend, Madame Récamier. Constant's *Correspondence*, his *Journals*, all that we know of his life, show him, as he reveals himself here, always seeking emotion, never attaining passion. He repeatedly and consistently fought for his opinions, even when his future and very life were at stake. With this novel still unpublished, he returned to France after Napoleon's first abdication (1814), with the prestige of his stirring pamphlet *De l'esprit de conquête et de l'usurpation* (1813). He expected to find the Restoration more favorable to constitutional liberty than Napoleon's "government of mamelukes," but he was soon undeceived. During the Hundred Days he coöperated with the returned Emperor, and assisted in drawing up the *acte additionel* to the constitution. He was not false to his original principles in this step, for he was actuated by the vain hope that a strong government might be a better guarantee of individual liberty, as in England. After Waterloo he retired to England, but was permitted to return to France in 1816. He joined the liberal writers of the day and was elected deputy in 1819. However, his spirit was somewhat crushed now by Madame de Staël's death and still more so, later on, by his unrequited love for the famous beauty, Madame Récamier. He became the acknowledged leader of the opposition to Charles X, and the most brilliant champion of a constitutional monarchy. He deplored the violence of the revolution of July, which occurred while he was convalescent in the country. At the request of Lafayette he returned, and for the few months that remained to him of life supported the government of Louis Philippe and the principles to which his political life had been dedicated. He died at Pau, Dec. 8, 1830. Constant was not a graceful speaker, but a singularly effective writer. His speeches are collected as *Discours* (2 vols., 1828); his essays on representative government as *Cours de politique constitutionelle* (4 vols., 1817–20). His *De la Liberté des brochures, des pamphlets, et des journaux considérée sous le rapport de l'intérêt du gouvernement* (1814), a most forcible pamphlet on free speech, is undoubtedly one of his best contributions to the progress of human thought. He wrote also *Mémoires sur les Cent Jours* (1820), and *De la religion considérée dans sa source, ses formes, et ses développements* (1824–31), visibly saturated with German mysticism, in which he undertook to show that the religious instinct remained essentially unaffected through all changes of dogma and forms. In teaching that Christianity had "introduced moral and political

liberty into the world," he widened the breach with the thought of the eighteenth century shown and in part caused by the *Génie du Christianisme* of Chateaubriand. "Lucian was incapable of understanding Homer," he said; "Voltaire has never understood the Bible."

Consult: Faguet, *Politiques et moralistes* (Paris, 1898); Sainte-Beuve, *Nouveaux Lundis*, vol. i (Paris, 1863), and *Portraits littéraires*, vol. iii (ib., 1864); *Le cahier rouge de Benjamin Constant* (1907); *Journal intime* (1804–16), ed. by D. Megari (1895); G. Rudler, *La jeunesse de Benjamin Constant* (1900); G. Rudler, *Bibliographie Critique* (1909).

CONSTANTIN, kōn'stăN'tăN', Abbé. The lovable, benevolent old parish priest in Ludovic Halévy's graceful romance *L'Abbé Constantin* (1882). A successful comedy under the same title was adapted from the romance by Crémieux and Decourcelle, and presented at the Gymnase in 1887.

CONSTANTINA, kōn'stăn-tē'nȧ. A town of Spain, in the Province of Seville, about 40 miles north-northeast of Seville (Map: Spain, C 4). It is in a mountainous region and has lead mines, lumbering interests, distilleries, and tanneries. Pop., 1900, 9687; 1910, 11,295.

CONSTANTINE, kŏn'stăn-tēn'. A fortified city and a Catholic episcopal see, the capital of the Department of Constantine, Algeria, 54 miles by rail southwest of Philippeville (Map: Africa, E 1). It is situated on a precipitous hill with a flat summit, two sides of which are washed by the Rummel, flowing through a deep and narrow ravine. It is a natural citadel, 830 feet above the river and 2162 feet above sea level; surrounded by walls which the Arabs made out of Roman sculptured stones. The Moorish or older portion of the town is close and dirty. Its chief ancient buildings are the Kasba, or Roman citadel; the palace of the Bey; the harem of Salah; and three mosques, one of which, Suk-er-Rezel, dating from 1143, is now the Christian church of Notre Dame des Sept Douleurs. The modern or French portion has wide streets and open squares. Its principal buildings are the Palais de Justice, administrative buildings, the Protestant church, and a theatre. A Mohammedan religious seminary, a French government college, and other educational institutions for Arabic and European culture have been founded. The town is a centre of the leather industry and also has manufactures of woolen cloths, saddlery, and a considerable grain trade with Tunis. Its seaport is Philippeville, to the northeast. Constantine, named after the famous Roman Emperor, anciently one of the most important towns of Numidia (Carta of the Carthaginians; Cirta of the Romans), was destroyed in the wars of Maxentius against Alexander, about 311 A.D., but was rebuilt by Constantine the Great in 313. It was a flourishing town in the twelfth century, trading with Venice, Genoa, and Pisa. The French captured it in 1837. Pop., 1901, 48,243, including 15,096 French residents; 1906, 46,806; 1911, 61,413.

CONSTANTINE, kŏn'stan-tīn. The name of two popes.—Constantine I (Pope 708–715), a Syrian by birth. His pontificate was marked by the submission of Felix, Archbishop of Ravenna, to the supremacy of Rome, and by his voyage to Constantinople, at the invitation of Justinian II, to confirm the decrees of the Quinisextan Council, which his immediate predecessor had refused to do.—Constantine II (Pope 767–768). He was forced into the see by his brother, Duke Toto of Nepi, but within a few months was overthrown and blinded by an opposing faction, his deposition being solemnly confirmed by the Lateran Synod of 769, which laid down the rule that the Pope must be chosen from the College of Cardinals. On this account his name is often excluded from the list of popes.

CONSTANTINE I, Flavius Valerius Aurelius Constantinus, surnamed "the Great." A Roman Emperor (306–337 A.D.). He was born about 274 A.D., at Naissus, in Mœsia (Servia). He was the eldest son of Constantius Chlorus. He accompanied Diocletian, in that monarch's famous Egyptian expedition (296); subsequently he served under Galerius in the Persian War. In 305 the two emperors, Diocletian and Maximian, abdicated, and were succeeded by Constantius Chlorus and Galerius (q.v.). Galerius, who could not endure the brilliant and energetic genius of Constantine, took every means of exposing him to danger; in this period, it is believed, Constantine acquired that mixture of reserve, cunning, and wisdom which was so conspicuous in his conduct in after years. At last Constantine fled to his father, who ruled in the West, and joined him at Boulogne just as he was setting out on an expedition against the Picts in North Britain. Constantius died at York, July 25, 306, having proclaimed his son Constantine his successor. The latter now wrote a conciliatory letter to Galerius and requested to be acknowledged as Augustus. Galerius did not dare to quarrel with Constantine, yet he granted him the title of Cæsar only. Political complications now increased, and in a short time no fewer than six emperors were "in the field"—Galerius, Licinius, and Maximin in the East, and Maximian, Maxentius (his son), and Constantine in the West (308). Maxentius, having quarreled with his father, forced him to flee from Rome. The latter took refuge with Constantine, but was ungrateful enough to plot the destruction of his benefactor. This being discovered, Maximian fled to Marseilles; its inhabitants gave him up to Constantine, who put him to death (309). Maxentius professed great anger at the death of his father and assembled a large army, with which he threatened Gaul. Crossing the Alps by Mont Cénis, Constantine thrice defeated Maxentius—first near Turin, then under the walls of Verona, and finally near the Milvian Bridge at Rome, Oct. 27, 312; Maxentius himself, in the last of these engagements, was drowned in an attempt to escape across the Tiber. During this campaign Constantine was said to have had the apparition in the sky of a luminous cross with the words, *Ἐν τούτῳ νίκα, En toutō nika* (in Latin, *Hoc vince*, 'By this conquer'), as the contemporary historians Eusebius and Lactantius record. This vision, it is said, spurred him on against Maxentius and made him a Christian. Constantine now entered the capital, disbanded the prætorians, and adopted other judicious measures for allaying the public excitement. He was honored with the title of Pontifex Maximus, or supreme dignitary of the pagan hierarchy.

Constantine was now sole Emperor of the West. Similarly, by the death of Galerius in 311 and of Maximin in 313, Licinius became sole Emperor of the East. In 314 a war broke out between the two rulers, in which Licinius was worsted and was fain to conclude a peace by the cession of Illyricum, Pannonia, and Greece. For

the next nine years Constantine devoted himself vigorously to the correction of abuses in the administration of the laws, to the strengthening of the frontiers, and to chastising the barbarians, who learned to fear and respect his power. In 323 war was renewed with Licinius, who was defeated and ultimately put to death. Constantine was now at the summit of his ambitions—the sole governor of the Roman world; but Rome was no longer the political or geographical centre of this world, and he determined to move the capital to Byzantium, which he solemnly inaugurated in 330 under the name of Constantinopolis, the 'City of Constantine.' A further motive for the removal has been found in the suggestion that Constantine, who had now fully identified himself with Christianity, wished to avoid conflict with the pagan feeling that still was deep-seated at Rome. From Constantinople he ruled his vast empire until his death, which occurred May 27, 337. From the reign of Constantine Christianity was not only recognized and tolerated, but became the religion of the rulers themselves. Of Constantine's personal feeling in the question of Christianity and paganism much has been written. By birth and education he was much inclined towards the growing faith; his mother was a Christian, and his father, Constantius, though a pagan, was very tolerant and would allow no direct acts of violence in his part of the Roman domain during the great persecution of 303. Constantine was by nature mild and kind-hearted; his legislation was governed by humane principles. He abolished the system of branding the faces of convicts; ordained that masters who killed their slaves were guilty of homicide, and published an edict of toleration which insured liberty of conscience throughout the Empire. The Christians were as yet but a minority of the whole population, but the Emperor openly sympathized with them and did not hesitate, upon occasion, to insult the pagans. Yet his Christianity was not deep-seated, though doubtless quite sincere as far as it went. He looked upon his overthrow of Maxentius as due to the help of God, *instinctu divinitatis*, as the inscription on his arch in Rome (see CONSTANTINE, ARCH OF), built in 315, shows; but the very form of expression displays a concession to pagan sensibilities that a rigorous Christian of the period would not have made. He retained the traditional pagan title of Pontifex Maximus, as did his Christian successors of the fourth century, and his coins still bear the figures and the names of the old gods. In the Arian controversy he sided with the Catholic bishops, and it was he who called the great Council of Nicæa (Nice) in Bithynia in 325 (see NICE, COUNCIL OF) and presided at the first sitting. By this council the doctrine of consubstantiality was defined, and the Nicene Creed was adopted. He did not receive baptism until shortly before his death. Consult Firth, *Constantine the Great* (New York, 1905), and *The Cambridge Mediæval History*, vol. i (ib., 1911).

CONSTANTINE I, KING OF GREECE (1868–1923). He was born in Athens, the eldest son of King George I and Olga, the daughter of the Russian Grand Duke Constantine Nikolayevitch (q.v.) and niece of Czar Nicholas I. He was reared in the Greek Orthodox faith and studied at the universities of Berlin and Leipzig. In 1889 he married Princess Sophia, sister of Emperor William II of Germany. As heir to the throne, he was styled Duke of Sparta and received a careful military training. He was commander in chief of the Greek forces in the brief but disastrous Turkish War of 1897, and for some years subsequently suffered unmerited blame for the military reverses of the Greeks. The agitation against him was carried so far that the Military League compelled him in 1909 temporarily to relinquish his command and retire from the country. In the Balkan War (q.v.), of 1912–13, however, he acquitted himself so well as commander in chief of the Greek armies operating in Macedonia against the Turks that he was hailed as a national hero. His triumphant entry into Saloniki on Nov. 8, 1912, marked his complete conquest of the hearts of his countrymen. His father, while paying a visit to Saloniki, was assassinated on March 18, 1913, and Constantine took the oath at Athens as constitutional King of the Hellenes on March 21. As King, he continued the series of Greek victories by wresting Janina from the Turks and by driving the Bulgarians from Macedonia and the greater part of Thrace, and, as a result of the treaties of London (May 30, 1913) and Bucharest (Aug. 10, 1913), secured sovereignty over an area twice as extensive as his father had ruled. Constantine has five children, of whom the eldest, Prince George (born 1890), is heir apparent. See GREECE, *History*.

CONSTANTINE II, or JUNIOR, FLAVIUS CLAUDIUS CONSTANTINUS. A Roman emperor (337–340 A.D.). He was the eldest son of Constantine the Great, and was born, 317, at Arelate (Arles), in Gaul. He became joint Emperor with his brothers, Constantius and Constans, on the death of their father, in 337, receiving Gaul, Britain, Spain, etc., as his share of the Empire. In 340 he invaded the dominions of Constans and was killed in the battle of Aquileia (340).

CONSTANTINE VII, PORPHYROGENITUS (905–959). A Byzantine emperor. He became, at the age of seven, associate Emperor with his uncle, and at eight sole ruler; but in reality he was the ruler only after the death of his father-in-law, Romanus (q.v.), in 945. Even then he paid more attention to literature than to state affairs. He wrote a life of his grandfather, Basil I, and a number of political works, including *On the Themes*, *On the Ceremonies at the Court of Constantinople*, and *On the Administration of the Empire*. Some of his works are published, in 3 vols., in the Bonn edition of the Byzantine Historians (1829–40). In addition he caused a large number of works to be written for the sake of preserving what was best in the older literature; these included excerpts from the classical authors; encyclopædic collections on history, medicine, and other subjects; and especially the *Basilika*, or collection of laws. He also gave new life to the university at Constantinople. Consult Krumbacher, *Geschichte der byzantinischen Litteratur* (2d ed., Munich, 1897), and Rambaud, *L'Empire grec au Xe siècle; Constantin Porphyrogénète* (Paris, 1870).

CONSTANTINE XI, PALÆOLOGUS (1404–53). The last of the Byzantine emperors. He was the son of the Emperor Manuel II. He had gained possession of Morea and of much of the Peloponnesus and had won many victories over the Turks. In 1446 Murad II defeated him and compelled him to surrender the Peloponnesus. His brother, the Emperor John VIII, died in 1448, and Constantine became Emperor in 1449. He at once went to Constantinople and showed

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himself an intelligent, brave, and resolute ruler, but his position was a hopeless one. Mohammed II was preparing for the final assault on Constantinople, and Constantine appealed in vain to the princes of Christendom. A long siege preceded the capture of the city, which was finally accomplished May 29, 1453. In the desperate battle waged at the gates of the city Constantine fell, slain by some unknown hand. Consult Mijatovitch, *Constantine, the Last Emperor of the Greeks* (London, 1892), and Pears, *Destruction of the Greek Empire* (ib., 1903). See BYZANTINE EMPIRE.

CONSTANTINE, KONSTANTIN NIKOLAYEVITCH (1827–92). A grand duke of Russia, the second son of Emperor Nicholas I and brother of Alexander II. Having been trained for the navy from early youth, he rose rapidly in rank until he became grand admiral of the Russian fleet and, in addition, held numerous military offices. During the Crimean War he commanded the Russian fleet in the Baltic and directed the defensive preparations which held the English and French armaments in check before Cronstadt. He earnestly supported his brother's liberal reform plans and endeavored in many ways to promote the cause of enlightenment in Russia. He was appointed Governor of Poland in 1862, but failed in his attempts to reconcile the Poles and resigned soon after the outbreak of the revolution in 1863. In January, 1865, he was appointed President of the Council of the Empire. On the accession of his nephew, Alexander III, he was deprived of most of his offices, however, and soon retired altogether from public life, living in retirement in Crimea for the rest of his life.

CONSTANTINE (KONSTANTIN), PAVLOVITCH (1779–1831). A grand duke of Russia, the second son of the Emperor Paul I. He was brought up together with his brother Alexander under the supervision of Catharine II. Having been appointed inspector general of cavalry under Alexander I, he was given command of a division of the Russian army in the Napoleonic campaigns. On the establishment of Polish sovereignty (1815), he was given chief command of the Polish army. After the Congress of Vienna the government of the newly created Kingdom of Poland was intrusted to him by his brother, the Emperor Alexander I. In January, 1822, on his divorce and remarriage out of the ranks of royalty, he executed a private deed by which he resigned his claims to the throne in the event of Alexander's death, and, when that event took place in 1825, he adhered to this resignation, although he had been proclaimed Emperor in the so-called Decembrist uprising. (See RUSSIA.) The succession thus fell to his younger brother Nicholas. The character of Constantine's administration in Poland was not such as to conciliate any class of the people, and a widespread conspiracy was formed. The revolution of July (1830) in France supplied the spark which was needed to kindle the revolution in Poland, and he was obliged to flee for his life. He died soon after of the cholera.

CONSTANTINE, ARCH OF. A famous arch at Rome, between the Palatine and the Cælian hills, southwest of the Coliseum, at the junction of the Sacred and the Triumphal ways. It was erected in 315 A.D., to commemorate the Emperor Constantine's victory over Maxentius. (See CONSTANTINE I.) The arch is the best-preserved monument of ancient Rome, probably because the fact that its builder was a Christian Emperor saved it from destruction during the devastations of the Middle Ages. It has three openings and four columns on each main face. The columns support pedestals, on which were statues of barbarian prisoners, sculptured in the round. Of the reliefs with which the arch is richly decorated, some belong to the time of Constantine; others were taken by Constantine from earlier structures. Consult: Platner, *The Topography and Monuments of Ancient Rome* (New York, 1911); Frothingham, "The Mystery of the Arch of Constantine Unveiled," in the *Century Magazine* for January, 1912; Frothingham, "Who built the Arch of Constantine?" in *American Journal of Archæology*, 2d series, vols. xvi, xvii (1912–13).

CONSTANTINE, BASILICA OF. A vast basilica begun by Maxentius and completed by Constantine I (q.v.), on the site of a former warehouse, at Rome. It had a nave about 250 feet long, with a vaulted roof over 100 feet high and 80 broad. The original entrance faced east, towards the Coliseum. Constantine added a second entrance, facing south, towards the Sacred Way. Thenceforth the basilica gave the same impression of three vaulted parallel halls, whether one entered from the east or from the south. Eight monolithic marble columns adorned the nave; of these only one remains, having been removed in 1613 to the piazza in front of the church of Santa Maria Maggiore. Consult Hülsen-Carter, *The Roman Forum* (Rome, 1906), and Platner, *The Topography and Monuments of Ancient Rome* (New York, 1911).

CONSTANTINE, BATHS OF. Enormous baths built by Constantine, covering nearly the whole breadth of the Quirinal Hill, in Rome. Some remains were seen when the Via Nazionale was built. The baths were demolished by Paul V in 1610, and their site is now occupied by the Quirinal and Rospigliosi palaces. The figures known as the "Horse Tamers," from which Monte Cavallo in Rome is named, stood in front of the baths.

CONSTAN'TINO'PLE (Lat. *Constantinopolis*, from Gk. Κωνσταντίνου πόλις, *Konstantinou polis*, city of Constantine, Turk. *Istambol* or *Stambol*, from Gk. εἰς τὴν πόλιν, *eis tēn polin*, or, in the corrupted dialect of the people, ἐς τὰμ βόλιν, *es tam bolin*, to the city). The capital and largest city of the Ottoman Empire, situated in the extreme eastern part of European Turkey, on a hilly promontory washed by the Sea of Marmora, the Bosporus, and the Golden Horn, a narrow inlet about 4 miles long and from one to 4 miles wide, extending in a northwesterly direction from the Bosporus; lat. 41° N., long. 28° 59′ E. (Map: Balkan Peninsula, G 4). With its many mosques, kiosks, and extensive gardens, it presents from the sea a magnificent appearance, which is greatly enhanced by the natural picturesqueness of the site. The town is divided into quarters in which members of the various creeds segregate. South of the Golden Horn lies Stambol, the Mohammedan centre. It occupies the site of ancient Byzantium. This section is not only the heart of the Turkish Empire, but also of the Islamic world. The suburbs of Galata and Pera are situated on the north and opposite shore of the Golden Horn, which is spanned by two iron pontoon bridges. Stambol is sur-

rounded by partly ruined walls, the most famous of which is the Theodosian double wall dating from 447. The fortifications are flanked by towers and are pierced by numerous historic gates. The streets are crooked and often without sidewalks. There are countless house gardens and many beautiful cemeteries. The houses, usually two-storied, are mostly built of wood, though some portions of the city, since the great fires of 1865, 1866, 1870, and 1909, have been reconstructed in a modern fireproof style.

Constantinople has always been celebrated for the large number and the beauty of its churches. These edifices either belong to the Byzantine period subsequently to which they have been converted into mosques, or else they have been built by the Turks after the city had fallen into their hands. St. Sophia (q.v.) is the most famous church in the first category.

The Suleymanieh Mosque covers a site nearly as large as that of St. Sophia and, like most mosques, is surrounded by a well-shaded court. It was built in 1550–66 by Sultan Suleyman. It has four minarets and is surmounted by a dome somewhat higher than that of St. Sophia. The marble decorations in the interior are magnificent. It is an excellent specimen of genuine Turkish architecture. The Ahmedieh Mosque was built in 1609–14, and exceeds in dimensions the Suleymanieh, but is inferior to the latter in design and in ornamentation. Among other mosques may be mentioned those of Mohammed II, Beyazid II, Selim I, Yeni-Jami, and Nuri-Osmani.

Secular buildings of historic interest are: the Castle of the Seven Towers, once a state prison where a number of dethroned sultans were executed; the hippodrome, completed by Constantine, the scene of public festivals as well as of popular uprisings; and the old seraglio, with its extensive gardens and beautiful kiosks and palaces. This ancient residence of the sultans has been transformed into a museum within which some of the most exquisite creations of the genius of Greek paganism and of Mohammedanism are now stored. South of this museum lies the Sublime Porte. This is the seat of government and consists of an assemblage of administrative buildings. It is surrounded by a railing with several gates. The one facing the ancient palace is very elaborate and was used by the sultans when they went to attend a council of their ministers. It was thus that the name "Bab-Ali," or "Sublime Gate," was applied to it, the French version being now universally used.

The bazars of Constantinople are very numerous. The chief of them, the Grand Bazar, somewhat injured by an earthquake in 1894, occupies a large number of narrow, vaulted alleys and contains about 3000 shops. It is filled with Oriental merchandise of great variety and beauty and affords in daytime one of the finest sights of the city. The bazars, however, are gradually losing their importance, the wealthier classes preferring to make their purchases in the European shops on the Grande Rue in Pera, where modern goods can be obtained.

Galata, situated on the east shore of the Golden Horn, is the business port of Constantinople. Its water front is lined with wharves to which steamers are constantly moored. Here are found the warehouses, banking houses, exchanges, and the customhouse. The town is built of stone, and the streets in some sections are new and regular. The Galata Tower, formerly known as the "Tower of Christ," is 150 feet high and is divided into several stories and surrounded by galleries. It serves as a fire-signal station.

Pera, the foreigners' quarter and the most modern part of Constantinople, lies northwest of Galata. Here are the foreign embassies and the residences of the Europeans. Here also is the Grande Rue, lined with fashionable shops and hotels. Pera has a fine park, barracks, and several cemeteries which are occasionally used as festival grounds.

Administration.—As to government, Constantinople, including the suburb of Scutari across the Bosporus, forms a separate district, under the administration of a prefect. The fire department is being organized gradually according to western systems. Systematic street cleaning is attempted only in the European section of the city. The oldest aqueducts of Constantinople date in part from the reigns of Hadrian and Valens and are regarded among the finest remaining specimens of ancient engineering. Their capacity was increased by the Sultans. Some of the cisterns are the largest in the world; the roof of one of them is supported by 336 marble columns. The water comes from the reservoirs of the forest of Belgrade and also from Lake Derkos.

Numerous elementary public schools are attached to the mosques and offer instruction free; as do also the colleges, or "medresses," some 170 in number, with public libraries attached, many of them filled with valuable books and manuscripts. A university was opened in 1900, with faculties of philosophy, Mussulman theology, mathematics, law, and medicine. The Imperial Art School is not without importance. The two most important educational institutions are the "Lycée Impérial" and Robert College. The last named is an American institution, founded in 1863. The "Great National School" of the Greek dates from the Byzantine period and supplies many teachers for the Greek schools in Turkey. The French conduct several schools for the children of the wealthier classes. Benevolent institutions are numerous.

The industrial importance of Constantinople is not great. The few large establishments manufacture tobacco products, fezzes, and iron wares. The handmade products, on the contrary, are important, both as regards variety and quantity; and to the trade in these small articles the life of the city lends itself most interestingly, with its bursting little shops, its noisy street traffic before the mosques, and its curious and picturesque trade customs. The geographical position and natural harbor facilities of Constantinople are unsurpassed. The Golden Horn affords accommodation for over 1000 vessels of the heaviest draft. It is divided by its two bridges into the outer and inner ports of trade and the port of war.

Not until 1888 did the city have railway connection with the rest of the world. Since the establishment of direct steam communication between Persia, Syria, Arabia, and southern Europe, and the opening up of Central Asia by Russia, Constantinople has lost a considerable part of its commerce. Important imports are food products, textiles, coal, metal ware, instruments and implements of all kinds, petroleum,

and wood. The exports are largely confined to carpets and rugs, lambskins and wool, attar of roses, embroideries, and filigree work. The entrances and clearances of shipping during 1910 comprised 20,268 vessels, with a tonnage of 19,154,000. For local transportation there are omnibuses, horse-car and electric lines. An underground cable road connects Galata and Pera. Small steamers and ferries ply in the Golden Horn between Stambol and Galata. Excellent passenger service between the city proper and the suburbs in the Bosporus is afforded by splendidly equipped ferries.

The population of Constantinople proper is estimated at about 942,000. This figure is increased to over 1,200,000 by including the suburbs. In the city proper nearly two-thirds of the population are Mohammedans.

History.—The city was founded in the sixth century B.C. by Greek adventurers. Owing to the advantages of its site, the settlement prospered rapidly. Its possession was the aim of the leading nations. In 330 A.D. the Roman Emperor Constantine the Great adopted the city as his capital in preference to Rome and gave it the name "Constantinople." The presence of the Emperor made Constantinople from the first distinctively the capital of the Greek civilization in the eastern part of the Roman Empire, as Rome remained the head of the Latin civilization in the West. From 395 to 1453 the city was the capital of the Byzantine or Eastern Empire. The Patriarch of Constantinople gradually rose to the position of head of the Christian Church in the East. In the course of years, as the Imperial provinces in Asia and Africa, with the great metropolises of Antioch and Alexandria, fell into the hands of the Mohammedans, the Christian culture of the East found refuge in Constantinople, and Byzantinism—a blending of the ideas of Oriental despotism with the Roman conception of the state—found its home there. In the struggle between Latin and Greek Christianity Constantinople naturally was the great opponent of Rome, and, as the champion of inflexible orthodoxy, it welcomed the great schism of 1054, which broke up the Catholic church. The strategic position of the city at the meeting place of two continents exposed it to attacks from numerous nations—Avars, Arabs, Bulgars, Varangians, the Latin powers of western Europe, and finally the Turks. It was besieged frequently, and its walls were repeatedly assaulted; but it was taken thrice only—by the Crusaders in 1203 and 1204, and by Mohammed II, after a memorable siege, on May 29, 1453. The prosperity of the city sank during the period of the Crusades, when its lucrative commerce was diverted to the Italian towns. In 1204 it was captured and sacked by the Crusaders, who established the Latin Empire of Constantinople; but this lasted only until 1261, when the Greeks regained the city. Its capture by the Turks marks an epoch in European history. In more recent times Constantinople has been important as a storm centre in the play of international politics known as the "Eastern Question." In 1878 the Russian armies advanced to the fortifications of the city and occupied the suburb of San Stefano. See BALKAN WAR.

Consult: Grosvenor, *Constantinople* (2 vols., Boston, 1895); Van Milligan, *Byzantine Constantinople* (London, 1899); Pears, *Fall of Constantinople* (New York, 1886); *The Destruction of the Greek Empire* (London, 1903); Djelal Essad, *Constantinople, De Byzance à Stamboul* (Paris, 1909); Hutton, *Constantinople* (London, 1904); Dwight, *Constantinople and its Problems* (New York, 1901); Barth, *Konstantinopel* (Leipzig, 1901).

CONSTANTINOPLE, COUNCILS OF. Eight councils which are recognized as ecumenical by either the Greek or Latin church, or by both, were held at the city of Constantinople. The *first* was the second ecumenical council of the Church, convened in 381 by the Emperor Theodosius I. It consisted of 150 bishops, chosen under the dictation of the Emperor and chiefly from the East, besides 36 semi-Arian bishops, followers of Macedonius of Constantinople, who withdrew after their opinions had been condemned. This council condemned also the Arians, Eunomians, and Eudoxians; it reaffirmed the resolutions of the Council of Nice, completed the definition by that council of the divinity of the Holy Ghost, and declared that the Bishop of Constantinople, or new Rome, was, of right, next in rank to the Bishop of old Rome; both of them being alike subject only to the Emperor. The *second* was the fifth ecumenical council of the Church, convened in 553 by Justinian I to sustain his condemnation of three distinguished teachers of the Antiochian school, viz., Theodore of Mopsuestia, Theodoret of Cyprus, and Ibas of Edessa, whose opinions had been collected into "three chapters." (See CHAPTERS, THE THREE.) There were 165 bishops, all Eastern except six, in attendance. They condemned the "three chapters" and renewed the condemnation of the doctrines of Nestorius. Pope Vigilius, though not present, afterward sanctioned the condemnations. The *third* was the sixth ecumenical council, held in 680–81. Through the influence of the Roman legates the council condemned the doctrine that, "as there was only one Christ, so He had only one will," and recognized in Him, consistently with the doctrine of two natures in one person, two wills made one by the moral subordination of the human to the divine. The *fourth* was the council held in 692, by command of Justinian II. It is recognized as ecumenical only by the Greeks, and is called *quinisextum*, because it supplemented the fifth and sixth. It passed more than 100 canons concerning the morals of the clergy and Church discipline. The *fifth* was held in 754, and was attended by 338 bishops. It is recognized only by the Greeks and is called "the Mock Synod" by Hefele. It issued a decree against image worship, which was revoked in 787 by the second ecumenical Council of Nice. The *sixth* was held in 869–870 and is recognized only by the Latin church. It was attended by about 100 bishops. It deposed the Patriarch Photius, restored Ignatius, and enacted laws concerning Church discipline. The *seventh* was held in 879 and is called by the Greeks the eighth ecumenical. There were 383 bishops present. It recalled Photius, repealed the action of the preceding council against him, and defined the position of the Patriarch of Constantinople in relation to the Pope. The *eighth* was held in 1341 and is called by the Greeks the ninth ecumenical. It condemned Barlaam, an educated monk, as heretical in opposing the Hesychasts, a mystical sect among the monks of Mount Athos, who asserted the possibility of attaining, while yet in the

body, an intuition of the divine light and essence by a perfect cessation of corporeal life.

CONSTANTIUS I, kŏn-stăn′shĭ-ŭs, FLAVIUS VALERIUS. A Roman Emperor (305–306 A.D.), commonly known as *Chlorus*. He was adopted as Cæsar in 292 by Maximian and received the government of Gaul. When Diocletian and Maximian abdicated the throne, May 1, 305, Constantius and Galerius became emperors respectively of the West and the East. Constantius died at Eboracum (York), in Britain, July, 306, and was succeeded by his son, Constantine the Great. He was distinguished alike for his intrepidity as a soldier and for his ability and humanity as a ruler. See CONSTANTINE I.

CONSTANTIUS II, FLAVIUS JULIUS. A Roman Emperor (337–361 A.D.). He was, by Fausta, the second son of Constantine the Great, and was born at Sirmium (Illyricum), 317. Constantine made him Cæsar in 333, and in 335 appointed him ruler in the East, where, after 337, he reigned as Emperor. Often involved with the Persians, he suffered at their hands a galling defeat in 348. His brother Constans being murdered by Magnentius, he met the latter in battle at Mursa and punished him so grievously that he subsequently perished by his own hand. Constantius now reigned alone over the whole Empire. He made his cousin, the apostate Julian, Cæsar in Gaul and bestowed upon him the hand of his sister, Helena. When, however, Julian achieved great glory, Constantius became jealous and demanded the relinquishment of many troops. With this order Julian was disposed to comply, but his admiring soldiers refused to leave him. Constantius then proceeded against him, but died of fever before an engagement, whereupon Julian, previously proclaimed, succeeded to the title. As a ruler, Constantius was severe and oppressive. Consult *The Cambridge Mediæval History,* vol. i (New York, 1911).

CON′STANTS OF NATURE. A term applied to various unchangeable quantities that are found to be characteristic of natural phenomena or relations. The propagation of light through space takes place invariably at the rate of 186,770 miles per second, and hence the velocity of light may be referred to as a constant of nature. The period of rotation of the earth on its axis may be considered as another constant of nature, although, strictly speaking, it is subject to slight variation. The atomic weights of chemistry, i.e., the smallest relative combining weights of the elements, furnish another example of important constants of nature —important because they permit of expressing the composition and reactions of all substances in a simple and useful form. The electrolytic equivalents, i.e., the weights of elements deposited in the electrolysis of their compounds by a unit current in one second, are likewise constants characteristic of the several chemical elements.

In choosing the units of precise measurement, which form the basis of all calculations in pure and applied science, it is necessary in certain cases to employ the constant quantities of nature. For example, the second, which is the unit of time generally used at present, is defined in terms of the time of a complete revolution of the earth on its axis. As thus defined, however, the unit is not quite perfect; the time of a revolution of the earth on its axis is subject to slow variation, and hence the duration of the second, referred to that time, must likewise be slowly changing. But, taking the average for a year of the times of rotation of the earth, i.e., obtaining "the mean solar day," it is found that this remains unchanged from year to year so far as is known. Ordinary chronometers and clocks are so rated as to give this time. With a view to establishing a more perfect unit of time, scientists have proposed to adopt as its basal constant of nature the period of vibration of an atom emitting light of a given wave length—an interval of time that is believed to be absolutely constant, provided the conditions of excitation of the light remain unchanged.

The laws of science are generally expressed in the form of mathematical equations whose numbers and terms represent the constant as well as the variable factors of typical natural phenomena. Thus, the variation of volume under variable conditions of temperature and pressure, which is characteristic of all bodies, is in the case of perfect gases subject to laws that are usually expressed by the equation $PV = RMT$ in which P stands for pressure, V for volume, T for the absolute temperature (i.e., $t°$ centigrade + 273), R is a constant for any *one* gas, and M is the mass. If, in experimenting with different gases, we should employ such quantities of them as would, under the same conditions of pressure and temperature, occupy equal volumes,—i.e., if the mass of the gas is numerically equal to the "molecular weight" of the gas,—we would find that while the pressure and temperature might subsequently be changed, the ratio of the product PV to T, i.e., the product Rx "molecular weight," would remain constant and the same for all gases, irrespective of their chemical nature; i.e., the product of the pressure and volume (PV), divided by the absolute temperature (T), would yield invariably the same number. That number, called "the gas constant," is therefore obviously characteristic of the interdependence of pressure, volume, and temperature in all gaseous matter; and, being so general, it has great importance in both pure and applied science. Thus, the constants of nature characterize natural phenomena and enter into all the mathematical laws of science.

Consult: Lupton, Everett, *C. G. S. System of Units* (London, 1902); Landolt and Börnstein, *Physikalisch-chemische Tabellen* (4th ed., Berlin, 1912); Clarke, *The Constants of Nature* (5 parts, Smithsonian Miscellaneous Collections, Washington, 1873–88). Some of the constants of nature may of course be found in any scientific textbook. See also CALCULUS; C. G. S. SYSTEM.

CON′STELLA′TION (Lat. *constellatio,* from *com-,* together + *stella,* star, Gk. *ἀστήρ, astēr,* Skt. *star,* Ar. *stare,* OHG. *sterno, sterro,* Ger. *Stern,* AS., Eng. *star*). A group of stars. From a time earlier than authentic records can trace, the stars have been formed into artificial groups, which have received names borrowed from fancy or fable. These groups are called "constellations." Though quite devoid of anything like systematic arrangement, this traditional grouping is found a sufficiently convenient classification and still remains the basis of nomenclature for the stars among astronomers. Before the invention of almanacs the risings and settings of the constellations were looked to by husbandmen, shepherds, and seafaring men as the great landmarks of the seasons, and consequently of the weather which each season

was expected to bring with it (see Job xxxviii. 31); and it is not surprising if the storms or calm weather that usually accompanied such seasons were connected, in the popular imagination, with the influence of the stars themselves, or the beings with whom superstition or fable identified them. Thus, the risings and settings of Boötes with the bright star Arcturus, which took place near the equinoxes, portended great tempests. (See Vergil's *Georgics*, i, 204.) The great heat in July was ascribed to the rising of Canis Major, the Great Dog, with its bright star Sirius. (See CANICULA; HELIACAL RISING.) The appearance of the twins, Castor and Pollux, was hailed as the harbinger of fair summer weather.

Almost all nations have, from early times, arranged the stars into constellations, but it is chiefly from the nomenclature of the Greeks and Romans that our own is derived. Eudoxus (c.370 B.C.), a contemporary of Plato, gave a description of the face of the heavens, containing the names and characters of all the constellations recognized in his time. Though this production is lost, a poetical paraphrase of it, entitled *Phainomena*, written about a century later by Aratus (q.v.), is still extant. This poem describes 12 zodiacal constellations (see ZODIAC), with 20 situated to the north and 13 to the south of the ecliptic (q.v.). The next enumeration occurs in the *Almagest* of Ptolemy, and includes the preceding, with three additional, one northern and two southern, constellations, making in all 48. The names of these ancient constellations are: north of the ecliptic, *Andromeda, *Aquila, *Auriga, *Boötes, *Cassiopeia, *Cepheus, *Corona Borealis, *Cygnus, Delphinus, *Draco, *Equuleus, *Hercules, *Lyra, *Ophiuchus, *Pegasus, *Perseus, Sagitta, Serpens, Triangulum, *Ursa Major, *Ursa Minor; in the Zodiac, *Aries, *Taurus, *Gemini, *Cancer, *Leo, *Virgo, *Libra, *Scorpio, *Sagittarius, *Capricornus, *Aquarius, *Pisces; south of the ecliptic, Ara, *Argo, *Canis Major, *Canis Minor, *Centaurus, *Cetus, *Corona Australis, Corvus, Crater, *Eridanus, Hydra, Lepus, Lupus, *Orion, Piscis Australis. Large accessions have been made to the nomenclature in modern times partly in consequence of maritime discovery having made us acquainted with constellations in the Southern Hemisphere which never rose upon the world known to our ancient authors, and partly through the subdivision of some of the larger of the ancient constellations into smaller groups. Among those who were chiefly instrumental in forming new constellations may be mentioned Petrus Theodorus (d. 1596), Johann Bayer (1572–1625), Jakob Bartsch (1600–33), Johann Hevel, or Hevelius (1611–87), and Nicolas Louis Lacaille (1713–62). In 1751 Lacaille went to the Cape of Good Hope for the purpose of making a catalogue of the southern stars, and forming them into constellations —an undertaking which he prosecuted with great ardor for nearly four years, at the expense of the French government. In 1840, a committee, consisting of Sir John Herschel, Dr. Whewell, and Francis W. Baily, was appointed by the British Association for the purpose of defining the constellations and settling their boundaries. Largely as a result of their recommendations, 87 constellations are now accepted as authoritative. These include the 48 Ptolemaic constellations: Apus, *Camelopardus, *Chamæleon, Columba, *Coma Berenices, *Crux, Dorado, Grus, Hydrus, Indus, *Monoceros, Musca, Pavo, Phœnix, Piscis Volans, Toucan, and Triangulum Australe, formed by Bartsch and others before the middle of the seventeenth century; *Canes Venatici, Lacerta, Leo Minor, Lynx, *Scutum Sobieski, Sextans, and *Vulpecula, described by Hevelius in 1690; *Antlia, Cœlum, Circinus, Fornax, Horologium, Microscopium, Mensa, Norma, Octans, Pictor, Reticulum, Sculptor, and Telescopium, contributed by Lacaille in 1753; and finally, Carina, Puppis, and Vela, formed by the British Association committee, and replacing the ancient constellation Argo, out of which they were carved. The chief constellations are indicated by an asterisk, and will be noticed under their several names. Early in the seventeenth century, Julius Schiller, the friend of Bayer, attempted to reform the nomenclature of the constellations, replacing the old pagan names by others drawn from Christian sources. Thus, the zodiacal constellations received the names of the twelve Apostles, and Perseus, Hercules, Cassiopeia, Pegasus, Canis Major, Centaurus, and Auriga, became the Apostle Paul, the Three Kings from the East, Mary Magdalen, the Archangel Gabriel, King David, the Patriarch Abraham, and St. Jerome respectively, but the changes failed to meet with acceptance. The fanciful figures from which the constellations are named are depicted on celestial globes and maps of the heavens.

In the older writers upon astrology, constellation signifies the relative positions of the planets at a given moment. See ASPECT.

Consult: Wolf, *Geschichte der Astronomie* (Munich, 1877); Plunket, *Ancient Calendars and Constellations* (London, 1903); Young, *Uranography*, a supplement to *Elements of Astronomy* (New York, 1909).

CONSTELLATION. A famous United States vessel, built in 1798, which, as the flagship of Commodor Truxton, captured the French frigate *Insurgente* in 1799, and in 1800 won a brilliant victory over the superior French frigate *La Vengeance.*

CON'STIPA'TION (Lat. *constipatio*, from *constipare*, to crowd together, from *com-*, together + *stipare*, to crowd, from *stipes*, stem). Abnormal retention in the intestines of fecal matter, or its passage in abnormally hard masses. Normally the bowels of an infant should "move" or be emptied from two to five times in 24 hours; the bowels of an adult once in 24 hours. The causes of constipation are imperfect digestion (due to deficient secretion in the alimentary canal, inaction of the liver, or insufficient contraction of the muscular fibres of the intestine), insufficient exercise, the use of alcohol or drugs, or improper food. Congenital or acquired strictures of the bowel, fibrous bands following intra-abdominal operations or inflammations, lax abdominal walls with a general prolapse of the abdominal contents (enteroptosis), are also frequent causes. Symptoms may be entirely absent, but commonly there are lassitude, dull headache, and mental depression, together with failing appetite and furred tongue. In obstinate cases acute obstruction of the colon may occur, or ulceration of the colon, or even perforation. Hemorrhoids are not an unusual result of chronic constipation. The treatment of constipation may be dietetic, hygienic, and medicinal. The diet should be largely vegetable, with whole-wheat bread, cereals, fruit, and an increase of fats and water, with little

meat, no alcoholic beverages, and little sugar. A daily cold sponge bath, regular out-of-door exercise, and circular massage of the abdomen in the direction of the passage of the intestinal contents, relieve many cases. In other cases enemas or cathartic medicines may be necessary. See CATHARTIC.

Lower Animals. Constipation in the lower animals depends, as in man, on imperfect secretion from, or motion of, the intestinal walls. In the horse it is usually accompanied by colic (q.v.), and when long continued leads to enteritis (q.v.). The appropriate remedies are soap and water clysters, given every two hours; smart friction and cloths wrung out of hot water applied to the abdomen, with three drachms of aloes and one of calomel, given in gruel, and repeated in 16 hours if no effect is produced. Give, besides, walking exercise; restrict the amount of dry solid food, but allow plenty of thin gruel or other fluids, which may be rendered more laxative by admixture with treacle or a little salt. Similar treatment is called for in dogs, cats, and pigs. In cattle and sheep digestion principally takes place in the large and quadrisected stomach; the bowels, accordingly, are little liable to derangement; and constipation, when occurring in these animals, generally depends upon impaction of dry hard food between the leaves of the manyplies, third stomach, or fardel bag. The animal is hence said to be *fardel bound.* The complaint results from the eating of tough and indigestible food, such as ripe vetches, rye grass, or clover; it prevails in dry seasons, and on pastures where the herbage is coarse and the water scarce. It occurs among cattle partaking freely of hedge cuttings or shoots of trees, hence its synonym of *wood evil.* From continuous cramming and want of exercise, it is frequent in stall-feeding animals, while from the drying up of the natural secretions it accompanies most febrile and inflammatory diseases. The milder cases constitute the ordinary form of indigestion in ruminants, are accompanied by what the cow man terms *loss of cud,* and usually yield to a dose of salts given with an ounce or two of ginger. In more protracted cases rumination is suspended, appetite is gone, constipation and fever are present. There is a grunt noticeable especially when the animal is moved, and different from that accompanying chest complaints, by its occurrence at the commencement of expiration. By pressing the closed fist upward and forward beneath the short ribs on the right side, the round, hard, distended stomach may be felt. This condition may continue for 10 days or a fortnight, when the animal, if unrelieved, becomes nauseated and sinks. Stupor sometimes precedes death, while in some seasons and localities most of the bad cases are accompanied by excitement and frenzy. In this, as in other respects, the disease closely corresponds with stomach staggers in the horse. *Treatment.*—Give purgatives in large doses, combining several together, and exhibiting them with stimulants in plenty of fluid: For a medium-sized ox or cow, use three-quarters of a pound each of common and Epsom salts, 10 croton beans, and a drachm of calomel, with three ounces of turpentine, and administer this in half a gallon of water. If no effect is produced in 20 hours, repeat the dose. Withhold all solid food; encourage the animal to drink gruel, soft bran mashes, molasses and water; and give exercise, enemata, and occasional hot fomentations to the belly.

CONSTIT'UENT ASSEMBLY. See ASSEMBLY, NATIONAL.

CON'STITU'TION (Lat. *constitutio,* a settlement of a controversy; then a decree; from *constituere,* to cause to stand, to establish, from *con-* + *statuere,* to erect, to establish). Formerly used of any law promulgated by sovereign authority. In the Roman Empire the Imperial legislation, decreed and put into effect by the will of the Emperor, was comprehensively described by the term *constitutiones.* These included *rescripts,* or answers to petitions; *mandates,* or instructions to officials, administrative and judicial; *decrees,* or judgments on causes brought before him, directly or on appeal; and *edicts,* or general proclamations. See CIVIL LAW.

So, in early English law, *constitution* signified any statute, though it was not commonly employed except with reference to certain important legislation affecting the relations of the state and the church. Thus, the Constitutions of Clarendon were laws enacted in the reign of Henry II at a Parliament held at Clarendon in 1164, restricting the power of the clergy, limiting the right of appeal to the Pope, and virtually making the King the supreme head of the church in England.

At the present time, however, the term is used in the more restricted sense of the fundamental law of a state, society, or corporation, public or private. More specifically, the constitution of a state or society is the body of legal rules by which it is organized and governed, and which determines its legal relations to other states and societies and to its own members. This constitution may be created by the political or other body whose powers it defines and regulates, or by the individuals composing it and from whom its powers are derived, or it may be the creation of an external authority to which it is subject. Examples of the last form of constitution are afforded by the case of the ordinary private corporation, whose fundamental law is prescribed by the state to which it owes its existence; by municipal corporations, such as cities and villages, which derive their authority from their charters of incorporation and from the municipal law of the state to which they belong; and by subject states, territories, or colonies, whose constitutions are to be looked for in the legislation of the parent or sovereign state. The constitutions of Canada, of Hawaii, of Porto Rico, and to a certain extent that of the Republic of Cuba, belong to this class—the act of the American Congress, under the authority and the limitations of which the Cuban constitution was recently enacted, being in effect a part thereof.

Examples of the second form of fundamental law exist, in the political sphere, in popular constitutions like those of the United States, of the several States of the American Union, of the French Republic, and of Switzerland; and, in the domain of private law, by the rules adopted by the stockholders of corporations and voluntary associations for the conduct of their affairs by their boards of directors and other officers.

The first type of constitution, in which the fundamental law is the creation of the powers wielding the sovereign authority of the state, is to be found in all of the monarchical states of

Europe which have adopted, in whole or in part, a constitutional form of government. The free constitution of England, so popular in character and so largely the product of custom, in a strict legal sense, belongs in this category as clearly as does the government of Russia, which became at least nominally constitutional in 1905 by Imperial decree. To this class also we must refer the constitution of the Roman Empire, as well as of the Republic, and of the free commonwealths of ancient Greece. It is to this form of constitution, because it is alterable by the ordinary legislative authority of the state, that Viscount Bryce applies the term "flexible," while constitutions of the second and third classes, which are superior to the ordinary law-making power and not capable of amendment except by the higher authority which created them, he describes as "rigid" constitutions.

It is obvious that the authority of a self-imposed constitution differs widely from that of a true fundamental law, which underlies the ordinary processes of government and by which a political society has chosen to limit or has been constrained to restrict its governmental agencies. In a legal sense, therefore, the real distinction between constitutions does not turn upon the ease or difficulty with which they can be altered, nor yet upon the fact that the established process for amending a constitutional provision differs from the ordinary processes of legislation, but in the fact that a constitution of the one type is a part of the ordinary law of the land, and that a constitution of the other type is superior to the ordinary law; that in the one case legislation is irresponsible and uncontrollable, while in the other it is controlled by the fundamental law. In a state having a constitution of the one sort, we shall expect to find a court or other independent representative of the sovereign power from which the constitution was derived, which shall protect it from encroachments on the part of the ordinary law-making power; in a state of the other sort, we shall look to see the governing authority of the state unfettered by any external authority—itself the supreme representative of the sovereignty of the state.

Ordinary Constitutions.— The constitution of Great Britain affords the best modern example of the nature and operation of an *ordinary* constitution; that of the United States, the best example of an *extraordinary*, or *supreme*, constitution. The British constitution is an indefinite body of legal rules and principles, partly customary, partly the result of judicial decisions, and partly made up of acts of Parliament. These are nowhere collected in one place, but must be extracted from the whole body of the common and statute law of the realm and from observation of the workings of the government. Any act of Parliament and any judicial decision may modify it, and not infrequently statutes have been passed which have contained both constitutional and ordinary legislation mingled together in one and the same paragraph. Not only is there no authoritative statement of the British constitution to be found, but, from its very nature, no such statement could be made. So much of it depends upon custom and so much is left to time and circumstance that the most precise definition of its terms would be the most misleading. No law, statutory or judicial, has created the cabinet, to which, as the executive committee of the House of Commons, the government of the Empire is at present committed; but whether it is really the cabinet, or a committee of the cabinet, or the Prime Minister, that governs England, is so much a question of personality and of circumstances that it defies answer. So no one can say whether the crown still retains the ancient prerogative of vetoing an act of Parliament. It is commonly assumed that the power is extinct. The only safe statement that could be made, however, would be that the right has not been exercised for nearly 200 years, and that only a grave emergency would justify the sovereign in employing it; and if this should occur, there is no lawful process by which the act, however repugnant to current ideas of government in England, could be declared unconstitutional or deprived of its legal effect. Under such a system the constitution would sanction any governmental act which could be performed without precipitating a revolution.

The latest English writers distinguish between the *law* and the *custom* of the constitution—the former having reference to certain statutory provisions (such as the act settling the succession to the crown, the bill of rights, etc.) which, being laws in the strictest sense of the term and tending to limit the authority of a single branch of the government and not the supremacy of Parliament, are capable of enforcement by the courts; and the latter, to the great body of customary rules and observances which in practice control the working of the government and the distribution of its powers, but are enforced only by public opinion and by respect for the settled order of the constitution. The latter are not true laws, as they lack the sanction of any legal authority to declare and enforce them. In the field of ordinary jurisprudence no such distinction as this can be drawn between custom and law. There custom *is* law and will be enforced as such. But the case is manifestly different in the sphere of constitutional law, for there a custom tending to restrict the action of the sovereign power can find no jurisdiction to enforce it.

A constitution of the ordinary legal type may belong to either of the two old categories of "written" and "unwritten" constitutions—an unwritten constitution being one which is wholly or largely based on custom or judicial decisions, and a written constitution being the result of a specific act of legislation and having the definite form and the certainty of a body of statute law. But the distinction, though sound enough, is of no practical importance, as no considerations of political philosophy or of legal validity are involved in it. In fact, every political constitution is a composite of common and statute law, of custom and legislation, and the validity of its several provisions is not in the least dependent upon the manner in which the principles which they embody have acquired the form and content of legal authority. The British constitution, e.g., is much more than a body of customary law. At least five important sources of the rules and principles which it embodies may be distinguished. These are: 1. Two principal treaties, the Act of Union with Scotland in 1707 and the Act of Union with Ireland in 1800. 2. Certain great "compacts," viz., Magna Charta in 1215, the Declaration of Right in 1689, and the Act of Settlement in 1701. 3. A large number of public acts of Parliament, ranging from matters of the greatest

to those of the least political importance. 4. The body of precedents and customs known as the common law. 5. The usages and practices known specifically as the customs of the constitution, which are in reality the mass of practical expedients and understandings by which government is mainly carried on. To these last we have denied the character of law, partly because of their indefiniteness and fluctuation, but more particularly because of their lack of a legal sanction. The fourth class consists of legal rules in the proper sense of the term, but of the sort contemplated by the use of the word "unwritten"; but nevertheless, if formal treaties and acts of Parliament are written law, then is the British constitution, in part at least, a written constitution. Some constitutions of the ordinary type, however, are of the strictly "written" sort, being the result of a single legislative act or a grant of power from the sovereign head of the state. Most of the constitutions which have been promulgated in the several states of continental Europe, as well as that of Japan, are of this character. They have the common characteristic of the lack of any superior sanction. A law enacted by the ordinary legislative authority and promulgated by the supreme executive power of the state is a law, whether sanctioned by the constitution or not. In other words, a law may be unconstitutional and yet valid.

Extraordinary Constitutions.—As the polity of the British Empire furnishes the best example of the ordinary, "flexible," and unwritten constitution, so does the fundamental law of the United States exhibit the best and most characteristic constitution of the opposite type —of the extraordinary, or supreme, and "rigid" form. Though the constitutions of the general government and of the several States have very great and even fundamental differences, they are all alike in this respect, that the organic law has a sanction superior to that of the ordinary law of the land; that the Constitution is in fact "the supreme law" to which the ordinary law must conform; that the sovereignty is not wholly committed to the ordinary agencies of government, but the power of these is limited, and that this limitation on legislative and executive action is not a mere form of words, but is rendered effective by the power vested in the courts of annulling acts of government in contravention of the supreme law. The Federal government and the governments of the States are, therefore, not sovereign, but legally limited corporations, strictly analogous to private and minor municipal corporations, which derive a limited authority from the State which created them. There is nothing singular in the power exercised by the courts in declaring a corporate act invalid because of its transcending the legal authority of the body performing it, even in the political sphere. It is plain that the political action of a colony, even of the "self-governing" type, and of dependent States, as well as of cities and towns, is subject to control by the dominant political authority. The British Parliament and the English courts exercised this authority over the American Colonies as they now exercise it over Canada, Australia, and South Africa. The novelty of the American system consists in the application of this familiar principle to independent and sovereign States. The right of the Supreme Court of the United States, and even of the ordinary Federal tribunals, to pass upon the validity of acts of the national Congress was long disputed, but it was asserted by the Supreme Court as early as 1797, and actually exercised in the celebrated case of Marbury *v.* Madison in 1803. This conclusion was so plainly sound, and so obviously necessary to the working of the American constitutional scheme, that it has been generally acquiesced in. Several of the State courts had in the meantime reached a similar decision as to their authority to nullify acts of their own legislatures when in conflict with the local constitution or with that of the United States, and the principle may now be regarded as an essential part of the constitutional system of the United States. See SUPREME COURT OF THE UNITED STATES.

There is one important difference between the fundamental law of the United States and that of the several States. The national government being a federal union of independent commonwealths—some of them existing before its formation and others having come into the Union as independent States—the national Constitution is simply a grant of powers from the latter to the former, while the State constitutions are merely limitations upon the power of the ordinary agencies of government of the States. From this it follows that the Federal government has no powers excepting such as are conferred by the Constitution to which it owes its existence, while the State governments, on the contrary, have vested in them the full sovereignty of the commonwealth, excepting as this is limited by the local constitution and that of the United States. The function of the courts of the United States and of the several States in interpreting their respective constitutions is very different therefore. An act of Congress is invalid if it transcends the powers conferred upon the legislative branch of the government by the fundamental law; whereas, an act of the Legislature can be impeached for unconstitutionality only if it is in contravention of the limits placed by the Constitution on legislative power.

In general, constitutions may be amended, altered, or abrogated by the same power which created them, or by a process provided in the fundamental law for that purpose. A constitution which is the free gift of the sovereign authority may be recalled or nullified by the authority that conferred it. A rigid constitution of the American type, which is the creation of the people, and which cannot be directly changed without their concurrence, has in practice been found to be of the most inflexible kind. For a period of more than 60 years after the adoption in 1803 of the Twelfth Amendment (relative to the election of President and Vice President) the Constitution of the United States did not suffer a single amendment, and the three amendments adopted at the close of the Civil War, and as the result thereof, and the two recent amendments (1913) empowering the Congress to enact an income tax and providing for the election of United States Senators by popular vote, have been the only changes which it has since sustained. Like the English constitution, however, it has changed greatly, though imperceptibly, by the insidious processes of custom and of judicial interpretation. The history and language of the instrument, and the nature of the changes which it has undergone, will be set forth in the article on the CONSTITUTION OF

THE UNITED STATES. See also GOVERNMENT; STATE; SOVEREIGNTY; GREAT BRITAIN; and the titles of other States concerning whose constitutions information is sought.

Consult: Bryce, *The American Commonwealth* (4th ed., London and New York, 1913) and *Studies in History and Jurisprudence* (London and New York, 1901); Burgess, *Political Science and Comparative Constitutional Law* (Boston, 1900); Anson, *Law and Custom of the Constitution*, part i (7th ed., Oxford, 1893), part ii (2d ed., 1896); Dicey, *Lectures Introductory to the Study of the Law of the English Constitution* (4th ed., London, 1893); Bagehot, *The English Constitution* (new ed., London, 1896); McClain, *Constitutional Law in the United States* (New York, 1905); Cooley, *Treatise on the Constitutional Limitations which Rest upon the Legislative Power of the States* (Boston). Consult also the historical works referred to under the various titles UNITED STATES; GREAT BRITAIN, ETC.

CONSTITUTION, CHEMICAL. See CHEMISTRY; CARBON COMPOUNDS; STEREOCHEMISTRY.

CONSTITUTION, THE. A 44-gun frigate, the most famous vessel in the history of the United States navy, sometimes called "Old Ironsides," from the hardness of her planking and timbers. She was launched on Oct. 21, 1797, but was not completed and equipped until the following year, when she put to sea under Captain Nicholson for service against the French. During the war with Tripoli, 1801–05 (see BARBARY POWERS, WARS WITH), she was Preble's flagship and in 1805 took part in three of the five bombardments of the port of Tripoli. In July, 1812, in command of Isaac Hull (q.v.), she escaped from a British squadron off the New Jersey coast, after a spirited chase of three days, and on August 19, off Cape Race, fought her famous battle with the *Guerrière*, Captain Dacres, a somewhat weaker English frigate, which she left a total wreck after an engagement of 30 minutes, the English losing 79 of their crew, the Americans 14. On December 29, under the command of Captain Bainbridge, she captured off Bahía, Brazil, the *Java* (38 guns, Captain Lambert), after a two hours' engagement, in which the British lost 300 in killed and wounded, the Americans 34. On Feb. 14, 1814, under Captain Stewart, she captured the *Picton*, 16 guns, and a convoy, in the West Indies; and on Feb. 20, 1815, she took the *Cyane*, 34 guns, and the *Levant*, 18 guns, after a fierce engagement—remarkable for the seamanship of the Americans and the gallantry of the English—between the Madeira Islands and Gibraltar. The English lost 19 killed and 42 wounded out of 320; the Americans, 6 killed and 9 wounded out of 451. Soon afterward the *Constitution* was closely pursued by a British squadron, which recaptured the *Levant*. Reported unseaworthy between 1828 and 1830, she was ordered to be dismantled, but was retained in deference to the popular sentiment aroused by Holmes's poem "Old Ironsides" and in 1833 was rebuilt. She went out of commission in 1855 at Portsmouth, N. H., was subsequently used as a training ship, was again partially rebuilt in 1877, crossed the Atlantic for the last time in 1878, and was stored at the Boston Navy Yard in 1897. Consult: Hollis, *The Frigate Constitution* (Boston, 1900); Roosevelt, *The Naval War of 1812* (New York, 1882); Barnes, *Naval Actions of the War of 1812* (ib., 1896).

CON'STITU'TIONAL LAW. In general, that branch of public law which deals with the nature and organization of government, the distribution and mode of exercising the sovereign powers of the state, and the relations of the government to those who are subject to its authority. It has nothing to do with the regulation of the external relations of a state with other states, these being governed by international law, though the agencies for maintaining those relations, and the determination of their character and form, may be included within the constitutional law of the state. Thus, the choice of ambassadors, as well as their rank and functions, being the direct concern of the state they are chosen to represent, is governed by its constitutional law, and so, in the United States, is the power exercised by the Senate in approving, amending, or rejecting treaties with foreign powers.

Again, where the states are not related to one another as independent political communities, but sustain a relation of superior and dependent states, as of a colony to the parent state, or a subject to a dominant state, or of a member of a federation of states to the central authority, such relations are matters not of international, but of constitutional law. Thus, the Acts of Union of England with Scotland and Ireland, the acts of the British Parliament incorporating the Dominion of Canada, the Commonwealth of Australia, and the South African Confederation, the various acts of Congress providing for the government of Porto Rico, Hawaii, and the several Territories of the United States, the provisions of the American Constitution determining the relations between the general government and the individual States—all these are as much a part of the constitutional law of the states affected by them as are their bills of rights, or the laws and customs determining the powers of their respective legislatures.

On the other hand, two political communities may be for some purposes constitutionally related and may yet in some respects remain foreign to one another. Thus, while the relations of the several States of the American commonwealth to the central authority, and, through that authority to one another, are governed by their constitutional law, they are yet for many purposes independent of one another, and, in so far as they are independent, their relations are matters of international and not of constitutional law.

Specifically, the constitutional law of a state consists of its constitution, or so much of it as is legally effective, together with the constructions and interpretations which it has received at the hands of the courts or other competent authority.

British Constitutional Law.—Under a flexible constitution like that of England, which is mainly the result of the accumulated experience of centuries, the principal function of constitutional law is to discriminate between those portions of the constitution which are law, in the strict sense of the term, i.e., which have a legal sanction and will be declared by the courts, and those that rest only upon the customs of the community and upon considerations of practical expediency. These last, which are known as the "custom of the constitution," may have a moral sanction which makes them for the time being as effective politically as the law

of the constitution. But, being legally ineffective, i.e., unenforceable by the authority of the state, they do not, strictly speaking, belong in the category of constitutional law. As a considerable part of the British constitution is made up of such customs and practical expedients, the range of law comprised within it is comparatively narrow. It is to be remembered, however, that though custom, in and by itself considered, is not a part of constitutional law, it may become a source of such law by being adopted by the courts and declared in judicial decisions. More than one of the so-called liberties of the subject in England have thus arisen and now form part of the common law of the land. It is to be observed, also, that in Great Britain constitutional law does not exist as a separate and distinct body of rules and precedents, its provisions being an integral part of the common and statute law of the realm, from which they are to be collected.

American Constitutional Law.—In a state which has a constitution of the "fixed" or statutory type, like the United States, much less is left to convention and understanding, and much less depends upon custom and expediency. The area of law under such a constitution is, therefore, much wider, while the task of the constitutional lawyer is much simpler. The constitutional law of such a state consists of the terms of the constitution itself, with the amendments thereto, and the judicial decisions in which its provisions have come up for construction and application. No acts of the legislature declaring the rights of the citizen, no treaty with a foreign government, no abdication of power by any arm of the state, enters into it. In the American system the only authoritative exposition of a constitution is that furnished by the courts. This extraordinary jurisdiction is not confined to the Supreme Court, but is exercised as well by the inferior Federal courts and by the regular tribunals of the several States. As constitutional law, the judgments of these courts vary according to the constitution whose provisions are under examination. The Supreme Court of the United States is the final authority on the Federal Constitution, and the supreme appellate courts of the several States on the constitutions of their respective States.

It will be borne in mind that the judicial power in the United States extends to acts of Congress and of the legislatures, the Constitution being the supreme law to which all legislation must conform; whereas, the British constitution not being a supreme law, but a part of the ordinary law of the land, the powers of Parliament are not and cannot be limited by it. Accordingly judicial decisions upon the legislative power and its limitations, which constitute the bulk of constitutional law in the United States, are wholly unknown in England.

This, indeed, is the leading principle of American constitutional law—that all acts of government, whether legislative, judicial, or administrative, made or done in contravention of the Constitution, are void. This principle is equally applicable to the constitutions of the several States and to that of the United States. But, the Federal government being one of strictly limited powers, a still more stringent principle is applied to test the validity of its acts, viz., that they are void if not specially sanctioned by the fundamental law. But it does not lie within the competence of the courts to control the action of the State on any other principles than such as are laid down in the fundamental law. They cannot declare void an act within the general competence of the legislative powers, merely because it is contrary to natural justice, or because it violates fundamental principles of republican government, or because of a supposed conflict with the general spirit of the Constitution. It should be added that an act adjudged to be unconstitutional is held to have been void and without legal validity from the time of its enactment.

In the article CONSTITUTION OF THE UNITED STATES (q.v.) reference is made to certain changes which the Constitution of the United States has undergone as the result of judicial interpretation and the slow growth of custom. The former of these is clearly a part of constitutional law, but it is not easy to say how far a particular custom, if threatened with violation, would be supported by the courts. It seems probable, however, that the Supreme Court would not hesitate to recognize a well-established practice of the government as a part of the constitutional law of the land. If, e.g., a presidential elector should at the present time assert his right to disregard the instructions under which he was chosen and cast his vote for the candidate of the opposing party, there is at least a question whether he could not be restrained by the courts from carrying his intention into effect. Consult: Boutmy, *The English Constitution* (London and New York, 1891); Story, *Commentaries on the Constitution of the United States* (5th ed., Boston, 1891); McClain, *Constitutional Law in the United States* (New York, 1905). See CONSTITUTION OF THE UNITED STATES; LAW; PUBLIC LAW.

CONSTITUTIONAL UNION PARTY. A party, formed chiefly out of the remnants of the Know-Nothing and Whig parties, which met in convention at Baltimore in May, 1860, and nominated John Bell (q.v.) and Edward Everett (q.v.) for President and Vice President, respectively, of the United States of America, on a platform which declared simply for "the Constitution of the country, the union of the States, and the enforcement of the laws." The party carried Virginia, Kentucky, and Tennessee, and cast a popular vote of about 600,000, and an electoral vote of 39, in the ensuing election. After this campaign the party virtually went out of existence. It was also known as the "Bell-Everett party."

CONSTITUTION OF ATHENS. The title of a work by Aristotle (q.v.).

CONSTITUTION OF MATTER. See MATTER, PROPERTIES OF.

CONSTITUTION OF THE UNITED STATES. The Federal Constitution of the United States of America is one of the class of "written" and "rigid" constitutions, and the most important example of a constitution of the "supreme" or "extraordinary" type. That is to say, it is not only the result of a definite purpose and of a deliberate act of legislation, embodied in written form; it is not only incapable of modification by ordinary legislative processes; but it is the true supreme law of the land, to which all other law must conform, and conformity to it is the test of the validity of the ordinary law. The commanding quality of the Federal Constitution is the fact that it is not,

like most political constitutions, including those of the several States of the American Union, a mere restriction upon the authority of the governing powers of the state, but that it creates a new frame of government, which it endows with certain limited powers, and from which it deliberately withholds all powers not so granted. The government so constituted by it is, therefore, a government of granted, and not of antecedent, authority, and the Constitution is not only the supreme law of the land, but comprehends within itself the whole of that law.

There is some confusion, therefore, in the use of such phrases as the "territorial extent," "the Constitution follows the flag," and whether the Constitution "applies" to certain newly acquired Territories. Strictly speaking, the Constitution has no territorial extension; it neither expands nor contracts with the limits of American jurisdiction; but, whatever those limits may be, it steadily and invariably binds the governmental agencies of the nation and limits their authority. In so far as it confers general powers of government on the President and Congress, those powers may be exercised in the ends of the earth as well as within the limits of the original States; whereas the restrictions upon that power are equally valid wherever it may be exercised.

This view of the Federal Constitution as a carefully guarded grant of powers to the central government, explains even those guarantees of personal liberty and security which it contains and which are commonly referred to as the Bill of Rights of the Constitution (Amendments I–X). These are not, as they are commonly understood, an unlimited charter of liberties for the people of the United States, but only restrictions upon the exercise of arbitrary power by the President and Congress. They are not aimed at the States or at local authority. It is announced as "a settled rule of construction of the national Constitution, that the limitations it imposes upon the powers of government are in all cases to be understood as limitations upon the government of the Union only, except where the States are expressly mentioned" (Cooley, *Constitutional Limitations*, p. 19). Accordingly, even such a right as that of trial by jury in criminal cases, which is usually regarded as one of the inalienable rights of the American citizen, is by the Federal Constitution protected only against violation by Congress and the Federal judiciary. Excepting as they are restrained by their own constitutions, there is nothing to prevent the several States from abolishing the jury system entirely.

From what has been said above, it will be observed that the Constitution of the United States is not, as it is conceived by foreigners, a complete scheme of government for the people of the United States, but only a part, and that the smaller part, of such a scheme. To fill out the outline, the constitutions and laws of the several States must be taken into account. These provide by far the greater part of the machinery of government, the securities of life, liberty, and property, and the political rights of the citizen.

The Constitution of the United States, in the form in which it is reprinted in this article, represents a long process of experiment and discussion, in the course of which the jealousies and conflicting interests of the different States and sections of which the Union was made up, were gradually compromised and subordinated to the common welfare of all. The Articles of Confederation, by which the ill-jointed union of the 13 original States was held together from 1779 to 1789, can scarcely be described as a constitution, in any proper sense of that term, as they created only the form and not the substance of government, and vested no real authority in the common representatives of the several commonwealths. They were more in the nature of a treaty of alliance, by which the States bound themselves to common action and under which the Congress constituted an international conference for promoting the common welfare. The inconveniences and dangers of this arrangement soon became too pressing to be ignored, and in February, 1787, Congress took such action as its limited powers permitted and passed a resolution, suggesting that a convention of delegates from the several States be held at Philadelphia on the second Monday of May following, "for the sole and express purpose of revising the Articles of Confederation, and reporting to Congress and the several State legislatures such alterations and provisions therein as shall, when agreed to by Congress and confirmed by the States, render the Federal Constitution adequate to the exigencies of government, and the preservation of the Union."

Pursuant to this resolution of Congress, delegates from 12 of the 13 States (Rhode Island alone being unrepresented) assembled at Philadelphia, the convention opening its sessions in Independence Hall on May 14, 1787, under the presidency of George Washington. For four months the delegates carried on the great work which had been intrusted to them, and at the close of their deliberations, on Sept. 17, 1787, they had completed the Constitution of the United States, with the exception of the amendments, in the form in which we have it to-day. Their work was promptly approved by Congress, and at the close of the year 1788 had been adopted by 11 of the States and went into operation among them. The two remaining States, North Carolina and Rhode Island, ratified it and entered into the American Union in 1789 and 1790, respectively.

These results were not achieved without difficulty—in the face of profound differences of opinion. In most of the States the ratification of the Constitution was secured by narrow majorities and after prolonged and earnest discussion, and in none of the States was it approved with anything approaching unanimity. This opposition and these differences of opinion were primarily due to what have been called "the compromises of the Constitution." These were three in number. The first dealt with the fundamental conflict between those who desired a strong central authority and those who feared the extension of executive power. This was compromised by investing the President of the Republic with great powers, but for a limited term only, and by a complicated system of "checks and balances," whereby the exercise of his power was at divers points and in various ways subjected to the control of Congress or of the Senate.

The second compromise was of the conflict of the great and small States, the former claiming the weight in the national government to which their size, wealth, and population entitled them, and the latter insisting upon the recognition of their equality as independent, self-governing commonwealths. This was effected by the institution of two chambers of legislation—a Sen-

ate, in which the States were to have equal representation, and a House of Representatives, in which the representation should be in proportion to population. This compromise involved also the delicate question of the distribution of power between the two houses of Congress.

The third compromise was of the controversy between the upholders of slavery and those who believed that slavery should be restricted or abolished. This was adjusted by the proviso forbidding Congress to prohibit the importation or migration of slaves before the year 1808 (Art. I, Sec. 9), and the requirement that fugitive slaves should be delivered up by the States in which they had taken refuge (Art. IV, Sec. 2). As no power was conferred upon Congress or the President to interfere with slavery in the States in which it existed, the institution was left within the complete control of those States.

In some of the States great dissatisfaction was expressed at the absence of anything like a Bill of Rights in the Constitution, and for a time the fear was felt that certain of the States might refuse to ratify unless the Constitution were amended. Accordingly the first Congress after the adoption of the Constitution proposed a series of amendments, which were promptly ratified by the States as Articles I–X of the amendments as they now stand. (See RIGHTS, BILL OF.) Articles XI and XII speedily followed, in 1793 and 1803, respectively. From that date to the Civil War, no amendments to the original instrument were adopted. The next three amendments, Articles XIII, XIV, and XV, were adopted in 1865, 1868, and 1870, respectively, as a part of the reconstruction policy of the government after the Civil War, in order to secure to the lately emancipated slaves the legal and political benefits of full citizenship in the United States and in the several States, and the last two, Articles XVI and XVII, in 1913, as the long result of the democratic movement of the new century. See RIGHTS, CIVIL; CIVIL WAR; RECONSTRUCTION; SLAVERY.

It remains to be said, in conclusion, that, in speaking of the constitution of a State, reference is made to the whole body of its fundamental law, whether embodied in written form or not. The constitution of every active political community is the product of many agencies and influences, not merely of deliberate legislative action. That of the United States is no exception to this rule. The Constitution, as adopted in the early formative period of the Republic, and formally amended from time to time in the manner therein prescribed, has been more extensively amended by the insensible processes of use and custom and by the far-reaching effects of judicial construction. As to the last, it may be said that the Constitution, in setting up a supreme judicial tribunal, with the function of passing upon the validity of national and State legislative action and of executive action, has indirectly provided for a process of amendment much more efficacious than that directly provided. The Constitution of the United States, as it exists to-day, therefore, must be looked for in the decisions of the courts and in the political practice of the people, as well as in the text of the original articles and their formal amendments. The leading authorities on the Constitution are: *The Federalist; Elliott's Debates in Convention on the Adoption of the Federal Constitution;* Curtis, *History, Origin, Formation, and Adoption of the Constitution of the United States;* Story, *Commentaries on the Constitution of the United States;* Cooley, *Treatise on the Constitutional Limitations which Rest upon the Legislative Powers of the States;* Von Holst, *Constitutional Law of the United States of America* (Chicago, 1887); De Tocqueville, *Democracy in America* (London, 1835); Bryce, *The American Commonwealth* (4th ed., 1913), and the *Cases on Constitutional Law of the United States,* collected and edited by J. B. Thayer (Cambridge, Mass., 1894–95). See also CONSTITUTION; CONSTITUTIONAL LAW; SUPREME COURT OF THE UNITED STATES. The text of the Constitution is as follows:

CONSTITUTION OF THE UNITED STATES

We, the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.

ARTICLE I, Sec. 1. All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Sec. 2. The House of Representatives shall be composed of members chosen every second year by the people of the several States, and the electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

No person shall be a Representative who shall not have attained to the age of 25 years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

Representatives and direct taxes shall be apportioned among the several States which may be included within this Union according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each State shall have at least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose 3; Massachusetts, 8; Rhode Island and Providence Plantations, 1; Connecticut, 5; New York, 6; New Jersey, 4; Pennsylvania, 8; Delaware, 1; Maryland, 6; Virginia, 10; North Carolina, 5; South Carolina, 5; and Georgia, 3.

When vacancies happen in the representation from any State, the executive authority thereof shall issue writs of election to fill such vacancies.

The House of Representatives shall choose their Speaker and other officers; and shall have the sole power of impeachment.

Sec. 3. The Senate of the United States shall be composed of two Senators from each State, chosen by the legislature thereof, for six years; and each Senator shall have one vote.

Immediately after they shall be assembled in consequence of the first election, they shall be

divided as equally as may be into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every second year; and if vacancies happen by resignation, or otherwise, during the recess of the legislature of any State, the Executive thereof may make temporary appointments until the next meeting of the legislature, which shall then fill such vacancies.

No person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State for which he shall be chosen.

The Vice President of the United States shall also be president of the Senate, but shall have no vote, unless they be equally divided.

The Senate shall choose their other officers, and also a president *pro tempore*, in the absence of the Vice President, or when he shall exercise the office of President of the United States.

The Senate shall have the sole power to try all impeachments; when sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

Sec. 4. The times, places, and manner of holding elections for Senators and Representatives shall be prescribed in each State by the legislature thereof; but the Congress may at any time, by law, make or alter such regulations, except as to the places of choosing Senators.

The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless they shall, by law, appoint a different day.

Sec. 5. Each House shall be the judge of the elections, returns, and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner and under such penalties as each House may provide.

Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and, with the concurrence of two-thirds, expel a member.

Each House shall keep a journal of its proceedings and from time to time publish the same, excepting such parts as may in their judgment require secrecy, and the yeas and nays of the members of either House on any question shall, at the desire of one-fifth of those present, be entered on the journal.

Neither House, during the sessions of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

Sec. 6. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the sessions of their respective Houses, and in going to and returning from the same; and for any speech or debate in either House they shall not be questioned in any other place.

No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments whereof shall have been increased during such time; and no person holding any office under the United States shall be a member of either House during his continuance in office.

Sec. 7. All bills for raising revenue shall originate in the House of Representatives; but the Senate may propose or concur with amendments, as on other bills.

Every bill which shall have passed the House of Representatives and the Senate shall, before it become a law, be presented to the President of the United States; if he approve, he shall sign it; but if not, he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered; and if approved by two-thirds of that House, it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. If any bill shall not be returned by the President within ten days (Sunday excepted) after it shall have been presented to him, the same shall be a law in like manner as if he had signed it, unless the Congress by their adjournment prevent its return; in which case it shall not be a law.

Every order, resolution, or vote to which the concurrence of the Senate and the House of Representatives may be necessary (except on a question of adjournment) shall be presented to the President of the United States; and before the same shall take effect, shall be approved by him, or, being disapproved by him, shall be repassed by two-thirds of the Senate and House of Representatives, according to the rules and limitations prescribed in the case of a bill.

Sec. 8. The Congress shall have power

To lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States;

To borrow money on the credit of the United States;

To regulate commerce with foreign nations, and among the several States, and with the Indian tribes;

To establish an uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States;

To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures;

To provide for the punishment of counterfeiting the securities and current coin of the United States;

To establish post offices and post roads;

To promote the progress of science and useful arts, by securing for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries;

To constitute tribunals inferior to the Supreme Court;

To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations;

To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water;

To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years;

To provide and maintain a navy;

To make rules for the government and regulation of the land and naval forces;

To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions;

To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress;

To exercise exclusive legislation in all cases whatsoever over such district (not exceeding ten miles square) as may, by cession of particular States, and the acceptance of Congress, become the seat of the Government of the United States, and to exercise like authority over all places purchased by the consent of the legislature of the State in which the same shall be, for the erection of forts, magazines, arsenals, dockyards, and other needful buildings; and

To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

Sec. 9. The migration or importation of such persons as any of the States now existing shall think proper to admit shall not be prohibited by Congress prior to the year one thousand eight hundred and eight; but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person.

The privilege of the writ of *habeas corpus* shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

No bill of attainder or *ex post facto* law shall be passed.

No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

No tax or duty shall be laid on articles exported from any State.

No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another; nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties in another.

No money shall be drawn from the treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of the Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign State.

Sec. 10. No State shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, *ex post facto* law, or law impairing the obligation of contracts, or grant any title of nobility.

No State shall, without the consent of the Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts, laid by any State on imports or exports, shall be for the use of the treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

No State shall, without the consent of Congress, lay any duty of tonnage, keep troops, or ships of war in time of peace, enter into any agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II, Sec. 1. The executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and, together with the Vice President, chosen for the same term, be elected as follows:

Each State shall appoint, in such manner as the legislature thereof may direct, a number of electors, equal to the whole number of Senators and Representatives to which the State may be entitled in the Congress; but no Senator or Representative, or persons holding an office of trust or profit under the United States, shall be appointed an elector.

The Congress may determine the time of choosing the electors, and the day on which they shall give their votes; which day shall be the same throughout the United States.

No person, except a natural-born citizen or a citizen of the United States at the time of the adoption of the Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years, and been fourteen years resident within the United States.

In case of the removal of the President from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice President, and the Congress may by law provide for the case of removal, death, resignation, or inability, both of the President and Vice President, declaring what officer shall then act as President, and such officer shall act accordingly, until the disability be removed, or a President shall be elected.

The President shall, at stated times, receive for his services a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

Before he enters on the execution of his office, he shall take the following oath or affirmation: "I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States, and will, to the best of my

ability, preserve, protect, and defend the Constitution of the United States."

Sec. 2. The President shall be commander in chief of the army and navy of the United States, and of the militia of the several States when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment.

He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present concur; and he shall nominate, and by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may by law vest the appointment of such inferior officers as they think proper in the President alone, in the courts of law, or in the heads of departments.

The President shall have power to fill up all vacancies that may happen during the recess of the Senate, by granting commissions which shall expire at the end of their next session.

Sec. 3. He shall from time to time give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may on extraordinary occasions convene both Houses, or either of them, and in cases of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

Sec. 4. The President, Vice President, and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

ARTICLE III, Sec. 1. The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the Supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services a compensation, which shall not be diminished during their continuance in office.

Sec. 2. The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers, and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States; between a State and citizens of another State; between citizens of different States; between citizens of the same State claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign States, citizens, or subjects.

In all cases affecting ambassadors, other public ministers, and consuls, and those in which a State shall be party, the Supreme Court shall have original jurisdiction. In all the other cases before mentioned, the Supreme Court shall have appellate jurisdiction, both as to law and fact, with such exceptions and under such regulations as the Congress shall make.

The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the State where the said crimes shall have been committed; but when not committed within any State, the trial shall be at such place or places as the Congress may by law have directed.

Sec. 3. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort.

No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

The Congress shall have power to declare the punishment of treason; but no attainder of treason shall work corruption of blood, or forfeiture except during the life of the person attainted.

ARTICLE IV, Sec. 1. Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State. And the Congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

Sec. 2. The citizens of each State shall be entitled to all privileges and immunities of citizens in the several States.

A person charged in any State with treason, felony, or other crime, who shall flee from justice, and be found in another State, shall, on demand of the executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

No person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

Sec. 3. New States may be admitted by the Congress into this Union; but no new State shall be formed or erected within the jurisdiction of any other State, nor any State be formed by the junction of two or more States, or parts of States, without the consent of the legislatures of the States concerned as well as of the Congress.

The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or any particular State.

Sec. 4. The United States shall guarantee to every State in this Union a republican form of government, and shall protect each of them against invasion, and, on application of the legislature, or of the Executive (when the legislature cannot be convened), against domestic violence.

ARTICLE V. The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the legislatures of

two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes as part of this Constitution, when ratified by the legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided, that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the ninth section of the first article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI. All debts contracted and engagements entered into before the adoption of this Constitution shall be as valid against the United States under this Constitution, as under the Confederation.

This Constitution and the laws of the United States which shall be made in pursuance thereof, and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

The Senators and Representatives before mentioned, and the members of the several State legislatures, and all executive and judicial officers, both of the United States and of the several States, shall be bound by oath or affirmation to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII. The ratification of the conventions of nine States shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

Done in convention, by the unanimous consent of the States present, the 17th day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the independence of the United States of America the twelfth.

AMENDMENTS

ARTICLE I. Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble, and to petition the Government for redress of grievances.

ARTICLE II. A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.

ARTICLE III. No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war but in a manner to be prescribed by law.

ARTICLE IV. The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

ARTICLE V. No person shall be held to answer for a capital or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service, in time of war and public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb, nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

ARTICLE VI. In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusations; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

ARTICLE VII. In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise reëxamined in any court of the United States than according to the rules of the common law.

ARTICLE VIII. Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishment inflicted.

ARTICLE IX. The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

ARTICLE X. The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

ARTICLE XI. The judicial power of the United States shall not be construed to extend to any suit in law or equity commenced or prosecuted against one of the United States by citizens of another State, or by citizens or subjects of any foreign State.

ARTICLE XII. The electors shall meet in their respective States, and vote by ballot for President and Vice President, one of whom at least shall not be an inhabitant of the same State with themselves. They shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice President; and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice President, and of the number of votes for each, which lists they shall sign and certify, and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted; the person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such a majority, then from the persons having the highest numbers, not exceeding three, on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or

members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice President shall act as President, as in the case of the death or other constitutional disability of the President. The person having the greatest number of votes as Vice President shall be the Vice President, if such number be a majority of the whole number of electors appointed; and if no person have a majority, then from the two highest numbers on the list the Senate shall choose the Vice President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice President of the United States.

ARTICLE XIII, Sec. 1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Sec. 2. Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XIV, Sec. 1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

Sec. 2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice President of the United States, Representatives in Congress, the executive and judicial officers of a State, or the members of the legislature thereof, is denied to any of the male inhabitants of such State being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportions which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

Sec. 3. No person shall be a Senator or Representative in Congress, or Elector of President and Vice President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath as a member of Congress, or as an officer of the United States, or as a member of any State legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each House, remove such disability.

Sec. 4. The validity of the public debt of the United States authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

Sec. 5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

ARTICLE XV, Sec. 1. The right of the citizens of the United States to vote shall not be denied or abridged by the United States, or by any State, on account of race, color, or previous condition of servitude.

Sec. 2. The Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XVI. The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration.

ARTICLE XVII, Sec. 1. The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State legislatures.

Sec. 2. When vacancies happen in the representation of any State in the Senate, the executive authority of such State shall issue writs of election to fill such vacancies: Provided, That the legislature of any State may empower the executive thereof to make temporary appointment until the people fill the vacancies by election as the legislature may direct.

Sec. 3. This amendment shall not be so construed as to affect the election or term of any Senator chosen before it becomes valid as part of the Constitution.

ARTICLE XVIII. Sec. 1. After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited.

Sec. 2. The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.

Sec. 3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the Legislatures of the several States, as provided by the Constitution, within seven years from the date of the submission hereof in the States by the Congress.

ARTICLE XIX. Sec. 1. The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex.

Sec. 2. Congress shall have power by appropriate legislation to enforce the provisions of this article.

CONSTITUTIONS, APOSTOLICAL. See APOSTOLIC CONSTITUTIONS AND CANONS.

CONSTITUTIONS OF CLARENDON. See CLARENDON, CONSTITUTIONS OF.

CONSTRUCTION (Lat. *constructio*, from *construere*, to construct, from *com-*, together + *struere*, to heap). In geometry, the process of

drawing a figure so as to satisfy the conditions of a given problem. Thus, to construct an equilateral triangle of side a: with the ends of a as centers and with a radius equal to a describe circles; connect either intersection with the ends of a. Here the construction seems at first not to be unique, since two triangles satisfy the condition, but it is evident that there is essentially only one construction for the triangles are congruent. In solving problems, a valuable method is to assume the construction and investigate the properties of the figure. Thus, to draw a line through a given point parallel to a given line: assuming the construction and a transversal of the parallels through the given point, it appears that the alternate angles are equal; hence, to construct the figure, draw a transversal through the point cutting the given line and construct the alternate angle equal to the angle formed by the transversal and the given line.

Another fruitful method is that of the intersection of loci; e.g., if it is known that a point is on each of two intersecting straight lines, it is uniquely determined as their point of intersection; but if it is on a straight line and a circle which the line intersects, it may be either of the two points of intersection.

The best works upon the constructions of elementary geometry are Petersen, *Methods and Theories* (Copenhagen and London, 1879); Rouché and De Comberousse, *Traité de géométrie* (Paris, 1900); Alexandroff, *Problèmes de géométrie élémentaire*, trans. into French by Aitoff (Paris, 1899); Knobloch, *Sammlung geometrischen Konstruktionen* (Altona, 1911); and Adler, *Theorie der geometrischen Konstruktionen* (Leipzig, 1906).

CONSTRUCTIONISTS, STRICT. See STRICT CONSTRUCTIONISTS.

CON'SUA'LIA. See CIRCUS.

CONSUELO, kôn-swā'lō. A famous novel by George Sand (1842) and the name of its chief character; marked by a visionary humanitarianism.

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SECOND EDITION

VOLUME VI

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KEY TO PRONUNCIATION

For a full explanation of the various sounds indicated, see the Key to Pronunciation in Vol. I.

ā as in ale, fate.
ȧ " " senate, chaotic.
â " " glare, care, and as *e* in there.
ă " " am, at.
ä " " arm, father.
ȧ " " ant, and final *a* in America, armada, etc.
a " " final, regal, pleasant.
a̤ " " all, fall.
ē " " eve.
ė̄ " " elate, evade.
ĕ " " end, pet.
ē̤ " " fern, her, and as *i* in sir, etc.
e " " agency, judgment.
ī " " ice, quiet.
i̇ " " quiescent.
ĭ " " ill, fit.
ō " " old, sober.
ȯ " " obey, sobriety.
ô " " orb, nor.
ŏ " " odd, forest, not.
o " " atom, carol.
oi " " oil, boil.
o͞o " " food, fool, and as *u* in rude, rule.
ou " " house, mouse.
ū " " use, mule.
u̇ " " unite.
ŭ " " cut, but.
u̯ " " full, put, or as *oo* in foot, book.
û " " urn, burn.
y " " yet, yield.
B " " Spanish Habana, Córdoba, where it is like English *v* but made with the lips alone.

ch as in chair, cheese.
D " " Spanish Almodovar, pulgada, where it is nearly like *th* in English then.
g " " go, get.
G " " German Landtag = *ch* in Ger. ach, etc.
H " *j* in Spanish Jijona, *g* in Spanish gila; like English *h* in hue, but stronger.
hw " *wh* in which.
K " *ch* in German ich, Albrecht = *g* in German Arensberg, Mecklenburg, etc.
n̲ " in sinker, longer.
ng " " sing, long.
N " " French bon, Bourbon, and *m* in the French Étampes; here it indicates nasalizing of the preceding vowel.
sh " " shine, shut.
th " " thrust, thin.
TH " " then, this.
zh " *z* in azure, and *s* in pleasure.

An apostrophe ['] is sometimes used as in tā'b'l (table), kăz''m (chasm), to indicate the elision of a vowel or its reduction to a mere murmur.

For foreign sounds, the nearest English equivalent is generally used. In any case where a special symbol, as G, H, K, N, is used, those unfamiliar with the foreign sound indicated may substitute the English sound ordinarily indicated by the letter. For a full description of all such sounds, see the article on Pronunciation.

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Professor David Eugene Smith.
COPPER.
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COPYING MACHINES AND PROCESSES.
Mr. Herbert Treadwell Wade.
CORAL.
Mr. C. William Beebe.
CORAL ISLAND AND CORAL REEF.
Mr. David Hale Newland.
CORINTHIANS, EPISTLE OF PAUL TO THE.
Professor Edward E. Nourse.
CORNEILLE, PIERRE.
Dr. Benjamin W. Wells.
Professor John Lawrence Gerig.
CORNELL UNIVERSITY.
Mr. W. J. Deyo (Secretary).
COROT, JEAN BAPTISTE CAMILLE.
Dr. George Kriehn.
CORPORATION.
Professor Munroe Smith; Dr. Harlan F. Stone; Professor George W. Kirchwey.
CORREGGIO, ANTONIO ALLEGRI.
Dr. George Kriehn.
CORTES, HERNÁN.
Professor John Driscoll Fitz-Gerald.
COSMOGONY.
Professor Harold Jacoby; Professor A. V. W. Jackson; Professor T. W. Edmondson.
COSTA RICA.
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COSTUME.
Mr. Russell Sturgis.*
Mr. George Leland Hunter.
COSTUME, ECCLESIASTICAL.
Professor Jeremiah Whipple Jenks.
COTTON.
Dr. Alfred Charles True; Dr. Edwin West Allen; and others.
COTTONSEED AND ITS PRODUCTS.
Dr. Edwin West Allen.
COURT.
Professor Munroe Smith; Professor Francis M. Burdick; Professor George W. Kirchwey.
COURTS, MILITARY.
Colonel Edward Hunter.
Captain James J. Mayes.
CRAB.
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CREEDS AND CONFESSIONS.
Dr. Frank Hugh Foster.
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Professor George W. Kirchwey.
CRIMINOLOGY.
Professor C. W. A. Veditz.
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Professor Alpheus Spring Packard.*
Dr. George Kriehn.
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Professor Hubert Lyman Clark; Mr. Ernest Ingersoll; Mr. C. William Beebe.
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Professor William H. Hobbs.
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CUBAN LITERATURE.
Professor J. D. M. Ford.
Professor John Driscoll Fitz-Gerald.
CUNEIFORM INSCRIPTIONS.
Professor Nathaniel Schmidt.
CURRENCY.
Professor Alvin Saunders Johnson.
CURVE.
Professor David Eugene Smith.
CUSTOMS DUTIES.
Professor Alvin Saunders Johnson.
CUTANEOUS SENSATIONS.
Professor Edward Bradford Titchener.

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CYPRESS.
Mr. Leon Dominian; Mrs. Allan E. Engle; Professor Charles Knapp.
DAHOMEY.
Mr. Edward Lathrop Engle.
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DAIRYING.
Dr. Alfred Charles True.
Dr. Edwin West Allen.
DAMAGES.
Professor George W. Kirchwey.
DAMASCUS.
Mr. Edward Lathrop Engle.
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DAMS AND RESERVOIRS.
Professor Moses Nelson Baker.
DANCING.
Mr. Stanley S. Sheip.
Dr. Clark Wissler.
DANIEL, BOOK OF.
Professor Nathaniel Schmidt.
DANISH LANGUAGE AND LITERATURE.
Professor Daniel K. Dodge; Dr. Benjamin W. Wells; Professor John Lawrence Gerig.
DANTE, ALIGHIERI.
Dr. Frederic Taber Cooper.
Professor A. Arthur Livingston.
DANTON, GEORGES JACQUES.
Professor Edwin A. Start; Professor Walter Phelps Hall; and others.
DARWIN, CHARLES ROBERT.
Professor Charles B. Davenport; Mr. Ernest Ingersoll; Mr. C. William Beebe.
DAVID.
Professor Nathaniel Schmidt.
DAVIS, JEFFERSON.
Professor James Edward Winston.
DEAD SEA.
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DEAF-MUTE.
Dr. David Gilbert Yates.
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DECAPOLIS.
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Professor George W. Kirchwey.
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Mr. Charles Haskins Townsend.
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Mr. C. William Beebe.
DEFOE, DANIEL.
Professor William Peterfield Trent.
DEGENERATION AS A FACTOR IN EVOLUTION.
Professor Alpheus Spring Packard.*
Mr. C. William Beebe.
DEGREE.
Prof. I. L. Kandel; Mr. D. A. Modell.
DELACROIX, (FERDINAND V.) E.
Dr. George Kriehn.
DELAWARE.
Mr. William Clark.
Mr. Allen Leon Churchill.
DELHI.
Mr. Edward Lathrop Engle.
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DELPHI.
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DELUGE.
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DEMOCRACY.
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DEMOCRATIC PARTY.
Professor James Edward Winston.
DEMOLITION.
Lieut. Colonel Edgar Jadwin, C.E.
DEMONIAC.
Professor Nathaniel Schmidt.
DEMONOLOGY.
Professor Nathaniel Schmidt.
DEMOSTHENES.
Professor Clifford Herschel Moore.
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DENMARK.
Professor Robert M. Brown; Mr. Edward Lathrop Engle; Professor Dana Carlton Munro; Professor Walter Phelps Hall.
DENTISTRY.
Dr. Alfred R. Starr.
Dr. David Gilbert Yates.
DENVER.
Dr. Henry A. Buchtel.
DEPENDENT CHILDREN.
Professor Alvin Saunders Johnson.
DE QUINCEY, THOMAS.
Professor John Erskine.
DESCARTES, RENE.
Professor Evander Bradley McGilvary.
DESCENT.
Professor George W. Kirchwey.
DESIGN, SCHOOLS OF.
Dr. George Kriehn.
DETERMINANTS.
Professor David Eugene Smith.
DETROIT.
Mr. Clarence Monroe Burton.
DEUTEROCANONICAL BOOKS.
Professor Nathaniel Schmidt.
DEUTERONOMY.
Professor Morris Jastrow.
Professor Nathaniel Schmidt.
DEVIL (OR SATAN).
Professor Irving F. Wood.
DEVONIAN SYSTEM.
Professor Heinrich Ries.
Mr. David Hale Newland.
DEW.
Professor Cleveland Abbe.
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DIALECT.
Professor Daniel K. Dodge.
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DIAMOND.
Mr. Herbert P. Whitlock.
DIAZO COMPOUNDS.
Professor Martin A. Rosanoff.
DICKENS, CHARLES.
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DICOTYLEDONS.
Professor John Merle Coulter.
DICTIONARY.
Professor James C. Egbert, Jr.
Mr. David A. Modell.

* Deceased.

THE NEW INTERNATIONAL ENCYCLOPÆDIA

CON'SUL (Lat.). The title given to the two chief magistrates established in Rome on the expulsion of the kings in 509 B.C. So violent was the hatred of the monarchy that the Romans were unwilling to intrust the new Republic to a single executive, but gave the entire administration to two consuls, of equal rank and jurisdiction, that each might check any tyranny on the part of the other. At first the entire power of the King, in state and church, at Rome and abroad, was vested in the two consuls, and each was wholly responsible for the acts of both; the acts of either, however, were nullified by the dissent of his colleague. Gradually their powers were limited, and many of their functions were given to other officials, such as the censors, the prætors, and the ædiles. They held office for one year only, and years were reckoned by their names. In the early days of the Republic one consul was generally commander in chief in the field, while the other remained to administer affairs at Rome; but often both were forced to lead the armies in battle. In such cases they commanded by turns, a day at a time. They presided at meetings of the Senate, at elections, and at the chief public festivals. Together with the Senate, they exercised a general supervision of the state. As a mark of their high office, they wore a white toga with a crimson border (*toga prætexta*), sat in public on the 'curule chair' (*sella curulis*), and were accompanied by 12 attendants (*lictors*) bearing the *fasces* (q.v.).

The consuls were elected by the *Comitia Centuriata* (see COMITIA). In the earlier period the date of the election and of entering upon office was irregular and dependent on circumstances; but if convenient the election took place generally in July, and after 153 B.C. the consulship began regularly on January 1. At first only patricians were eligible to the office, and a consul could not be reëlected. After a long struggle of the plebeians for recognition, it was established by the *Leges Liciniæ Sextiæ* (see LICINIAN ROGATIONS), in 367 B.C., that one of the consuls must be a plebeian. Meantime, between 444 and 367 B.C. the consulship was frequently suspended, and the military tribunate with consular power, an office to which plebeians could be elected, was substituted for it. In 342 B.C. both consulships were opened to the plebs by a popular vote, and it was ordained that ten years must elapse before a consul could be eligible for reëlection; however, it was not until 215 B.C. that two plebeian consuls were elected together, and one of these was quickly ousted. Not until 162 B.C. did the plebeians succeed in obtaining two effective consuls.

With the organization of the Empire by Augustus, the consulship ceased to be of real importance. In the division of functions between the Emperor and the senatorial body the consuls remained the head of the latter; but their nomination became a prerogative of the Emperor, and their election a farce. They still gave their names to the year, but the position was simply one of honor, so that we very often find several consuls named in succession in one year, the *eponymous* consuls holding office only for four, or even two, months, and then being replaced by others. The original pair were called *consules ordinarii*, their substitutes *consules suffecti*. Under the later Empire nothing but the name and the honor of the consulship remained. The Emperor Honorius was made consul in the very year of his birth! Official dating by the name of the consuls came to an end in 537 A.D. Consult: Mommsen, *Römische Staatsrecht*, ii (Leipzig, 1887–88); Daremberg and Saglio, *Dictionnaire des antiquités romaines*, vol. i (Paris, 1892); Pauly-Wissowa, *Real-Encyclopädie der classischen Altertumswissenschaft*, vol. iv (Stuttgart, 1901); Greenidge, *Roman Public Life* (London, 1901).

CONSUL, MERCANTILE. An agent appointed by one nation to reside within the territory of another for the special purpose of promoting commercial intercourse between them. The earliest prototype of this official is the ancient Greek *proxenus*, whose functions were to represent his country, and to protect its citizens while trading at the place of his residence. Modern Greek applies this term to the consul of to-day. That "consul" has superseded "proxenus" as the title of the international agent of commerce is due to the supremacy of Italian commerce in the Middle Ages. During that period Italian traders in a foreign country were accustomed to have their disputes settled by magistrates of their own upon whom they conferred the proud title of "consul." In 1485 Richard III appointed the first consul for English merchants (Lorenzo Strozzi, at Pisa), being moved thereto, it is said, "by observing

from the practice of other nations the advantage of having a magistrate for settling disputes among merchants trading in another country."

This judicial function of the early consul is maintained at present in certain Oriental and African countries. In other lands his primary duties are those of an international commercial agent. The exact nature of his activities and the manner in which he is to perform them are determined mainly by the government appointing him and by treaty with the power in whose territory the consular office is exercised.

The consular service of the United States embraces one consular agent and consul general (located at Cairo, and enjoying a quasi-diplomatic position), consuls general, vice consuls general, deputy consuls, consular agents, consular clerks, and office clerks, numbering, in 1913, about 1200 persons. The fees received by the consular offices, which under the Law of 1906 are covered into the Treasury, practically cover the expenses of the service. Under earlier laws all or part of the fees were retained by the consular officials. Thus the total income of the Consul at London, whose salary was fixed at $5000, approximated $20,000. The abolition of the fee system by the Law of 1906 was accompanied by an increase in salaries, especially in the Oriental consulates. The number of consulates general (January, 1914) is 67, and of consulates 235. The incumbents of these offices who receive salaries of $1000 or over are not allowed to transact business in or with the countries to which they are accredited. Formerly a large proportion of the officials in the consular service were foreigners resident in the countries in which the consulates were established. The Law of 1906 required that all officials receiving salaries of $1000 and over must be American citizens. All consuls are appointed by the President by and with the advice and consent of the Senate. They qualify by taking a prescribed oath of office, and by executing a bond to the United States for the faithful discharge of their duties and for accounting for, paying over, and delivering up all fees, money, goods, effects, books, records, papers, and other property coming to their hands. Upon filing the oath of office and the bond a commission issues, and a request is made by the State Department to the government within whose jurisdiction the office is situated for an exequatur, upon the receipt of which the consular officer is entitled to perform his functions and enjoy the privileges of his station. The exact extent of these privileges depends upon the conventions or treaties existing between the United States and the countries to which the consuls are accredited. In the absence of any convention, a consul, after receiving his exequatur, while not entitled to the exemptions of a diplomatic agent (see DIPLOMATIC AGENTS; ALIEN), is a recognized officer of a foreign state, under the special protection of international law; he may raise the flag and place the arms of the United States over his gates and doors, and his official papers and archives are exempt from seizure and destruction. While the duties of consular officers pertain chiefly to commercial transactions, they are not limited to them. These officers "stand as protectors and advisers of their countrymen present in foreign lands; they act as judges, notaries, administrators of interests and of all property of such as have no legal representative; they have to prevent frauds on the revenue; to notice infractions of treaty stipulations relating to trade; to advise their government of new laws or regulations within their district; to preserve the discipline of the commercial marine; to guard seamen from oppression; to aid the destitute; and to make reports upon matters affecting commercial, industrial, financial, and agricultural pursuits."

Some of the specific duties of consuls included under these general duties are the arbitration of disputes between master and crew, the relief of destitute seamen, the care of property of their countrymen in case of shipwreck, etc., the issuing of passports, the authentication of documents, and the certification of marriages, births, and deaths. The consuls of the United States are expressly prohibited from performing the marriage ceremony, but the statutes provide that when a marriage is duly solemnized in accordance with the law of the country in which the consul resides, the consul shall, upon proper application, issue a certificate of such solemnization, provided such persons would have been authorized to marry if residing in the District of Columbia.

Ministers and consuls of the United States in China, Siam, and Madagascar have the judicial powers which are bestowed upon them by Chapter 47 of the Revised Statutes, including jurisdiction in criminal cases and in civil cases involving sums of $500 or less. The *personnel* of the consular courts is specially determined, varying with the country and the subject matter under dispute; thus, in capital cases it is provided that the consul must sit with four of his countrymen as assessors, and that their verdict must be approved by the minister before conviction can be had; and in some countries provision is made for a consular mixed court consisting of natives of the country and of the United States. Consuls have the judicial powers above referred to also in Turkey so far as relates to crimes and offenses committed by citizens of the United States, and in civil cases where such powers are permitted by the laws of Turkey or its treaties with civilized nations or by its usages with the Franks or foreign Christian nations; and in Persia, as to suits and disputes between citizens of the United States. Special provisions exist granting special powers to the consuls of the United States in the Barbary States, Muscat, Samoa, and in some other places where treaty has provided for them. In China, Madagascar, Siam, Turkey, and other non-Christian countries the property of deceased persons, both real and personal, is administered under the probate jurisdiction of the consular courts of those countries. (The judicial powers of the United States Consul in Japan were terminated on July 17, 1899, by the treaty with Japan which took effect upon that date.) Provision is made for an appeal from the consular courts under certain conditions to the minister, and to the circuit courts of the United States. See EXTERRITORIALITY.

In recent years many complaints have arisen as to the character of the American consular service, and several bills, having for their object the placing of the service under the merit system, have been introduced in Congress. One of these was the Lodge Bill, introduced in 1906. It was amended so as to eliminate the require-

ment of competitive examinations for entrance to the service; but in the form in which it became law it provided for classification of service on the basis of work performed, with a view to promotion for efficiency from the lower to the higher grades. This plan had already been introduced by executive orders of President Cleveland (1895) and President Roosevelt (1905). The expectation that through the chance of promotion a better class of men will seek consular office has to a considerable degree been realized. Permanence of tenure is necessary if candidates for the service are to equip themselves with sufficient technical information; and some assurance of such permanence of tenure is held out by the new law.

Consult: Warden, *On the Origin, Nature, Progress, and Influence of Consular Establishments* (Paris, 1813); Tarring, *British Consular Jurisdiction in the East* (London, 1887); the *Consular Regulations of 1896* (United States Public Document, Washington, D. C.); *House Report No. 562, Fifty-sixth Congress, First Session; Senate Report No. 1202, Fifty-sixth Congress, First Session.*

CON'SULATE (Fr. *consulat*). The form of government in France from 1799 to 1804. After the sudden overthrow of the Directory on the 18th Brumaire (Nov. 9. 1799), the members of the Council of Ancients and the Five Hundred, or rather such of them as approved of that act of violence on the part of Bonaparte, appointed three consuls—Sieyès, Bonaparte, and Roger Ducos. Sieyès and Ducos were quietly got rid of by pensions, and Cambacérès and Lebrun took their places. This approach to a monarchical government was confirmed, Dec. 24, 1799, by the Constitution of the Year VIII, by which Bonaparte was made First Consul. The consuls were elected by the Senate for 10 years and were eligible for reëlection. There was a Conservative Senate (sénat conservateur) of some 60 members appointed for life, a Tribunate of 100 members, and a Legislative Assembly of 300, but their powers were very limited, while those of the First Consul were made almost absolute. He promulgated laws and appointed or dismissed ministers, ambassadors, members of the Council of State, military and naval officers, and all civil and criminal judges, excepting justices of peace and members of the Court of Cassation. Bonaparte at once took up his residence at the Tuileries and held a splendid court. In May, 1802, he was reëlected for 10 years, and in August of the same year was made First Consul for life. Nothing but the Imperial name and insignia was wanting to complete the picture of absolutism, and these were supplied, May 18, 1804, when Napoleon was made Emperor. Consult: Hélice, *Les constitutions de la France* (Paris, 1875–80); Thiers, *Histoire du consulat et de l'empire* (Paris, 1845–62); and the various lives of Napoleon, the memoirs of the time, and general histories. See FRANCE; NAPOLEON I.

CONSULATE OF THE SEA. See CONSOLATO DEL MARE.

CONSUM'ERS' LEAGUE. An "association of persons who desire, so far as possible, to do their buying in such a way as to further the welfare of those who make or distribute the things bought." The movement started in England in 1890. About the same time the Working Women's Society of New York was investigating the condition of women and cash girls in the stores of that city. They called a public meeting in May, 1890, to ask the help of consumers in bettering these conditions, and as a result the Consumers' League of New York was formed in January, 1891. Similar leagues have since been organized in almost all the important cities of the United States. The leagues have been especially active in their efforts to improve the conditions of employment of workers in retail establishments, but wherever practicable they extend their activities to manufacturing as well. The leagues, according to the needs of their respective cities, draw up lists of conditions which a store must maintain in order to be called a "fair house." These include, as a rule, a minimum standard of wages, reasonable hours of employment, freedom from arbitrary exactions in the way of fines, etc., adequate provision for the employee's health and comfort while at work. Further conditions, designed to safeguard the public health, are frequently made, such as the proper protection of food exposed for sale from dust, etc. Stores which fulfill the conditions prescribed are placed on a "white list," and not only members of the league, but the general public as well, are urged to patronize such stores.

The promoters of the league soon found that its work must be extended to reach the makers of goods, both to improve their conditions and to protect the purchaser, who had no way to distinguish between factory-made goods and those made or finished in sweat shops. Accordingly the National Consumers' League was organized in 1899 with Mrs. Florence Kelley, who had been a successful factory inspector in Illinois, as secretary. In order to identify the factory-made article a "consumers' label" was adopted, which can be placed on goods made in factories maintaining the following conditions: (1) compliance with State factory law; (2) the manufacture of the goods on the premises; (3) no child under 16 employed; (4) a 10-hour day; (5) permission given for inspection by a representative of the league. The National League has provided for the education of purchasers through lectures, the distribution of literature, and organization. The State leagues use similar methods. While the membership of these leagues has nowhere become so great as to have a perceptible control over the sales of any business of extensive proportions, their indirect influence, through the creation of public sentiment, has been very considerable. One of the most noteworthy achievements of the leagues has been the fixing of the attention of the public upon the overwork from which the employees of stores suffer just before Christmas. In many cases the evils of evening selling have been mitigated, and in some cities the stores have been closed, by mutual agreement, on Christmas Eve, instead of remaining open until late at night, as formerly. The Consumers' Leagues have also exercised a considerable influence upon the course of labor legislation.

Bibliography. Brooks, *The Consumers' League Reports* (New York, 1896 et seq.); Lowell, *Consumers' League* (ib., 1896); Kelley, *Some Ethical Gains through Legislation* (ib., 1905); *American Journal of Sociology*, vol. v (Chicago, 1901); *Annals of American Academy Bulletin*, N. S., No. 5 (Philadelphia, 1898); *Reports* of national and State leagues. Literature may

be obtained at the office of the National Consumers' League, 105 East Twenty-second Street, New York.

See FACTORY INSPECTION; SWEATING SYSTEM; UNION LABEL.

CONSUMP'TION (Lat. *consumptio*, a consuming, from *consumere*, to consume, from *com-*, together + *sumere*, from *sub*, under, *emere*, to buy). One of the traditional divisions of political economy. J. B. Say, the earliest systematizer in the science, devotes a book to consumption, following books on production and distribution. Say's treatment of consumption is, however, little more than an analysis of the possible effects of productive and unproductive consumption and of public expenditures, which he treats under this head. The classical school generally followed Say in the order of divisions, but, in consequence of the exclusion of public expenditures, often left the division "consumption" with scarcely any other content than a discussion of luxury.

The marginal-utility school placed a new emphasis on consumption, through their derivation of value from utility, or want-satisfying power. The law of the declining scale of satisfaction is essentially a law of wealth consumption. The phenomena of varying elasticity of wants, of the search for variety in satisfaction, of the reinforcing of satisfactions through complementary relations, are further examples of principles derived from consumption serving important theoretical purposes. The general principles derived from investigations of family budgets, such as those of Ducpétiaux and Engle (q.v.) and those of the United States Department of Labor, are properly treated as inductive principles of consumption. Under the same head are to be classed investigations of the minimum wage and of the standard of living (q.v.). The social laws of consumption, as exemplified in imitation (fashion) and desire for distinction in dress, housing, etc., have usually been treated in cursory manner, but have served as a basis for illuminating studies by Sombart and other economists. In America especial stress has been laid upon the study of consumption by Prof. S. N. Patten (q.v.). While the importance of the study of consumption is generally admitted, no thoroughly satisfactory treatise covering the whole field has been written. The most systematic work on the principles of consumption has been done by Cuhel, *Zur Lehre von den Bedürfnissen* (Innsbruck, 1907), and Brentano, *Versuch einer Theorie der Bedürfnissen* (Munich, 1908). The most suggestive examples of the application of the principles of consumption to the problems of progress are found in Patten, *Theory of Prosperity* (New York, 1902), and Sombart, *Der moderne Kapitalismus* (Leipzig, 1902). See POLITICAL ECONOMY.

CONSUMPTION. See TUBERCULOSIS.

CON'TACT (Lat. *contactus*, from *contingere*, to touch, from *com-*, together + *tangere*, to touch). In geometry, two lines, of which one at least is curved, are said to be in contact when they have two or more consecutive points in common. For example, in analytic geometry a tangent is said to be in contact with a circle in two consecutive points. This is called contact of the first order. If two curves have contact at three consecutive points, the contact is said to be of the second order, and so on; e.g., the curves $y = x^3$ and $y = 3x^2 - 3x + 1$ have contact of the second order. The analytic condition for contact of the first order at a point $x = a$, between two curves, $y_1 = \phi(x)$, $y_2 = \psi(x)$, is that $\phi(a) = \psi(a)$, $\phi'(a) = \psi'(a)$, ϕ' and ψ' being the first derivatives. The condition for contact of the second order is that $\phi(a) = \psi(a)$, $\phi'(a) = \psi'(a)$, $\phi''(a) = \psi''(a)$. Contact of the third order requires the derivative of the third order, and so on. In contact of the nth order between two surfaces there must be $(n + 1)$ consecutive common points.

CONTACT ACTION, CHEMICAL. See CATALYSIS; REACTION.

CONTACT DEPOSITS. See ORE DEPOSITS.

CONTA'GION (Lat. *contagio*, contact, from *contingere*, to touch, from *com-*, together + *tangere*, to touch). The communication of a disease from the sick to the healthy, either by direct contact of a part affected with the disease, or by indirect contact through the medium of the excretions and exhalations of the body. Among the contagious diseases are measles, scarlet fever, smallpox, erysipelas, typhus fever, bubonic plague, epidemic influenza (the grippe), diphtheria, and tuberculosis. See BACTERIA; EPIDEMIC; INFECTION.

CONTAGIOUS ABORTION IN ANIMALS. This disease has been increasing in importance economically until it now ranks second only to tuberculosis among the diseases of cattle. In the United States alone the direct loss among dairy and range cattle reaches into the millions, while the potential loss is enormous and inestimable. While most frequent among cows, the disease is commonly met with in mares and less often in sheep, goats, and swine. It occurs in otherwise healthy mothers as a result of external infection, producing inflammatory lesions of the fœtal membranes and cotyledons, usually appearing in an enzoötic form. In the cow it is caused by the *Bacillus abortus*, commonly known as "Bang's bacillus," and in the mare by the *Bacillus abortivus equinus*, and possibly other microörganisms.

Premonitory symptoms when present are manifested two or three days before the expulsion of the fœtus by swelling of the udder, edematous swelling of the vulvar lips, reddening of and small inflamed nodular formations on the vulvovaginal mucosa, and the appearance of a mucous or mucopurulent odorless discharge from the vagina. In cows abortion seldom occurs before the fourth month of pregnancy, but may occur at any time after that period. The fœtus is expelled with ease and is usually dead at birth. If abortion occurs at the end of six months, the young may be alive, but lives only a few hours. Mares abort between the fourth and the eighth month of gestation.

If an aborting cow is placed in a herd which has hitherto been healthy, an outbreak of abortion may occur. Bulls that have served aborting cows transmit the disease to other cows. In general, the microörganisms to which the disease is due are found in the male and female genital organs and on the afterbirth from aborting animals.

The bacillus has the udders of apparently healthy cows as its normal habitat and may be eliminated continuously for years in the milk of infected cows that no longer abort.

The treatment for this disease includes isolation of affected animals and the application of thorough antisepsis. In case of an outbreak

of abortion the fœtus and fœtal membranes from aborting animals should be burned or deeply buried, the posterior parts of the animals should be washed in some antiseptic solution, repeated antiseptic vaginal douches should be given, and the stable should be thoroughly disinfected. In order to prevent the possible spread of the infection, the posterior parts of other cows or mares in the same stable should be carefully washed with a solution of lysol, creolin, potassium permanganate, or corrosive sublimate. Solutions of carbolic acid and of methylene blue, preferably administered by mouth, have been found to have valuable curative effects.

Noncontagious abortion is occasionally met with among farm animals, there being a number of conditions which may cause it. A general cachexia or anæmia may be among the predisposing causes of abortion; and among other conditions and causes which may lead to abortion mention should be made of acute diseases of the vital organs, contagious fevers, chronic diseases of the abdominal organs; diseases of the ovaries, kidneys, or bladder; diarrhœa; fatty degeneration of the heart; ingestion of large quantities of cold water; various forms of indigestion, especially those which are accompanied by the formation of gas in the stomach; imprudent feeding with succulent forage in large quantities, such as roots, potatoes, apples, pumpkins, ergotized grasses, sweaty or rusty grains and grasses; mechanical injuries; standing in stalls with too great a backward slope; nervous excitement, and muscular strain. Consult: *Report Bureau of Animal Industry, United States Department of Agriculture for 1911;* Hutyra and Marek, *Pathology and Therapeutics of Diseases of Domestic Animals*, vol. i; Hoare, *System of Veterinary Medicine*, vol. i.

CONTA'GIOUS DISEASES. The law takes cognizance of contagious and infectious diseases as they menace the public health, for the protection of which health and quarantine laws are enacted under the broad authority of the police power of the state. For purposes of administration, this power may be delegated to municipal corporations or like political subdivisions.

While the right to take summary measures for the public safety is one of the most ancient of government prescriptions and is rarely challenged, yet it is none the less formidable, inasmuch as it involves the power of the state forcibly to confine those suffering from infectious diseases, even where properly cared for by friends or relatives, and other like interference with the personal rights of liberty and property. Maritime quarantine was early practiced by the commercial nations, and was enforced by the Venetians in the fifteenth century; but municipal health regulation is of somewhat later development, and the two are still usually separated in administration. Thus, e.g., the Board of Health of the City of New York exercises jurisdiction within the city proper and upon the waters of the bay to the limits of quarantine, which, with its shipping, is under the authority of the Board of Quarantine Commissioners and the health officer of the port. In the United States the enactment of quarantine laws is held to be among the powers preserved to the States under the Constitution. Under their authority State boards of health are created and general statutes passed delegating the power to local boards in cities, towns, and villages. Violations of the sanitary code are usually made misdemeanors and punished by imprisonment or fines. For the purpose of avoiding any questions that might arise from the possible interference of local regulations of the public health with the Federal prerogative of regulating interstate commerce, Congress early passed acts adopting such State laws and requiring their observance by Federal officials (Act of Feb. 25, 1799; Act of April 29, 1878 [20 Stat. L. 37]). In 1879 a National Board of Health was created, but its powers were little more than advisory, and by the Act of Congress, Feb. 25, 1893 (27 Stat. L. 449), it was abolished and its powers and duties transferred to the Marine Hospital Service, which, under the direction of the Secretary of the Treasury, performs the functions of national quarantine. Questions pertaining to the people at large arising from immigration and importation belong to Federal jurisdiction as incidental to the constitutional right of regulating commerce. Thus conditions of entry are imposed, such as detention, inspection, and disinfection, and under the Act of 1893 protective restrictions may even be laid upon interstate intercourse where a danger is threatened and State authority is wanting or lax. The Federal quarantine may arrest the entrance of forbidden persons or things; but once past the "Barge Office" or customhouse, the local authorities take jurisdiction. Naval vessels as well as commercial are bound to observe quarantine rules.

In Great Britain a similar system of sanitary protection prevails. In England the controlling statute, the Public Health Act (38 and 39 Vict. c. 55 [1875]), is comprehensive in its provisions and regulations, though it does not extend to Scotland or Ireland, or, except as to special provisions, to the city of London. The Infectious Disease (Notification) Act (52 and 53 Vict. c. 72) and the Infectious Disease (Prevention) Act (53 and 54 Vict. c. 34), as the titles signify, provide respectively for the course to be pursued in notifying the proper authorities in cases of defined contagious illness, and the regulations to be adopted in the way of inspection and disinfection to prevent infection. The first applies to the United Kingdom, and may be adopted by urban and rural authorities of ports and local districts; the second is confined to England.

In its international aspect the obligation resting upon a state to adopt proper regulations to prevent the spread of epidemics belongs to the so-called natural duties rather than the more defined and absolute principles of international jurisprudence. But with the increase of international intercourse and the development of a more sensitive national conscience, a demand has arisen among civilized nations for the recognition of the right to such protection by another state, as well as the long-established one of surrounding itself by defensive barriers. The United States, Great Britain, Germany, and other countries, have provided for inspection of meats and like food exports. In 1879 Sir Shenstone Baker prepared a Code of International Quarantine, which was approved by the United States. Consult Lumley, *The Public Health Acts* (London, 1902). See QUARANTINE; POLICE POWER.

CONTARINI, kōn'tȧ-rē'nê. The name of a distinguished Venetian family, one of the 12 that elected the first Doge. Between 1043 and

1684 eight doges were furnished by this family, and several of its members were men of note.—DOMENICO, Doge in 1043–70, was the first of the family to be invested with that dignity; during his reign the rebuilding of St. Mark's Church was begun.—ANDREA, Doge in 1368–82, terminated the long war between Venice and Genoa by defeating the Genoese fleet at Chioggia. His return from this expedition was depicted by Paolo Veronese by order of the Republic.—AMBROGIO was Ambassador of Venice to Persia in 1473–77 and gave an account of his travels, published in Venice (1487).—GASPARO (1483–1542), Cardinal and diplomatist, went as Venetian Ambassador to the Diet of Worms in 1521, thence accompanied Charles V to the Netherlands, England, and Spain, and in 1523 concluded the Emperor's alliance with Venice. In 1535 he was made Cardinal by Pope Paul III, and as Papal Legate to the Diet of Ratisbon, in 1541, made the most extensive concessions to the Protestants, endeavoring to bring about a reconciliation with the Catholic church. Of his earnest efforts to introduce sweeping reforms in the latter, his *Consilium de Emendanda Ecclesia* (1537) is sufficient proof. The best known of his other writings is *De Magistratibus et Republica Veneta* (1543).—GIOVANNI (1549–1605) was a painter of the Venetian school, who formed himself chiefly after the works of Titian and Palma the Younger. Called to Vienna by Emperor Rudolph II, he painted many portraits, but he is more noted for his historical compositions, among which are "The Doge Marino Grimani Adoring the Virgin," "Conquest of Verona by the Venetians," both executed for the Doge's Palace in Venice; and "Baptism of Christ." Consult Romanin, *Storia di Venezia* (10 vols., Venice, 1853–61); for Ambrogio's journey, *Hakluyt Society Publications, No. 49* (London, 1873); for Gasparo, Brown, *Studies in Venetian History*, vol. ii (ib., 1907), and *Regesten und Briefe des Cardinals Gasparo Contarini* (Braunsberg, 1881).

CONTARINI FLEMING. A romance by Benjamin Disraeli (1832).

CONTÉ, kôn'tā', NICOLAS JACQUES (1755–1805). A French chemist and inventor, born at Aunou-sur-Orne (Orne). He was at first a painter, but afterward turned to the mechanical arts, and, when France was deprived, through war with England, of its plumbago supply, invented a substitute in the shape of a mixture of graphite and clay. This substance he utilized for the manufacture of black-lead pencils, known as *crayons Conté*, by a process since followed in making all pencils. He also made extensive researches concerning the military aërostat, became director of the aërostatic school at Meudon, and was appointed by Napoleon chief of the aërostatic corps of the French army of invasion in the Egyptian expedition. During that expedition his inventive genius proved to be of great service; for, after the reverse at Aboukir, the revolt at Cairo, and the consequent loss of instruments and supplies, he directed the manufacture of cloth, surgical instruments, bread, arms, ammunition, and other necessaries. He also devised (1798) a barometer, similar to the later one of Vidi. In 1802 he assisted in founding the Society for the Encouragement of National Industry, and was appointed to superintend the publication of the commission's great work on the Egyptian expedition. At the time of his death he was constructing an engraving machine with which he hoped to do this work. Consult Jomard, *Conté, sa vie et ses travaux* (Paris, 1852).

CONTEM'PORANE'ITY (from Lat. *contemporaneus*, simultaneous, from *com-*, together + *tempus*, time). A term used in geology to imply that two formations were deposited during the same period of time. This does not necessarily mean that they must contain the same fossil species, nor is it likely that they will, except when the two areas of deposition are in the same basin. The term "contemporaneity" is sometimes confused with *homotaxy*, which means that certain formations occupy the same relative positions with respect to the development of life forms. Thus, certain formations of the Devonian in Europe and North America might show similar faunas, but not have been deposited at exactly the same time. They would be homotaxial. See GEOLOGY.

CONTEMPT' (Lat. *contemptus*, from *contemnere*, to despise, from *com-*, together + *temnere*, to despise). In law, any disobedience of, or disrespectful or disorderly conduct in the presence of, any court or legislative body. It is punishable because it tends to impair the dignity, power, and authority of such bodies, and thus interfere with the administration of the law, and generally the body concerned has an inherent power summarily to impose upon the offender a penalty of fine or imprisonment, or both. All courts have such power. The guilty person may usually have these penalties remitted by "purging" the contempt; i.e., by making pecuniary reparation, as far as possible, for any damage caused by his acts and apologizing for his fault. If satisfactory, an order or minute is then entered reciting that this has been done and directing that the culprit be relieved from the penalty. The power to punish as contempt any willful misconduct committed in the presence of the court, which was an ordinary incident of common-law procedure, received a great extension in the process for enforcing the decrees of the courts of equity, or chancery. "Equity acts *in personam*," i.e., its judgments, as distinguished from those of the common law, are orders or decrees directing specified persons to do or to refrain from doing certain acts. The breach of such an order, though committed out of court, as must usually be the case, is a contempt and the ordinary process of the equity tribunals is to punish such an act of disobedience by imprisonment. It is this use of the jurisdiction of punishing for contempt in labor disputes that has been under fire in recent years, under the name of "government by injunction," as an arbitrary method of dealing with offenses prohibited by judicial order and as subjecting offenders to the penalty of imprisonment without trial by jury and the other safeguards of the ordinary criminal law. Consult Rapajje, *Treatise on Contempt* (New York, 1884), and Oswald, *Contempt of Court, Committal, and Attachment, and Arrest upon Civil Process* (London, 1895).

CONTEMPT OF PARLIAMENT. See PARLIAMENT.

CONTES À NINON, kônt zà nê'nôn' (Fr., Ninon stories). A collection of short stories by Emile Zola, which were collected and published in 1864, when their author was only 24 years old. It was his first important work and has been deemed by some critics his best

book of short stories, being free from the exaggerations and brutalities which marked many of his later writings. In 1874 he published *Nouveaux contes à Ninon.*

CONTES DE MA MÈRE L'OYE, kôNt dᵉ mȧ mâr lwä (Fr., stories of my Mother Goose). A famous collection of fairy tales by Charles Perrault (1697), purporting to be written by his 10-year-old son. The stories are taken from popular tradition and are told in simple, childish language, which has made them very successful among children for 200 years.

CONTES DES FÉES, dȧ fȧ (Fr., stories of the fairies). A collection of fairy stories from various sources by the Comtesse d'Aulnoy (1710), in which many of the tales received their literary form in French.

CONTES D'HOFFMANN, LES (Fr. tales of Hoffmann). An opera by Offenbach (q.v.), first produced in Paris, Feb. 10, 1881; in the United States, Nov. 14, 1907 (New York).

CONTES DRÔLATIQUES, drô'lȧ'tēk' (Fr., droll stories). A series of 30 tales by Balzac, abounding in Rabelaisian humor and copying the style and spelling of the sixteenth century. They were published variously in 1832, 1833, and 1837.

CONTES DU LUNDI, dụ lēN'dē' (Fr., Monday stories). A collection of short stories by Alphonse Daudet (1873).

CONTI, kôN'tē'. The house of Conti was a younger branch of the house of Bourbon-Condé. (See CONDÉ.) It first appears in French history in the sixteenth century, when François, son of Louis de Bourbon, first Prince of Condé, took the name of Marquis de Conti from his mother's fief of Conti-sur-Selles, in Picardy. Towards the end of the century he was made Prince of Conti. He died without heirs in 1614, and for 16 years the title was in abeyance. In 1629 it was bestowed upon the infant Armand de Bourbon, second son of the Prince of Condé. This second Prince de Conti is generally regarded as the founder of the house. His son, Louis Armand, Prince de Conti, succeeded him, and on his death, in 1685, left the title to his younger brother, François Louis (1664–1709), who styled himself Prince de la Roche-sur-Yon et de Conti and was the most noted member of the family. He had been educated under the eyes of the great Condé and embraced a military career with enthusiasm. He served in Hungary against the Turks, but, owing to incautious letters which he wrote home, he lost the favor of Louis XIV and on returning was banished to Chantilly. Pardoned through the intercession of the great Condé, the Prince served with distinction under the Duke of Luxembourg and was present at the battle of Steenkerk (1692) and Neerwinden (1693). In 1697 he was put forward by Louis XIV as a candidate for the Polish crown and was in fact elected King by a part of the nobles, but found himself powerless against the opposition of Russia, the Emperor Leopold I, and the Pope, and abandoned his claim. Louis XIV was never his friend and feared Conti's popularity, so that the Prince spent his later life in retirement. In 1709, however, he was summoned to take command of the Army of Flanders, but was carried off by an attack of the gout, Feb. 22, 1709. Massillon pronounced his funeral oration, and Saint-Simon, in his memoirs, speaks of him in glowing terms. His son was a worthless *roué* of the time of the Regency; but his grandson, Louis François (1717–76), Prince de Conti, distinguished himself as a brave and popular commander. The last member of the house was Louis François Joseph (1734–1814), Prince de Conti, son of the preceding, who after a somewhat checkered career died at Barcelona. Consult: Martin, *Histoire de France,* vols. ix, x, xi (Boston, 1864–66); *Mémoires* of Fontenay-Mareuil, La Rochefoucauld-Doudainville (Paris, 1861–64), and Saint-Simon (London, 1889); Topin, *L'Europe et les Bourbons* (Paris, 1868); *Mémoires of Noailles* (ib., 1777); D'Argenson, *Mémoires* (London, 1893); Bernis, *Mémoires* (Paris, 1878); De Broglie, *Le secret du roi* (ib., 1879).

CONTI, AUGUSTO (1822–1905). An Italian philosophical writer, born near San Miniato in Tuscany. He studied law at several Italian universities and practiced in Florence until 1848, when he enlisted as a volunteer for service against Austria. Subsequently he practiced law and taught philosophy in San Miniato, in 1855 was made professor of philosophy in Lucca, in 1863 professor of the history of philosophy in Pisa, and in 1864 professor of mental and moral philosophy in Florence. His published works include: *Evidenza, amore e fede, o i criteri della filosofia* (1862, and subsequent editions); *Storia della filosofia* (1864, and subsequent editions); *L'Armonia delle cose* (2 vols., 1878); *Filosofia elementare* (1869; 9th ed., 1879); *Dio come ordinatore del mondo* (1871); *Ilvero nell' ordine* (1876; 2d ed., 1891). In these and other works Conti makes an earnest attempt to bring into agreement the teachings of different philosophical schools.

CONTI, NICCOLÒ DEI. An Italian traveler of the fifteenth century. He learned Oriental languages and carried on an extensive traffic in the East. He traveled in Egypt, Arabia, Persia, and India, and later gave a complete account of his travels to Poggio Bracciolini, secretary of Pope Eugenius IV. Poggio's manuscript relating the observations and adventures of Conti was first published in 1723, under the title *Historiæ de Varietate Fortunæ.* Conti was one of the pioneers of European commerce in the East, and one of the first to advocate the idea of finding a western way by sea to the Eastern countries. Consult Giardina, *I viaggi di Niccolò dei Conti* (Catania, 1898).

CON'TINENT (ML. *continens,* from Lat. *continere,* to touch, from *com-,* together + *tenere,* to hold). The largest natural land division, of greater area than an island or peninsula. The outer portion of the earth is composed of two layers—the solid rocky crust, or "lithosphere," and the water areas, or "hydrosphere." In the early period of its history the earth may have been surrounded entirely by the hydrosphere, but at present and, so far as known, in all geological ages, the crust has been folded into mountain chains, forming nuclei around which the continental land areas are grouped, while the waters have accumulated in the intermediate depressions. Geographers usually recognize as continents Eurasia (comprising Europe and Asia), Africa, Australia, North America, and South America; the two Americas, however, are sometimes grouped as a single continent, although such a classification is hardly justifiable unless Africa be included with the Eurasian continent. A sixth continent is probably represented by the land areas in the Antarctic

region (q.v.). It is estimated that the land constitutes about 55,000,000 square miles, or 28 per cent of the entire surface of the earth. The continents vary widely in form, area, relief, and distribution on the globe, yet they may have many features in common. Usually the regions of greatest elevation are found in the interior, while along the coast line there is a gentle slope outward which, continued beneath the sea, forms a slightly submerged land strip called the "continental shelf." On the seaward edge of the shelf the slope is very rapid down to the great depths of the sea. The average altitude of the continents, according to the calculations of Lapparent, Murray, Penck, Supan, and Heiderich, is shown below:

ESTIMATED AVERAGE ELEVATIONS OF THE CONTINENTS

CONTINENT	Lapparent	Murray	Penck	Supan	Heiderich
Europe	958	938	918	951	1,230
Asia	2,883	3,188	3,116	3,084	3,018
Africa	2,007	2,020	2,132	2,034	1,975
Australia	1,188	803	918	853	1,542
North America	1,953	1,886	1,968	2,001	2,723
South America	1,762	2,077	2,067	2,001	2,493

Between the form and distribution of the continents many interesting comparisons may be drawn. The two Americas, comprising the greater part of the land area in the New World, are triangular in shape, the apex of the one lying in the Isthmus of Panama and the apex of the other being represented by Cape Horn. Both continents are bounded on the west by a long mountain system, and both have a region of lower elevation in the eastern portion. The Old World, on the other hand, is composed of a single triangular land area which has its base on the Arctic Sea and its apex at the Cape of Good Hope. Here the main trend of the mountain chains is east and west. In general, the continents that extend into or lie within the Southern Hemisphere—South America, Africa, and Australia—are most regular, contrasting strongly in this particular with North America and Eurasia in the Northern Hemisphere. The northern continents have a wider extension from east to west than the southern, and are further characterized by a great group of islands lying along the southeastern coast.

That the great land areas are not stable either as to form or elevation may be regarded as established beyond doubt by geological evidence. Moreover, certain coastal regions are known at the present time to be undergoing changes of level by which land emerges above or sinks below the sea. The extent of these oscillations in past ages can only be conjectured. Lyell's theory that there has been a constant interchange between the land and water areas has been objected to on the ground that there is no evidence that the abysmal depths of the ocean have ever been elevated; for the existence of any considerable deposits abysmal in character and containing a deep-sea fauna has not been conclusively established within the interior of the continents. The changes of level between the land and the sea take place very slowly, and may be caused either by gradual vertical movement of the land area or by variations in the level of the ocean itself. Geologists generally agree that the positions of the present continents were determined as far back as Archæan times. The Laurentian plateau of North America, the Brazilian highlands of South America, and the Scandinavian peninsula and Lapland in Europe are composed of crystalline rocks, and except on the margins they are bare of all sediments. These primitive lands were extended in area by the deposition of sedimentary strata on their borders, and by great upheavals accompanied by foldings of the crust into mountain ranges.

The evolution of the continental lands can be studied only tentatively, and is largely conjectured from the evidence afforded by the characters of the fauna and flora that lived in past ages. During the Cretaceous and Tertiary times the animal and plant life of South America, South Africa, and India were strikingly similar, while there was also a uniformity between the life forms of Europe and North America. This circumstance can best be explained by the assumption that in these periods the continents had an east and west trend, so that Brazil, Central Africa, and lower India were united by one broad land strip, and eastern Canada with Europe by another. Between the northern and southern continents an ocean basin extended from the isthmus of Central America eastward to the Indian Ocean, or nearly at right angles to the basin now occupied by the Atlantic. The changes by which the continents assumed their present form took place gradually and were accomplished by a slow depression of portions of the land and by encroachment of the sea. It is probable that certain regions for a long time remained above sea level as large islands, the unsubmerged remnants of which still exist, e.g., in the Cape Verde and Canary islands, in the British Isles, and in Madagascar. These changes were doubtless completed before the appearance of mankind; at least within historical times, so far as is known, there has been no marked alteration in the form of the continents.

Bibliography. Suess, *Das Antlitz der Erde* (Leipzig, 1885–1900); Eng. trans., *The Face of the Earth* (Oxford, 1904–09); Neumayr, *Erdgeschichte* (Leipzig, 1895); Mill, *The Realm of Nature* (New York, 1895); Mill, *The International Geography* (ib., 1900). See GEOLOGY; GEOGRAPHY; AMERICA; EUROPE; ASIA; AFRICA; AUSTRALIA; ANTARCTIC REGION.

CON'TINEN'TAL CONGRESS. See UNITED STATES.

CONTINENTAL SYSTEM. The name given to the commercial policy adopted by Napoleon for the purpose of shutting England out from all connection with the continent of Europe, and thus compelling her to acknowledge the maritime law as established at the Peace of Utrecht. This system began with Napoleon's famous Berlin Decree of Nov. 12, 1806, which declared the British Isles in a state of blockade and prohibited all commerce or correspondence with them; every Englishman found in a country occupied by French troops or by their allies was declared a prisoner of war; all merchandise belonging to an Englishman was made lawful prize; and all trade in English goods was entirely prohibited. No ship coming directly from England, or from a British colony was allowed to enter any port; and any ship seeking by false declarations to evade this regulation was confiscated with its cargo as if British property.

England was not long in making reprisals. By an Order in Council, Jan. 7, 1807, all neutral vessels were prohibited from trading from port to port within France or any country in alliance with it or under its control. Every neutral vessel violating this order was to be confiscated with its cargo. Napoleon responded by a decree dated Warsaw, Jan. 25, 1807, which ordered the confiscation of all English or English colonial merchandise found in the German Hanse towns. By a second Order in Council, Nov. 11, 1807, all harbors and places in France and her allies in Europe and the colonies, as well as in every country with which England was not at war, but from which the English flag was excluded, were placed under the same restrictions as if strictly blockaded. These orders were followed by reprisals on the French side. By the Milan Decree of Dec. 17, 1807, strengthened by a second, of Jan. 11, 1808, issued from the Tuileries, any vessel, of whatever nation, that had been searched by an English ship, or had submitted to be sent on a voyage to England, or paid any duty to the English government, was to be declared denationalized and treated as English. By the Treaty of Tilsit (1807) Russia consented to close her ports to English commerce, and in order the more effectually to annihilate such commerce, there appeared, Aug. 3, 1810, the tariff of Trianon for colonial goods; this was extended by a decree of September 2; on October 18 followed the decree of Fontainebleau, ordering the burning of all English goods, an order which was to be carried out with more or less modification in all countries connected with France.

The consequence of the Continental System was undoubtedly the springing up upon the Continent of many branches of manufacture. On the other hand, the price of foreign goods rose to an extraordinary height, the daily comfort of the middle classes was seriously affected, and the American carrying trade, then very prosperous, was practically ruined. On the whole, the Continental System, both politically and economically, was a mistake. Russia abandoned it in 1810, and with the breaking up of Napoleon's power the system collapsed entirely. On the English side the enforcement of the Orders in Council gave offense to the United States and was one of the principal causes of the War of 1812. Consult: Mahan, *The Influence of Sea Power upon the French Revolution and Empire* (Boston, 1894); Thiers, *Histoire du consulat et de l'empire* (Paris, 1845–62); Cime, *Etude sur les tarifs de douane et les traités de commerce* (Paris, 1875); Henry Adams, *History of the United States* (New York, 1889–91). See NEUTRALS; NAPOLEON I.

CONTIN'GENT (from Lat. *contingere*, to touch). A quota of troops, furnished to the common army by another branch of the service or by different coöperating nations or armies. It was the naval contingent that saved the day in the defense of Ladysmith against the Boers in 1899. The various contingents of the international armies formed the common army under the leadership of Count Waldersee, the German commander, in the China campaign of 1900. The troops to be furnished by each of the United States under a call for volunteers by the President is its *quota*.

CONTINGENT REMAINDER. See REMAINDER.

CONTINUANCE. In law, the adjournment of a cause from day to day or from one term of the court to the next succeeding term. The proceedings of a case on trial or otherwise before the court are continuous until it is disposed of by judgment decree or other final proceeding. An interruption of the proceeding, whether by the absence of a party, or his failure to proceed, or by the termination of the sitting of the court, naturally results in a discontinuance of the proceeding, with the consequence that it loses its place on the calendar and must be begun over again at a future term or sitting of the court. To obviate this result, the court may make an order continuing the case from day to day or from time to time until disposed of. Continuances are granted as a matter of course when necessitated by the adjournment of the court in which the case is pending and, on the request of either party to the suit, for good cause, as for the illness of a party or his counsel or the illness or disappearance of a material witness, and the like. In this class of cases, however, the application is addressed to the discretion of the court which may grant or withhold the continuance prayed for. See ADJOURNMENT; and consult Blackstone, *Commentaries on the Laws of England*, and the authorities cited under PROCEDURE, LEGAL.

CONTINUED FRACTION. See FRACTION.

CON'TINU'ITY (Lat. *continuitas*, from *continuus*, uninterrupted, from *continere*, to hold together, from *com-*, together + *tenere*, to hold). In geometry, a vital principle which asserts that if from the nature of a particular problem we would expect a certain number of solutions, then there will be the same number of solutions in every case, although some may be imaginary. For example, a straight line and a circle in the same plane intersect in two points real, coincident, or imaginary. The sum of the angles of a quadrilateral is a perigon, whether the quadrilateral is convex, cross, or concave. In this case, however, angles which have decreased and have passed through zero must be regarded as negative. By the principle of continuity theorems concerning real points or lines may be extended to imaginary points or lines. This change can take place only when some element of the figure passes through either a zero value or an infinite value; e.g., rotate an asymptote of the hyperbola about the origin; before rotation it cuts the curve in two infinite points; after rotation it cuts it in two real points or two imaginary points. In case of the real points, rotate it still further and these pass to infinity, and imaginary points occur. Many propositions of elementary geometry may be inferred from this principle. It was first stated by Kepler, emphasized by Boscovich, and put into acceptable form by Poncelet in his *Traité des propriétés projectives des figures* (2d ed., Paris, 1865–66).

More generally, continuity is a philosophical concept exemplified in space and time. It has been defined as a series of adjacent parts with common limits; as infinite divisibility, i.e., that, however small the segment between the two points, a further division is possible; but in modern analysis continuity is the essential property of a continuum. By a continuum is understood a system or manifoldness of parts possessed in varying degree of a property A, such that between any two parts distant a finite length from each other an infinite number of other parts may be interpolated, of which those

that are immediately adjacent exhibit only indefinitely small differences with respect to the property A. This is expressed by Cantor as a *perfekt zusammenhängende Menge*, a perfect concatenation of points; e.g., all numbers rational and irrational in any interval form a continuum. A concatenation not perfect is called a semicontinuum; e.g., the rational or the irrational numbers in any interval. A straight line is said to possess continuity.

By the continuity of the roots of an equation is meant that, as a result of certain variations of the function, different pairs of roots may during the process become equal or imaginary, the total number always continuing the same—an example given by Leibnitz. By the continuity of a function of x is meant the fact that indefinitely small and continuous changes in the value of x between certain limits produce indefinitely small and continuous changes in the function. Consult: Jordan, *Cours d'analyse* (Paris, 1893); Poncelet, *Traité des propriétés projectives des figures* (ib., 1865–66); *Encyclopädie der mathematischen Wissenschaften*, vol. i (Leipzig, 1901); Cantor, *Mathematische Annalen*, vols. xx and xxi (ib., 1882–83); Mach, in *The Open Court*, vol. xiv (Chicago, 1900).

CONTINUITY, Law of. A principle first formulated by Leibnitz (q.v.), which is expressed in the Latin sentence, *Natura non facit saltum* ('Nature does not make sudden leaps'). This is a denial of discreteness, and the assertion that differences of kind are merely differences of degree. The law of continuity may be illustrated in the solar spectrum, which presents us with a series of colors blending into each other in such a way that it is impossible to say where one color ends and another begins. By abstracting from the intervening colors and shades we can represent any detectable differences to ourselves as discrete, but this appearance of discreteness comes from failure to attend to the mediating shades. Generalizing this, we get the law that all gaps between differing kinds are bridged over by intervening kinds, which form a continuum of differing degrees. Darwinism gives a view of evolution that supports the law of continuity in biology. De Vries's doctrine of mutation (q.v.), on the contrary, would deny the validity of the law of continuity in this field. William James (q.v.) has vigorously assailed the universality of the law of continuity, maintaining that experience presents us with discontinuities as well as with continuities, and "that conjunctions and separations are, at all events, coördinate phenomena which, if we take experiences at their face value, must be accounted equally real." James seems to be justified in his contention; the law of continuity is an unwarrantably sweeping generalization. Consult James, *Essays in Radical Empiricism* (1912). See Leibnitz.

CONTIN'UOUS SERVICE. See Enlistment.

CONTIO. See Comitium.

CONTOR'NIATE (It. *contorniato*, from *contorno*, contour, from ML. *contornare*, to turn around, from Lat. *com-*, together + *tornare*, to turn, from *tornus*, Gk. *τόρνος*, *tornos*, lathe). A term applied to a class of antique copper medals, slightly larger than coins, which have a deep line cut round the edge, like a furrow, and are thereby marked by a strongly projecting edge. They show on one side a head, often of an emperor or other ruler, sometimes Homer, Sallust, Horace, or other authors, and on the other a scene from the circus or amphitheatre or from mythology or, rarely, daily life. No contorniate is known to be certainly earlier than the third century A.D.; most of them are later. Of the many explanations of the use of contorniates none has won general acceptance. Consult Smith, *A Dictionary of Greek and Roman Antiquities* (3d ed., London, 1890).

CONTORTED STRATA. See Geology.

CON'TOURS' (Fr., from ML. *contornare*, to go around). In topographical surveying and military sketching, the lines in which horizontal planes, at constant vertical intervals, intersect the surface of the ground. *Contouring* is a method of exhibiting relief of ground by means of lines so drawn on a map as to indicate points of equal elevation. The lines so drawn on a map and the corresponding lines on the ground are called *contours*. The word *contouring* is applied to the field work directed especially to obtaining data for drawing *contours*. The difference of elevation of points in adjacent contours is called the *contour interval*, and is usually constant for all the contours on the same map. The horizontal distance between contours, measured in a radial direction with reference to the curvature of the contours, is called the *contour distance*. For equal contour intervals the map contours are closer together, as the slope is steeper. It follows that for steep slopes the map contours will approach each other very closely, and for a vertical wall or cliff they will coincide. Contours are designated by their heights above a datum plane. The height is expressed in feet, except when the metric scale is used, when contour intervals are in meters. Facility in reading contoured maps is essential for military officers. It enables them quickly to form a mental picture of the general configuration of the ground over which they are to operate, to know the nature of the slopes to be traversed and the amount of cover available for the concealment of troops. See Surveying; Engineering, Military. See article Map, where contour lines are shown on the topographical map there given.

CON'TRABAND OF WAR (It. *contrabbando*, Sp., Portug. *contrabando*, from ML. *contrabannum*, contraband, from *contra*, against + *bandum*, *bannum*, proclamation, from OHG. *ban*, Ger. *Bann*, AS. *bann*, Eng. *ban*). In international law, goods of such character as to be liable to seizure by a belligerent in the course of trade between a neutral and the enemy in time of war. Munitions of war intended for the use of the enemy and chemicals or other raw materials to be converted into instrumentalities of war by the enemy are always deemed contraband. Other things innocent in character are similarly regarded if intended for the use of the armed forces of the enemy, but not if intended for general use or consumption in the country of the enemy. It is obvious that the latter class of cases may often call for delicate discrimination and may lead to sharp differences of opinion between the belligerent intercepting such a cargo and the neutral state whose commerce is thus interfered with. To some extent the matter has been regulated by treaty among the leading powers, but no satisfactory definition for contraband goods has yet been reached. The changes in methods of modern warfare render the list a constantly shifting one. Great Britain has adopted the classification of (*a*) *goods ab-*

solutely contraband, and (*b*) *goods occasionally contraband*. In the case of a Swedish ship in the War of 1812 bound for the neutral port of Bilbao with a cargo of grain intended for the use of the British fleet lying there, the cargo was held to be subject to confiscation as contraband. So, in the Crimean War, Great Britain claimed coal destined for a Russian port to be included under the head of *occasional contraband*. France in the War of 1859 refused to treat coal as contraband. The United States at the time of the Civil War adopted the English position, as did Germany in the War of 1870, and Russia in the war with Japan. Such differences threaten to furnish serious controversy in the event of war between any of the great commercial nations. The rules of international law do not prohibit subjects of neutrals from carrying contraband to either belligerent, but they do so at their own risk. So neutral merchants may trade in arms, ammunition, and stores in time of war as in time of peace, but either belligerent may capture such goods as are of direct and immediate use in war, if it can intercept them in their passage to the enemy while not within neutral jurisdiction. While a neutral power is bound to prevent the departure of armed expeditions from its shores and the supplying of munitions of war, etc., to belligerent vessels in its ports, no duty is imposed of restraining contraband trade, though it has no right to interfere in behalf of subjects whose property is seized by one belligerent on the way to another, provided it belongs to the class of forbidden commodities.

Three requisites are necessary to constitute the offense of *carrying contraband:* 1. Sale and transport of contraband goods within a neutral territory is permissible, but they may not be sent across the frontier to a belligerent by land or sea. 2. The goods must be intended eventually for a hostile destination. 3. The offense is completed with the deposit of the contraband cargo at the belligerent destination.

The ship when captured is generally taken to a prize court by the captor, and the penalty of conviction is the confiscation of the contraband goods, unless the owner of the contraband also has ownership in the vessel, in which case the ship, or his share therein, is likewise confiscated, and also any innocent goods of his ownership. False papers or misrepresentation as to destination may lead to the ship's condemnation. The carrying of agents or dispatches of an enemy must be distinguished as more properly unfriendly neutral service than carrying of contraband. The Trent Affair (q.v.), in which a British vessel carried agents of the Confederate government to England, comes under the former description.

The term *contraband of war* was inappropriately though ingeniously applied during the Civil War by Gen. B. F. Butler, while in command at Fort Monroe, to captured slaves, as a ground for retaining them when demanded by their Southern owners. Consult M. Wiegner, *Die Kriegskonterbande* (Berlin, 1904). See NEUTRALITY; BLOCKADE; INTERNATIONAL LAW.

CON'TRABASS'. See DOUBLE BASS.

CONTRABASS TUBA. See TUBA.

CONTRACT (from Lat. *contrahere*, to draw up, from *com-*, together + *trahere*, to draw). In English and American law, an agreement, enforceable at law, between two or more parties to do or not to do a particular thing. The elements essential to all forms of contracts are: (*a*) an obligation founded on the promise made by a party to the contract and resulting from his intent to enter into such an obligation; (*b*) a meeting of the minds of all the parties to the contract as to the terms and conditions of the promise given. Additional elements may be required to give validity to various classes of contracts, as is pointed out below.

Classification.—Contracts are usually classified as: (*a*) contracts of record; (*b*) contracts by specialty; and (*c*) simple contracts.

Contracts of record, so called, are conclusive legal obligations created by the judgment or order of a court of record. Examples of contracts of record are judgments, recognizances, statutes staple, etc. They are not true contracts at all, as they do not contain a promise and are not founded upon the intention of the party bound, but should properly be classified as *quasi contracts*.

Contracts by specialty are contracts depending for their validity upon the formality of their execution. They are required to be in writing and to be perfected by sealing and delivery by the party to be bound thereby. The usual form of specialty contract is a covenant (q.v.). A bond (q.v.), though in strictness not a contract, being an acknowledgment of indebtedness instead of a promise to pay, has always been regarded and classified as a specialty contract. Contracts by specialty require no consideration to give them validity. As in the case of other contracts, courts of equity will not specifically enforce a specialty contract unless it is founded upon a consideration.

At common law the seal required to be placed upon specialty contracts was of great technical importance, but the law in this respect has been greatly modified by modern statutes. In nearly all of the United States a scroll or mark with the pen may be used in place of a seal. In a number of States it is provided by statute that the seal upon a sealed instrument is only presumptive evidence of a consideration; the effect of which probably is to make a consideration necessary to the validity of a sealed instrument, at least where it is intended by the parties that a consideration is to be given. In a few States all distinction between specialty contracts and simple contracts has been abolished by statute. The common-law form of action for enforcing all kinds of specialty contracts, except a bond, was the action of covenant (q.v.). Recovery upon a bond was secured by the common-law action of debt (q.v.). These distinctions are not preserved in modern systems of pleading. The usual period of limitation upon specialty contracts is 20 years.

Simple contracts are contracts which do not depend for their validity upon any particular formality as to execution, but upon the existence of a consideration, which is a detriment, or a surrender of a right, given in exchange for the promise. (See CONSIDERATION.) A simple contract may be in writing or by parole, or may even be implied from the acts and conduct of the parties manifesting their intentions.

As no formality is required in the creation of a simple contract, it always comes into existence as the consequence of an offer and acceptance. The offer must be accepted in accordance with its terms within a reasonable time, or within the time stated in the offer, in order to give rise to a contract. A refusal to accept, or

a counteroffer, puts an end to the first offer, which cannot thereafter be accepted unless renewed. In contracts entered into by letter, in most jurisdictions, the offer is deemed to be accepted upon the posting of the letter of acceptance, but in a few States it is held that there is no acceptance until the letter of acceptance is actually received by the person making the offer. Inasmuch as there must be an agreement in order to create a contract, any mistake as to the terms of the offer or acceptance will prevent a meeting of the minds of the parties and no contract will arise. But a mistake as to some collateral matter will have no effect upon the contract unless induced by fraud, in which case the defrauded party may rescind the contract. Thus, if A offers to sell property to B for $10,000, and B accepts, understanding the offer to be $5000, no contract arises; but if B understands the offer made and accepts it because he erroneously believes the property is of much greater value, a contract does arise. Simple contracts are frequently classified as *express* and *implied*. An express contract is one entered into on terms expressed in spoken or written words. An implied contract is one which is inferred from the acts or conduct of the parties. The latter should not be confounded with the so-called contracts implied in law, as, e.g., the obligation to repay money paid by mistake, which are not true contracts, because not based upon intention. They are properly classified as *quasi contracts* (q.v.). Express contracts may be by parole or in writing, the only difference in legal effect being in the method of proof. A few simple contracts are required, however, by the Statute of Frauds (q.v.) to be executed in writing. Simple contracts are further classified as *unilateral* and *bilateral*. A unilateral contract is one in which only one party to the contract makes a promise in exchange for the other party's giving something or doing some act. A bilateral contract is one in which each of the two parties gives his promise in exchange for the promise of the other, the promise of each being a consideration for the promise of the other.

Contracts are also said to be *executory* or *executed*. An executory contract is one which has not been fully performed. As the performance of a contract terminates its existence as a legal obligation, it will be observed that the expression "executed contract" is a contradiction in terms. A present sale of personal property is sometimes said to be an executed contract, but the expression is improper, as the sale may be effected by a mere meeting of the minds without any promise, and hence without contract. See SALES.

As a contract proper is always an expression of the will or intent of the party to be bound, a promise made by a person mentally incapable of a free act of will or consent, or by a person under a legal disability to bind himself by contract, is unenforceable. Thus, the contract of a lunatic or idiot, or of a person so under the influence of a narcotic or of intoxicating liquor as not to be capable of a free exercise of will, or (at the common law) by a married woman, is wholly void. The disability of the married woman in this respect has, however, been generally removed by statute. The contract of an infant, i.e., a person under the age of 21 years, is, on the contrary, not void, but may be disaffirmed by him when he attains full age.

Performance.—In the case of all true contracts, whether by specialty or simple contracts, the obligations of a party to perform may not arise until the happening of a condition, or the performance of his promise by the other party, as expressly or impliedly provided in the contract by its terms. If there be no such provision in the contract, by certain settled rules of construction (known as the law of conditions implied in law), the performance of one party may be deemed a condition precedent to the performance of the other, or the performance of each of the parties may be a concurrent condition to the performance by the other; i.e., each party must tender his performance before he can recover damages for the breach of contract by the other. In general, impossibility of performance is no defense to an action brought to recover damages for breach of contract. If, however, the contract contemplates the continued existence of the parties or the subject matter of the contract, the death of a party or failure of subject matter is a defense. Thus, in contracts for personal service, death of the employer or employee terminates the contract, and a contract for the use of a particular building or other property is terminated by the destruction of the property.

Suits upon Contracts.—Owing to the rule of pleading in actions upon contract at common law, the plaintiff must show that he has given consideration for the defendant's promise. A third person for whose benefit the contract was made, but who was not a party to it, could not sue upon it. This is still the rule in most jurisdictions, although not in all; and in a few, notably New York, in the single case when A gives money or property to B upon his agreement to pay money to C, C may sue upon the contract upon the theory that a debt has been created in his favor. Equity exercises jurisdiction to compel specific performance of a contract when legal damages would be inadequate. It also exercises its powers to rescind or reform written contracts affected with fraud or mistake. Fraud is also a defense at law to an action founded on contract, it having been early adopted by the courts of law, although it is a defense equitable in character. Contracts which contravene rules of public policy or statutory enactment are illegal and void. See ILLEGALITY.

Contracts in the Civil Law.—In the Roman law contract (*contractus*) signified an agreement which created an actionable obligation. The original roots of contractual obligations were apparently pledge and vow. In the first case, the debtor gave the creditor a pledge, which the creditor held until the debtor had fulfilled his promise. If a debtor had nothing else to pledge, he pledged his own person in the form of a sale. This transaction the Romans called *nexum*. It created something analogous to a judgment debt; and as the debtor was in default, the creditor levied on his body (*manus iniectio*). By the time of Gaius this contract had become antiquated. A vow to the gods to do something for, or pay something to, the third person enabled the priest to intervene and insist upon performance—from this root sprang the sacral contract of the priestly law, the *sponsio*, and out of the *sponsio* grew the sacral contract of *stipulatio*.

At the time of Gaius (early Empire) five classes of contracts were recognized: (*a*) The

verbal contract, *stipulatio*, which was actionable because a certain form of words (question and answer) had been observed. It was usual to draw up a written statement (*cautio*) reciting the terms of the agreement, but the validity of the contract rested on the exchange of the spoken words. (*b*) The *literal* contract (from *literæ*, 'writing'). This was actionable because a formal entry had been made in the creditor's ledger (*expensilatio*). In the case of the verbal and the literal contract it was neither the agreement alone nor the form alone which created the obligation, but the two together. (*c*) The *real* contract. This was actionable because something (*res*) had passed from the creditor to the debtor, and the return of the thing or an equivalent had been promised. To this class belonged the bailments known as *mutuum*, *commodatum*, *depositum*, *pignus*. Besides these there were many other real contracts without special names. Ultimately it was recognized that any agreement for reciprocal performances would become a binding contract as soon as one party had performed. (*d*) The *consensual* contract. This was actionable by virtue of the agreement (*consensus*) between the parties, although no form had been observed and nothing had passed. There were only four contracts of this class: *emptio venditio*, sale; *locatio conductio*, hiring; *societas*, partnership; and *mandatum*, commission of agency.

Agreements that fell within none of these four classes were simple pacts (*pacta*), not contracts, and were not actionable. Such pacts might, however, be available for defense, e.g., when a creditor had given his debtor an informal release or an extension of time, and pacts made immediately after the conclusion of a contract (*pacta adiecta*) were treated as part of the contract.

In order that a contract should be valid it was necessary that the parties should be of such age as to be capable of binding themselves and of sound mind, and that the object to be attained should be neither impossible, illegal, nor immoral. Mistake (*error*) was regularly fatal to the validity of a contract, provided the mistake was excusable and essential. A mistaken reason or motive for contracting was not regarded as essential. Where, however, the mistake was caused or utilized by the other party, these limitations disappeared, and the contracts were voidable for fraud (*dolus*). Duress (*metus*) also made a contract invalid.

In modern European codes all agreements except those looking to impossible or immoral ends are valid and actionable, unless a special form is required by law and the required form has not been observed. It is therefore maintained by many writers that the Roman category of real contracts has disappeared, and that there are now but two classes, the formal and the consensual.

Bibliography. For special branches, consult REAL PROPERTY; SALE; MORTGAGE; ETC. Also consult: Parsons, *Law of Contracts* (9th ed., Boston, 1904); Anson, *Principles of the Law of Contract* (7th ed., Oxford, 1893; 2d Amer. ed., Chicago, 1887); Chitty, *Treatise on the Law of Contracts* (14th ed., London, 1904); Addison, *Treatise on the Law of Contracts* (10th ed., ib., 1902); Marriman, *Elements of Contracts* (2d ed., Boston, 1901); Hollingsworth, *The Law of Contracts* (1896); Page, *Law of Contracts* (Cincinnati, 1905); and the authorities referred to under such special titles as NEGOTIABLE INSTRUMENTS; SALE; ETC.

CONTRACT, SOCIAL. See SOCIAL CONTRACT.

CONTRAC'TION (Lat. *contractio*, from *contrahere*, to draw up). The wish or necessity for economizing labor and parchment led the scribes of the Middle Ages to use a great many abbreviations or contractions in their manuscripts. These contractions were transplanted into the first printed books; and more recently they have been reproduced in many works, where it was thought desirable that the modern print should represent as nearly as possible all the peculiarities of the ancient manuscript. A knowledge of contraction, therefore, is indispensable, not only to readers of old writings, but to readers of the printed books of the fifteenth, the sixteenth, and the earlier part of the seventeenth centuries, and to all who desire to avail themselves of the vast stores of historical and archæological materials accumulated in the rolls and records published by the governments of Great Britain, France, and other countries. See PALEOGRAPHY.

Contraction may be divided into six classes: (1) contraction, properly so called; (2) contraction by elision or suspension; (3) contraction by writing a smaller letter above the word contracted; (4) contraction by running two or more letters into one character; (5) contraction by symbols representing syllables or words; (6) contraction by initial letters.

CONTRACT LABOR LAW, or ALIEN LABOR LAW. The provisions of the statutes of the United States relative to immigration prohibiting the bringing into the country of aliens who are under contract to perform labor or service of any kind in the United States. The first provisions of this character were enacted in 1885. These were general in terms and were interpreted by the courts to have reference only to persons imported under a contract to perform unskilled manual labor. As this interpretation was unsatisfactory to the labor organizations at whose instance the law was passed, it was amended by a subsequent Act of Congress (Act of March 3, 1903, chap. 1012) so as to cover "labor or service of any kind, skilled or unskilled." See IMMIGRATION.

CONTRACT SURGEON and **ACTING DENTAL SURGEON.** In the United States army, a civilian physician or dentist employed under contract with the surgeon-general of the army. Civilian physicians and dentists may be employed as contract surgeons and acting dental surgeons under contracts entered into by, or with the authority of, the surgeon-general of the army. They are entitled to the transportation and fuel allowances of first lieutenants, and when on duty at a post or station where there are quarters belonging to the United States, they receive the quarters in kind allowed by regulations to a first lieutenant; they are not entitled to commutation of quarters nor to the 10 per centum increase of pay when serving beyond the territorial limits of the United States. They are entitled to the same official obedience from enlisted men as commissioned officers, and may be detailed on councils of administration and boards of survey, act as post treasurer, etc., and witness payments to enlisted men under the provisions of paragraphs 1315 to 1337 of the *Regulations*, but may not be detailed for duty on courts-martial. Generally expressed, the contract surgeon's eligibility

for duty is the same as that of a first lieutenant of the Medical Corps, except in so far as it is limited by the fact that he is not a commissioned officer. Candidates for appointment as acting dental surgeons must be not less than 21, nor more than 27 years of age, and must be graduates of standard medical or dental colleges, trained in the several branches of dentistry, of good moral character, and, prior to appointment, will be required to pass a satisfactory professional examination before a board of dental surgeons, convened for that purpose. Contracts with acting dental surgeons are made for three years, but may be annulled, for cause, at any time. They are attached to the medical department, and are assigned to duty in accordance with the recommendations of the surgeon-general of the army, or the chief surgeon of a military department. An acting dental surgeon is allowed, as an assistant, one enlisted man from the hospital corps, and must operate upon those entitled thereto only.

The United States is the only country in the world employing army dental surgeons. Consult *United States Army Regulations* (1913). See SURGEON, MILITARY.

CON'TRAFAGOT'TO (It., counterbassoon). The name in orchestral scores for the double bassoon. See BASSOON.

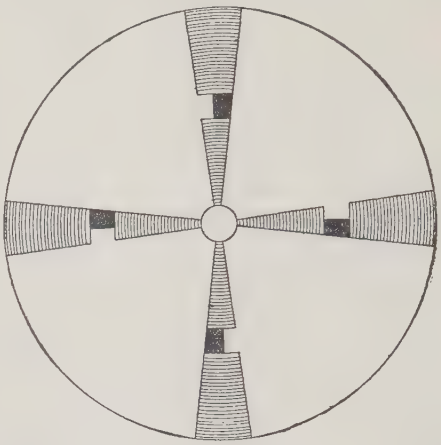
CONTRAL'TO. See ALTO.

CON'TRARY MOTION. See MOTION, in Music.

CON'TRAST (Fr. *contraste*, from ML. *contrastare*, to withstand, from Lat. *contra*, against + *stare*, to stand). The enhancement of the difference between objects or attributes of objects which results from their juxtaposition or immediate comparison. Contrast has been employed, very loosely, as a principle of explanation in psychology; and we cannot even now say that the whole field of "contrast phenomena" has been adequately explored. It is, clearly, no explanation of a given fact to refer it to a general law of contrast, any more than it is an explanation of a mental connection to refer it to the "association of ideas." We must know, in each particular case, the conditions under which the fact is determined and the connection takes shape.

1. One chapter of the psychophysics of contrast may, however, be considered closed. This is the chapter that deals with the contrast of light and colors. If we lay two black strips upon a gray ground and then push a white cardboard under one of them so that the white projects on either side, we see at once that the black on white is blacker than the (same) black on gray. If we lay a gray disk upon a red ground of the same brightness and stand so far away that the contour of the disk is eliminated, we see a bluish green in place of the gray disk; and the color is most intensive along the line of junction of disk and ground. These experiments may be varied in many ways.

The principal laws of contrast, as determined by such experiments, are five in number: (*a*) Contrast always takes the direction of greatest opposition. A white induces a black, a color its complementary color. (See VISUAL SENSATION.) (*b*) The more saturated the color (the redder the red, the purer the white), the greater is the contrast effect. (*c*) The contrast effect is greatest along the line of junction of the contrasting surfaces (marginal contrast). (*d*) The more nearly alike two colors are in brightness (both light or both dark), the better will be the contrast effect. And (*e*) the more nearly homogeneous the contrasting surfaces (the less distinction there is at the line of junction), the



Disks for mounting upon the color mixer, to show light and color contrast. The black portions of the disks are black, the white portions white, and the shaded portions of some color. From Helmholtz, *Physiol. Optik* (1896).

better will be the contrast effect. Helmholtz sought to explain these facts, in purely psychological terms, as deceptions of judgment; we see aright, but estimate wrongly; and Wundt accepts the explanation for certain of the phenomena. The psychological theory, however, breaks down when one attempts to carry it out in detail. There can be no doubt whatsoever that, as Hering maintains, contrast of light and color is a matter of direct physiological conditioning, the result of the interaction of excitations within the visual organ, a symptom or expression of the functional unity of the retina.

2. Whether contrast occurs in the perceptual sphere, whether, e.g., "great" and "small" contrast as do blue and yellow, is a much-disputed question. There are certain optical illusions (see ILLUSION) which seem to be most easily "explained" by reference to a law of space contrast. In its most direct form the theory of spatial contrast affirms that "the space sensation of a stimulated retinal point is a function primarily of the position of the point stimulated, but also of the space sensations of the neighboring retinal elements" (Loeb); the formula that holds of sensation is thus applied, without modification, to the sphere of visual space perception. It has been said, again, that lines of different direction exercise "contrastive" influences upon the movements of regard, i.e., upon the movements made by the eyes as we attentively follow the course of the lines. (Heymans.) And, lastly, it has been asserted that figures of the same size, surrounded by like figures of another size, look larger "by contrast" if the surrounding figures are smaller, and smaller if these are larger. (Wundt.) Most of these illusions can, however, be otherwise explained; and, despite the array of authorities, the fact seems to be that a given perception is never really changed by contrast with other perceptions. "Perceptual contrast" consists rather in a feeling. When we see a middle-sized man by the side of a dwarf, we are surprised at his height; when we see him by the side of a

giant, we are disappointed in his height. Our perception of the man's height is not affected by the neighborhood of smaller and larger men; the contrast that we "feel" is felt, literally, as surprise or disappointment.

3. Many psychologists, again, assume the existence of an affective contrast (see AFFECTION); a particular pleasure appears more pleasant if it follows a preceding unpleasantness, and conversely. (Fechner, Höffding, Lehmann.) The affective value of a stimulus, however, is not constant, as is its sensation value, but varies with the present state of the organism and the corresponding disposition of consciousness. The "particular" pleasure, then, is not a determinate amount of pleasantness, that may "seem" to be greater or less according to its affective setting. The pleasure actually aroused may differ within wide limits, while the stimulus remains the same. Moreover, where there is affection, there is also sensation; where there is affective contrast there must also be a "perceptual contrast," in the sense just defined of the conditions of the arousal of a contrast feeling. It is, then, perhaps safer to give up the idea of an "affective contrast" altogether.

4. Lastly, we must note that, in certain psychological systems (Wundt, Höffding), the law of contrast figures as a general law of the mental life. Wundt, e.g., speaks of the "law of psychical contrasts" as one of the three psychological laws of relation; all "volitional processes . . . are arranged in groups made up of opposite qualities; . . . these opposites obey in their succession the general law of intensification through contrast. . . . The law is secondarily applied to ideas and their elements." The rejection of this law does not necessarily carry with it the rejection of spatial and affective contrast, though its acceptance would naturally incline us to accept the alleged illustrations of its working.

Consult: Fechner, *Vorschule der Aesthetik* (Leipzig, 1876); Lehmann, *Hauptgesetze des menschlichen Gefühlslebens* (ib., 1892); Wundt, *Outlines of Psychology* (ib., 1902); Höffding, *Outlines of Psychology* (London, 1891); Titchener, *Experimental Psychology* (New York, 1901); Wirth, in *Zeitschrift für Psychologie*, vol. xviii (Leipzig, 1898).

CONTRAT SOCIAL, kôn'trȧ' sō'sē'ȧl'. See ROUSSEAU, JEAN JACQUES.

CON'TRAYER'VA (Sp. *contrayerba*, antidote, from *contra*, against + *yerba*, Lat. *herba*, Eng. *herb*). A medicine once in much repute against low fevers and as a mild stimulant and diaphoretic, but not used in the United States. It consists of the rootstocks (rhizomes) of different species of *Dorstenia*, tropical American plants of the natural order Moraceæ. The genus is remarkable for the plane receptacle in which the numerous small flowers are fixed—the male flowers in superficial depressions, the female flowers in deep sockets. The flowers have neither calyx nor corolla. The fruit consists of achenia, imbedded in the fleshy receptacle from which they are projected by elastic force when ripe. *Dorstenia contrayerva* is a perennial plant with palmate leaves and somewhat quadrangular receptacles. Its rootstock is knotty, one to two inches long, about one-half inch thick, reddish brown, pale within, sending out on all sides many slender fibres (roots), which are generally loaded with small brown knots. It has a peculiar aromatic smell and a somewhat astringent, warm, bitter taste. It keeps badly. It contains so much mucilage that a decoction of it will not pass through a filter. *Dorstenia brasiliensis*, a stemless species, with oblong, heart-shaped leaves, and a circular receptacle, a native of the West Indies and Brazil, possesses similar properties, but is said to be more energetic. Other species have been represented as efficacious against serpent bites; hence the name "contrayerva," a counterpoison.

CONTRERAS, kôn-trā'rȧs. A village about 12 miles southwest of the city of Mexico, the scene, Aug. 19 and 20, 1847, during the Mexican War, of an important battle between a Mexican force of 7000 under General Valencia, supported by another of 12,000 under General Santa Anna, and a United States force of 4500 under General Scott. The Mexicans occupied a strong position on high ground and fought for a time with great gallantry, but, being attacked both in front and rear at daylight on the 20th, finally gave way and fled in confusion, after having lost in killed and captured over 1500. The American loss in killed and wounded was reported by General Scott at 60. Consult Wilcox, *History of the Mexican War* (Washington, 1892), and *Autobiography of Lieutenant General Scott* (New York, 1864).

CONTRERAS, HERNANDO DE (c.1520–50). A Spanish adventurer, a son of Rodrigo de Contreras, Governor of Nicaragua. After the confiscation of his father's property he plotted revenge by organizing, in company with his brother Pedro, an expedition against Peru, which he determined to seize as his inheritance, tracing his claim somewhat remotely to certain rights of his grandfather, Pedrarias, the former Governor of Nicaragua. After murdering the Bishop of Nicaragua, they captured Panama, April 20, 1550, and took a large part of the treasure left there by the licentiate La Gasca. While Hernando was pursuing La Gasca, who was already on his way from Peru to Spain, the citizens of Panama retook the city and pursued the brothers. Hernando was shortly afterward drowned (May, 1550) while endeavoring to make his escape, and Pedro fled into the interior of the country, where every trace of him was lost.

CONTRERAS, JUAN SENEN DE (1760–1826). A Spanish soldier. He was born in Madrid, studied military matters, under commission from Charles III, in England and various continental countries, and took part, in 1788, in the campaign of Austria against the Turks. In the War of Independence he greatly distinguished himself, in particular at Talavera and at the defense of Tarragona, where he was captured by the French. He was imprisoned in the castle of Bouillon, but escaped thence in 1812 and made his way to London, whence he returned to Spain in 1814. He wrote an account of the siege of Tarragona which appeared in Paris in 1825 as volume iii of the *Mémoires relatifs aux révolutions de France et d'Espagne.*

CON'TRIBU'TION (Lat. *contributio*, from *contribuere*, to contribute, from *com-*, together + *tribuere*, to grant, from *tribus*, tribe; probably connected with *trabs*, beam, Umb. *trefu*, Welsh *tref*, village, Goth. *þaurp*, AS. *þorp*, OHG. *dorf*, Ger. *Dorf*, village). In the law of war, a levy of money or supplies imposed by an invader upon the citizens of an enemy's territory. The term *requisition* is usually applied to a levy of supplies, which may consist of food,

forage, clothing, or means of transport. Contributions are an outgrowth of the conditions of pillage and devastation which formerly marked the course of an invader. Private property in land was of course exempt from seizure owing to its immovability; but personal property, being of a portable character, was appropriated for the purpose of maintaining and strengthening the invading force. This practice reached its height during the seventeenth century, when armies of adventurers swept over Europe, depending upon the country for support. Gradually, with the growth of more humane feelings and for the more practical reason of increased efficiency and discipline in armies, the practice hardened into the usage of permitting inhabitants of invaded territories to purchase immunity from plunder by payment of a money indemnity.

A contribution is of the nature of an extraordinary tax (regular taxes being appropriated as public property by the enemy), and though it is levied primarily by the invader, it may be administered by local representative authorities, and its incidence thus regulated. Modern usage has approved the giving of receipts or *bons de requisition* for the sums or quantities taken, to guard against burdensome demands by later bodies of invaders; also to furnish a basis for recovery from the domestic government in the event of national division of the loss. Yet the state is not generally held liable for losses entailed by contribution; but these losses are considered to have been beyond the state's control, except when a certain territory has been given over to an enemy to protect the rest of the country. In that case justice demands a different rule. Effort has been made by international convention to modify the usage of exacting contribution, and modern warfare has relaxed its severities, though during the Franco-Prussian War it was rigorously enforced by Prussia. The Allies made no levies in the Crimea, nor did the United States in Mexico in 1847. The British also generally purchased supplies from the Boers. In each of these cases, however, this conduct appears to have been dictated by motives of momentary policy. Contribution should be distinguished from tribute, which is usually a condition of peace exacted by treaty. Consult the authorities referred to under WAR. See TAX; TRIBUTE; CONQUEST.

In municipal or private law contribution denotes the right of one person to exact from another his proportionate share of a common loss; as where one of two sureties on an obligation discharges the whole obligation, he is entitled to call upon his cosurety to contribute his share of the amount so paid. The term is sometimes employed of the right of a surety to recover from the principal debtor the amount paid by the surety in discharge of the latter's liability, but this is more properly termed "indemnity" or "exoneration" (qq.v.). In exceptional cases, also, a tenant in common or joint tenant of real estate might at common law be compelled to contribute to the cost of necessary repairs. (See PRINCIPAL AND SURETY; COMMON, TENANCY IN.) In maritime law, also, the principle of contribution is applied in cases where, in order to save a ship or cargo, a part of the goods are cast overboard. In such case the loss is equitably distributed so as to fall on the entire ship and cargo. See MARITIME LAW.

CONTRIB'UTORY NEGLIGENCE. See NEGLIGENCE.

CONTRI'TION (Lat. *contritio*, grief, from *conterere*, to bruise, from *com-*, together + *terere*, to rub). Sorrow for sin. As a term of Roman Catholic theology, it signifies "a sorrow of mind and a detestation for sin committed, with a firm purpose of not sinning in the future." A smaller degree of sorrow, arising from "the consideration of the turpitude of sin or from the fear of hell and of punishment," is called "attrition."

CONTROL'LER (variant of *comptroller*, q.v. for etymology). On shipboard, a contrivance for holding the anchor chain and keeping it from running out while getting up anchor or mooring. It is made in two parts, one of which slides vertically. When this part is up, the chain slips freely over the jaws of the controller; when the movable part is lowered, the chain drops in a slot, where it is caught and held. For further security the controller usually has an arch-shaped iron strap above it; this keeps the chain in place and has sockets for a heavy bar which holds the chain down against the jaws.

CONTUCCI, ANDREA. See SANSOVINO.

CONTUSION. See BRUISE.

CON'ULA'RIA (Neo-Lat. nom. pl., from Lat. *conus*, cone). A genus of fossil Pteropoda of curious form found abundantly in some Paleozoic rocks and rarely in Permian and Triassic beds. The shell, when perfectly preserved, has the form of an elongated quadrangular pyramid of which the sides are flattened and the edges sharp. In size they vary from half an inch to 10 inches in length. The surface is ornamented by numerous transverse ridges, and the interior is divided by septa in the apical portion. The aperture is closed by four incurved lobes, which are extensions of the sides of the pyramid. Certain forms in the Utica slate of New York State, originally described as algæ, have been shown to be sessile *Conularia*, in which the young remain attached to the parent shell to form a colony with the appearance of a branching seaweed. Consult: Hall, "Geological Survey of New York," in *Palæontology*, vol. v, part ii (Albany, 1879); Ruedemann, "Notes on the Discovery of a Sessile Conularia," in *American Geologist*, vol. xvii (Minneapolis, 1896); Slater, "A Monograph of the British Conulariæ," in *The Palæontographical Society*, vol. for 1907 (London, 1907). See also PTEROPODA.

CONUN'DRUM (probably a pseudo-Latin word; hardly from Lat. *conandum*, thing to be attempted, from *conari*, to attempt). A pun in the interrogative form, a kind of riddle (q.v.) involving the discovery of some odd or absurd resemblance between things utterly dissimilar, or of some odd difference between similar things. The conundrum is usually put in the form of a question, the answer to which either is or involves a pun. A good example is the following: Q. When is it easiest to read? A. In the autumn, when Nature turns the leaves. Save in folklore and savage life, the conundrum has almost entirely supplanted the riddle.

CON'VALLA'RIA. See LILY OF THE VALLEY.

CONVEC'TION OF HEAT, CONVECTION CURRENTS. See HEAT, *Expansion*.

CONVENT. See MONASTERY.

CONVEN'TICLE (Lat. *conventiculum*, dim. of *conventus*, assembly, from *convenire*, to assemble, from *com-*, together + *venire*, to come). 1. The private religious meetings in the early Church. 2. Later a cabal among the monks of

a monastery formed to secure the election of a favorite as abbot; the word consequently fell into disrepute. 3. It was given as an appellation of reproach to the assemblies of Wiclif's followers and was afterward applied (4) to the meetings of English and Scottish Nonconformists. In this connection the legal term developed. The Conventicle Act of 1664 made all assemblies for religious purposes, other than those of the Church of England, illegal, permitted houses to be searched for suspected conventicles, and imposed the penalty of transportation for repeated offenses.

CONVEN'TION (Fr., from Lat. *conventio*, a coming together, a meeting, from *convenire*, to meet, from *com-*, together + *venire*, to come). In the civil law, a contract, pact, or treaty. Hence, in more general usage, a rule of conduct depending upon agreement, express or implied, rather than on any positive rule of law. Thus, we speak of the *conventions* of a constitution, meaning those parts of it which are the result of custom and of general agreement, as distinguished from the *law* of the constitution, which is embodied in statutes or in judicial decisions. The term is also employed in a technical sense, in the language of diplomacy, and in military affairs, with the signification of treaty or agreement respecting the conduct of military operations or the relations of the contracting parties to one another.

In the political sense, the term "convention" signifies an extraordinary assemblage of delegates, representing the people of a state or the members of a political party, for other purposes than the regular functions of government. Thus, a regular legislative body is not a convention, though the term is sometimes applied to the joint meetings of the two houses of a State Legislature when convened for the formal election of a United States Senator. The two houses of Parliament constitute a convention, whether acting jointly or severally, if assembled, without authority of law. This was the character of the two "convention Parliaments," as they were called, which met in 1660 to restore Charles II to the throne, and in 1689 to alter the succession from the house of Stuart to William and Mary. In both of these cases the illegal and revolutionary acts performed were afterward validated and confirmed by regular acts of Parliament. Of a similar character was the convention by which the first French Republic was declared in 1792, and under which the Revolution was carried on till the establishment of the Directory in 1795.

Constitutional Conventions. The fact that conventions may be made up of delegates representing the whole body of the people of a state, and chosen specifically to represent the popular will in a particular matter, has made them a favorite instrument for framing a new scheme of government or for amending an old one. The convention is thus a more immediate representative of the people, with a higher and more imperative mandate than the legislature. There has been only one national constitutional convention in the United States—that which framed the Constitution; but the high character of this assemblage, the patriotic spirit and wisdom which animated it, and the astonishing success which has attended its labors, have made it the immortal type of such gatherings. In the United States its members are revered as the "Fathers of the Constitution."

This convention met, pursuant to the call of the Congress, in Philadelphia, on the 14th of May, 1787, to frame measures for the preservation of the union of the States and the establishment of a stable and efficient government; and, under the presidency of George Washington, it completed its labors on the 17th of September. It included most of the men of authority and influence in the country, among them such well-known figures as Alexander Hamilton, Benjamin Franklin, James Madison, Roger Sherman, Robert Morris, Elbridge Gerry, and Rufus King, and all but one (Rhode Island) of the original 13 States were represented in its deliberations and in the final vote by which the Constitution was adopted. The Constitution (Art. V) provides for its own amendment by the process of a convention called upon the demand of two-thirds of the States; but the greater ease and simplicity of the alternative method, of proposing amendments to the several States by a two-thirds vote of the two houses of Congress, has caused the latter method to be preferred. See CONSTITUTION OF THE UNITED STATES.

In the States composing the American Union, however, the convention method of amending their constitutions has usually been followed. The ordinary procedure is for the Legislature to call a convention to be chosen by vote of the electors, and providing for the submission of the results of its work to the Legislature, and then to the people for ratification. In many cases the proposed amendments are submitted directly to the people, without previous reference to the Legislature, and in at least one recent case (Mississippi, 1890) an amended constitution was promulgated and put into effect by the constitutional convention which framed it, without ratification by the people or the Legislature. Doubtless such amendment, by convention only, is valid, if the powers of that body are not limited by the statute calling it into existence. But where the Legislature, in calling a convention, prescribes for the submission of its conclusions to the Legislature or the people, or both, for ratification, the amendments do not acquire the force of law until such ratification has been had. See Jameson, *Treatise on Constitutional Conventions* (4th ed., Boston, 1887).

Political Convention. A gathering of delegates representing a political party for the purpose of placing in nomination the candidate of that party for an elective office. The method of holding elections is carefully regulated by statute in all communities in which public offices are filled by popular vote, but the method of nominating candidates for such offices is usually left to the initiative of the voter. Under the party system which prevails in most popular governments, the process by which candidates are selected and placed in nomination is usually supervised by the party organizations seeking to control the election. In Great Britain candidates for Parliament are named by committees composed of party leaders, and in the early history of the United States the necessary leadership was supplied by party committees in Congress. Nominations for the presidency were made in this way until 1824. At the present time, however, nearly all nominations for elective offices in the United States, whether great or small, are made by the primary and convention systems. The primary is

the meeting of the electors themselves, at which delegates to the nominating conventions are chosen. In some instances, however, the system is more complicated, the voters at the primaries choosing delegates to local conventions, and these, in their turn, electing delegates to represent the party in State or national conventions. The enormous extension of this system is doubtless due to the ease and completeness with which it lends itself to partisan control of elections, and thus of the machinery of government. It has doubtless done much to build up the system of party domination and the power of the great party leaders. The party organization, controlling the primaries, makes up a convention of its partisans and dependents, and thus dictates the nominations for office, leaving to the voter no choice but that of supporting or rejecting the candidate of his party. Then, when the party organization of city, county, or State, through a refinement of these methods, becomes wholly subservient to one man, we have the "boss" system which exists and flourishes to a large extent in the United States. The party convention, as the chief instrumentality of boss rule, has excited so much resentment in recent years that its existence is seriously threatened. In some of the States attempts have been made to render the primaries and conventions more truly representative of the body of the voters by statutory regulation of the nominating machinery, and in others a system of "direct nomination" of candidates for public office by primaries held for this purpose or by direct ballot has been instituted. This movement is gaining ground rapidly and bids fair to destroy the convention system altogether or to leave it only the function of formulating and declaring the principles of the party.

National conventions—for the nomination of candidates for the presidency and vice presidency of the United States—were first held about 70 years ago. The Anti-Masonic party (1828–32) was the first political party to perfect the national-convention system, and that party held the first national convention in the presidential campaign of 1832. Both factions of the Democratic-Republican party had, however, held nominating conventions that were not national nor systematically representative during the campaigns of 1824 and 1828. The collapse of the congressional nominating caucus in the campaign of 1824 hastened the development of the convention system. Political conventions, like most other representative bodies, usually reach their conclusions by a majority vote of the delegates present. The national conventions of the Democratic party, however, are governed by a peculiar rule, requiring a two-thirds vote for a candidate in order to secure the nomination. Another practice, peculiar to the machinery of the Democratic party in nominating its candidates for the presidency and vice presidency, is the "unit rule," as it is called, under which certain State conventions bind the delegates of those States in the national convention of the party to cast the unanimous vote of the delegation according to the wishes of the majority of its members.

Although the principal business of political conventions is the nomination of candidates for office, they have, in the course of American political development, become the councils of the great parties, and in and by them the principles of political action are formulated and declared. The "platforms," as they are called, adopted at State and national conventions, constitute the declarations of policy of the parties making them, upon which they seek the verdict of the people at the ensuing election. This declaration of principles has become one of the most important functions of political conventions and often constitutes the principal part of their work. See ELECTION; NOMINATION; POLITICAL PARTY. Consult Bryce, *The American Commonwealth* (ed. 1912).

CONVENTION, NATIONAL (Fr. *convention nationale*). The third assembly of the deputies of the French people chosen after 1789, and the one which assumed the government of France on the overthrow of the throne in 1792. After the Legislative Assembly had decreed the suspension of the King, Aug. 10, 1792, it voted the election of a National Convention, which commenced its sittings on September 21, immediately after the dissolution of the Legislative Assembly. Its first act was to declare the abolition of the kingship and to make France a republic. Upon this followed the trial and condemnation of the King. Through the support of excited mobs, the extreme Jacobin party became predominant in the convention, where, from the elevated seats on which its members sat, it received the name of the Mountain. (See MONTAGNARDS.) The Revolutionary Tribunal and the Committee of Public Safety were created by this party. The Girondists (q.v.), at first a powerful party, were destroyed, many of them perishing by the guillotine; and a new constitution, thoroughly democratic, was adopted Aug. 10, 1793. Its operation, however, was suspended until peace should be restored. Meanwhile the rulers in the convention displayed marvelous energy, almost a million citizens being placed under arms, and immense supplies of military stores being raised by means of continual requisitions. By order of the majority of the convention thousands of its political opponents were thrown into prison, and the number who died by the guillotine increased daily both in Paris and throughout France. In the end the National Convention became subject to the dictatorial power of Robespierre (q.v.) and independent opinion was no longer expressed. The overthrow of Robespierre was followed by a great reaction; the Jacobins were suppressed; and finally the remnant of the convention, after concluding peace with Prussia and Spain, dissolved itself, Oct. 26, 1795, leaving to the nation a new constitution, which placed the government in the hands of the Directory (q.v.). During its long lease of life the National Convention had passed over 8000 decrees and acts and had set into motion forces which profoundly influenced the history of France and of Europe. See FRANCE; DANTON; HÉBERT; MARAT; ROBESPIERRE; ETC.

CONVENTIONAL. In art, a term which indicates that a work has been produced in accordance, not with the absolute principles of beauty in form and color, or with the appearance of natural objects, but with the theories and rules concerning forms and colors which prevail at a given time or in a given country or social class. An artist who adheres too rigidly to such rules is said to be conventional. The term is also used to describe representations of natural objects; as, e.g., leaves which

are not strictly true to nature. Such representations are frequently used for decorative effect, and the objects are said to be conventionalized.

CONVENTION PARLIAMENT. A British term for a Parliament convened without royal authority. The English sovereign has a vested prerogative in the assembling of Parliaments, but when the crown is in abeyance convention Parliaments meet—as before the restoration of Charles II (1660), and when William and Mary were offered the sovereignty after James II had fled the kingdom (1689). The acts of such Parliaments are subsequently ratified by a Parliament summoned in due form.

CONVER'GENCE. See SERIES.

CONVERSANO, kōn'vĕr-sä'nō. A city in southern Italy, in the Province of Bari, situated on an eminence about 20 miles southeast of the city of that name and 5 miles from the Adriatic coast (Map: Italy, M 7). It is the seat of a bishop, has a beautiful cathedral of the thirteenth century, the nunnery of San Bendetto, and a castle which belonged to the family of Acquaviva. A trade in wine, oil, flax, cotton, and almonds is carried on. It was founded by the Etruscans. Pop. (commune), 1881, 11,890; 1901, 13,685; 1911, 15,112. Consult S. Simone, *Il duomo di Conversano* (Troni, 1896).

CONVERSAZIONE, kōn'vĕr-sä'tsē-ō'nā (It., conversation). A gathering for social purposes and conversation, where amateurs and others meet for interchange of ideas on literature, art, or science.

CONVERSE, FLORENCE (1871–). An American author, born in New Orleans. She graduated from Wellesley College in 1893 and was a member of the editorial staff of the *Churchman* from 1900 to 1908, when she joined the staff of the *Atlantic Monthly*. Besides her stories in the magazines, she is author of *Diana Victrix* (1897); *The Burden of Christopher* (1900); *Long Will, A Romance* (1903; "Everyman's Library," 1908); *The House of Prayer* (1908); *A Masque of Sibyls* (1910); *The Children of Light* (1912).

CONVERSE, FREDERICK SHEPHERD (1871–). An American composer, born at Newton, Mass. He was educated at Harvard University and at the Royal Academy of Music, Munich. From 1899 to 1901 he was instructor in harmony in the New England Conservatory of Music. At Harvard he was instructor in music in 1901–04 and assistant professor in 1904–07. His compositions include: "Sonata in A"; "Suite for Piano"; "Festival of Pan" (1904); "Night and Day"; "La belle dame sans merci"; "Three Love Songs"; "Two Songs for a Soprano Voice"; "Quartet in A Minor"; "Two Songs for Low Voice"; "Silent Noon"; "Laudate Dominum"; "The Pipe of Desire"; "The Sacrifice"; "Job," an oratorio; and "Ormazd," a symphonic poem.

CONVER'SION (Lat. *conversio*, from *convertere*, to turn, from *com-*, together + *vertere*, to turn; connected with OChurch Slav. *vrŭtĕti*, Skt. *vart*, to turn, Goth. *waírpan*, AS. *weorþan*, OHG., Ger. *werden*, to become). In logic, the transposition of subject and predicate in a proposition—e.g., "No S is P" becomes by conversion "No P is S." Conversion is *simple* when no other change is made in the original proposition than the transposition of subject and predicate. It is *limited* or *accidental* (*per accidens*) when the quantity of the proposition is reduced from universality to particularity—e.g., "All S is P" becomes by limited conversion "Some P is S." Simple conversion here would be unwarranted. Conversion is *by contraposition* when it is preceded by obversion (q.v.). The proposition obtained by conversion is called the converse of the original proposition. See LOGIC.

CONVERSION. At common law, the unauthorized assumption by one not the owner of the dominion of the owner over goods and chattels. The act of conversion may consist either in the destruction of the property, its sale or transfer to a third person, or the use of it as owner. For example, a person converts the horse of another by wrongfully taking it into his possession or detaining it; an auctioneer or agent for B converts the furniture of A by selling it as the property of B, although he may believe that it is B's property; a manufacturer converts A's cotton or wool when he makes it into cloth, even though in good faith he thinks the cotton or wool is his own; a person who wrongfully draws out a gallon of liquor from a cask and fills up the cask with water converts the entire quantity. In each of these cases the converter wrongfully assumes the dominion over the property and exercises it to the exclusion of the owner. The mere loss of property by a carrier, or its deterioration because of careless storage by a warehouseman, is not conversion, as neither carrier nor warehouseman in such case exercises an act of ownership over it.

The common-law action by the owner against the converter was that of *trover*, so called from the French *trouver*, to find, because the declaration contained an averment that the defendant had found the property and had thereafter converted it to his own use. This averment, being in most cases fictitious, is no longer employed, and the action is now spoken of as one of conversion rather than of trover.

The amount of damages recoverable in an action of this kind is generally the value of the plaintiff's interest in the property at the time of the conversion. Where the conversion was willful the owner may usually recover the enhanced value due to the repair or improvement of the property by the converter, and he may in any case, whether the conversion was innocent or willful, usually retake the property in its improved form, in lieu of suing for damages. Whether the defendant has the right to reduce damages by tendering the property to the plaintiff is a question upon which the courts in this country are not agreed. Upon principle it would seem he has no such right. In case the property is still in possession of the converter, the owner has the option of reclaiming or of suing for damages. If he resorts to the latter alternative, obtains judgment, and collects it, the title to the converted property vests in the defendant. But neither in England nor in the United States does title vest in the defendant without the plaintiff's assent, unless the judgment is satisfied. See TORT; TROVER; RECAPTION; DAMAGES; and consult the authorities there referred to.

Conversion of property in equity is quite a different thing from the common-law tort, which we have been considering. In equity, real property is treated as converted into personalty, and personal property into realty, where the owner has properly expressed his intention that such an alteration should take place. Land may be converted into the purchase money, in equity, by a contract to sell; it may be converted into per-

sonalty, also, by a devise in a will to sell it and distribute the proceeds. As equitable conversion works a radical change in the legal character and the devolution of property, the intention of the owner to effect such a conversion must be clearly manifested.

The conversion of land into personalty is also brought about in the administration of the estates of bankrupts or of intestates, generally under statutory provisions. The land is sold by trustees or administrators, and the proceeds applied to the payment of debts. Conversion is applied, by some authorities, to the change of partnership debts, with the consent of creditors, into the debts of one partner, or the change of a partner's debts into those of the firm. See EQUITY; and consult the authorities there referred to.

CONVERT'ER. A device used in transforming molten pig iron into steel by the Bessemer process (see IRON; STEEL). The converter consists of a heavy sheet-iron, pear-shaped vessel, suitably lined with acid or basic refractory material, and having numerous holes in the bottom through which a powerful air blast is driven during the process. From this vessel the resultant molten steel is poured into molds. A similar apparatus is also employed in converting copper matte into crude metal. See COPPER.

CON'VEX. See CONCAVE.

CONVEY'ANCE (from *convey*, OF. *conveier*, *convoier*, Fr. *convoyer*, from ML. *conviare*, to accompany, from *com-*, together + *via*, way; connected with Lith. *veza*, wagon, track, Skt. *vaha*, road, Goth. *wigs*, OHG. *wec*, Ger. *weg*, AS. *weg*, Eng. *way*, from Lat. *vehere*, Skt. *vah*, to carry). The technical term for a transfer of real property, the word having in law retained its earlier English meaning of a transfer, or passing, of a thing from one to another. It comprehends all manner of transfers—whether by livery of seisin, judgment of law, or deed—whereby any interest in land is vested in another, but it is strictly applicable only to transfers *inter vivos*, and does not include devises of land by will, or the devolution of an estate upon the heir by descent, or to the husband and wife of their curtesy and dower, or to the state of its right by escheat or forfeiture; neither does it include involuntary transfers of property, as by bankruptcy, the creation of judgment or statutory liens, etc. It is, thus, a term of much narrower signification than *alienation*, and somewhat more restricted than *common assurance*, though it is much wider than the term *grant*, as it includes transfers of interests which do not require, or which cannot be effected by, that process. A lease for years, even though made by parol, is a conveyance, and so is a mortgage, a declaration of trust, a marriage settlement, the creation of a power affecting land, etc. The term is also applied to the transfer of title to a ship, but not to the alienation of other species of personal property. The general substitution of written for parol and ceremonial transfers of land, effected by the Statute of Frauds (29 Car. II, c. 3, 1676), has made the term *conveyance* one of common application to the instrument of transfer as well as to the transaction itself.

The difficult and technical character of the law of real property appears at its worst in the complicated processes which have from time to time been developed for transferring such property. The earlier methods of the common-law system depended for their efficacy largely on the notoriety of the transaction, the feoffment, or livery of seisin, being a public ceremonial, and the subsequently devised processes of "levying a fine" and "suffering a recovery" being attended with the publicity of judicial proceedings. These "notorious" conveyances, as they were termed, have in modern times given place to more convenient modes of transfer, which are called "secret" conveyances. This salutary change has been brought about by the general substitution of written deeds of transfer, which take effect upon delivery, for the older and more formal methods, and the form and style of these deeds, formerly in the highest degree technical and complicated, have in recent years been greatly simplified by statute. The general prevalence of registry acts and of the practice of recording deeds in the United States does not affect the secret character of the conveyance, as such, this being complete upon the delivery of the deed, the object of the recording being only to guard against a subsequent fraudulent transfer of the same property to an innocent purchaser for value.

The earlier modes of conveyance at the common law, besides their notoriety, and in part as a consequence thereof, had the extraordinary operation of transferring a greater estate in the land than the transferrer himself had. That is to say, a tenant for life or years might by feoffment convey the premises in fee simple to a stranger. It is true the fee thus conveyed was a defeasible one; but it placed the landlord—reversioner or remainderman—in the situation of a disseisee, and forced him into the disadvantageous position of a plaintiff seeking to recover his land from one who claimed it under a notorious public conveyance. This was called a "tortious," or wrongful, conveyance, and the term "tortious" was thus applied to all the earlier modes of alienation which possessed this curious power. Conveyances by deed, on the other hand, have never been attended with these consequences, have never possessed a tortious operation, and have therefore been distinguished as "innocent" conveyances. Whatever they may purport to do, they pass only such interest as the grantor can lawfully convey. All modes of conveyance are now of this character, the older conveyances and the tortious effect of them having been done away with, both in England and in the United States, by statute. A curious survival of this obsolete and discredited doctrine appears in the modern American doctrine of conveyance by estoppel (q.v.). Notwithstanding the improvements which have been effected in recent years in the substitution of secret for notorious conveyances and the simplification of the former, the conveyance of land continues to be a much more cumbrous, uncertain, and expensive operation than the transfer of personal property. Many suggestions have been made looking to the elimination of these objections and the assimilation of the two species of property in this respect, and in several of the United States and in some of the British colonies different systems for achieving these objects have been adopted and are now on trial. These will be explained under the titles LAND TRANSFER; REGISTRATION OF TITLE. See the several titles of the various modes of transfer referred to in this article, and in addition, ALIENATION; CONVEYANCING; TITLE; WARRANTY; and the authorities there referred to.

CONVEY'ANCING. The act or art of preparing the deeds or instruments used for the transfer of property from one person to another. As such writings not only form the evidence of the right of the person possessing or claiming possession of property, but do in themselves constitute the title thereto, it is of the greatest importance that the conveyancer employed to prepare them should be possessed of a competent knowledge of the law and have the skill required to frame them in such a form as clearly to express and attain the object intended. In the early stages of society there is no call for the profession of a conveyancer; property is held in right of occupancy, without any written title, and even lands are conveyed from one to another without writing, the new owner being usually put in possession in presence of witnesses called for the purpose, by some symbolical form, such as the delivery of earth and twigs.

In the early history of the Jews the symbolical mode of transferring title prevailed (Ruth iv. 7). But they subsequently developed a much more artistic system of conveyancing, making use of all the safeguards that are used in modern times, viz., writing, witnesses, subscribing, sealing, and recording the documents (Jer. xxxii. 9–12). In Rome, as elsewhere, early transfers of property, whether land or goods, were of a ceremonial character. Later, a distinction was made between property capable of transfer by a simpler process (*res nec mancipi*) and such as could be effectually transferred only by the older and more formal method (*res mancipi*). It was not until Justinian's reign that the distinction between the two classes of property was abolished and a simple form of conveyance made sufficient for both.

Strictly speaking, the term "conveyancing" has no application to the various modes by which the title to chattels is transferred. These processes have almost always been of the simplest character, and do not usually call for expert knowledge or for elaborate writings to render them safe and effective. It is to the feudal system of land tenure, and to the complexities and refinements which it introduced into the simple notion of ownership, that we owe the difficulties and dangers which attend the transfer of title to land at the present time. As the feudal system nowhere exercised a stronger and more persistent influence than in England, so there is no country in Europe in which the conveyance of lands is as complicated and precarious an undertaking as it is in that country and in most of the United States. The number and variety of estates and other interests which may exist at one and the same time in the same parcel of land, and the diversity of circumstances under which these varied interests may arise, may be transferred and extinguished, have combined to make conveyancing one of the most technical and difficult branches of the work of the legal profession. In England it has resulted in the development of a special branch of lawyers who are known as "conveyancers." In the United States the process of specialization has not gone so far as that, the business of conveyancing being still for the most part in the hands of the profession at large or latterly, in the larger cities, in those of title-guarantee companies, which generally employ a large force of specially trained lawyers for the purpose.

The process through which the conveyancer must go may be briefly described. He has first to make a careful search of the public records and from these to prepare an abstract (q.v.) of the title to the land in question. He must then examine with the greatest care all of the documents constituting the chain of title, in order to determine their validity and sufficiency. He will then be prepared to draw up the appropriate document to effect the transfer desired—which may be a deed of trust, a marriage settlement, a grant of the lands, or a last will and testament. In England, where no system of general registration of land titles is in force, the conveyancer has recourse to the original documents of title, which are carefully preserved and transferred with the land.

The complexity, uncertainty, and expense of the old method of conveyancing have long called for radical reform. In England, in the United States, and in Canada land-transfer reform associations exist, and are vigorously pushing for legislation in this direction; something has already been achieved, but much remains to be done. Few even of professional conveyancers would deny the truth of the statement made by the Duke of Marlborough in the *Fortnightly Review*, that heretofore "in every country the theory of the land laws has depended on the fact that land was never intended to be dealt with by free commerce and barter, and its sale and exchange have at all times been surrounded with legal difficulties of every description." As property is subdivided into smaller and smaller portions, and as the number of conveyances which make up the chain of title to a piece of real estate continually increases, the difficulty and cost of establishing a clear title become more and more burdensome. So great has the task of searching and verifying titles become in New York and other large cities that land-title guarantee companies have been formed, which insure purchasers and mortgagees against flaws in titles.

In the United States the system of conveyancing generally adopted is that by deeds of grant, or bargain and sale; many States have enacted statutes simplifying the older methods, and several prescribe an exact form of deed, defining the legal effect of the specific words of conveyancing, limiting, conditioning, and so on. It follows that the laws of the States are not uniform, but the essentials of a conveyance by deed are practically the same, requiring that it be in writing, be signed and sealed by the grantors, be acknowledged before a notary or other officer authorized by the statutes, and be actually delivered. The direction which all present agitation for reform in conveyancing is taking is that pointed out by the success of the Torrens system of Australia. The main principle in that system is the registration of *titles* as distinguished from the registration of deeds. It was introduced first in South Australia about 1857 by Sir Robert Richard Torrens, was eminently successful practically, and was afterward adopted in the other Australian colonies and elsewhere. Under it the ownership passes only on the filing, in the proper registry office, of the title; thus the actual transfer and the public notice of it are simultaneous, and the records of the office cannot be impeached by flaws in the conveyance itself, nor can a purchaser be deceived by the existence of a deed not recorded and of which he could have no knowledge. The system of registration is a very simple one; a

special folio of the record is devoted to a single piece of land, and there in one place and together are recorded all transfers and transactions affecting the title of that piece of land or forming a charge on it; and, we repeat, the title to that land can shift only upon the registration itself. The government holds to the landowner under this system much the same relation that a corporation issuing certificates of registered stock holds to the purchaser thereof, i.e., the transfer of such stock certificates is made on the books of the company and takes effect only upon new entry therein. Under the Torrens system a "Master of Titles" is intrusted with the duty of seeing that the transfer is regular and is properly executed. A guarantee fund is established by the state to compensate any persons injured by errors of any kind. The great merit of this system is that, once established, it makes title certain and absolute, and obviates research in ancient conveyances. In Canada the system has been tried—though in a limited and imperfect form—in Toronto, and there is a strong agitation for its universal adoption under a compulsory law. In England a Land Transfer Reform Bill was introduced in 1875 by Lord Cairns, and passed, but in a mutilated and altogether unsatisfactory form; in 1882 a second act was passed simplifying the art of conveyancing and leading the way towards a general reform; in 1889 Lord Salisbury's government introduced a bill making the Torrens system compulsory, which was defeated only after its third reading and by a very small majority. In New York an Act was passed and went into effect in January, 1891, which provided for a reformed or block scheme of indexing conveyances to supplant the old system of consecutive registration of deeds indexed only by the names of the parties thereto. This is also a step in the direction of the Torrens system of registration. A voluntary Torrens system has been adopted in several of the States of the American Union, but the preliminary work of title registration is so great and attended with so much expense that little has yet been done to bring the system into extended use.

Consult: Leonard A. Jones, *Forms in Conveyancing and General Forms* (5th ed., Indianapolis, 1899); Wolstenholme, *Forms and Precedents Adopted for Use under the Conveyancing Acts* (5th ed., London, 1891); Sheppard, *The Touchstone of Common Assurances, etc.* (Amer. ed., Philadelphia, 1840–41); Greenwood, *Manual of the Practices of Conveyancing* (8th ed., London, 1891); Elphinstone, *Introduction to Conveyancing* (5th ed., ib., 1900); Hunter, *The Dominion Conveyancer* (Toronto, 1893); Brewster, *Conveyance of Estates in Fee by Deed* (Indianapolis, 1904).

CONVEY'OR. A device for moving or transporting freight, either in bulk or in packages, for a limited distance. It is much used for grain, coal, ore, and the like, in the form of an endless belt or band passing over supporting pulleys. The edges are turned up by guiding pulleys to prevent loss of material sidewise. The belt may discharge endwise over the last pulley as it passes over it and changes direction; or the charge may be thrown off sidewise by a deflecting guide. Or, the conveyor may be an endless chain with buckets, which dump at a designated point. The belt conveyors usually run at a relatively high speed; the bucket conveyors must move more slowly, but have the advantage that they can serve as elevators also. Conveyors for packages and small freight are usually belts or in slat form in terminals and warehouses, or convey parcels from store departments to the delivery-department vehicles. Conveyors are used in power plants for coal from bins to furnaces, and for ashes from the ash pits to the discharge carts.

CON'VICT (Sp., Portug. *convicto*, from Lat. *convictus*, p.p. of *convincere*, to convict, from *com-*, together + *vincere*, to conquer). A person found guilty, after due trial, of a criminal offense; in general use applied only to those convicted of felony or serious crimes, not to those guilty of petty offenses. The system used by a country in dealing with convicts is termed the convict system. In Europe in the Middle Ages the punishments inflicted upon criminals were cruel and brutal. Wholesale execution and mutilation gave way to transportation to colonies in the seventeenth century. Down to the time of the Revolution convicts were transported from Great Britain to the English Colonies in America; after the Revolution transportation to Australia came into vogue and continued until near the middle of the nineteenth century. In Russia transportation to Siberia was a favorite mode of disposing of convicts until 1900, when the system, in its essentials, was abandoned. Transportation is still a part of the French penal system, although it is rarely employed. Confinement in prisons, with or without hard labor, enforced labor on public works, or, under a gradually vanishing system, on private works under lease or contract, are the prevailing modes of disposing of convicts. In some jurisdictions, as a reward for good behavior, convicts are given their liberty under parole. Consult: Drähms, *The Criminal* (New York, 1900); Whitin, *Penal Servitude* (ib., 1912); Aschaffenburg, *Crime and its Repression* (Boston, 1913). See CONVICT LABOR; CRIMINOLOGY; PENOLOGY; PRISONS.

CONVICT LABOR. In all penitentiaries the work of keeping the institution in good order and carrying on the domestic arrangements is done by the prisoners. In addition, repairs and improvements, such as constructing new buildings, are often made by inmates under expert direction. This would not furnish sufficient employment to keep the prisoners occupied. For the sake of the convict as well as for the pecuniary returns, it is customary to employ the prisoners in productive enterprises. In America the following general systems prevail.

In the lease system the convicts are leased to contractors for a fixed sum and period, the entire responsibility for the care and safekeeping of the convicts devolving upon the contractors. This system may reduce the cost to the State, but it tends to great abuses and should be abolished. It prevails only in some of the Southern States.

The contract system exists in two forms. In the first the labor of the convicts is furnished to contractors for a fixed sum, the contractors personally directing the employment in the institution. The raw material and machinery are furnished by the contractor, though in some cases the State furnishes the latter. In the second form, the piece-price system, the contractor furnishes the material and pays a stipulated price for the finished product. The direction of the industry is in the hands of the prison officials. The advantage of this form is that it

avoids the possibility of trouble coming from the presence in the institution of employers who are not directly responsible to the authorities.

The contract system has been in general use. It has many advantages. The industry is managed by experts who can buy and sell to better advantage than can the warden, who, presumably, is not so well posted. Moreover, the State is not subject to loss because of gluts in the market or because of official ignorance or duplicity. It necessitates no great investment in expensive machinery. It has furnished steady employment to the prisoners and has reduced appreciably the net cost of maintenance.

There are, however, serious objections to the plan. When it involves the presence of outside overseers, it may seriously interfere with prison discipline. From an educational standpoint the highly developed industry interferes with the training of the individual convict. This applies with special force to the younger prisoners. Employers have condemned the system on the ground that the cheap labor gave the contractor an unfair advantage. Labor unions have objected because they felt that it had a tendency to lower wages. The objections have weight. While the total of prison labor is but a small part of the labor of the country, the introduction of special industries may easily depress and unfairly compete with similar local industries.

For these reasons the contract system is losing ground and is giving place to the public-account system. The State furnishes the plant and materials and conducts the entire business through its officials. Any profits go to the State, and any loss is borne by it. Products are sold upon the open market, or, as in a number of States, only such articles may be made as will be utilized in other public institutions or in the various State departments. Under this system the individual prisoner may be employed as seems for his best interest. Generally speaking, this plan is probably the best yet proposed. In recent years a strong tendency has developed to employ convicts, without the intervention of a private contractor, on the highways and other public works. Experiments with the system were first made in Colorado, in 1908. Oregon, New Mexico, Arizona, and Utah now use this system. Convicts thus employed are not required to wear prison garb, and they are placed wholly on their honor, working under the direction of an unarmed foreman. The results of this system have been highly favorable. In Colorado, in 1911–12, convicts thus employed built 157 miles of road at a cost of $298 a mile, or one-fifth the normal contract cost. Only one in 100 has tried to escape. Similar results have been attained in Oregon.

The advantages of employment upon the public highways are (1) physical improvement in the persons so employed, (2) gain in self-respect, with increased probability of reform, (3) solution of the problem of competition with free labor. Usually convicts so employed are given special inducements to good behavior, such as reduction in term and wages, which may either be paid to the dependents of the men under sentence, or may be reserved for them until their discharge. The system of wage payment to convicts has been established in several States in the United States and has also been tried in France, Germany, and England. It is gaining ground and may be expected to become practically universal, since it increases the efficiency of convict labor and renders easier the work of reformation. Consult: *United States Industrial Commission Report on Prison Labor* (Washington, 1900); *Proceedings of National Prison Association* (Pittsburgh, 1898, 1899); Henderson, *Introduction to Study of Dependents, Defectives, and Delinquents* (Boston, 1893); Henderson, *Outdoor Labor for Convicts* (Chicago, 1907); Whitin, *Penal Servitude* (New York, 1912). See PENOLOGY; CRIMINOLOGY.

CON'VOCA'TION (Lat. *convocatio*, from *convocare*, to call together, from *com-*, together + *vocare*, to call, from *vox*, voice). An assembly of the clergy of the Church of England, analogous in many respects to Parliament, at the same time with which it usually meets. As a factor in the development of English institutions, it is of great interest, being in some shape perhaps older than Parliament, into which attempts were made to incorporate it in the reigns of Edward I and Edward II. Convocation formerly exercised the right of enacting ecclesiastical legislation and also of voting subsidies to the crown; but the former right was greatly restricted under Henry VIII and by later acts of Parliament, while the latter was abandoned in 1664, since which time the clergy have been taxed like other citizens. Certain convocations are of importance in the history of both church and state in England; in particular that of 1529, which reasserted the royal supremacy; and declared that "the Bishop of Rome has not, in Scripture, any greater jurisdiction in the kingdom of England than any other foreign bishop"; that of 1562, which confirmed the Articles of Religion; that of 1603, which enacted an important body of canons; and that of 1661, which completed the revision of the Book of Common Prayer. About the beginning of the eighteenth century a factious spirit prevailed, so that the sittings of the Lower House were distinguished by contention with the bishops. Convocation was prorogued in 1717, and not again assembled until the revival of church life in the nineteenth century caused a demand for the renewal of its sessions. By the influence of Bishops Wilberforce, of Oxford, and Philpotts, of Exeter, the Convocation of Canterbury reassembled in 1852 and that of York in 1856, since which time their meetings have been regularly held. The provinces of Canterbury and York have each a convocation of its own. The Upper House is composed of the diocesan bishops; the Lower of bishops suffragan, deans, archdeacons, and certain representatives of the lower clergy, known as proctors. Convocation is reëlected with every new Parliament, and now commonly meets three times a year. While Convocation has at present no legislative functions, its discussions are of great interest to members of the Church of England. A "House of Laymen" has recently been organized, which, while not constitutionally forming a part of convocations, discusses similar topics on parallel lines. In 1905 was formed the Representative Church Council, composed of joint sessions of both convocations, together with the House of Laymen. Consult: Trevor, *The Convocations of the Two Provinces: Their Origin, Constitution, and Forms of Proceeding, with a Chapter on their Revival* (London, 1854); Lathbury, *A History of the Convocation of the Church of England* (ib., 1842; 2d ed., 1853); Whitehead, *Church Law* (ib., 1872).

In the University of Oxford the term "Convocation" is applied to the assembly composed of

all masters of arts, nonresident as well as resident, which finally accepts or rejects the statutes which have passed the narrower governing bodies, the Hebdomadal Council and Congregation. See OXFORD UNIVERSITY.

CONVOL'VULA'CEÆ (Neo-Lat. nom. pl., from Lat. *convolvulus*, bindweed, from *convolvere*, to roll together, from *com-*, together + *volvere*, to roll). A family of dicotyledonous plants, the morning-glory family, comprising 45 genera and about 1000 species, chiefly displayed in the tropics. They are annuals or perennials, many are twining or climbing in habit, and one genus, *Cuscuta*, is a climbing parasite. (See DODDER.) In many the stems contain a milky juice, and some have tuberous roots which are of economic value as furnishing jalap, scammony, sweet potato, etc. Some are noted for their beautiful flowers, as the morning-glory. The leaves are generally alternate and without stipules. The calyx is five-parted and the corolla with a five-lobed and plaited limb which is usually valvate, sometimes convolute. The stamens are inserted within the corolla, alternating with its lobes. The ovary is free and consists of two (rarely more) carpels and bears two or more ovules. The fruit ripens into a berry, nut, or capsule.

CONVOL'VULUS (Lat., bindweed), or BINDWEED. A genus of plants, the type of the family Convolvulaceæ. This genus contains nearly 150 species, herbaceous and shrubby, generally with a twining stem and milky juice; large and beautiful flowers. The plants of this genus are very abundant in the tropics, but comparatively rare in cold climates. Many are cultivated as ornamental plants, particularly species of *Convolvulus* and *Ipomœa*, the latter being commonly known as "morning-glory." Some species have large farinaceous roots, capable of being used as food, of which the sweet potato (q.v.), or batatas, is the most important. Two or three species are common in the eastern United States and are called "bindweed." *Convolvulus arvensis* is a troublesome weed in some sandy soils near the coast, and *Convolvulus sepium* in richer soils. The former has rose-colored fragrant flowers, the latter large white flowers. Both are ornamental; the latter is now often planted to cover posts and trellises. *Convolvulus scammonia* yields scammony, and the root of *Ipomœa pandurata* is used as a purgative in the United States. *Convolvulus scoparius*, a shrubby species, native of the Canary Isles, yields one of the kinds of wood called "rosewood," which has a strong smell of roses. *Exogonium purga*, formerly known as *Ipomœa jalapa*, of this order yields jalap, a well-known cathartic. It abounds in Mexico. For illustration, see Plate of DICOTYLEDONS.

CON'VOY (Fr. *convoi*, from *convoyer*, to convey). The name given to one or more ships of war appointed to protect a fleet of merchant vessels against the attacks of an enemy or pirates. If a merchant ship part company with the convoy, or neglect to obey the signals, all claims of insurance are forfeited. The name is sometimes applied to the merchant vessels so escorted. In the military service a convoy is, properly speaking, a train of wagons laden with provisions or warlike stores; the term, however, is applied also to the detachment of troops, or escort, appointed to protect such a train.

CONVUL'SION (Lat. *convulsio*, convulsion). A symptom of disease occurring in sudden attacks during which the patient generally loses consciousness; the muscles of a part or of much of the body are contracted and relaxed involuntarily, in spasmodic and irregular movements; the eyes are generally open, the eyeballs turned up or to one side; the teeth are set tight together; the tongue or cheeks are frequently bitten; the breathing is at first arrested, then labored and deep; the face is generally red, and the saliva oozes from the mouth as froth. In epilepsy (q.v.) the convulsions are as just described, and the patient generally sleeps immediately after them before regaining consciousness. In hysteria (q.v.) there is less writhing and more rigidity, the patient is not entirely unconscious in most cases, the cheeks remain pale, and he regains consciousness after a period of confusion, without sinking into a sleep; the tongue is not bitten, and froth does not issue from the mouth. Uræmic convulsions are very similar to those of epilepsy. Convulsive seizures accompany many diseases. They may be due to cerebral pressure, as in brain tumors, tertiary syphilis, cerebral hemorrhage, thrombosis, or embolism (see APOPLEXY), or extradural hemorrhage and meningitis; certain nervous diseases, e.g., general paresis, epilepsy, and hysteria; certain general toxæmias as uræmia, the puerperal state, lead poisoning, acute and chronic alcoholism. Convulsions in children (spasms) are likely to arise from slighter causes than in adults. Besides the diseases mentioned above, which may occur at any age and cause convulsive seizures, the following causes are operative in infants and young children: dentition, acute inflammations of the ear, gastro-intestinal irritation (overloading the stomach, worms, etc.), the onset of the acute exanthemata; birth injuries, tubercular meningitis, and rickets.

In cases of infantile convulsions the clothing should be removed and the patient immersed in a hot bath up to the neck for 10 or 15 minutes or till the limbs relax. An enema of soapsuds will always be of advantage to a child. The epileptic patient should never be grasped and held by any one, but should be protected from falling from the bed with cushions and pillows. The tongue should be protected from being bitten by being thrust back into the mouth, or by a rubber eraser inserted between the teeth. The patient should not be allowed to bury the nose and mouth in the pillows.

CONVUL'SIONARIES (Fr. *convulsionnaires*, from Lat. *convulsio*, convulsion, from *convellere*, to convulse, from *com-*, together + *vellere*, to pluck). A fanatical sect of Jansenists who sprang up in France about 1730. Their meeting place was the churchyard of Saint-Médard, in a suburb of Paris, where was the tomb of a certain Francis of Paris, who died in 1727 and was reckoned very holy by the Jansenists on account of his extravagant asceticism. At this tomb people began to gather for preaching and prayer. Miracles and cures are also alleged to have been performed, for proof of which we are referred to a work written by Carré de Montgeron, a member of the Parliament of Paris, and entitled *La vérité des miracles opérés à l'intercession de M. de Paris et autres appellans* (3 vols., Paris, 1737). "They threw themselves into the most violent contortions of body, rolled about on the ground, imitated birds, beasts, and fishes, and at last, when they had completely spent themselves, went off in a swoon." Some

of the phenomena seem to have been genuine and of a sort that would now be ascribed to hysteria. In 1733 the King issued an order for the imprisonment of these fanatics, but it was found impossible to put a complete stop to the mischief. They brought Jansenism into so much disrepute that Voltaire declared the tomb of Francis to be the grave of Jansenism. Consult P. F. Mathieu, *Histoire des miracles et des Convulsionnaires de Saint-Médard, précedée de la vie du diacre Paris, d'une notice sur Carré de Montgeron et d'un coup d'œil sur le Jansénisme* (Paris, 1864).

CON'WAY. A river in North Wales, 30 miles long, noted for its scenic beauty. It rises in a small mountain lake and flows between Llanrwst and Trefriw into the Irish Sea. At Conway it is half a mile broad at spring tides which rise here 21 to 24 feet. The Conway has been famous for its pearls since Roman times.

CONWAY, or **AB'ERCON'WAY.** A seaport market town and municipal borough of Carnarvonshire, North Wales, beautifully situated on a steep slope on the left bank of the Conway, 22 miles northeast of Carnarvon (Map: Wales, C 3). It is surrounded by triangular walls, 12 feet thick, with 21 towers and battlements. The principal streets are wide and regular. Here is situated St. Mary's Church; it is also the seat of the Royal Cambrian Academy of Art. Conway Castle, one of the noblest ancient structures in Britain, stands on a precipice overlooking the river. It was built in 1284 by Edward I to check the Welsh. Its walls are 12 to 15 feet thick, with eight vast towers, four of which are each surmounted by a slender turret. Inside is a great hall, called Llewelyn's. Pop., 1891, 3400; 1901, 4681; 1911, 5242. Outside the town can be found evidences of the Roman camp, Conovium, in the ruins of baths, roads, and pillars. Consult *Historical Sketch of Conway Castle and its Environs* (Carnarvon, 1852).

CONWAY. A city and the county seat of Faulkner Co., Ark., 30 miles north by west of Little Rock; on the St. Louis, Iron Mountain, and Southern Railroad (Map: Arkansas, C 2). It is the seat of Hendrix College (Methodist Episcopal, South), organized in 1884, Arkansas State Normal School, and Central Baptist College for Women, opened in 1892. Conway has an extensive cotton trade, lumber, flour, and cottonseed-oil mills, cotton compress, broom factory, and excelsior works. The city was settled in 1871 and incorporated three years later. It is governed by a mayor, who is elected every two years, and a council. The electric-light plant, water works, and sewerage system are owned and operated by the municipality. Pop., 1890, 1207; 1900, 2003; 1910, 2794.

CONWAY. A town in Carroll Co., N. H., containing the villages of Kearsarge, North Conway, Conway, and Conway Centre, about 60 miles (direct) north-northeast of Concord, on the Saco River and on the Boston and Maine Railroad (Map: New Hampshire, N 5). The village of North Conway is famed for beautiful scenery and is a popular summer resort. Conway is the centre of an extensive granite industry and has a ribbon-peg factory, spool mill, box factory, and lumber and canning interests. The water works are municipally owned. Pop., 1890, 2331; 1900, 3154; 1910, 3413. Consult Mrs. M. E. Eastman, *East of the White Hills.*

CONWAY, Henry Seymour (1721–95). An English field marshal, a second son of Francis Seymour, first Lord Conway. He was aid-de-camp to the Duke of Cumberland at the battles of Fontenoy (1745) and Culloden (1746). On March 30, 1759, he was appointed lieutenant general, and he served in 1761–63 under the Duke of Brunswick in Germany. In 1757 he was in the unsuccessful Rochfort expedition. For his attitude in Parliament in the Wilkes case he was deprived of his military command by the King, which resulted (1765) in the crown's abandoning its right to remove army officers for what they did in Parliament. He persistently opposed the war with America, and on Feb. 22, 1782, in an address to Parliament, urged the advisability of discontinuing aggressive warfare against the American Colonies. Shortly after the resignation of Lord North, he became commander in chief of the army (March 27, 1782).

CONWAY, Hugh. The literary pseudonym of Frederick John Fargus, part of which may have been first suggested to him by his student life on the school frigate *Conway.*

CONWAY, Moncure Daniel (1832–1907). An American clergyman, historian, and ethical writer. He was born in Stafford Co., Va., and was graduated at Dickinson College (1849) and at the Harvard Divinity School (1854), having studied law and been a Methodist minister in the interval. He imbibed humanitarian and rationalistic ideas and returned to Virginia to preach them, but was obliged to leave the State. He then took charge of a Unitarian church in Washington, D. C., but, too outspoken against slavery, was forced to go to Cincinnati, where he preached, wrote books, and edited *The Dial.* There, and later in Boston as editor of *The Commonwealth,* he urged emancipation, and in 1863 went to England to explain the cause of the war. He was minister of the ultraliberal South Place Chapel, London, from 1863 to 1884. At the close of the last century he returned to America and resided in New York City. Among his volumes are: *The Rejected Stone* (1861); *Idols and Ideals* (1877); *Demonology and Devil Lore* (1878); *The Wandering Jew* (1881); as well as biographies of *Edmund Randolph* (1888), *Thomas Carlyle* (1881), *Emerson at Home and Abroad* (1882), and *Hawthorne* (1890). His edition of the writings of Thomas Paine (4 vols., 1894–96), his life of Paine (2 vols., 1892), his *Autobiography* (1904), *My Pilgrimage to the Wise Men of the East* (1906), and *Addresses and Reprints, 1850–1907* (Boston, 1909), are his most important works.

CONWAY, Robert Seymour (1864–). An English classical philologist, born at Stoke Newington. He received from Gonville and Caius College, Cambridge, the degrees of B.A. (1887), M.A. (1891), Litt.D. (1898). He was fellow of Gonville and Caius College in 1888–94, classical lecturer in Newnham College in 1887–93, and professor of Latin, University College, Cardiff, Wales, in 1893–1903, when he took the corresponding chair in Victoria University, Manchester. He wrote *Verner's Law in Italy* (1887) and *Vergil, an Inaugural Lecture* (1903), collaborated in the translation of *Brugmann's Comparative Grammar* (1888–95), and edited *The Italic Dialects* (1897). He became a frequent contributor to classical periodicals. Among the latter papers may be mentioned one on Vergil's fourth Eclogue, the so-called Messianic Eclogue, printed in *Vergil's Messianic Eclogue, its Mean-*

ing, Occasion, and Source (London, 1907). He published also *Dialecticarum Italicarum Exempla Selecta in Usum Academicum Latine Reddita* (1899) and *The Restored Pronunciation of Greek and Latin* (1909).

CONWAY, THOMAS (1733–c.1800). An Irish soldier of fortune. He was educated in France, entered the French army, and had attained the rank of colonel when, early in 1777, he came to America with a recommendation from Silas Deane, and offered his services to Congress. He was appointed a brigadier general in May of this year, served at Brandywine and Germantown, where he led the main attack, and later in the year was made inspector general, with the rank of major general, contrary to Washington's wishes. He was the chief conspirator in the "Conway Cabal" (q.v.), for which, however, he no doubt got more than his share of blame, and upon the discovery of his intrigue resigned from the army in 1778. Soon afterward, on July 22, he was wounded in a duel by General Cadwallader, who challenged him because of his attacks upon Washington. Conway then returned to France, reëntered the army, and in 1784 was appointed Governor of Pondicherry and the French settlements in Hindustan. In 1792 he was appointed commander of the Royalist forces in the south of France, but on the success of the Revolutionists fled from the country.

CONWAY, SIR (WILLIAM) MARTIN (1856–). An English art critic and mountain climber, born in Rochester, the son of William Conway, afterward canon of Westminster. He was educated at Repton and at Trinity College, Cambridge; was a university-extension lecturer in 1882–85, professor of art at University College, Liverpool, in 1885–88, and Slade professor of fine arts, Cambridge, in 1901–04. He early became an enthusiastic mountaineer; was president of the Alpine Club in 1902–04; was the first to reach an altitude of more than 23,000 feet—in the Karakoram Himalayas in 1892; and explored Spitzbergen in 1896–97 and the Bolivian Andes and Tierra del Fuego in 1898. He was knighted in 1895. His principal books on art are: *The Woodcutters of the Netherlands in the Fifteenth Century* (1884); *The Artistic Development of Reynolds and Gainsborough* (1886); *Early Flemish Artists* (1887); *Literary Remains of Dürer* (1889); *The Dawn of Art* (1891); *Early Tuscan Artists* (1902). On travel and mountaineering he wrote, besides contributions to the Badminton Library, guidebooks to the Pennine and Lepontine Alps; *Climbing and Exploration in the Karakoram-Himalayas* (1894); *The Alps from End to End* (1895); *The First Crossing of Spitzbergen* (1897); *The Bolivian Andes* (1901); *Aconcagua and Tierra del Fuego* (1902); *The Alps* (1904); *Early Voyages to Spitsbergen* (1904); *No Man's Land, a History of Spitzbergen* (1906).

CONWAY CABAL', THE. In American history, the name given to an intrigue, organized under the leadership of Thomas Conway (q.v.), in 1777, during the Revolutionary War, for the purpose of bringing about the supersession of Washington, as commander in chief of the American armies, by Gen. Horatio Gates. With Conway were associated such men as Gates, Charles Lee, Thomas Mifflin, and Benjamin Rush, besides several other army officers and members of the Continental Congress, who charged Washington with gross incompetence and favoritism, and in particular endeavored to prove the superiority of Gates over Washington as a commander by contrasting the victories of the former at Saratoga with the almost contemporaneous reverses of the latter at Brandywine and Germantown. The faction gained sufficient power to secure the appointment of Gates as head and of Thomas Mifflin as a member of the Board of War and the promotion, against Washington's emphatic advice, of Conway to the rank of major general and to the position of inspector general; but they did not succeed in retaining any considerable following, and in a few months their schemes fell through, and Conway was virtually forced to leave the service (1778). A good account of the intrigue is given in vol. ii of Fiske's *The American Revolution* (Boston, 1893).

CON'WELL, RUSSELL HERMAN (1842–1925). An American Baptist clergyman. He was born at Worthington, Mass., and was educated at Wilbraham Academy and at Yale and Albany law schools. During the Civil War he served in the Union army (1862–65) and rose to the rank of lieutenant colonel. After the war he devoted himself to the practice of law. He was correspondent in Germany of the New York *Tribune* and the Boston *Traveler* from 1868 to 1870. After his ordination to the ministry in 1879 he occupied the pulpit of Grace Baptist Church, Philadelphia (1881–91). He founded and became president of Temple College (established 1888), and the Samaritan Hospital was also established by him (1890). In 1891 he became pastor of the Baptist Temple in Philadelphia. The following are his principal works: *Why the Chinese Emigrate* (1871); *Woman and the Law* (1875); *Lives of the Presidents* (1878); *Acres of Diamonds* (1888; 1905); *Life of C. H. Spurgeon* (1893); *The New Day* (1902); *How to Live the Christ Life* (1912). Consult his *Life*, by Burr (Philadelphia, 1905).

CONYBEARE, kŭn'ĭ-bâr, FREDERICK CORNWALLIS (1856–). An English Orientalist. He was educated at Tonbridge School and at University College, Oxford, of which he became scholar in 1875 and fellow and prælector in 1881. He was made a fellow of the British Academy in 1903, an officer of the French Academy in 1906, and honorary doctor of theology at Giessen in 1907. In his special field, Armenian language and literature, he came to be recognized as probably the foremost authority of his time; but he wrote besides on religious history. His published works include: *Ancient Armenian Texts of Aristotle* (1892); *The Key of Truth, a Manual of the Paulician Church of Armenia* (1898); *Roman Catholicism in International Politics* (1901), which, with his writings on the Dreyfus case, made him very unpopular among continental clericals and anti-Semites; *Rituale Armenorum* (1905); *Old Armenian Texts of Revelation* (1906); *Myth, Magic, and Morals: a Study of Christian Origins* (1909); *A History of New Testament Criticism* (1910); *A Catalogue of the Armenian MSS. of the British Museum* (1912); and translations of *Philostratus' Life of Apollonius of Tyana* (1912) and *Heliodorus' Æthiopica and other Greek Romances* (1913).

CONYBEARE, kŭn'ĭ-bâr, JOHN (1692–1755). An English clergyman. He was born at Pinhoe, graduated at Oxford, and was ordained priest in 1716. In 1730 he became master of Exeter College, of which he had previously been a tutor. He had attracted notice by two sermons, on *Miracles* (1722) and on the *Mysteries of the*

Christian Religion (1724). In 1732 he published his great work, *A Defense of Revealed Religion*, a reply to Matthew Tindal's *Christianity as Old as the Creation* (1730). Conybeare was appointed dean of Christ Church, Oxford, in 1732, and Bishop of Bristol in 1750.

CONYBEARE, John Josias (1779–1824). An English scholar. He was the grandson of the Bishop of Bristol and became professor of the Anglo-Saxon language (1807) and of poetry at Oxford (1812). He made some contributions to the literature of geology and chemistry, but is chiefly remembered for his devotion to Anglo-Saxon literature. His *Illustrations of Anglo-Saxon Poetry* (1826) was edited by his brother, William Daniel Conybeare.

CONYBEARE, William Daniel (1787–1857). An English geologist and clergyman, the younger brother of John Josias Conybeare. He was educated at Westminster and Oxford. While at the latter institution he devoted much time to the study of geology, and his researches in this science afterward procured for him the friendship of Buckland, De la Bèche, Elie de Beaumont, and many of the leading geologists of the time. He contributed several papers on various geological subjects to English periodicals and was admitted to membership in the Royal Society and the Geological Society of London, receiving from the latter the Wollaston medal. In 1844 he became dean of Llandaff, an office he retained until his death in 1857. His most important scientific work is *Outlines of the Geology of England and Wales* (1822), in which he coöperated with William Phillips.

CONYBEARE, William John (1815–57). An English clergyman and essayist, the son of Rev. William Daniel Conybeare (q.v.). He graduated at Cambridge in 1837, took orders four years later, became principal of the Liverpool Collegiate Institution in 1842, and in 1848 succeeded his father as vicar of Axminster. He wrote *Perversion; or, The Causes and Consequences of Infidelity*, a religious novel (1856); *Essays Ecclesiastical and Social* (1856); and, far more important, with Rev. J. S. Howson, *Life and Epistles of St. Paul* (1851), which is still a valuable biography.

CONYERS, kŏn'yērz. A city and the county seat of Rockdale Co., Ga., 30 miles by rail east-southeast of Atlanta, on the Georgia Railroad (Map: Georgia, B 2). It is in a cotton-growing and granite-quarrying region and has an oil mill, cotton factory, bottling works, and a flouring mill. The water works are owned by the city. Pop., 1890, 1349; 1900, 1605; 1910, 1919.

CONZE, kōn'tse, Alexander Christian Leopold (1831–1914). A German archæologist. He was born at Hanover and was educated at Göttingen and Berlin. He was professor of archæology at Halle (1863–69), Vienna (1869–77), and Berlin (1877–87). He was also director of the Berlin Museum and in 1887 received an appointment as general secretary of the German Archæological Institute. His writings include chiefly, in addition to some general studies, the following descriptions of travel and excavations: *Reise auf den Inseln des thrazischen Meeres* (1860); *Archäologische Untersuchungen in Samothrake* (2 vols., Vienna, 1875–80); *Beiträge zur Geschichte der griechischen Plastik* (2d ed., Halle, 1869); *Die Ergebnisse der Ausgrabungen zu Pergamon* (Reports 1–3, Berlin, 1880–88); *Die Arbeiten zu Pergamon, 1886–1898* (Athens, 1899); *Die Kleinfunde aus Pergamon* (Berlin, 1902).

COO'DIES, The. A name applied to the New York Federalists who favored the War of 1812. It was derived from Abimalech Coody, the pseudonym adopted, in his communications to the press, by Gulian C. Verplanck, the leader of the faction. Consult Hammond, *The History of Political Parties in the State of New York* (4th ed., Cooperstown, 1846).

COOK, Mount (called by the Maoris *Aorangi*, bright cloud of the sky). A mountain in the Southern Alps, on the South Island, New Zealand (Map: New Zealand, S. I., C 4). It has an altitude of 12,349 feet and is regarded as the highest point of Australasia. Its top is covered with perpetual snow. The first ascent was made in 1882. Since then the mountain has been repeatedly ascended and explored.

COOK, Albert Stanburrough (1853–). An American scholar, born at Montville, N. J. He graduated in 1872 at Rutgers College, studied at the universities of Göttingen and Leipzig, and in 1879–81 was associate professor of English at Johns Hopkins University. While professor of English (1882–89) in the University of California, he influenced the instruction in English in the entire State. In 1889 he was appointed professor of English language and literature in Yale University. He became an editor of the *Journal of Germanic Philology*, and published a valuable translation of Sievers's *Old English Grammar* (Boston, 1885). His publications further include: *The Phonological Investigation of Old English* (1888); *The Bible and English Prose Style* (1892); *The Art of Poetry* (1892); *First Book in Old English* (1894; 3d ed., 1903); *The Artistic Ordering of Life* (1898); *Biblical Quotations in Old English Prose Writers* (1904, 1913); *Higher Study of English* (1906); *Concordance to Beowulf* (1910).

COOK, Charles (1787–1858). An English Wesleyan clergyman, born in London. He was appointed in 1818 to the French mission of the Methodist church in Normandy and established Methodism in France. He engaged in a controversy with César Malan on predestination, which led to his work *L'Amour de Dieu pour tous les hommes.* Consult *Life of Charles Cook* (Paris, 1862), by his son.

COOK, Clarence Chatham (1828–1900). An American art critic and author, born in Dorchester, Mass. He graduated at Harvard in 1849, studied architecture, and spent several years in teaching. He was a contributor of articles on American art to the New York *Tribune*, from 1863 until 1869, when he was appointed Paris correspondent for the same paper and took up his residence abroad. He remained in Paris until the outbreak of the Franco-Prussian War, when he returned to New York and resumed his former relations with the *Tribune.* Cook was one of the earliest American art critics and on that subject, as well as archæology, was an authority in his day. Besides his chief work, *The House Beautiful* (1878), he wrote *Central Park* (1869) and edited a translation of Lübke's *History of Art* (1878). From 1884 he edited *The Studio* for a number of years.

COOK, Edward Dutton (1829–83). An English author and dramatic critic. He studied painting and engraving; with Leopold Lewis

wrote a melodrama, *The Dove and the Serpent;* in 1867–75 was dramatic critic of the *Pall Mall Gazette,* and from 1875 of the *World.* Of his works in fiction, the best known is *The Trials of the Tredgolds* (1864).

COOK, Sir Edward Tyas (1857–1919). An English journalist and author, born in Brighton. He was educated at Winchester and at Oxford (New College), where he was president of the Union. In 1882–85 he was secretary of the London Society for Extension of University Teaching. He was assistant editor and in 1890–92 editor (succeeding W. T. Stead) of the *Pall Mall Gazette,* and, after its purchase by William Waldorf Astor, in 1893 with many members of its staff took charge of Sir G. Newnes's *Westminster Gazette.* From 1896 to 1901 he edited the *Daily News,* and from then until 1912 he was on the staff of the *Daily Chronicle,* although devoting much of his time to writing on a variety of subjects. Among his books are: *Popular Handbook to the National Gallery* (1888; 7th ed., 1912), with notes from Ruskin's works and a preface by Ruskin; *Studies in Ruskin* (1890; 2d ed., 1891), with special attention to Ruskin's career as a teacher (Cook had been one of his pupils); *Popular Handbook to the Tate Gallery* (1898); *The Rights and Wrongs of the Transvaal War* (4th ed., 1902); *Popular Handbook to Greek and Roman Antiquities in the British Museum* (1903); *Memoir of Edmund Garrett* (1909); *Life of Ruskin* (1911); *Homes and Haunts of Ruskin* (1913); and *Life of Florence Nightingale* (1913). With Alexander Wedderburn he edited (1903–11) the Library Edition of Ruskin's works, *Letters and Life;* and he was knighted (1912) upon the completion of this definitive edition.

COOK, Eliza (1818–89). An English poet, born in London. Her first volume, entitled *Lays of a Wild Harp,* she published in 1835, and, after writing considerably for periodicals, particularly the *Weekly Dispatch,* she published *Melaia and Other Poems* (1838). In 1849–54 she edited *Eliza Cook's Journal,* much of whose contents was republished in *Jottings from my Journal* (1860). Her unpretentious verse, including, notably, "God Speed the Plough," "The Old Armchair," and "The Star of Glengarry," has been very popular among a wide circle of readers in both England and America. A complete edition of her poetical works appeared in London in 1870 and in New York in 1882.

COOK, Francis Augustus (1843–1916). An American naval officer. He was born in Northampton, Mass., and in 1863 graduated at the United States Naval Academy. He then served for two years as an ensign in the western Gulf blockading squadron, attained the rank of commander in 1880, was in charge of the department of seamanship at Annapolis until 1883, and was inspector of ordnance at the Boston Navy Yard from 1889 to 1893. He was subsequently assistant to Rear Admiral Ramsay, chief of the Bureau of Navigation in Washington, and in 1896, with the rank of captain, took command of the cruiser *Brooklyn.* At the beginning of the war with Spain (1898) he joined the "flying squadron" under Commodore Schley, and took an important part in the battle of Santiago (q.v.), pursuing the *Cristóbal Colon* until she ran ashore at Río Tarquino, when he received the surrender of her commander. At the close of the war he was relieved of sea duty at his own request and was appointed to the United States Naval Examining Board. He was retired in 1903.

COOK, Frederick Albert (1865–). An American explorer who claimed to have reached the North Pole on April 21, 1908. He was born at Callicoon Depot, N. Y., graduated at New York University in 1890, and was surgeon of the Peary Arctic expedition of 1891–92, and of the Belgian Antarctic expedition of 1897–99. Upon his return in 1909 "from the Pole"—as he said—he was received with great honors at Copenhagen, Denmark, and then, hastening to New York, he at once began making large sums of money by his writings and lectures. Doubts soon began to arise as to the veracity of his story—his companion on the journey he made in 1906 to Mount McKinley, Alaska, made an affidavit that no ascent of that mountain was made as described in Cook's narrative, and the Eskimos who were supposed to have been his companions on the dash to the Pole told the Peary party that they had spent the winter of 1907–08 at Jones Sound. This was followed by the sworn statement of a man who had been hired to prepare for Cook a set of observations for latitudes and longitudes on his journey to the Pole, to send with his other data to the University of Copenhagen for examination. In the meantime Cook disappeared from view, and the learned scientists at Copenhagen decided that his proofs were not sufficient; but the sale of his book, *My Attainment of the Pole* (1909; 3d ed., 1913), was very large. In 1913–14 he lectured in England. In addition to numerous magazine articles he is author of *Through the First Antarctic Night* (1900); *To the Top of the Continent* (1908). See *North Pole and Bradley Land,* by E. S. Balch (1913).

COOK, George Hammell (1818–89). An American geologist, born at Hanover (Morris Co.), N. J. He graduated in 1839 at the Rensselaer Polytechnic Institute (Troy, N. Y.), was a professor there in 1842–46, and in 1853 became professor of chemistry and the natural sciences at Rutgers College. His chair was changed to that of chemistry, natural history, and agriculture in 1867, analytical chemistry, geology, and agriculture in 1878, and geology and agriculture in 1880. In 1864 he was appointed State geologist of New Jersey, and in 1880 director of the New Jersey Agricultural Experiment Station (Somerville, Somerset County). He published a *Geology of New Jersey* (1868), a work that is still regarded as a standard of reference.

COOK, Capt. James (1728–79). A celebrated English navigator. He was the son of a farm laborer; was born at Marton, Yorkshire; was meagerly educated at the village school, and at 12 years of age was apprenticed to a small shopkeeper in the fishing village of Staithes. Disagreeing with his employer, he applied to a firm of Whitby shipowners engaged in the Newcastle, Norway, and Baltic trades, and in their service soon rose to the rank of mate. In 1755, at the outbreak of the French war, he volunteered for the royal navy. Showing ability, in 1759 he was given a master's warrant, and, in command of the *Mercury,* proceeded to the North American station. During a winter at Halifax he diligently applied himself to the study of mathematics and astronomical navigation. The charts and observations which he made of the coasts of Newfoundland and Labrador, published in 1776–78 and distinguished

for their accuracy even to the present day, introduced him to the notice of the Royal Society, and this society intrusted him with the command of an expedition to the Pacific, to observe the transit of Venus. He left Plymouth on Aug. 26, 1768, and, after touching at Madeira and Rio de Janeiro, doubled Cape Horn and reached Tahiti on April 13, 1769, where the transit was successfully observed, June 3. On the return voyage six months were spent in sailing around and charting the coast of New Zealand, which had not been visited by Europeans for more than a century. In a similar way the eastern coast of Australia was examined and named New South Wales. The entire separation of Australia from New Guinea was determined. After a two months' stay at Batavia he returned by the Cape of Good Hope, and arrived in England, June 12, 1771. The important geographical results of this successful voyage won universal recognition, and two months afterward Cook received the rank of commander and an appointment to organize a new expedition for the discovery of the imaginary *Terra Australis Incognita*. He sailed with two ships from Plymouth, July 13, 1772, and, in a three years' cruise of over 20,000 leagues, encircled the Antarctic region from New Zealand to Cape Horn. His claim that there is no other great southern continent is not admitted by contemporary explorers, though his maps in many respects are still valuable for Antarctic navigation. He returned to England, July 30, 1775. Taught a lesson by a mortality of 46 per cent in his first voyage around the world, Cook had made such excellent hygienic arrangements that only one man out of 118 died during the cruise. His detailed account of the measures and precautions adopted were read before the Royal Society, which granted him the Copley gold medal for his important services to humanity and to the maritime world. Promoted to the rank of captain, he received an appointment at Greenwich Hospital, but shortly afterward he offered to command an expedition in search of a passage round North America from the Pacific. He sailed July 12, 1776, by way of the Cape of Good Hope, and spent the following year in the South Pacific. Thence he set sail for the north in January, 1778, and, after rediscovering the Sandwich Islands, reached America, and added to geographical knowledge by making an almost continuous running survey of the coast as far as Bering Strait, where, stopped by impenetrable ice, he returned to winter at the Sandwich Islands. Here he was brutally slaughtered, Feb. 14, 1779, by the natives in a sudden attack aggravated partly by the cowardice and neglect of one of his officers and Cook's own rashness in dealing with the natives. His death occasioned widespread regret, and the King pensioned his wife and children. An obelisk erected in 1874 marks the spot where he fell. A practical and scientific seaman, a sagacious commander, kind but strict with his crew, Cook was also distinguished by indomitable perseverance and decision. An account of Cook's first voyage appeared originally as part of Hawkesworth's *Voyages* (1773); the narrative of the second was written by Cook himself, under the title of *A Voyage Towards the South Pole and Round the World, Performed in His Majesty's Ships the Resolution and Adventure, in the years 1772, 1773, 1774, and 1775* (1777); the story of Cook's third voyage, partly written by Cook himself and partly by Capt. James King, appeared in 1784. Consult: Wharton, *Captain Cook's Journal during his First Voyage round the World* (London, 1897); Synge, *Captain Cook's Voyages round the World* (ib., 1897); Besant, *Captain Cook* (ib., 1890); Kippis, *Life of Captain James Cook* (ib., 1788); *Narrative of the Voyages round the World Performed by Captain James Cook* (2 vols., ib., 1878); Kitson, *Captain James Cook* (ib., 1907).

COOK, John (1805–92). A Canadian clergyman and educator. He was born at Sanquhar, Dumfriesshire, Scotland, and was educated at Edinburgh University. He was ordained to the Presbyterian ministry in 1835, but came to Canada in 1836, and was appointed pastor of St. Andrew's Church, Quebec. When the Established church of Scotland was divided by the secession of those who afterward organized the Free church, the movement likewise affected Presbyterianism in Canada; but Cook remained a member of the Established church and maintained a mediating attitude, seeking to heal the breach between the two divisions. He aided in establishing Queen's University, Kingston, which was founded in protest of sectarian educational privileges, was acting principal in 1857–60, its first chancellor in 1877–80, and for many years a trustee. He was largely instrumental in founding Morvin College, Quebec, in 1862, and was its first principal. In 1861 he became an active supporter of Presbyterian union in Canada, and after this was accomplished in 1875 became the moderator of the first general assembly.

COOK, Joseph (1838–1901). An American lecturer and author, born at Ticonderoga, N. Y. He studied at Phillips (Andover) Academy and at Yale, and graduated at Harvard in 1865. He then spent three years at Andover Theological Seminary, preached in various Congregational churches, spent two more years in study in Germany, and then settled in Boston, where in 1873 he began his "Boston Monday Lectures," which became very popular and which he continued until 1880, when he set out on a two years' lecturing journey round the world. In 1883 he resumed his Monday Lectures in Boston. In 1888 he founded a religious monthly called *Our Day*. He lectured on many subjects, both in Europe and in America, and had great vogue with a part of the religious public for the reason that all of his philosophical discourses were attempts to harmonize religion and science. He published: *Biology* (1877); *Marriage* (1878; 8th ed., 1891); *Labor* (1880); *Socialism* (1880; 6th ed., 1893); *Occident* (1884); *Orient* (1886); *The Higher Levels of Arbitration* (1900); *New Defenses of the Lord's Day* (1900).

COOK, Melville Thurston (1869–). An American botanist, born at Coffeen, Ill. He was educated at DePauw, Leland Stanford Junior, Chicago, and Ohio State universities. In 1894–95 he was principal of the high school at Vandalia, Ill. At DePauw he was instructor in biology in 1895–97 and professor from 1897 to 1904; for two years he headed the department of plant pathology and economic entomology at the Estación Central Agronómica, Santiago de las Vegas, Cuba; from 1907 to 1911 he was plant pathologist of the Delaware Experiment Station at Newark, N. J., and thereafter he served as professor of plant pathology at Rutgers College and State plant pathologist. He is author of *Galls and Insects*

Producing them (3 vols., 1902–04) and *Diseases of Tropical Plants* (1912).

COOK, Orator Fuller, Jr. (1867–). An American botanist, born at Clyde, N. Y. He was educated at Syracuse University, where he was in charge of the biology department in 1890–91. As agent of the New York Colonization Society he made explorations and investigations in Liberia in 1891–97, and he also served as professor of natural sciences in Liberia College during this same period and as president of the institution in 1896–97. In 1898 he became custodian and assistant curator of the United States National Museum. He had charge of plant importation by the United States Department of Agriculture from 1898 to 1900, when he took up the investigation of tropical agriculture. In 1904 he became professor of botany at George Washington University. He is author of various articles and reports on Liberia and African colonization, Porto Rico, tropical agriculture, botany, zoölogy, and evolution.

COOK, Stanley Arthur (1873–). An English Orientalist, born in King's Lynn. He was educated at Gonville and Caius College, Cambridge, of which he became fellow and lecturer in Hebrew and Syriac. In 1896–1903 he was on the editorial staff of the *Encyclopædia Biblica;* in 1902 he became editor for the Palestine Exploration Fund; and he was the editorial adviser and a contributor on Old Testament and Semitic subjects to the *Encyclopædia Britannica.* He contributed to the *Jewish Quarterly,* the *Expositor,* etc., and wrote: *Glossary of Aramaic Inscriptions* (1898); *The Laws of Moses and the Code of Hammurabi* (1903); *Critical Notes on Old Testament History: Traditions of Saul and David* (1907); *Religion of Ancient Palestine* (1908); *I. Esdras* (1912).

COOK, Theodore Andrea (1867–). An English journalist and sportsman, born in Exmouth, Devon. He was educated at Radley and at Wadham College, Oxford, making a remarkable record as a scholar and oarsman. He became assistant editor of the *St. James's Gazette* in 1898, and was its editor for the first four months of 1900. He then went on the staff of the *Daily Telegraph,* and in 1910 became editor in chief of the *Field.* Cook was one of the first Englishmen to take up *épée de combat* fencing and was captain of the English fencing team in the first international match at Paris in 1903 and at the Olympic Games of 1906. Among his many books are the following: *Old Touraine* (1892); *Tobogganing at St. Moritz* (1896); *The Story of Rouen* (1899); *A History of the English Turf* (1903); *Old Provence* (1905); *Eclipse and O'Kelly* (1907); *The Olympic Games* (1908); and *Thomas Doggett, Deceased* (1908).

COOK, Thomas (1808–92). An English railway excursion and tourist pioneer, born at Melbourne, Derbyshire. His energy was at first devoted to the cause of temperance, but later to the work with which his name is now inseparably connected. Beginning in 1841 with trips between Leicester and Loughborough, on the Midland Railway, the business rapidly increased in spite of many difficulties. The tourist tickets of Thomas Cook & Son have now become known all over the world. See Cook's Excursions.

COOK, Walter (1846–1916). An American architect, born in New York City. He was educated at Harvard University and received his professional training at the Royal Polytechnic School, Munich, and the Ecole des Beaux-Arts, Paris. In 1877 he returned to New York, becoming in succession a member of the firms of Babb, Cook and Willard, Babb, Cook, and Welch, and Cook and Welch. He was a member of the jury for the New York Public Library and for the University of California, became consulting architect for New York's Board of Estimate and Apportionment, and was a member of that city's Art Commission in 1905–07. At various times he was president of the New York Chapter of the American Institute of Architects, of the Institute itself, and of the Society of Beaux-Arts Architects; and he was elected a member of the National Academy of Design and made a chevalier of the Legion of Honor. The following buildings, among many, were designed wholly or in part by him: the DeVinne Press building, office buildings for the New York Life Insurance Company, a residence for Andrew Carnegie, the Choir School at the cathedral of St. John the Divine, the stadium and other buildings at the Pan American Exposition, Buffalo, and a number of branch buildings for the New York Public Library.

COOKE, George Albert (1865–). An English clergyman, educated at Merchant Taylors' School and at Wadham College, Oxford, where he was scholar. He was lecturer in Hebrew at St. John's, chaplain of Magdalen, and, after 10 years as curate and rector, private chaplain to the Duke of Buccleuch from 1899 to 1908. He was made canon of St. Mary's, Edinburgh, in 1907 and canon of Rochester in 1908, and was chosen in 1908 Oriel professor of the interpretation of Holy Scripture at Oxford. He contributed to theological periodicals and to Hastings' *Dictionary of the Bible,* the *Encyclopædia Biblica,* etc., and published: *History and Song of Deborah* (1892), *Text-Book of North Semitic Inscription* (1903), *The Progress of Revelation* (1911), *Judges and Ruth* (1912).

COOKE, George Frederick (1756–1811). An English tragedian, born at Westminster. He made his début on the stage in 1776 and soon became popular in England and Ireland. In 1810 he appeared in New York and other American cities, where his success was equally great. Although possessed of fine talents, Cooke ruined his career by intemperance, which also caused his death. His best work was in the characters of Shylock, Iago, and Richard III. Edmund Kean, who admired him as the greatest of actors, erected a monument to his memory in St. Paul's Churchyard, New York City. Consult Dunlap, *Memoirs of Cooke* (London, 1813).

COOKE, George Willis (1848–). An American clergyman, editor, and author, born at Comstock, Mich. He studied at Olivet College (Mich.) and at the Meadville Theological School (Pa.) and was in 1872 ordained to the Unitarian ministry. Thereafter he held pastorates in Wisconsin, Michigan, and Indiana, and in Dedham and Lexington, Mass., and Dublin, N. H. After 1899 he devoted his time principally to lecturing (at the Concord School of Philosophy, the Boston School of Social Science, and the Rand School of Social Science in New York) and to writing. Besides contributing much to the periodical press, including editorials for *The Christian Socialist* (he became a Socialist in 1902), he is the author of: *Ralph Waldo Emerson* (1881); *George Eliot* (1883); *Poets*

and Problems: Tennyson, Ruskin, and Browning (1886); *The Guide Book to Robert Browning* (1891); *Unitarianism in America* (1902); *The Poets of Transcendentalism* (1902); bibliographies of James Russell Lowell (1906) and Ralph Waldo Emerson (1908); *Woman in the Progress of Civilization* (1912).

COOKE, Grace MacGowan (1863–). An American writer of stories, born at Grand Rapids, Ohio. She was married to William Cooke in 1877. In 1897–98 she was president of the Tennessee Woman's Press Club. Her writings include: *Mistress Joy*, with Annie Booth McKinney (1901); *Return: A Story of the Sea Islands*, in collaboration with her sister, Alice MacGowan (1903); *Huldah* (1904); *A Gourd Fiddle* (1904); *The Grapple* (1905); *Their First Formal Call* (1906); *Son Riley Rabbit and Little Girl* (1907); *The Power and the Glory* (1910); *The Doings of the Dollivers* (1910); *The Joy Bringer: A Tale of the Painted Desert* (1913); *The Girls of Silver Spur Ranch*, with Anne MacQueen (1913); *William and Bill*, with Caroline Wood Morrison (1914).

COOKE, Henry (1788–1868). An Irish Presbyterian leader. He was born at Grillagh, near Maghera, County Derry, May 11, 1788; studied at Glasgow and Dublin; entered the ministry in 1808, and from 1829 was pastor in Belfast, and from 1853 professor of sacred rhetoric in Assembly College there. He played a prominent part in his denomination's affairs and was especially active and successful in excluding Arians from the Irish Presbyterian church and in promoting educational movements. He was an orator of a high grade, but he left no publications other than speeches and sermons. For a half-century his life was a large portion of the religious and public history of Ireland. A statue of him was erected in Belfast in 1875. For his *Life*, consult J. L. Porter (3d ed., Belfast, 1875).

COOKE, Jay (1821–1905). An American banker and financier, born in Sandusky, Ohio. He was privately educated and in 1838 entered the banking house of E. W. Clarke & Co., in Philadelphia, where he developed such rare ability in banking and financial matters that he was made a junior member of the firm in 1842. In 1858 he retired from the firm, and until 1861 was engaged in financing railroad companies and negotiating their bond issues. In the latter year he established the banking house of Jay Cooke & Co., in Philadelphia. During the Civil War, as the principal financial agent of the Federal government, he performed services of great value to the nation. He negotiated the first five-twenty loan of $513,000,000, the ten-forty loan of $200,000,000, the seven-thirty loan of $830,000,000, and others, making a total of over $2,000,000,000. He was an ardent advocate of the national banking system and was influential in securing its success at the start. The failure of his banking house in 1873, through having advanced too largely on Northern Pacific Railroad bonds, was one of the causes of the financial crisis in that year; but the principal and interest was eventually paid on all claims, and the firm continued successfully. Consult E. P. Oberholtzer, *Jay Cooke, Financier of the Civil War* (Philadelphia, 1907).

COOKE, John Esten (1830–86). An American novelist. He was born at Winchester, Va., the son of a distinguished lawyer, John Rogers Cooke, and brother of Philip Pendleton Cooke (q.v.). He studied law, but showed early a literary bent. His best work, *The Virginia Comedians* (1854), a Colonial romance uneven in merit, was yet full of a promise not destined to be realized. He entered the Confederate service on Stonewall Jackson's staff, and on the death of the latter was transferred to the staff of Gen. J. E. B. Stuart. Later he was inspector general of the horse artillery of the Army of Northern Virginia. From the close of the war until his death his pen was rarely idle. Novels dealing with military events in Virginia and biographies of the great generals under whom he had served were produced with a speed fatal to high excellence, which did not, however, prevent his work from having historical value. The most popular of his military novels is *Surry of Eagle's Nest* (1866), which is understood to be partly autobiographical. Among his many books may be named the following: *Leather Stocking and Silk* (1854); *The Youth of Jefferson* (1854); *Henry Saint John, Gentleman* (1859), a sequel to *Virginia Comedians: Wearing of the Gray* (1867) and its sequel, *Mohun; or, the Last Days of Lee and his Paladins* (1868); *Life of Stonewall Jackson* (1863, 1876); *Life of R. E. Lee* (1871); and *Virginia: A History of the People* (1883), an excellent book contributed to the "American Commonwealths Series."

COOKE, Joseph Brown (1868–). An American surgeon, born at Saratoga Springs, N. Y. After graduating from the College of Physicians and Surgeons, New York, he became a practicing physician and surgeon in New York City in 1890. He was visiting physician to the Northwestern Dispensary in 1892–94 and to St. Mary's Free Hospital for Children in 1892–96. In 1900 he became surgeon to the New York Maternity Hospital and in 1903 obstetrician to the New York Polyclinic Medical School and Hospital and adjunct professor of obstetrics. His publications include: *Manual of Obstetrical Technique* (1900; 6th ed., 1908); *A Nurse's Handbook of Obstetrics* (1903; 6th ed., 1913); *Textbook of Obstetrics* (1905); and a novel, *The Mystery of Carney-Croft* (1906).

COOKE, Josiah Parsons (1827–94). An American chemist, born in Boston. He graduated at Harvard in 1844 and soon afterward was appointed to the chair of chemistry and mineralogy at Harvard College. In this capacity he stimulated the scientific study of chemistry at collegiate institutions, urging laboratory instruction, which before his time had not been introduced into the undergraduate course of American colleges. It was Cooke who introduced his pupil Theodore William Richards, at the time a graduate student of chemistry at Harvard, into the study of atomic weights—a subject to which Richards (q.v.) subsequently made a number of contributions. The joint communication, by Cooke and Richards, on the relative values of the atomic weights of hydrogen and oxygen, was published in the *Proceedings of the American Academy of Arts and Sciences* for 1887 and shortly afterward reprinted in the *American Chemical Journal* and in the *London Chemical News*. Cooke's other publications include: *Chemical Problems and Reactions* (1853); *Elements of Chemical Physics* (1860; 4th ed., 1886); *First Principles of Chemical Philosophy* (1868; rev. ed., 1882); *The New Chemistry* (1872; rev. ed., 1884);

Michigan: A History of Governments (1885; rev. ed., 1905); *The Credentials of Science the Warrant of Faith* (1888).

COOKE, Mordecai Cubitt (1825–1912). An English botanist, born at Horning, in Norfolk. When a boy he was apprenticed in the draper's trade, afterward acted as clerk in a law office, and subsequently taught school. At the age of 35 he obtained a position in the India Museum, from which he was transferred to the Kew Botanical Gardens in 1880. In 1903 he was awarded the Victoria medal of honor by the Royal Horticultural Society, and the Linnæan gold medal by the Linnæan Society. He wrote more than 40 botanical works, dealing chiefly with fungi, and including: *Manual of Botanic Terms* (1862); *Handbook of British Fungi* (1874); *Mycographia* (6 vols., 1879); *Illustrations of British Fungi* (8 vols., 1881); *An Introduction to the Study of Fungi* (1895); *Mushrooms Edible and Poisonous* (1903); *Fungoid Pests of the Flower Gardens* (1906); *A Manual of Structural Botany* (new ed., 1907).

COOKE, Philip Pendleton (1816–50). An American poet, elder brother of John Esten Cooke and first cousin of John Pendleton Kennedy, the novelist. He was born at Martinsburg, Va. He graduated at Princeton in 1834 and, like his more famous younger brother, studied law under his father, but preferred literary pursuits, and contributed many poems and stories to the *Southern Literary Messenger* and other magazines. He was equally devoted to field sports, which in part accounts for the fresh quality of his work, especially of his *Froissart Ballads* (1847), his only published book.

COOKE, Philip St. George (1809–95). An American soldier, born near Leesburg, Va. He graduated at West Point and was assigned as second lieutenant of the Sixth Infantry in 1827, served for many years on the frontier, participated in the Black Hawk War of 1832, and became lieutenant of dragoons in 1833. During the Mexican War he served from October, 1846, to July, 1849, in California as lieutenant colonel of a battalion of Missouri volunteers and for a short time commanded a regiment in the city of Mexico. In 1847 he became major of the Second Dragoons. After 1849 he was reassigned to frontier duty, took part in several operations against the Indians, commanded the cavalry in the Utah expedition of 1857–58, became colonel of the Second Dragoons in 1858, and from August, 1860, to August, 1861, was in command of the Department of Utah. He was raised to the rank of brigadier general in November, 1861, and participated as a commander of a cavalry division in the Peninsular Campaign, commanded the Baton Rouge District of the Department of the Gulf from October, 1863, to May, 1864, and from May, 1864, to March, 1866, was general superintendent of the recruiting service. At the close of the war he was brevetted major general. He commanded the Department of the Platte in 1866–67, the Department of the Cumberland in 1869–70, and the Department of the Lakes from 1870 until his retirement in 1873. He published: *Scenes and Adventures in the Army, or Romance of Military Life* (1856); *The Conquest of New Mexico and California: An Historical and Personal Narrative* (1878); *New Cavalry Tactics* (1884).

COOKE, Richard Joseph (1853–). An American Methodist Episcopal bishop, born in New York. He entered the ministry in 1873 and was ordained in 1876; graduated at East Tennessee Wesleyan University in 1880 and studied in Berlin for a year; and was connected after 1889 with Grant University (Chattanooga, Tenn.), of which he became professor of New Testament exegesis in that year and vice chancellor in 1893. His greatest influence in the Methodist church was as editor of the *Methodist Advocate Journal* (1891) and as book editor of the church from 1904 to 1912, when he was chosen bishop. Among Dr. Cooke's works are: *Doctrine of the Resurrection* (1884); *Reasons for Church Creed* (1888); *Christianity and Childhood* (1891); *The Historic Episcopate* (1896); *Christ and the Critics* (1898); *The Incarnation and Recent Criticism* (1907); *The Wingless Hour* (1911); and *Freedom of Thought in Religious Teaching* (1913).

COOKE, Rose Terry (1827–92). An American poet and writer of short stories, chiefly of New England rural life, whose prominent characteristics are pathos and humor. She was born at West Hartford, Conn. After her marriage to R. H. Cooke in 1873 she lived at Winsted, Conn., till 1887, removing thence to Pittsfield, Mass., where she died in 1892. Her first published work was *Poems* (1860). A second and complete collection of her verses was made under the same title in 1888. She then turned to fiction, often defective in form, but spontaneous, fresh in its humor, and keen in its perception of New England traits and character. Her volumes, except for a single novel, *Steadfast* (1889), are collections of short stories: *Happy Dodd* (1879); *Somebody's Neighbors* (1881); *Root-Bound* (1885); *The Sphinx's Children* (1886); *Huckleberries* (1891).

COOKE, Thomas (1703–56). An English writer, known as Hesiod Cooke. In 1725 he published a poem called *The Battle of the Poets*, in which he attacked Pope and the other wits and was rewarded by a place in the *Dunciad* (ii, 138). He did a large amount of miscellaneous literary work and was for a time editor of the *Craftsman*. He has a deserved place in literature as the translator of Hesiod (1728) and of Terence (1734).

COOKE, Sir William Fothergill (1806–79). An English electrical engineer, born at Ealing, in Middlesex. He received his education at Durham and Edinburgh, served on the Indian staff from 1826 to 1831, and then studied medicine and the physical sciences in France and in Germany. In 1837 he entered into partnership with Wheatstone, and together with him rendered services of the highest importance to electrical engineering, especially to telegraphy. In 1838 he built the first English telegraph line, between London and West Drayton. He published *The Electric Telegraph: Was It Invented by Professor Wheatstone?* (1854).

COOK'ERY. The art of preparing food for the table. In general, the preliminary processes of cleaning foods, paring vegetables, etc., are included under the term "cookery" as is also the preparation of foods by chilling or freezing. Some foods, e.g., fruits, are eaten both raw and cooked, both being wholesome. In the majority of cases, however, the effect of proper cooking is to render food more wholesome and palatable than in the raw state. The heat of cooking also sterilizes food if microörganisms, insects, or their eggs be present accidentally.

History. Cooking, in one form or another,

has been practiced since immemorial times, and the knowledge we possess of the ancient modes of cooking presents some interest in connection with the study of the customs and habits of the past. The Egyptians possessed wheaten flour of the finest sort. Their common bread was made of spelt, or of the centre of the lotus dried and pounded. Leeks and onions seem to have been common vegetables. Fish they salted and dried in the sun; quails, ducks, and small birds they salted and ate raw. We read of their roasting and boiling the flesh of the ox.

Fish was a common article of food with all classes of Greeks; but with the wealthier much skill and delicacy was used in cooking it, and choice and expensive varieties were sought after. Archestratus writes of "a boiled torpedo done in oil and wine, and fragrant herbs, and some thin grated cheese" (*au gratin*). Fish, stuffed with forcemeat and fried, boiled in pickle, baked in fig leaves soaked in oil, cooked in hot ashes, etc., are among the recipes that we find recorded. The Greeks boiled and roasted the flesh of sheep, pigs, lambs, and goats. They had poultry, small birds, and game, and sausage made of blood, partaking of the character of blood puddings (*Blutwurst*). The bread of Athens was the most celebrated in Greece; it was sometimes homemade, but chiefly bought in the market, and prepared in great variety, as pan loaves, rolls, sweet loaves, etc. The bread eaten by the poorer classes was made of barley and was sometimes flavored with oil, honey, poppy seed, etc. Athenian cheese cakes were also famous; and there were honey and sesame cakes, which, with fresh and dried fruits, as figs, almonds, olives, and nuts, seem to have been partaken of after dinner. They consumed vegetable food also in abundance and had cabbage, onions, lettuce, and so on.

In the Greek house there was no regular cook, though in the establishments of the wealthy several women were kept to attend to the kitchen. The women in general saw to the requirements of the table, and even the mistress of the house was not idle. Cooks stood in the market in Athens, ready to be hired for particular occasions. The most celebrated were those of Sicily; they were probably persons of some importance.

In the early days of Rome a gruel made of lentils, and called *puls*, was the common food of the people, and with green and other vegetables was, till later times, the usual fare of the inferior classes—meat being used but sparingly. By degrees, however, a taste for better eating crept in, and after the Asiatic conquests luxury was imported. The wealthy Romans were fond of elegant service at their tables and studied carefully the quality of the viands that were placed before them. They seem to have been as clever as the French in preparing surprises and in carrying out disguises in their dishes. The Romans prepared and cooked their food with oil to a great extent. Their meals probably consisted of two courses and a dessert, the first course being intended to excite an appetite; the second was a joint, roasted or baked. The Greeks and Romans used honey for the purposes for which we use sugar. Cane sugar probably was cultivated in China, and its manufacture understood there; but the Greeks took it for a kind of solid honey and used it only for medicinal purposes.

Of ancient British cooking not much is known; it was probably of an extremely rude description. Hares, poultry, and fish are said to have been forbidden as food. The Saxon chronicles make some reference to cooking. The Danes and Germans appear to have paid little attention to the preparation of their eatables. The Normans were more curious in these matters; some offices among them were held in right of the kitchen. In early English cooking much use was made of the mortar. Oil and lard were used instead of butter. Many English cookbooks bear an early date, as *The Forme of Cury*, by Pegge (1780), and others date as follows: Sir J. Elliott's book (1539); Abraham Veale's (1575); and *The Widdowe's Treasure* (1625).

From the writings of early explorers a good deal is known of the cookery of the American Indians. They roasted food, baked it in earth ovens, and boiled it, as did most primitive peoples. We owe to them one of our common foods, Indian corn or maize, and some of our corn dishes, e.g., succotash (corn and beans cooked together), are of Indian origin.

The cooking of France was probably of an imperfect and rude kind until the introduction of Italian tastes by the princesses of the house of the Medici. The great difference between French and English or American cooking consists in the fact that the French cook their meat much longer, knowing that this renders it more tender. They are thereby enabled to multiply dishes by altering or annihilating the original taste of the meat and making it a vehicle for foreign flavors. The variety, daintiness, and grace of form which dishes thus acquire are very admirable. In the point of economy, the French are commonly said to surpass the Anglo-Saxon. Great attention is given by the French to the economical use of materials, to seasoning, and to careful cookery. Bread and pastry are less often made at home in France than in the United States. Jewish cookery is termed "Kosher," i.e., "ceremonially clean," in accordance with the requirements of the Mosaic law. The word is used of foods which meet these requirements, especially of meats from animals slaughtered in accordance with Jewish ecclesiastical law, as well as of methods of preparing food.

The art of cooking as a branch of woman's education has latterly engaged considerable attention in America, England, and other countries; and there are in New York, Boston, Philadelphia, Canada, and other places schools where young women can receive this kind of instruction. The preparation of food is an essential part of any course in home economics, a subject commonly found in the curricula of colleges and other schools for women—the colleges and similar institutions specializing commonly on theories of nutrition, of cookery, etc., and the grade schools giving instruction quite largely in the art.

The principal cooking methods are boiling, steaming, roasting, broiling, frying, and baking. These terms and similar ones are not absolute, but are used somewhat loosely.

Boiling consists in cooking food in water at the boiling temperature, 212° F. or 100° C., with heat enough to insure vigorous ebullition. The water may be seasoned with salt, sugar, seasoning herbs, etc., according to the food used and the object sought.

Steeping, *infusing*, and *percolating* are special processes akin to boiling, usually employed in the making of such beverages as tea and coffee.

Another special form of cooking in hot water is *coddling*, in which eggs, e.g., are placed in boil-

ing hot water which is allowed to cool gradually without further application of heat.

Steaming consists in cooking food over boiling water or in live steam in some special device.

Roasting, a process more used formerly than at the present time, is employed chiefly with meats, fish, and fowl. The food is cooked in the open air in front of a fire, being suspended or placed on a spit or some similar device so that it can be rotated. Frequent basting is desirable. A similar method is *planking*, in which the meat or fish is fastened to a suitable board or plank and placed in front of a fire until cooked. Bread, particularly Indian corn bread, may be cooked in the same way. The term is now applied to cooking meat and vegetables in ovens, more properly known as "baking."

Broiling, or *grilling*, is a process similar in principle, in which the food—most commonly meat, fish, or fowl—is cooked on a gridiron, broiler, or other device over or under the fire. When bread or similar food is thus treated, it is termed *toasting*.

Baking is a general term applied to cooking in hot, relatively dry air in an inclosed space, as an oven, the process being used with meats and fish as well as with breadstuffs, vegetables, and other foods. Utensils of various sorts are used to contain the foods during baking. Meat baked in open, shallow pans resembles roasted meat in appearance, and in fact is generally termed "roast meat," since true roasting has become an uncommon practice in households.

Frying is of two sorts, viz., *deep frying*, in which the food is immersed in hot or boiling oil or fat, and *sautéing* (*pan frying*, *dry frying*, or *pan broiling*), in which the food is cooked in an open shallow utensil in its own fat or in a small amount of added fat, sometimes only enough to "grease the pan." Frying is a method used with meat, vegetables, batters, and other food materials.

There are also special forms of these cooking processes which are very largely determined by the kind of utensil used. For instance, casserole cookery, in which the foods are cooked in a covered vessel, usually earthenware. This is akin to *baking* or to *sautéing* if the food is cooked in a little fat with or without seasoning, or akin to *stewing* if water or other liquid is added. Casserole cooking is essentially the same as the process sometimes termed *braising*, in which the food, e.g., meat, is browned and then cooked in a moist heat in a closely covered utensil. The term *braising* is also applied to browning the surface of food, e.g., an omelet, by holding a red-hot iron over it.

A *double boiler*, or *bain marie*, is a common cooking device in which food is placed in a container which in turn is partly immersed in boiling water or in steam.

In so-called *fireless cookers* hot foods are placed in insulated air spaces and cooked by the retained heat alone or by this with the addition of heat supplied by hot stones or iron plates or in some similar way. The principle is similar to that employed in keeping liquids, etc., hot in vacuum jacketed bottles or similar containers. See FIRELESS COOKING.

The *chafing dish* is a common special cooking utensil. It is usually made of silver, copper, or other metal, and foods may be cooked in a pan directly over the flame, usually an alcohol lamp or in a pan over a hot-water pan which is next to the flame. Electric chafing dishes are also common, as are many other special cooking appliances and utensils in which electricity is used as a source of heat instead of the usual fuels—wood, coal, gas, petroleum, etc.

Judging by the results of many careful laboratory experiments, the chief loss of weight in cooking meat is due to the driving off of water. When beef is pan-broiled, there appears to be no great loss of nutritive material, particularly if the material adhering to the pan is utilized for making gravy. When beef is cooked in water, 3 to 20 per cent of the total substance is extracted and found in the broth. This is not an actual loss if the broth is used for soup or in other ways. Beef used for the preparation of beef tea or broth, on an average, loses relatively little nutritive material, though much of the flavoring material is removed. The amount of fat in the broth varies directly with the amount originally present in the meat, the fatter the meat the greater the quantity removed. In cooking in water, the smaller the piece the greater the amount of material removed, and the longer the time the more material removed. Cookbooks generally state that when meat is boiled for the table it should be plunged at once into boiling water, so that the outer layer may be coagulated, and recommend that it should be placed in cold water and slowly raised to the boiling point when used for soup making. Experiments show that the amount of material removed is practically the same whichever method is followed. In general, soups and broths do not contain much of the nutritive material of the meat, though they do contain much of the flavoring material originally present.

Authorities quite generally agree that when meat is baked it should be submitted at once to a degree of heat which will sear the outside of the roast so that the juices may be retained in it, and that the subsequent cooking should be rapid rather than slow, and at a high rather than a moderate oven temperature. To insure a rare (underdone) or medium well-cooked roast, the cooking should continue 13 to 15 minutes per pound, and 13 to 15 minutes "to the oven"; and 20 minutes per pound and 20 minutes "to the oven" for a well-done roast.

Experiments have shown that meats of various kinds and cuts cooked by the ordinary methods are all very thoroughly assimilated, no marked difference being found which could be ascribed to the kind or cut, or to the method of cooking. There is a common belief, apparently borne out by experience, that for invalid cookery the meats should be cooked in such a way that they are very tender, and similarly that soft-cooked eggs are preferable to hard-cooked eggs. Breads and other foods made from flour and meals should be cooked sufficiently to remove the raw or "doughy" taste, i.e., until the starch is well gelatinized. It is a general belief, well borne out by experience, that cereal breakfast foods and similar articles are best when cooked slowly for a long time. Fried foods should not be cooked at a temperature so high that the fat undergoes decomposition, since acrolein, one of the products formed from overheated fat, is very irritating to the mucous surfaces. Very probably the presence of this substance in fried foods improperly cooked is responsible for the statement often

made that fried foods are the cause of digestion disturbances.

Vegetables are commonly fried, boiled, or baked. Potatoes should be cooked until they are tender and mealy. If boiled, the water is commonly poured off, and the potatoes allowed to stand where they will keep hot in order that they may "steam" or "dry out." Green vegetables are most commonly cooked in boiling salt water, and the process should be continued only until they are tender, as overcooking injures the flavor and color. Special directions for cooking fruits and nuts, for making breads, cake, pastries, bonbons, etc., as well as for preparing the foods enumerated above, can be found in the numerous books and journals devoted to cookery.

Every precaution should be taken to insure cleanliness in the cooking of food. This is important, not only because one wishes to avoid filth, but also because unclean methods make possible the transmission of disease.

In the United States and in other countries there is a growing effort to secure cleanliness in markets, food factories, bakeries, hotels, restaurants, and other places where food is handled, prepared, sold, and eaten. With this end in view legislation has been enacted in many places, providing for inspection and for punishment if the law is violated.

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COOK INLET. A bay of the Pacific Ocean, indenting the south coast of Alaska, between the Alaskan and Kenai peninsulas (Map: Alaska, J 5). It is included between lat. 59° and 61° 20′ N. and long. 149° and 154° W. In shape long, relatively narrow, and crooked, its length is about 200 miles and its greatest breadth 60 miles. Sudden storms, fogs, and tidal rips, due to high tides along the broken coast line, make navigation at the northern extremity somewhat dangerous, though steamers ply its waters without serious difficulty during the season. From November to May the northern part is locked in ice. It contains several islands, Augustine Island, with its volcano Mount St. Augustine, in violent eruption during 1883, being the largest. The coast scenery is grand, comprising active volcanoes (of which Mount Iliamna, 12,066 feet altitude, is the highest), snow-clad mountains, glaciers, and green hills. At its northern extremity are the Knik Arm and the Turnagain Arm, branching to the northeast and east. It was explored in 1778 by the navigator whose name it bears, in the hope of finding a passage to the Arctic Sea. It receives the waters from a number of rivers, chief of which is the Sushitna River, coming from the north. Coal is found on its shores, along which are a number of small towns. Seldovia is the steamship port of call.

COOK ISLANDS, or HERVEY GROUP. An archipelago of small islands in Polynesia, Pacific Ocean, consisting of six large and a number of small islands and reefs, extending from about lat. 19° to 22° S. and from long. 157° to 163° W. southeast of Samoa and northwest of the Austral Islands (Map: World, West. Hem., M 4). The total area is 150 square miles. Rarotonga, with an area of 26 square miles, is the largest island. The soil is generally fertile, but water is scarce. The chief products are copra, coffee, and oranges, and the trade is mostly with New Zealand, with which the group has monthly steam communication. Pop., 1906, 6708; 1911, 6964; chiefly consisting of Polynesians of the second, or Tongafiti, swarm of migration, and all converted to Christianity of evangelical type. The group was discovered by Cook in 1773–77; made a British protectorate in 1888, and annexed in June, 1901, to the Dominion of New Zealand. The islanders have a legislature of heads of families and an executive council of the higher chiefs; the acts of the legislature require the approval of the British Resident, whose residence is on Rarotonga.

COOK'S EXCURSIONS. A system of travel originated by Thomas Cook in 1841, by which companies of tourists are conducted by a manager or guide, who makes all the traveling arrangements and directs the disposition of the time.

COOK'S TALE, The. One of the stories forming Chaucer's *Canterbury Tales.*

COOK STRAIT. A passage which separates North Island and South Island, New Zealand (Map: New Zealand, S. I., E 2). Its greatest width is 90 miles. It was discovered by Captain Cook on his first voyage in 1769.

COOK'TOWN. A town and port of Banks Co., Queensland, at the mouth of the historic Endeavor River in 15° 27′ 20″ S. lat., 145° 17′ E. long., 1050 miles northwest of Brisbane, with which and with other ports it is connected by steamship service (Map: Australasia, D 4). It is connected by rail with Laura in the gold fields, 67 miles westward. It was here that Captain Cook beached the *Endeavor* in 1770 after he had got her off a reef outside, having thrown his guns overboard to keep the ship afloat. Search has failed to recover the guns, which have evidently been covered up by the strong coral growths of the vicinity. A monument to Captain Cook was unveiled in 1889. There are fine public buildings, an admirable hospital, churches, schools, etc. It is the main port for trade with New Guinea, and the port is the outlet for a sugar country and a rich mineral country. It has pearl fisheries, coffee and rice grow near by, tin and gold are mined. Pop., 1901, 1936; 1911 (election district), 3349.

COO'LEY, LeRoy Clark (1833–1916). An American chemist. He was born at Point Peninsula, in Jefferson Co., New York; graduated at Union College in 1858; and from 1860 to 1874 was professor of natural sciences in the New York State Normal School. In 1874 he became professor of physics and chemistry in Vassar

College. He became professor of physics only in 1894 and professor emeritus in 1907. His works include: *The New Text-Book of Physics* (1880); *The New Text-Book of Chemistry* (1881); *Laboratory Studies in Chemistry* (1894); *The Student's Manual of Physics* (1897).

COOLEY, Mortimer Elwyn (1855–). An American engineer, born at Canandaigua, N. Y. He graduated from the United States Naval Academy in 1878; in 1881 became professor of mechanical engineering and in 1904 dean of the department of engineering at the University of Michigan; was chief engineer in the United States navy during the Spanish-American War, and chief engineer officer of the Michigan Naval Brigade from 1895 to 1911. After 1900 he was known as an expert investigator and appraiser of public utilities through his work in appraising the railroads and public service corporations of Michigan and his municipal investigations in New York, Chicago, Boston, and other cities. In 1907 he became chairman of the Block Signal and Train Control Board of the Interstate Commerce Commission.

COOLEY, Thomas McIntyre (1824–98). An American jurist and writer on constitutional law. He was born in Attica, N. Y., but removed to Michigan in 1843 and in 1846 was admitted to the bar. He compiled the general statutes of the State, was reporter for the Supreme Court (1858–64), and published eight volumes of reports and a digest of the Michigan decisions. He was professor in the law department of the University of Michigan and dean of the faculty in 1859. In 1861 he became professor of constitutional and administrative law in the school of political science in the university, and also dean, and later occupied the chair of American history in the academic department. From 1864 to 1885 he was a justice of the State Supreme Court, and was Chief Justice from 1868 to 1869. In 1887 he became chairman of the Interstate Commerce Commission, but resigned four years later. Judge Cooley's publications on constitutional law are: *The Constitutional Limitations which Rest upon the Legislative Power of the States of the American Union* (1868); *Story's Commentaries on the Constitution of the United States, with Additional Commentaries on the New Amendments* (1873); *Law of Taxation* (1876); *The Law of Torts* (1879); *General Principles of Constitutional Law in the United States* (1880; 3d ed., 1898).

COOLGAR'DIE. A mining town in Western Australia, 310 miles east-northeast of Perth, with which it is connected by rail and telegraph (Map: Western Australia, E 10). Gold, discovered here in 1891, has given rich yields since 1893. Lignite and copper are also mined. Pop., 1901, 4249; 1907, 2829.

COOLIDGE, Archibald Cary (1866–). An American professor of history, born in Boston and educated at Harvard University, the University of Berlin, the Ecole des Sciences Politiques (Paris), and the University of Freiburg. He was acting secretary to the American legation at St. Petersburg in 1890–91 and secretary to the American legation at Vienna in 1893. In 1893–99 he was instructor in history at Harvard, from 1899 to 1908 assistant professor, and thereafter professor; in 1911 he also became director of the University Library. He was a member of the Taft party to the Philippine Islands in 1905–06, Harvard lecturer at various French universities in 1906–07, and delegate to the Pan-American Scientific Congress at Santiago, Chile, in 1908–09. In 1913–14 he was American exchange professor at the University of Berlin. He is author of *The United States as a World Power* (1908).

COOLIDGE, Calvin (1872–). Vice-President of the United States, born July 4, 1872, at Plymouth, Vermont. He graduated at Amherst College, Mass., and practiced law at Northampton, Mass. He held various local offices and served in the Massachusetts State Senate (1912–15). He was lieutenant-governor of Massachusetts (1916–18) and governor (1919–1920). While governor, he acquired a nation-wide reputation as a champion of law and order. For details of his election see United States.

COOLIDGE, Charles Allerton (1858–). An American architect, born in Boston. He was educated at Harvard University and the Massachusetts Institute of Technology. From 1892 to 1900 he had charge of the Chicago office of his firm. Among the notable buildings planned by him are the Ames Building, South Terminal Station, and the new Harvard Medical School buildings at Boston; the Chicago Public Library, Chicago Art Institute, and the Law School and Commons of Chicago University.

COOLIDGE, Mary (Elizabeth Burroughs) Roberts (1860–). An American economist, born at Kingsbury, Ind., and educated at Cornell and Leland Stanford Junior universities. She was on the staff of the *Rural New Yorker* (1880–81); taught history in the Washington (D. C.) High School (1882–84); was instructor in history and economics at Wellesley College (1886–90); and between 1896 and 1903 was assistant and associate professor of sociology at Stanford University. For four years she served as research assistant in the Carnegie Institution, and in 1909 she engaged in research for the San Francisco Relief Survey. She married Dane Coolidge in 1906. She revised Warner's *American charities* (1908); and wrote *Chinese Immigration* (1909); *Why Women Are So* (1912).

COO'LIDGE, Susan. The pen name of Miss Sarah Chauncey Woolsey (q.v.).

COOLIDGE, Thomas Jefferson (1831–1920). An American manufacturer and diplomat. He was born in Boston, Mass., and was educated at Harvard and in Europe. In 1892 he was sent as United States Minister to France, but was superseded by James B. Eustis in 1893. He was appointed member of the Joint High Commission to adjust disputes between the United States and Canada in 1899. He was interested in various banking, manufacturing, and transportation enterprises, as president, manager, or treasurer.

COOLIDGE, William Augustus Brevoort (1850–1926). An American writer on Switzerland. He was born near New York City and was educated at St. Paul's, Concord, N. H., Elizabeth College, Guernsey, and Exeter College, Oxford. In 1875 he became life fellow of Magdalen College, Oxford, but did not give up his citizenship in the United States. He was professor of English history at St. David's College, Lampeter, in 1880–81, and modern history tutor at Magdalen in 1881–85. His experiences as a member of the English Alpine Club, together with his knowledge of French, modern history, and jurisprudence, made him the foremost writer in English on Swiss topography, history, government and biography. In 1908 he received the honorary degree of Ph.D. from the University of Bern. He wrote and revised several

guidebooks to Switzerland and the Alps, edited the *Alpine Journal* (1880–89), contributed articles on Switzerland to reviews and works of reference, and published *The Mountains of Cogne* (1893), *The Alps in Nature and History* (1908), and *Alpine Studies* (1912).

COO'LIE (Beng. *kūlī*, Hind. *qūlī*, laborer, from Tamil *kūli*, daily hire). A name applied to an unskilled laborer in India and eastern Asia and to contract emigrant laborers sent from India and China to other countries, especially the West Indies and South Africa. In tropical countries where white labor is impossible, there arose with the abolition of slavery a need for cheap labor capable of doing the heavy tasks of plantations, factories, and shipping. For this purpose the acclimated cheap labor of the overpopulated Asiatic countries seemed especially adapted. The coolie trade began about 1834. It was accompanied by abuses which made it little better than a form of slavery, and Great Britain, which had been largely interested in the trade, undertook to put a stop to it in 1855. This threw it largely into the hands of the Portuguese. The coolie trade from Macao to Cuba and Peru was little better than the slave trade so far as its conditions were concerned. The traffic was regulated by the convention of 1866 between China, France, and Great Britain. The requirement by China of a return passage at the end of five years stopped the trade with the West Indies. Under the Indian Emigration Act of 1883 emigration under contract is allowed only to certain colonies, where good treatment is assured. These are the British colonies of British Guiana, Jamaica, Mauritius, Trinidad, St. Lucia, St. Kitts, St. Vincent, Grenada, Natal, and Fiji, and the French Guadaloupe and Martinique, as well as Dutch Guiana and the Danish St. Croix.

In the Transvaal, after the conclusion of the South African War, the deficiency of native labor in the Rand mines led to the enactment of an ordinance in February, 1904, providing for the importation of Chinese laborers under a system of indenture. The terms under which the importation of laborers was to be carried on were set forth in a convention between the British and Chinese governments concluded May 1, 1904. The Boer element in the Transvaal was bitterly opposed to the ordinance as tending to introduce a new factor into the already serious racial problem of South Africa. The compound system of housing the Chinese miners was not free from violence, and the many serious crimes committed by runaway coolies created a feeling of alarm in the Transvaal and in England, where the Liberal party denounced the system as one equivalent in practice to slavery. The issue was largely responsible for the Liberal triumph in the General Election of 1906, and one of the first acts of the Campbell-Bannerman ministry was an order for the stoppage of coolie importation until the establishment of responsible government in the Transvaal should enable the colony to pronounce on the system. By 1906 over 50,000 laborers had been imported, and the result has been that the treatment of these alien Asiatics has become one of the most vital questions in South African politics. (See UNION OF SOUTH AFRICA.) Consult: Jenkins, *The Coolie: His Rights and Wrongs* (London, 1871); Hope, *In Quest of Coolies* (ib., 1872).

COOLIE LABOR. See ORIENTAL IMMIGRATION.

COOMAS'SIE. See KUMASSI.

COON OYSTER. An oyster growing wild near shore, where it can easily be obtained by a raccoon. The name originated in the southern United States, where these oysters are often called "strap oysters," because their clustered manner of growth makes them long, narrow, and thin.

COONS. A popular name (contracted from raccoon) for members of the Whig party in 1838–45, when the raccoon formed the emblem of the party.

COON'TIE. See ZAMIA.

COOPER, kōōp'ẽr *or* kup'ẽr, ANTHONY ASHLEY. See SHAFTESBURY.

COO'PER, SIR ASTLEY PASTON (1768–1841). A celebrated English surgeon, born in Norfolk. In 1784 he began the study of surgery in London under Mr. Cline and in 1789 was appointed demonstrator of anatomy at St. Thomas's Hospital. In 1793 he was appointed professor of anatomy at Surgeons' Hall; and in 1800, surgeon to Guy's Hospital. In 1813 he received the professorship of comparative anatomy in the College of Surgeons. An essay on the effects resulting from the destruction of the *membrana tympani* gained him, in 1802, the Copley medal of the Royal Society, of which he was elected a fellow three years afterward. In 1804–07 appeared his great work on *Hernia*. His other works include: *The Principles and Practice of Surgery* (1836–37); *On Dislocations and Fractures* (1822); *Anatomy and Diseases of the Breast* (1829–40); *Anatomy of the Thyroid Gland* (1832). He was the first to attempt the tying of the carotid artery—an attempt which, though unsuccessful in his hands, has since proved effectual in the hands of other practitioners. In 1817 he tried what was considered the boldest experiment ever attempted in surgery—the tying of the aorta—which did not prove successful. Consult his *Life and Correspondence*, 2 vols. (London, 1843).

COOPER, COLIN CAMPBELL (1856–). An American landscape painter. He was born in Philadelphia and studied there at the Academy of Fine Arts and in Paris at the Julian and Delécluse academies. After a year as teacher in Drexel Institute, Philadelphia, he settled in New York. He was one of the first to give expression to the distinctive beauty of American cities, with their skyscrapers and manifold activities. A close observer, he reminds one, in his color and atmospheric effects, of the Impressionists. He also paints cathedrals and views of quaint German cities, such as Rothenberg, with feeling and charm. Among his best-known works are "Broad Street, New York" (Cincinnati Museum); "The Flatiron Building" (Dallas, Texas); "Quebec Cathedral" (Philadelphia Art Club); "Procession of Bruges" (1906, Lotos Club, New York); "View of Pittsburgh"; "Beauvais Cathedral" (1912); "The Avenue" (1913); "Cathedral of Siena" (1913).

COOPER, EDITH EMMA. See FIELD, MICHAEL.

COOPER, EMMA LAMPERT (?–1920). An American painter, wife of Colin Campbell Cooper, born at Nunda, N. Y. She was educated at Wells College and studied art under Harry Thompson in Paris, Kever in Holland, and Chase in New York. Her principal subjects are street scenes, interiors, and landscapes. Her pic-

ture in water color, "The Bread Winner," was awarded a medal at the World's Columbian Exposition, Chicago, 1893. Other works include "Through the Meadows" (1900), "Morning near Riverdale" (Wells College), water-color views of Wells and Lincoln cathedrals; "Courtyard, Verona" (1911); "The Market Stairway, Siena" (1912).

COOPER, Frederic Taber (1864–). An American editor and writer, born in New York City and educated at Harvard and Columbia universities. He was assistant in Latin at Columbia (1891–94), associate professor of Latin and Sanskrit at New York University (1895–1902), literary editor of the New York *Commercial Advertiser* (1898–1904), and editor of *The Forum* (1907–09). His publications include: *History of the Nineteenth Century in Caricature,* with A. B. Maurice (1904); *The Craftsmanship of Writing* (1911); *Some American Story Tellers* (1911). He contributed to the first edition of the New International Encyclopædia.

COOPER, George Henry (1821–91). An American naval officer, born in Fort Diamond, New York harbor. He was appointed a midshipman in the United States navy in 1837 and in 1838–42 was attached to the *Constitution,* of the Pacific squadron. From 1847 to 1861 he was stationed successively on board the receiving ship at Norfolk, Va., at the naval station there, on board the *Susquehanna* of the East Indian squadron, again at Norfolk on board the *Roanoke* of the Home squadron, and at the Portsmouth Navy Yard. Promoted in 1862 to be commander, he was in charge of several vessels during the Civil War, notably of the monitor *Sangamon,* which for seven weeks in 1863 was constantly employed in shelling Fort Sumter and Sullivan's Island. In 1867–69 he commanded the Norfolk Navy Yard, in 1874–78 that at Pensacola, Fla., and in 1880–82 that at Brooklyn, N. Y. He was promoted rear admiral in 1881 and until his retirement in 1884 commanded the North Atlantic squadron, with the flagship *Tennessee,* and headquarters at New York.

COOPER, Henry Ernest (1857–). An American statesman, born at New Albany, Ind. He graduated at the Boston University Law School in 1878 and subsequently became established at Honolulu. Upon the outbreak of the Hawaiian revolution he was appointed chairman of the Committee of Safety and three days later (Jan. 17, 1893) publicly read the proclamation abolishing the monarchy. He was active in the organization of the provisional government and was subsequently appointed Minister of Foreign Affairs (1895–99), Minister of Public Instruction (1896–99), acting President of the Republic of Hawaii (Jan. 9 to March, 1898), and Attorney-General (1899–1900). He also served as Minister of the departments of the Interior and of Finance, and as first Secretary of Hawaiian Territory.

COOPER, Jacob (1830–1904). An American clergyman and author. He was born in Butler Co., Ohio, and was educated at Yale University, at Berlin, and at the Theological Seminary in Edinburgh. He was professor of Greek at Centre College, Ky., from 1856 to 1866; professor of Greek at Rutgers College from 1866 to 1883; and professor of ethics and metaphysics at the University of Michigan from 1883 to 1884. From 1893 until his death he was professor of philosophy and logic at Rutgers College. His publications include: *The Eleusinian Mysteries* (1854); *The Loyalty Demanded by the Present Crisis* (1864); *Creation, a Transference of Power* (1900); *The Passage from Mind to Matter* (1901).

COOPER, James (1810–63). An American statesman and soldier, born in Frederic Co., Md. He graduated in 1832 at Washington College (Pa.), studied law in the office of Thaddeus Stevens at Gettysburg, Pa., and, upon his admission to the bar in 1834, began practice in that place. In 1839–43 he was a Whig member of the Federal House of Representatives, in 1843–48 of the Pennsylvania Legislature, of which he was Speaker in 1847, and in 1848 was elected State Attorney-General. From 1849 to 1855 he was United States Senator. Upon the outbreak of the Civil War he organized the Maryland volunteers, and in 1861 was appointed a brigadier general in the volunteer army. He was subsequently assigned to the command of Camp Chase, Columbus, Ohio, where he was stationed until his death.

COOPER, James (1846–). A British theologian, born at Elgin, Scotland. After studying at the University of Aberdeen he was minister of St. Stephen's at Broughty Ferry in 1873–81 and of the East Parish of St. Nicholas at Aberdeen in 1881–96, and then became professor of church history in the University of Glasgow. The degrees of D.D., Litt.D., and D.C.L. were conferred upon him, respectively by Aberdeen, Trinity College (Dublin), and Durham. He was president of the Scottish Ecclesiological Society in 1903, 1911, and 1912, edited the Society's *Transactions,* and wrote and edited various books on ecclesiology, including *Reliques of Ancient Scottish Devotion* (1913), and a volume of sermons.

COOPER, James Fenimore (1789–1851). An American novelist, born at Burlington, N. J., Sept. 15, 1789. His father came of good English and Quaker stock; his mother, Elizabeth Fenimore, was a Swede and also of Quaker ancestry. He was the eleventh of 12 children and in his second year was taken by his father, William, to a large estate that he had acquired near Otsego Lake shortly after the Revolution. Here had been already laid out the site of Cooperstown. For some years the family lived in a log house, but the settlement prospered, and, determining to make it his home permanently, Cooper's father, who for many years represented the district in Congress, began in the year 1796 to build a manor house, Otsego Hall, which was for many years the finest residence in that region. That Cooper thus spent his boyhood years on the frontier of civilization, surrounded by primeval forests, and never far removed from the possibility of Indian raids, while in daily contact with the red men who came to Cooperstown for trade, was most important to his future literary development. The environment stimulated his imagination, made him responsive to the sense of mystery, and gave him materials for the most important section of his writings, the *Leatherstocking Tales.* He passed through the village school and received private instruction in the family of the Rev. Mr. Ellison, rector of St. Peter's, Albany, whose refined culture and un-American ideals had a not altogether desirable effect on the style and character of the future novelist, who was something of an aristocrat at heart. In

January, 1803, Cooper went to Yale College. Here he learned more out of doors than in the classroom. Indeed, he neglected his studies with such persistent defiance of academic restraints that he was expelled in his third year. His father resented the action of the faculty, but readers may be glad that the future novelist of the sea should have been led to choose a naval career. To fit himself for this, there being no naval academy at that time, Cooper entered the merchant service as a sailor before the mast (September, 1806), and after 16 months' experience on the sea, in London, and at Gibraltar, received a midshipman's commission (Jan. 1, 1808). He served for a time on the *Vesuvius*, then with a construction party on Lake Ontario, where he saw a new aspect of frontier life and became familiar with the details of shipbuilding. He saw also other forms of naval service before his resignation in 1811. Meantime he had been married (Jan. 1, 1811) to a daughter of John Peter DeLancey, who came of a conspicuous Tory family. The marriage was happy, but Cooper's resignation on the eve of the War of 1812 did not escape criticism, for a Tory connection seemed to imply lack of patriotism. For the next 10 years he lived chiefly in Westchester County, his wife's home, devoting himself to farming and becoming the father of six children before he conceived the idea of authorship. As it was, he began to write, less in emulation of the success of others than through conviction of their failure. He had been reading an English novel aloud, when he suddenly said to his wife, "I believe I could write a better story myself," and proceeded to try it. But *Precaution* (1820), dealing with high life in England, about which Cooper knew nothing, was naturally a failure and wholly uncharacteristic of his future work. Then, when advised to deal with more local themes, he remembered a story that John Jay had told years before about a spy, and his home in Westchester, the scene of much fighting during the Revolution, furnished a fit stage for the play of his fancy. The result was *The Spy* (1821–22), which achieved a success till then unapproached in America and determined its author to pursue his new-found career. It proved to a very self-conscious generation that it was not impossible for America to produce a novelist almost worthy of being ranked with the great author of *Waverley*. Even to-day it remains a stirring narrative that deals adequately with important events, and in Harvey Birch, the Spy, it has added to our national fiction one of its few imperishable characters.

In 1823 Cooper began what is now known as the "Leatherstocking Series" with *The Pioneers*, for he did not compose the famous five romances in their natural chronological order. Early in the next year he published *The Pilot*, thus practically for the first time joining the ocean to the domain of fiction, just as he had previously added the backwoods and as he was soon to add the prairie. He also added to Harvey Birch and Natty Bumppo his third great character, Long Tom Coffin. He now removed to New York City and shortly after had a serious illness. His next novel was *Lionel Lincoln* (1825), a story of Boston during the Revolution. This was not specially successful, but in 1826 *The Last of the Mohicans* placed him at the summit of his popularity and probably represented his highest achievement.

In 1826 he changed his name, in compliance with the wishes of his grandmother, from simple James Cooper to James Fenimore-Cooper, but soon dropped the hyphen. He could not easily get rid of the misapprehensions caused by his act in a crude society. Immediately afterward he went abroad and resided there for seven years, during which time he was the recipient in foreign capitals of many attentions from distinguished people, but felt called upon, as in *The Bravo* (1831), to proclaim vigorously the beneficent greatness of republican institutions. His pride in the better features of American government and society did not, however, prevent him from being one of the first Americans to perceive how really crude his fellow citizens were, and he told them their faults with a frankness that was not discreet. He exploited his prejudices against New England and in favor of the Episcopal church, and soon became in his native land a synonym of all that was unpopular and snobbish. His honest, if overemphatic, strictures outweighed with his comically sensitive critics such fine romances as *The Prairie* (1827), *The Red Rover* (1828—the dates of Cooper's books are often hard to determine exactly), and the less interesting, but creditable, *Water Witch* (1830). But the fault was not entirely on the side of his countrymen, for he took an injudicious part in more or less unnecessary foreign discussions of American political affairs.

On his return to America, in 1833, he at first spent his winters in New York City, but soon took up his permanent abode at Cooperstown. Here he published several volumes of travels, and still not restraining himself from criticism of his countrymen, especially in his story, *Home as Found* (1838), he was again embroiled in bitter controversy and exposed to almost incomprehensible vituperation, which was increased through the fact that in 1837 a dispute had arisen with regard to the claims of his townspeople upon a certain tract of the Cooper estate. The great author's determination to enforce his plain rights was distorted by the newspapers into a heinous crime. And, ironically enough, just at that time this proud aristocrat was being denounced in England for his obtrusive republicanism. But Cooper still plied his pen and produced his *History of the Navy of the United States* (1839), his *Pathfinder* (1840), his *Deerslayer* (1841), *The Two Admirals* (1842), and *Wing-and-Wing* (1842). For the admirable English and Mediterranean setting of the last two stories he was as much indebted to his European stay as he was to his return to the home of his boyhood for his equally admirable setting of the two novels preceding. Mention should be made here of an "antirent series" of novels, dealing with the well-known demagogic agitation against the proprietors of certain large estates in New York. These were *Satanstoe*, *The Chain-Bearer*, and *The Redskins* (1845–46). The first of them contains one of the best pictures that we have of life in Colonial New York.

Yet, while Cooper was thus composing novels which have been translated into many languages and have gained him an undying reputation abroad, especially in France, he was bringing libel suits against many of the Whig editors of his native State, among them Horace Greeley, Thurlow Weed, and James Watson Webb. He was Quixotic enough to conduct these suits him-

self, and he proved able to win verdicts which finally brought his critics to their senses, although they did little to restore his popularity. A later generation smiles wonderingly at the whole matter, but sympathizes with the pugnacious author. The last few years of Cooper's life saw the publication of enough novels to occupy an ordinary lifetime, but they added little to his reputation. He maintained his proud independence to the last, and just before his death forbade his family to give any biographer access to his papers—an injunction which has been obeyed, but which has not prevented the life written by Prof. T. R. Lounsbury (q.v.) in the *American Men of Letters Series* (Boston, 1885) from being an admirable piece of work. Cooper died at Cooperstown, N. Y., Sept. 14, 1851. Six months after his death a public meeting in New York, addressed by Daniel Webster and William Cullen Bryant, did something to atone for the evil treatment America had accorded one of the very greatest of her writers.

But even after the lapse of half a century it can hardly be said that Americans are prepared to do full justice to Cooper. His great romances are frequently spoken of as if they were, in the main, fit reading for boys only. His undoubted defects, such as his careless style, his exploitation of his prejudices, his stilted conversations, his inability, as a rule, to draw women who were not distressingly prim, the fact that he wrote entirely too many novels, and that not a few of his men are as wooden as his women—these grave faults have been put forward, while his greater merits have been kept in the background. For, when at his best, as in nearly all the romances named above, Cooper was a great novelist. He had the narrative faculty of carrying his readers along, however much they might grumble at this detail or that. In "Leatherstocking" he added a character to the small gallery of the world's fictitious personages—something no other American has ever done, except Mrs. Stowe—and in Harvey Birch, Long Tom Coffin, and other sailors, as well as in Uncas, Chingachgook, and other Indians, he created characters of undying power. His Indians, at whom it was once the fashion to sneer, as the creations of a romantic fancy, are now said by ethnologists to be far from overdrawn portraitures. He was, as we have seen, practically the first writer to extend the domain of fiction over the sea, the primeval forest, and the prairie. If he was in a way a follower of a still greater romancer, Scott, he won the enthusiastic commendation of two great writers of fiction, Balzac and Hugo, and he has the unique credit of having written a prose epic of the planting of his native country, which is as spacious and free as the virgin woods and lakes amid which its scenes are laid. In other words, Cooper is a large genius, who ranks well with his fellow romancers. It is almost absurd to judge one of Cooper's rapidly written romances by the canons one might legitimately apply to a short story by Daudet or Maupassant. When the man is judged in the large by the effects of his best works, and when he is compared with his rivals like Simms and Bird, and with his predecessor, Brockden Brown, his full genius and the service he did American literature emerge splendidly. For carrying power his work has probably had no equal in America; with fewer crying faults he would in all likelihood have been our greatest author.

A full bibliography of Cooper is not needed here, but to the works already named may be added: *The Wept of Wish-ton-Wish* (1829); *The Heidenmauer* (1832); *The Headsman* (1833); *Sketches of Switzerland* (1835); *The American Democrat* (1838); *The Chronicles of Cooperstown* (1838); *Homeward Bound* (1838); *Mercedes of Castile* (1840); *Wyandotte* (1843); *Ned Myers* (1843); *Afloat and Ashore* (1844); *The Crater* (1847); *Jack Tier* (1848); *Oak Openings* (1848); *The Sea-Lions* (1849); *The Ways of the Hour* (1850). Lounsbury's *Life*, already mentioned, contains a good bibliography and probably the best criticism that has yet been devoted to Cooper. Consult also: Clymer, *James Fenimore Cooper* (1901); Richardson, *American Literature*, vol. ii (New York, 1887–88); Wendell, *A Literary History of America* (ib., 1900); Brownell, *American Prose Masters* (ib., 1909)—the chapter "Cooper"; J. Erskine, *Leading American Novelists* (ib., 1910); M. E. Phillips, *James Fenimore Cooper* (ib., 1912); and essays by Mark Twain, T. W. Higginson, and Brander Matthews.

COOPER, LANE (1875–). An American educator. He was born in New Brunswick, N. J.; graduated at Rutgers College in 1896; studied at Columbia, Yale, Berlin, Leipzig, and the Collège de France, and in 1902 became an instructor and in 1906 assistant professor of English at Cornell University. In his special field—English literature of the early nineteenth century—he published: *The Prose Poetry of Thomas De Quincey* (1902); *The Power of the Eye in Coleridge* (1910; in *Studies* in honor of J. M. Hart), and a monumental *Concordance to the Poems of Wordsworth* (1911). He also wrote: *Theories of Style* (1907), *A Manual of American Literature* (1909, in the "Tauchnitz Series," with Theodore Stanton and others); *The Function of the Leader in Scholarship* (1911).

COOPER, MYLES (1737–85). An English clergyman, scholar, and educator, second president (1763–76) of King's College (now Columbia University). He was educated at Queen's College, Oxford (M.A., 1760), was appointed a fellow of that college, and in 1762, on the recommendation of the Archbishop of Canterbury, came to America as fellow of King's College, professor of moral philosophy, and assistant to President Samuel Johnson. In 1763 he succeeded Dr. Johnson in the presidency. He strengthened the curriculum and to the academic department and divinity school already existing added a medical school, which was organized in 1768, and in 1769 conferred the first medical degrees bestowed in America. In 1771 he visited England on behalf of the college. A true Oxonian, a High-Churchman, and a Tory, he supported the cause of King George against the Colonies, and by such vehement pamphlets as *A Friendly Address to All Reasonable Americans on the Subject of our Late Political Confusion* (1775), *What Think ye of the Congress Now?* (1775), *The American Querist* (1774), made himself cordially detested. On May 10, 1775, he escaped from a mob attack upon the college and the next day took passage for England. He there received the livings of Sulhamsted-Abbots and Cowley and afterward became senior minister of the English chapel at Edinburgh. Among those trained under him were Gouverneur Morris, Robert R. Livingston,

John Jay, and Alexander Hamilton. He was perhaps the finest classical scholar in eighteenth-century America.

COOPER, PETER (1791–1883). An American inventor, manufacturer, and philanthropist, born in New York City. He assisted his father in his successive occupations of hatter, brewer, and brickmaker; gained such education as his limited means allowed, and from 1808 to 1812 was apprenticed to a carriage builder. He invented a machine for shearing cloth, which was used during the War of 1812–15; then manufactured cabinet ware; was for a time a grocer, and finally established a glue and isinglass factory on Long Island, continuing the business for more than 50 years and acquiring great wealth. In 1828 he built large iron works in Baltimore, and afterward a rolling and wire mill in New York, and blast furnaces in Pennsylvania. In 1830 he designed and built the first American locomotive engine, a rude little contrivance, which he exhibited on the Baltimore and Ohio Railroad, and about 1845 made at Trenton the first rolled-iron beams for building purposes. He was among the earliest to promote the laying of the Atlantic cable and for 18 years was president of the New York, Newfoundland, and London Telegraph Company. He invented a method of propelling canal boats by an endless chain, which, while not adopted at the time, was used later on the Delaware and Raritan Canal. Mr. Cooper served in both branches of the New York Common Council and as a trustee in the Public School Society, an organization formed to advance the cause of public education. Upon the union of that body with the Board of Education he became a school commissioner. In 1876 he received the Independent nomination for President. Peter Cooper engaged in many forms of mercantile life. In gratitude for his success and wishing to afford others opportunities which he himself had never enjoyed, he established (1857–59) "Cooper Union" (q.v.) in New York City. Consult Carter, "Life of Peter Cooper," in *Century Magazine* (New York, 1883–84), and Raymond, *Peter Cooper* (ib., 1901).

COOPER, PHILIP HENRY (1844–1912). An American naval officer, born at Camden, N. Y. After graduating from the United States Naval Academy in 1863 he served on the *Constellation* in the same year and on the *Richmond* in 1863–65, participating in the battle of Mobile Bay and the siege of Fort Morgan. He served on the *Powhatan* in 1865–67, was for two years an instructor at the Naval Academy, took part in the Tehuantepec surveying expedition (1870–71), and from 1894 to 1898 was superintendent of the Naval Academy. During the Spanish-American War he commanded the *Chicago*. He was promoted through the various grades to be rear admiral in 1902, and was squadron commander in 1903 and commander in chief of the Asiatic station in 1904. He was retired in the latter year.

COOPER, SUSAN FENIMORE (1813–94). An American author, born at Scarsdale, N. Y. She was the daughter of James Fenimore Cooper, the famous American novelist. Her chief publications include: *Rural Hours* (1850; 6th ed., 1854), a year's journal of country scenes; *Rhyme and Reason of Country Life* (1854), a volume of selections; *Fields Old and New* (1854); *Mount Vernon to the Children of America* (1858).

COOPER, THEODORE (1839–). An American engineer, born at Cooper's Plains, N. Y., and educated at Rensselaer Polytechnic Institute. From 1861 to 1872 he was an engineer officer in the United States navy and in 1865–68 assistant professor at the Naval Academy. He was associated with James B. Eads in the construction of the St. Louis Bridge; later was superintendent of the Delaware Bridge Company's shops and then assistant general manager and superintendent of the Keystone Bridge Company, and acted as assistant engineer in charge of the construction of the first elevated railroads in New York City. From 1879 to the time of his retirement he was a consulting engineer on many important bridges, buildings, and aqueducts. In 1903 he was a member of the board of experts on the Manhattan Bridge plans. His writings include *General Specifications for Iron and Steel Highway Bridges and Viaducts* (1885; 7th ed., rev., 1909) and *American Railroad Bridges* (1889).

COOPER, THOMAS (1759–1840). A British-American scientist, political economist, educator, and publicist, conspicuous for his versatility and his radicalism in politics. He was born in London, studied for a time at Oxford, and was admitted to the bar. In 1792 he spent four months in Paris and while there acted with James Watt, the famous inventor, as a delegate from the Manchester Constitutional Society to the Patriotic Societies of France. For this both he and Watt were warmly criticized at home, especially by Edmund Burke, who took them to task in a somewhat intemperate speech before Parliament. To this speech Cooper replied in a caustic pamphlet entitled *A Reply to Mr. Burke's Invective Against Mr. Cooper and Mr. Watt* (1792), the circulation of which in a cheap edition designed to reach the lower classes was prohibited by the British government. After an unsuccessful attempt, as a bleacher and calico printer, to apply a secret process learned in France for preparing chlorine from sea salt, he emigrated to America in 1795, and for a short time practiced law in Northumberland Co., Pa. He soon began to take an active part in support of the anti-Federalists in current political discussions, and for a violent attack upon President John Adams in the Reading *Advertiser* of Oct. 26, 1799, was tried under the Sedition Law (see ALIEN AND SEDITION ACTS), was convicted of libel, and, besides being fined $400, was sentenced to six months' imprisonment. He was appointed a land commissioner for the State of Pennsylvania in 1806 and subsequently acted as president judge of a common pleas district until 1811, when he was removed because of his alleged arbitrary conduct and overbearing temper. He was professor of chemistry in Dickinson College, Pa., from 1811 to 1814, and of mineralogy and chemistry in the University of Pennsylvania from 1816 to 1819, and from 1820 to 1834 was president of South Carolina College, where he acted also as professor of chemistry and political economy and for a time of "rhetoric, criticism, and belles-lettres." From 1834 until his death he was engaged, with Dr. McCord, in revising the statutes of South Carolina, which were published in 10 volumes (Columbia, 1836–41). Though he was strongly condemned by many for his radicalism in philosophy, religion, and politics, he undoubtedly exercised a powerful influence in the South, especially in South Carolina, and did much to inculcate in the minds of the politicians

of his State the doctrine of extreme States' rights, nullification, and free trade. In a speech which was widely circulated in 1827 he openly urged both nullification and secession upon South Carolina, and he was unquestionably responsible to a considerable degree for the nullification measures of 1832–33. Cooper was highly esteemed by Thomas Jefferson, who secured for him the appointment as first professor of natural science and law in the University of Virginia—a position he was forced to resign on account of the fierce attacks made on him by the Virginia clergy. Besides editing *The Emporium of Arts and Sciences* at Philadelphia from 1812 until 1814 and writing numerous pamphlets and articles for the press, he published: *Some Information Respecting America* (1794); *Political Essays* (1800); *An English Version of the Institutes of Justinian* (1812); *A Practical Treatise on Dyeing and Calico Printing* (1815); *Lectures on the Elements of Political Economy* (1826); and *A Treatise on the Law of Libel and the Liberty of the Press* (1830).

COOPER, Thomas (1805–92). An English Chartist agitator, poet, and author. In youth he was a shoemaker, but at the age of 23, after a hard-gained education, became a schoolmaster. He was the leader of the Leicester Chartists in 1841, lectured during the riots of that year, was found guilty of conspiracy and sedition, and was sent to prison for two years. While in jail he wrote an epic poem, *The Purgatory of Suicide* (1845), and a series of stories entitled *Wise Saws and Modern Instances* (1845). Some time afterward he wrote papers on *The Condition of the People* and *Triumphs of Perseverance* and *Triumphs of Enterprise* (1856). In 1848 he was lecturing; in 1849 he edited a radical penny paper, *The Plain Speaker*, and in 1850 a free-thinking publication, *Cooper's Journal*. Near the close of 1855 he gave up skepticism and afterward lectured in support of Christianity. He published: *The Bridge of History over the Gulf of Time* (1871); a *Life* of himself (1872); several volumes of sermons and Christian evidences; *Collected Poems* (1878); and *Thoughts at Fourscore and Earlier* (1884).

COOPER, Thomas Abthorpe (1776–1849). An actor who was born at Harrow, England, but came to this country in 1796 and for many years held a leading place on the American stage. He made his début in Edinburgh and afterward played at Covent Garden, London, before coming to America, where he made his first appearance in Philadelphia, in the rôle of Macbeth. He quickly won great popularity. Later he went to New York and remained several years, gaining a wide reputation. In 1803–04 he was again in London and had a successful engagement at Drury Lane, in Shakespearean tragedy. A later visit to London, in 1827, met with a less flattering reception, for which he was requited, however, on his return to America; but before he retired from the stage his popularity in this country had greatly declined, as had also, apparently, his artistic talents. Among his best parts were Shylock, Richard III, Othello, Damon, and Virginius. In later life he was for a time a customhouse officer in New York, a son of President Tyler having married one of Cooper's daughters. It was at the home of this daughter in Bristol, Pa., that Cooper died. Consult: Ireland in Matthews and Hutton, *Actors and Actresses of Great Britain and the United States*, vol. ii (New York, 1886).

COOPER, Thomas Sidney (1803–1902). An English animal painter, born in Canterbury. He was a pupil of the Royal Academy in London, and of Verboeckhoven in Brussels. He first exhibited at the Royal Academy in 1833, where he continued to send work for 69 consecutive years. He attained considerable reputation as a painter of cattle, and the skill and spirit with which he depicted them made his works very popular, but after 1860 he lost the originality that had been his distinguishing quality. Among his numerous pictures, in some of which Frederick R. Lee and Creswick painted the landscapes, are: "Ettrick Shepherds" (1842); "Cattle at Pasture" (1843); "River Scene" (1855, National Gallery), "Cow and two Sheep" (ib., 1860); "God's Acre" (1875); "Isaac's Substitute" (1880); and "Harbledown, near Canterbury" (1902). Consult his autobiography, *My Life* (1890).

COOPER, William Ransom (1868–). A British consulting engineer. He was educated at Central Technical and King's colleges and the Royal University of Ireland. In 1895 he joined the staff of James Swinburne as an assistant consulting engineer. From 1899 to 1901 he edited *Science Abstracts*, and in 1906 he became editor of the *Electrician*. He published *Primary Batteries* (1901) and *"The Electrician" Primers* (1906); and also scientific papers, including the following: *Electric Traction on Tramways* (1902); *Alternate Current Electrolysis* (1905); *Electricity Supply* (1908); *Dust Prevention* (1909); *Heat Tests of Electrical Machines* (1913).

COOP'ERAGE (from *coop*, AS. *cypa*, OS. *cōpa*, OHG. *chuofa*, Ger. *Kufe*, vat, from ML. *copa*, Lat. *cupa*, vat, Gk. *κύπη*, *kypē*, hole, Skt. *kūpa*, well). The art of making vessels of pieces of wood bound together by hoops. It is a very ancient art, such vessels having been in use among the Romans at the beginning of the Christian era. The upright pieces forming the sides of a barrel, or cask, or other cooper's work, are called *staves;* and, as casks are usually larger in the middle than at the top and bottom, this swelling, called the *belly* or *bulge*, is formed by skillfully shaping each stave so that it shall form part of the required double conoid, and so that, when all are built and hooped together, their edges shall coincide perfectly. For this purpose each stave is made broadest in the middle, and narrowed down in a curved line towards each end. A skillful cooper can produce this curve so accurately that no further fitting or alteration is needed when the staves are put together. The staves are made to meet at their inner edges, and by driving the hoops very hard, the inner part is compressed until the slight gaping outside is closed, and thus slight inaccuracies of fitting are remedied. There are several branches of cooperage. The *wet*, or *tight*, cooper makes vessels for holding liquids. The *dry*, or *slack*, cooper does inferior work, such as barrels for containing dry goods, where an inferior degree of accuracy is sufficient. The *white* cooper makes churns, pails, etc., which for the most part have straight sides. The best wood to employ is oak, which must be thoroughly dried before the staves are put together. Other woods employed are elm, pine, gum, beech, and bass in the order named. In warm countries the drying of the sun is sufficient, and casks are therefore mounted in summer only; but in northern countries artificial drying is commonly resorted to. The hoops are hammered down from the

narrow to the wide part of the cask, by means of a mallet striking a piece of wood or iron held against the hoop. Iron hoops are sometimes put on hot, in order that their contraction on cooling may bind the work together.

Like most other processes of manufacture, the cooper's trade has changed in modern times, with the substitution of machinery for handwork. The machinery used is commonly termed "barrel-making machinery"; but it is employed, with suitable modifications, in making casks and kegs as well as barrels. Barrel-making machinery may be divided into machines for the manufacture of staves, machines for manufacturing heads, and machines for setting up and finishing the barrel. For cutting staves a stave cutter with a knife 36 inches in length and 6½ inches in width with a face ground to a circle of 20 inches may be used, or a cylindrical stave saw, the latter being generally used for making slack staves from hemlock, jack pine, pitch pine, spruce, and other soft woods. It is a cylindrical sheet, having teeth upon one end. The bolts or blocks of wood, after having been steamed and cut on the equalizer so that they are of the desired length and square on the ends, are clamped in the usual manner, and the staves fall within the cylinder. They are then laid upon an endless conveyer, which carries them against two circular saws that cut them a definite length. Each piece is then placed in a pair of clamps, and moved against a rotary wheel provided with cutters, that dress the edge to the required bilge and bevel; the *bilge* is the increased width midway between the ends, which causes the enlarged diameter of the cask at the middle; the *bevel* is the angle given to the edge conforming to the radius of the cask. The surface of the stave is smoothed by passing it under revolving cutters; a recent form of machine takes off the surplus wood from riven staves without cutting across the grain, following winding or crooked pieces as they are split from the block. The heads are usually made of several flat pieces jointed and fastened with dowels, or pins of wood. The edge of each piece is pushed against the side of a rotary disk, provided with cutters that instantly straighten it; it is then pushed against bits that bore holes for the pins to be afterward inserted by hand. Several boards being pinned together, enough to make a head, the whole is first smoothed on one side and dressed to a uniform thickness; then it is clamped between two disks, and, as these disks turn, a saw trims the head into a circle with a beveled edge; if the wood is green, an oval form may be given to provide against shrinking.

The barrel has next to be "set up." A sufficient number of staves are set into a frame, their edges refitted if necessary; stout iron hoops, called "truss hoops," pushed up from below, grasp the lower ends tightly, and the whole may be lifted from the mold. One end of the barrel is formed, but the other end is open and flaring. A rope is passed about the open end and taken to a windlass, and the staves are drawn together by tightening the rope; in this stage the barrel is heated, to cause the staves to yield more easily to their required form. The barrel is now leveled by placing it upon a horizontal bed and bringing down upon it a powerful disk that presses upon its ends and forces the staves into their proper position. A machine is devised which trusses and levels the barrel at a single movement. The slack barrel stands in its truss hoops, two on each end; those of the lower end rest on strong supports; those of the upper end are seized by hooks whose handles pass down through the platform to a common level; when all the parts are in place, powerful machinery pulls the upper trusses down, at once driving the barrel into the lower trusses, drawing together both ends, and leveling the whole. Each end of the shell, thus made, passes under a rotary cutter which forms a *croze*, or groove, to receive the head, and chamfers, or bevels, the ends of the staves. The heads are put in and the hoops set by hand. The barrel is then made to turn under a smoothing tool and rapidly finished. For the making of slack barrels, consult: Wagner, *Cooperage: A Treatise on Modern Shop Methods and Practice* (Yonkers, N. Y., 1910). For description of wooden barrels used in transportation of liquids and especially the series of tests to secure better specifications and designs, consult Newlin, "Tests of Wooden Barrels," *Bulletin of the United States Department of Agriculture, No. 86* (Washington, 1914). Statistical Bulletins on tight and slack cooperage stock are compiled by the U. S. Census Bureau in cooperation with the finest service of the Department of Agriculture and are published annually. Other bulletins from the Forest Service dealing with cooperage are issued from time to time. See BARREL.

COOPERAGE (from Dutch *koper*, sort of boat, from *kopen*, Ger. *kaufen*, Goth. *kaupōn*, AS. *cypan*, to buy, from Lat. *caupo*, innkeeper). The sale of tobacco, alcoholic liquors, or clothing to fishermen in the North Sea, or the barter of these articles for fish, nets, or other such property. As the goods for sale had escaped duty, the business was profitable, but it demoralized the fishermen. In 1882 a convention was held at The Hague, and a mission was founded for supplying the fishermen with good clothing, literature, etc., at a fair cost, and in 1887 six nations—Great Britain, Germany, Belgium, Denmark, France, and the Netherlands—signed an agreement to prohibit the sale of intoxicating liquors to fishermen at sea. Next year Great Britain embodied the terms of this convention in the North Sea Fisheries Bill. This act was repealed five years later and replaced by the North Sea Fisheries Act, 1893, which was more explicit than the former act. Consult Mather, *Nor'ard of the Dogger* (1888).

COÖP'ERA'TION (Lat. *cooperatio*, from *cooperari*, to coöperate, from *co-*, together + *operari*, to work, from *opus*, Skt. *apas*, work). In the widest sense of the word, all production is the result of the coöperation of nature, labor, and capital; but economists have generally restricted the term to three classes of enterprises, viz., (*a*) coöperative distribution; (*b*) coöperative production; and (*c*) coöperative societies for banking or loaning money. It is sometimes extended to profit sharing, by which the employee shares beyond his wages to some extent in the profits of his employer; but this is a misapplication of the term, for coöperation starts with the worker, while profit sharing starts with the employer.

Coöperative Distribution. This is sometimes called "consumers' coöperation," and is an effort to do away with the middleman and to have the consumers themselves organize distributive stores and reap the profit which would otherwise fall to the storekeeper. There can, of course, be no doubt that under existing condi-

tions of production the merchant who serves as an intermediary between the producer and the consumer, or between the wholesale dealer and the retail purchaser, performs an important social service for which he is entitled to a reasonable remuneration; but unfortunately the number of these intermediaries has increased beyond all measure; and, as they all must strive to subsist, there is still, in spite of great improvements in the distributive process, a vast difference between wholesale and retail prices. A French economist, Prof. Charles Gide, estimates that more than one-tenth of the population of France depends on commerce for its subsistence. In other words, every 10 persons support one intermediary. The economic waste of commercial competition indicated by these facts aroused, many years ago, the condemnation of such social reformers as François Fourier (q.v.) and Robert Owen (q.v.); but the first lasting, successful attempt to dispense with the middleman was made in 1844, by 28 poor weavers of Rochdale, near Manchester. They organized, under the name of Equitable Pioneers of Rochdale, to supply themselves with provisions, beginning with flour, butter, sugar, and oatmeal. Business was transacted at first in a small room in Toad Lane, with a capital of £28, each member having subscribed an equal share. They overcame all difficulties and outlived not only internal divisions and jealousies, but also external prejudices and opposition. The success of the store led to many imitations, a considerable number of which, however, had only a very short existence, owing in many cases to want of harmony among the members, bad management, insufficient capital, or dishonest officials. Notwithstanding all difficulties, coöperation continued to increase, and in 1864 no less than 395 societies in Great Britain made returns to the registrar, possessing a share and loan capital of £774,000, doing an annual trade of nearly £3,000,000, and making an annual profit of £225,000. It was then proposed to form a federation of societies for the purpose of undertaking the wholesale trade of the movement, thereby protecting the societies from the imposition of the wholesale traders and securing the profits of wholesale dealing. The North of England Wholesale Society began business in Manchester in 1864, and in 1871 became the English Wholesale Society. This organization has purchasing and forwarding depots not only in England and Ireland, but in New York, Hamburg, Copenhagen, Calais, and Rouen. It owns six steamships, which ply between England and the Continent. Following the same lines, the Scottish Wholesale Society was formed in 1868 and commenced business in Glasgow. Both of these organizations have prospered and grown and now supply a large portion of the goods sold by the retail societies. They not only purchase direct from the producers, but produce on their own account, or in connection with other associations. Among the industries in which they engage are the making of boots, clothing, furniture, flour, and butter. In 1920 the productive and distributive workers employed by the system numbered 138,955. They received wages amounting to £19,978,118. The number of societies in 1920 was 1379 with a membership of 4,504,852; the aggregate trade transacted, £254,158,144; and a surplus of £25,458,555.

In Germany coöperative distribution had its beginnings in the two decades 1850–70. It gained little headway until after 1890 when it came under the influence of British experience. The German coöperative stores, originally forming a single association, were organized in 1902 in two competing central associations, the Allgemeiner Verband and the Zentral Verband. The former is essentially a middle class and the latter a working-class organization. In 1920, the Zentral Verband (Central Union) had 1291 societies, with a total membership of 2,714,109. Trade transacted was 1,289,009,780 marks.

In the United States isolated experiments of a similar nature were made as early as the eighteenth century. In 1847 the Workmen's Protective Union of Boston organized a successful store, which was afterward carried on under the name of the New England Protective Union. The Patrons of Husbandry, founded in 1867, for a time developed a variety of coöperation by encouraging the local "granges" to form purchasing clubs and to employ agents to buy supplies. The Sovereigns of Industry, a secret order with ritual, founded in 1874 to do for the artisan classes what the Patrons of Husbandry were doing for the farmers, founded numerous coöperative stores on lines resembling the Rochdale Pioneers. In 1877 it was doing a business of $1,089,372, but by 1880 the order had collapsed. The Coöperative League of America (organized 1918) had 350 societies in 1921 with 100,000 members, and a trade of $24,000,000.

The foundation of a coöperative store on a small scale is a simple matter in itself. A group of consumers meet to discuss rules and regulations for the enterprise and agree to furnish the necessary capital by subscribing, say, five dollars each. As coöperative stores almost always do business on a cash basis, the original capital need not be very great. Each share of capital receives a fixed rate of interest, say, 5 per cent. The dividends may be credited as payments on additional shares up to the maximum number of shares allowed any one shareholder. In this wise the store serves also as a savings bank for the members. Usually the money subscribed as share capital need not all be paid at once; weekly payments of 10 cents are customary. Whatever profit the store makes after deduction of the interest on loans, the charge for depreciation in the value of the stock and plant, 5 per cent dividend on the capital, a reserve fund, and perhaps a bonus to employees, is divided among the purchasers according to the respective amounts of their purchases. Goods are sold at the usual prices of private stores. Outsiders may buy at the store, but only members receive shares in the gains. These shares are also usually credited as payments on the stock shares until they are paid in full. The amount of each member's purchase is recorded by means of checks distributed with every sale. The management of the business is in the hands of an executive committee, which appoints the storekeepers and oversees the purchase of goods and the finances. It is evident that the success of the society will depend largely on this committee, which must be honest and efficient.

Coöperative Production. An attempt to solve the more difficult problem of doing away with the employer, the "entrepreneur," by having the workers furnish their own capital. Under our present economic system the distribution of wealth among the agents of production involves a grave conflict of interests, which may lead to industrial warfare and jeopardize the welfare

of society by separating laborers and capitalists into distinct antagonistic classes; but the relation between capital and labor is most satisfactory when there is no sharp separation into classes. Productive coöperation, therefore, by uniting men in the twofold capacity of workers and capitalists, has been recommended by many social reformers as a cure for our social ills. The voluntary union of a number of workers to conduct an enterprise collectively is by no means a modern invention. Schmoller and other economic historians have shown that it is, indeed, one of the earliest forms of industrial organization. Coöperative enterprises were often undertaken by guilds, each member furnishing a share of the small capital required. But their conservatism of method led to their displacement by capitalistic industry, and it is not until the nineteenth century that we find widespread attempts to reëstablish coöperative productive enterprises; but only a few of them, notably among masons and piano makers, were successful. The modern system of coöperative production dates in England from the close of the eighteenth century. The oldest-known association is the Hull Anti-Mill Society, founded in 1795 for the production of flour. The object of this undertaking was to curb the exactions of private millers rather than to improve the position of labor. Societies with the latter object were founded in considerable numbers in the decades 1830–50 under the influence of Owen, and later of the Christian Socialists. These enterprises were only moderately successful. The extension of consumers' coöperation in the latter half of the nineteenth century gave a considerable impetus to producers' coöperation, especially in organizations affiliated with the coöperative stores, but also in organizations producing for the open market. In England the production societies in 1920 (exclusive of the Wholesale Societies) numbered 105, with a membership of nearly 43,000, and had £2,800,000 in share and loan capital. Their sales exceeded £9,200,000; their net surplus approximated £540,000; their employees numbered nearly 12,000 and the collective sum paid in wages and salaries amounted to about £1,700,000. The chief industries were textile, agriculture, leather, and metals.

The first productive association in the United States of which we have any record was that of the Boston Tailors' Associative Union, which was formed in 1849, but did not last long. There were many other experiments of a like nature, the most promising of which seems to have been the stove foundry of the Iron Moulders' International Union, started in 1867 in Allegheny County, Pa. But the paid-up capital proved insufficient at a critical moment, and the enterprise failed. By far the most successful experiment in the United States is found among the coopers of Minneapolis. In 1868 a few journeymen coopers made an attempt to manage industry for themselves; they were so successful that in 1874 a strong organization known as the Coöperative Barrel Company was formed, with a membership of about 20 coopers. They bought a shop for $3000, paying $1000 cash. The company became exceedingly prosperous. The wages paid are equal for members and nonmembers employed; profits are distributed according to stock holdings, but all members hold equal amounts of stock.

This example has been followed by others and frequently with success. Experience seems to show that where articles are produced to order and not for the general market, coöperative production may succeed, but that these enterprises fail when they are confronted with the difficulty of adjusting the supply to the variations of the market demands. Coöperation has made extensive progress in connection with certain agricultural processes, such as the manufacture of cheese, butter, etc. Such coöperation, however, is essentially an incident in the marketing of products and has no close relation to the above-described forms.

Coöperative Credit and Banking Organizations. These are founded for mutual financial aid and have been wonderfully prosperous in Germany, where they do a business of hundreds of millions of dollars. In 1849 Herr Schulze (Schulze-Delitzsch) founded a coöperative society to purchase raw material, among 13 cabinetmakers in Delitzsch, his native town. In the next year he founded the first of his loan associations (*Vorschussvereine*), which differed from the earlier banks in that the persons to whom loans could be granted must themselves be members of the association, paying regular monthly contributions. They thus themselves indirectly furnished the security for the credit afforded them. While these loan associations put the lender's interest foremost, Raiffeisen, another German, born in the Westerwald, organized a coöperative bank in 1849 which placed the borrower's interest as the keystone of his system. Both systems have spread over the country, especially Schulze-Delitzsch's banks. The plan has been copied in Belgium with the greatest success, and a few Schulze-Delitzsch banks have been founded in Russia. As a matter of fact, all these "people's banks" bear a close resemblance to our American building and loan associations (q.v.), whose special and marked development in this country makes the United States one of the pioneer countries and chief homes of this form of coöperation.

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COOPERIA, kōō-pē'rĭ-*a*. A genus of two

species of tender, bulbous plants, of the family Amaryllidaceæ. The narrow, elongate, twisted leaves appear with the fragrant solitary flowers in summer. The flowers, which resemble those of the *Zephyranthes*, but have erect instead of versatile anthers and, unlike other members of the order, bloom at night, are 2 inches or more in diameter, usually waxy white, blushed with pink outside and green-tinged within. Those of *Cooperia pedunculata* (giant fairy flower), the most popular species, are larger, of purer color and longer duration than those of *Cooperia drummondii* (evening star), the other well-known species. The plants are of easiest culture. They do well in garden soil, and, if dug at the approach of frost and stored in dry soil, where the temperature is maintained below 50° F. but not so low as 32°, they may be kept over winter without trouble. The genus is named after Joseph Cooper, an English gardener. For Illustration, see Colored Plate of AMARYLLIDACEÆ.

COOPER RIVER. A river rising in Berkeley Co., S. C. It flows south and unites with the Ashley River, below the city of Charleston, in the estuary forming Charleston harbor (Map: South Carolina, E 4). It is navigable for 30 miles to the canal connecting it with the Santee River.

COOPER'S CREEK. An Australian river formed by the confluence of the Thomson and the Barcoo in Queensland, flowing southwest through South Australia into Lake Eyre. During the rainy season the river rises 20 feet and widens to 2 miles, while in the summer season its lower course is dry (Map: Queensland, A 10). On its banks the explorers Burke and Wills succumbed to starvation in 1861. Consult Burke and Wills, *Exploring Expedition* (Melbourne, 1861), and Wills, *Exploration* (London, 1863).

COOPERSTOWN. A village and the county seat of Otsego Co., N. Y., 35 miles (direct) southeast of Utica, on the Susquehanna River, at the outlet of Otsego Lake; and on a branch of the Delaware and Hudson Railroad (Map: New York, F 5). The village is growing in popularity as a summer resort and has a park, "Cooper Grounds," orphan house, hospital, library, and several hotels and boarding houses. Cooperstown is in a hop-growing and farming region, and contains an ice-cream and cheese factory. Cooperstown was first incorporated in 1812 and is now governed under a charter of 1889, revised in 1895. The executive holds office for a year. Pop., 1900, 2368; 1910, 2484.

The land on which Cooperstown stands was the site of an Indian town and in 1769 became the property of George Croghan, who attempted unsuccessfully to found a settlement. In 1785 it came into the possession of Judge William Cooper, who in 1786 founded a village and in 1790 moved thither with his family, including J. Fenimore Cooper, the future novelist, then an infant. The latter is buried here. Consult: Cooper, *The Chronicles of Cooperstown* (Cooperstown, 1838); Livermore, *A Condensed History of Cooperstown* (Albany, 1862); Halsey, *The Old New York Frontier* (New York, 1901).

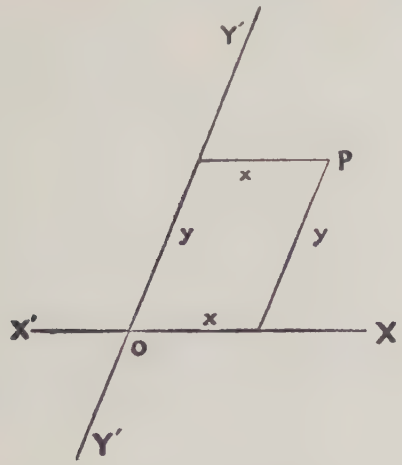
COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART. An institution established in New York City in 1859 for the free instruction of the working classes in applied science, art, and social and political science. The Union embodies the social philosophy of its founder, Peter Cooper (q.v.), and is unique among educational institutions in the United States. Its central idea is to afford working people full opportunity, by means of day and evening classes, to obtain a mastery in art, science, and technical knowledge bearing upon industries and the engineering professions, and also, through the medium of lectures, reading rooms, and art and scientific collections, to induce a more discerning citizenship and a broader mode of living. To accomplish these purposes, Mr. Cooper erected a large building at the point where the Bowery divided into Third and Fourth avenues, and deeded both land and building, valued at $630,000, to a self-perpetuating board of trustees. This board was to consist of not less than five nor more than six members, and upon the board was especially enjoined the establishment of regular courses of evening study; the maintenance of a library, galleries, and collections; the establishment of a school of art for women, in order that those who "might otherwise struggle through a life of poverty and suffering" should be raised to "competence and comfort"; and the establishment of a polytechnic school "equal to the best technological schools now established or hereafter to be established." By 1864 the trustees had developed this broad scheme of education so far as their funds permitted; but afterward, for many years, the union was unable through lack of endowments adequately to extend in scope and was even obliged to turn away large numbers of its constantly increasing applicants. Indeed, except for large sums given by Peter Cooper, and afterward by Edward Cooper and William Cooper, and by Mr. and Mrs. Abram S. Hewitt, the union remained practically unendowed until 1900, when Andrew Carnegie gave $300,000 and later $300,000 more. These sums, together with considerable gifts made by Mr. Abram S. Hewitt and others, permitted the final rounding out of the original plans.

The scope of the institution now includes, besides evening courses in the various lines of drawing, modeling, and design, five-year courses in civil, mechanical, and electrical engineering and chemistry as well as courses in elocution, oratory, and debate. The day courses include a four-year Day School of Technical Science, the Woman's Art School, the School of Stenography and Typewriting for Women, and the School of Telegraphy for Women. Degrees are conferred in civil, mechanical, and electrical engineering, and in chemistry. In 1912–13 the annual budget of the Union approximated $205,000, its income-producing endowment to about $3,000,000, and the total value of property in its control to over $4,000,000. In the same year 3370 pupils were enrolled in the classes, of whom 1246 were in the evening technical courses and 1187 in the night art classes. Visitors to the reading room numbered 488,000. The trustees who were originally appointed in 1859, and to whose untiring efforts the success of the Union must in large measure be ascribed, were Peter Cooper (q.v.), Daniel F. Tiemann, Wilson G. Hunt, Edward Cooper, Abram S. Hewitt, and John E. Parsons. The director in 1914 was C. R. Richards.

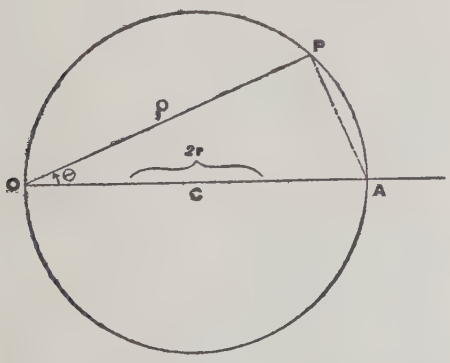
COÖRDINATES (from ML. *coordinare*, to coördinate, from Lat. *co-*, together + *ordinare*, to arrange, from *ordo*, order). Magnitudes which serve to determine the position of an element—point, line, or plane—relative to some fixed figure. For instance, latitude and longi-

tude are arcs (or angles) that define the position of a ship at sea relative to the equator and the prime meridian; latitude, longitude, and elevation above sea level serve to determine the position of a balloon.

The method of treating geometry analytically by use of coördinates is due chiefly to Descartes



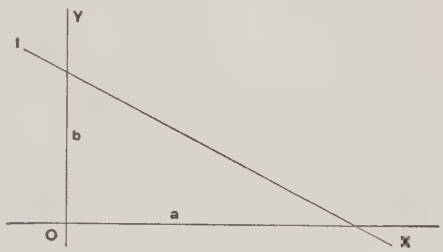
(1637) and Fermat, although the terms "coördinate" and "axes of coördinates" were first used by Leibnitz (1694). For the explanation of rectangular coördinates as used in plane geometry, see ANALYTIC GEOMETRY. As there explained, the axes in the rectangular system are at right angles to each other, but it is often more convenient to employ a system in which the axes form oblique angles. Coördinates referred to such a system of axes are called oblique coördinates. The notation is the same as in the rectangular system, and the lines which determine a point are drawn parallel to the axes; thus the coördinates (x, y) of a point P form the outer adjacent sides of a parallelogram of which the axes form the inner sides. Another system in common use is that of polar coördinates. This involves two magnitudes—the linear distance from a fixed point and the angular distance from a fixed line. In the figure the posi-



tion of point P is determined by the distance ρ from O, and the angle θ between ρ and the fixed line OA. O is called the pole and ρ the polar radius or radius vector. If OA passes through the centre C of a circle, the polar equation of the circle is $\rho = 2r\cos\theta$. That is, the values of ρ and θ, which satisfy this equation, determine points on the circle. If C is taken as the pole, the equation of the circle is evidently $\rho = r$. Rectangular coördinates may be changed to polar coördinates, and vice versa, by means of the equations

$$x = \rho\cos\theta,\ y = \rho\sin\theta;$$
$$\rho = \sqrt{x^2 + y^2},\ \theta = \tan^{-1}\frac{y}{x}.$$

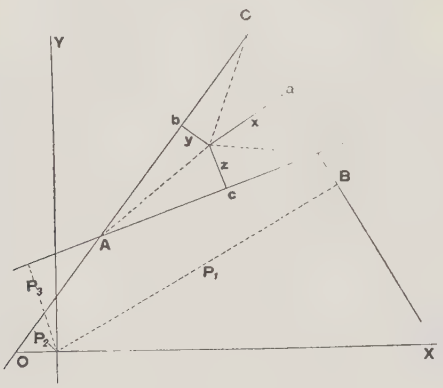
So far we have considered lines as loci of points whose coördinates satisfy given relations; but it is often more convenient to select magnitudes which determine lines passing through a given point. Thus $ux + vy + 1 = 0$ may be taken as the equation of a straight line in which u is the negative reciprocal of the intercept on the X-axis, and v the negative reciprocal of the intercept on the Y-axis. For if $y = 0$, $x = -\frac{1}{u}$, and if $x = 0$, $y = -\frac{1}{v}$. The segment a, in the figure, is the intercept on the X-axis, and corresponds to $y = 0$, and b is the intercept on the Y-axis and corresponds to $x = 0$. Therefore, $a = -\frac{1}{u}$ and $b = -\frac{1}{v}$, whence $u = -\frac{1}{a}$ and $v = -\frac{1}{b}$. If x and y are regarded as constants and u, v as variables, the equation $ux + vy + 1 = 0$ is the equation of all lines passing through the point (x, y)—i.e., of a pencil of which the point (x, y) is the vertex. Hence



this equation is called the line equation of the given point, and the system of coördinates one-point intercept coördinates. Two-point or bipunctual coördinates determine the position of an element in the plane by reference to two fixed points and a given direction. As in one-point coördinates there are two kinds, line coördinates and point coördinates, so these classes exist in two-point coördinates. Bipunctual line coördinates are the distances of a variable line taken in a constant direction from two fixed points. Bipunctual point coördinates are the negative reciprocals of the distances measured in a given direction from one of two fixed points to the line determined by the variable point and the other fixed point.

Although two magnitudes are sufficient to fix the position of a point in a plane, the introduction of a third has the advantage of rendering homogeneous certain equations involved; however, the coördinates of a single element are, in general, connected by a nonhomogeneous relation. Thus, if x, y, z in the figure represent the perpendicular distances of a point from the sides a, b, c of the triangle ABC, they are connected by the relation $ax + by + cz = k = 2 \times$ area of ABC, or $x\sin A + y\sin B + z\sin C =$ a constant. (See TRIGONOMETRY.) We may also take x, y, z oblique to a, b, c, each form-

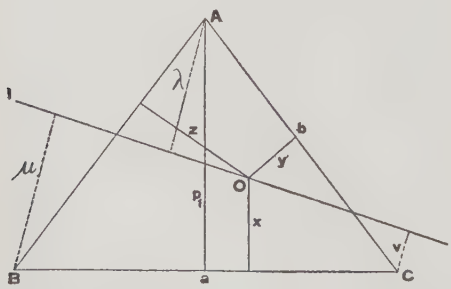
ing the same angle with its corresponding side. Equations between the coördinates of two or more points in this system are homogeneous, as $mx + py + qz = 0$, the equation of a straight line. Such coördinates are called trilinear or



homogeneous coördinates. These form a special case of barycentric coördinates, the first homogeneous coördinates in point of time, introduced by Möbius (q.v.) in his *Der barycentrische Calcul* (1827). Tetrahedral space coördinates belong to the same class. If in the above figure rectangular axes are also assumed, and if P_1, P_2, P_3 are the perpendiculars from the origin upon the sides a, b, c, respectively, then

$$\frac{x}{P_1}=\frac{BPC}{CBA}, \quad \frac{y}{P_2}=\frac{ACP}{CBA}, \text{ and } \frac{z}{P_3}=\frac{BAP}{CBA};$$

these expressions may be designated by x', y', z', and be employed to determine the position of point P (P denoting the point at which x, y, and z meet). Since they are expressed in terms of areas, they are called areal coördinates. In either the trilinear or areal system a point is determined if the ratios only of the coördinates are known. If $lx + my + nz = 0$ is the trilinear equation of a straight line (L in the figure), then by making x, y, z constant and l, m, n variable, the equation is called the tangential equation of the point O (x, y, z). Since l, m, n are variable, the equation represents any

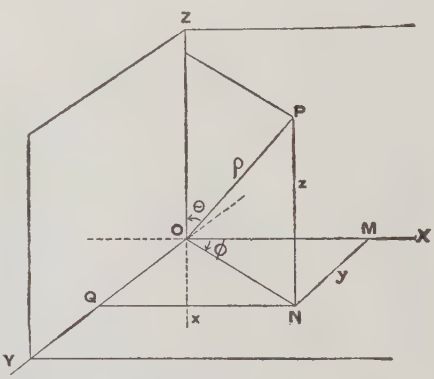


straight line passing through O. If λ, μ, ν are the perpendiculars from A, B, C, upon the line L, and p_1, p_2, p_3, the altitudes of the triangle ABC, the equation of the point O is

$$\frac{\lambda x}{p_1}+\frac{\mu y}{p_2}+\frac{\nu z}{p_3}=0.$$

When the perpendiculars λ, μ, ν are taken for the coördinates of the line, the coefficients become the areal coördinates of the points referred to the same fundamental triangle. Any homogeneous equation in l, m, n as tangential coördinates is expressed in terms of λ, μ, ν by substituting $\frac{\lambda}{p_1}$, $\frac{\mu}{p_2}$, $\frac{\nu}{p_3}$, for l, m, n, respectively. An equation in λ, μ, ν of a degree higher than the first represents a curve such that λ, μ, ν are always the perpendiculars upon the tangent. The curve must therefore be the envelope (q.v.) of the line (λ, μ, ν). Tangential coördinates are often called "Boothian coördinates," in honor of James Booth, who invented them. Bicircular coördinates are magnitudes which determine a point with reference to two series of circles which intersect one another at a constant angle. Generalized, Lagrangian, Eulerian, and Rodrigue's coördinates are special systems used in treating certain problems of mechanics.

From the idea of coördinates of an element in a plane we easily pass to the notion of coördinates of an element in geometry of three dimensions. The determination of a point in such space requires three coördinates. In the Cartesian system these are represented by x, y, z. An origin being taken (as O in the figure), and three axes, OX, OY, OZ mutually at right angles to one another, the point is referred to the



three planes through these axes. Here z or PN is the distance of the point above the plane YOX; y or NM is its distance from the plane XOZ; and x or OM is its distance from the plane ZOY. In three dimensions, as in two, the problem may be stated to be: Given the law of the motion of P, to express the law of variation of its coördinate; the algebraic expression of the latter law is the equation of the surface traced by the point in moving over all the space it can traverse consistently with the law of its motion. Thus, the equation of a sphere referred to its centre O is $x^2 + y^2 + z^2 = r^2$. As in plane geometry, if the axes are taken oblique to one another, the coördinates are called oblique coördinates. Likewise, the polar coördinates in space corresponding to the polar coördinates in a plane are ρ, θ, ϕ. In the above figure $\rho = OP$, the distance from the origin; $\theta = \angle POZ$, the angle between OP and OZ, and $\phi = \angle XON$, the angle between planes XOZ and POZ. In plane geometry there are intercept equations for straight lines, and in solid geometry there are intercept equations for planes. And as certain equations of plane geometry are made homogeneous by the introduction of a third coördinate, so in solid geometry certain equations are made homogeneous by the introduction of a fourth coördinate. Thus, in

tetrahedral or barycentric four-plane coördinates, the four faces of a tetrahedron (q.v.) of reference are taken as the coördinate planes. The equation of any plane in this system is $lx + my + nz + rw = 0$, in which

$$l:m:n:r=\frac{x_1}{p_1}:\frac{y_1}{p_2}:\frac{z_1}{p_3}:\frac{w_1}{p_4}, x_1, y_1, z_1, w_1$$

being the perpendiculars upon the plane from the vertices A, B, C, D of the tetrahedron of reference, and p_1, p_2, p_3, p_4, the altitudes of the tetrahedron from A, B, C, D respectively. For the coördinate systems for space of n-dimensions, and for the transformations from one system into another, it will be necessary to refer to special works on the subject. Consult: Carr, *Synopsis of Pure Mathematics* (London, 1886); Lamé, *Leçons sur les coördonnées curvilignes* (Paris, 1859); Möbius, "Des barycentrische Calcul" (1827), in his *Gesammelte Werke*, vol. i (Leipzig, 1885); Townsend, *Modern Geometry of the Point, Line, and Circle* (Dublin, 1863–65); Scott, *An Introductory Account of Certain Modern Ideas and Methods in Plane Geometry* (New York, 1894); Clebsch, *Vorlesungen über Geometrie* (Leipzig, 1876–91); Pascal, *Repertorium der höheren Mathematik*, German ed. (ib., 1902); Weber and Wellstein, *Encyklopädie der Elementar-Mathematik* (2 vols., ib., 1903), both with valuable bibliographies.

COORG, kōōrg, or KURG. A Province of British India, west of Mysore. Area, 1582 square miles. Pop., 1891, 173,055; 1901, 180,460; 1911, 174,976. It was a native principality of ampler dimensions before 1834, in which year it was annexed by Great Britain. Nearly the whole of the region is covered with forests, more or less dense. Its chief products are rice, coffee, lumber, and hogs. Specially notable are the ancient fortifications. The country is intersected by ramparts, which are from 15 to 25 feet in height, and by ditches of about 10 feet in depth and about 8 feet in width; while, being in some places double or triple, or even quadruple, they measure in aggregate length upward of 500 miles. Capital, Merkara.

COORNHERT, kōrn'hĕrt, or **CORNHERT,** DIRK VOLCKERTSZOON (1522–90). A Dutch scholar and poet, born in Amsterdam. He lived in Haarlem from about 1542, supporting himself by his skill in engraving. In 1561 he became notary, and in 1562 secretary to the municipality also. Most active as a champion of political and religious liberty, he incurred the disapproval of the Spanish government, was imprisoned in 1567, and afterward took refuge at Cleves and Xanten. When the states threw off the Spanish yoke in 1572, he was recalled and made secretary to the States of Holland, in which capacity he rendered important services to William of Orange. He was a famous theologian, stoutly opposed the orthodox Protestant party, and by his writings aided materially in preparing the classical period of the literature of the Netherlands. His poetical works include *Abrahams uytgang* ('The Death of Abraham') and *Comedie van de blinde van Jericho* ('Comedy of the Blind Man of Jericho'). Of his works in prose, the *Zedekunst, dat is wellevens kunst* ('Ethics; that is, the Art of Right Living'), which appeared in 1586, deserves special mention. Consult Moorrees, *D. V. Coornhert de Libertijn* (1887).

COOSA (kōō'sȧ) **RIVER.** A river formed by the confluence of the Etowah and Oostanaula rivers in Floyd County in northwestern Georgia (Map: Alabama, C 2). It flows southwest and enters Alabama, where it flows between the hills of the southern extremity of the Appalachian Range and is joined by the Tallapoosa River to form the Alabama River. The Coosa is about 335 miles long, is navigable from its mouth to Wetumpka and from Greensport to Rome, Ga., and drains an area of 10,000 square miles.

COOS (kōōs) **BAY.** An inverted V-shaped arm of the Pacific Ocean, about 10 miles long, in about lat. 43° 45′ N., in Coos Co., Oreg. (Map: Oregon, A 4). On the eastern shore of its western arm (which has an average width of about one mile and runs nearly parallel to the coast) lies Empire City, a small coal-shipping port. The eastern arm expands considerably as it extends southward, and on its western shore, near its base, is Marshfield (Pop. 1910, 2980), also a coal-shipping port and manufacturing town. The bay receives the Coos River and has a depth of 14 feet of water over its bar at high tide.

COO'SHIE (native name) **ANT.** A South American leaf-cutting ant (*Œcodoma cephalotes*). See SAUBA ANT.

COOS INDIANS. See KUSAN.

COO'SY. See KUSI.

COOT (probably from Welsh *crota*, Corn. *cut*, Ir., Gael. *cutach*, bob-tailed). A kind of rail, or "mud hen" (*Fulica*), distinguished from other rails (q.v.) chiefly in having the toes edged with a scalloped membrane. Coots have a strong, straight bill, the base of which extends up the forehead and there dilates so as to form a remarkable naked patch. The color is generally dark with more or less white, and the length is about 15 inches. Coots are aquatic in their habits, preferring lakes, or pools with reedy margins, and retreating among the reeds on any alarm. The American coot (*Fulica americana*) is found breeding throughout all North America and is migratory in the north, but resident in the south. It is dark-slate color, deepening on the head and neck, and the crissum is white. The nest is a hollow heap of broken, dead reeds; the eggs (see Colored Plate of EGGS OF WATER AND GAME BIRDS) are usually about a dozen in number, clear clay color, dotted with dark brown. The young are covered with black down, striped with bright orange red. See Plate of RAILS, ETC.

The common coot (*Fulica atra*) of the Old World is found in most parts of Europe, Asia, and the north of Africa. It is about 16 inches long, black, with a narrow white bar across the wings, and the naked patch on the forehead pure white, on account of which it is often called "bald" coot. The crissum is not white, and this is the most important difference between it and its American cousin. It makes a large nest of water plants among reeds or rushes. Although not very highly esteemed for the table, the circumstance that many can be killed by a single shot, on the mud banks to which coots resort in winter, as on the south coast of England, makes coot shooting profitable to market gunners. Other species inhabit eastern Asia, Africa, and South America. The name "coot" is very often incorrectly applied in the United States to certain ducks, which are properly known as "scoters" (q.v.).

COOTE, SIR EYRE (1726–83). A British general, born at Ash Hill, County Limerick, Ireland. He joined the first regiment (thirty-ninth) sent to India and took a conspicuous

part in the capture of Calcutta. It was by his advice that Clive decided on the immediate and vigorous action which culminated in his victory over Siraj-ud-Daula at Plassey in 1757. On Jan. 22, 1760, he defeated Lally at Wandewash, destroying the power and prestige of France in India. Appointed commander in chief of the Indian forces in 1779, he began, in 1781, his celebrated campaign against Hyder Ali, whom he vanquished at Porto Novo, thus saving Madras to the English. He died on shipboard on his way from Calcutta to Madras. There is a monument to him in Westminster Abbey.

COOTE, RICHARD. See BELLAMONT.

COOT'ER. A name in the southern United States for the Carolina box tortoise. See TURTLE.

COPAIBA, kō-pā'bȧ (Sp. and Portug., from Brazil. *cupauba*), or COPAIVA. A valuable medicinal substance, consisting chiefly of a resin (resin of copaiba) and a volatile oil (oil of copaiba), both of which are used in medicine. It flows from incisions made in the stems of trees of the genus *Copaifera*, such as *Copaifera langsdorffii* and others, natives of the tropical parts of America. Copaiba has a peculiar, not disagreeable odor, and an acrid taste. It is diuretic when taken in small doses; large doses cause gastrointestinal and renal irritation, and the administration of even a small quantity may give rise to an eruption somewhat like that of measles. It imparts a strong odor to the breath and mucous secretions. It is principally useful from its powerful stimulating and disinfectant action on the mucous membranes. It is much used in affections of the genito-urinary system, during the subacute or chronic stages, and is also employed in chronic catarrhs, etc. The medicinal dose of the balsam is from one-fourth to one fluid drachm. Balsam of copaiba is not infrequently adulterated with castor oil. The wood oil, Gurgina or Gurjun balsam of India, the produce of a species of *Dipterocarpus*, is sometimes sold as balsam of copaiba. See GURJUN BALSAM.

COPAIS (kō-pā'is) **LAKE.** See BŒOTIA.

CO'PAL (Mex. *copalli*, resin). A resinous mineral substance of vegetable origin, chiefly used in the manufacture of varnishes and lacquers. The hardest varieties are used like amber, for making various objects. It appears in commerce in smooth rounded masses, colorless or lemon yellow, translucent or transparent, rather brittle, fusible at a somewhat elevated temperature, and but sparingly soluble in oil of turpentine. In making varnishes copal is first rendered soluble; for this purpose it is melted and, on cooling, reduced to a powder and exposed for some time to the action of atmospheric air. It is then boiled with linseed oil and oil of turpentine, and the resulting solution is filtered. Copal is dug in Zanzibar and Mozambique, at several places in western Africa, in New Caledonia, New Zealand, the East Indies, Brazil, etc. The varieties brought from Zanzibar and Mozambique are noted for their hardness and have therefore the highest market value; they are supposed to have been produced by trees like the *Trachylobium hornemannianum* and *Trachylobium mosambicense*. The copal dug in New Zealand and New Caledonia is known in commerce as *cowrie* and *dammar;* it is the semi-fossil resin of the *Dammara australis* and *Dammara ovata*, trees still abundantly growing in those countries; the natives of New Zealand chew the resin when freshly exuded by the trees. *Anime* (q.v.) is another variety of copal; in England, however, the name "anime" is applied to all the different varieties of copal. A mineral substance resembling copal, and known as *fossil copal*, is found at Highgate, London.

COPALCHE, or **COPALCHI** (kō-păl'chē), **BARK.** A name given to the bark of two species of *Croton*, natives of Mexico. One, the product of *Croton pseudo-china*, reaches the market in small, slender, ash-colored quills which resemble a light variety of cinchona, for which they may easily be mistaken, but have a taste and an odor, especially when burned, which suggest cascarilla (*Croton eluteria*), to which the tree is allied; the other in large quills, presumably derived from *Croton suberosus*, which is very bitter and yields an aromatic odor upon burning. The barks are credited with tonic, aromatic properties and have been used, particularly in Mexico, in intermittent fevers and in cases which seemed to demand a mild bitter. The barks have been sold for quebracho.

COPALM, kō'păm. See LIQUIDAMBAR.

COPAN, kō-pän'. An ancient ruined city of Honduras. The buildings are of stone carved with symbolic designs. Good collections of the sculptures made by Saville and others are in the American Museum of Natural History (New York) and other American museums. The city was captured by Hernando de Chavez in 1530. See ARCHITECTURE, AMERICAN.

COPAR'CENA'RY (from *co-* + *parcenary*, from OF. *parcenerie*, from *parcener*, partner, from ML. *partionarius*, having a share, from Lat. *partitio*, share, from *pars*, portion). An estate in England originating in descent to two or more persons, called thence "coparceners" or "parceners." It generally arises under the rule of law which makes the daughters of one dying without male heirs inherit equally, but it may also arise by local custom, as in the case of the descent of lands held by the tenure of *gavelkind*, where all the sons inherit equally. Although the property remains unsevered, yet each parcener is entitled to a distinct share of it, and consequently there is no benefit of survivorship, but the right of each descends to his or her heirs, who are still called "coparceners" with the surviving original parceners. If one of the coparceners alienates his share, the coparcenary is destroyed, and the estate becomes a tenancy in common (q.v.). It may also be destroyed by partition, whereby the estate is divided up among the coparceners in severalty. This may be effected either voluntarily by an interchange of deeds or by an action at law. Such parts of the property as cannot be divided (such as the manor house, etc.) pass to the eldest sister or her issue, but an equivalent in value is assigned to the remaining sisters. If the estates in coparcenary are by descent reunited in one person, they become again an estate in severalty.

In the United States, where descent is to all the children or to all of a group of heirs equally, without distinction of age or sex, coparcenary was from the beginning the usual form of common ownership of land. Such descendants are now usually declared by statute to take the land as tenants in common. See COMMON, TENANCY IN; JOINT TENANCY; DESCENT.

COPE. See COSTUME, ECCLESIASTICAL.

COPE. A custom or tribute due to the crown, or lord of the soil, out of the lead mines in Derbyshire, England.

COPE, Charles West (1811–90). An English historical and genre painter, etcher, and illustrator. He was born in Leeds and studied at Sass's Art School and the Royal Academy, of which he was made a member in 1848 and a professor in 1867. He visited Paris, Munich, and Italy to make special studies of the technique of fresco painting for his series of historical fresco decorations in the houses of Parliament (London). These include "The Embarkation of the Pilgrim Fathers in 1620" and the "Burial of Charles I." His numerous oil paintings include such subjects as "The Death of Cardinal Wolsey" (Osborne Castle); genre subjects, as "Maiden Meditation," "Mother and Child" (South Kensington); "Almsgiving" (ib.); and portraits—all executed in the conventional academic style. He also contributed illustrations for *de luxe* editions of Gray's *Elegy* (1847), Goldsmith's *Poetical Works* (1845), Thomson's *Seasons*, and other works. Consult C. H. Cope, *Reminiscences of C. W. Cope* (London, 1891).

COPE, Edward Drinker (1840–97). An American naturalist, born in Philadelphia. He received his earliest training in private schools and then studied anatomy at the University of Pennsylvania. From 1864 to 1867 he was professor of the natural sciences at Haverford College, Pa. On the death of Leidy, in 1891, he was made professor of geology and paleontology at the University of Pennsylvania, where he was also professor of zoölogy and comparative anatomy; from 1878 until his death he was editor of the *American Naturalist*. He was geologist and paleontologist of the survey of the region west of the 100th meridian under Capt. G. M. Wheeler and also of the survey of the Territories under Dr. F. V. Hayden. He was president of the American Society of Naturalists in 1895 and of the American Association for the Advancement of Science in 1896. He made an immense collection of fossils which he described in his various reports, usually published by the government. His most important contributions were to the history of extinct vertebrates. Scarcely less important were his investigations of the herpetology and ichthyology of North America. In these fields (and especially in the former) his work was epoch making and laid the foundation for the modern classification of North American reptiles, amphibians, and fishes. Cope's contributions to science number about 400. The most important are: *Systematic Arrangement of Lacertilia and Ophidia* (1864); *Systematic Arrangement of Extinct Batrachia, Reptilia, and Aves of North America* (1869–70); *Systematic Relations of the Fishes* (1871); *Cretaceous Vertebrates of the West* (1877); *Tertiary Vertebrates* (1885); *The Batrachia of North America* (1889); *The Crocodilians, Lizards, and Snakes of North America* (1898). Cope was deeply interested in the questions relating to the subject of evolution. He was the leader of the school of American evolutionists, teaching Neo-Lamarckism (q.v.), which considers the changes and variations wrought in the organism by the immediate influence of environment and the inheritance of such variations by the offspring as the most important factors of organic evolution. His most important works on evolution are: *Origin of Genera* (1868); *Origin of the Fittest* (1886); *Primary Factors of Organic Evolution* (1896).

COPE, Sir John (?–1760). An English general. He was at Dettingen in 1743, but is best known through his ignominious defeat at Prestonpans (q.v.) by the Highlanders, under Charles Edward Stuart, the "Young Pretender," Sept. 21, 1745, and perhaps more widely through the sarcastic Jacobite song, based on the event, "Hey, Johnny Cope! are ye waukin' yet?" In 1732 he headed a committee which made a famous report on revenue frauds and smuggling.

COPE, Thomas Pym (1768–1854). An American merchant. He started at Philadelphia the first line of sailing vessels between that city and Liverpool, and made a large fortune during the War of 1812 by taking all the marine risks on his vessels, which were singularly fortunate in their voyages. He was largely instrumental in introducing the Schuylkill water into Philadelphia, in the completion of the Chesapeake and Delaware Canal, the construction of the Pennsylvania Railroad, and the foundation of the Mercantile Library of Philadelphia. In 1807 he was elected to the State Legislature.

COPE, Walter (1860–1902). An American architect, born in Philadelphia. He received his professional training in architects' offices in Philadelphia. The work of Cope includes the buildings of Bryn Mawr College, the dormitory system and other buildings of the University of Pennsylvania, several buildings of Washington University in St. Louis, and the Pennsylvania Institution for the Blind at Overbrook. Cope was a fellow of the American Institute of Architects.

CO'PECK (Russ. *kopieĭka, kopeĭka*, from *kopatĭ*, OChurch Slav. *kopati*, to dig). A Russian coin, the oldest kind in Russia and the first substitute for furs as a medium of exchange. It is worth one-hundredth of a silver ruble, or about half a cent.

COPEHAN. See Wintún.

COPELAND, Edwin Bingham (1873–). An American botanist, born at Monroe, Wis. He was educated at Leland Stanford Junior University and also studied at Leipzig and the universities of Halle, Wisconsin, and Chicago. Between 1897 and 1903 he was assistant professor of botany at Indiana University and at the State Normal School at Chico, Cal., assistant professor and professor at West Virginia University and instructor at Stanford. In 1903–08 he was botanist to the Philippine government; in 1908–09, superintendent of the Philippine Agricultural School; and in 1909 he became dean of the College of Agriculture, University of the Philippines. His publications include some 70 articles on botanical research and also *Elements of Philippine Agriculture* (1908) and *Cocoanut Cultivation* (1912).

CO'PENHA'GEN (Dan. *Köbenhavn*, Merchants' Haven, from *köbe*, Ger. *kaufen*, to buy + *havn*, Ger. *Hafen*, haven). The capital and largest city of Denmark, situated on the islands of Sceland and Amager, in lat. 55° 41′ N., and long. 12° 35′ E. (Map: Denmark, F 3). The Kalvebod, or Kallebo, Strand, an inlet of the sound separating the two islands of Seeland and Amager, forms the excellent harbor of the city.

Copenhagen is divided into six parts, of which that lying within the former fortifications (now converted into boulevards) forms the nucleus of the city. The quarter situated on the island of Amager is called Christianshavn. The centre of the city is marked by the Kongens Nytorv (New King's Market Place), an irregular square with an equestrian statue of Christian V. From this square issue the principal streets, the finest

of which is Bredgade, leading to the esplanade of the citadel. The beautiful national theatre (the Royal, built 1874) and some of the more important commercial buildings are on this square. The most interesting of the numerous churches of Copenhagen are the Vor Frue Kirke, the metropolitan cathedral, famous for its statues of Christ and the Twelve Apostles, of a kneeling angel holding a shell for a font, and of other figures, designed and partly executed by Thorwaldsen; the Holmens Kirke, built in the seventeenth century, and containing monuments to the naval heroes, Juel and Tordenskjöld; Trinitatis Kirke, with a high round tower; the Vor Frelsers Kirke ('Church of Our Redeemer'), with an external winding staircase leading to the tower; and the handsome Frederiks Kirke, begun in 1749 and completed in 1894, whose magnificent dome is one of the most conspicuous objects of the city. Christiansborg, the king's residence and a noted palace (built 1731–45), was destroyed by fire (1794), rebuilt, and again burned in 1884. The royal abode was then removed to Amalienborg Plads, a group of four palaces built in the style of Louis XV. The Rosenborg Palace, built at the beginning of the seventeenth century, contains a remarkable collection of jewels, weapons, and regalia. The Palace of Charlottenborg (built 1672), situated on the Kongens Nytorv, is now the seat of the Royal Academy of Arts. Other notable public buildings are the exchange, erected in 1619–40 in the Dutch Renaissance style; the university; the new city hall; the Glyptothek, containing one of the choicest collections of sculpture and other objects of art in northern Europe; and the new Art Museum, with the Royal Picture Gallery, which ranks high among the minor collections of paintings, including choice specimens of the Dutch and Italian schools, and by modern Danish masters. The Moltke Palace contains a collection of Dutch paintings. The world-renowned Thorwaldsen Museum (built 1839–48) contains about 300 of the sculptor's works, together with furniture and art objects bequeathed by him to his native city. Within the central court is Thorwaldsen's tomb.

The University of Copenhagen (q.v.) occupies a distinguished place among European institutions of learning. Other prominent educational institutions are the polytechnic institute affiliated with the university, the veterinary school, founded in 1773, the military and naval schools, and the Academy of Arts. Copenhagen has a number of scientific and art associations, the most prominent of which are the Danish Royal Society, founded in 1742, and the Royal Northern Antiquarian Society, founded in 1825. The Royal Library contains about 600,000 volumes and about 20,000 manuscripts; and the National Museum, contained in the Prinsens Palace, includes the Danish, the ethnographical, the antique, and the numismatic collections.

The city is administered by a board of magistrates, including the president, appointed by the King, and a municipal council of 42 members.

The chief manufactures of Copenhagen include sugar, machinery, textiles, and porcelain ware. Shipbuilding is the principal industry. Over one-half of the commerce of Denmark passes through Copenhagen, and the chief financial institutions of the country are situated here. There is regular steam communication between Copenhagen and ports of Germany, Russia, England, France, and the United States. It is the seat of a United States consul general. The area of the city with suburbs is 31 square miles (Copenhagen 28, Frederiksberg 3); pop., 1921, 561,344; 1911, 559,398 (Copenhagen 462,161, Frederiksberg 97,237); 1906, 514,134 (Copenhagen 426,540); 1901, 454,466 (378,235); 1880, 261,360 (234,850); 1860, 163,307 (155,143); 1840, 120,819; 1769, 80,000.

Copenhagen was a fishing village until the middle of the twelfth century; it began to grow in importance after coming into the possession of Bishop Absalon, who fortified it in 1167. Owing to its good harbor, Copenhagen soon became a place of commercial importance and received from the Bishop of Roskilde municipal rights about the middle of the thirteenth century. It was repeatedly attacked by the Hanseatic towns. It was chosen for the capital of the kingdom in 1443 by King Christopher, the Bavarian. During 1658–59 it withstood a severe siege by the Swedes under Charles X, by its resistance probably saving the Danish monarchy. In 1700 it was bombarded by the united fleets of England, Holland, and Sweden. It suffered heavily from conflagrations during the eighteenth century. In 1801 the harbor of Copenhagen was the scene of the destruction of the Danish fleet by Nelson, and in 1807 the city was subjected to a bombardment by the British, during which the university and a number of public buildings were destroyed. Consult: *Copenhagen, the Capital of Denmark* (Copenhagen, 1898); Seelig, *Führer durch Kopenhagen* (Hamburg, 1895); Nielsen, *Kjobenhavns Historie og Beskrivelse* (6 vols., Copenhagen, 1877–92).

COPENHAGEN, UNIVERSITY OF. The only university in Denmark, and the oldest and one of the most famous in northern Europe. It was founded by Christian I in 1478, taking its statutes as well as some of its teachers from the University of Cologne, which up to that time had been the chief resort of Danish students. This first foundation perished during the civil wars accompanying the Reformation, but was reëstablished in 1539 by Christian III, as a Protestant university, on the model of Wittenberg, then at the zenith of its influence. This foundation, destroyed by fire in 1728, was reestablished in 1732 by Christian VI and reorganized on its present basis in 1788. Among the distinguished men who have shed lustre on the university are Holberg, in the first half of the eighteenth century, and Oehlenschläger, the poet, Madvig, the classical scholar, Rask, the philologist, Oersted, the physicist, and Worsaae, the archæologist, in the first half of the nineteenth century; Höffding, the philosopher, and Brandes the literary critic, in the latter half. Supported partly by the state and partly by endowment, the university is attended by some 3000 students, has a library of 400,000 volumes, museums, an academy of surgery, and an observatory. Instruction is gratuitous, and the courses are open to both sexes. The university has five faculties. Attached to it are botanical and zoölogical gardens.

CÖPENICK, or **KÖPENICK,** kē'pe-nĭk. A town in the Prussian Province of Brandenburg, situated on an island at the confluence of the Dahme and the Spree, 10 miles southeast of Berlin. It contains a royal palace built on the site of a sixteenth-century castle of the Elector Frederick William, now used as a seminary for teachers, and a seventeenth-century Rathaus. The chief manufactures include dyestuffs, sawmill machinery, inks, glass, linoleum, starch,

sugar, chicory, and shoddy. Pop., 1900, 21,024; 1905, 27,721; 1910, 30,879. The city is mentioned in 1157 as the residence of the Slavic Prince Jaczo. It was conquered by the Margrave of Brandenburg in 1240 and plundered by the Russians in 1760. Consult Graf zu Dohna, *Kurfurstliche Schlosser in der Mark Brandenburg* (Berlin, 1890).

COPEP'ODA (Neo-Lat. nom. pl., from Gk. *κώπη, kōpē,* oar + *πούς, pous,* foot). A large and important order of entomostracous crustaceans, characterized by having the five pairs of feet specially adapted for swimming. There are no branchial sacs on the feet, and there is never any bivalve shell. The copepods, sometimes called "water fleas," live in both salt and fresh water in swarms. Some species are parasitic on fish and sometimes do great damage in that way, but most copepods are free-swimming and feed on organic matter in the water. They thus act as scavengers and must be of great importance in keeping harbors clean. Moreover, they serve as food for many species of food fishes. Among our fresh-water species, those of the genus *Cyclops* are perhaps the best known. They are very minute, actively moving creatures. The genus *Argulus* is parasitic on carp, suckers, and other fish. They reach a considerable size, frequently half an inch in length. Consult: publications of United States Fish Commission and National Museum; Herrick and Turner, *Synopsis Entomostraca of Minnesota* (St. Paul, 1895); Calman, *The Life of Crustacea* (New York, 1911). For further information see CRUSTACEA; ENTOMOSTRACA.

COPER'NICAN SYSTEM. The system which represents the sun to be at rest and the earth and planets to move round it; in other words, that which we now know, on unquestionable evidence, to be the true system of astronomy. It derives its name from Copernicus (q.v.), but, in point of fact, it may be described as being a growth to which he was only one of many contributors. The merit of having first formed the general notion of the system seems to be due to Pythagoras; Copernicus has the credit of having, after the lapse of centuries, again drawn the attention of philosophers to it and of having greatly increased the probability of its truth by his calculations and arguments; for the rest, the glory of having matured the idea belongs to Kepler, Galileo, and Newton, who, through the discovery of the law of gravitation, finally demonstrated its truth effectually. Many who have been used to reverence the name of Copernicus in connection with this system would be surprised to find, on perusing his work, *De Revolutionibus Orbium Cœlestium,* how much of error, unsound reasoning, and happy conjecture combined to secure for him in all times the association of the system with his name.

De Revolutionibus Orbium Cœlestium, dedicated to Pope Paul III, consists of six books, in which Copernicus undertook to demonstrate his whole system. The character of the reasoning which then passed for demonstration must be borne in mind in judging of the author's procedure in establishing his various positions. It was then thought a sufficient demonstration of a phenomenon to make a supposition, on which its occurrence would be intelligible, without attempting to bring the supposition itself, by an induction of facts, within the truth of nature: many abstract propositions, too, which would now appear to be ridiculous, were at that time universally admitted to be of great weight in scientific arguments.

Illustrations of both of these peculiarities may be gleaned from the first of the six books of *De Revolutionibus.* It contains the following propositions: 1. The universe is spherical. This is established by such arguments as that the sphere is the most perfect figure, etc. 2. The earth is spherical; which flows from the same kind of considerations. 3. The earth and sea make one globe. 4. The motions of all the heavenly bodies must be uniform and circular, or compounded of uniform and circular motions. Here, again, we meet with singular reasons. A *simple* body must move in a circle, and nothing but circular motion could give periodicity to phenomena. 5. Supposing the distance of the stars to be immense, there is no reason why the earth should not have a motion round its axis as well as a motion in its orbit. 6. The sphere of the stars is immensely distant. 7 and 8. The ancients were wrong in placing the earth at the centre of the universe. The arguments under this head are as imaginary as those which they were designed to refute. The falling of a body to the earth is deduced from the assumption that it is only given to wholes to move circularly, while it is of the nature of parts, separated from their wholes, to move in straight lines. That there must be a *centrum mundi,* an entity not recognized by modern science, is admitted, the question being as to its position. 9. It is possible for the earth to have several motions. 10. Copernicus establishes the order of the planets and draws a diagram of the system much as it is now represented. It may be observed that, following the old systems, such as the Ptolemaic, he lays down *a sphere* for the fixed stars. See FIRMAMENT.

The most brilliant and valuable part of the *De Revolutionibus* is that in which he explained, for the first time, the variations of the seasons, the precession of the equinoxes, and the stations and retrogradations of the planets. In general, his explanations are correct as to the general nature of the causes of the phenomena. But Copernicus had neither mathematical nor mechanical knowledge sufficient to enable him to explain more than the mean motions of the solar system. To account for irregularities he was obliged to introduce a system of epicycles entirely resembling that of Ptolemy. (See PTOLEMAIC SYSTEM.) This arose from the false notion of his time that all motions must be compounded of circular ones, with the application of which idea, and with the invention of convenient epicycles, the greater part of the *De Revolutionibus* is occupied. It may further be added, to rectify the vulgar notion regarding the relation of Copernicus to the system of the heavens, that he had no answer to offer to the mechanical objections to his system. One of the commonest objections was that against the axial motion of the earth, that it was inconsistent with the fact of bodies falling to the points of the earth directly beneath the points from which they are dropped; for this he had no answer, nor could he have, the laws of motion being not yet discovered. Consult: Wolf, *Geschichte der Astronomie* (Munich, 1877); Dreyer, *History of the Planetary Systems from Thales to Kepler* (Cambridge, 1906); also works mentioned under COPERNICUS.

COPERNICIA, kō'pĕr-nĭsh'ĭ-â. See CARNAUBA PALM.

COPER'NICUS (Latinized form of *Koppernigk*), NICOLAUS (1473-1543). A celebrated Polish astronomer, born at Thorn, a Prussian town on the Vistula, at that time belonging to Poland. He was instructed in the Latin and Greek languages at home; in 1491 he was sent to the University of Cracow, where he studied mathematics and other sciences. In 1495 he went to Italy and spent some years in the study of law, astronomy, and medicine, in Bologna and Padua. His natural bent, however, was towards mathematics, the study of which he pursued with passion through all its branches.

Having become enamored of the study of astronomy, he spent considerable time with masters in that field, and at Rome in particular, where he resided some time, his astronomical knowledge seems to have made a favorable impression. He studied Greek as well as mathematics and astronomy, in addition to law and medicine in which he was supposed primarily to be engaged, and enjoyed many friendships. He became doctor decretorum at Ferrara in 1503 and in 1505 returned to his native country, where, having entered into holy orders, he obtained through his uncle, the Bishop of Ermeland, a canonry at Frauenburg, in the enjoyment of which he passed the rest of his life. His working day, it is said, he divided into three parts—one devoted to the duties of his office, another to giving medical advice gratuitously to the poor, and the third to study.

Soon after his return to Prussia he began, in his thirty-fifth year (1507), to apply his fund of observations and mathematical knowledge to correcting the system of astronomy which then prevailed. The result was his *De Revolutionibus Orbium Cœlestium* (Nuremberg, 1543), a brief account of which is given under COPERNICAN SYSTEM. He completed it in 1530, in his fifty-seventh year. Twelve years, however, elapsed before he could be persuaded to give his book to the world. Perhaps the strongest motive for his reticence was the fear of the unpopularity which the work threatened to bring him; for many who had heard of the views it advocated doubted if these were in harmony with Scripture. At all events, it is pretty certain that it was his desire to conciliate the Church that led him to dedicate his book, when it was published, to Pope Paul III. By the time the book was actually printed, however, the author was beyond the power of the Church. An attack of dysentery, followed by paralysis of the right side, had destroyed his memory and obscured his understanding, and he is said to have died a few hours after a copy of the labor of his life reached him.

Besides the *De Revolutionibus*, may be mentioned among Copernicus' works a treatise on trigonometry, entitled *De Lateribus et Angulis Triangulorum* (Wittenberg, 1542), which was edited by his friend and pupil Rhæticus; and *Theophylacti Scholastici Simocattæ Epistolæ Morales, Rurales, et Amatoriæ, cum Versione Latina* (Cracow, 1509). He also wrote in 1526 a work on money, entitled *De Monetæ Cudendæ Ratione*, which was first published in 1816, and several manuscript treatises from his pen are in the library of the bishopric of Ermeland. A statue of Copernicus by Thorwaldsen was placed in the Casimir Palace at Warsaw in 1830; another, by Tieck, bearing the inscription *Nicolaus Copernicus Thorunensis, Terræ Motor, Solis Cœlique Stator*, was erected at Thorn in 1853; and in 1900 his memory was honored by the erection of a monument in the courtyard of the University at Cracow. In commemoration of the four hundredth anniversary of his birth a sumptuous edition of *De Revolutionibus*, afterward translated into German by Menzzer in 1879, was published at Thorn in 1873 by the Copernicus Society. Consult: Gassendi, *Vita Nicolai Copernici* (The Hague, 1652); Czynski, *Kopernik et ses travaux* (Paris, 1847); Bertrand, *Les fondateurs de l'astronomie moderne* (ib., 1865); Flammarion, *Vie de Copernic* (ib., 1872); Wolf, *Geschichte der Astronomie* (Munich, 1877); Prowe, *Nicolaus Coppernicus* (3 vols., Berlin, 1883–84; the best account of his life and works); Wolf, *Handbuch der Astronomie, ihrer Geschichte und Litteratur* (2 vols., Zurich, 1890–93); Muller, *Nikolaus Copernicus, der Altmeister der neueren Astronomie* (Freiburg, 1898); Curtze, *Nicolaus Copernicus* (Berlin, 1899); Bryant, *History of Astronomy* (London, 1907).

COPHET'UA. An African king who loved and married a beggar maiden, Penelophon. The story is told in Percy's *Reliques* and is alluded to in various plays of Shakespeare. Tennyson's *Beggar Maid* gives the legend in modern form.

CO'PIAPITE. A basic ferric sulphate crystallizing in the monoclinic system. It occurs in yellow crystalline masses or crusts and is found in considerable quantity near Copiapó, Chile.

COPIAPÓ, kō'pyä-pō' (So. Amer. *Copayaipu*). The capital of the Province of Atacama, Chile, situated on the Copiapó, 50 miles by rail from its port, Caldera (Map: Chile, C 9). It possesses a fine parish church, a bronze statue of Juan Godoy, the discoverer of the Chañarcillo silver mines, and also a provincial high school, a mining school, and a public library. The town is the centre of a productive mining district and contains machine shops and smelting works. Pop., 1895, 9301; 1903, 9128; 1907, 11,617.

COPING, kōp'ĭng (from *cope*, variant of *cape*, from Lat. *capa*, cape). The upper or covering course or top of a wall, generally either overhanging or sloping or rounded, so as to shed the water. In the Middle Ages, where the coping was of hewn stone, it was often ornamented with a circular molding along the top, a stepped slope, and a groove under the lower edge.

COP'INGER, WALTER ARTHUR (1847–1910). An English lawyer and writer of varied attainments. He served as president of the Bibliographical Society and became professor of law at Owens College and at Victoria University, Birmingham. He wrote: *Index to Precedents* (1872); *Title Deeds* (1875); *An Essay on the Abolition of Capital Punishment* (1876); *A Treatise on Predestination, Election, and Grace* (1889); *The Law of Rents* (1886); *Law of Copyright* (3d ed., 1891); *On the Authorship of the First Hundred Numbers of the "Edinburgh Review"* (1895); and *Supplement to Hain's Repertorium Bibliographicum* (1895).

COPLAND, kōp'land, JAMES (1791–1870). An English physician. He was born at Deerness, in the Orkney Isles, studied medicine at Edinburgh, traveled on the Continent, and subsequently undertook a journey to Africa to investigate the nature of epidemic diseases prevalent in tropical lands. He settled in London about 1818 and was made a member of the Royal College of Physicians. In 1822 he became editor of the *London Medical Repository;* and, being

chosen in that year to deliver the annual oration before the London Medical Association, he advanced in his lecture a new theory of electro-galvanism. His *Outlines of Pathology and Practical Medicine*, in which he especially treated of the ganglionic nerves and their functions and proposed a new and more simple classification of diseases, appeared in 1822; the *Elements of Physiology* in 1824, and *On Pestilential Cholera* in 1832. Copland's most important work was the *Dictionary of Practical Medicine* (1833–58), four closely printed volumes, to which he devoted the labor of many years.

COPLAY. A borough in Lehigh Co., Pa., 6 miles northwest of Allentown, on the Lehigh Valley and Ironton railroads, and on the Lehigh Coal and Navigation Canal. It has manufactures of silk, cement, and cigars. Pop., 1900, 1581; 1910, 2670.

COPLEY, kŏp'lĭ, JOHN SINGLETON (1737–1815). An American portrait and historical painter, along with West one of the two important masters of the early period. He was born in Boston of Irish parentage, July 3, 1737, and received instruction from his stepfather, Peter Pelham, a mezzotint engraver, in which art his first artistic efforts were made. In painting he was practically self-taught, although influenced by his older contemporaries, Blackburn and Smybert. His progress was rapid, and at 17 he was recognized in Boston as a prominent painter. In 1769 he married the daughter of a wealthy Boston merchant, purchased a stately house on Beacon Hill, and soon became the recognized painter of Boston society. After exhibiting repeatedly and successfully at the Royal Academy, in 1774, on the invitation of Benjamin West, he went to London. Through the latter's kindness he received a number of commissions for portraits, including those of Lord and Lady North and the King and Queen. The following autumn he went to Italy, spending almost a year in study, to the great improvement of his drawing. Notwithstanding his sympathy with the American Revolution he remained in London. He was elected to the Royal Academy in 1779, and through three very popular historical pictures he became one of the most celebrated English artists of his day. These were: "The Death of Lord Chatham" (1779–80), "The Death of Major Pierson" (1783), and the "Siege of Gibraltar" (1790), all in the National Gallery, London. He lived in considerable state, and his popularity continued until a few years before his death in London, Sept. 9, 1815. His son, Lord Lyndhurst, afterward became Lord Chancellor of England.

Copley's art falls into two distinct periods—an American, lasting until his removal to London, and a British period. In the former his art was somewhat primitive—faulty in line, hard in color, and stiff in pose, but the sitters were always distinguished in bearing, determined in expression, and convincing in appearance. His portraits are the most typical representations of the New England society of his day. After his study in Italy and his work in London his art approached more nearly that of contemporary British painters. His execution became less labored and his technique better, but his art is less characteristic and convincing. The principal portraits of his early period include those of John Hancock and Samuel Adams (1772), in the Boston Art Museum; Mrs. Ford, in the Boston Athenæum; Mrs. Thomas Boylston and several others in Memorial Hall, Harvard University, which possesses other examples of his works; Lady Wentworth and Mrs. Robert Harper, in the New York Public Library; besides others in private possession, principally in Boston. The portraits of Robert Izard and his wife (Boston Art Museum), painted in Rome, represent the transition to his later manner. In London he painted "A Youth Rescued from a Shark" (replica in the Boston Art Museum), with surprising realism; portraits of Lord Cornwallis (Corporation Art Gallery, London); the Earl of Mansfield (National Gallery, London); the Copley Family—one of his very best works—and John Quincy Adams (both in the Boston Art Museum). Among his later historical paintings was "The Offer of the Crown to Lady Jane Grey" (1808, belonging to Mr. Amory, Boston). Consult: Amory, *Domestic and Artistic Life of J. S. Copley, R.A.* (Boston, 1882); Perkins, *Sketch of the Life of Copley* (ib., 1873); Isham, *History of American Painting* (New York, 1905).

COPLEY, JOHN SINGLETON, LORD LYNDHURST (1772–1863). A British lawyer and statesman, three times Lord Chancellor of England. He was the son of J. S. Copley, R.A., and was born in Boston, Mass., May 21, 1772. While yet an infant, his father removed to England for the practice of his art. He was educated at Trinity College, Cambridge, where he was second wrangler and Smith's prizeman in 1794. In 1795–96, as a traveling bachelor and fellow of his college, he visited the United States, and in company with the French author Volney made a tour which he described in Latin letters to the vice chancellor of his university. Called to the bar at Lincoln's Inn in 1804, he chose the Midland circuit, but did not achieve financial success until 1812, when his defense of a Luddite at Nottingham established his reputation. In politics he was at first a Liberal, and long expressed sentiments hostile to the ministry of the day. He ably defended Watson and Thistlewood on their trial for high treason in 1817 and obtained their acquittal. He entered Parliament in 1818, and a year later became Solicitor-General in the Liverpool administration and was knighted. In 1824 he was promoted to the rank of Attorney-General, and held that office until 1826, when he became Master of the Rolls. When Canning was charged to form a ministry in 1827, he offered the Great Seal to Sir John Copley, who was raised to the Upper House as Baron Lyndhurst and remained Lord Chancellor from 1827 to 1830. In 1831 he became Lord Chief Baron of the Exchequer, which office he exchanged for the woolsack during the brief administration of Sir Robert Peel in 1834–35. In 1835 he led the opposition to the Melbourne ministry in the Upper House, in speeches of great power and brilliancy. Lyndhurst's orations and annual reviews of the session did much to reanimate the Conservative party, and pave the way for their return to power in 1841. He then became Lord Chancellor for the third time, and held the Great Seal until the defeat of the Peel government in 1846. After that time he took little part in home politics, but his voice was often heard on matters of foreign policy, and in denunciation of tyranny in Italy and elsewhere. He died in London, Oct. 12, 1863. Lord Lyndhurst's high attainments as a lawyer have never been questioned, and his judgments have never been excelled for clearness, method, and legal

acumen. In the House of Lords he had few equals among his contemporaries as a brilliant orator and debater. He delivered his last speech in Parliament at the age of 88 with his usual force and ability. Consult Martin, *Life of Lord Lyndhurst* (London, 1883), and Campbell's *Lives of the Chief Justices* and *Lives of the Chancellors.*

COP'MANHURST, The Clerk of. An alias of Friar Tuck in the Robin Hood tales. Sir Walter Scott alludes to him by this title in *Ivanhoe.*

COPPÉE, kô'pā', François Edouard Joachim (1842–1908). A French poet, dramatist, and novelist. He was born in Paris and for a time was a clerk in the government service. *Le reliquaire,* his first book of poems, appeared in 1866 and was followed by *Les intimités* (1868), and *Poèmes modernes* (1869), which marked him as a member of the Parnassian school. He first attracted notice by a one-act play, *Le passant* (1869), the first of a series of curtain raisers in which he displayed greater talent than in his formal dramas, *Le luthier de Crémone* (1876), *Severo Torelli* (1883), *Les Jacobites* (1885), and *Pour la couronne* (1895). He also wrote the play *Mme. de Maintenon* (1881). His later lyric work is contained in *Les humbles* (1872), *Le cahier rouge* (1874), *L'Arrière-saison* (1890), and *Dans la prière et dans la lutte* (1901); his narrative verse in *Une idylle pendant le siège* (1875), *Olivier* (1875), *L'Exilée* (1876), *Récits et élégies* (1878), and *Vingt contes nouveaux* (1883). His prose tales of the eighties include *Fille de tristesse, Henriette, Madame Nunu,* and *Le coucher de soleil.* He told his own story in *Toute une jeunesse* (1890), and published a series of journalistic essays, *Mon franc parler* (1893–96). *Le coupable* (1897) is a novel of criminal psychology, and *La bonne souffrance* (1898) signalizes the writer's reconciliation with the Church. From 1880 to 1884 he was the dramatic critic of the well-known newspaper, *La Patrie.* He was elected to the French Academy in 1884. Coppée is an accomplished artist in the short story, and here it is the poet in him that lends these brief and finished narratives their distinctive charm. He was at first and by instinct an artist in verse, a skilled craftsman, though, perhaps, a little affected; indeed, his verse has often been characterized as poetical prose, owing to the lack of real inspiration in it and his delight in treating countless unimportant details of everyday life. After 1870 his facile suavity yielded to sterner notes in the lyric of democracy, of work, poverty, and self-denial, and of the indignant patriotism of defeat. To this succeeds the gentle idyllic vein with an occasional tragic touch. But whether in prose or verse, he continues the poet of the Parisian workman and the petty trading class. He continually harks back to his lost youth in his sweetly melancholy romances, from which much real and delightful local color and Parisian atmosphere can be gleaned. He was very aptly called *le poète des humbles.* He has happily described himself as "a man of refinement who enjoys simple people, an aristocrat who loves the masses."

Consult: Lescure, *Coppée, l'homme, la vie et l'œuvre* (Paris, 1888); Driulhet, *Un poète français: François Coppée* (ib., 1902); L'Abbé Delmont, *Trois illustres conquêtes de la foi: Coppée, Brunetière, Bourget* (1905); Ernest Gaubert, *François Coppée* (1906).

COP'PÉE, Henry (1821–95). An American educator and author, born in Savannah, Ga. He graduated at West Point in 1845, served in the Mexican War, and was assistant professor at the Military Academy from 1850 to 1855, when he became professor of English literature and history in the University of Pennsylvania. Here he remained for 11 years, after which he was president of Lehigh University until 1875 and a professor there till his death. In 1874 he was appointed a regent of the Smithsonian Institution. Among his publications were: *Elements of Logic* (1857); *Gallery of Famous Poets* (1858); *Gallery of Distinguished Poetesses* (1860); *Grant and his Campaigns* (1866); *The Conquest of Spain by the Arab-Moors* (1881); *Elements of Rhetoric* (10th ed., 1887). He edited two volumes of the Comte de Paris's *Civil War in America* (1876).

COP'PER (symbol, Cu), a metallic element, distinguished from all other metals by its peculiar red color. The name is derived from the Latin *cyprium* (from the island of Cyprus), later *cuprum.*

Physical Characteristics. Specific gravity, (cast) 8.921, (rolled or hammered) 8.952; streak or powder, red; hardness, 2.5 to 3; heat conductivity, 89.8 (gold being taken at 100); electric conductivity, 93.08 (silver being taken at 100); melting point, 1981.5° F.; malleability and ductility, high.

Chemical Characteristics. Valency, I and II; atomic weight, 63.57; specific heat, 0.093; electrochemical equivalents, (cuprous salts) 191.2 ampere hours per pound, (cupric salts) 382.4 ampere hours per pound. Copper is easily soluble in nitric acid, aqua regia, and boiling concentrated sulphuric acid; slowly soluble in hydrochloric acid with access of air. Copper combines with oxygen to form two important oxides, cuprous oxide (Cu_2O) and cupric oxide (CuO). It combines readily with various metals forming alloys, the more important of which are bronze (copper with tin), brass (copper with zinc), and monel metal (copper with nickel). (See Alloys.) From acid, neutral, and alkaline solutions copper is precipitated by hydrogen sulphide and ammonium sulphide as a brownish-black precipitate, cupric sulphide (CuS). Ammonia added in excess to solutions of cupric salts produces a clear fluid of an azure-blue color. Metallic iron in contact with acid solutions is covered with a coating of metallic copper.

Production and Prices. The following table shows the world's copper production for the year 1913 as compiled by *The Engineering and Mining Journal,* New York:

THE WORLD'S COPPER PRODUCTION IN 1913

Source	Metric tons
Africa	20,000
Australasia	45,300
Bolivia	5,000
Canada	34,587
Chile	40,195
Cuba	3,417
Germany	25,000
Japan	65,000
Mexico	52,815
Peru	25,715
Russia	44,000
Spain and Portugal	52,300
Other Countries	30,000
United States	557,387
Total	1,000,716

From the foregoing table it will be noted that North America supplies 64.8 per cent of the world's copper, the United States alone producing 55.7 per cent.

The production of the United States is shown by States in the annexed table, as compiled by *The Engineering and Mining Journal:*

COPPER PRODUCTION OF THE UNITED STATES IN 1913

STATE	Pounds
Alaska	23,360,000
Arizona	401,223,786
California	32,206,435
Colorado	7,320,000
Idaho	8,594,722
Michigan	161,000,000
Montana	284,210,911
Nevada	83,829,329
New Mexico	48,710,000
Utah	148,274,658
Southern States	20,857,849
Other	9,223,891
Total	1,228,811,581

The annual average prices for New York delivery prevailing for the last 10 years are shown in the following table, as compiled by *The Engineering and Mining Journal:*

AVERAGE PRICES FOR COPPER, 1904–1913

YEAR	Electrolytic cents per lb.	Standard sterling per long ton	Lake cents per lb.
1904	12.823	58.884	12.990
1905	15.590	69.465	15.699
1906	19.278	87.282	19.616
1907	20.004	87.007	20.661
1908	13.208	59.902	13.424
1909	12.982	58.732	13.335
1910	12.738	57.054	13.039
1911	12.376	55.973	12.634
1912	16.341	72.942	16.560
1913	15.269	68.335	15.686

The prices given are for three classes of copper, which may be briefly defined as follows: (1) *electrolytic* copper, or copper electrolytically refined; (2) *standard*, the London term for ordinary commercial brands; (3) *lake*, applied to the product of the Lake Superior mines (Michigan), which, because of its peculiar occurrence and treatment, is of especial value in plate and tube mills.

History. Copper and copper-alloy objects are found in the prehistoric remains of (1) Egypt, dating back to the fourth dynasty (3800 to 4700 B.C.); (2) Asia Minor, dating probably to 3000 B.C.; (3) China (2500 B.C. ?). The remains of the Mycenæan, Phœnician, Babylonian, and Assyrian civilizations (1800 to 500 B.C.) have yielded a variety of copper and bronze objects. It is probable that the Egyptians obtained their copper from the mines located on the Sinai Peninsula. The copper used by the Greeks and Romans was first mined on the island of Cyprus. Later, during the Roman conquests, copper was found and mined in central Europe, Spain, and Britain.

On the American continent copper was known to, and used by, the aboriginal races. No dates can, however, be applied to its first use. The Lake Superior deposits were known to the French explorers in the seventeenth century. During the eighteenth century some small shipments of copper ores were made from the Atlantic seaboard to Europe, originating from mines in Connecticut, New Jersey, and Pennsylvania. It was not until 1844 that copper came into prominence as a mineral product of the United States. Since that date the increase in production has been phenomenal, until at present the United States is alone credited with 56 per cent of the world's production.

Mineralogy. The principal copper-bearing minerals are: native copper, cuprite, or copper oxide (Cu_2O); malachite, or green carbonate of copper ($CuCO_3.Cu(OH)_2$); azurite, or blue carbonate of copper ($2CuCO_3.Cu(OH)_2$); chalcopyrite, or copper pyrite ($CuFeS_2$); bornite or peacock copper (Cu_3FeS_3); chalcocite, or copper glance (Cu_2S); chrysocolla, or silicate of copper ($CuSiO_3.2H_2O$); tetrahedrite, a copper-antimony sulphide ($Cu_8Sb_2S_7$); enargite, a copper-arsenic sulphide (Cu_3AsS_4); and covellite, or cupric sulphide (CuS).

Geology and Mining. The origin and geological occurrence of these minerals is so varied and so complex as to preclude any detailed description within the scope of this article. Suffice it, therefore, to briefly enumerate and describe the deposits of chief economic importance in America, which are: (1) *the native copper deposits of Lake Superior;* (2) *vein deposits,* as exemplified at Butte, Mont.; (3) *contact deposits,* as exemplified at Bisbee, Ariz.; (4) *disseminated or so-called "porphyry" deposits,* of which the Utah, Nevada, Ray, Miami, and Chino mines are examples; and (5) *pyritic deposits,* exemplified at Ducktown, Tenn., and in northern California.

1. *The Lake Superior deposits.* The valuable mineral here is native copper, occurring as a cement binding together or replacing the pebbles of a conglomerate, and as a filling in an amygdaloidal diabase. The largest producer of this district, the Calumet and Hecla mine proper, is now deriving the major portion of its ore from the amygdaloidal beds, the conglomerate ores being nearly exhausted. The average yield of copper from the ores mined and milled during recent years is from 14 to 22 pounds per ton. The handling of such low-grade ore at a profit has only been possible because of the very unusual and favorable natural conditions.

2. *The Butte deposits* consist of several series of large and numerous veins in granite. The ores, as mined latterly, yield from 40 to 70 pounds of copper per ton. The ore of the upper part of the zone of secondary enrichment has been largely exhausted, and the present output is made up mainly of ores from the lower horizons, primary chalcocite and similar minerals occurring at a depth of 2000 feet and over.

3. *The Bisbee deposits* have yielded large tonnages of exceptionally high-grade ores. The main ore bodies have been found on or near a limestone-porphyry contact, the chief tonnages of former years having come from the limestone side of the contact; now, however, the lower-grade ore occurring in the porphyry is being developed with excellent results. For the year 1912 the yield in copper per ton of ore was 122 pounds.

4. *The disseminated or so-called "porphyry" deposits* consist of large areas of altered rocks carrying uniformly disseminated copper values. The yield of copper per ton of ore varies from 20 pounds, as in the case of Utah copper, which is mined by steam shovels, up to 33 pounds at

Miami, which is operated as an underground mine. Two South American deposits of this type are worthy of note: they are the Braden mine, and the property of the Chile Copper Company, both located in Chile.

5. *The pyrite deposits* consist of large masses or lenses of cupriferous pyrite occurring practically free from gangue. Deposits of this character usually yield copper values ranging from 32 pounds per ton, as in Tennessee, to 60 pounds per ton, as in northern California. Their economic importance is largely due to associated recoverable mineral values, i.e., gold, silver, and sulphur. Foreign mines of importance of this type are the Mount Lyell mine in Tasmania and the Kyshtim mine in Russia.

METALLURGY

Extracting. The methods employed in recovering copper from its ores may be divided into two general classes: (1) *mechanical methods;* (2) *chemical methods.* Ordinarily a combination of both methods is used.

1. *Mechanical* or *milling methods,* presuppose that in all cases the material to be treated has been crushed to a degree of fineness sufficient to liberate the particles of valuable mineral from the associated valueless material, and may be subdivided into the following methods: (*a*) *wet,* (*b*) *dry,* (*c*) *magnetic,* (*d*) *electrostatic,* and (*e*) *flotation.* Briefly, (*a*) *wet* and (*b*) *dry milling* separate the copper minerals from the associated barren rock (gangue) by making use of the relatively greater weight (for a like bulk) of the copper minerals as compared with the gangue. In the first case water, in the second air under pressure, is used as the working medium. (*c*) *Magnetic* milling is used at times when the copper minerals are mechanically associated with certain iron minerals which are susceptible to magnetic influence, and which may therefore be removed by passing the crushed ore through a magnetic field, thereby removing the iron minerals with the consequent increase in grade (copper content) of the remaining material. (*d*) *Electrostatic* milling makes use of the varying electrical conductivity of minerals, the crushed and dry ore being passed by gravity through a field of static electricity, with the result that each falling particle of ore is charged with electricity in a degree dependent on its mineral character, and as a result is correspondingly deflected in falling. (*e*) *Flotation* methods depend upon the fact that certain minerals (usually sulphides) are buoyed up by oil films or attached gas particles, while the associated non-metallic minerals are not so affected, the result being that when the crushed ore is brought in contact with oil or dilute acid solutions in proper receptacles a separation is effected. In all of the above-mentioned methods the valuable mineral is separated from the barren material, suitable mechanical means being provided to maintain and to provide for the effected separation. The valuable product is usually termed "concentrate" and is given further treatment as indicated below, while the valueless product is called "tail" or "tailings" and is discarded.

2. *Chemical methods,* adapted for treating crude ore, or, as is now more often the case, using as their base material obtained from some one of the mechanical or milling methods above described, may be subdivided into (1) *dry methods,* or *smelting,* and (2) *wet,* or *hydrometallurgical.*

(1) *Dry methods,* or *smelting,* as carried on to-day, may be subdivided according to the type of furnace employed into (*a*) *reverberatory smelting,* (*b*) *blast-furnace smelting,* and (*c*) *electric smelting.* In (*a*) *reverberatory smelting* the dimensions of the furnaces employed reach a maximum width of 20 feet by a length of 120 feet, the height being small as compared with the width. The smelting procedure is as follows: The ore, after having received a preliminary heating or roasting treatment in circular multi-hearth furnaces of the McDougall or Wedge type, is mixed with suitable fluxes (limestone, quartz, or iron ore) and charged hot on the furnace bottom and fused by extraneous heat (usually from oil burners at one end of the furnace). The products of this fusion are *slag* and *matte,* which are removed from the furnace while molten. The matte, which accounts for the copper of the original ore, is subsequently retreated by processes hereafter described. The waste heat from furnaces of this type is used for steam generation. (*b*) *Blast-furnace smelting.* The ore, either in a crude state or partially roasted as metallurgical requirements may dictate, is mixed with proper fluxes and fuel and charged into furnaces whose height is invariably greater than their width (dimensions vary, ranging in width from 36 to 60 inches, in length from 36 to 612 inches, and in height from 6 to 24 feet). These furnaces have near their bottom a varying number of air inlets (tuyeres) through which air under pressure is forced with the purpose of giving the oxygen necessary for the burning of the fuel and for the thermo-chemical reactions incidental to smelting. The products from the fusion of the charge are *slag, matte,* and *fumes.* The matte is retreated, the fumes may or may not be treated, for the recovery of the sulphur which they contain. (*c*) *electric smelting* is still in the experimental stage, the basic idea being to do away with the use of carbonaceous fuel as a heat producer, substituting therefor heat resulting from the passage of an electric current.

The old Welsh or German methods, consisting of stage smelting in furnaces of small dimensions, are but little used at the present time.

Matte treatment.—The matte obtained from the above-described smelting methods consists of a copper-iron sulphide, its composition changing with conditions. Usually the range of copper contained will be from 25 to 60 per cent (in exceptional cases the matte may be as low as 10 per cent copper, as at Ducktown, Tenn., in which case the matte is given a secondary smelting in blast furnaces for the purpose of increasing its copper content). In order to eliminate the iron and sulphur contained the matte may be treated in (*a*) *reverberatory furnaces* or (*b*) in *converters.* (*a*) The *reverberatory method* of treatment, not now generally used, provided for the resmelting of the roasted matte with the addition of silica in small reverberatory furnaces, the iron of the matte combining with the silica forming slag which is removed as formed, the resulting impure copper being subsequently refined. (*b*) The *converter method* of treatment, now practically universal, provides for the treatment of the molten matte in barrel-shaped vessels fitted with air inlets. According to the character of

the lining of these vessels they have been called *acid-lined* converters and *basic-lined* converters. The basic lining has superseded the acid and is now generally used. In both types the sulphur of the matte is eliminated by oxidization; while the iron forms a slag—in the first case with the siliceous (acid) lining of the converter, or in the second case with silica added through the mouth of the converter—and is poured off at intervals leaving the impure or so-called blister copper (analyzing 96 + per cent copper) to be finally cast as ingots or as anodes and subsequently refined.

(2) *Hydrometallurgical methods* aim at the obtaining of the copper contained in the ores under treatment in the form of an aqueous solution. Basically they are an adaptation of laboratory methods of analysis to commercial ends, and as so applied are a development of the last 50 years. The process is in general as follows: (*a*) *Rendering the copper as occurring in the ores soluble.* This normally means preliminary roasting for those ores containing sulphur in combination with the copper. The roasting may be carried on with or without the addition of reagents (Fe2S or NaCl) and means the heating of the ore by the use of extraneous fuel to a degree of heat varying from 300° to 800° C. (*b*) *Leaching.* The roasted ore is subjected in suitable vessels to the action of a dilute acid solution (the solvent). Those solvents which have had the most successful application to date are sulphuric acid, ferric sulphate, hydrochloric acid, ferric chloride. (*c*) *Precipitating.* The copper solution obtained is removed from the ore pulp and subjected to either chemical or electrical treatment. Probably the most used method of precipitating (removing in solid form) copper from solutions is that employing iron (scrap iron), the copper being deposited in a finely crystalline form, the equivalent iron replacing it in the solution. Copper thus produced is naturally impure and must therefore be melted down and refined. Hydrogen sulphide has also been used as a precipitant, the copper coming down in the form of a sulphide and subsequently retreated and refined. Carbonate of lime as a precipitant has been tried, the copper being brought down as an oxide, which is further treated for the production of commercial copper.

The passage of a suitable direct electric current through a copper-bearing solution, using insoluble anodes and pure copper cathodes, causes the contained copper to be deposited in a finely crystalline form at the cathode, this cathode copper being melted and cast in salable form or subjected to refining, depending on the character of the deposit.

Refining. Copper, either as produced in the form of "blister copper" or as a product from hydrometallurgical treatment, is usually refined by either of the following methods: (1) *reverberatory* or (2) *electrolytic.* 1. The *reverberatory method* (English process) procedure is to melt the impure copper down in saucer-shaped furnaces by extraneous heat and then subject it to proper oxidizing and reducing action with the addition of small quantities of silica and iron. But a small percentage of the world's copper is now handled by this method. 2. *Electrolytic refining,* now generally used, consists of casting the impure copper in slabs, placing them in suitable tanks as anodes, using as cathodes sheets of refined copper; the tanks being filled with a copper sulphate solution (the electrolyte) showing some free acid. The passage of a direct electric current causes copper to be deposited at the cathode with the release of a corresponding quantity of sulphuric acid which attacks the copper of the anode, thus continuously regenerating the electrolyte. This cyclic action is continued until the anodes have been consumed to a minimum of waste. The impurities in the anode not being soluble fall and collect on the tank bottom in the form of a *sludge.* This sludge contains the precious metals and receives a subsequent treatment for their separate recovery. The refined copper cathodes are removed from the tanks when built up to a convenient thickness, are washed and dried, and melted down under proper oxidizing and reducing conditions in a special form of reverberatory furnace (casting furnace), the molten copper being cast in shapes adapted for commercial uses, and analyzes approximately 99.8 + per cent copper.

Uses. Copper, because of its abundance in nature and its amenability to metallurgical treatment and consequent low cost, its high electrical and thermal conductivity, its great tensile strength and the ease with which it may be worked, is consumed in large quantities in the manufacture of electrical and mechanical apparatus, alloy metals, munitions of war, coins, shipbuilding, and in architecture and the arts.

Terminology

Anode. Term used in the electrolytic treatment of copper to denominate that electrode or conductor by which the electric current enters into the solution or electrolyte.

Black copper (coarse copper). An impure metal normally ranging from 70 per cent to 99 per cent copper with less than 2 per cent sulphur. Usually a product resultant from the smelting of oxidized (nonsulphur-bearing) ores.

Blister copper. The final product of direct smelting of copper ores, the copper ranging from 96 per cent up.

Cathode. Used in contradistinction to anode and indicates that electrode by which the electric current leaves the solution.

Cement copper. The copper obtained by precipitating copper from solutions by the use of iron.

Concentrate. The valuable mineral product resultant from mechanical treatment of an ore.

Converting. A special form of treatment for the oxidization and reduction of matte to blister copper.

Electrolytic copper. The copper produced by electrolytic refining methods.

Flux. Any material added in smelting for the purpose of facilitating the fusion of the charge.

Head. A term used in the mechanical treatment of ores, indicating the material as delivered to the mill, prior to any treatment other than crushing.

Matte (coarse metal). The valuable product resultant from smelting sulphur-bearing ores. Consisting of copper, iron, and sulphur in varying proportions.

Mill. A general term for a plant using mechanical or hydrometallurgical processes of ore treatment.

Milling. The mechanical treatment of an ore, having as its purpose the separation of the valuable from the nonvaluable minerals.

Ore. A mine product containing minerals of economic value.

Refining. The further treatment of white metal or blister copper with the purpose of producing a commercially pure copper (99.8 + per cent) and the incidental recovery of any associated precious metals.

Roasting. Subjecting ore or furnace product to heat without fusion with the object of removing or decreasing the contained sulphur.

Slag. The valueless scoria produced in smelting processes.

Smelting. The reduction of ores or concentrates in furnaces by heat and fusion.

Tail (*Tailings*). The waste or discarded product resulting from the mechanical treatment of an ore.

White metal. A matte containing but a relatively small amount of iron, the copper approximating 60 to 75 per cent.

Wire bar. A special form of casting suited in dimensions to the use of wire-drawing machines.

Wire-bar copper. Refined copper cast in wire bars.

Bibliography. For information on those subjects briefly touched upon in the foregoing article, consult the following books: CHEMISTRY, Fresenius, *Manual of Qualitative Chemical Analysis* (New York, 1913); Miller, *Quantitative Analysis for Mining Engineers* (ib., 1907); MINERALOGY, Dana, *System of Mineralogy* (ib., 1913); GEOLOGY, Kemp, *Ore Deposits of the United States and Canada* (ib., 1900); Weed, *Copper Mines of the World* (ib., 1907); MINING, Hoover, *Principles of Mining* (ib., 1909); METALLURGY, Richards, *Ore Dressing* (ib., 1909); Schnabel, *Handbook of Metallurgy* (ib., 1907); Greenawalt, *Hydrometallurgy of Copper* (ib., 1912); Peters, *Principles of Copper Smelting* (ib., 1907); STATISTICS, *Mineral Industry* (annual, ib.); *Engineering and Mining Journal* (weekly, ib.).

COPPER, IN SHIPBUILDING. A ship which has her bottom sheathed with sheet copper is said to be coppered, or copper-bottomed. The copper so used is in sheets measuring about 48 by 14 inches, and weighs 18 to 32 ounces per square foot. The copper is always applied over wood, to which it is nailed; at ordinary draft the line of the copper is usually well above water. It seems to keep the bottom free of serious marine growth, which readily attaches itself to wood and less readily to iron. Coppering checks the formation of marine growth in two ways—as a germicide (the carbonate of copper formed is a deadly poison to animal and vegetable life) and by exfoliation, the film of copper salt peeling off quite readily, carrying with it the attached growths. When cheapness is more desired than strict efficiency, alloys of copper are used for sheathing. Iron and steel ships are coppered by first putting on a thickness or two of wood planking; this is to avoid galvanic action, which may be serious if the hull and copper are connected. In the United States navy very few vessels have been coppered, and the Board of Construction in the Navy Department has decided against coppering except for certain small vessels for special service. A wooden ship is copper-fastened when the bolts used in her underwater body are of copper instead of iron. Iron bolts rust rapidly when exposed to the action of salt water, particularly when merely damp, or wetted and dried alternately. This seriously reduces the strength of the ship. Copper bolts are eaten away much less rapidly.

COP'PERAS (ME. *coperose*, from OF., Fr. *couperose*, from ML. *coporosa, cuperosa, cuprosa*, from Lat. *cupri rosa*, rose of copper). The name given to the commercial ferrous sulphate and also applied to the native mineral melanterite.

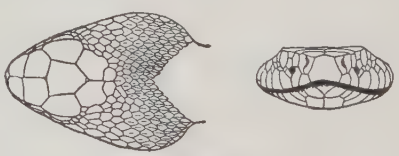
COPPER BUTTERFLY. Any of several small butterflies, so called in reference to their colors. In England collectors apply the name to those of the family Lycænidæ in general. In the United States it is restricted to the closely related forms of the genus *Chrysophanus*, which, however, is found also in the Old World.

COPPER CLIFF. A town in Sudbury District, Ontario, Canada, on the Canadian Pacific Railway, 4 miles west of Sudbury. It is of recent origin, having grown into recognition since 1901. It is dependent upon the mining and smelting of copper and nickel, which abound in the district. Good fishing and hunting are to be had in the vicinity. Pop., 1911, 3082.

COP'PERFIELD, DAVID. See DAVID COPPERFIELD.

COPPER GLANCE. See CHALCOCITE.

COP'PERHEAD. A venomous North American snake (*Ancistrodon contortrix*) of the rattlesnake family. It may exceed 4 feet in length, and has a burnished copper-colored head, hazel-brown (sometimes golden) body, with Y-shaped dark blotches on the sides, which usually meet over the back. The belly is marked with round black spots. The tail is tapered, greenish when young, chestnut in age, and has no rattle; nor



THE COPPERHEAD.
(Top of head, and face view.)

does the snake vibrate it against the grass, "and so produce a warning sound not unlike that of the rattlesnake," as is often said, more than is the habit of all snakes when excited. Another unfounded fable is that it waits until you pass and then strikes from the rear. The truth is it is sluggish, moving about mainly at night, and by day seeks to avoid notice and will not bite unless greatly alarmed or provoked; most accidents result from picking it up or touching it with the hand in handling brush or stones in the woods or clearing swamps. Its bite is as deadly as that of any snake of its size, and the absence of rattling makes it especially dangerous. In the fall it seeks some underground den, where occasionally several have been found entangled together in dormancy; these are usually, if not always, pregnant females. When aroused in spring, it seeks swamps and wet meadows, where its food (mainly mice) is most abundant, and where the young are brought forth alive in midsummer. This snake is known from Massachusetts to the Rio Grande, especially in mountainous districts, and is still common in the

rocky hills of the Hudson and Connecticut valleys. It has many names, such as "pilot," "red-eye," "red adder," "copper-belly," and, in the South, "cotton-mouth" and "moccasin"—the last confusing it with its near relative, the true or water moccasin (q.v.). Consult Stejneger, "The Poisonous Snakes of North America," in *Annual Report of United States National Museum for 1893* (Washington, 1895), and Ditmars, *The Reptile Book* (New York, 1907). See Plate of RATTLESNAKES.

COPPERHEADS. A name given by their political opponents during the Civil War to those Northern men who, believing the conquest of the South impossible—though not necessarily sympathizing with the Southern cause—strenuously objected to the vigorous prosecution of the war by the administration. In some parts of the country the name was uniformly used as synonymous with "Democrats." The most prominent and most obnoxious of the "Copperheads" was Clement L. Vallandigham (q.v.). The name was taken from the copperhead snake, which gives no warning before it strikes. It originated in 1862 and quickly came into general use throughout the North. Another explanation of the name is that it came from the habit of the extreme opponents of the war wearing as a badge a button cut out of a copper cent on which was the head of the Goddess of Liberty.

COPPER INDIGO. A name given to the mineral covellite, especially when found in spheroidal masses of an indigo-blue color, as is the case at various localities in Thuringia and at Vesuvius. Covellite is a copper sulphate.

COP'PERMINE RIVER. A river of northern Canada, so named, in common with the mountains to the west of it, from the metallic products of the vicinity. It rises in Point Lake, Mackenzie Province, and enters Coronation Gulf, in the Arctic Ocean, about lat. 68° N. and long. 116° W. (Map: Canada, G 3). The Coppermine River is not navigable, being throughout its course of over 300 miles little better than a series of falls and torrents.

COPPER NICKEL. See NICCOLITE.

COPPER-NOSED BREAM (so called from the color of the snout). The blue sunfish, or dollardee (*Lepomis pallidus*), of the Mississippi valley. See SUNFISH; and Plate of DARTERS AND SUNFISH.

COPPERPLATE ENGRAVING. See ENGRAVING.

COPPER PYRITES. See CHALCOPYRITE.

COPPER RIVER. A river of Alaska, whose source is a glacier of the same name on the northern slope of Mount Wrangell. It flows at first northward, then westward and southward to the Gulf of Alaska, into which it empties at long. 145° W.—just west of Controller Bay (Map: Alaska K 5). Excepting the mountainous region in which the stream originates, the topography of its basin reverses the usual rule, for the river's upper course, once it is fairly clear of Wrangell's slope, lies through a broad plain, while its lower course carries it through the Chugach Mountains, which extend almost down to its delta. Its length is about 300 miles, and its basin has an area of about 23,000 square miles. Its fall is about 3600 feet, or at an average of nearly 12 feet a mile. From Copper Center the fall is nearly 7 feet a mile. Its chief tributary is the Chitna, from the east. Consult Mendenhall, "Geology of the Central Copper River Region, Alaska," in *United States Geological Survey, House Document No. 197* (Washington, 1905).

COP'PERSMITH (translation of the native Philippine *tambagut*, which is imitative of the bird's cry). One of several barbets (q.v.) of India and eastward to the Philippines, which are called by the natives by names meaning "coppersmith," "ironsmith," etc., on account of their sharply accented metallic notes. A familiar species in Natal is called "tinker bird." They are gorgeously plumaged, sluggish, fruit-eating birds, very numerous and noisy, but keeping in the tops of the trees and making only short, heavy flights. The crimson-breasted coppersmith (*Megalæma hæmacephala*) is one of the best known and most gaudy.

COPPET, kȯ'pâ'. A village in the Canton of Vaud, Switzerland, situated on the west bank of the Lake of Geneva, 9 miles north-northeast of Geneva (Map: Switzerland, A 2). The house in which Madame de Staël lived is still standing and contains some excellent paintings and sculpture. Watches and clocks are made in Coppet. Pop., 1900, 552; 1910, 581.

COP'PICE. See COPSE.

COP'PINGER, JOHN JOSEPH (1834–1909). An American soldier. He was born at Queenstown, Ireland, and early joined the papal army in the struggle against King Victor Emmanuel. Afterward he came to the United States, was appointed a captain in the Fourteenth Infantry in 1861, served throughout the Civil War, being brevetted major and lieutenant colonel for services at Trevilian's Station and Cedar Creek, respectively, in 1864. In 1865 he became colonel of the Fifteenth New York Cavalry. He served in several Indian campaigns (1866–68), receiving the brevet of colonel (1868), and was promoted to be major of the Tenth Infantry (1879), lieutenant colonel of the Eighteenth Infantry (1880), colonel of the Twenty-third Infantry (1891), and brigadier general on April 25, 1895. During the Spanish-American War he was appointed major general of United States Volunteers and was placed in command of the Fourth Army Corps, stationed at Camp Wheeler, Huntsville, Ala. He was retired from active service Oct. 11, 1898.

COPPINO, kȯp-pē'nȯ, MICHELE (1822–1901). An Italian statesman and author. He was born in Alba, Piedmont, and was educated in Turin, where he became professor of Italian literature in 1861 and rector in 1869. He was Minister of Education in the cabinets of Rattazzi (1867), Depretis, Cairoli (1876–79), and Depretis (1884–88), in which capacity he secured the passage of a law regulating compulsory elementary education. He contributed largely to the *Rivista contemporanea*.

CO'PRA (Hind. *khoprā*, from Malayalam *Koppara*). The dried kernel of the coconut. It is used for the coconut oil which it yields and coconut stearin. Copra, either sun dried or kiln dried, contains 50–65 per cent of oil, while hot air dried may run as much as 74 per cent.

COPRI'NUS. See FUNGI, EDIBLE, for article, and Colored Plate.

COP'ROLITES (from Gk. *κόπρος, kopros*, dung + *λίθος, lithos*, stone). The fossil excrements of animals found at times in the Paleozoic and Mesozoic strata of the earth's crust. Their true nature was first inferred from their occurrence in the bodies of several species of

ichthyosaurus, in the region where was situated the intestinal tube. It has been since shown that they are the voidings chiefly of saurians and also of fishes. They often contain portions of scales, bone, teeth, and shells, the indigestible parts of the food on which the animals lived. Occasionally they may be found exhibiting the spiral twisting and other marks produced by the conformation of the intestinal tube, similar to what is noticed in the excrement of some living fishes, and some specimens have been erroneously described as plants. These peculiar markings obtained for them the name, when their true nature was unknown, of "larch cones" and "bezoar stones." Coprolites are found to contain a large quantity of phosphate of lime; and as this forms a valuable manure, the deposits containing them have been largely quarried, especially in England, where they are found over extensive areas in Norfolk, Essex, Cambridgeshire, and Suffolk. The coprolites are extracted by washing the earth and are then treated with sulphuric acid; which converts their lime phosphate into a soluble form.

Among the most interesting coprolites are those of spiral form from the Waverly group of Pennsylvania and elsewhere, originally described as fossil algæ and problematic plants under the generic names of *Palæoxyris, Spirangium, Spiraxis,* and now known to be the dung of ancient sharklike fish such as *Cladoselache.* The silicified coprolites of the Lias of Hanover, Germany, have afforded great numbers of radiolarian remains which have been described by Rüst. (See RADIOLARIA.) Consult Mantell, *Petrifactions and their Teachings* (London, 1851), and id., *Medals of Creation* (ib., 1844).

COPROPHAGY. See BULIMIA.

COPSE, or **COPPICE** (OF. *copeiz,* from *coper,* Fr. *couper,* to cut, from OF. *coup, caup, cop, colp,* Fr. *coup,* from ML. *colpus,* blow, from Lat. *colaphus,* Gk. *κόλαφος, kolaphos,* buffet, from *κολάπτειν, kolaptein,* to strike). A name given in England and elsewhere to a natural wood or plantation in which the trees are periodically cut before being allowed to attain the size of timber trees, and where new shoots are permitted to grow from their roots or stumps. Some kinds of trees do not send up new shoots; but many—as the oak, birch, chestnut, ash, elm, maple, alder, hazel, and willow—very readily do so, especially when not allowed to attain too considerable a size before being cut over. Copsewoods are sometimes planted to vary and beautify the landscape, but more generally with a view to profit, either owing to a great local demand for their produce, or to peculiarities of soil and situation. It often happens that, owing to scantiness of soil or to unfavorable subsoil, oaks and other trees, after growing vigorously for a number of years, are arrested and remain almost stationary in their growth. In such circumstances it is advantageous to cut them over early and to treat the plantation as a copse, the former vigor being again manifested in the young shoots, and the land yielding in this way a greater return to its owner. Oak and birch are much planted as copsewood, in consequence of the demand for their bark; the trees are cut over every 12 to 25 years, dependent upon the character of the soil, climate, etc. The largest pieces of the wood are used for making wheel spokes and for other purposes of timber; the smaller portions are used for making charcoal and firewood. Ash is sometimes planted as copse, with a view to the employment of the wood for handles of implements, hurdles, hoops, etc., the wood of the ash, even when very young, being highly valued for strength and elasticity. Chestnut copses are planted in England to supply hop poles. Hazel is a very common copsewood, being in great demand for making crates, etc. Besides the cultivation of different kinds of willow or osier for basket making, in which they are cut over annually, some of the species are cultivated as copse, and cut every five, six, or seven years, for hoops, crates, etc., the species which is deemed most suitable being *Salix cuprea. Salix alba* is also commonly employed in copse plantations for larger willow wood. In some countries copsewood is particularly valued for the regular supply of fuel which it affords.

In cutting copsewood care is taken to dress the stumps so that water may not lodge in them and cause them to rot. The size to which the stems are allowed to attain before being cut, and the frequency of cutting, differ according to the different kinds and the uses intended. Stems more than 4 inches thick are generally cut with the saw, but smaller stems with a curved bill or axe cutting upward.

COP'TIC VERSION. See BIBLE.

COP'TIS (Neo-Lat., from Gk. *κόπτειν, koptein,* to cut; referring to its divided leaves), or GOLDTHREAD. A genus of plants of the family Ranunculaceæ. *Coptis trifoliata,* the best-known species, is a native of the north of Europe, Siberia, Greenland, Iceland, and North America, It grows in swamps and derives its popular name from the golden-yellow color of its long, threadlike rootstocks. The rootstocks are very bitter and have some reputation as a tonic. They also contain a yellow dye. The leaves of this plant have three wedge-shaped leaflets, and its leafless stems bear each a solitary, rather pretty white flower, the petal-like sepals of which have yellow bases.

COP'TOS. See KOPTOS.

COPTS. The name given to the Christian descendants of the ancient inhabitants of Egypt. The Arabic word *Qubt* is probably nothing but a mutilation of *Egypt* (not of *Koptos,* or *Jacobite*). The number of the Copts was estimated in 1907 at 706,322, and the total number of Christians, 881,692. They are most numerous in the towns of Upper Egypt, south of Assiut. As they usually live in towns and are rarely engaged in agriculture, they present a certain contrast to the Mohammedan peasants. They are, as a rule, of smaller stature than the latter and of a lighter complexion. Most of the Copts still wear the black coat and black or blue turban which they were forced to assume in the time of the Mohammedan persecution. They are frequently goldsmiths and money lenders, and they are also excellent clerks and accountants, although few of them attain the higher governmental positions. Their character is apt to be marked by sullenness, distrust, and avarice. Although the Arabs owed the conquest of Egypt to the assistance of the Copts, they soon began to oppress them cruelly, taxing them to the utmost, hindering their religious worship, and occasionally even branding them. These persecutions reduced the numbers of the Copts very considerably. A few of them are at present

adherents of the Roman Catholic church; still fewer of the Greek church. The majority adhere to the old National church, which originated in a schism after the rejection by the Council of Chalcedon (451 A.D.) of the Monophysitic doctrine, the Egyptians not accepting the decision of the council. A long and bitter struggle against the orthodox Byzantine government arose, lasting until this was replaced by the Arab invasion. The Coptic sect is also called Jacobite, after a prominent teacher of the fifth century. The highest ecclesiastical dignitary of the Monophysitic church is the Patriarch of Alexandria, who at present, however, resides at Cairo. This patriarch is always chosen from the monks of the convent of St. Anthony. By him the metropolitan of Abyssinia is nominated. The rest of the clergy represent orders similar to those of the Roman Catholic church. They have 12 bishops. The monks and nuns were once very numerous, but they have in the course of time greatly diminished in number. The elaborate rites of the church present some rather curious features—e.g., the celebration of the Lord's Supper with unleavened bread dipped in wine, and the strict division of the sanctuary or chancel from the body of the church. The Copts practice circumcision and baptize by immersion. The feasts and fasts, which are very strictly observed, are numerous. Owing to the extreme length of the service and the absence of seats, many worshipers lean on crutches which they bring with them. The Copts are very bigoted and are especially fanatical against other Christian denominations. Of late, however, the American Presbyterian mission has worked among them with success. At Qus it converted the Coptic Bishop and his whole congregation. The Coptic language, which was spoken from the third to the sixteenth century, but has now become extinct as a vernacular, belongs to the Hamitic group of African languages. It is of great importance linguistically as being the descendant of Ancient Egyptian (see EGYPT, *Language*), although its own literature is of comparatively small importance. In character Coptic was at first almost monosyllabic, like Egyptian, but it developed at a later period into a highly agglutinate language (q.v.). The morphological side of Coptic was therefore little developed, but the phonology became the real basis of the grammatical system for variations of meaning. It gained in consequence a far greater flexibility than Egyptian had possessed, and it also enriched its vocabulary by many Greek loan words, as well as a smaller number of Latin and Persian terms. Arabic words are significantly lacking in the Coptic vocabulary. The language was divided into five principal dialects. These were the Sahidic, or Thebaic and Achmimic in Upper Egypt, the Boheiric and Memphitic in Lower Egypt, and the Fayumic, or so-called Bashmuric, spoken near Lake Menzaleh in central Egypt. There were also doubtless a number of dialects of much importance of which no record has been preserved. Of the Coptic dialects the oldest is the Sahidic, whose literature dates from the period extending from the third to the seventh century, comprising annals, translations of the Bible, apocryphal and Gnostic books, legends of the saints, and the like. This oldest literature has been in great part lost, and only fragments remain. The Boheiric dialect, dating from the seventh century, contains by far the greater amount of extant Coptic literature, again in the main translations from the Greek or revisions of the older Sahidic texts, as well as a few translations from the Arabic. It is this dialect which is still used in the liturgy of the Coptic church. The Fayumic dialect has only very scanty literary remains, which have been discovered lately by excavations in Egypt. The Sahidic is the most harmonious and has more Greek loan words than the Boheiric, while the Fayumic stands midway between the two. The Coptic script has 31 letters, 24 of which are Greek uncials (see UNCIAL LETTERS), while the remaining characters, for ϣ (sh), *f*, *h* (German *ch*), *h*, ϫ (French *j*), *c* (English *ch* in *child*), and *ti*, are derived from the Egyptian demotic script. After the Mohammedan conquest of Egypt, Arabic gradually displaced Coptic, although Coptic is said to have been spoken as late as 1633 by one old man.

Consult: Kircher, *Prodromus Coptus sive Ægyptiacus* (Rome, 1636); *Lingua Ægyptiaca Restituta* (ib., 1643–44); Tattam, *Compendious Grammar of the Egyptian Language* (London, 1830; 2d ed., 1863); Rosellini, *Elementa Linguæ Ægyptiacæ sive Copticæ* (Rome, 1837); Peyron, *Grammatica Linguæ Copticæ* (Turin, 1841); Schwartze, *Koptische Grammatik* (Berlin, 1850); Uhlemann, *Linguæ Copticæ Grammatica* (Leipzig, 1853); Stern, *Koptische Grammatik* (ib., 1880); Loret, *Manuel de la langue égyptienne* (Paris, 1892); Steindorff, *Koptische Grammatik* (Berlin, 1894); Peyron, *Lexicon Linguæ Copticæ* (Turin, 1835); Tattam, *Lexicon Ægyptiaco-Latinum* (Oxford, 1835); Parthey, *Vocabularum Coptico-Latinum et Latino-Copticum* (Berlin, 1844); J. Strzygowski, *Hellenistische und koptische Kunst in Alexandria* (Vienna, 1902); "Die Entstehung der koptischen Kirche," introduction to R. Haupt's *Katalog 5* (Halle, 1905).

COP'ULA (Lat., bond). A term employed in logic to designate the word which expresses the relation of subject and predicate in a judgment. Thus, in the sentence "Art is long," *art* is the subject concept, *long* the predicate concept, and *is* the copula. The copula is either expressed separately, as by some part of the verb "to be," as in the above sentence, or it is contained in the word expressing the predicate; as "The flower blooms," i.e., *is* blooming.

COP'ULATIVE (Lat. *copulativus*, from Lat. *copulare*, to join together, from *copula*, bond, from *co-*, together + *apere*, Gk. ἅπτειν, *haptein*, to fasten). A term applied to words and sentences that introduce something which adds to the preceding thought, in the same direction. They are sometimes for this reason called "cumulative conjunctions." The principal ones are *and* (the typical copulative conjunction), *also*, *as well as*, *likewise*, *moreover*.

Adversative, marking degrees of opposition of thought in the words and expressions connected; as, *but*, *however*, *nevertheless*, *only*, *still*, *yet*.

Causal, introducing a reason or cause; as, *consequently*, *for*, *hence*, *then*, *therefore*.

Alternative, expressing a choice between two or more things; as, *either*, *else*, *nor*, *neither*, *whether*.

When two conjunctions connect closely related parts of a sentence, they are called "correlatives"; as, *either—or*, *neither—nor*, *whether—or*. The subordinating conjunctions may also

be subdivided, the principal classes being place, time, manner, cause, comparison, purpose. See CONJUNCTION.

COP'Y (OF. *copie*, abundance, from Lat. *copia*, from *co-*, together + *opes*, riches). In the fine arts, a reproduction of a work, whether painting, statue, or engraving, not by the original artist. A copy made by the master himself is called a repetition or replica (in French, a *doublette*). A copy of a statue, or other piece of sculpture, taken from a mold, is not called a copy, but a *cast* (q.v.).

COP'YHOLD. A species of estate in land in Ireland and England, the modern form of the ancient tenure in villeinage, closely resembling in many particulars the feu rights of Scotland. Copyhold is expressed technically as "tenure by copy of court roll at the will of the lord, according to the custom of the manor." This means that it is tenure of land, being part of a manor, the title being evidenced by the court rolls of the manor, and the right of the owner being in conformity with the immemorial customs of the manor. The addition, "at the will of the lord," serves only as a memorial of the derivation of this species of estate from the estates granted in old times to the bondmen, or villeins, which estates were, in theory at least, resumable at the pleasure of the lord. But the will of the lord has from a very early period been controlled by the custom of the manor, which forms the law of the tenure; and as this custom must be immemorial, i.e., extending to the reign of Richard I, no new copyholds can be created.

The custom of each manor may vary from that of others in important particulars. In some the copyhold lands are held for life only; in some they descend according to particular rules of their own; in most, however, they descend according to the ordinary rules of inheritance of freehold estates. But the custom, whatever it may be, cannot be altered by the holder of the copyhold; he cannot, e.g., entail his land unless the custom warrants it.

One practical distinction of much importance, drawn between freehold and copyhold land, is the mode in which it must be conveyed. An ordinary conveyance is ineffectual in regard to copyhold, and indeed would operate, like other attempts to break through the custom which forms the title, as a forfeiture. The owner comes to the steward of the manor and by a symbolical delivery, according as the custom may prescribe, surrenders the land to the lord of the manor, in order that it may be granted again to such person and on such terms as are desired and as the custom authorizes. The steward, by a repetition of the symbolical delivery, transfers the copyhold to the person in question in terms of the surrender; and the transferee then pays the customary fine, or fee, and takes the oath of fealty. This is called conveyance by surrender and admittance. In the case of an heir succeeding there is no surrender, but there is admittance only upon payment of the customary fine, and it is enforced by a customary penalty. A mortgage is effected by a surrender upon condition that the money is repaid and the admittance takes place only in event of failure of payment. A copyhold may in like manner be devised by will, the devisee being admitted on the death of the devisor.

The inconveniences and loss accruing through the variety of customs to which copyhold lands are subject led the legislature to provide for their gradual extinction. By consent of the copyhold commissioners, all the services due to the lord of the manor may be commuted for a fixed rent. The lord of every manor is also authorized to enfranchise, or convert into freehold, the copyhold lands by agreement with their owners, and either the lord or the tenant may compel enfranchisement on payment either of a fixed sum, where it is at the instance of the lord, or of an annual rent, where it is at the instance of the tenant, fixed in both cases by the commissioners. See MANOR; TENURE; SERF; and consult: Elton, *Treatise on the Law of Copyholds and Customary Tenures of Land* (2d ed., London, 1893), and Scriven, *Treatise on Copyhold, Customary Freehold, etc.* (7th ed., ib., 1896).

COP'YING MACHINES AND PROCESSES. The various contrivances for procuring duplicates of manuscripts without the labor of transcribing them may be reduced to two classes. In the one, the writing or typewriting is first made and then copied; in the other, the copy and the original are produced at the same time. The essence of the first method is this: In writing the original, an ink is used that is made for the purpose, or common ink is thickened by the addition of a little sugar or glycerin. If the typewriter is used, a copying ribbon or one impregnated with such an ink is employed. When the writing is dry, a damped sheet of thin unsized or tissue paper is laid upon it, and over this a piece of oiled paper. The whole is then subjected to pressure, and the damped paper is found to have received an impression of the writing. It is of course the reverse of the original, but the thinness and transparency of the paper allows it to be read right on the other side. The machines for communicating the pressure are of various kinds. Some pass the sheets between rollers like the copperplate press; others act on the principle of the simple screw press. A simple plan is to wrap the sheets around a wooden roller of about an inch diameter, lay this upon a table, and roll it under a flat board, pressing all the while. In the second method of copying, prepared blackened or carbon paper is laid between two sheets of thin writing paper. The writing is traced firmly on the upper sheet, with a steel or agate point, or common lead pencil, and the lines are found transferred in black from the blackened sheet to the paper adjacent. By having several of these blackened leaves, a number of copies may be produced at once, so that the method can be employed in duplicating invoices, newspaper copy, and telegraph messages. The blackened paper is prepared by saturating it with a mixture of lard and lampblack. The *manifold writer* of Wedgwood, invented in 1806, was on this plan.

This is, of course, the underlying basis of obtaining carbon copies with the typewriter. A sheet of paper upon which the copy is to be made is placed next to the cylinder, and in contact with it a sheet of carbon paper. Other sheets of paper and carbon paper to the limits of the capacity of the machine and the number of copies desired follow, and finally the original sheet on which the ribbon leaves the mark of the characters when struck by the type. Press copies are being supplanted in large part by carbon copies for business and official correspondence, as the permanence and indelibility

of the ink is not so assured, and the cost of labor and material is much greater. The United States government Commission on Economy and Efficiency made recommendations to that effect in 1911.

The first suggestion for a copying press is said to have been made by Benjamin Franklin, who sanded the yet wet ink of his manuscript with emery and then passed the manuscript between rollers in contact with a soft, highly polished pewter plate. This received the impression from the emery, from which numerous copies could be made by the copperplate printing process. In 1778 James Watt adopted the simple plan of copying by pressing transparent, bibulous paper against the damp manuscript, so that the writing would be transferred as on a blotter and then read from the other side. Watt devised not only the copying process with a special ink but also a rotary and other presses.

In the *papyrograph* a specially prepared paper is used, upon which words are written with a common pen, but with a special ink. The sheet is then soaked in water, and the ink corrodes the fabric of the wet paper, leaving open lines in place of the writing. The sheet is then used as a stencil, like that prepared by the electric pen. The *mimeograph* is an apparatus invented by Thomas A. Edison, by which stencils of written pages are obtained for the purpose of producing an indefinite number of copies. It consists of a fine-pointed steel stylus, moving over the surface of a sheet of tissue paper, coated on one side with a film of sensitive material. This paper is placed on a plate of steel, known as the baseboard, upon which are cut intersecting corrugations, numbering 200 to the inch. As the stylus moves over the paper, it presses it down upon the steel plate, and the fine sharp points puncture the paper from the under side in the line of the writing. This paper, or stencil plate, is then fastened into a frame, which stretches it tight and smooth, again placed upon the baseboard with a sheet of paper between, and an ink roller of peculiar construction is passed over its surface, forcing the ink through the perforations upon the paper beneath, thus making a print. The patent for this instrument was applied for in 1878, and there have been numerous improvements since, the apparatus being used extensively in connection with the typewriter, where the stencil is made by the type bars striking a sheet of paper laid against a piece of gauze, the resulting effect being exactly the same as described above. Various mechanical devices for printing from stencils thus prepared are available.

A familiar form of copying device uses a gelatin surface against which a manuscript written with a special ink is pressed. The ink is absorbed by the surface, and a number of copies may be secured by simply placing fresh sheets against the surface.

In making copies of insurance policies and other documents where exact reproduction is desired, it is now customary to use a special form of camera and sensitized paper, making a direct photograph, but reversed, in that white is black, which is available for filing.

In connection with the typewriter there are many different devices for producing a greater or less number of facsimile letters or circulars, but in the main they all depend upon one or another of the principles mentioned above, unless they make use of some form of movable type. For making copies simultaneously and at distant points a mechanical and electrical device known as the telautograph is available, but this is used more for the transmission of intelligence than to provide an exact copy.

The Blue-Print Process is peculiarly adapted to the reproduction of drawings and plans, and is used by architects, engineers, and mechanics. Two solutions are prepared: the first contains one part of citrate of iron in four parts of pure water; the second contains one part of red prussiate of potash in six parts of water. When ready for use, equal parts of the solutions may be mixed in a shallow dish and applied to sheets of paper with a sponge or a camel's-hair brush. Any paper will serve, but that is best which has but little sizing. The solution should be applied and the paper should be dried and kept in the dark. The solutions themselves will keep, separately, in the dark as long as desired, but if mixed soon begin to deteriorate. The drawing or writing to be copied should be made with very black ink, upon thin paper or tracing cloth. A photographer's printing frame, with a plain glass and a back easily removed, is used in the following manner: Place the drawing face down upon the glass; the prepared paper with its face against the back of the drawing; put the movable back in place, reverse the frame, and expose to light. In direct sunshine 2 to 7 minutes will be long enough, the time to be ascertained by trial; in diffused light, the exposure must be 5 to 10 times as long. After exposure the print should be immediately washed in clear water; when the chemicals are removed, the sheet is fastened by its corners to a line to dry, and the surface may afterward be finished by a hot iron or by pressure. A little practice is needed to secure the best results, and in a good print the lines will be clear white, and the background a deep blue. A light blue background indicates a weak solution, or insufficient exposure; overexposure is shown by a grayish tint. Clear, quick sunshine will give sharper lines than can be obtained by slow, diffused light, but in large blue-printing establishments electric lights and special machines are employed. The chemical change is evident; the light causes a reaction between the prussiate of potash and the iron, of which Prussian blue is the product; this occurs wherever the light has not been intercepted by the black lines of the drawing, which therefore appear in white upon an intensely blue and unfading background. Copies may be multiplied at will from negatives on glass or films, from engravings in books, from drawings, or from manuscripts.

Black Prints on a white ground may be made in the same general way, by using the proper solution in preparing the paper, of which there are now numerous varieties sold ready for use, while the rapid making of blue and other prints from tracings, especially those of large size, is an important industry in large cities where there are many architects and engineers.

COP'YRIGHT. The exclusive right of reproducing, by writing, printing, or otherwise, the language and form of a literary or artistic production and of publishing and vending the same. In this broad sense the right is wholly modern, being based upon a series of statutes, beginning with 8 Anne, c. 19, in England, and with the first Federal Copyright Act passed by the Congress of the United States in 1790.

Copyright in published works exists in Eng-

land to-day by virtue of the Copyright Act of 5 and 6 Vict., c. 45 (1842). With this must, however, be considered the following amendments: 1844, international provisions; 1847, Colonial act; 1850, designs and sculpture; 1852, international and engravings; 1862, fine arts; 1875, international, for dramatic works; 1875, Canada; 1882, musical compositions; 1886, international; 1887, order in council (confirming the Bern convention); and 1888 and 1902, musical compositions. In the United States the matter is one for national and not for State regulation, the power "to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries" being vested in Congress by Art. I, Sec. 8, of the Constitution. The only effective restriction which this clause places upon the power of Congress to legislate concerning copyrights is the virtual prohibition of the grant of a perpetual right of this character. The apparent limitation of the power to a copyright for "writings" only has been removed by judicial construction, the term "writings" having been held to include maps, charts, music, prints, engravings, drawings, paintings, and photographs, as well as books, written and printed articles, and the like. The power to protect the author of a book in the right to dramatize the same, and the author of a dramatic composition in the right of publicly performing or representing it, is included within the constitutional provision. But it is not clear whether the protection afforded by the copyright law to sculptors places them in the category of authors of writings or of inventors or designers. However this may be, there is no dispute as to the authority of Congress to enact general copyright legislation. The law in force prior to 1909 is to be found in U. S. Rev. Stat., Tit. 60, c. 3. An important modification of this act is the enactment of March, 1891, introducing international provisions. Further amendments are: 1893, deposit of copies; 1895, limitation of penalty for art infringements; 1897, additional penalty for dramatic infringements; 1897, instituting the register of copyrights; 1897, penalty for fraudulent notice. Under the Act of 1870 the supervision of the business of copyrights is placed under the control of the Librarian of Congress. Under the Act of 1897 the office of Register of Copyrights was created. The details of the copyright business are managed by the Register, who remains, however, subject to the general supervision of the Librarian of Congress. The statute provides that two copies of the work copyrighted, printed from type set within the limits of the United States (except in the case of musical compositions), shall be deposited in the office of the Librarian of Congress not later than the day of publication of the work in this or any foreign country, except that where the original publication was in a foreign language the amendment of 1905 prevents printing in the United States for 12 months thereafter. This discrimination against Great Britain has been strongly criticized in that country. The original jurisdiction of all suits under the copyright laws rests with the United States circuit courts. Under the interpretation of these courts copyright in published works exists only by virtue of the statute.

The terms of these acts are very similar to those of the English law and provide that the author, inventor, designer, or proprietor of any book, map, chart, dramatic or musical composition, engraving, cut, print, or photograph, or negative thereof, or of a painting, drawing, chromo, statue, statuary, etc., being a citizen of the United States or a resident therein, or a citizen of any State which grants reciprocal privileges to citizens of the United States, may secure the sole liberty of printing, reprinting, publishing, copying, executing, and vending them for the term of 28 years, which period may, on the application of the author or inventor, or, if he be dead, of his widow or children, be extended to a further period of 28 years. The time limit of the first American act is that specified (for books thereafter printed) in the English Statute of 1709, and was originally adopted by analogy from the Statute of Monopolies (21 Jac. I, c. 3).

In order to make clear the claim of a work to copyright, it is necessary that it should be original, but the originality can exist in the form or in the arrangement as well as in the substance. Corrections and additions to an old work (itself not the property of the compiler) can also secure copyright. The copyright of private letters constituting literary compositions is in the composer, not in the receiver. As to the right of property in lectures, whether written or oral, the American courts have followed the English precedents.

It is to be borne in mind that what is thus protected by law, and thus erected into a species of property, is not the ideas, sentiments, and conceptions of the author, artist, or designer, but the substantial form in which he has embodied them. There is no property in thoughts and feelings, and there can therefore, in the legal sense of the term, be no theft or piracy of ideas. It is the literary or artistic creation, i.e., the form, which is protected, and not the substance. Hence ideas, whether expressed in conversation, or in lectures, or in copyrighted books, immediately become common property and may be employed by any one who will clothe them in a new and different form from that in which they were communicated to him. But the new form must be substantially different from that of the copyrighted matter. It must not be merely a disguised copy or reproduction of the original, for the law protects the arrangement of the matter as well as the language in which it is conveyed. On the other hand, as it is the financial and proprietary interest, and not the pride, of the author which the copyright law seeks to protect, it is no infringement of his rights to make a fair and reasonable use of a book by way of quotation or otherwise, whether for purposes of criticism or for the private use of the reader. Thus it has been held that "extracts and quotations fairly made, and not furnishing a substitute for the book itself, or operating to the injury of the author, are allowable." Furthermore, as the law is aimed at reproducing a work by printing, publishing, dramatizing, or translating any copy thereof, it is conceived that it is no infringement of the author's copyright to read in public a printed poem or other literary production, though of course it cannot be reprinted in a newspaper or magazine, even as an item of news, without permission. It has, however, been held by the English courts that the presentation, through reading or through singing, of a copyrighted work to a public which makes payment for the privilege, constitutes an infringement.

It is not necessary that matter shall be literary or artistic in form, nor even that it shall be original in substance, to be entitled to copyright. A translation or dramatization of another's work may be so protected, and so may be an abstract or newspaper report of a speech, a judicial opinion, or a debate. The law extends equally to compilations of the writings of others, to dictionaries, gazetteers, road and guide books, directories, calendars, catalogues, mathematical tables, and the like, the arrangement of the material being protected even though the matter of which it is composed is common property.

There is in the United States no general principle of law conferring the copyright on all published works, nor does it arise in favor of an author merely by virtue of his authorship. It is a peculiar privilege, which can be had for the asking, but which is not conferred on those who do not seek it. It is still possible for an author or an artist to dedicate the productions of his genius to the public. Having once done this by publishing his work, he is precluded from setting up an exclusive title to it thereafter. In other words, the steps requisite to secure copyright of any work entitled thereto must be taken in advance of publication. The process of obtaining a copyright is very simple, consisting only in the deposit in the Library of Congress at Washington, not later than the day of its publication in this or any other country, of a copy of the title-page and two copies of the book or other work to be copyrighted, and printing on the book or other work and on all reproductions thereof a notice that the copyright has been secured, together with the date thereof. In Great Britain, on the other hand, copyright attaches, without previous application therefor, in favor of all books, etc., first published in the United Kingdom. The right does not exist and cannot be acquired in favor of works previously published elsewhere. The English statute provides for registration at Stationers' Hall, not as a prerequisite to the existence of copyright, but as a preliminary to a suit for its infringement.

As already stated, copyright is a matter of only national and local concern. The granting of copyright by one nation to the productions of citizens of another has resulted as a slow development from influences that first began to have effect about the beginning of the nineteenth century. (For a historical treatment of this, see LITERARY PROPERTY.) At the present time many of the leading states of Europe have granted international copyright, mostly under specific conditions of time or place of publication. In Great Britain, the copyright law now in force is in substance that of 5 and 6 Vict., c. 45. The international provisions are contained in the Acts of 1844, 1852, 1875, 1886, and the order in council of 1887, confirming the Bern convention. The decision given in June, 1891, by the law officers of the crown that citizens of the United States could secure copyright throughout the territory of the British Empire by compliance with the provisions of the British statute, enabled President Harrison to include Great Britain in the proclamation of July 1, 1891, in the list of states the citizens of which could secure copyright in the United States under the Act of March, 1891. The term is for the life of the author and seven years, or for 42 years from the date of first publication, whichever may be the longer. The law provides that a copy of the first and of each subsequent edition of every book must be sent, on demand, to the following libraries: The British Museum in London, the Bodleian in Oxford, the University Library in Cambridge, the Library of the Faculty of Advocates in Edinburgh, and the Library of Trinity College in Dublin.

The term for art copyright is fixed, under the Act of 38 Geo. III, at 28 years. Copyright in a dramatic production is protected for the same term, of 42 years (or for the life of the author and seven years), as that accorded to a work of literature. The copyright in letters vests in the writer, except in so far as any particular circumstance may give to the person to whom the letter is addressed, or to his representatives, a right to publish the same. The perpetual copyright of the authorized versions of the Bible and of the Book of Common Prayer (and possibly, adds Stephen, in the text of acts of Parliament) is vested in the crown. A perpetual copyright in books first issued by the following institutions (unless such books came into the control of the institutions for but a limited term) is vested in the universities of Oxford, Cambridge, Edinburgh, Glasgow, St. Andrews, and Aberdeen, and also in each college of the universities of Oxford and Cambridge, in Trinity College, Dublin, and in the colleges of Eton, Westminster, and Winchester. The book of registry of copyrights is kept at Stationers' Hall. There is no obligation to make registration, excepting that such entry must be made before the owner of the copyright is in a position to take action in regard to any alleged infringement. A bill for the reshaping of the British copyright act, known as the Monkswell Bill, was reported to the House of Lords by committee in 1900 but was not passed. It was originally introduced in November, 1886, at the instance of the British Society of Authors. It was reintroduced, with some material modifications, in 1900. Under this bill the term of copyright is extended to the life of the author and 30 years.

The provisions controlling copyright in Germany, including Alsace-Lorraine, date from 1871. The Statute of June 19, 1901, now in force, made no material changes in the conditions of copyright, but instituted detailed regulations for the relations of authors and publishers, covering the *Verlagsrecht*. There are also Acts of Jan. 9, 1876, for sculpture, and Jan. 10, 1876, for photographs. The copyright relations with the United States are defined in the convention of Jan. 15, 1892. The term is for the life of the author and for 30 years thereafter. Copyright registry for the Empire is kept in Leipzig. The protection of the law is afforded to the works of German citizens, whether published inside or outside of the Empire. Under this same law the works of aliens receive protection provided that they are published by a firm doing business within the Empire. In Italy literary copyright rests upon the Statute of September, 1882. The term is for the life of the author and for 40 years after his death, or for 80 years from the publication of the work. In Austria the term of literary copyright is 30 years after the author's death. In Belgium copyright (formerly perpetual) is now limited, under the Law of 1886, to the life of the author and 50 years thereafter. In Holland, under the Law of 1881, the term is for 50 years from the date of publication. In Hungary the term is the life of the author and 50 years. In Japan, under the Law

of March 3, 1899, the term is the life of the author and 30 years. In Russia the term is for the life of the author and 50 years. In Spain, under the Act of 1879, the term is for the life of the author and 80 years.

In 1909 the law in the United States relating to copyright underwent a thorough redrafting and rearrangement, resulting in considerable modification of the text. For important changes, see UNITED STATES COPYRIGHT ACT. Consult: Copinger, *Law of Copyright* (4th ed., London, 1904); Drone, *Treatise on the Laws of Property in Intellectual Productions* (Boston, 1879); McGillivray, *The Law of Copyright* (London and New York, 1902); Briggs, *The Law of International Copyright* (London, 1906); Hamlin, *Copyright Cases* (New York, 1904); Solberg, *Copyright in Congress, 1779–1904* (Washington, 1905).

COQUELIN, kō'klăn', BENOÎT CONSTANT (1841–1909). A distinguished French actor, known as Coquelin Ainé, to differentiate him from his younger brother, Coquelin Cadet. Born at Boulogne-sur-Mer, Jan. 23, 1841, he early showed such dramatic gifts that he was sent to the Paris Conservatoire (1859). The following year he took the second prize for comedy and made his début on the stage of the Comédie Française in *Le dépit amoureux*. Later he appeared with brilliant success in *Le mariage de Figaro, Le malade imaginaire, Le misanthrope, Le barbier de Séville,* and other pieces in the classic repertoire. In modern plays he was no less effective, and he speedily became the leading comic actor of his time. Among his creations have been rôles in *Le lion amoureux, Gringoire, Tabarin, Paul Forestier, L'étrangère, Les faux ménages, Le monde ou l'on s'ennuie,* and *Denise,* to mention only a few. He was elected a *sociétaire* in the Théâtre Français in 1864, but in 1886 he retired and made an extensive tour abroad, visiting America in 1888. At the end of 1889 he returned to the Théâtre Français, where, as a salaried member of the company, he remained till 1892, creating among other parts that of Labussière in *Thermidor* (January, 1891). In 1893–94 he appeared again in the United States. His engagement in 1895 at the Renaissance Theatre in Paris led to a lawsuit from the Comédie Française, in which he was condemned to pay damages. In 1897, at the Porte-Saint-Martin, he produced Rostand's *Cyrano de Bergerac,* which became his most celebrated character. In 1899 came his Napoleon in *Plus que reine.* In 1900–01 he visited America once more, this time in company with Sarah Bernhardt, to whose Duc de Reichstadt he played Flambeau in Rostand's *L'Aiglon.* Coquelin was abundantly endowed for the stage. He had a trim figure and expressive face. The large tip-tilted nose was a partial disqualification for tragedy, but an advantage in comedy. His eye was alert and penetrating, his voice naturally deep and resonant, but it could be exquisitely modulated to express varying moods. He lacked Fechter's fervor in love-making scenes, but he had a simplicity and directness that was more appealing; and in his versatility and the mastery of the technique of his art he was without a rival among his contemporaries. He entered into the soul of the character he was portraying and divested himself of every attribute that was not in harmony with it. Each of his characters was a new being, differing in thought and action from the others. Coquelin was known also as a writer and lecturer. Among his publications are: *L'Art et le comédien* (1880), which is known in English as 'The Actor and his Art'; *Les comédiens par un comédien* (1882); *L'Arnolphe de Molière* (1882); and, in collaboration with his brother, Coquelin Cadet, *L'Art de dire le monologue* (1884). Consult, for biographical matter, E. Zabel, "Coquelin im Berliner Schauspielhause" in *Zur modernen Dramaturgie,* vol. iii (Oldenburg, 1903); for criticism, Edmondo de Amicis, "L'attore Coquelin," in *Ritratti letterari* (3d ed., Milan, 1881).

COQUELIN, ERNEST ALEXANDRE HONORÉ (1848–1909). A French actor, known as "Coquelin Cadet," to distinguish him from his more famous elder brother, Constant Coquelin. He was born May 16, 1848, at Boulogne-sur-Mer, and in youth was for a time in the employ of the Northern Railway, but went, in 1864, to Paris to enter the Conservatoire and make a career upon the stage. He was graduated three years later with the first prize in comedy and made his début at the Odéon. In 1868 he appeared with his brother at the Théâtre Français, and he continued there till 1875, playing in *Les plaideurs, Le barbier de Séville, Les femmes savantes, Le mariage de Figaro, L'Avare,* and other well-known pieces. In 1875 he went to the Variétés, but returned to the Comédie Française in the following year, and in 1879 he became a member of the company. Among the principal plays in which he created parts are: *Le sphinx, L'Ami Fritz, Les corbeaux, Denise,* and *L'Héritiére.* M. Coquelin Cadet owed much of his reputation to the success of the numerous monologues of which he was the author, and in the rendering of which he gained great popularity in the salons of Paris. He wrote also, under the pseudonym of Pirouette, *Le livre des convalescents* (1880), *Le monologue moderne* (1881), *Fariboles* (1882), *Le rire* (1887), *Pirouettes* (1888), and other humorous volumes.

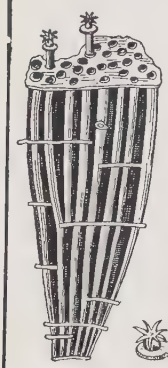
COQUELIN, JEAN (1865–). A French actor, son of Constant Coquelin (q.v.). He studied under his father and in 1890–92 was engaged at the Théâtre Français. In 1897 at the Porte-Saint-Martin he created the rôle of Ragueneau in *Cyrano de Bergerac.* He has also played Lubin in *Thermidor,* Verdelet in *Le gendre de M. Poirier,* and Talleyrand in *Plus que reine* (1899).

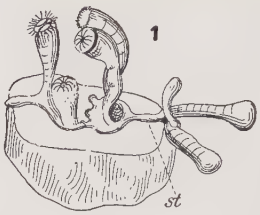
COQUEREL, kō'krĕl', ATHANASE LAURENT CHARLES (1795–1868). A French Protestant theologian. He was born in Paris and studied theology at Montauban. In 1818 he became pastor of the French church in Amsterdam and in 1830 was induced by Cuvier to return to Paris, where he won high reputation as a pulpit orator. An earnest opponent of the doctrine of predestination, he drew upon himself the violent attacks of the orthodox Calvinists and propagated his opinions in three periodicals founded by him. He was elected a member of the Constituent Assembly in 1848 and later also of the Legislative Assembly. Among his writings may be mentioned a reply (1841) to Strauss's life of Jesus, which was translated into English (1844); *Biographie sacrée* (1825–26); *L'Orthodoxie moderne* (1842); *Christologie* (1858). His son ATHANASE JOSUÉ (1820–75) was a pulpit orator and was prominent as the leader of liberal Protestantism in France. He wrote *Libres études* (1867); *Des Beaux-Arts en Italie* (1857; Eng. trans. by E. and E. Higginson, 1859); and *Jean Calas et sa famille* (1858). Consult

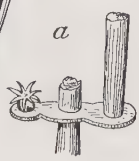
ALCYONARIANS AND MILLEPORES.

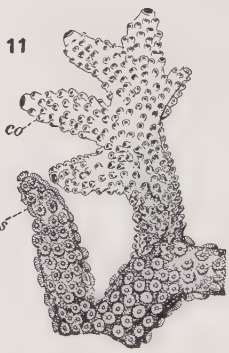
LIVING MADREPORES.

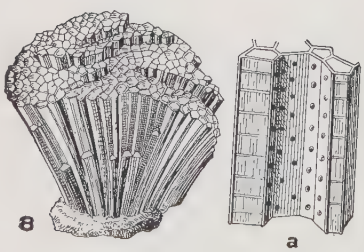
AN AUSTRALIAN CORAL REEF AT LOW TIDE.

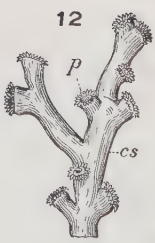


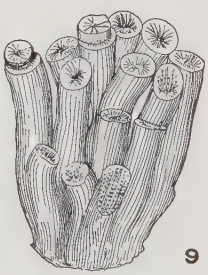


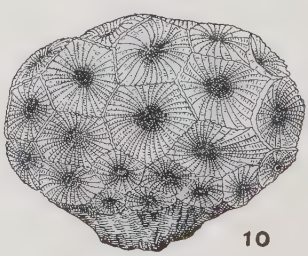












For description, see article CORAL.

Stroehlin, *Athanase Coquerel, fils* (2 vols., Paris, 1886).

COQUES, kōk, or **COCX,** GONZALES (1618–84). A Flemish portrait painter. He was born in Antwerp and studied under the third Pieter Breughel, and afterward with David Ryckaert the elder. He quickly gained a reputation, received commissions from many of the princes and notable persons of the time, and held several positions of honor. He painted almost exclusively portraits and family groups engaged in different tasks, the backgrounds being often by other artists. They are very small, but a certain elegance of manner has given him the title of "Van Dyck in miniature." In his restricted sphere he attained a rare perfection, and the new style of art he created for the southern Netherlands was continued by Franchoys and Biset. His art is represented in the galleries of Berlin, Dresden, Brussels, Paris, Vienna, etc., and in many private collections, including that of John Wanamaker, Philadelphia.

COQUETTE, kō-kĕt′ (Fr. *coquette,* flirt, fem. of *coquet,* gallant, little cock, from *coq,* cock; so called from its fanciful plumage). A kind of humming bird, of which a dozen species are known, constituting the genus *Lophornis,* and scattered from the lowlands of Mexico to and throughout the Amazon region. The coquettes are small, crested, and exquisitely adorned with spangled frills on each side of the neck; the tail is long and capable of wide spreading; the colors varied and brilliant, and the whole effect of the bird is peculiarly gemlike. See CROSS FERTILIZATION and Plate of HUMMING BIRDS.

COQUI, kō′kē (probably of West Indian origin). A West Indian tree frog (*Hylodes martinicensis*), remarkable for undergoing its whole metamorphosis within the egg. "The pairing takes place on land in the months of May and June, when the female lays about 20 eggs, which are enveloped in a foamy mass and glued onto a broad leaf, or hidden in the axillæ of irridaceous plants. The mother seems to remain in the neighborhood watching the eggs, which are large, measuring 4 to 5 millimeters in diameter . . . pale and straw-colored. The embryo develops neither gills nor gill openings, but a large, well-vascularized tail, by means of which, being immersed in the watery fluid contained within the egg, it seems to breathe. After 21 days the tadpole, having used up all the available yolk and fluid, and most of its own tail, bursts the eggshell and hops away as a little frog." Consult Gadow, *Cambridge Natural History,* vol. viii (London, 1901).

COQUILLA (kō-kwīl′lȧ) **NUT** (Sp. *coquillo,* coconut). The fruit of a palm, *Attalea funifera.* It is exported from South America, being used to a considerable extent in America in the manufacture of buttons and in turning various small ornaments. It is also called "vegetable ivory." The imports into the United States were in 1913 approximately 30,000,000 pounds, valued at about $1,000,000, and were chiefly from Colombia, Ecuador, and Panama. The importations of 1913 were nearly double those of a decade earlier. See ATTALEA; PIASSABA.

COQUIMBITE, kō-kīm′bīt. A hydrous sulphate of iron resembling copiapite (q.v.) in composition and occurrence, but crystallizing in hexagonal forms. It is found near Copiapó, Chile.

COQUIMBO, kō-kēm′bō. A seaport in the Province of Coquimbo, Chile, about 10 miles south of La Serena, the capital of the province, with which it is connected by rail (Map: Chile, C 10). It has a good harbor, a lighthouse with a revolving light, a customs office, and exports chiefly copper ores and cattle. It is the residence of a United States consular agent. Pop., 1903, 8478; 1910, 12,106.

COQUIMBO. See BURROWING OWL.

COQUINA, kō-kē′nȧ (Sp., shellfish, from Lat. *concha,* Gk. *κόγχη, konchē,* shell, Skt. *śaṅkha,* conch shell). A porous variety of limestone which occurs in Florida. It is made up of cemented fragments of shells and corals that have been cast about by the waves and accumulated in some sheltered basin of the sea bottom. Coquina is extensively used for building stone in Florida and the Bermudas.

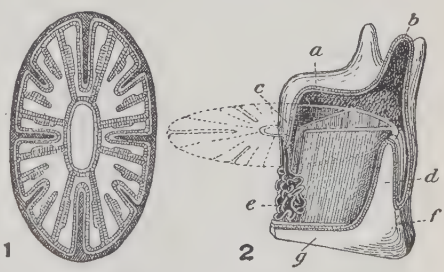
CORA. A group of tribes of the Piman family, occupying parts of the Rio de Jesus María, Jalisco, Mexico. See PIMAN STOCK.

CORABÉCAN. A small linguistic stock—the language is long extinct—whose representatives formerly dwelt in the forested region of eastern Bolivia. Rivet thinks that it is a dialect of Otuquian, or Otuké.

COR′ACLE (Welsh *corwgl, cwrwgl,* coracle, from *corwg, cwrwg,* Ir. *curachan,* skiff). A boat of oval shape with a frame of wickerwork covered with hide or oiled cloth, which covering is removed when the boat is not in use. The ordinary coracle will carry comfortably only one man, but it is so light that he can easily carry it on his back to a place where it may be safely deposited. See CURRACH.

CORAIS, kō′rȧ′, ADAMANTIOS. See CORAY, ADAMANTIOS.

COR′AL (OF. *coral,* Lat. *corallum, coralius,* from Gk. *κοράλλιον, korallion,* coral; of uncertain origin, possibly a loan word from Heb. *gōrāl,* small stone). A calcareous or horny secretion or deposit of many kinds of polyps of the class Anthozoa, which assume various and often beautiful forms. Millepore "coral" is produced by polyps of the class Hydrozoa. (See MILLEPORE.) The coral-producing polyps form



STRUCTURE OF A SIMPLE CORAL.

1. Diagrammatic cross section of a coral: the black part represents the stony outer wall (theca) and partitions (septa); the open lines, the fleshy lining and partitions (mesenteries). 2. Semi-diagrammatic view of a coral: *a,* a septum; *b,* a tentacle; *c,* position of the gullet; *d,* theca; *e,* mesenteric filaments; *f,* epitheca; *g,* basal plate.

colonies which increase by gemmation, young polyp buds springing from the original polyp, sometimes indifferently from any part of its surface, sometimes only from its upper circumference, or from its base, and not separating from it, but remaining in the same spot, even when the original or parent polyp has ceased to exist, and producing buds in their turn. The calcareous or horny deposition begins when the

polyp is single, adhering to a rock or other surface, on which the coral grows or is built up, the hard deposits of former generations forming the base to which those of their progeny are attached. One layer of the chambers, of which the greater number of corals are composed, occasionally surrounds another like the concentric circles in the wood of exogenous trees; one layer is sometimes deposited above another; the whole structure sometimes branches like a shrub, spreads like a fan, or assumes the form of a cup, a flower, or a mushroom. Under the common name "coral" are included many species, also designated "madrepores" (q.v.), and some have received other names derived from peculiarities of their form and appearance, as "brain coral," etc. This last forms into large rounded masses furrowed with winding depressions like the convolutions of a mammalian brain or the windings of a meadow brook; hence its technical name is Meandrina. In the greater number of kinds, besides the plates which form and separate the polyp cells, and which are variously arranged, there is a more solid internal or central part, formed by the additional deposition of matter at the bottom of each polyp cell, or from the common living part in which the polyps are united. The calcareous framework is sometimes further strengthened by a greater or less mixture of horny animal matter with the purely calcareous substance.

Kinds of Corals.—Corals are roughly classed under two heads, the horny corals and the lime or stone corals. The former consist chiefly of a horny secretion from the polyps, which may include also separate particles of lime, while the stone corals consist almost wholly of lime firmly united in a solid mass. No sharp line can be drawn between these two groups, for all possible gradations can be found. The Antipatharia and Alcyonaria as a rule have a horny skeleton, while the millepores and madrepores are almost wholly limestone. The polyps of the common red, or precious, coral (*Corallium rubrum*) belong to the suborder Alcyonaria (q.v., for illustration); but the central axis in this and other corals forming the family Corallidæ is quite solid, and is produced in concentric layers by the living gelatinous substance which envelops it like the bark of a tree, and from which the polyps project like buds, or, when their tentacles are expanded, like little flowers. Another alcyonarian coral of more than usual interest is the "organ-pipe" coral (*Tubipora*) in which no central axis fills in behind the polyps, but the chambers in which they live remain as open, elongated tubes, crowded together side by side to form a solid mass. Its polyps are violet or grass-green, but the coral itself is red or purplish. These corals are found in the Indian and Pacific oceans. Many of the madrepores have the whole calcareous framework covered, as in the Corallidæ, by a gelatinous living substance which unites all the polyps. The whole living part soon decomposes and disappears, when the coral is taken out of the water, in some species almost immediately running from the calcareous part as a watery slime.

Utilization.—Red coral—so much admired for its fine color and susceptibility to a high polish and much used for ornamental purposes—is chiefly obtained from the Mediterranean, in some parts of which extensive "fisheries" are carried on. It is brought up from considerable depths by means of a sort of grappling apparatus dragged after a boat or boats, the pieces being broken from the bottom by beams of wood which are sunk by weights and then entangled among hemp. Red coral has a shrublike branching form and grows to the height of about one foot, with a thickness like that of the little finger. Much of the coral of the Mediterranean is exported to India, but red coral is also obtained in the Red Sea, the Persian Gulf, etc. Black coral (*Antipathes*), the axis of which is more solid, is still more highly prized. Coral was known to the ancients and was used for ornamental purposes by the Gauls.

Reefs.—The formation of coral reefs and islands is one of the most noteworthy results of the action of coral polyps. Many kinds of polyps are concerned in the building of a reef, but the growth is mainly dependent on the stone corals. Reef-building corals only flourish in clean, fresh sea water, which is not over 125 feet in depth and never is cooler than 68° F. They are consequently confined to the tropics and to shallow water and never thrive near the mouths of rivers. Although reef-building corals are not found on the coast of the United States north of Florida, some species of coral occur much farther north. Even on the coast of New England there is to be found quite commonly a true stone coral (*Astrangia danæ*), the polyps of which when expanded are large and very beautiful. See CORAL ISLAND AND CORAL REEF.

Fossil Forms. Among the fossil corals only those belonging to the Anthozoa are of importance, those of the Hydromedusæ either not appearing until the Mesozoic, and then but sparingly (for fossil Hydrocorallinæ and Tubulariæ, see CŒLENTERATA), or not being clearly recognized as to their systematic position and only provisionally referred to the Hydrozoa. (See STROMATOPORA; GRAPTOLITE.) The Anthozoa appear in the Cambrian rocks with the Archæocyathinæ, forms of peculiar structure and uncertain relationships. In the Upper Silurian period they have become the most important fossils, as well in number of individuals as in diversity of structure and importance as rock-building organisms. They continue thus throughout geologic times and are hence of

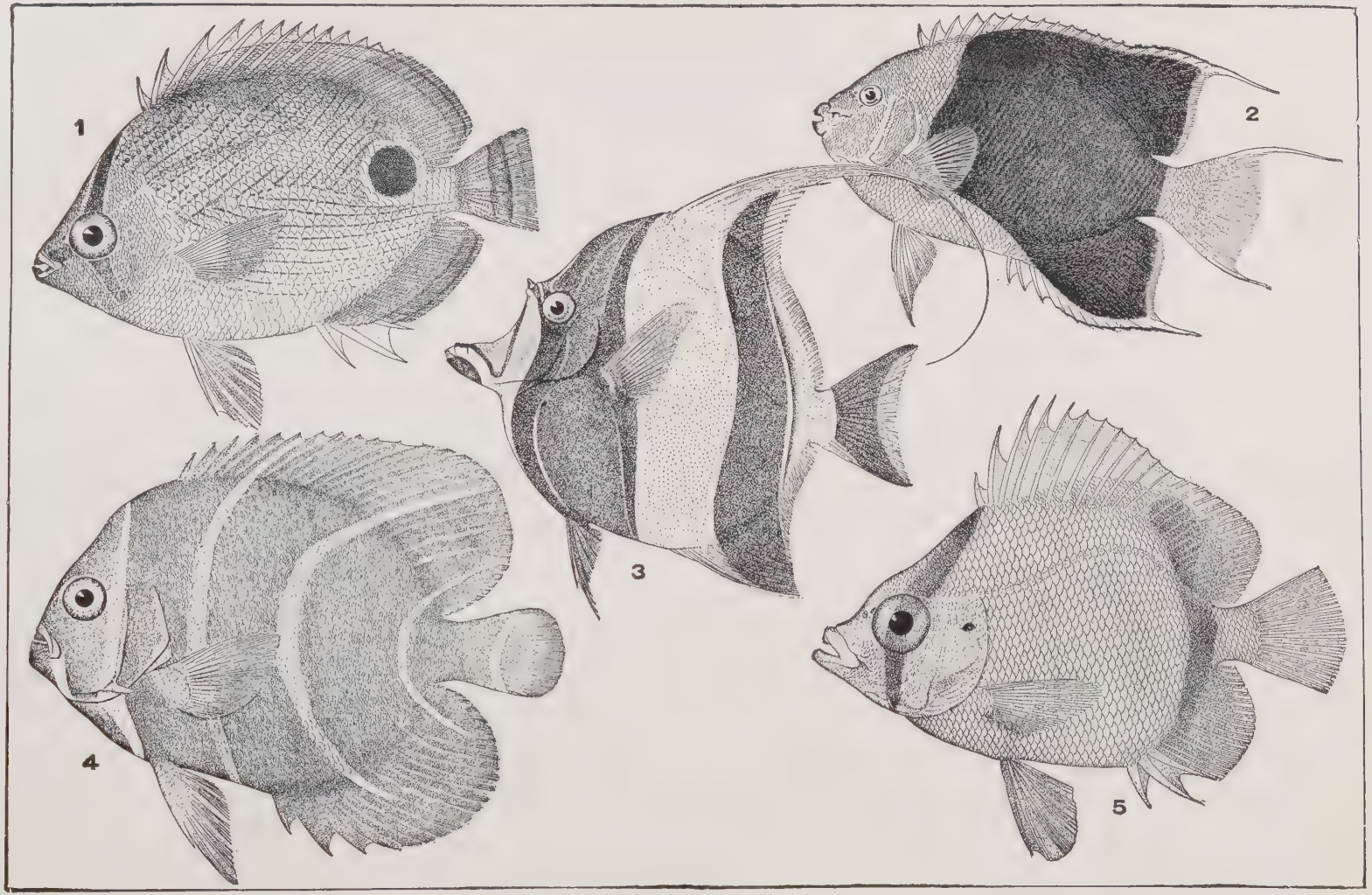
REPRESENTATIVE FORMS OF CORALS.

1. Beginning of a colony (of Zoanthus), showing simplest mode of budding from a creeping stolon (*st*). 2. Sea pen, or pennatulid (*Virgularia mirabilis*), a portion of the stem in the living condition; *a*, the same, dead. 3. Organ-pipe coral (*Tubipora musica*), skeleton of a colony showing two living polyps; *a*, manner of growth, by budding from the lateral shelf-like expansions. 4. Red or "precious" coral (*Corallum rubrum*), part of a living colony. 5. Part of a fan coral (*Rhipidogorgia flabellum*), showing the polyp cells. All the foregoing are Alcyonarians. The following are "true" or "stony" corals. 6. *Syringopora ramulosa*, fossil in the Carboniferous of Germany. 7. *Halysites catenularia*, fossil in the Silurian of Gotland. 8. *Favosites polymorpha*, fossil, Devonian: *a*, corallites, enlarged, two of them broken open and showing tabulæ. 9. Cup coral (*Cyathophyllum cæspitosum*), fossil in the Devonian of Germany. 10. Cup coral (*Cyathophyllum hexagonum*), fossil in the Devonian of Germany. 11. A madrepore (*Madrepora aspera*); the lower part shows the living polyps, the upper part naked (dead) corallum, at the summit of a bushy branch. 12. Part of a branching coral (*Dendrophyllia*) in which a common calcareous stem (*co*, cœnenchyma) is formed by calcification of the cœnosarc (*cs*) and gives origin to the individual corallites (*co*); *p*, an active polyp. 13. Star coral (*Astræa*), an example of the massive type of reef corals, in its living condition.

CORALS FROM THE GREAT BARRIER REEF, AUSTRALIA

1. STAGHORN CORAL (Madrepora muricata), etc.
2. A MADREPORE (Madrepora formosa).
3. A MADREPORE (Madrepora convexa).
4. A FUNGOID FORM (Podobacia crustacea).
5. SEVERAL MUSHROOM CORALS (Fungia lacerta).
6. A RELATED SPECIES (Mussa multilobata).
7. HERPETOLITHIA TALPINA.

CORAL FISH



1. CHÆTODON CAPISTRATUS.
2. HOLACANTHUS TRICOLOR.
3. ZANELLUS CORNUTUS.
4. POMACANTHUS ZONISPECTUS.
5. CHÆTODON OCELLATUS.

great importance to the paleontologist and geologist. As they are also objects of great beauty, they are much sought by collectors and dealers. Especially rich and famous are the fossil coral faunas of the Silurian of North America and Gotland; the Devonian of the Helderbergs of New York, the Falls of the Ohio, and the Rhenish provinces; the Jurassic formations of middle Europe and the Tertiary beds of northern Italy.

The Anthozoa are divided by Haeckel into the subclasses Tetracoralla, Hexacoralla, and Octocoralla, according to the number of their septa, which were considered to be multiples of these figures. The Tetracoralla comprise, together with the Tabulata, the Paleozoic corals; the Hexacoralla and Octocoralla, the Mesozoic and later forms. Recent investigations on the embryology of the Hexacoralla and thecal structure of the Tetracoralla (Dr. M. Ogilvie) seem to demonstrate that these divisions are artificial, that the tetrameral system is only an ancestral feature strongly marked in certain of the old families (Cyathophyllidæ, Zaphrentidæ, Cyathaxonidæ), while hexameral symmetry is but one of many forms of radial symmetry. The Anthozoa are therefore at present divided into but two subclasses, according to Ray Lankester: the Alcyonaria, or Octocoralla, and the Zoantharia. None of the fossil alcyonarians, which with doubtful forms do not appear till the Mesozoic, are of importance; the Paleozoic Helioliti dæ, which are referred with doubt to this subclass, are quite abundant in the Silurian and Devonian rocks.

The subclass Tabulatæ, of Milne-Edwards and Haime, comprising common and important Paleozoic genera, such as *Favosites*, *Aulopora*, *Syringopora*, *Halysites*, and *Chætetes*, which was long considered as a distinct subclass characterized by the slight development of the septa and the presence of numerous tabulæ, has now been broken up; it having been recognized that some families belong to the Octocoralla, others (Favositidæ, Syringoporidæ, Halysitidæ) exhibit close relationships to the Hexacoralla, and others (Chætetidæ, Monticuliporidæ) are even placed by some authors, as Ulrich, among the Polyzoa. All these very primitive groups of tabulate corals played important rôles as Paleozoic reef builders.

Bibliography. Milne-Edwards and Haime, "Monographie des Polypiers fossiles des terrains Paléozoiques," in *Archives du Muséum*, vol. v (Paris, 1851); Roemer and Frech, *Lethæa Palæozoica*, vol. i (Stuttgart, 1883); Ogilvie, "Structure and Classification of Corals," in *Philosophical Transactions*, vol. clxxxvii (London, 1896); G. C. Bourne, "The Anthozoa," in Lankester's *Treatise on Zoölogy*, part ii (ib., 1900); Hickson, "Cœlenterata," in *Cambridge Natural History*, vol. i. (ib., 1906).

COR'ALBERRY. See SNOWBERRY.

CORAL FISH. A name given in a general way to various tropical fishes of the families Chætodontidæ and Pomacentridæ, because they frequent submarine coral growths. All are much compressed, high-backed fishes of brilliant hues; and most of them are marked with vertical black bars, and possess filamentous appendages upon the fins and tail. They remain among the branching corals for safety, and are further protected, apparently, by the curious pattern of their coloration. Many species abound in the waters from Bermuda to Brazil, where several species are known as "angel fishes." All are small, but excellent eating.

CORAL ISLAND AND CORAL REEF. An island or marine ridge formed from the petrified skeletons of coral polyps. They are numerous in the warmer portions of the Pacific and in the Indian Ocean, where the growth of coral goes on with great rapidity, occurring to a lesser extent in the Gulf of Mexico and along the Atlantic shores of the West Indies. The coral islands and reefs may be classed, according to their general form, into fringing reefs, barrier reefs, and atolls. *Fringing reefs* are closely attached to the shore line of an island or land mass and extend outward as a submarine platform. *Barrier reefs* lie at some distance from the land, the intermediate space being occupied by a shallow lagoon of salt water. Usually some parts of the barrier rise above the level of the ocean as islets which support a scanty vegetation, while the position of the submerged reef is indicated by a line of breakers. An excellent illustration of this type is the Great Barrier Reef of Australia, over 1000 miles long, lying off the east coast of Queensland. *Atolls* (q.v.) are of rude circular form, inclosing a lagoon, but without any visible land to which the reefs are attached. Their presence is made known by a girdle of breakers and by wave-formed islets on which the coconut palm and a few other tropical plants grow. The central lagoon of placid, transparent water is usually less than 300 feet deep, and when there are passages through the reef it constitutes a safe harbor for ships. Soundings have shown that the slope of the bottom is gentle in the interior, but very steep on the seaward side of the reef, indeed being sometimes almost perpendicular. The Pelew Islands of the Caroline Archipelago, the Low Archipelago in the Pacific, and the Laccadive and Maldive island groups in the Indian Ocean, exhibit many examples of atolls.

Formation of Reefs. The great masses of coral rock have been built up by the continuous growth of various genera and species of corals, which secrete carbonate of lime dissolved in the sea water. The coral polyps flourish only under certain conditions; their growth requires clear, warm, salt water, an abundance of food, and a water depth of not more than 20 fathoms. They cannot live in muddy or brackish water, or in regions where the mean temperature for any month falls below 68° F. The polyp also does not grow above the level of the lowest tides. As to the rate of growth of coral many observations and estimates have been made. Some species build up a reef as rapidly as three inches per year, others increase less than one inch in the same time. Alexander Agassiz estimates that the corals on the Florida coasts would construct a reef from the depth of seven fathoms to the surface in a period of from 1000 to 1200 years.

Under the special conditions necessary for the growth of coral it is a matter of interest to discover by what means the reefs and atolls have been formed, that often rise from depths of several hundred and even thousands of feet. Darwin, who recognized the fact that shallow water was necessary for the living polyp, inferred that the sites of the reefs must have undergone a gradual subsidence, corresponding to the growth of the reef upward. According to his theory, the colonies of polyps first settled along the

shores of an island, where after a time a fringing reef would be formed (Fig. 1). Then, if the ocean floor subsided at a sufficiently slow rate to permit the growth of the coral to be continued on the outward side of the reef, the water channel would gradually widen and deepen and a barrier reef (Fig. 2) would be formed,

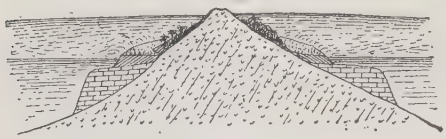


FIG. 1.

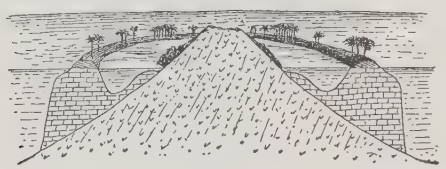


FIG. 2.

which, after a long interval, upon the submergence of the entire island, would give way to an atoll (Fig. 3). This simple explanation,

FIG. 3.

first advanced by Darwin in 1835 and afterward elaborated by J. D. Dana, found wide acceptance among geologists. It was soon discovered, however, that in certain cases the theory of submergence did not conform with the actual conditions. Semper, in 1868, directed attention to the Pelew Islands, where the sea floor and the reefs built thereon have actually undergone elevation. Later, Murray pursued the study of the question still further and was able to show that reefs do not necessarily require a sinking shore for their formation, but they may grow on a stable foundation such as a submarine bank, raised to near sea level by accumulation of fossil organisms, or the slopes of a volcanic island. After becoming established in such localities the corals continue their growth outward, and at the same time wave action washes down débris from the reef to the bottom, forming a platform for their further activity. In case the original foundation was above sea level the projecting portion may have been cut down by breakers. The solvent action of water would remove the dead coral from the interior of the reef and thus excavate a basin to be occupied by the lagoon. The same conclusions were reached by Alexander Agassiz in his extended investigations of coral islands. Agassiz also explained certain barrier reefs as having been formed by the growth of a thin wall of coral on the outer edge of a wave-cut submerged platform surrounding a volcanic island. In the latter case neither subsidence, elevation, nor solution is necessary for reef development. The several theories of reef building are probably to be accepted as valid, and each must be tested by actual conditions before its application in any particular instance can be determined. Darwin's theory of subsidence, therefore, has not been displaced by the more recent work, but given a limited field of application.

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COR'ALLI'NÆ, or COR'ALLINE ALGÆ (Lat. nom. pl. fem. of *corallinus*, made of coral, from *corallum*, *corallius*, coral). A group of red algæ (Rhodophyceæ, q.v.), distinguished by the calcareous incrustations secreted by the thallus. The thallus is branching, usually articulated, and forms stony masses like those of the branching corals with which these algæ are often associated. Corallinæ are important rock-making organisms in some formations, especially of Tertiary age, such as the Lower Eocene of Ariège, and the nummulitic Limestone of the Alps. The genus *Corallina* itself, now abundant, was rare during Tertiary time. Lithothamnium, however, appeared in Jurassic time, extending through the Cretaceous, was very abundant during the Tertiary, and has persisted to the present era. Consult: Gümbel, "Die sogenannten Nulliporen, etc.," in *Abhandlungen der königlich bayerischen Akademie der Wissenschaften*, vol. ii (München, 1874); Unger, "Beitrag zur näheren Kenntniss des Leithakalkes," in *Denkschriften der Kaiserlich-königlichen Akademie der Wissenschaften zu Wien*, vol. xiv (Vienna, 1858); Zittel and Schimper, "Traité de paléontologie," part ii, *Paléophytologie* (Paris, 1891). See ALGÆ.

CORAL SEA. That part of the Pacific Ocean off the east coast of Australia, extending between the parallel of 25° S., and Torres Strait (Map: Australasia, G 4). Its boundaries are indefinite, but it is generally considered to extend from the Australian coast to the irregular line of islands, including the western outposts of the Solomon and New Hebrides groups, from New Caledonia to the Louisiade Archipelago. The coral growths of the Great Barrier Reef lie along its western boundary.

CORAL SNAKE. A poisonous serpent of the genus *Elaps*, common in tropical America and also represented in Africa, so called because coral red is its prevailing color. There are many species, each marked by some different arrangement of black and yellow rings; the epidermis is also iridescent, probably due to laminations on the scales, and no more beautiful snakes exist. (See Plate with article SNAKE.) All are small, of terrestrial habits, and provided with a poison apparatus sufficient for the

killing of small animals and birds, but rarely fatal to man. A representative species (*Elaps fulvius*) is well known from Mexico to South Carolina and common in Florida, as the "coral snake," "American cobra," "garter snake," and "harlequin"; it is the only poisonous snake, not

CORAL SNAKE OF FLORIDA.

crotaline, in the United States, and, though small and gentle, is not safe to handle. Coral snakes do not strike, as do other poisonous snakes, but twist rapidly about until the head touches the object of their irritation, when they seize it and chew until their fangs have sunk in. These snakes spend most of their time burrowing in the ground, where they lay six or eight eggs. Consult: *Report of United States National Museum* (Washington, 1893), and Males and Urich, "Serpents of Trinidad," in *Proceedings of Zoölogical Society of London* (London, 1894); Ditmars, *The Reptile Book* (New York, 1907). See CYLINDER SNAKE.

CO'RAM, THOMAS (1668–1751). An English philanthropist, born at Lyme Regis, Dorsetshire. His father was a merchant captain, and he was probably a shipwright by profession. He settled in Taunton, Mass., in 1694 and returned to England in 1703. He was constantly interested in philanthropic schemes, particularly in the establishment of the Foundling Hospital, which was accomplished after many years of struggle. The institution was opened in Hatton Garden in 1740. Coram was also a promoter of the English settlements in Georgia and Nova Scotia. In later life he lost most of his fortune and at his death was in possession of an annuity from the government. He was buried in the chapel of the Foundling Hospital. One of Hogarth's best portraits is that of Coram, which has hung in the hospital since its presentation by the painter (1740).

CORAM'BIS. In Shakespeare's *Hamlet,* the name given in the quarto edition of 1603 to the character afterward called Polonius.

CORANACH, kŏr'ä-năk, **CORONACH, CORANICH,** or **CRONACH** (Gael., Ir. *coranach,* from Gael., Ir. *comh,* with + Gael. *ranaich,* a crying, from *ran,* to cry out). A funeral dirge, formerly in use among the Irish and Scottish Celts. "The cries (coranich) are called by the Irish the ulagohne and hululu, two words extremely expressive of the sound uttered on these occasions (funerals); and being of Celtic stock, etymologists would swear to be the origin of the *ololungon* of the Greek, and *ululatus* of the Latins."—Pennant's *Tour.*

The coranach seems to be identical with the Irish *caóine,* generally written and pronounced *keen,* a dirge for the dead, "according to certain loud and mournful notes and verses," wherein the pedigree, property, the good and great deeds of the deceased, and the manner of his death are recounted, in order to excite sorrow or revenge in the hearers and to show them the loss they have sustained.

The word, in one or other of its forms, occurs in the writings of many of the ancient Scottish authors:

"Cryand for yow the cairfull corrinoch."
Sir D. Lindsay.

"Cryand the corynoch on hie."
Battle of Harlaw.

"Be he the correnoch had done shout."
Dunbar.

The coranach has long since fallen into disuse among the Highlanders. The funeral lament performed on the bagpipes, which may be considered as an instrumental coranach, lingered on till the latter half of the eighteenth century.

For specimens of the coranach, see Sir Walter Scott's *Lady of the Lake* and accompanying notes; Crofton Croker's *Researches in the South of Ireland* (1824); *Blackwood's Magazine,* vols. xiii and xxiii; and Jamieson's *Etymological Dictionary of the Scottish Language,* revised by Longmuir and Donaldson, vol. i, p. 494, under *coranich* (Paisley, 1879).

COR ANGLAIS, kôr äN'glâ' (Fr., English horn). 1. A wooden wind instrument of the double reed species, the body of which was formerly bent in the form of part of a circle, which accounts for its being called a horn. It is merely a large oboe (called in German *Altoboe,* i.e., 'alto of the oboe'), and is usually played by oboe players. Its compass is two octaves and a fifth from e to b^2. Modern composers employ for this instrument only the G clef. It is a transposing instrument, and music for it is written a fifth above its real tones. 2. Also the name of an eight-foot organ stop occasionally used in French and English pipe organs. For illustration, see MUSICAL INSTRUMENTS.

CORATO, kô-rä'tô. A city of southeastern Italy, in the Province of Bari delle Puglie, about 26 miles west of the city of Bari (Map: Italy, L 6). Not far from Corato are the ruins of the Castel del Monte, built by the Emperor Frederick II, in which the sons of Manfred (q.v.) were imprisoned. The town carries on a trade in cattle and leather, the surrounding country being well adapted for grazing. A good deal of tartar is manufactured here as well as wine and oil. Pop. (commune), 1881, 30,552; 1901, 41,573; 1911, 45,307.

CORAY, kô-rā', **CORAËS,** or **KORAËS,** ADAMANTIOS (1748–1833). A Greek classical scholar and patriot. He was the son of a merchant in Smyrna. He engaged in trade in Amsterdam, but in 1782 went to Montpellier to study medicine and natural history. From 1788 till his death he lived in Paris. Stimulated by the French Revolution, Coray was one of the first to attempt to revive modern Greek literature, and his political tracts did much to arouse the Greeks to successful revolt against Turkish rule. Of his classical works the most important is his edition of Heliodorus' romance, *Ethiopian Histories,* his commentaries on the writings of Hippocrates, and his editions of Xenophon's *Memorabilia,* Plato's *Gorgias,* and Strabo. His work, *Atacta, ou mélanges sur la littérature grecque moderne* (1828–35), did much to elevate the modern Greek literary language. Consult his autobiography in Greek (Paris, 1833) and a Latin translation of it by Schultze (Liegnitz, 1834); also Sinner, *Life and Works of Korais* (Zurich, 1837); and Bywater, in *Journal of Hellenic Studies,* vol. i (London, 1881). See ROMAIC LITERATURE.

COR'BAN (Heb. *qorban,* offering, from *qarab,* to draw or bring near, to offer). A term used by the Jews to denote things offered or devoted to the Deity. In the Priestly Code it is the

regular word for an offering to God of any kind (Lev. ii. 1, 4, 12, 13, etc.). Such an object was necessarily sacred and could not be applied to profane use. Later the word came to be the technical expression for formally setting a thing apart as sacred to God or God's use, but it often was used when there was no real intention of devoting a thing to God. Certain of the schools held that the mere pronunciation of it, however rashly, constituted a vow. Hence it often became a convenient makeshift to avoid a distasteful duty. Thus a son might say his money or other property was corban and so escape the obligation to use it for the support or need of a parent. This interpretation was rebuked by Jesus (Matt. xv. 5; Mark vii. 11), and also by certain broad-minded and humane rabbis.

CORBEIL, kôr'bâ'y' (Lat. *Corbulinum*). A town in the Department of Seine-et-Oise, France, at the junction of the Essonne with the Seine, 18 miles south-southeast of Paris (Map: France, N., H 4). It consists of an old and a new town. From the tenth to the twelfth century it was the chief town of a powerful countship; was besieged by the Duke of Burgundy in 1418, by the Huguenots in 1562, and by Alexander Farnese in 1590. The Gothic church of Saint-Spire (tenth century) was rebuilt in the fifteenth century. The town has flour mills, print works, cotton factories, and manufactures of watches, clocks, etc. The Moulins de Corbeil are the largest flour mills in France. The Decauville engineering works are near by. Pop., 1901, 9362; 1911, 10,746.

COR'BEL (OF. *corbel*, Fr. *corbeau*, basket, from Lat. *corbis*, basket). A support, usually of stone, projecting from a wall and forming an integral part of it. In France it is not a corbel unless it has parallel sides, but the English usage includes also those forms of support, called in French *culs-de-lampe*, which project from the wall to carry colonnettes, vaulting shafts, vault ribs, etc. They are often elaborately carved with foliage and volutes. A row of corbels supporting a horizontal coping or cornice is called a *corbel table*. See BRACKET; CANTILEVER; CONSOLE.

COR'BENIC. The name of a stronghold erected by Galafres after his conversion as a shrine for the Holy Grail. It is called also the Palace of Adventure, and in it Galafres, christened Alphasan, is stabbed to death.

COR'BETT, JULIAN STAFFORD (1854–1922). An English barrister and man of letters, born in Surrey and educated at Trinity College, Cambridge. He practiced law until 1882, was special correspondent of the *Pall Mall Gazette* on the Dongola expedition, 1896, lectured on English history at Oxford in 1903, and was appointed lecturer in history to the Naval War College. Besides several romances, his writings include: *England in the Mediterranean* (1904); *The Campaign of Trafalgar* (1910); *Some Principles of Maritime Strategy* (1911); *The Spencer Papers* (1913).

CORBETT, LEE CLEVELAND (1867–). An American horticulturist, born at Watkins, N. Y., and educated at Cornell University, where from 1891 to 1893 he was assistant horticulturist. He was professor of horticulture and forestry at the South Dakota Agricultural College in 1893–95 and at the West Virginia University from 1895 to 1901, and then he became horticulturist in the United States Department of Agriculture. His publications include *Garden Farming* (1913); *Intensive Agriculture* (1913), and the following experiment station bulletins: *Pruning* (1903); *Cranberry Culture* (1903); *The School Garden* (1904); *Strawberries* (1904); *Tomatoes* (1905); *Raspberries* (1905); *Beans* (1907); *Cabbages* (1911); *Ice Houses* (1911); *Tomato Growing as Club Work in the North and West* (1913).

CORBIE, kôr'bê'. A town in the Department of La Somme, France, 10 miles northeast of Amiens (Map: France, N., H 3). It has cotton, woolen, and hosiery factories. Pop., 1901, 4133; 1911, 4408. Corbie owes its fame to the Benedictine abbey founded here in 662 by Queen Balthilde. A beautiful statue of the Queen remains. Of the abbey, the church of St. Pierre alone remains. The banished King Desiderius was sent here by Charlemagne in 774. Corvei (q.v.) owes its origin to Corbie.

COR'BIE STEPS, COR'BEL STEPS. or **CROW STEPS** (a Scottish corruption of *corbel steps*, from OF. *corbel*, corbel, but confused by popular etymology with Scotch *corbie*, crow, from ME., OF. *corbin*, Lat. *corvinus*, crow, and supposed to mean 'steps for crows'). In architecture, the succession of steps with which the gables of old houses are ornamented in Scotland. This gable ornament is by no means peculiar to Scotland and France, but is met with in Flanders, Holland, and all over Germany, where it is even more characteristic and general, especially in the brick architecture of north Germany—both of churches and of houses.

COR'BIN. A city in Whitley Co., Ky., about 80 miles (direct) south by east of Lexington (Map: Kentucky, F 6). It is at the junction of three divisions of the Louisville and Nashville system and is essentially a railroad town. There are some deposits of coal, railway repair shops, and a woodworking plant. Corbin has a Catholic academy and owns its water works. Pop., 1900, 1544; 1910, 2589.

CORBIN, HENRY CLARK (1842–1909). An American soldier, born in Clermount Co., Ohio. In 1862 he entered the Union army as a lieutenant in the Eighty-third Ohio Volunteers, but in the following month was transferred to the Seventy-ninth Regiment. He was major of the Fourteenth United States colored troops in 1863, lieutenant colonel in 1864, and colonel in 1865, and remained with the Army of the Cumberland until the close of the war, when he was brevetted brigadier general of volunteers. In 1866 he entered the regular army as a second lieutenant in the Seventeenth Infantry and became captain in the Thirty-eighth Infantry in the same year. He was appointed major and assistant adjutant general in 1880, lieutenant colonel in 1889, and colonel in 1896. After serving at the adjutant general's office in Washington, and on Governor's Island as chief of staff in the Department of the East, he was appointed adjutant general of the army in 1894. During the war in Cuba he was practically the head of the army and was involved in the criticism of the War Department, but in the reorganization of the army it was considered that he displayed industry and ability, and in 1900 he was promoted major general and adjutant general, "this grade to expire with the termination of office of the present incumbent." He was in command of the Division of the Philippines in 1904–06, when he was made a lieutenant general, and retired.

CORBIN, JOHN (1870–). An American dramatic critic and author, born in Chicago. He

was educated at Harvard University. From 1897 to 1900 he was assistant editor of *Harper's Magazine*, during part of this time acting also as dramatic critic for *Harper's Weekly;* in 1902 he wrote the dramatic notices of the New York *Times* and in 1905–07 those of the *Sun*. From 1908 to 1910 he was literary manager of the New Theatre, during the short life of which his efforts contributed much towards notably artistic productions. Besides magazine stories and articles on the drama, he is author of *The Elizabethan Hamlet* (1895); *Schoolboy Life in England: An American View* (1898); *An American at Oxford* (1902); *A New Portrait of Shakespeare* (1903); *The First Loves of Perilla* (1903); *The Cave Man* (1907); *Which College for the Boy* (1908); *Husband and the Forbidden Guests* (1910).

CORBOULD, kôr'bōld, Edward Henry (1815–1905). An English painter and illustrator, born in London. He studied at Sass's Art School and the Royal Academy, and when only 19 painted "The Fall of Phaethon," for which he received a gold medal from the Society of Arts. Nearly all his paintings are large historical or romantic compositions in water color, academic in style. He was appointed instructor in water color to the royal family in 1851, and many of his pictures are in their possession. Some of his best-known pictures are "Lady Godiva" (National Gallery, Sydney); "Canterbury Pilgrims," and "The Heiress" (British Museum). Among his portraits are those of the Princess Alice and the Prince Consort. He illustrated *Percy's Reliques, The Book of British Ballads*, etc.

COR'BULO, Gnæus Domitius (?–c.67 A.D.). A Roman general under Claudius and Nero; brother of Cæsonia, wife of the Emperor Caligula. In Nero's reign he conducted a successful campaign against the Parthians under Tiridates (61–63). His successes and his popularity excited the jealousy of Nero, who gave orders for his execution. Upon hearing the Emperor's orders, Corbulo committed suicide. His account of his experiences in Asia, which is mentioned by the Elder Pliny, has been lost. Consult Schoonover, *A Study of Cn. Domitius Corbulo* (Chicago, 1909).

CORCHORUS, kôr'kō-rŭs (Neo-Lat., from Gk. *κόρχορος, korchoros*, a wild plant of bitter taste). A genus of plants of the family Tiliaceæ, containing about 30 species, both shrubby and herbaceous, natives of the warm parts of the globe. *Corchorus olitorius* is widely diffused in tropical countries and introduced into America. It is an annual, with a smooth, more or less branching stem, varying in height from 2 to 14 feet or upward, according to soil and climate. It has smooth, stalked, alternate, oval, or ovate-lanceolate leaves, and small yellow flowers, solitary or in pairs. It is much used as a pot herb and is called Jews' mallow, from being much cultivated by Jews in Syria and other parts of the East. It is still more valuable for the fibre of its inner bark, as is also *Corchorus capsularis*, a species very similar, but distinguished by its capsule, which is short, globular, and wrinkled in *Corchorus capsularis* and elongated and slender in *Corchorus olitorius*. Both are much cultivated in India, yielding the greater part of the jute (q.v.) of commerce, and of the fibre employed in making gunny bags (q.v.). *Corchorus capsularis* is sometimes called Chinese hemp. *Corchorus silquosus* is a small American shrub, occurring from the West Indies southward. It is of little value. In Panama an infusion of its leaves is used instead of tea. See Colored Plate of Fibre Plants with article Hemp.

COR'CORAN, Michael (1827–63). An American soldier. He was born at Carrowkeel, Ireland, emigrated to the United States in 1849, and enlisted in the army. He rose to colonel in the regular service, and in 1860 was court-martialed for refusing to parade his regiment in honor of the Prince of Wales. Before he was sentenced the hostilities of the Civil War began. He was sent to the front, was wounded, and was taken prisoner at the first battle of Bull Run. Upon his exchange he was commissioned brigadier general in 1862 and organized the Corcoran Legion, which in 1863 checked the Confederate advance on Norfolk and was subsequently attached to the Army of the Potomac. He died as the result of a fall from his horse. Consult his book, *The Captivity of General Corcoran* (Philadelphia, 1864).

CORCORAN, William Wilson (1798–1888). An American financier and philanthropist, born in Georgetown, D. C. He was educated at Georgetown College, became an exchange broker in Washington, and in 1840 formed a partnership with George W. Riggs. At the time of the Mexican War he took a large part of the government loans and financiered them so skillfully as to lay the foundation of a large fortune which he used with munificence. He was the founder of the Louise Home for impoverished gentlewomen, the Oak Hill Cemetery at Georgetown, and the Corcoran Art Gallery, and made many liberal gifts to colleges and benevolent associations. Consult a sketch of his life called *A Grandfather's Legacy* (Washington, 1879).

CORCORAN ART GALLERY. An important public collection of painting, sculpture, and ceramics in Washington, D. C. Its nucleus was the private collection of William Wilson Corcoran, which he presented to the city of Washington in 1869 with an endowment fund of $900,000. It was opened to the public in 1874 and was originally situated on Pennsylvania Avenue, but in 1897 it was transferred to a new structure on Seventeenth Street, designed by Ernest Flagg in the Neo-Grecian style. The gallery contains, among other treasures, fine specimens of early American painters, an admirable collection of Barye bronzes, and the well-known "Greek Slave" by Hiram Powers. There is a free school of art connected with the institution, and biennial exhibitions of contemporary American painting contribute greatly to its usefulness. Consult Henderson, *The Art Treasures of Washington* (Boston, 1912).

CORCOVODA, kôr'kō-vō'dȧ (probably Peruvian in origin). A cranelike bird, known as the "white-backed trumpeter" (*Psophia leucoptera*) of Peru and the upper Amazon, closely related to the trumpeter (q.v.). It is domesticated and has some curious and friendly habits, described at length in *American Museum of Natural History Bulletin*, vol. ii (New York, 1887–90).

CORCY'RA. See Corfu.

COR'DA, August Karl Joseph (1809–49). An Austrian botanist, born in Reichenberg, Bohemia. At the age of 20 he published his *Monographia Rhizospermarum et Hepaticorum*, and in 1834 was made one of the keepers of the Museum in Prague. In 1847 he came to Texas, where he collected a large number of valuable botanic specimens; but on his voyage home, in 1849, he

was shipwrecked and drowned. His works include the following: *Icones Fungorum hucusque Cognitorum* (6 vols., 1837–54); *Prachtflora europäischer Schimmelbildungen* (1839); *Beiträge zur Flora der Vorwelt* (1845).

CORD'AGE (from *cord*, Fr. *corde*, ML. *corda*, Lat. *chorda*, from Gk. χορδή, *chordē*, string; connected with Lat. *haru-spex*, inspector of entrails). A name applied chiefly to the running rigging of a ship and to the rope of which the rigging is made. See RIGGING; ROPE.

CORDAITES, kôr'dā-ī'tēz (Neo-Lat. nom. pl., named in honor of A. J. Corda). A genus of fossil plants, of the family Cordaitæ, that shows intermediate characters between the conifers and the cycads. The genus appeared in Devonian time, reaching its maximum during the coal-measure period, when it was an important forest tree of the coal-swamp flora, and declined during the Permian. The tree grew to a height of 30 to 50 feet, with a trunk that branched freely, and it had dense foliage of parallel-veined leaves of lanceolate or linear form. These leaves are found in great abundance in some coal-measure shales, where they often lie packed in layers as do the fallen leaves of a modern forest. In the Middle Devonian of New Brunswick, Canada, a formation is called the "Cordaites shale," because of the number of Cordaites leaves it contains. The inflorescence of Cordaites was separate as in the cycads, and the male and female elements were arranged in catkins placed in the axils of the leaves. The fructification is nutlike, resembling somewhat that of the yew or that of *Cycas revoluta* (a cycad), and has been described under the names Cardiocarpum, Trigonocarpum, etc. The trunk had a large pith, which often decayed to form a cavity of which the casts, known as Artesiæ and Sternbergia, are found on the dumps of some coal mines. The wood of the trunk, described partly as Araucaroxylon, has a microscopic structure remarkably like that of the conifers. Consult H. Graf zu Solms-Laubach, *Fossil Botany*, pp. 104–122 (Oxford, 1891). See CARBONIFEROUS SYSTEM; CYCADACEÆ; CONIFERÆ.

CORDAY D'ARMONT, kôr'dâ' där'mäN', MARIE ANNE CHARLOTTE (1768–93). The assassin of Marat, generally known as CHARLOTTE CORDAY. She was born at Saint-Saturnin in Normandy. Her youth, passed in a convent, was spent in the reading of Plutarch, Rousseau, Raynal, Voltaire, and Corneille. Though she was noble by birth, she sympathized ardently with the cause of the Revolution in its early phases; but when the fall of the Girondists ushered in the Terror, she swung immediately to the opposite pole. She was convinced by Barbaroux that Marat and Robespierre were the enemies of France. To the fervent student of the classics the rôle of Brutus seemed a noble one, and she determined to save the nation by murder. Telling her father that she was bound for England, she journeyed to Paris (July 1, 1793), inquired there for the house of Marat, pretending to be the bearer of a message, and bought a knife on the way. Twice delayed, she found Marat at last in his bath, writing (July 13). He had asked that morning, in the *Ami du Peuple*, for 200,000 heads, and Charlotte told him she could give him those of the Girondists at Caen. As he was setting down the names she uttered, one by one, she drove the knife up to the hilt into his heart, then made a futile attempt to escape. Marat cried out, *"à moi, ma chère amie!"* and then died immediately; and the girl, quickly captured, and saved with difficulty from the mob, was taken to prison. Brought to trial and speedily condemned, she died calmly (July 17, 1793). Consult: Dubois, *Charlotte Corday* (Paris, 1838); Vatel, *Charlotte Corday et les Girondins* (Paris, 1872); *Bibliographie des femmes célèbres* (3 vols., Turin and Rome, 1892–1905); Defrance, *Charlotte Corday et la mort de Marat* (1909).

CORDEIRO, kôr-dā'ê-rō, JOÃO RICARDO (1836–82). A Portuguese dramatist. He was born in Lisbon and in 1863 became secretary in the Conselho de Beneficencia. He was the founder of the periodical *Futuro*. His reports on charitable work contain much of value concerning the problem of poverty. In 1877 he obtained a government position under the president of the ministry, Luciana de Castro. His plays include: *Fernando* (1857); *Amor e arte* (1860); *A sociedade elegante* (1862); *A familia* (1869); *Os paraizos conjugaes* (1882).

CORDELE'. A city and the county seat of Crisp Co., Ga., 65 miles south of Macon, on the Georgia Southern and Florida, the Seaboard Air Line, the Atlanta, Birmingham, and Atlantic, and the Georgia, Southwestern, and Gulf railroads (Map: Georgia, C 4). It is the commercial centre of a cotton-growing region, and manufactures cottonseed oil and lumber. There are a Carnegie library and a sanitarium. Cordele was settled in 1887 and is governed under a charter of 1904 which provides for a mayor, elected biennially, and a unicameral council. The water works are owned and operated by the municipality. Pop., 1900, 3473; 1910, 5883.

CORDE'LIA. In Shakespeare's *King Lear*, the youngest daughter of the King.

CORDELIERS, kôr'd'-lyâ (Fr., cord wearers), or Society of the Friends of the Rights of Man and of the Citizen. The name given in France to the most austere branch of the Franciscan Friars on account of the girdle of knotted cord they wore. After 1790 the name was applied to the members of a political club which assembled in the abandoned chapel of a Franciscan monastery and exercised great influence on the progress of the Revolution in Paris. Its leaders were men of various opinions, Danton, Camille Desmoulins, Marat, Hébert, and the picturesque Anacharsis Clootz. It drew its strength from the very lowest classes of Paris and always had an armed mob at hand ready for insurrections. The members of the Cordeliers were the first to demand a republic, vitalizing the motto "Liberty, Equality, Fraternity," and took a very prominent part in the events of the 10th of August, 1792, and chiefly contributed to the overthrow of the Girondists (q.v.). While the club was at the height of its influence, Desmoulins began the publication of his popular journal *Le Vieux Cordelier*. Later, the spirit of the Cordeliers became so violent as to out-Jacobin the Jacobins, and men like Danton and Desmoulins abandoned it. In 1794 the Cordeliers awakened the enmity of Robespierre. On March 24 and April 5 most of the leaders were guillotined, and the club practically came to an end. Consult Bougeart, *Projet d'organisation des Cordeliers* (Paris, 1870); also *Les Cordeliers, documents pour servir à l'histoire de la Révolution* (Caen, 1891).

CORD'ER, FREDERICK (1852–). An English musician, born in London. He studied at the Royal Academy of Music, London, gained the Mendelssohn scholarship in 1875, and, after

studying in Cologne under Ferdinand Hiller, returned to London and in 1880–82 was conductor of the orchestra at the Brighton Aquarium. In 1890 he became professor of composition at the Royal Academy of Music. He was one of the earliest English champions of the cause of Wagner, and, together with his brother Henry, translated the later music dramas of Wagner into English. His compositions include three operas, *Morte d'Arthur* (1877), *Philomel* (1879), *Nordisa* (1887); three operettas; the cantatas, *The Cyclops, The Bride of Triermain, Dreamland, The Sword of Argantyr;* several works for declamation with orchestra; two suites for orchestra, *In the Black Forest* and *Roumanian Suite;* two overtures, *Ossian* and *Prospero;* incidental music to Shakespeare's *Tempest,* Parker's *The Termagant* and *The Black Tulip.* He also wrote several works on the theory of music.

CORDE'RIUS, or **CORDIER,** kôr'dyā', MATHURIN (1479–1564). A French schoolmaster, especially skillful as a teacher of children. He taught in Paris, where he had as one of his scholars John Calvin, who dedicated to him the commentary on the *First Epistle to the Thessalonians.* Later he taught at Geneva, and died there. He wrote, besides philosophical works, a number of books for children, one of which, *Colloquiorum Scholasticorum Libri Quattuor ad Pueros in Latino Sermone Exercendos* (1564), appeared in numerous later editions and was translated into English and French.

CORD GRASS (*Spartina*). A genus of grasses having compound spikes, the species of which are found in wet places, many of them in salt or brackish tide marshes. The spikelets are arranged on one side and have only one perfect floret and very unequal glumes. The species are perennial, rigid, from creeping rootstocks, and have long, tough leaves; hence the name "cord grass." *Spartina stricta,* found in muddy salt marshes on the east and southeast coasts of England, and in America, although remarkable for its extreme stiffness and rigidity of habit, is used for making ropes on account of the toughness of its fibre. *Spartina cynosuroides* and *Spartina patens* are common in the United States, the former along the ocean and lake shores from Maine to the Pacific; the latter species is common in salt marshes, and this and *Juncus gerardi* furnish the best of the marsh hay. *Spartina cynosuroides* has been successfully used in the manufacture of twine and paper.

COR'DIA'NI. See SANGALLO.

CORDIER, kôr'dyā', HENRI (1849–). A French Orientalist, born in New Orleans. He studied in France and England and in 1869–76 lived in China. He became professor of the School of Political Science in Paris in 1886, and professor of history, geography, and Eastern legislation at the School of Living Oriental Languages. He wrote on China for *La Grande Encyclopédie.* His works include *Bibliotheca Sinica,* a bibliography of the Chinese Empire (1878–95); *La France en Chine* (1882); *Recueil de voyages et de documents pour servir à l'histoire de la géographie depuis le XIIIe siècle jusqu'à le fin du XVIe siècle* (1882–85); an *Atlas sino-coréen* (1896); *Histoire des relations de la Chine avec les puissances occidentales, 1860–1902* (3 vols., 1901–02); and *L'Expedition de Chine de 1857–58* (1905).

CORDIER, MATHURIN. See CORDERIUS.

CORDIÈRE, kôr'dyâr', LA BELLE (Fr., the beautiful ropemaker). A nickname of the poetess Louise Labé, wife of Perrin, a ropemaker.

CORDIERITE, kôr'dī-ēr-īt. See IOLITE.

CORDILLERA, kôr'dĭl-yā'rȧ. The great system of elevations that extend along or near the Pacific coast of North and South America from northern Alaska to Cape Horn. The Cordillera of North America includes the mountain ranges in Mexico, the Rocky Mountains, the Sierra Nevadas, the Coast and Cascade ranges in the United States, and the several ranges in British Columbia and Alaska. The whole western part of the continent traversed by these ranges is commonly called the "Cordilleran region." In South America the term is sometimes used as a synonym for the Andes, or the two may be united, i.e., Andean Cordillera, and is also applied to definite portions of the Andes, as in Colombia, where the three mountain ranges are known as the Eastern, Central, and Western Cordilleras. The term, originally Spanish, is used in America by geographers to signify an extensive system of elevations. See AMERICA; ANDES; ETC.

CORD'ITE (from *cord,* because it is made in the form of a cord instead of being granulated). A form of smokeless gunpowder used in England and some other countries. The original cordite was composed of 58 parts of nitroglycerin, 37 parts of nitrocellulose, and 5 parts of vaseline. It gave excellent ballistic results per unit of weight and volume of space occupied but it caused excessive erosion of the bore of guns using it. Moreover, at temperatures of over 90° F., there was an exudation of nitroglycerin and this could be readily detonated. These defects resulted in its condemnation. The next type devised was called Cordite, M. D., and carried less than 30 per cent of nitroglycerin, with a corresponding increase of nitrocellulose. The latest type is said to contain about 15 per cent of nitroglycerin and over 80 per cent nitrocellulose. In preparing cordite the nitrocellulose is dissolved in a solvent, incorporated with the other ingredients, and the solvent evaporated. While still in a plastic state it is pressed through holes in a plate which form it into a cord of any size desired. Cordite is very easy to handle as the charges are put up in bundles of convenient length. In its early form it required a powder chamber very much smaller than that necessary for a charge of pure nitrocellulose of equal power. When its excessive erosion was fully realized the nations using it were unable to turn at once to pure nitrocellulose as the chambers of their guns were too small. They have therefore been gradually reducing the amount of nitroglycerin and increasing the chamber capacities of their new guns so that both old and new pieces could use the same powder. Very few guns designed for the original type of cordite are now in existence except on unimportant ships. See EXPLOSIVES; SMOKELESS POWDER; GUNS, NAVAL.

CÓRDOBA, kôr'dō-bȧ, or **COR'DOVA.** The flourishing capital of the province of the same name in Argentina, on the Río Primero, a tributary of the Paraná, northwest by rail 246 miles from Rosario and 535 from Buenos Aires (Map: Argentina, E 10). It is situated at an elevation of about 1200 feet, and is regularly laid out and well built, except on the surrounding heights, which are inhabited mostly by the poorer classes. The city has a fine park, or

promenade, and plazas, in the principal of which is situated the cathedral, an imposing structure of composite architecture with a fine cupola, dating from the seventeenth century. A massive Jesuit church, the fine old government house, and the national observatory are worthy of mention. Among the educational institutions are the university—founded by the Jesuits in 1613, thus ranking in age next to that of Lima—a national college, two national normal schools, an episcopal seminary, and a public library. Other features of Córdoba comprise a well-equipped general hospital, asylums for orphans and the poor, etc. The city is an episcopal see. Though a part of the surrounding country is rendered fertile only by irrigation, Córdoba is an important commercial centre, owing to its geographical position. Live stock, wool, and hides are the chief exports of the vicinity, and beds of calcite are worked. The city has some industrial interests, principally manufactures of building material, lime, bricks, and flour. About 12 miles above the city a great dam stretches across the Río Primero; this insures a water supply and furnishes irrigation and power for an electric light and power plant. The population, which is increasing, was about 62,000 in 1900 and 95,000 in 1910. Córdoba was founded in 1573 by Luis Gerónimo de Cabrera. The vicinity had been visited some 30 years before by an officer of Pizarro. The town became the capital of the Spanish Intendencia of Tucumán, and rose to prominence as an educational centre and as the headquarters of the Jesuits in that region. It suffered to some extent in the revolutionary struggles. In 1871 Córdoba was the seat of the first national exposition of Argentina. The Province of Córdoba, of which the city is the capital, has an area of 62,000 square miles and a population of approximately 500,000. The atmosphere of Córdoba is scholastic, and the city, unlike other large Argentine towns, is of special interest as an academic and scientific centre. The national meteorological station here supplies the time for Argentina.

CÓRDOBA. A town of Mexico, in the State of Vera Cruz, on the railroad to the city of Mexico (Map: Mexico, L 8). It manufactures woolen and cotton goods and has a trade in sugar and coffee. It is famous for its scenic attractions. Pop., 1900, 8136; 1910, 9600.

CÓRDOBA, Francisco Fernández de. See Fernández de Córdoba, Francisco.

CÓRDOBA, Gonsalvo de. See Gonsalvo de Córdoba.

CÓRDOBA Y FIGUEROA, ā fē'gā-rō'ä, Pedro de (1692–c.1770). A Chilean historian, born at Concepcion. He entered the army in 1725. In 1739 by order of President Velasco, he founded Los Angeles, the capital of Araucania. About 1745 he wrote a history of Chile from the conquest until 1717. It has been published in the *Colección de historiadores de Chile.*

CÓRDOBA Y VALCÁRCEL, Fernando Fernández de. See Fernández de Córdoba y Valcárcel, Fernando.

COR'DON (Fr. *cordon,* from *corde,* cord). A military term for a line of sentries, posted within view of each other, and designed to prevent forbidden contact or communication between one side of the line thus guarded and the other. When large separate bodies of troops are so disposed as practically to shut in a section of country, they are spoken of as a "cordon of troops." Country inclosed by a series or system of blockhouses, as in South Africa under General Kitchener (1901), is described as "cordoned." A cordon instituted to prevent contagion from an infected place or district is a *cordon sanitaire.*

CORDON. A system of training by which a plant that is naturally diffusely branched is dwarfed to one or two stems in order to induce large fruits. Trees trained as cordons with two stems are usually carried horizontally in opposite directions about 18 inches from the ground. Single-stem cordons are carried obliquely, horizontally, or vertically, the laterals of such branches being kept spurred. Any plant which bears its fruit upon spurs will therefore lend itself to this style of training. In parts of Europe fruit trees are frequently trained, by a series of superimposed cordons, on the walls of houses or other buildings.

CORDON BLEU, kôr'dôN' blē (Fr., blue ribbon). Knights of the ancient French Order of the Saint Esprit, or Holy Ghost, were so called because the jewel of the order was suspended on a blue ribbon. In late times the term was degraded to mean a "first-rate cook." The *cordon grand* is any member of the Legion of Honor, the decoration being suspended by a ribbon.

CORDOVA. See Prince William Sound.

CORDOVA, kôr'dō-vä, or **CÓRDOBA,** kôr'-dō-bä (Lat. *Corduba,* from Phœnician *Kartatuba,* Great City). A city of Spain and capital of the Province of Córdoba, situated on the Guadalquivir, 120 miles by rail north of Málaga (Map: Spain, C 4). It lies at an altitude exceeding 390 feet at the base of the Sierra de Córdoba. In appearance the city is less characteristically Moorish than might be supposed, its aspect being one rather of heterogeneity arising from the conglomerate architecture of various periods; it retains but few marks of the Saracen period and but faintly recalls the grandeur of the former metropolis of Mohammedan Spain. The streets are with few exceptions narrow and crooked, and the houses gloomy. The finest edifice is the cathedral, once the chief mosque of the "Infidels" and one of the most splendid examples of Moorish architecture. Together with the court, it occupies a site 570 feet by 425 feet, with a bell tower 300 feet in height. It is surrounded by a wall with strong buttresses and was originally both mosque and fortress. The interior is almost a labyrinth of pillars, for they number some 850, in various styles and mostly of marble, porphyry, and jasper. The building has suffered considerably through the changes of different epochs, made in the endeavor to convert the mosque into a Christian cathedral. A short distance from the cathedral, to the south, stands the marble triumphal column, erected 1765, of San Rafael, the patron saint of Córdoba. Among the Moorish remains are the ruined city walls, part of the Alcâzar, and the old bridge of 16 arches, 730 feet long, connecting Córdoba with its suburb, Campo de la Verdad. The bridge, originally built by the Romans, was reconstructed on the same foundations by the Saracens. Córdoba contains a large number of churches and convents, a bishop's palace, a theatre, and a bull ring. The educational institutions include a lyceum, a theological seminary, a veterinary school, and a library.

Once a great centre of commerce, Córdoba is

in a state of decline. The railroad connection with Seville, Málaga, and Madrid brought in a little new life, but Córdoba is still a city of the Middle Ages. There are manufactures of leather (the celebrated "Cordovan" leather), liquors, hats, cloth, silk, and paper, besides the ancient silver-filigree industry for which Córdoba has long been famous. Iron is mined in the vicinity. Pop., 1900, 58,275; 1910, 65,160.

Córdoba is said to have been founded by the Phœnicians, but was acquired 152 B.C. by the Romans. It rose to be the second city of Spain, the seat of a prætor, and a supreme tribunal. Taken by the Goths in the sixth century, it fell in 711 into the hands of the Saracens. At first it was subject to the Caliphate of Damascus, but in 756 the city became independent under 'Abderrahmân I, the founder of the dynasty of the Omayyades, whose rule continued till 1031 and embraced all Mohammedan Spain. From 912 to 961 it was the capital of the Caliphate of Córdoba, and the metropolis of Moorish Spain, rivalling in splendor the Eastern Caliphate of Bagdad. From the ninth century to the twelfth Córdoba was one of the greatest centres of commerce in the world. According to Arabian historians the city at the height of its splendor contained 200,000 houses, 1,000,000 inhabitants, 600 mosques, 80 institutions of learning, and a public library with 600,000 volumes. Such accounts are doubtless exaggerations, but certainly when all was dark over the rest of the Occidental world Córdoba held aloft the light of civilization. After the fall of the caliphate the decline was rapid; the city was taken by Ferdinand III of Castile in 1236. Córdoba was plundered by the French under Dupont in 1808. It is the birthplace of the two Senecas, the poet Lucan, and the philosopher Averroës.

COR'DOVAN, or CORDUAM. Originally a Spanish leather prepared from goatskins or split horsehide, and used throughout Europe during the Middle Ages for the boots of the wealthy. It was originally made by the Moors of Cordova. The modern application of the term is to a grain leather from the best and strongest portions of a horsehide and used for heavy boots, as for walking or hunting.

CORDUBA. See CORDOVA.

COR'DUROY (probably for Fr. *corde du roi*, king's cord). A cotton material having a cut pile like velvet, but with the surface ribbed. The gut which separates the ribs was produced by binding the pile weft to the cloth, but these ribs are now cut on the face of the fabric by a special form of knife operated at regular intervals during weaving. Cotton corduroy is woven upon a plush loom. See FUSTIAN.

CORDUROY ROAD. A road built of straight logs, round or split, laid side by side across the roadway. Such roads are used in swampy ground, where they make travel, particularly in the rainy season, less difficult.

The logs are laid on a level foundation of natural soil, and placed together as close as possible to avoid big joints. They may be left loose or secured in position by two stringers, parallel to the axis of the road, which are spiked down to the logs. Sometimes the joints are filled with wooden wedges to reduce the shock to passing vehicles.

COR'DUS, CREMUTIUS. A Roman historian, who in 25 A.D. was, according to Tacitus (*Annales*, iv, 34, 35), accused before Tiberius of having praised Cæsar's assassin, Brutus, and of having termed Cassius the "last of the Romans." The true cause for this accusation, however, was his free expression of opinion regarding Sejanus, the influential minister of Tiberius (q.v.). Having pronounced an apology, he starved himself to death. Of his works, one of which was a history of the period 43–18 B.C., only a few fragments remain, preserved in the *Suasoriæ* of Seneca. Consult Rathlef, *De Cremutio Cordo* (Dorpat, 1860); H. Peter, *Die Geschichtliche Literatur über die Römische Kaiserzeit* (1897).

COR'DYLINE. See TI.

CORE (OF. *cor*, Fr. *cœur*, from Lat. *cor*, heart). 1. In masonry, the inner portion of any heavy part of the structure, such as pier, buttress, main wall, etc., which is not visible, but is covered with a sheathing or surface of another material. Roman buildings have a concrete or rubble core, with a facing of brick or coursed-stone construction, sometimes of marble slabs or stucco. In mediæval structures the core is sometimes of brick, oftener of rubble, with facing of cut stone. In modern work, especially in America, the core, or backing, is generally of brick, even in buildings externally of cut stone. Concrete is now coming into more frequent use to form the core of buildings externally faced with brick or stone. (See MASONRY.) 2. The mold by which the interior of a hollow casting is shaped. 3. The cylindrical mass brought up by a hollow drill in boring through strata of earth and rock.

COREA. See KOREA.

COREAL, kō'rā-äl', FRANCISCO. Probably the pseudonym of an author who in 1722 published a book entitled *Voyage aux Indes*. According to the statements of the author, he was born in Cartagena, Spain, in 1648 and spent more than 30 years in travel, chiefly in the Caribbean region and in South America. The work passed through several editions, one of the most important of these being published in Brussels in 1736. The numerous errors which it contains and the doubts which have been cast upon its authenticity justify the belief that it was a pseudonymous publication.

COREL'LI, ARCANGELO (1653–1713). An eminent Italian violinist and composer, surnamed *Il Divino*. He was born at Fusignano, near Bologna, and studied in Rome under Bassani and Matteo Simonelli. He is said to have been in Paris in 1672 and subsequently passed several years in Germany in the service of the Elector of Bavaria. In 1681 we find him settled in Rome, where he found a generous patron in Cardinal Ottoboni, and soon acquired fame as a virtuoso, teacher, and composer. According to Georg Muffat, he is the originator of the *concerto grosso* (q.v.). He was especially admired for the beauty of his tone and expressive execution and laid the foundation for the development of superior violin technique. His compositions rank among the best of his time and continue to this day models of classical study in instrumental music. The finest and most famous among them are 12 *Concerti grossi*, op. 6. His complete works were edited by Joachim.

CORELLI, MARIE (1864–1924). An English novelist, whose talent ran to the romantic, sensational, and melodramatic. The adopted daughter of Charles Mackay, of English and Italian parentage, she was born in Italy and was educated in London and in France. *The*

Romance of Two Worlds and *The Vendetta* (1886) made her reputation, and many successes followed these two books. Secure in popular favor, she early came to regard with disdainful pity the severe literary criticism that cavalierly dismissed her from serious consideration. She made Stratford-on-Avon her home. Miss Corelli's books, all showing the real story-teller's gift, include: *Thelma* (1887); *The Sorrows of Satan* (1895); *The Mighty Atom* (1897); *The Master-Christian* (1900); *Temporal Power* (1902); *God's Good Man* (1904); *Woman or Suffragette* (1907); *Holy Orders* (1908); *The Devil's Motor* (1910); *Ziska, the Problem of a Wicked Soul* (1911); *The Strange Visitation* (1912).

CORENTYN, kō'rĕn-tĕn' (Dutch *Corantyn*). A river of Guiana, South America. It rises near the boundary of Brazil, flows in a northerly direction, and empties into the Atlantic. Throughout its length it forms the boundary line between British and Dutch Guiana (Map: Guiana, F 3). It is navigable for a distance of over 40 miles for large steamers, while light vessels can ascend as high as 170 miles from its mouth, where navigation is interrupted by cataracts, which occur at a number of points on its middle and upper course. Its total length is about 400 miles.

CO'REOP'SIS (Neo-Lat., from Gk. *κόρις, koris,* bedbug + *ὄψις, opsis,* appearance). An herbaceous annual or perennial plant of the family Compositæ, nearly all natives of eastern North America, and popularly known as tickseed, the fruit being in the shape of a small tick. It is often raised for its showy yellow or rose-purple flowers with yellow or brown disks. The perennials are grown in hardy borders; the annuals in the garden in almost any soil. For illustration, see Plate of CRANBERRY.

CORESPONDENT. See DIVORCE.

COREY, WILLIAM ELLIS (1866–). An American capitalist and steel manufacturer, born in Braddock, Va., and educated at Duff's College, Pittsburgh. When 16 years old, he entered the chemical laboratory of the Edgar Thomson Steel Works, and five years later he went into the Homestead Steel Works, where, in 1889, he became superintendent of the plate mill, in 1893 superintendent of the armor-plate department, and in 1897 general manager (succeeding Charles M. Schwab). From 1901 to 1903 he was president of the Carnegie Steel Company and from the latter year to 1911 president of the United States Steel Corporation. He was one of the circle of men associated with Andrew Carnegie in the development of his great steel industries.

CORFE (kôrf) **CASTLE.** A village of Dorsetshire, England, in the middle of Purbeck Isle or Peninsula, 24 miles east-southeast of Dorchester (Map: England, D 6). In the vicinity are stone and marble quarries, and clay works for potteries. Pop. (parish), 1901, 1440; 1911, 1406. The ruins of a castle, giving the name to the village, stand on a neighboring hill. Founded in the tenth century, it was long one of the strongest fortresses in the kingdom. Here King Edward the Martyr was murdered by his stepmother, Elfrida, in 979, and King John, during his disputes with his barons, kept his regalia here for safety. In 1642 Lady Bankes defended the castle for six weeks against Charles I. It was dismantled by Fairfax in 1645. Consult T. Bond, *History and Description of Corfe Castle* (London and Bournemouth, 1883).

CORFLAM'BO. In Spenser's *Faerie Queene,* a giant representing licentiousness.

COR'FU (Gk. *Κόρκυρα, Korkyra,* or *Κέρκυρα, Kerkyra,* Lat. *Corcyra*). The most northerly of the Ionian Islands (q.v.), in lat. 39° 20′ to 39° 50′ N., long. 19° 40′ to 20° 10′ E. (Map: Greece, A 2). It has a length of about 38 miles, with a breadth varying from 3 or 4 to 20 miles. Area, 275 square miles. Pop., 1907, 99,571. Like the rest of the Ionian Islands, it is mountainous, and the mountains are generally naked and dry, the highest summit, Pantokrator, being about 3000 feet above the sea. The valleys, however, are very fertile, and yield olive oil, wine, honey, oranges, figs, etc. Salt is also produced in some quantity. The climate is generally mild and healthful. The principal town, Corfu, on the east, situated on an elevation, has some good streets and a fine esplanade. It has (1907) 28,254 inhabitants and a considerable trade. It is the seat of a Greek archbishop and of a Catholic bishop. The early history of the island is purely mythical; the later inhabitants identified it with the Homeric Scheria (Phæacia). About 734 B.C. the Corinthians are said to have colonized the island, which, however, soon attained such wealth and maritime power as to assert its independence. After the Persian wars, in which Corcyra took no part, a further dispute with Corinth led the Corcyreans to ally themselves with Athens (435 B.C.), and the intervention of the latter city was one of the factors which contributed to the outbreak of the Peloponnesian War. Internal dissensions and varying foreign control marked the history of the island until it was taken under Roman protection in 229 B.C. During the greater part of the Middle Ages it belonged to the Byzantine Empire; later, it passed into the possession of the Venetians, who held it, in spite of two fierce attacks by the Turks, until 1797. Since that time Corfu has shared the fortunes of the other Ionian Islands. At present it forms, with some minor islands, a nomarchy of Greece. Consult: Riemann, *Corfou* (Paris, 1879); Partsch, *Die Insel Korfu* (Gotha, 1887); Schmidt, *Korkyräische Studien* (Leipzig, 1890).

CORI, kō'rē. A city in the Province of Rome, central Italy, 36 miles southeast of Rome (Map: Italy, G 6). Important to the antiquarian are the huge polygonal blocks that formed the walls of the ancient Cora—a city that was an early member of the Latin League and that had for traditional founder the Trojan Dardanus, or Coras; also the ruins of a temple of Castor and Pollux, an old bridge, the churches of Sant Olivia and San Pietro, and of a so-called temple of Hercules. Its chief trade is in tobacco, oil, and southern fruit. Pop. (commune), 1881, 6300; 1901, 6709; 1911, 7308. Consult G. B. Piranesi, *Antichita di Cora* (Rome, 1770), and A. Nibby, *Analisi della carta dei dintorni di Roma* (Rome, 1848).

CO'RIAN'DER (Lat. *coriandrum,* Gk. *κορίαννον, koriannon, κόριον, korion,* coriander, possibly from *κόρις, koris,* bedbug, referring to the smell of the leaves), *Coriandrum sativum.* An annual or biennial plant of the family Umbelliferæ, with branching stem, 1 to 2 feet high, the lower leaves bipinnate, the upper leaves more compound, divided into very narrow divi-

sions, and with globose fruit. It is a native of the south of Europe and of the East and has long been cultivated for the sake of its fruit. It has thus become naturalized in some parts of England and the United States, where its fruit, coriander seed, is much less used than in Germany and some other European countries. The whole plant, when fresh, has a very offensive smell, due to an essential oil, but the ripe and perfectly dry fruit has an agreeable aromatic smell and a sweetish aromatic taste. It is used in medicine as a carminative and in domestic economy as an aromatic, being very often mixed with bread in the north of Europe; spirituous liquors are flavored with it; and confectioners cover it with sugar, to make a well-known kind of confection. In the south of England it is common to sow coriander and caraway together, the coriander yielding a crop in the first year and the caraway in years following. Coriander delights in a rich soil and is much cultivated and used in India. It is little used in the United States.

CORIGLIANO CALABRO, kō'rē-lyä'nō kä-lä'brō. A city in the Province of Cosenza, south Italy, 4 miles from the Gulf of Taranto and 70 miles southwest of Taranto (Map: Italy, L 8). It has a castle and an aqueduct, and markets a high quality of manna from the ash trees of the surrounding country, as well as some oil. It was destroyed in 1806 by the French. Pop. (commune), 1881, 13,272; 1901, 13,320; 1911, 16,338.

COR'IN. In Shakespeare's *As You Like It*, a shepherd who offers his services to Rosalind and Celia.

CORIN'NA (Gk. Κόρινν*α*, *Korinna*). A Greek lyric poetess, nicknamed "The Fly" (Μυ*ία*, *Myia*), famous alike for her beauty and for her genius. She was born at Tanagra, in Bœotia. She was an elder contemporary of Pindar and, according to tradition, his rival. Ælian and Suidas speak of her five victories over him, and Pausanias saw at Tanagra a picture of her wearing about her head a fillet of victory, which he supposes she gained in a contest with her younger rival. Her poems were all in the Bœotian dialect. The older fragments were edited by Bergk, *Poetæ Lyrici Græci* (Leipzig, 1900); Smyth, *Greek Melic Poets* (London, 1900). In 1907, in a papyrus of the second century A.D., were found considerable remains of two poems attributed to Corinna. Consult *The Year's Work in Classical Studies* (for 1907), and Edmonds, *New Fragments of Corinna* (1910).

CORINNA. 1. A name given by Dryden to Mrs. Elizabeth Thomas, with whom he had a correspondence. She afterward made the acquaintance of Curll, the notorious publisher, and furnished him with a selection of letters interchanged between herself and Dryden. They were probably fictitious. 2. The daughter of Gripe in Van Brugh's comedy *The Confederacy*.

CORINNE, OU L'ITALIE, kô'rēn' o͞o lē'-tä'lē' (Fr., Corinna, or Italy). The most important novel of Madame de Staël, published in 1807, named from its heroine, who pines and dies after her lover proves false.

COR'INTH (Gk. Κόρινθ*ος*, *Korinthos;* said to have been called in early times "Ephyra"). An ancient city of Greece, situated at the south end of the isthmus connecting the northern division of Greece with the Peloponnesus. Its citadel was the Acrocorinthus, an isolated hill 1886 feet high, with precipitous sides, commanding one of the finest views in Greece. At the northern foot of this hill lay the city of Corinth, on a broad terrace nearly 200 feet above the level of the isthmus. In the Homeric epic Ephyra is mentioned as the home of Sisyphus and Bellerophon (see also MEDEA), but the city does not seem to have played a great part in the heroic age, and appears in dependence upon the rulers of Mycenæ, with which place it was connected by a very early system of roads. Discoveries of pre-Mycenæan pottery in graves show that there was a settlement at the foot of the Acrocorinthus in very early times, but as yet few remains of the Mycenæan age have come to light. The growth of the city seems to have occurred after the Dorian conquest of the Peloponnesus and to have been especially favored by the development of intercourse with the West; for this its situation with harbors on both the Corinthian and the Saronic gulfs gave it peculiar advantages, which were further enhanced by alliances with Samos and Chalcis on Eubœa, and by the building of an arrangement by which vessels could be hauled across the isthmus. By the end of the eighth century B.C. Corinth was the chief trading city of Greece, and the extent of its trade is shown by the number of Corinthian vases found in Italian graves as well as by the testimony of ancient writers. Among the colonies founded by Corinth at this period were Syracuse and Corcyra (See CORFU). The government was a strict oligarchy under the leadership of the family of the Bacchiadæ, but when, early in the seventh century B.C., Corcyra successfully maintained her independence of the mother city, a revolution occurred, and Cypselus became tyrant (c.657 B.C.). Under his rule and that of his son, Periander (q.v.), the prosperity of the city increased, Corcyra and Epidaurus were reduced, and the establishment of Potidæa on the northern coast of the Ægean gave Corinth a share in the rich trade of Macedon and Thrace. About 582 the tyrants were overthrown, and a moderate oligarchy established, which seems to have remained the usual form of government, though occasionally interrupted by democratic revolutions. With the other cities of Peloponnesus (except Argos), Corinth became a member of the Lacedæmonian League and played a large part in the Persian wars. The great development of Athenian power was a serious blow to the commercial interests of Corinth; accordingly we find the city active in promoting the Peloponnesian War. (See CORFU.) After the fall of Athens the Corinthians became jealous of the Spartan rule and formed an alliance with Thebes and Athens, which led in 395 to the Corinthian War. Later, Corinth returned to the Spartan alliance and supported the city in the war waged with the Thebans under Epaminondas. Three years after the battle of Chæronea (338) it was garrisoned by the Macedonians, who held it until 196, with the exception of 242–223, when it was occupied by Aratus (q.v.) for the Achæan League. When the freedom of Greece was proclaimed by the Romans, Corinth was restored to the Achæan League. Having become the centre of the last uprising of Greece against the Roman power, it was utterly destroyed (146) by L. Mummius, the Roman general, and for a whole century it continued in ruins. In 46 B.C. Julius Cæsar rebuilt it, and it afterward became the capital of the Roman Province of Achaia; al-

though it never again attained its early importance, it became both prosperous and powerful. St. Paul planted a Christian church here, to which he addressed two epistles. In 1458 A.D. it was conquered by the Turks under Mohammed II, was taken by the Venetians in 1687, and retaken by the Turks in 1715, who held it till 1823. Reduced to ashes in the Greek Revolutionary War, and again utterly destroyed by an earthquake in 1858, Corinth is now rebuilt in a more convenient position on the shore of the Gulf of Corinth. Ancient Corinth was surrounded by walls, having a circuit of about 4½ miles, or, including the Acrocorinthus, of 8 miles. It had two harbors—*Lechæum*, on the Gulf of Corinth, and *Cenchreæ*, on the Saronic Gulf, opening into the Ægean. The former was connected with the city by two parallel walls. The wealth and prosperity of Corinth made it the seat of luxury and licentiousness. Besides the sea deities Poseidon and Amphitrite, Aphrodite claimed a large share in the religion of the city, and her temple alone is said to have had 1000 courtesans as sacred slaves. The Corinthian *hetæræ* were famous throughout Greece. In the earlier period Corinth was noted for its work in clay and bronze, and even in later times "Corinthian bronze" was almost as precious as gold. Though devoted to art, and filled with costly paintings and statues at the time of its capture by Mummius, the city does not occupy a prominent place in either art or literature, and but few Corinthians except Periander and Timoleon appear among the famous names of Greece. Before 1896 the chief remains of ancient Corinth were the foundations on the Acrocorinthus and the seven columns of a very early Doric temple, probably of the time of Periander. In 1896 excavations were begun by the American School of Classical Studies at Athens, and although few works of art or inscriptions have been found, the discoveries have furnished a sure basis for the topography of the ancient city, of which the traveler Pausanias (q.v.) gives a detailed description. The chief sites determined are the Theatre, the Fountains of Pirene and Glauce, the road to Lechæum, the Propylæa, and the Agora to which it led, and the identification of the old temple with the Temple of Apollo. The mediæval walls are still in a fair state of preservation. Consult: E. Curtius, *Peloponnesos* (Gotha, 1851–52); Wilish, *Beiträge zur inneren Geschichte des alten Korinth* (Zittau, 1887); id., *Geschichte Korinths von den Perserkriegen bis zum dreissigjährigen Frieden* (Zittau, 1896); these pamphlets contain also a bibliography of Corinthian history. The reports of the American excavations are published in the *American Journal of Archæology* (2d series, New York, 1897 et seq.). For a popular account, consult Richardson, in the *Century Magazine* (New York, 1899) and Cooley, in *Records of the Past*, vol. i (Washington, 1902).

CORINTH, or NEW CORINTH. An episcopal city and seaport of Greece, situated on the north coast of the Isthmus of Corinth, 3½ miles northeast of the ancient city (q.v.) and 1½ miles southwest of the northern terminus of the Corinth Canal (Map: Greece, D 4), and about 55 miles west of Athens. The town was founded in 1858 after the destruction of the vestiges of old Corinth by an earthquake. It is wholly modern and has a good harbor. It has been prospering since the Corinth Ship Canal was opened in 1893. Among its exports are oil, honey, silk, corn, and currants. It is the capital of the District of Corinth. Pop., 1896, 4188; (commune) 12,567; 1907, 5340; (commune) 14,867.

CORINTH. A city and the county seat of Alcorn Co., Miss., near the Tennessee border, 93 miles east-southeast of Memphis, Tenn., on the Southern, the Illinois Central, and the Mobile and Ohio railroads (Map: Mississippi, J 1). It contains a national cemetery, a park, and a museum. There are machine shops, and manufactories of spokes, lumber, etc. The water works are owned by the city. Pop., 1890, 2111; 1900, 3661; 1910, 5020.

At the outbreak of the Civil War Corinth, being at the junction of the Mobile and Ohio Railroad running north and south and of the Memphis and Charleston running east and west, became a point of great strategic importance. It was fortified by the Confederates, and immediately after the battle of Shiloh (April 6, 7, 1862) General Beauregard with 50,000 men retreated thither, followed by General Halleck at the head of a force of over 100,000 men. Halleck advanced with great caution, being more than a month in covering a distance of only 23 miles, and when he approached Corinth, Beauregard, after slight skirmishes, quietly evacuated the place during the night of May 29, Halleck taking possession the following day. On Oct. 3, 4, 1862, a force of 22,000 Confederates under Generals Van Dorn and Price attempted to recapture the place, then defended by General Rosecrans with 20,000 troops. But the assailants, notwithstanding the heroic valor displayed, were repulsed with great loss. The Union loss was 315 killed, 1812 wounded, and 232 missing, while that of the Confederates (estimated) was 592 killed, nearly 2000 wounded, and 2225 prisoners.

CORINTH, GULF OF, or GULF OF LEPANTO. An arm of the Mediterranean extending from west to east through the centre of Greece and dividing the Peloponnesus from the northern mainland. The outer portion extends from the promontory of Araxus (now Kalogria) in Achæa to the narrow strait (1¼ miles) between Rhion and Antirrhion (south and north shores); the inner portion stretches from this point to the isthmus, a distance of about 80 miles. The gulf has the appearance of an inland lake, and the scenery is remarkably attractive, since the shores show striking contrasts of rocky promontories and fertile plains, while the background is everywhere marked by lofty mountains. The narrow neck of land which separates the Gulf of Corinth from the Saronic Gulf and unites the Peloponnesus to the mainland is called the Isthmus of Corinth. (See ISTHMUS.) It is about 10 miles in length, and about 4 miles in width at its northern extremity, near Mount Geraneion. In ancient times a wall was built across the isthmus to prevent invasion from the north. On the Saronic Gulf, at the point where this wall terminated and where the Isthmian games were celebrated, is situated the modern town of Isthmia. Excavations by the French School in 1883 brought to light remains of the ancient sanctuaries and houses on a fortified hill; near by are scanty ruins of the old Stadium. The isthmus is pierced by a canal, completed in 1893. See CORINTH CANAL.

CORINTH CANAL. The construction of a canal across the Isthmus of Corinth was begun by Nero, but the undertaking proved too vast and

was abandoned. In 1881 a French company obtained a concession to construct such a canal, and in 1882 work was begun. In 1889 the work was transferred to a Greek company and was brought to completion by Matsas, a Greek engineer, in 1893. The canal, uniting the Gulf of Corinth with the Saronic Gulf, shortens the journey from the Adriatic to the Piræus by 202 miles. It is 4 miles long, 70 feet wide, and 26 feet deep. The difficulties of navigation, however, in the Corinthian and Saronic gulfs have led large steamships to prefer the longer voyage around Cape Malea. At its western extremity a new town, Poseidonia, has sprung up, and at its eastern end is the modern town of Isthmia.

CORIN'THIAN ORDER. The latest developed and most elaborate of the three orders of Greek architecture. See COLUMN; ORDERS OF ARCHITECTURE.

CORINTHIANS, EPISTLES OF PAUL TO THE. The two writings in the New Testament addressed by Paul to the church at Corinth represent what remains of a larger body of correspondence between Paul and this church, which he had founded in 51 A.D. Paul left the young church of Corinth in a flourishing condition the next year (52 A.D.) and soon after, in 53, began his great missionary work in western Asia Minor with headquarters at Ephesus (Acts xix). In the meantime the church at Corinth had been visited by the eloquent Apollos (Acts xviii. 24–xix. 1) and probably by other prominent Christian evangelists. It grew rapidly in numbers and complexity of membership. Divergent views appeared, a disputatious and divisive spirit was manifested, and some members were even guilty of serious immorality.

Sometime in 55 Paul sent Titus to Corinth to ask the church there whether it would be willing to contribute to the great collection he was planning for the poor brethren in Judæa (2 Cor. viii. 6, 10 f., 16 ff.; ix. 1 ff.). Titus was well received, but may have reported the case of immorality to Paul on his return. This was probably the reason why Paul wrote the letter referred to in 1 Cor. v. 9. This letter is now lost.

Somewhat later Paul sent Timothy, by a roundabout route, to Corinth (1 Cor. xvi. 10 f.), but before his arrival there a deputation from the church of Corinth had arrived at Ephesus (1 Cor. xvi. 17 f.) with a letter from the church asking advice on a number of matters. It was this letter and the information Paul received from the members of the deputation and from others (cf. 1 Cor. i. 11) that led Paul to write the long letter now known as 1 Corinthians, written before Pentecost of 55 A.D. (1 Cor. xvi. 5–8).

In this letter he deals first with the reports brought to him of the grave disorders in the church, especially the party factions, gathering around the names of certain Apostles and their workers and Christ (chaps. i–iv), the grossly immoral practices (chap. v), and the contentious spirit which resulted in bringing one another before the courts of law (chap. vi), all of which things the Apostle sternly rebuked. The letter brought by the deputation showed Paul that the church had misunderstood his earlier letter, taking him to mean that he had forbidden them all companionship with any and all persons of bad character. The practical impossibility of complying with this command they had doubtless laid before the Apostle in their letter, in view of which protest he explains that his intention was to prohibit Christian companionship with such persons in the membership of the church (v. 9–11: "I wrote unto you in my Epistle to have no company with fornicators; not at all meaning with the fornicators of this world . . . but . . . if any man that is named a brother be a fornicator, or covetous, or an idolater, or a reviler, or a drunkard, or an extortioner, with such an one no, not to eat").

The Apostle next replies to the questions on which his advice had been asked (chaps. vii–xvi). These questions regarded marriage (chap. vii), the eating of meat offered in sacrifice to idols (chap. viii), the proprieties of public worship (chaps. xi–xiv)—chiefly as to the use of the *charismata*, or spiritual gifts (chaps. xii–xiv), the doctrine of the resurrection (chap. xv), and the collection for the saints in Jerusalem (chap. xvi)—possibly also the return of Apollos to work among them (xvi. 12).

The writing known as 2 Corinthians presents a complicated problem as to its composition and date. Strong reasons appear for viewing it as made up from two (or parts of two) separate letters of Paul to the church of Corinth written at different dates. There are passages in 2 Corinthians which make it impossible to avoid the impression that the Apostle made a visit to Corinth which is not recorded in the Book of Acts, and that he wrote more letters to the church than are distinctively preserved in the New Testament. The passages referring to the visit are the following: (ii. 1) "But I determined this for myself, that I would not come again to you with sorrow"; (xii. 21) "Lest again when I come my God should humble me before you"; (xiii. 2, 3) "I have said beforehand . . . as when I was present the second time . . . that, if I come again, I will not spare." From these it is clear that the Apostle had made a visit to Corinth which was of a sorrowful kind. This cannot possibly be the only previous visit of which we have record in the Acts—the visit in which he founded the church; since, while at that time he was discouraged regarding his gospel work in Corinth, there had been no sorrow between him and his people such as these passages necessarily imply. This inference is confirmed by the remaining passages: (xii. 14) "Behold, this is the third time I am ready to come to you"; (xiii. 1) "This is the third time I am coming to you," from which it is clear that the visit which he was about to make was, to the Apostle, his third visit to this place. The passages referring to the letter are the following: (ii. 3, 4) "Out of much affliction and anguish of heart I wrote unto you with many tears"; (vii. 8, 9–12) "For though I made you sorry with my Epistle, I do not regret it. . . . So although I wrote unto you, I wrote not for his cause that did the wrong, nor for his cause that suffered the wrong," etc., from which it is clear that the Apostle has in mind some other letter than that which we know as 1 Corinthians; since, while 1 Corinthians might be called a letter of censure, whose object was to shame its readers, it could not in any way be termed a letter of "affliction" and "anguish of heart" and "many tears."

The only reasonable explanation of these intimations is to be found in the theory that the facts were somewhat as follows: Timothy's mission (see above) had resulted disastrously. He had not quieted the disputes in the church and had noticed that even Paul's authority was set at naught. Some members were even insinuating that Paul was actuated by unworthy motives.

Timothy returned to Paul with a gloomy report, probably having left Corinth before the return of the deputation bearing 1 Corinthians. It was then that Paul decided to make the visit referred to in 2 Cor. ii. 1, xii. 21, xiii. 2, 3, which was a painful visit and, for some reason, fruitless (cf. 2 Cor. x. 10). Returning to Ephesus, he writes to the church out of the fullness of his mortification and grief a letter bearing upon his experience in this visit and upon the general situation in the church, a letter which might easily have been one "of many tears."

In such a case, however, it is quite certain that we have a portion of this painful letter preserved in the last four chapters of our second Epistle (chaps. x–xiii). The evidence for this statement lies in the following facts: 1. Between chaps. i–ix and chaps x–xiii there is a marked and otherwise unaccountable difference in the feelings of the Apostle. The earlier chapters are full of cheer and satisfaction; the later of dissatisfaction and distress. 2. Between these two groups of chapters there is, further, a marked and otherwise unintelligible difference in the condition of the church's affairs. In the earlier chapters the church is manifestly loyal to the Apostle; in the later it is as manifestly disloyal. 3. Between these two groups of chapters there is a peculiar set of cross references. It is found in the following passages:

I. (ii. 3) "And I *wrote* this very thing, lest when I came, *I should have sorrow* from them of whom I ought to rejoice"; (xiii. 10) "For this cause I *write* these things while absent, that *I may not* when present deal sharply," etc.

II. (i. 23) "But I call God for a witness upon my soul, that to spare you *I forbare to come* to Corinth"; (xiii. 2) "I have said beforehand, and I do say beforehand . . . that, if *I come again, I will not spare*."

III. (ii. 9) "For to this end also *did I write*, that *I might know* the proof of you, whether ye are obedient in all things"; (x. 6) "—— *being in readiness to avenge* all disobedience, when your obedience *shall be made full*."

From these passages it would appear (1) that the actions or states of feeling described in the later chapters as future are in the earlier chapters described as past; (2) that between the future references to these states and actions and the references to them that are past there had come over the situation to which they apply a change for the better. These two phenomena are rendered the more significant by the fact that the passages in the earlier chapters are all of them from a portion of the letter (i. 23–ii. 11) in which reference is made expressly to the painful letter (ii. 3, 4) and most probably to the experiences of the sorrowful visit (ii. 5–11); while two of the three passages in the later chapters are from a portion of the letter (xiii. 1–10) in which reference is made specifically to a contemplated visit which has in it the possibilities of being one of unpleasantness between the Apostle and his people.

These internal evidences are confirmed by the fact that 2 Corinthians does not seem to have been known as early in the post-Apostolic Church as 1 Corinthians. This is especially evident from the fact that Clement of Rome, in writing to the Corinthian church (95 A.D.), though there was in the situation of the church that which would have made references on his part to 2 Corinthians most apt and forceful, apparently confines all his references to the less applicable 1 Corinthians. There seems to be no allusion to it before Polycarp's letter to the Philippian church (116 A.D.); while, generally speaking, references to it by the Fathers are few and not over clear. But if 2 Corinthians was thus so much later in coming to the notice of the church, this period of obscurity would involve necessarily a harsh usage for the first copies of both the letters of which it is composed, and this may easily have resulted in a loss of the closing portion from Paul's last letter (chaps. i.–ix.) and, correspondingly, of the earlier portion of his painful letter (chaps. x.–xiii.). Inasmuch, however, as both these fragments, when finally discovered, gave evidence of having been written by Paul (cf. i. 1, 2, which gives the apostolic greeting in the name of Paul: "Paul an Apostle," etc., and x. 1, which presents Paul by name as the writer: "Now I, Paul, myself entreat you," etc.), and as one showed itself clearly to be the beginning, while the other as clearly showed itself to be the close, of one of his letters, it would be not at all unnatural were the two fragments placed together as one Epistle and so received generally in the church.

In view, therefore, of the facts presented in the Epistles, we recognize three visits of Paul to Corinth: (*a*) at the founding of the church; (*b*) in response to the urgency call; (*c*) at the close of his mission work in the East. We recognize also four letters of Paul to the church: (*a*) the letter of prohibition (cf. 1 Cor. v. 9); (*b*) the canonical 1 Corinthians; (*c*) the painful letter (2 Corinthians x.–xiii.); (*d*) the canonical 2 Corinthians (chaps. i.–ix.).

Together with the Epistle to the Galatians and the Epistle to the Romans, the Corinthian Epistles have been almost universally received as genuine letters of Paul. The Tübingen school (1845) made these four Epistles the standard for their criticism against the remaining New Testament writings. Recently a school of Dutch critics (1880–90) has sought to disprove their apostolic origin. Other continental critics (1875–90), while admitting their substantial genuineness, have attempted to redistribute their contents among various documents. Still other critics (1880–87) confine their efforts to the elimination of certain minor interpretations. Apart, however, from the two-epistle theory for 2 Corinthians, as advanced in this article, the letters are not only unmistakably genuine products of Paul, but are clearly integral in their contents.

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CORIN'THIANS, THIRD EPISTLE TO THE. See APOCRYPHA.

CORINTO, kō-rēn'tō (Sp., Corinth). A seaport in the Department of Chinandega, Nicaragua, situated on the island of Aserradores, between Realejo Bay and the Pacific (Map: Central America, D 4). It has an excellent harbor and is the chief Nicaraguan port of the west coast, having supplanted Realejo. It is the residence of a United States vice consul. Corinto was founded in 1899. Pop., 3000.

CO'RIOLA'NUS, GAIUS, or GNÆUS MARCIUS. A Roman patrician. According to the legend, he was surnamed Coriolanus on account of his capture, 493 B.C., of the town of Corioli, belonging to the Volsci. Of a proud and haughty spirit, he was strongly opposed to the plebeians; on one occasion, during a time of famine, he argued in the Senate that grain which had arrived from Sicily should not be distributed gratuitously to the plebeians, unless they should give up their tribunes, an office lately instituted. For this he was impeached and banished. He took refuge among the Volscians, whom he aided in their war with the Romans. His victories at the head of his Volscian troops alarmed the Romans, who, on his approach to their city, sent a variety of deputations to plead with him. He was deaf to every entreaty. At last the noblest matrons of Rome, headed by his old mother and his wife, Volumnia, leading her two children, came to his tent. His burning desire to be revenged on those who had dishonored him was cooled by the tears of his relatives, and he led back the Volsci to their own territories, where he lived to an advanced age. To this story numerous objections have been raised by the scientific modern historians of Rome.

CORIOLANUS. 1. A tragedy by Shakespeare, produced probably in 1609 and published in 1623. The plot is derived from *Plutarch's Lives*, and some speeches are taken verbatim from Sir Thomas North's translation of that work, published in 1579. 2. A tragedy by James Thomson, published, after his death, in 1748 or 1749.

CORIP'PUS, FLAVIUS CRESCONIUS (sixth century A.D.). A Latin author, native of Africa. He wrote a panegyric on Justin the Younger, Byzantine Emperor (565–578 A.D.). Corippus was also the author of *Johannis*, an epic poem celebrating the exploits of a proconsul of that name in Africa in Justinian's time, in overthrowing the Moors. The poem, in 8 books and 5000 hexameters, is of importance for the history of Africa and for its accounts of contemporary manners and customs. For editions of Corippus' poems, consult Partsch, in *Monumenta Germaniæ Historica* (1879), and Petschenig, *Berliner Studien für klassische Philologie*, vol. iv (1886).

CORIS'CO. An island belonging to Spain, situated off the coast of Guinea, Africa, at the entrance to Corisco Bay, in lat. 0° 55′ N., long. 9° 20′ E. It has an area of about 5½ square miles, and its surface is very diversified. The island is densely wooded, chiefly with ebony and logwood, which, with the ivory obtained from the mainland, constitute the chief articles of trade. Pop., 1900, 1438; 1910, 845.

CORITYBA. See CURITIBA.

CORK (OIr. *Corach-Mor-Murham*, Great March of Munster). A maritime county in Munster, the southernmost and largest of the Irish counties (Map: Ireland, C 5). Area, 2890 square miles. Cork is hilly, with a great diversity of surface. The western part is rocky, mountainous, wild, and boggy; the east and south, rich, fertile, and picturesque. The Munster coal field occupies 400 square miles in the northwest section of the county; some iron is also mined; and Cork is rich in limestone and sandstone deposits. The dairy industry is extensive. The population is less than half what it was in 1850, due mainly to emigration to the United States. The capital is Cork. Pop., 1841, 858,100; 1891, 438,432; 1901, 404,611; 1911, 315,431.

CORK. A city, port, and parliamentary borough, capital of county Cork, Ireland, on the Lee, 11 miles above its discharge into the sea, and 165½ miles southwest of Dublin by rail (Map: Ireland, C 5). It stands in the centre of a picturesque valley, partly on an island, formerly a swamp, which the word "Cork," "Corroch," or "Corcagh" implies, and partly on the north and south banks of the river. Several bridges span the river to the central island. The situation is picturesque from the uneven ground, irregular streets, intersecting river, and overhanging heights. Cork is the seat of a Roman Catholic bishopric. Its finest building is the Anglican cathedral of St. Finn Barr, in Early French style, completed in 1879 on the site of the saint's seventh-century foundation. The Roman Catholic cathedral, also dedicated to St. Finn Barr, dates from 1808, but was subsequently restored. There are four monasteries and two nunneries. Notable Protestant churches, besides the cathedral, are St. Luke's, St. Nicholas, and St. Anne Shandon. The last named has a high tower of party-colored stones and a noted peal of bells; it is near the site of the Shandon

Castle, once an important stronghold. Roman Catholic churches include those of St. Patrick, St. Mary, Sts. Peter and Paul, St. Vincent de Paul, and Holy Trinity. The principal educational institution is University College, founded as Queen's College in 1849; it was rechartered under its present name in 1908. It occupies a fine building, in Tudor style, on the site of a seventh-century abbey. There are a school of science (1885), an agricultural school, and various parochial and industrial schools. Besides the public library (1790), there are several private collections of importance. There is a public park of 240 acres, with a well-known race course. There is also a handsome public cemetery. The banks of the Lee, above and below Cork, are studded with villas. The estuary contains several islets rising abruptly from the water, with narrow channels between them. It is a landlocked basin, having an entrance one mile in width, which is defended by batteries on Spike, Haulbowline, and Rocky islands, which are also occupied by a convict prison, government repairing dock, ordnance depots, and artillery barracks. On the shores of the estuary are the towns of Passage and Queenstown, formerly Cove of Cork. The Lee is navigable for a considerable distance above the city, and on the improvement of navigation the harbor commissioners have expended large sums. The harbor, formed by the Lee estuary, is noted for its size and safety and has been the main source of the rise and progress of the city. It has dry docks and patent slips. It has a large export and import trade, but of a fluctuating and latterly declining character. The chief manufactures of the city are leather, metallic goods, woolen and linen goods, beer and whisky. The United States is represented by a consul. Founded in 622 by St. Finn Barr, during the ninth century Cork was frequently devastated by the Danes, who early in the eleventh century made it a trading station and built the city walls. Desmond Macarthy, King of Munster, surrendered it to Henry II in 1172. During the Civil War it held out for the King and was taken by Cromwell in 1649. In 1690 it was again besieged and taken by Marlborough. Pop., 1901, 76,122; parliamentary borough, 100,022; in 1911, 76,673; parliamentary borough, 102,-274. The great majority of the inhabitants are Roman Catholics. Cork returns two members to Parliament. Consult Cusack, *History of the City and County of Cork* (Dublin, 1875).

CORK (Sp. *corcho*, cork, from Lat. *cortex*, bark). The unusually developed epiphlœum (see BARK) of the bark of the cork tree, or cork oak (*Quercus suber*), the *alcornoque* of the Spaniards, a species of oak (q.v.), a native of southern Europe and northern Africa. Theophrastus, in bk. ii of his *Historia Plantarum*, speaks of the cork tree as a native of the Pyrenees, and Plutarch mentions cork jackets, or life preservers. Spain and Portugal chiefly supply the world with cork, while in addition Algeria and Tunis, southern France and Corsica, and Italy, including Sardinia and Sicily, are also sources of supply. Some parts of the United States have been deemed favorable for the culture of the cork tree, and attempts in this direction were made in 1858, but were not vigorously prosecuted.

Seventy per cent of the world's cork is produced in Spain and Portugal. The cork production of Spain during 1912 was, approximately, 78,000 tons, of which 54,780 tons came from the Seville district, 12,650 tons from Catalonia and Castellon, 7100 tons from Galicia, and 3460 tons from the two Castile provinces. While the finest cork is grown in various parts of the provinces of Seville, Badajoz, Caceres, Cadiz, Huelva, Córdoba, Gerona, Barcelona, Castellon, Ciudad Real, Toledo, Malaga, and Salamanca, the greatest part of the finest supplies, however, is grown near Barcelona. Most of the low-grade cork is produced in Seville. The total number of cork factories in Spain was 892, distributed through 107 towns, and these produced for export 8964 tons of cork, 746 tons of small squares, 583 tons of other manufactured cork, and 50,198 tons of cork wood and cork waste. About 5500 tons of cork sawdust are used in Spain annually in packing fruit for shipment. Some 40,000 persons were employed in some manner in the cork industry in Spain, with an average wage of about 67 cents per day. Planted trees are said to be inferior to the natural forests. The cork tree is not of great size, generally 20 to 40 feet high, with ovate-oblong evergreen leaves, which are sometimes entire and sometimes sharply serrated. It lives to a great age, in some instances 300 or 400 years, and is as much as 15 feet in circumference. It blossoms in April or May; the fruit ripens from September to January, falling on the ground as soon as ripe. The acorns are edible and in taste resemble chestnuts. The bark in trees or branches from three to five years old acquires a rough appearance, new layers of cellular tissue being formed, and the outer parts cracking from distension until they are finally thrown off in large flakes, when a new formation of the same kind takes place.

Cork intended for the market is generally stripped off a year or two before it would naturally come away, or when, according to the Spanish regulations, it measures 40 c.m. (15 inches) in circumference. This first, or virgin, cork is taken off when the tree is about 20 years old and has little commercial value. The process is repeated at intervals of about nine years, according to the vigor of the tree. The removal of the cork does not require the removal of the whole bark, but only of external layers of spongy cellular tissue, all or the greater part of which has ceased to have any true vitality and has become an incumbrance to the trees. Consequently, instead of being injurious, the taking of the bark, when done with proper care, rather promotes the health of the tree, which yields its best bark at about the age of 40 years and continues to yield crops for 150 years or more. In stripping off the cork longitudinal and transverse incisions are made to the proper depth, and each piece is then cut away from the tree. The average yield for one tree is about 45 pounds, although as much as 500 pounds may be secured. The slabs, after drying for a few days, are placed in boiling water for one hour. This process enables the useless outer coating of the slabs to be scraped off and increases their bulk one-fourth and also their elasticity, besides dissolving the tannin and other substances. Steam is sometimes employed instead of hot water. The cork is then scraped either by hand or by scraping machines, in which process it loses from 20 to 30 per cent of its weight. The cork is then cut crosswise into strips of the proper length, then lengthwise, and finally into pieces of the proper shape; or the strips of a given quality may be shipped direct

to the point of manufacture. In many Spanish districts the manufacturing industry is carried on in the homes by hand, but there are also cork-cutting machines, especially in the United States, of great efficiency, which handle the strips imported in bales. The United States in 1913 imported unmanufactured cork valued at $3,152,670 and manufactures of cork valued at $2,350,684. The cork, after being cut, is washed in oxalic salt, or some other solution, and then dried. It is now ready to be sorted and packed for the market. In Spain the corks, after being sliced and cut, are packed in lots of 30,000 in bagging cloth and called bales.

Besides its use for stopping bottles, casks, etc., cork is largely used, on account of its lightness, for floats of nets, swimming belts, etc.; and, on account of its impermeability to water, and its being a slow conductor of heat, inner soles of shoes are made of it. All these uses are mentioned by Pliny; but the general employment of corks for glass bottles appears to date only from the fifteenth century. It is also used for smokers' mouthpieces and many other modern devices. The bits that are left in the process of manufacture are ground to powder and used in the manufacture of linoleum, for the loose filling of refrigerators or other heat insulation, and for many other purposes. The Spanish black used by painters is made by burning cork in close vessels.

CORK, Earls of. See Boyle.

CORLEONE, kôr'lā-ō'nā (It., lion heart). A city in the Province of Palermo, Sicily, situated 1950 feet above the sea, at the foot of Mount Cardellia and 21 miles south of Palermo (Map: Italy, H 10). Little industry of any kind is carried on, but Corleone has a splendid old church (restored). The ancient Korliun was founded by the Saracens and colonized with Lombards by Frederick II in 1237. Pop. (commune), 1881, 15,686; 1901, 14,803; 1911, 19,072.

COR'LISS, George Henry (1817–88). An American engineer and inventor, born at Easton, N. Y. In 1844 he removed to Providence, R. I., where he engaged in the manufacture of steam engines and in 1848 established the Corliss Steam Engine Company. He made and patented many improvements in steam engines and in 1876 furnished the "Corliss engine" of 1400 horse power to Machinery Hall in the Philadelphia Centennial Exhibition.

CORMS.

a, Colchicum; *b*, Arisæma (Indian turnip).

CORM (Gk. κορμός, *kormos*, the trunk of a tree, with boughs lopped off, from κείρειν, *keirein*, Lith. *skirti*, OHG. *sceran*, Ger. *scheren*, Icel. *skera*, AS. *sceran*, Eng. *shear*). A compact subterranean stem which is related both to tubers and bulbs. It is very short and fleshy, usually more or less rounded or depressed, and in this feature is related to the tuber. It is related to the bulb, however, by the fact that this short and compact fleshy stem is invested by thin scale leaves. Corms are sometimes spoken of as "root bulbs," and in popular usage are constantly spoken of as "bulbs." Common illustrations are found in the Indian turnip, crocus, gladiolus, cyclamen, etc.

CORMENIN, kôr'me-năn', Louis Marie de la Haye, Vicomte de (1788–1868). A French jurist and publicist, born in Paris. He was educated for the law, and as auditor of the Council of State, after 1810, drew up several of the Council's most important reports. He was a deputy from 1828 to 1846. His extensive knowledge of jurisprudence and of the practical affairs of government, and the clear and logical force with which he presented his ideas, soon secured for him great influence in public affairs. His famous *Lettres sur la liste civile* began to appear in 1831 and passed through 25 editions within 10 years. He was elected to the National Assembly in 1848, was made president of the commission appointed to remodel the constitution, and strongly advocated universal suffrage. Although he had opposed the admission of Louis Napoleon to the National Assembly, and afterward had protested against the coup d'état, he was appointed, in 1852, a member of the reconstituted Council of State. In 1855 he was elected a member of the Institute. Besides his numerous political pamphlets, published under the pseudonym of "Timon" and subsequently collected as *Pamphlets de Timon* (1848)—all models of political satire—Cormenin wrote *Etudes sur les orateurs parlementaires* (1838), which passed through nearly 20 editions, and a valuable *Droit administratif* (1822), summing up French administrative law in aphorisms.

CORMON, kôr'môn', Fernand, properly Fernand Piestre (1845–1924). A French decorative, figure, and portrait painter. He was born in Paris, and studied under Cabanel at the Ecole des Beaux-Arts, then in Brussels under Portaels, and finally under Fromentin and Busson in Paris. He exhibited constantly in the Salon after 1868 and was made a member of the Institute in 1898. Many of his works are of an archæological character, the most important of these being a series of 10 mural paintings and a ceiling in the Natural History Museum, Paris (1898), some of the cartoons of which were exhibited at the St. Louis Exposition in 1904. They represent prehistoric men and animals and the development of the human race, are excellent in design, and show deep scientific knowledge. He came to enjoy high reputation as an instructor and met success also in painting portraits, which include those of President Loubet (Luxembourg), Gérôme, and Carrier-Belleuse. Other important works are: "Cain" (1880, Luxembourg); "The Victors of Salamis" (1887, Rouen), and "The Roman Legion" (1909, Leipzig).

CORMONT, kôr'môn', Thomas and Reynaud de. Father and son; French architects of the thirteenth century; prominent among the builders of the cathedral of Amiens, following Robert de Luzarches (1223–69).

CORMONTAIGNE, kôr'môn'tä'ny', Louis de (c.1695–1752). A French military engineer, who took part in some of the most important sieges in the War of the Polish Succession and that of the Austrian Succession. He had charge of the line of fortification from Calais to the Rhône, and he built new defenses at Strassburg, Metz, and Thionville. His improvements of Vauban's system of fortification are embodied in his *Architecture militaire, par un officier de distinction* (1741). For his biography, see Von Brese-Winiari, *Ueber Entstehen, der neueren Befestigungsmethode* (Berlin, 1844).

COR'MORAN. A Cornish giant in the story of *Jack the Giant-Killer.*

COR'MORANT (Fr. *cormoran,* It. *corvo marino,* from *corvo,* crow, and *marino,* marine; cf. Bret. *morvran,* cormorant, from *mor,* Lat. *mare,* sea + *bran,* crow). A group of web-footed birds comprising the steganopode family Phalacrocoracidæ, characterized especially by a bare dilatable membrane beneath the lower mandible, but not in the form of a sac under the throat as in the pelicans; a compressed bill, rounded above, and with a strong hook at the point of the upper mandible; the nostrils linear and seemingly impervious to air; the claw of the middle toe serrated, used in trimming the plumage; the wings of moderate length; the tail rounded, the feathers stiff and rigid and used to aid in walking or climbing. The species are distributed over the coasts of most parts of the world, some of them ascending rivers and even visiting freshwater lakes in pursuit of fish, on which all of these birds subsist exclusively.

Cormorants are proverbially voracious. They do not take their prey by diving, when on the wing, but pursue it by swimming and diving, using their wings in progress under water, and sometimes descending to a great depth; a British species has been caught in a crab pot fastened 120 feet under water. When the prey has been taken in a manner inconvenient for swallowing, they toss it in the air and adroitly catch it as it descends. The behavior of cormorants in fishing and towards each other in their colonies has been described at length by E. Selous in *Bird Watching* (London, 1901). Some of the species frequent high rocks, others low islands, on which they make rude nests, chiefly of seaweed and almost always in colonies; some perch and even build their nests on mangroves and other seaside trees. Their greenish-blue eggs are covered with a calcareous incrustation. The flesh of all the species is dark and of a fishy taste, but is sometimes used as food, particularly that of young birds.

There are described about 25 well-defined species, of which seven are found in North America. The commonest is the double-crested cormorant (*Phalacrocorax auritus,* or *dilophus*), so called from the lateral crest of curly feathers on the sides of the head, and present in some one of its four subspecific forms throughout North America. The "common" cormorant (*Phalacrocorax carbo*) occurs abundantly on both sides of the Atlantic, especially northward, while on the Pacific coast three species are numerous—the tufted, or Brandt's cormorant (*Phalacrocorax penicillatus*), the red-faced cormorant (*Phalacrocorax bicristatus,* or *urile*), and the violet-green cormorant (*Phalacrocorax pelagicus,* or *violaceus*); the two latter are especially characteristic of Alaska. The British species are the "common" cormorant, which is about 33 inches long and almost of a black color, but during the breeding season exhibits a sprinkling of elongated white and almost bristly feathers on the head and back of the neck; and the green cormorant, or "shag" (*Phalacrocorax graculus*), which is smaller and dark green. Two notable species are Pallas's cormorant, now extinct (see Extinct Animals), and Harris's, the surf-fishing, flightless species of the Galapagos Islands, which is exceedingly rare, of great size, and has wings useful only as fins. See Flightless Birds.

Fishing with cormorants is a very ancient practice, still regularly followed among the Chinese and Japanese and lately revived as a sport in Great Britain. The birds are taken from the nest when young and are easily tamed and trained; or old cormorants may be trapped and taught to serve. They are kept for a while and fed meat, etc., until accustomed to their master and the feeding methods. Then a line is fastened to one leg by a leather anklet, and they are taken out in a boat to fish and drawn in after each capture. After a time they may be set free. A ring or strap collar is fastened about their necks, so that no fish can be swallowed, but only pouched, and they return to the boat to be relieved of their burden. After a suitable time the ring is removed, and they are allowed to fish for themselves or are fed. These birds make a living for many families on the Chinese coast, and well-trained ones are highly valued. The modern use of cormorants in this way in England was described and illustrated in *The Field* (London, October, 1890). See Plate of Fishing Birds and Colored Plate with Water Birds.

CORN (Lat. *cornu,* horn; connected with Ir., Welsh *corn,* Gk. *κάρνον, karnon,* Goth. *haúrn,* AS., Eng., OHG. *horn,* Ger. *Horn,* also with Gk. *κέρας, keras,* Skt. *śṛ̃ga,* horn). A small hard growth resulting from an increase in the thickness of the cuticle or epidermis, which is generally caused by irritation, excessive pressure or friction on the part. Corns occur most commonly on the toes, as a result of tight shoes. Three varieties of corns are described, viz., 1. Laminated corns, or callosities, in which the hardened cuticle is arranged in layers, frequently of a dark brown color, from the effusion of blood in the deeper layers. 2. Fibrous corns (*clavi*), which are not only fibrous in their early stages, but have convex surfaces and, as time goes on, sink into the skin, sometimes producing great pain. Frequently a bursa, or small bag containing serum, is formed beneath, and if this should inflame, pus speedily forms, and the pain and constitutional irritation become severe; at other times the pressure may cause absorption of the ends of bones, and serious alterations in the condition of a joint. 3. Soft corns occur between the toes and cause much annoyance; they are generally small, and as they are constantly bathed in perspiration, the cuticle does not harden, as in the other varieties. They sometimes give rise to painful ulcerations and should never be neglected. The treatment of corns consists in the removal of all undue pressure or friction, either by removing the shoe altogether, or protecting the corn by surrounding it with a ring of felt or "corn plaster"; or the hardened cuticle may be softened by the application of water of ammonia and then scraped or filed away; or it may be extracted by using a dull instrument. A soft corn should be treated

by putting small rings of absorbent cotton around it and between the toes, and keeping it dry till it becomes a hard corn, and then treating it as such. Most druggists keep a "corn cure" composed of salicylic acid dissolved in collodion, several applications of which will remove a hard corn. In all serious cases application should be made to a surgeon or chiropodist.

Corns affect horses as well as man. In the foot of the horse they occur in the angle between the bars and outer crust and are caused by a bruise of the sensitive secreting sole. Two forms of feet are especially subject to them—those with deep, narrow, slanting heels, in which the sensitive sole becomes squeezed between the doubled-up crust and the shoe; and wide, flat feet, which, by the senseless cutting away of the bars and outer crust, allow the delicate interior parts to be pressed with all the force of the animal's weight on the unyielding iron shoe. Serum and blood are poured out, while the secreting parts, being weak and irritable, produce a soft, scaly, unhealthy horn. Corns constitute unsoundness; cause a short, careful, tripping gait; are a very frequent source of lameness among roadsters; abound in badly shod horses, especially those with the kind of feet alluded to, and usually occur in the inside heels of the forefeet, these being more especially subjected to weight and hence to pressure. The discolored spot indicating the recent corn must be carefully cut into with a fine drawing-knife, any serum or blood being thus allowed free vent. If the bruise has been extensive, a poultice will have the twofold effect of allaying irritation and relieving the sensitive parts by softening the hard, unyielding horn. When the injury has been of long standing, and soft faulty horn is secreted, a drop of diluted nitric acid may be applied. On no account must the bars or outer crust be removed; they are required for bearing weight, which may be further kept off the injured part by the use of a bar shoe. In horses subject to corns the feet should be kept soft by dressing with tar and oil, or any suitable emollient; the corn should be pared out every fortnight; a shoe with a wide web on the inside quarter should be used, and should be nailed only on the outside; and, if the sole is thin and weak, leather pads should be employed. In bad cases the shoes may be removed and the horses turned out to pasture for a few weeks with good results.

CORN, Indian. See Maize.

CORNARO, kôr-nä'rô, Caterina (1454–1510). Queen of Cyprus. She was born in Venice, of a patrician family. She was married to James II, of Lusignan, King of Cyprus, in 1472, and succeeded him on his death, only eight months later. When her son had also died, in 1475, the Republic of Venice assumed the government, and in 1489, fearing the conclusion of a marriage between her and Alfonso, the hereditary Prince of Naples, forced her to abdicate and leave the island. She was received in Venice with great pomp and thereafter resided at Castle Asolo, near Bassano. Caterina has been the favorite subject of romances and the heroine of several operas. Of her life in Venice her cousin, Cardinal Pietro Bembo, has left a vivid description in *Gli Asolani*. There is a famous portrait of this Queen by Titian in the Uffizi gallery in Florence. Consult Hare, *Most Illustrious Ladies of the Italian Renaissance* (New York, 1904) and McCurdy, *Essays in Fresco* (London, 1912).

CORNARO, Lodovico, or Luigi (1467–1566). A Venetian nobleman and hygienist. Up to his fortieth year he so wasted his forces, originally but feeble, in dissipations of every kind that his life was despaired of. He thereupon adopted strict rules of frugality in eating and drinking, with general care of his health and gentle exercises, and in consequence lived for almost a century. To promote those habits which had proved so advantageous in his own case, he wrote, in his eighty-third year, his celebrated treatise, *Discorsi della vita sobria* ('Essay on Temperate Living,'), which was first published at Padua in 1558 and has been translated into many European languages. The work is mentioned with approval by Addison in No. 195 of the *Spectator*. There is a translation, *The Art of Living Long* (Milwaukee, 1903).

CORN'BURY, Edward Hyde, Lord, third Earl of Clarendon (1661–1723). An English politician, Governor of the colonies of New York and New Jersey from 1702 to 1708. He was a member of Parliament for Wiltshire from 1685 to 1695, and for Christchurch from 1695 to 1701, and in September, 1701, was appointed Governor of the Province of New York by King William, to whose side he had treacherously deserted in 1688, from that of his uncle, James II. He reached New York in May, 1702, was confirmed in his office by his cousin, Queen Anne, on the death of King William, and later in the year was also appointed first royal Governor of New Jersey. In both New York and New Jersey his arbitrary policy, his religious intolerance, his administrative incapacity, and his dissolute habits soon made him extremely unpopular, while in New York the dislike of the people was considerably intensified by his fraudulent appropriation of public funds and his attempts to override the Legislature, which insisted on its right to appoint a treasurer of its own for the "receipt and disbursement of any moneys the Legislature might order to be raised for public purposes," and contended that "the Assembly as representatives of the people of this province are entitled to the same privileges and have a right to the same powers and authorities as the House of Commons enjoy." Finally, as a result of lists of grievances passed by the legislatures of both colonies, Cornbury was removed from office in 1708 and was immediately thrown into prison in New York by his creditors; but, on his becoming third Earl of Clarendon by the death of his father in 1709, he was enabled to pay off his debts and returned to England. He became a Privy Councilor in 1711 and was Envoy Extraordinary to Holland in 1714. During his term as Governor of New York and New Jersey, he was fond of appearing in public dressed as a woman, and Lewis Morris, a contemporary, wrote: "He dresses publicly in women's clothes every day and puts a stop to all public business while he is pleasing himself with that peculiar but detestable maggot." William Smith, in his *History of the Late Province of New York* (New York, 1829–30), speaks of him as follows: "We never had a governor so universally detested, nor one who so richly deserves the public abhorrence. In spite of his noble descent, his behavior was trifling, mean, and extravagant. The indignation of the people was kindled by his despotic rule, savage bigotry, insatiable avarice, and injustice not only to the public, but even his private creditors." Consult Wilson, *Memorial History of the City of*

New York, vol. ii (New York, 1891–93), and Gordon, *A History of New Jersey* (Trenton, 1834).

CORN COCKLE. See COCKLE.

CORN-CRACKER STATE. Kentucky. See STATES, POPULAR NAMES OF.

CORNCRAKE. See CRAKE.

CORNEA, kôr'nê-à (Neo-Lat., fem. of Lat. *corneus*, horny, from *cornu*, horn; so called from its resemblance to horn). The transparent anterior portion of the outer coat of the eye. It contains no blood vessels and obtains its nutrition by means of a system of spaces filled with lymph. The cornea is subject to inflammation, known as *keratitis;* ulcer of the cornea is very common, resulting most often from injury, inflammations of the conjunctiva, phlyctenular keratitis, various disturbances in nutrition, etc. A number of forms are seen attacking different portions of the cornea. Aside from inflammation of other portions of the eye accompanying the ulceration, there may result adhesion and prolapse of the iris, closure of the pupil, and opacity of a portion or the whole cornea. *Staphyloma* (q.v.), a protrusion of a part or the whole of the cornea, may follow. *Keratoconus* occasionally occurs in young adults, especially females; the cornea protrudes at the centre from weakness and intraocular pressure. See EYE; EYE, DISEASES OF THE.

CORNEILLE, kôr'nâ'y', PIERRE (1606–84). One of the greatest tragic poets of France. He was born at Rouen, June 6, 1606, the son of a lawyer and magistrate of worth, ennobled in 1637. He was trained by the Jesuits, took the advocate's oaths in 1624, and held minor legal offices until 1650. His first play, *Mélite*, presented in Paris (1629), was popular and was followed by *Clitandre* (1632), a tragi-comedy; *La veuve* (1633), his first comedy; *La galerie du palais* (1633) and *La suivante* (1634), both comedies. These early plays are full of the insipid love in fashion at the time, and the title of one of them will suffice alone to show their realism. In 1634 he met Richelieu, composed a Latin elegy on his visit to Rouen, and was enrolled among the five poets of the Cardinal statesman, of whom Rotrou alone was at all worthy of his company. He soon incurred Richelieu's displeasure for too frank criticism of his literary work and wrote, uninfluenced by the Minister's favor, *La Place Royale*, *Médée*, his first tragedy (both 1635), and *L'Illusion comique* (1636). But all this earlier work was completely eclipsed by the triumph of his epoch-making *Cid* (1636), though we may not leave these earlier dramas without recording that they are far superior to anything that had preceded them in vigor and in truth to nature, and that to them we owe the happy invention of the soubrette. Such promise as they gave, however, pointed less to the field of Corneille's great achievement than to the drama of intrigue and to the comedy of contemporary society, for some of them are full of rather coarse stage business and a battledore and shuttlecock repartee, and are written in a style that he felt needed apology for its familiar simplicity. Still, we must admit that in them Corneille created the comedy of manners as well as the beginnings of character comedy.

The tragi-comedy of *Le Cid* was so different from Corneille's earlier dramas that it hardly seems the work of the same hand. It gave him a preëminence over contemporaries and predecessors, questioned only by interested rivals and the Academy, which Richelieu summoned to support them, and which it did with studied half-heartedness. Among the conservative critics passion ran as high as in the famous battle over Hugo's *Hernani*. Scudéry, a critic of repute, asserted that *Le Cid's* subject was ill chosen, its structure unpardonable, its action clumsy, its versification bad, and that its undeniable beauties were stolen from a Spanish play by Guillen de Castro, which was indeed its acknowledged source. But the public spoke with no uncertain voice, and though *Le Cid* may lack the ethical depth and tragic force of some of Corneille's later dramas, it was and has remained the most popular on the stage of them all. Modern French drama dates from *Le Cid*.

In the controversy that raged around *Le Cid* Corneille's position was delicate. He was not by nature a tactful disputant, being indeed inclined to arrogance, as he showed on this occasion by his *Excuse à Artiste;* he could not afford to lose the favor that Richelieu continued to show him, and he could not secure a full hearing without imperiling it. He therefore withdrew for three years to Rouen. When he returned in 1639 to Paris, it was with a matured genius that almost immediately asserted itself in unparalleled splendor and fecundity. Yet the theme of *Le Cid*, the struggle between honor and love in the hero, between duty and love in the heroine, remains typical of the later tragedies. Typical of them all are also the five acts and the three "unities": the time limited to 24 hours, the scene to a single town, and the action to a central interest—self-imposed fetters worn with even greater complacency by Racine. The Spaniards knew nothing of these unities, and the effort to force their romantic drama into this rigid mold had, by the improbabilities, material and psychic, that it involved, given occasion for most of the criticism that had befallen *Le Cid*. Corneille therefore, in 1639, turned to classical subjects that would lend themselves more readily to the episodical treatment which the unities demanded. What survived of romance in him was the invariable intermingling of love with sterner themes.

Horace (1640) sets the love of man and woman against the love of race and fatherland in fourfold treatment of a single theme. In the more modern *Cinna* passion twists love of fatherland to its purpose and is opposed at once to the magnanimity and the patriotism of Augustus. *Polyeucte* (1642) opposes Christian to marital duty in a story of Christian martyrdom, which was a bold venture, for many thought, with Boileau, that the mysteries of the faith should be kept out of literature. These three, with *Le Cid*, mark the height of Corneille's achievement—the climax of the development of the elements of love and will—save that he touches for a moment a greater intensity of terror in *Rodogune* (1646). The other tragedies are more or less pale imitations of the merits of these. Among them it is worth while to name: *La mort de Pompée* (1643), which is but a series of dialogues and narratives; *Théodore* (1645), an even more dubious venture in Christian martyrology than *Polyeucte* had been; *Héraclius* (1647), followed by Corneille's election to the Academy; *Nicomède* (1651); *Pertharite* (1652). The last was an unmistakable failure which led Corneille for a time to withdraw altogether from the stage.

During these years he had written also two comedies on Spanish models, *Le menteur*, the best comedy written in France before Molière, and *Suite du menteur* (1644–45), and a good tragi-comedy, *Don Sanche d'Aragon* (1650), which, as the name implies, was Spanish also.

Disappointed by the failure of *Pertharite*, Corneille withdrew to Rouen, where he lived from 1652 to 1659, and turned his talent to versifying Thomas à Kempis's *Imitation of Christ* (1656), and to the writing of very frank critical essays on his own plays and the drama in general. He was recalled from this by a visit of Molière's company to Rouen in 1658, and between 1659 and 1674 wrote 11 tragedies of unequal mediocrity, though in each of them there were verses "with necks in thunder clothed and long resounding pace," such as he alone has known the art to create. The time to regret had passed, the time to cry halt had come, when Boileau wrote his famous epigram, *Après Agésilas hélas* (1666); *Mais après Attila holà* (1667). A new conception of dramatic art had been introduced by Boileau and Racine, and when Corneille was beguiled into a contest for court favor, he was fated to see his young rival's *Bérénice* preferred to his *Tite et Bérénice* (1670). Other plays of this period are: *Œdipe* (1659); *La toison d'or* (1660); *Sertorius* (1662); *Sophonisbe* (1663), after which he received an irregularly paid pension of 2000 livres; *Othon* (1664); *Psyché* (1671), in collaboration with Molière and Quinault; *Pulchérie* (1672); and *Suréna* (1674). He had written some devotional poetry between 1665 and 1670, and among his last compositions were some beautiful verses of thanks addressed to Louis XIV in 1676. Corneille's last years were passed in pecuniary straits, "satiated with glory and hungry for money," as he said, and when, at the urgent request of Boileau, the King sent him 200 pistoles, it was already too late. He had no time to spend them, and two days after he was dead (Oct. 1, 1684).

Corneille's works show him, as his friends describe and as his portraits paint him, a man of serious, rugged, and almost stern temper. A pious churchman, he was ill at ease in society, and awkward and unsuccessful when he attempted to flatter. The only touches of romantic sentiment revealed in his verses are found in those addressed to an actress of Molière's company, Mlle. du Parc, who scorned his attentions. Whether from pride or shyness, he never curried favor, nor took his place with courtiers at a time when this was almost necessary to literary prosperity. His public manners were not gracious, though he was an affectionate husband and brother. His best work never lost popular favor, and the most eminent of his literary contemporaries always did him justice. The greatest of them, Molière, spoke of him as his master, and Racine pronounced at the Academy a eulogy on his rival at once just and generous, that later critics have in the main confirmed.

The first impression made by an attentive reading of Corneille's work is its remarkable unevenness. Judged by his best, he ranks with the greatest. No dramatic poet rises to grander heights. Hence no poet is more quotable and few more quoted, for he has hundreds of lines that cling to the memory by their crash of sound and startling fullness of suggestion—"the most beautiful," says the French critic Faguet, "that ever fell from a French pen." And the same critic says of Corneille's language that it is "the most masculine, energetic, at once sober and full, that was ever spoken in France."

Corneille's tragedies arouse admiration rather than tragic fear. His interest is not in the fate of his characters, but in the unconquerable mind with which they meet it, their haughty disdain of destiny. He is of the school of the emphatics, delighting in extraordinary situations and subjects, in whatever will challenge the will to its utmost utterance. There is no fine-spun sentiment even in the love of *Le Cid*. But tragedy with the limitations of the "unities" involves much talk and little action, and Corneille's disdain of the endless subject of talk allows the interest to flag for scenes and even acts. There is monotony even in his nobility, and that in spite of the lyric and epic elements which he found in the drama and from which Racine was to free it. Yet his declamations—the tirades of Camilla, Augustus, Cornelia, and many another—are supreme in their kind and will thrill audiences as long as the antinomies of love and patriotism, honor and duty, perplex men's souls.

The best edition of Corneille is Marty-Laveaux's (12 vols., 1862–68). For bibliography, consult Picot's *Bibliographie Cornélienne* (1865), and Le Verdier and Pelay, *Additions à la Bibliographie Cornélienne* (1908). The best translated biography is Guizot's *Corneille and his Times* (1857); a good modern study, Faguet's "Corneille" (Paris, 1886), in the series *Classiques Populaires*. *Le Cid*, *Horace*, and *Polyeucte* have been done into English blank verse by Nokes, and (with *Cinna*) into English prose by Mongan and McRae (1878–86). Consult: Sainte-Beuve, *Nouveaux lundis*, vol. vii (Paris, 1863–72); Guizot, *Corneille et son temps* (7th ed., ib., 1880); Lemaître, *Corneille et la poétique d'Aristote* (ib., 1888); Liéby, *Corneille* (ib., 1892); Brunetière, *Epoques du théâtre français* (ib., 1892); Lanson, *Corneille* (ib., 1898); Segall, *Corneille and the Spanish Drama* (New York, 1902); Huszar, *Pierre Corneille et le théâtre espagnol* (Paris, 1903); Canfield, *Corneille and Racine in England* (New York, 1904); Faguet, *Propos de Théâtre* (3 vols., 1903–06); Raab, *Pierre Corneille in deutschen Uebersetzungen* (Heidelberg, 1911); Wendt, *Pierre Corneille und Jean Rotrou* (Leipzig, 1911). The three-hundredth anniversary of the poet's birth was celebrated with prolonged festivities in May and June, 1906.

CORNEILLE, THOMAS (1625–1709). A French dramatist and miscellaneous writer, whose productions are obscured by the genius of his older brother Pierre. He was born at Rouen, Aug. 20, 1625. His 42 plays are for the most part of a facile mediocrity, but he has to his credit the longest run of the century for his *Timocrate* (1656), the largest price for his *La Devineresse* (1679), and one of the most sensational failures in his *Baron des Fondrières* (1686). He was given his brother's chair in the Academy after the latter's death (1685), and published a dictionary supplementary to the Academy's, and a complete translation of Ovid's *Metamorphoses*, as well as a *Dictionnaire universel, géographique et historique* (1708). He was blind from 1704, but his literary activity continued uninterrupted until his death at Les Andelys, Dec. 8, 1709). *Ariane* (1672)

and *Le comte d'Essex* (1678), an historical drama, are among his plays the best worthy of memory. His dramatic *Works* are edited by Thierry (Paris, 1881). Consult Reynier, *Thomas Corneille, sa vie et son théâtre* (Paris, 1893), and Alfred de Vigny, *Fragments inédits de critique sur Pierre et Thomas Corneille* (published in 1905).

COR'NEL (OF. *cornille*, from Lat. *cornolium*, cornel tree, Lat. *cornus*, a cornel cherry tree, from *cornu*, horn, so called on account of the hardness of the wood). A term applied in America to various plants of the genus *Cornus*. In Europe the name seems to be restricted to *Cornus mas*, known as "cornel" or "cornelian cherry." It is a common shrub and was formerly much cultivated as a fruit tree. It has oval leaves, small heads of yellow flowers appearing before the leaves in spring. The fruit is oblong in shape, a little larger than the sloe, shining red, rarely yellow or white, and when perfectly ripe has an agreeable vinous acid taste. It is either eaten as it comes from the tree or is made into a preserve. When gathered green, it is pickled like olives. In America none of the plants to which the name is applied bears an edible fruit of value. *Cornus canadensis*, dwarf cornel, or bunchberry, is not properly edible, and, so far as known, has been little used by man. See DOGWOOD.

CORNE'LIA. A celebrated Roman matron, younger daughter of Scipio Africanus the Elder, and mother of the great tribunes Tiberius and Gaius Gracchus and of Cornelia, the wife of Scipio Africanus the Younger. On the death of her husband, refusing numerous offers of marriage, including even one from King Ptolemy, she devoted herself to the education of her 12 children, a task for which her lofty spirit, careful education, and wide attainments rendered her admirably fitted, and which had extraordinary results. On her death a statue was erected to her memory bearing the inscription "Cornelia, Mother of the Gracchi." The base, with the inscription, is now in the Capitoline Museum at Rome. To a Campanian lady who asked to see her jewels, she is said to have presented her sons as the only jewels of which she could boast. After the murder of Gaius, the second of her sons, she retired to Misenum, where she devoted herself to Greek and Latin literature and to the society of men of letters.

CORNELIA GENS. A distinguished clan of Rome, partly patrician, partly plebeian. The names (*cognomina*) of its patrician families, from which came more prominent men than from any other Roman gens, are Arvina, Blasio, Cethegus, Cinna, Cossus, Dolabella, Lentulus, Maluginensis, Mammula, Merenda, Merula, Rufinus, Scapula, Scipio, Sisenna, and Sulla.

CORNE'LIAN CHERRY. See CORNEL.

CORNELISZ, kôr-nā'lĭs, or **CORNELISSEN,** called CORNELIS VAN HAARLEM (1562–1638). A Dutch historical and portrait painter. He studied in Haarlem under Pieter Pietersz and in Antwerp under Conguet, but finally returned to Haarlem, where he occupied a very influential position until his death. He is best known for his "Banquet of the Archer's Guild" (1583) in the Haarlem Museum. This painting is remarkable for the natural poses and clever grouping of the figures and undoubtedly influenced Frans Hals. His portraits are excellent, but his historical and mythological compositions, painted in the Italian style, are full of exaggerations and mannerisms. In his two large paintings of the "Massacre of the Innocents," in Amsterdam and The Hague, he displays great skill in foreshortening. Consult Wedekind, *Cornelis Cornelisz van Haarlem* (Leipzig, 1911).

CORNE'LIUS. Bishop of Rome, 251–253. He ranks as the twenty-first pope. His lenient course respecting the lapsed (q.v.), those who under persecution had renounced Christianity, led to the opposition of Novatian and to the Novatian schism. When persecution was renewed in Rome by Gallus, he fled to Civitavecchia, and there met a martyr's death, in June, 253. His day is celebrated with that of St. Cyprian on September 14. His correspondence with St. Cyprian on the question of the lapsed is of great historic interest and value, especially on the question of the position of the Roman see. Consult Hartel's edition of the *Letters of Cyprian*, vol. ii (Vienna, 1871).

CORNELIUS, kôr-nā'lē-o͝os, KARL SEBASTIAN (1819–96). A German physicist, born at Ronshausen in Lower Hesse. He studied the exact sciences at Göttingen and at Marburg and from 1851 to the time of his death taught physics and physiography at Halle. His published works include: *Die Lehre von der Elektricität und dem Magnetismus* (1855); *Theorie des Sehens und räumlichen Vorstellens vom physikalischen, physiologischen, und psychologischen Standpunkte aus betrachtet* (1861, followed by another work on the same subject in 1864); *Meteorologie* (1863); *Ueber die Bedeutung des Kausalprinzips in der Naturwissenschaft* (1867); *Ueber die Entstehung der Welt* (1870); *Ueber die Wechselwirkung zwischen Leib und Seele* (2d ed., 1875, followed by another work on the same subject in 1880); *Grundriss der physikalischen Geographie* (6th ed., 1886); *Abhandlungen zur Naturwissenschaft und Psychologie* (1887).

CORNELIUS, PETER (1824–74). A German composer, nephew of the painter Peter von Cornelius, born at Mayence, Dec. 24, 1824. He studied for the stage, but, not meeting with success as an actor, he turned his attention to music. He became intimate with Liszt, who in 1858 produced his opera, *Der Barbier von Bagdad*, in Weimar, where, however, it failed. He then moved to Vienna, where he composed his second opera, *Der Cid*, produced in Weimar in 1865. In the same year he followed Wagner to Munich, where he was appointed to a professorship at the Königlische Musikschule. Although he devoted much of his time to fighting for Wagner's art, he produced his great choral works, op. 9–14, between 1868 and 1872. In 1869 he began his opera *Gunlöd*, which, however, progressed so slowly that when the composer died, Oct. 26, 1874, the work remained a fragment. His pupil C. Hoffbauer completed it from the sketches. E. Lassen reorchestrated it and produced it in Weimar in 1891. Cornelius' masterpiece is *Der Barbier von Bagdad*, which was completely rescored by Mottl and Levi and produced again in Munich in 1885. Its success was instantaneous and overwhelming, so that to-day it is in the regular repertoire of all German opera houses. In 1890 Seidl brought it out with great success at the Metropolitan Opera House, New York. Besides these works Cornelius wrote 69 songs for one voice and 7 duets, many of which are worthy to be ranked with the best songs of the great masters of song. Quantitatively Cornelius' musical output is rather

meagre, consisting of only 20 opus numbers, not including the operas. According to his own confession his close association with Wagner is to some extent responsible for this. His admiration of the Bayreuth master was so great that it almost suppressed his own creative impulses. Furthermore, Cornelius was a lyric poet of no mean order, a writer on music of unusual acumen, and a masterly translator. The chief characteristics of his music are nobility, refinement, and power of characterization. The more one studies it, the greater appears its charm. Cornelius' complete works were published in 1905 by Breitkopf and Härtel (5 vols.), his literary works and letters in 4 vols. Consult E. Istel, *Peter Cornelius* (Leipzig, 1904), and E. Sulger-Gebing, *Peter Cornelius als Mensch und Dichter* (Munich, 1908).

CORNELIUS, Peter von (1783–1867). A German historical painter, the founder of the Munich school. He was born, Sept. 23, 1783, in Düsseldorf, where his father was inspector of the gallery. From him the lad learned the rudiments of art, and from about 1795 he received instruction in the Düsseldorf Academy under Langer. His earliest works are unimportant, but after his removal to Frankfort-on-the-Main, in 1809, he acquired some celebrity. His first work of importance was his 12 drawings of Goethe's *Faust*, now in the Städel Institute of Frankfort. In 1811 he went to Rome, devoting himself to the study of the art of the Cinquecento, especially to that of Raphael and Michelangelo. He was associated with the so-called Nazarene painters, among whom he found a lifelong friend in Overbeck, but he was too independent to follow their footsteps. During this period he executed his famous drawings for the Nibelungenlied. Together with Overbeck, Veit, and Schadow, he received a commission to decorate a room in the house of the Prussian Consul at Rome, with scenes from the "History of Joseph." In executing this task he revived fresco painting, which had been almost forgotten since the days of Raphael Mengs. His work and that of his associates excited the greatest admiration, and they were engaged to decorate a room in the Villa Massimi, opposite the Lateran, with frescoes from the works of Dante, Ariosto, and Tasso. He had scarcely begun his work when there came a double call to return to Germany. The Prussian government invited him to become head of the Düsseldorf Academy, and Crown Prince Louis of Bavaria chose him to decorate the new Glyptothek in Munich.

Cornelius arranged to pass his winters in Düsseldorf, where a great crowd of students soon gathered about him, and his summers in executing the frescoes in Munich. He returned to Germany in 1819, and in 1820 he began his work upon the frescoes, which were carried out by his pupils, painting after his designs. In two great halls of the Glyptothek he represented the myths of the Greek gods and heroes in works which are masterpieces of drawing and composition. In 1825 he became director of the Academy of Munich and was raised to the nobility by King Louis I of Bavaria. He finished the frescoes of the Glyptothek, representing in the third hall scenes from the *Iliad*. All of this work, however, was executed by his pupils and may best be studied in the original cartoons by Cornelius, which are now preserved in the National Gallery of Berlin. In 1830 he began the decoration of the Ludwigskirche in Munich, with frescoes representing the "General Confession of Faith of the Christian Church." Contrary to his usual custom, he himself painted upon the large altar wall (62 × 38 feet) a fresco of the "Last Judgment." During the same time he made the designs for the "History of Christian Art" for the 25 loggie of the old Pinakothek, which were painted by Zimmermann.

After a disagreement with the King of Bavaria he was called to Berlin by Frederick William IV in 1841 and given a commission to decorate the proposed Campo Santo, a burial place for the royal family of Prussia. The four cartoons executed for this purpose, now in the National Gallery in Berlin, surpass all his previous work. This is especially true of the one containing the "Four Apocalyptical Riders," which is a masterpiece of conception, dramatic life, and boldness of drawing. On the other hand, the "Beatitudes" show appreciation for the beautiful and compact in outline. Until nearly the time of his death Cornelius was occupied with cartoons. He resided mostly in Rome, but returned to Berlin in 1861 remaining there until his death, which occurred March 6, 1867. During this last period he executed his design for a silver shield, which was a christening present of the King of Prussia to the Prince of Wales, his godson, representing the "Expansion of the Church." He also painted his dramatic picture "Hagen Casting the Nibelungen Treasure into the Rhine," now in the National Gallery, Berlin.

More than any other man, Cornelius dominated German art of the early nineteenth century. For decades his "cartoon style," with its emphasis of design and neglect of color, prevailed in mural decorations, especially at Munich, where his influence has only recently disappeared. His contemporaries held him in high repute, echoing the opinion of Crown Prince Louis: "There has been no painter like Cornelius since the Cinquecento." Modern critics, on the other hand, are not equally favorable, some of them, as Muther, going to the opposite extreme of considering his activity harmful. It is true that he imitated Michelangelo, and that imitation can never produce the healthiest and greatest art; that Cornelius' work is of an intellectual character, requiring study for appreciation; that his colors are poor, and that he is sometimes deficient even in drawing. But, on the other hand, his works were certainly great in composition and in conception. His tendency, like Michelangelo's, was heroic, indeed Titanic, but he was not insensible to grace and was capable of expressing the tenderest emotion. He was more of a designer than a painter, and his work must be judged by his cartoons. And certainly no painter exercised greater influence upon German art and imagination that did Cornelius in his great cycles of frescoes in Munich and in his cartoons in Berlin. Among his pupils were Wilhelm Kaulbach (q.v.), Carl Hermann, Eberle, and many others.

Consult the monographs of Von Wolzogen (Berlin, 1867), Riegel (Hanover, 1870), Förster (Berlin, 1874), Koch (Stuttgart, 1905), and Eckert, in *Künstlermonographien* (Bielefeld, 1906); Grimm, *Neun Essais* (Berlin, 1865); Valentin, in Dohme, *Kunst und Künstler des neunzehnten Jahrhunderts* (Leipzig, 1883);

Muther, *History of Modern Painting* (Eng. trans., London, 1895).

CORNELIUS À LAP'IDE (1568–1637). A Roman Catholic commentator, whose name was Van den Steen. He was born at Bocholt, near Liége. He became a Jesuit and lectured on the Scriptures in Louvain and in Rome, where he died. His fame rests upon his commentary on all the Bible except Job and the Psalms, the first complete edition of which was published in 10 vols., folio (Antwerp, 1681). The best edition appeared in Lyons (1838), in 11 vols., and an English translation of parts of it has been published (3 vols., London, 1876–87).

CORNELL', Alonzo Barton (1832–1904). An American politician, son of Ezra Cornell (q.v.). He was born at Ithaca, N. Y., became a telegraph operator, and from 1855 to 1859 was manager of the Central Telegraph Office in New York City. Afterward he was first vice president of the Western Union Telegraph Company. In 1868 he was the Republican candidate for Lieutenant Governor of New York, and from 1869 to 1873 was surveyor of customs in New York. By calling to order a Republican State convention he was held to have violated President Hayes's order that officeholders refrain from politics, and as a consequence he lost the surveyorship. He was chairman of the Republican State Committee from 1870 to 1878 and was three times Speaker of the New York Assembly. From 1880 to 1883 he was Governor of New York, after which he became connected with large financial interests. He wrote *The Life of Ezra Cornell* (1884).

CORNELL, Ezra (1807–74). An American capitalist and philanthropist, the founder of Cornell University. He was born in Westchester Co., N. Y., of Quaker parentage; removed with his father, a potter by trade, to De Ruyter, N. Y., in 1819; received a scant education and for some time taught a district school, besides assisting his father in farming and the making of pottery. He also learned the carpenter's trade, spent a year as a mechanic at Homer, N. Y., and in 1826 removed to Ithaca, where for eight years he managed a flour mill. In 1839 he joined his brother in the lumbering and farming business, but his attention being turned accidentally in 1842 to the project of constructing a telegraph line from Baltimore to Washington, he invented a machine for laying the wires underground and was subsequently put in charge of the work. The insulation being poor, however, the plan had to be abandoned, and on Cornell's suggestion the wires were strung on poles, and the line was thus speedily completed. Subsequently Cornell devoted his attention almost wholly to the construction of telegraph lines and the organization of telegraph companies, and was instrumental in forming the Western Union Telegraph Company in 1855. In 1858, having accumulated a large fortune, he settled on a farm at Ithaca, N. Y. He was a member of the first Republican National Convention in 1856, was president of the New York State Agricultural Society in 1862, and was a member of the State Assembly in 1862–63, and of the State Senate in 1864–67. After the passage of the Morrill Land-Grant Act in 1862 he succeeded in getting a bill through the Legislature assigning the whole of New York's land scrip to one institution, and in addition contributed an endowment of $500,000 towards building such an institution at Ithaca, N. Y. He subsequently (in 1866) bought up the scrip then remaining unsold and located it with great care in the timberlands of Wisconsin, of which the later advance in value greatly increased the endowment of the university. In 1868 "The Cornell University," so founded, was formally opened. Cornell also built a public library at Ithaca. Consult *The Life of Ezra Cornell*, by his son, A. B. Cornell (New York, 1884).

CORNELL COLLEGE. An institution of higher learning founded at Mount Vernon, Iowa, by members of the Methodist Episcopal church in 1853. It was not organized as a college until 1857. It includes an academic department and a department of civil engineering and is coeducational. The degrees are B.A., B.S., and B.S. in C. E. The enrollment in the college in 1913 was 704, and the faculty numbered 41. Besides the college proper, the organization includes an Academy, a Conservatory of Music, a School of Art, and a School of Oratory. The principal buildings of the college are the Library and College, Science, Chapel, Bowman, and Conservatory halls. The endowment amounted to about $900,000, and the annual income to about $90,000. The library contains about 39,000 volumes. The president in 1914 was James Elliott Harlan, LL.D.

CORNELL UNIVERSITY. An institution of higher education, situated at Ithaca, N. Y. The university owes its existence to the combined wisdom and bounty of the United States, the State of New York, and Ezra Cornell (q.v.). Under the Morrill Act of 1862 the State of New York received scrip representing 989,920 acres of land as its share of the public lands granted by the Federal government to the several States for the purpose of establishing colleges of agriculture and mechanic arts. Ezra Cornell offered $500,000 as an endowment fund for a university on condition that the State should set aside the proceeds of the sale of its public lands for the same purpose, and that the narrower purpose of the Act of Congress in establishing colleges of agriculture and the mechanic arts should be enlarged to the breadth of his own memorable ideal: "I would found an institution where any person can find instruction in any study." After much wrangling in the Legislature, this offer was accepted, with the stipulation, however, that the university should offer free tuition to as many students residing in the State as there were Assembly districts. Cornell University was incorporated in 1865 and was formally opened in 1868, with a registration of 412 students. The plan of the whole institution was modeled with a view to the practical tendencies of the times, though classical and humanistic studies were provided for as amply as science and technology. Its liberal programme was warmly welcomed by such men as James Russell Lowell, Louis Agassiz, Theodore D. Dwight, John Stanton Gould, Goldwin Smith, George William Curtis, and Bayard Taylor, who signified their interest in it by accepting nonresident professorships on its faculty. Andrew D. White gave up for a while the prospects of a political career to become its first president. This auspicious beginning, however, was not maintained. From 1868 to 1882 the university was engaged in a struggle for existence that seriously diminished its students, disheartened its trustees, and brought the whole structure to the verge

of bankruptcy. Mr. Cornell, seeing that the State's land scrip, on whose proceeds the university was solely dependent except for the original endowment of $500,000, was selling at about 50 cents an acre, a sum far less than its ultimate worth, bought up all the unsold "scrip" and located and transferred to the university before his death over 500,000 acres of the finest timberlands in Wisconsin. But the anticipated advance in forest values did not take place, taxes and cost of administration amounted to over $60,000 a year, and the university was soon obliged to trench heavily on its capital to meet current expenses. A way of escape that offered in 1880 was blocked by Henry W. Sage, chairman of the board of trustees. In that year a New York syndicate proposed to buy 275,000 acres of the Western lands for $1,225,000—an amount that would have released the trustees from their troubles. But Mr. Sage, believing that the lands would go still higher, refused his consent, and the bargain fell through. Less than two years later his faith was vindicated; 140,000 acres were sold for $2,320,000, other sales were made later at increasing prices, and the university up to 1905 realized a net profit of some $5,765,000. Besides its income from these sources Cornell received large private gifts. Henry W. Sage gave altogether $1,175,000; Andrew D. White, $200,000; O. H. Payne, $970,000 for the New York branch of the Medical College; W. H. Sage, $270,000; Hiram Sibley, $155,000; D. B. Fayerweather, $340,000; J. D. Rockefeller, $250,000; Dean Sage, $235,000; John McGraw, $140,000; and H. W. Sibley, $160,000.

Out of the 2704 students enrolled in the first five years, 2347 entered on the minimum entrance requirements. In 1872 the university became coeducational, and in 1877, in spite of the constant decrease in attendance, the entrance requirements were somewhat raised. In 1882 the faculty, including instructors and assistants, numbered but 49. The additions made to the library were few. During this anxious period in the history of the university the members of the faculty, ill paid and overworked, loyally stood by it and pursued their work notwithstanding all difficulties. New courses were offered in the departments of civil and mechanical engineering, architecture, agriculture, the sciences, humanities, and military science. After 1882 the university developed and expanded in accordance with the original idea of the founder. The Law School and the Andrew D. White School of History and Political Science were organized in 1887. The Sage School of Philosophy, which has become known for its work in mental and moral philosophy and in experimental psychology, was organized in 1890. President Schurman appealed to the State in 1892 for further aid, on the ground that Cornell, although not a State institution in the strict sense of the term, was educating 512 students free of tuition, and that the State was especially interested in education, agriculture, and allied subjects, for which, like the Western States, it should supply the necessary funds. The Legislature generously responded to his appeal by establishing at Cornell University the State Veterinary College in 1894, the State College of Forestry, the first institution of its kind in the United States, in 1898, and the State College of Agriculture in 1904, for the maintenance of which large legislative appropriations are annually made. The situation of Cornell University in a small town prevented it from adding a medical school to its departments, although a medical preparatory course has existed since its inception. In 1898 this problem was solved by establishing a medical college in the city of New York, with a branch at Ithaca, where the first two years of the course may be taken. In the same year the entrance requirements, which had been much raised since 1892, were put on a footing equivalent to those of the leading universities in the United States.

Cornell University comprises the following departments and colleges (the attendance given is in all cases that of 1912–13): 1. The Graduate Department, having charge of all students pursuing graduate work at the university under the several faculties. This department offers courses leading to the degrees of A.M., Ph.D., etc. It numbered 395 students. Twenty-four fellowships, ranging from $500 to $600 a year, and 17 scholarships, of the annual value of $300 a year, are available for students. 2. The College of Arts and Sciences offers elective courses leading, whether sciences, letters, or the classics are mainly chosen, to the degree of A.B. The attendance was 1112. 3. The College of Law offers courses leading to the LL.B. degree and numbered 297 students. 4. The Medical College, partially conducted at New York City, confers the degree of M.D. and numbered 150 students. 5. The College of Agriculture offers courses leading to the B.S.A. degree and numbered 1849 students. Connected with this college is an agricultural experiment station, established by the Federal government in 1887. 6. The New York State Veterinary College confers the degree of D.V.M.; its attendance was 120. 7. The College of Architecture confers the degree of B.Arch. and had an attendance of 144. 8. The College of Civil Engineering confers the degree of C.E. and numbered 503 students. 9. Sibley College of Mechanical Engineering and Mechanic Arts, consisting of the departments of mechanical, electrical, experimental engineering, the department of mechanic arts, etc., confers the degree of M.E.; its total registration was 956.

Undergraduates are required, except for special reasons, to take a course of military drill, extending over one year, under the supervision of a United States army officer.

The government of the university is vested in a board of 39 trustees, the university faculty, composed of the professors and assistant professors, having charge of educational matters concerning the university as a whole, and the faculties of the several schools and colleges, who have charge of their respective divisions.

The number of regular students in 1912–13 was 4803, of whom 466 were women. To these must be added an enrollment of 1392 in the summer session and 597 in the winter school in agriculture. The staff of instruction numbered 750. The principal buildings of Cornell University include the $300,000 Library, the gift of Henry W. Sage; Sage College and Prudence Risley Hall, dormitories for women; Boardman Hall, Stimson Hall, Sibley College, Franklin Hall, Lincoln Hall, Rockefeller Hall, Morrill Hall, McGraw Hall, White Hall, Goldwin Smith Hall, Rand Hall, Auditorium, Home Economics building, and the several buildings of the veterinary and agricultural colleges. The campus, situated on a hill looking down upon Cayuga Lake and surrounded by gorges, falls, and cascades, is considered one

of the most beautiful in the world. Barnes Hall and Sage Chapel represent the religious life of the university. The libraries, including the famous Andrew D. White collection on the Protestant Reformation and the French Revolution and the Fiske Dante, Petrarch, and Icelandic collections, contain 427,000 volumes, besides 64,000 pamphlets. The income of the university is about $2,487,510 a year. The presidents since its conception have been: Andrew D. White, LL.D. (1865–85); Charles Kendall Adams, LL.D. (1885–92); Jacob Gould Schurman, LL.D. (1892–).

COR'NER. A commercial term originating in the United States, and denoting the operation, —or, more properly, the resultant effect—of acquiring contracts for the delivery of so much of a commodity, or of the stock or certificates of indebtedness of a corporation, as to raise abnormally the values thereof, to the advantage of the buyers. A corner is "effective" when those who have contracted to sell and deliver the stock or commodity are forced, for lack of other supply, to buy it, or the certificates or warehouse receipts representing it, from the buying or cornering pool at the pool's prices. Conversely, a corner is "smashed" when the buyers, finding their means inadequate to their operations, are forced to throw their holdings on the open market, or when those who have contracted to deliver the stock or commodity are able to obtain it independently of the pool. For the latter reason, because the total supply is not strictly determinable nor all obtainable, attempted corners in wheat and other actual commodities are seldom successful. On the other hand, corners in stocks and certificates having definite total issues may be carried just to the point where they bankrupt the seller, i.e., to a point where, if the prices are put any higher, the sellers repudiate their contracts and the corner is smashed for lack of a market. The possibility of any considerable corner arises from buying and selling on margin. In this usual and speculative form of stock dealing the broker or commission house lends the buyer or seller the money needed for the deal, demanding, however, for his own protection, a deposit of 5, 10, or 20 per cent of the face value of the contracts made. The dealer is thus enabled to buy or sell stock to a value of from 5 to 20 times the amount of his actual capital, and a combination of large dealers can without difficulty buy or sell the whole stock issue of the largest trusts or railroads. If, now, such a combination sells, i.e., agrees to deliver, practically the entire issue of a road, they may find when they attempt to buy the stock to fill their contracts that it is already held by the very persons to whom they contracted to sell it. That is, a rival combination has been secretly working against them, and the sellers of the stock are forced to buy the stock at exorbitant prices and then sell it back to those for whom they bought it. This is the process technically known as "squeezing the shorts." Until recent years nearly all corners of importance were manipulated for speculative reasons, i.e., for the immediate gain of the operators and without any view to investment. Of such a nature was the famous gold corner, organized in New York by Jay Gould and his associates. This corner, culminating on "Black Friday," Sept. 24, 1869, was smashed by the release of government gold by the Secretary of the Treasury—thus rendering the "shorts," or sellers of gold, independent of the cornering syndicate that held the gold which the "shorts" had agreed to sell. Latterly, however, many corners or corners in effect have resulted, incidentally and often to the regret of all concerned, from the effort of rival combinations to buy the control of some large trust or railroad for permanent investment and administrative purposes. Of this kind was the corner in the Northern Pacific Railroad in May, 1901, when the price of the stock rose abruptly to 1000 bid. For an account of the gold corner of 1869, consult Boutwell, *Reminiscences of Sixty Years in Public Affairs* (New York, 1902). For an interesting account of the actual manipulation of a corner, consult Frederic, *The Market Place* (London, 1899). See MARGIN DEALS; SHORT; SPECULATION; TRUSTS.

COR'NET (OF., Fr. *cornet*, from ML. *cornetum, corneta*, bugle, dim. of *cornu*, horn). A stop or series of pipes in an organ, intended to imitate the tone of an obsolete wind instrument which has been superseded by the oboe. The CORNET-À-PISTON (Fr., cornet with pistons), a modern brass or silver wind instrument of the trumpet kind, has two or three valves and in brass bands takes the soprano and contralto parts. Its range is from c^1 to c^3. It was first introduced in France as an orchestral instrument. The cornet-à-piston produces very penetrating tones, though less powerful than those of the trumpet. The rapidity of execution in runs, trills, staccatos, etc., which can be attained on this instrument, combined with the pealing quality of its tones, has made it the favorite solo instrument in open-air band concerts; but this very resonance will most likely keep it out of the symphonic orchestra.

CORNET (Fr. *cornette*, standard, so called as having two points or horns, dim. of *corne*, from Lat. *cornu*, horn). Formerly the lowest commissioned rank in the British cavalry, so called because the cornet carried the standard. Its equivalent rank in the infantry was the ensign (q.v.). In 1871 the titles of cornet and ensign were changed to second lieutenant.

CORNETO, kôr-nā'tô, or CORNETO TARQUINIA (from It. *corno*, horn). A town of central Italy, about 12 miles north of Civitavecchia, occupying a commanding eminence on the left bank of the Marta, and 2 or 3 miles from the Mediterranean, over which it has an extensive view. Corneto arose near the ruins of the Etruscan city of Tarquinii, and was built in part from its remains. It was erected into a city by Pope Eugenius IV in 1432, but the picturesque old battlemented walls and towers which surround it are said to belong to an earlier period. During the wars of the Guelphs and the Ghibellines this city maintained a firm allegiance to the popes. Pop. (commune), 1910, 6617. The scanty remains of Tarquinii lie about 1½ miles from Corneto. Tarquinii was regarded as one of the most ancient and important of the Etruscan cities and took part in the wars with Rome in the fourth century B.C., but later, with the rest of Etruria, came under the Roman dominion. It seems to have been destroyed by the Saracens. The Necropolis of Tarquinii, which is far the most important relic of the ancient city, is on the same hill as the modern city and extends into the neighboring plain. It is of great extent and has been said to cover 16 square miles. Many tombs have been opened, but most of them had been plundered in early times. The most important tombs are those decorated with paintings on the walls; noteworthy are the Grotta

CORNFLOWER, ETC.

1. COCKLEBUR (Xanthium strumarium).
2. CORNFLOWER (Centaurea cyanus).
3. CALISAYA (Cinchona calisaya), var. Ledgeriana.
4. COLCHICUM (Colchicum autumnale).
5. COCA (Erythroxylon coca).
6. NIGHT-BLOOMING CATCHFLY (Silene noctiflora).

delle Iscrizioni (probably one of the earliest), Grotta del Barone, Grotta Querciola, Grotta del Convito Funebre, Grotta del Tifone, and Grotta dell' Orco. Consult: Dennis, *Cities and Cemeteries of Etruria* (London, 1907); Dasti, *Notizie di Tarquinia e Corneto* (Rome, 1878); and the periodical *Notizie degli Scavi* (1906, 1907).

CORN FLAG. See IRIS.

CORN'FLOW'ER, or BLUEBOTTLE (*Centaurea cyanus*). A plant of the family Compositæ, indigenous to Europe, where it is a common weed in grainfields and whence it has spread to other countries. Its long, slender, branched stems, which reach a height of from 1 to 2½ feet, bear terminal flower heads about 1½ inches in diameter during summer and autumn. These flower heads have a wreathlike appearance, due to the neutral ray florets, and from early times have been favorites for making garlands. Being hardy and of easiest culture, the cornflower has become one of the most popular annuals in American flower gardens and has developed many varieties, which range through various shades from deepest blue to white. In the United States it has at least 15 names, the commonest of which is perhaps "bachelor's-button," a name also applied to two other plants, *Ranunculus acris* and *Gomphrena globosa*.

CORN'HILL. An important London street, named from a corn market formerly held there. The Tun, a prison, and the Standard, a water conduit, stood upon it in mediæval times.

CORNIANI, kôr'nê-ä'nê, GIAMBATTISTA, CONTE DI (1742–1813). An Italian literary historian, born at Orzi-Nuovi (Brescia). In his youth he studied law and wrote for the theatre; but afterward he became connected with the College of Brescia and published some works on agriculture. In 1797 he was made one of the Tribunal of Cassation for the Cisalpine Republic. The work for which Corniani is best known is a literary history of Italy, *I secoli della letteratura italiana* (1804–13; new ed. by Ticozzi, 1832, and by Ticozzi-Predari, 1854–56).

COR'NICE (OF., It. *cornice*, ML. *cornix*, border, from Gk. *κορωνίς, korōnis*, garland, from *κορωνός, korōnos*, curved; connected with Lat. *corona*, crown, Ir. *cor*, circle). In architecture, the projecting cope or coping at the top of a wall; the crowning member of an entablature (q.v.). Its origin is to be found in the decoration of the eaves or projecting edge of the roof; its earliest forms recall primitive eaves construction; but, like so many forms derived from structural devices, it early became a decorative feature, quite independent of the eaves and even of the roof. The Egyptian cornice, invariably a high projecting cavetto and fillet above a round bead or torus, was probably derived from the overhanging eaves of papyrus stalks and earth in primitive huts. The Greeks developed two chief types of cornice in the Doric and Ionic orders, both recalling early eaves construction in wood. To these the Romans added a third, the Corinthian, of more ornate design than either, and these types have persisted through all the ages since, though with endless variations of detail. In all cornices of classic type the essential feature is the *corona* (q.v.), the broadly projecting square-edged member which casts the wide shadow which is one of the most important decorative effects of a cornice. A group of mouldings, called the *bed-mold*, supports this shelf, and it is usually crowned by a *cymatium* or crown molding, which generally forms the front of the gutter or eaves trough. This, however, is wanting on the Greek-Doric cornice, except upon the sloping or *raking* cornices of triangular pediments. The bed-mold may be plain or adorned with dentils; and the cornice may be further enriched with modillions or brackets, as in the Corinthian and Composite orders, or with *mutules*, under the corona, as in the Doric.

In Syrian-Christian and in Byzantine architecture the classic types were greatly modified, and in early Christian or basilican buildings the cornice gradually lost its importance. The Romanesque builders in Italy devised a new type, the arcaded, borne on small arches resting on corbels; in the West they more often employed the corbel table—a plain stone shelf or cope resting on corbels without arches or moldings. Gothic art, emphasizing vertical lines, subordinated the cornice as an architectural feature. Gothic cornices are little more than groups of vigorous moldings under a bevel-topped coping; but in some cases a deep hollow under the coping is filled with richly carved vines, leafage, or rows of crockets. The Renaissance revived the classic types, which are in general use to-day. As the top member of an entablature, the cornice is used not merely to mark the edge of the roof, but also as a band between successive stories, and as the topmost feature and finish in furniture and many forms of minor architecture. See ENTABLATURE; ORDERS OF ARCHITECTURE.

CORNICHE, kôr'nêsh', ROUTE DE LA (Fr., cornice road). A renowned carriage road following the coast line of the Riviera between Nice and Genoa. It is noted for its striking views, particularly between Nice and Mentone, and is much traveled in preference to the railway.

CORNIDES, kôr'nê-dēs, DANIEL VON (1732–87). An Hungarian historian, born at Szent-Miklós. He studied philosophy and theology at Erlangen, Germany. As the companion of Count Joseph Teleki, he visited Italy, Germany, and France, and while in Germany contributed greatly to the enlargement of the Hungarian department in the University of Göttingen and other institutions. In 1784 he was appointed librarian and professor of heraldry and diplomacy at the University of Pest. His principal works include: *Regum Hungariæ, qui Sæculo XI Regnavere, Genealogia* (Pressburg, 1778); *Bibliotheca Hungarica* (Pest, 1792); *Commentatio de Religione Veterum Hungarorum* (Vienna, 1791); *Vindiciæ Anonymi Belæ Regis Notarii* (Buda, 1802).

CORNIF'EROUS SERIES (from Lat. *cornu*, horn + *ferre*, to bear). In American geology, the second of the four great divisions of the Devonian system, so named on account of the hard cherty nodules found in many of its limestones. It includes the Schoharie and Corniferous stages. The rocks of the Corniferous series —mostly sandstones and limestones—are found along the Appalachians, in Ohio, and in Canada, where they inclose valuable deposits of petroleum. See DEVONIAN SYSTEM.

CORNIFICIUS, kôr'nê-fish'ī-ūs. A Roman, unknown, save for Quintilian's references to him as author of a work on rhetorical figures, and, perhaps, of a general work on rhetoric. We still have four books entitled *Rhetorica*, and dedicated *ad Herennium*. Since many passages quoted by Quintilian from Cornificius appear in the *Rhetorica ad Herennium*, it was long held that Cornificius was author of the treatise. Re-

cent opinion, however, is against this view. Consult the editions by Kayser (Leipzig, 1854), Friedrich (part i, vol. i, of the Teubner *Cicero*, Leipzig, 1884), and Marx, who refuses to recognize the authorship of Cornificius and has published the text under the title *Incerti Auctoris de Ratione Dicendi ad C. Herennium Libri IV* (Leipzig, 1893); Kröhnert, *Die Anfänge der Rhetorik bei den Römern* (Memel, 1871). Schauz, *Geschichte der römischen Litteratur*, § 197 a (3d ed., Munich, 1909), has also ceased to regard Cornificius as the author of the treatise *ad Herennium*. For further discussion of the question of authorship and a good account of the contents of the treatise, see the introduction to Wilkins's edition of the *De Oratore* of Cicero, vol. i, pp. 51–64 (2d ed., Oxford, 1888).

CORNIFICIUS, QUINTUS (?–c.40 B.C.). A Roman general, a contemporary of Cicero. During the Civil War he supported Cæsar, by whom he was appointed Governor of Syria and afterward of Africa. After Cæsar's death he maintained the latter province for the Senate, but on the establishment of the Second Triumvirate was defeated and slain in battle by T. Sextius. Cornificius appears to have been distinguished also for his literary abilities.

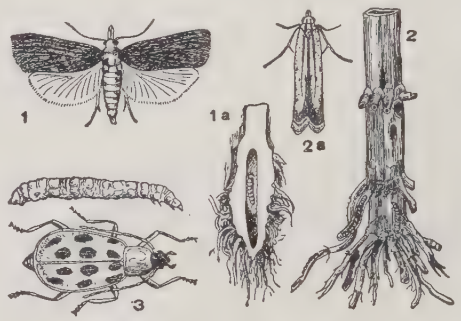
CORN'ING. A city and the county seat of Adams Co., Iowa, 77 miles east-southeast of Council Bluffs, on the Burlington Route (Map: Iowa, C 4). It has a public library and a fine Masonic Temple. Agriculture and stock raising are the chief industries, and brick and tile are manufactured. Corning was incorporated under a State Law of 1871. It was formerly the seat of an Icarian settlement. The government is administered by a mayor and a unicameral council. The city owns its water works. Pop., 1910, 1702.

CORN'ING. A city and the county seat of Steuben Co., N. Y., 18 miles by rail west-northwest of Elmira; on the Chemung River, and on the New York Central, the Erie, and the Lackawanna railroads (Map: New York, C 6). Among the more prominent buildings are the city hall, free academy, public library, Corning Hospital, courthouse, city club, and St. Mary's Orphan Asylum. Corning has extensive manufactures of cut and flint glass, railway supplies, pneumatic drills, air compressors, terra-cotta goods, building and paving brick, lumber, sash and blinds, etc. Corning was incorporated as a city in 1890. Under the revised charter of 1905 the mayor holds office for two years and the council is elected. The board of public works, police, fire, and civil-service commissioners, and the board of health are appointed by the mayor and council. The water works are owned by the city. Pop., 1910, 15,730; 1920, 15,820.

CORNING, ERASTUS (1794–1872). An American capitalist, born in Connecticut. In 1814 he settled in Albany, N. Y., where, as owner of the large ironworks there and later as a banker, he accumulated a large fortune. He was largely interested in the formation of the New York Central Railroad, of which he was president for 12 years. He was also active in promoting popular education and, taking part in public affairs, served as a State Senator in 1842–45 and as a Democratic Representative in Congress in 1857–59 and again in 1861–63.

CORNING, J(AMES) LEONARD (1855–1923). An American neurologist, born at Stamford, Conn., and educated at the universities of Heidelberg and Würzburg. He is known as the discoverer of spinal anæsthesia and as the first to inject liquid paraffin into the tissues, there to solidify; he also demonstrated that the action of stimulants, sedatives, and certain other medicinal substances may be increased if the subject remains in compressed air. As consulting neurologist he served various New York hospitals and, besides his contributions to the medical press, wrote: *Carotid Compression* (1882); *Brain Rest* (1883); *Brain Exhaustion* (1884); *Local Anæsthesia* (1886); *Hysteria and Epilepsy* (1888); *A Treatise on Headache and Neuralgia* (1888; 3d ed., 1894); *Pain in its Neuro-Pathological and Neuro-Therapeutic Relations* (1894); and also a romance, *The Princess Ahmedée* (1900).

CORN INSECTS. Insects affecting Indian corn are numerous and varied.—*Plant Lice:* An aphis (*Rhopalosiphum maidis*) is widely distributed by means of its migratory winged



INSECTS INJURIOUS TO INDIAN CORN.

1. Larger cornstalk borer (*Diatræa*): *a*, boring larva within the base of the stalk. 2. Smaller borer (*Pamfelia*): *a*, the moth at rest. 3. A flea beetle (*Diabrotica*) and its root-destroying grub.

swarms; it lays its eggs on the stems of the corn beneath the ground, and the young attack the roots; the ants assist this injury by carrying females heavy with young and colonizing them upon the roots. (See *Insect Life*, vols. i, iii, Washington, 1888–90.)—*Beetles:* Certain weevils attack the roots and stems, especially bill bugs of the genus *Sphenophorus*, the grubs burrowing in the bulbs of the young plants and eating the roots of the tender leaves near the surface of the ground; their work is sometimes confounded with that of a cutworm (larva of *Hadena stipata*). Fall plowing is useful against both. The larvæ of several flea beetles (Diabrotica) are often styled corn rootworms. The adult beetles, closely related to the cucumber, melon, and squash beetles, feed on the pollen and silk of corn and the larvæ on the roots, and both do great damage in the Mississippi valley. Rotation of crops is the most effective remedy. The corn silvanus (*Silvanus surinamensis*) is prominent as destructive to grain. From an economic standpoint this is the most important member of the family Cucujidæ. It is a flat beetle with the edges of the prothorax saw-toothed. Besides Indian corn, wheat, and other grain, it infests dried fruits and other foodstuffs. Another member of the same family, a bright-scarlet beetle, of the genus *Cucujus*, also infests stored grain.—*Moths:* The larvæ of moths, "cutworms" and "webworms," do much damage. The worst species, however, is the "corn worm," or "corn bud worm," the caterpillar of a noctuid moth (*Heliothis armigera*), which destroys the flower buds.

(See COTTON INSECTS.) The large "stalk borer," often highly injurious in Southern fields, is the larva of a phalænid moth (*Diatræa saccharalis*), which perforates the stems at their base, where, in the axils of the starting leaves, the parent moth lays its eggs in spring. This insect is better known as the "sugar-cane borer" of the American tropics. Tidy methods of farming are the best preventive. Other smaller borers are the caterpillars of the moths *Pempelia lignosella* and *Gortyna nitela*. The cinch bug (q.v.) is also an enemy of Indian corn. Consult: Riley, "Insects of Missouri," in *United States Department of Agriculture, Division of Entomology, Reports 1 and 3* (Washington, 1881); Lintner, "Insects of New York," in *Agricultural Experiment Station, Report 1* (Albany, 1882); Comstock and Slingerland, "Wireworms," in *Agricultural Experiment Station, Bulletin 33* (Ithaca, 1891); Myrick (ed.), "Corn Pests and Diseases," in *The Book of Corn* (New York, 1904); Chittenden, "Corn Root-Worms," *United States Department of Agriculture* (Washington, 1905); Webster, "The Corn Leaf-Aphis," *United States Entomological Bureau* (Washington, 1907); Forbes, "Experiments with Repellants against the Corn Root-Aphis, 1905 and 1906," *Illinois Experiment Station* (Urbana, 1908); Garman, "The Corn Root-Worms," *Kentucky Agricultural Experiment Station, Bulletin No. 130* (Lexington, 1907); *id.*, "Corn Pests," *Bulletin No. 145* (1909); Vickery, "Papers on Cereal and Forage Insects," *United States Entomological Bureau* (Washington, 1910); Turner, "Bud Worms in Corn," *Alabama Experiment Station, Circular No. 8* (Opelika, 1911); Kelly, "The Maise Bill-Bug," *United States Entomological Bureau, Bulletin 95*, part ii (Washington, 1911); Fulloway, "Insects Injurious to Corn," *United States Entomological Bureau* (ib., 1912).

CORNISH LANGUAGE AND LITERATURE. The Cornish language belongs to the British subdivision of the Celtic family and stands, on the whole, nearer to the Old Breton than to the Old Welsh. (See CELTIC LANGUAGES.) It ceased to be a living language in the eighteenth century, although a small number of Cornish words are still used in the English dialect of Cornwall.

Only a small quantity of Cornish literature has been preserved. For the Old Cornish period, of which the language is practically the same as Old Breton, nothing exists but a few proper names in old records. For Middle Cornish we are somewhat better off. A vocabulary of the twelfth or thirteenth century has been preserved, which appears to be a copy of a more ancient original, and also a few texts dating from the fourteenth century to the seventeenth. The Middle Cornish literature, like the Middle Breton, consists almost entirely of religious poetry and drama. These monuments scarcely go beyond the fifteenth century.

For Old Cornish, consult: Stokes, "The Manumissions in the Bodmin Gospels," *Revue celtique*, vol. i (Paris, 1870), and *Urkeltischer Sprachschatz* (Göttingen, 1894); Henry, *Lexique étymologique du breton moderne* (Rennes, 1900); Pedersen, *Vergleichende Grammatik der keltischen Sprachen* (Göttingen, 1909–13). The Middle Cornish vocabulary is printed in Zeuss, *Grammatica Celtica*, ed. by Ebel (Berlin, 1868–71). For the other monuments, consult: Norris, *The Ancient Cornish Drama* (Oxford, 1859); Stokes, "Pascon Agan Arluth," *Transactions of the Philological Society* (London, 1861–62); *Beunans Meriasek* (ib., 1872); Jenner, *The Cornish Language* (ib., 1873–74); Jago, *The Ancient Language of Cornwall* (Truro, 1882). For grammars, consult Jenner, *Handbook of the Cornish Language* (London, 1904), which treats of the language chiefly in its latest stages, with some account of its history and literature. DICTIONARIES: R. Williams, *Lexicon Cornu-Britannicum* (Llandovery, 1865); Loth, *Remarques et corrections au lexicon de Williams* (Paris, 1902); further corrections and additions in the *Revue celtique* (vol. xxiii, pp. 237–302; Paris, 1902); Stokes, *Cornish Glossary* (London, 1868–69); Jago, *English-Cornish Dictionary* (ib., 1887); Loth, "Etudes corniques," in *Revue Celtique*, vols. xviii–xxvi (1897–1905); *Les mots latins dans les langues brittoniques: gallois, armoricain, cornique* (Paris, 1892).

CORN LAWS. A name given in England to the long series of statutes dating as far back as the reign of Edward III and terminating only in the year 1846, which had for their object the regulation of the trade in grain. The tenor of these laws varied with the idea which was uppermost in the minds of the legislators. At one time designed to secure a proper supply of grain, the exportation of grain was prohibited, or allowed only when a surplus of the home supply revealed itself in the low price for grain. Later the underlying principle was frankly the encouragement and support of the agricultural interests, resulting in the prohibition of the importation of grain, or permitting it only when the price of grain was extremely high and importation seemed unavoidable to prevent famine. At times, moreover, in the long and varied history of this legislation, resort was had to bounties as means of encouraging and promoting home production. The shifting of legislation attracted little comment and less agitation until the beginning of the nineteenth century. At that time the manufacturing interests grew restive under the restrictions which were placed upon the trade in grain, and early in the century something in the nature of a compromise was made by the adoption of a sliding scale in the duties on importation. The object of this device was to reduce the import duties in proportion as the price of grain increased, so that at famine prices grain might be imported duty free. By the Act of 1828, at the price of 62s. a quarter for wheat, the import duty was £1 4s. 8d. For every shilling less in the price, a shilling was added to the duty, but when the price rose above this point the duty decreased by a larger ratio than the rise in price. At the price of 69s. the duty was 15s. 8d., and at 73s. the duty sank to its minimum of 1s. Such an arrangement not only promoted speculative operations, but also prevented foreign countries from furnishing grain habitually for the British market.

This legislation was obviously in the interest of the landowners, but as the tendency of Great Britain to be an importing rather than an exporting country had already become manifest, it seemed clear that the effort to increase home production by restrictions on importation was virtually an attempt to aggrandize the landed interest by a tax upon the food of the people. The manufacturing interests, which were now rapidly coming into power, devoted their energies to combating this principle, which increased

the cost of living, and, through wages, the cost of manufacturing. But the public at large, though vaguely conscious that the laws were at variance with the principles of political economy, did not, till the very last, earnestly unite in calling for repeal. There was a powerful party who represented with wonderful plausibility that these restrictive statutes were identified with the best interests of the country. Their arguments might thus be summed up: 1. Protection was necessary, in order to keep certain poor lands in cultivation. 2. It was desirable to cultivate as much land as possible in order to improve the country. 3. If improvement by that means were checked, England would be dependent on foreigners for a large portion of the food of the people. 4. Such dependence would be fraught with immense danger; in the event of war supplies might be stopped, or the ports might be blockaded, the result being famine, disease, and civil war. 5. The advantage gained by protection enabled the landed proprietors and their tenants to encourage manufactures and trade; so much so, that if the corn laws were abolished, half the country shopkeepers would be ruined; that would be followed by the stoppage of many of the mills and factories, and no one would venture to say what would be the final consequences. It cannot be uninstructive to put on record that these arguments exercised a commanding influence over the laboring classes, the small town shopkeepers, almost all the members of the learned professions, and a considerable section of both houses of Parliament. Yielding at length to the continued agitation, and recognizing that England's prosperity lay in the development of her manufactures rather than in the further encouragement of agriculture, Sir Robert Peel, in 1846, at the time of the Irish famine, effected the repeal of the Corn Laws. By this act the maximum duty on foreign wheat was immediately reduced to 10s. per quarter when the price was under 48s., with lower duties as prices rose above that figure; these duties to cease on Feb. 1, 1849, after which the duty should be 1s. per quarter. (See ANTI-CORN LAW LEAGUE; COBDEN, RICHARD.) The area devoted to wheat cultivation in England is less to-day than it was 50 years ago, although the population has greatly increased. Modern methods of communication, however, have opened up new areas of supply, and the development of manufactures and commerce has amply compensated for the loss in agricultural production.

The following tables show the trade prior to and following the repeal of the Corn Laws:

IMPORTS OF FOREIGN WHEAT, CURRENT PRICES OF WHEAT, AND DECLARED VALUE OF ALL BRITISH EXPORTS FROM 1801 TO 1859

AVERAGE PERIOD OF TEN YEARS	Average amount of wheat imported	Average price of wheat during each period	Average total declared value of all British exports
	Bushels	*s.* *d.*	£
1801 to 1810	600,946	81 5	40,737,970
1811 " 1820	458,578	84 11	41,506,794
1821 " 1830	534,992	58 3	36,600,536
1831 " 1840	907,638	56 10	45,249,037
1841 " 1850	2,877,999	53 3	57,412,494
1851 " 1859	4,547,311	54 9	103,253,189

Coincidently with an increased importation of food stuffs there was a notable expansion of foreign trade, as shown in the exports. In later years imports are measured in hundredweights. The increase in grain imports is shown in the following table:

YEAR	Wheat and wheat flour in cwts.	Value of all breadstuffs
		£
1860	31,841,926	31,676,353
1870	39,906,115	42,502,252
1880	68,459,814	62,857,269
1890	82,381,591	53,484,584
1900	98,597,450	50,929,313
1910	119,056,653	65,362,000
1912	123,724,589	73,428,538

In the meantime the aggregate value of all British imports and exports has risen from £376,000,000 in 1860 to £698,000,000 in 1880, £896,000,000 in 1905, and £1,232,000,000 in 1912. The growing dependence of Great Britain upon foreign sources of supply for breadstuffs is reflected in the decline of the area sown in grain crops, which in 1874 was reported as 9,431,276 acres, 6,953,034 acres in 1904, and 7,154,742 in 1912. Russia and other European countries contribute to the British imports, as does also India, but the principal sources whence imports are drawn are shown in the following statement:

IMPORTS OF WHEAT IN 1912

	Cwts.
India	25,379,000
Russia	9,005,000
Argentina	18,783,000
Australia	11,908,000
United States	19,974,000
Canada	21,551,000
Rumania	1,491,000

Bibliography. The text of the Corn Laws is to be found in *British Statutes* (rev. ed., 16 vols., London, 1882–1900), and the speeches on both sides of the question in Hansard, *Parliamentary Debates* (1815–46). A comprehensive and accurate presentation of the whole subject and its bearing on trade is given in M'Culloch, *Dictionary of Commerce and Commercial Navigation* (London, 1870); Acland and Ransome, *Political History of England* (ib., 1894), summarizes the Corn Laws previous to 1815, and the progress of legislation from that time until 1846, when the Corn Laws were repealed. Other sources of information are: "The First and Second Reports from the Select Committee on the Epworth (Corn Law) Petitions," *Great Britain Parl. Papers, Sess. 1843*, vol. xi; Wilson, *Influences of the Corn Laws* (London, 1840); Thornton, *Historical Summary of the Corn Laws* (ib., 1841); Platt, *History of the British Corn Laws* (ib., 1845); Morley, *Life of Richard Cobden* (ib., 1881); McCarthy, *The Epoch of Reform, 1830–50* (ib., 1882); Nichol-

son, *History of the Corn Laws* (ib., 1904); and for a full bibliography, *New York Public Library Bulletin*, vol. vi, No. 5 (New York, 1902).

CORN MARIGOLD. See CHRYSANTHEMUM.

CORNO, kôr'nō, MONTE (Mount Horn). The highest peak (9585 feet) of the Apennines (q.v.).

CORN OIL, CORN PITH. See MAIZE.

CORNOYER, PAUL (1864–1923). An American painter. He was born in St. Louis and studied there at the School of Fine Arts and in Paris under Lefebvre, Benjamin Constant, and Louis Blanc. In 1899 he came to New York, where he devoted himself principally to city scenes of a tranquil character. A subtle sense of values and rare atmospheric qualities constitute the great charm of his pictures. His favorite subjects are snow and rain effects, and he is at his best in such paintings as "Morning, Madison Square" (W. M. Chase collection, New York); "A Rainy Day, Madison Square"; "Late Afternoon, Washington Square"; "After the Rain" (Brooklyn Museum), "Hazy Morning, Fifty-ninth Street" (1911); "Old New York" (1912); "Library Lane" (1912)—all interpretations of a highly poetic character. Cornoyer was elected in 1913 an associate member of the National Academy of Design.

CORN'PLANTER (1732–1836). A celebrated half-breed chief of the Seneca Indians, the son of a trader named John O'Bail. During the French and Indian War he led a war party of the Senecas which had joined the French against the English, and took part in the defeat of Braddock in 1755. During the Revolutionary War he joined the English, took an active part in the border conflicts in New York, and seems to have been present at the massacre of Wyoming. Afterward, however, he became a steadfast friend of the whites and, with Red Jacket, directed the affairs of his tribe for many years. He spent much time and energy in exhorting his nation to avoid intemperance. His Indian name was Garyan-Wah-Gah. Consult Snowden, *Historical Sketch of Cornplanter* (1867).

CORN SALAD, or LAMB'S LETTUCE (*Valerianella*). A genus of plants belonging to the family Valerianaceæ. The species are annual plants of humble growth, with repeatedly forked stems and very small flowers, native in Europe. Some of them are frequently used as spring salads, and sometimes as a substitute for spinach, particularly the common corn salad (*Valerianella olitoria*). For early spring plants the seed is sown in September and cultivated, mulched, and wintered like spinach. Corn salad lacks pungency as a salad plant, but comes early in the spring when other salad plants are scarce. For illustration, see SALAD PLANTS.

CORNSHELLER. See MAIZE.

CORN SMUT. See SMUT.

CORN SNAKE (so called from its color, which resembles that of red Indian corn).

CORN SNAKE (*Coluber guttatus*).
(Plates of the top and side of the head.)

Either of two harmless snakes in the southern United States: 1. *Coluber guttatus*, found in Virginia and southward, 2½ feet long, reddish brown with black-bordered brick-red blotches. It climbs easily and feeds upon young birds and small rodents. 2. The milk snake (q.v.).

CORN'STALK (c.1720–77). A celebrated Shawnee Indian chief. He commanded the Indians in the stubborn battle of Point Pleasant (q.v.) on Oct. 10, 1774, during Lord Dunmore's War, and won the praise even of the whites by his great bravery and address. After the battle he made a treaty of peace with the Virginians, in spite of the opposition of a part of his tribe, and kept it loyally until 1777, when, the Shawnees being incited to renew hostilities, he appeared at Point Pleasant in person and notified the settlers that he might find himself forced "to run with the stream." The settlers decided to detain him and his son as hostages, and soon afterward, while still in confinement, the two were treacherously murdered by some whites infuriated by continued Shawnee outrages.

CORNSTALK DISEASE. A fatal disease that affects cattle, and occasionally horses and sheep, when turned into the fields in the fall after the corn has been gathered for the utilization of the stalks. The cause of the disease is still undetermined. By some investigators it has been considered as due to corn smut or to the organisms of the Burrill disease of corn. Others have believed that a poisonous principle is sometimes present in cornstalks which causes the death of animals. The name *toxemia maidis* for the disease was based on this theory. In some localities the disease has been supposed to be due to the combined action of indigestion and some poisonous substance absorbed by the corn, e.g., saltpetre. In a case of cattle poisoning in Kansas from eating dried cornstalks, an investigation revealed the presence of large quantities of potassium nitrate. This substance had formed in small white crystals which resembled mold, but was readily recognized by tasting. By cutting a cornstalk in two and tapping it on a table a considerable quantity of powdered nitrate of potash was jarred out. A chemical analysis showed that this substance constituted 18 per cent of the dry weight of the cornstalks. Feeding experiments with potassium nitrate showed that 500 grams would kill an adult animal weighing 1200 pounds. It has been suggested that hydrocyanic acid may form in the stalks and be the cause, but sufficient evidence of this is lacking.

The symptoms are those of violent digestive disturbances followed by delirium and complete unconsciousness. A pronounced weakness of the hind parts is usually observed, which finally leads to paralysis.

Corn smut has been extracted with alcohol and injected into guinea pigs with negative results, and no poisonous alkaloid has been isolated by chemical means. Corn affected with the Burrill corn disease has been fed to cattle without producing any poisonous effects. Some investigators consider cornstalk disease to be a form of hemorrhagic septicæmia. There is no medicinal treatment that seems to be of any benefit. The disease may be prevented by cutting the stalks early and feeding them only after they have been carefully cured and removed from the field.

CORNU, kôr'nu', JULIUS (1849–). A Swiss philologist, born at Basel. He was educated in Paris, taught Romance philology in

his native town, and in 1877 became professor in the University of Prague, later accepting the same chair at Graz. Among his works are: *Phonologie du Bagnard* (1877); *Glanures phonologiques* (1878); *Etudes sur le poème du Cid* (1881–1900); and the Portuguese grammar in Groeber's *Grundriss der romanischen Philologie.*

COR'NUCO'PIA (Lat., horn of plenty, from *cornu,* horn + *copia,* plenty). The horn of plenty (regarding the origin of which several fables are told by the ancient poets) is generally placed in the hands of figures emblematical of Plenty, Liberality, etc., who are represented as pouring from it an abundance of fruits, corn, etc. It is frequently used in both architecture and heraldry. On the arms of banks and other public institutions it is often represented as pouring forth coins. See AMALTHEA.

CORNU'TUS, LUCIUS ANNÆUS. A Stoic philosopher of the time of Nero. He was a native of Libya, but a resident of Rome. He was the teacher and friend of the poet Persius Flaccus, who left to him all his books and a large sum of money. He took the books, but gave the money to the sisters of the donor. Although he was a friend of Nero, the tyrant banished him because he did not like his advice about the number of books in which he (Nero) proposed to write the history of the Romans. Cornutus was a voluminous writer, both in Latin and in Greek, but little is known concerning his works. His treatise in Greek, *On the Nature of the Gods,* is extant; it deals with popular mythology as expounded by the Stoics. It is edited by Lang (Leipzig, 1881). Consult Arnold, *Roman Stoicism* (Cambridge, 1911).

CORN'WALL (AS. *Cornweallas* from Welsh, Ir., Bret. *corn,* horn, Lat. *cornu,* Gk. *κέρας, keras,* Goth. *haúru,* Eng. *horn* + AS. *weallas,* strangers, Welsh, *Wealh,* Ger, *welsch,* foreign, Lat. *Volcæ,* name of a people). A maritime county forming the southwest extremity of England (Map: England, B 6). Its area is 1357 square miles, most of which is arable or in meadow and pasture. The mining of tin and copper is an important industry, and there are extensive pilchard fisheries. The chief towns are Bodmin (the county town), Launceston, Penzance, Falmouth, and Truro. Pop., 1901, 318,591; 1911, 325,283. Cornwall is very rich in remains of some ancient culture. These comprise cromlechs or dolmens (q.v.), found chiefly in the Land's End district; uninscribed monoliths, circles, and avenues of stone, caves, cliff and hill castles. The products of the Cornish tin mines were famous in the ancient world, and furnished the Phœnicians with one of their chief articles of trade. The absence of Eastern coins and inscriptions, however, has seemed to some to indicate that the Phœnicians never set foot in Britain, but carried on their trade indirectly through Gaul. Consult, however, Holmes, *Ancient Britain and the Invasions of Julius Cæsar* (Oxford, 1907). After the Saxon Conquest Cornwall constituted part of the British Kingdom of Damnovia, which held out against the kings of Wessex till 926, when Athelstane captured Exeter. At the time of the Norman Conquest the Saxons were in full possession of the land. Christianity was introduced from Ireland, probably as early as the fifth century; there are numerous Christian remains, especially from the seventh and eighth centuries. The inhabitants maintained an independent priesthood till the tenth century, when the country was annexed to the see of Canterbury. William the Conqueror gave nearly the whole of Cornwall to his half brother, Robert of Montain, who was followed by a line of powerful earls, of whom the most celebrated was Richard, the second son of John, elected in 1257 King of the Romans. In 1337 Cornwall was created a duchy for the Prince of Wales, by whom it has continued to be held. During the civil war the inhabitants of Cornwall were intensely loyal and supplied Charles I with some of his bravest soldiers. Royalist victories were won at Braddoc Down (Jan. 19, 1643) and Stamford Hill (May 15, 1643). From Sudeley Castle Charles I, on Sept. 10, 1643, issued a proclamation to the people of Cornwall, thanking them for their great devotion. Copies of this letter are still to be seen in a number of churches. See CORNISH LANGUAGE AND LITERATURE.

CORNWALL. A port of entry and the capital of Stormont Co., Ontario, Canada, on the St. Lawrence River, the Cornwall Canal, of which it is the terminus, and the Grand Trunk and the Ottawa and New York railroads, 56 miles east-southeast of Ottawa (Map: Ontario, K 3). It has steamship connections with the principal Canadian ports. The public buildings include the town hall, a commercial college, and a high school. There are three parks. The town owns the water and sewerage systems and is supplied with electric light and gas. Electric and water power is available for manufacturing. The products of the manufacturing industries include cotton, furniture, bedsteads, chairs, paper, and lacrosse supplies. Cornwall lies in a mixed farming and dairying district. Good fishing and hunting abound, and there is a summer resort 8 miles distant, at Stanley Island. The town's lacrosse club is one of the foremost in the Dominion. The United States is represented by a consular agent. Pop., 1901, 6704; 1911, 6598.

CORNWALL. A village in Orange Co., N. Y., 52 miles by rail from New York City, on the west bank of the Hudson River, a little north of the Highlands, and on the New York, Ontario, and Western and the West Shore railroads (Map: New York, B 1). It is in a picturesque region, much frequented as a place of summer resort. Idlewild Park and Storm King Mountain are among the prominent points of interest. Just outside the village limits there is a large carpet mill, which employs some 500 persons. There are also municipal water works and a public library. Pop., 1900, 1966; 1910, 2658.

Cornwall was settled about 1684, became a precinct in 1764, a township in 1778, and was incorporated in 1885. From the original township, Highlands, Blooming Grove, and Monroe, besides parts of Chester and Hamptonburg, have since been taken. Consult Eager, *History of Orange County* (Newburgh, 1846–47), and Beach, *Cornwall* (Newburgh, 1873).

CORNWALL, BARRY. See PROCTER, BRYAN WALLER.

CORNWALL, EARL OF. See GAVESTON, PIERS.

CORNWAL'LIS, CAROLINE FRANCES (1786–1858). An English author, who was a linguist and a student of wide reading in various fields, and whose first work, *Philosophical Theories and Philosophical Experience, by a Pariah,* appeared in 1842. It was the first of a series entitled "Small Books on Great Subjects,"

which she had formed the idea of writing with the help of a few friends. Of the 22 volumes of this series, which appeared between 1842 and 1854, all the most important were written by herself. The subjects discussed were various —science, ragged schools, grammar, criminal law, Greek philosophy, etc. In 1864 appeared her *Letters and Remains*.

CORNWALLIS, CHARLES, first MARQUIS and second EARL (1738–1805). An English general and statesman. The son of the first Earl Cornwallis, he was born in London, Dec. 31, 1738. After an education at Eton and Cambridge he entered the army and served as aid-de-camp to the Marquis of Granby in the Seven Years' War. In 1760 he was elected member of Parliament for Eye, in 1766 received his promotion as colonel, in 1770 was made governor of the Tower of London, and in 1775 became major general. Though personally opposed to the war with America, he went with his regiment thither, and the first successes of the British arms were, in the main, due to him. After the battle of Long Island, in which he took a prominent part, he pursued Washington through New Jersey. A detachment of his army, consisting of Hessians, was captured by Washington at Trenton, Dec. 26, 1776, and part of his forces suffered a defeat at Princeton, Jan. 3, 1777. He had the principal share in the victory of the Brandywine, Sept. 11, 1777, after which he secured for the British the command of the Delaware River. In disgust at Howe's failure to grasp the critical situation of affairs and to attempt operations on a large scale, Cornwallis sent in his resignation, which the King refused to accept. He served under Clinton at the reduction of Charleston in 1780, achieved a great victory over Gates at Camden, S. C., on August 16 of that year, and defeated Greene at Guilford Court House, N. C., March 15, 1781. He was in the end outgeneraled by Greene and withdrew into Virginia, where he carried on a vigorous campaign against Lafayette, but without avail. Finally he was shut up in Yorktown by Washington and Rochambeau, aided by a French fleet under De Grasse, and was compelled to surrender on Oct. 19, 1781. With the surrender of Cornwallis the triumph of the American cause was virtually achieved. Although the disaster resulted in the resignation of the British ministry, Cornwallis escaped censure owing to royal favor. In 1786 he was appointed Governor-General of India and commander in chief and distinguished himself by his victories over Tippu Sahib and by his indefatigable efforts to promote the welfare of the natives. He returned from India in 1793, when he was raised to the rank of Marquis. Appointed Lord Lieutenant of Ireland, he succeeded in quelling the rebellion of 1798 and established order in a manner that gained him the good will of the Irish people. As Plenipotentiary to France he negotiated the Peace of Amiens. Reappointed Governor-General of India in 1804, he died at Ghazipur, in the Province of Benares, Oct. 5, 1805, on his way to assume the command of the army in the upper provinces.

Consult: Marshall, *Memoir* (Gateshead, 1806); Lord Cornwallis' *Correspondence*, ed. by Ross (London, 1859); Seton-Karr, "The Marquess Cornwallis," in *Rulers of India* (Oxford, 1890).

CORO, kō'rō, or SANTA ANA DE CORO. A city of the State of Falcón, Venezuela, situated east of the Gulf of Coro (Map: Venezuela, D 1). It is engaged in cattle raising and is a centre for interior commerce. Coro contains several churches, interesting for their antiquity, though they either have been rebuilt or lie in ruins. La Vela, its port, which is 6 miles to the east, has a good harbor and a trade with the Dutch West Indies and is the residence of a United States consular agent. Population, 9452. Coro, one of the oldest cities in Venezuela, was settled by Juan de Ampués in 1527 and for a time was the Spanish capital of Venezuela. It was created the first bishopric of Venezuela in 1531, but subsequently the see was removed. Its decline dates from the transference of the governmental and ecclesiastical authorities to Carácas. It was the objective point of Miranda's first descent upon Venezuela in 1805, when he led an abortive expedition against the Spanish in the hope of precipitating the revolution of the Spanish-American colonies.

COROADO, kō'rō-ä'dō (Portug., crowned, in allusion to a peculiar style of wearing the hair). A name without ethnic significance, applied by the Portuguese to several Brazilian tribes. The name "Coroados" (also Bugres) is now applied to the people formerly called "Zuayanás" (of Tapuyan stock), and known also as "Caingangs." These are "the dread Bugres of South Brazil," who inflicted such destruction upon the settler of the interior. They are to be distinguished from the "real Coroados" of the states of Minas and Matto Grosso.

COROL'LA (Lat., garland, dim. of *corona*, crown). In flowers, the inner one of the two sets of floral leaves. The individual parts are called "petals," and they are usually delicate in texture and variously colored, forming the showy part of the flower. In case they are absent the flower is said to be "apetalous." The corolla is supposed to serve as an attraction to insects, so that the flower may secure cross pollination. See FLOWER.

COR'OLLA'RY (Lat. *corollarium*, deduction, gratuity, money paid for a garland, from *corolla*, garland). A proposition the truth of which appears so clearly from the proof of another proposition as not to require separate demonstration. For example, having proved that the angles at the base of an isosceles triangle are equal, it follows as a corollary that an equilateral triangle is equiangular.

COR'OMAN'DEL COAST (Skt. *Cōramaṇḍala*, from *Cōra*, or *Cōla*, name of a people + *maṇḍala*, circle, kingdom). A region in British India in former times comprising the portion of the east coast of Madras lying between Point Calimere, in about lat. 10° 17′ N., and the mouths of the Kistna, in about lat. 15° 40′ N. (Map: India, D 6). The name is sometimes applied to the whole of the west shore of the Bay of Bengal. The coast has numerous inlets, but possesses no safe harbors. Ships are compelled to anchor several miles off the coast, which is visited by the northeast monsoon from October till April. The districts along the coast were the battlefields for supremacy in India between England and France in the eighteenth century.

COROMANDEL GOOSEBERRY. See CARAMBOLA.

CORO'NA (Lat., crown). In astronomy, the name given to the faint outermost luminous appendage of the sun, seen only during total solar eclipses, when the brilliant central disk is obscured. See SUN.

Coronæ, in meteorology, are colored rings seen around the moon through peculiar forms of cloud. See Halo.

CORONA. In architecture, the upper part of the classical cornice; especially the shelf-like portion between the bed-molding and the cymatium. (See Cornice.) The term "corona" is also applied, especially by ecclesiastical writers, to the apse or semicircular termination of the choir, as in the case of "Becket's crown," at Canterbury. Corona is also applied in ecclesiastical nomenclature to a chandelier, in the form of a crown or circlet, suspended from the roof of a church, or from the vaulting of the nave or of chapels, to hold tapers which are lighted on solemn occasions. Famous mediæval examples are those in Charlemagne's Palatine Chapel at Aix-la-Chapelle and in St. Michael's, Hildesheim.

CORONA. In plants, a word applied to any crownlike appendage at or near the summit of an organ. It is usually restricted, however, to appendages which occur in connection with corollas. For example, in the species of *Silene* and allied forms, members of the pink family, there is a two-lobed outgrowth at the junction of the claw and blade of each petal. Taking the petals together, these outgrowths form a 10-lobed crown at the base of the blades. In the passion flowers there is a very conspicuous corona consisting of many rows of filamentous outgrowths. Similar outgrowths are found in the flowers of other families, but are most notable in sympetalous corollas, where they form folds or projections in the throat, as in oleander, various borages, etc. In the several species of *Narcissus* the corona which rises from the throat of the corolla is often very conspicuous. In all cases these appendages are out-

CORONA (*p*) OF NARCISSUS.

growths from the inner face of the petals, and it has been suggested that they are the equivalents of similar outgrowths from the inner face of grass leaves, at the juncture of the blade and sheath. In this latter case the appendage is called a "ligule."

CORONA. A city in Riverside Co., Cal., 48 miles southeast of Los Angeles, on the Santa Fe and the Pacific Electric railroads (Map: California, H 9). The city contains a Carnegie library, Woman's Improvement Club, and fine high school and city hall buildings. There is also a splendid circular boulevard on which big automobile races are held annually. Corona is an important shipping point for lemons and oranges. Citrus fruit growing, alfalfa milling, and the manufacture of clay products and crushed rocks are the chief industries. Pop., 1900, 1434; 1910, 3540.

CORONA AUSTRA'LIS (Lat., Southern Crown). A small southern constellation, described by Ptolemy and consisting of stars of moderate brightness. It is situated between Scorpio and Sagittarius.

CORONA BO'REA'LIS (Lat., Northern Crown). A small and bright northern constellation between Hercules and Boötes. The arrangement of six of its principal stars, the brightest of which is of the second magnitude, in the form of an almost perfect semicircle renders it easily recognizable. In 1866 a *nova*, or temporary star, known as "T Coronæ," was discovered by Birmingham in this constellation. At first of the second magnitude, nine days after its discovery it was again invisible to the naked eye; it still exists as a star of the tenth magnitude. It is worthy of note as the first *nova* to which the then novel methods of stellar spectrum analysis were applied.

CORONACH, kŏr'ô-năk. See Coranach.

CORONA CIVICA. See Crown.

CORONA CONVIVIALIS. See Crown.

CORONADO, kō'rô-nä'dō (Sp., crowned). The name among Spanish-speaking fishermen of the West Indies and Mexico for the amber fishes of the genus *Seriola*. See Amber Fish.

CORONADO, Francisco Vásquez (?–c.1549). A Spanish explorer. He came to the New World about 1535, and, by marrying Doña Beatriz, the daughter of Estrada, the royal Treasurer for New Spain, secured preferment at the viceregal court in Mexico. He was appointed Governor of the Province of New Galicia, and in 1539 secured the command of an expedition for the conquest of the "Seven Cities of Cíbola," which the friar Marcos de Niza claimed to have discovered on a preliminary expedition earlier in 1539. On Feb. 23, 1540, Coronado started from Compostela with a large force of horsemen, infantry, and native allies, supplied with artillery and abundant munitions and food. He followed the western coast of Mexico till some distance beyond Guaymas and then crossed the mountains into southeastern Arizona. On July 7 he reached and stormed the chief city of Cíbola, the stone pueblo of Hawikuh, now represented by large ruins a short distance west of the pueblo of Zuñi, in New Mexico. Making this his headquarters, Coronado sent expeditions to the West, which explored the country as far as the Moqui villages of Tusayan, and to the Grand Cañon of the Colorado, which was first seen by Europeans when the soldiers under López de Cárdenas reached it early in September, 1540. Other parties explored towards the east, and in September, Coronado moved his forces to the Rio Grande, camping in the village of Tiguex, near Bernalillo, New Mexico. During the winter the natives of the river villages were subjugated after a fierce resistance. In April, 1541, Coronado led his whole army across the mountains into the great Buffalo plains of Arkansas and Indian Territory. Finding that he was being misled by a native guide, he sent his foot soldiers back to the Rio Grande, while he, with 30 horsemen, pushed northward, hop-

ing to find a country rich in treasure. In July he reached a group of tepee villages, somewhere near the border line between Kansas and Nebraska. Convinced that the country contained nothing of value for him, although he recognized its splendid agricultural possibilities, Coronado returned to Tiguex. A severe fall from his horse induced Coronado to turn homeward in the spring. After several months of deprivation he reached Mexico with such of his army as had not deserted along the route. The Viceroy received him coldly and allowed him to resign the government of New Galicia. Coronado lived quietly on his ample estates until his death, about 1549. The original documents describing Coronado's journey, which contain much information concerning the southwestern United States at the time it was first visited by Europeans, are translated in Winship, "The Coronado Expedition," in the *Fourteenth Report of the United States Bureau of Ethnology* (Washington, 1896). Consult also Winship: *Journey of Coronado* (New York, 1904).

CORONA FUNEBRIS. See CROWN.

CORONA MURALIS. See CROWN.

CORONA NATALITIA. See CROWN.

CORONA NUPTIALIS. See CROWN.

CORONA OBSIDIONALIS. See CROWN.

CORONA SACERDOTALIS. See CROWN.

CORONA SEPULCHRALIS. See CROWN.

COR'ONA'TION (from Lat. *coronare*, to crown, from *corona*, crown). The act or ceremony of crowning the sovereign of a monarchical country. The use of crowns in antiquity, as a mark either of honor or of rejoicing, will be explained under CROWN. It was, no doubt, as an adaptation of this general custom to a special use that the practice of placing a crown on the head of a monarch at the commencement of his reign was introduced. The practice is very ancient, as we may learn from the fact that Solomon and Ahaziah were crowned, and it has been followed, in one form or another, in most civilized monarchies. The ceremony is religious as well as political and is usually performed by a high ecclesiastic, as a recognition that "the powers that be are ordained of God." Generally it has been accompanied by what was regarded as the still more solemn rite of anointing with oil—a ceremony which, from the time of the ancient Hebrews to our own, has been peculiarly significant of consecration or devotion to the service of God. The term employed for "crowned" in the Saxon chronicle is *gehalgod*, 'hallowed' or 'consecrated'; and it would seem that the ceremony as then performed at Kingston-on-Thames or Winchester was the same in all essentials as that which now takes place in Westminster Abbey.

In the early days of the European monarchies coronation was an indispensable rite, without which no accession to a throne would be recognized by the people; but in our day, the line of succession being clearly established, the ceremony is often deferred without prejudice to the loyalty of the subject. In most countries a solemn pledge, known as the "coronation oath," is exacted from the new sovereign as an indispensable preliminary to coronation. There are very early traces of this, both among the Jews and among the rulers who established themselves upon the ruins of the Roman Empire. Before the principle of hereditary succession was firmly established, the consent of the people was an important factor in a transfer of sovereignty and was purchased by the solemn pledge to rule justly and to preserve every man's rights. The present English coronation oath is the most definite and carefully considered agreement of the kind. After the revolution of 1688 it was made more explicit than ever, including an express engagement on the part of the sovereign to maintain "the laws of God, the true profession of the Gospel, and the Protestant reformed religion as it is established by law." The terms of this declaration were long resented by Roman Catholics in England, and finally, in 1910, the Accession Declaration Act was passed, which substituted a short formula for the objectionable clauses. The formula now runs: "I, ———, do solemnly and sincerely in the presence of God, profess, testify, and declare that I am a faithful Protestant, and that I will, according to the true intent of the enactments which secure the Protestant succession to the Throne of the Realm, uphold and maintain the said enactments to the best of my powers according to law." The oaths of other countries are neither so elaborate nor so specific as that of England.

For a learned treatment of coronation usages in general, as well as for a typical modern instance, consult Pascoe, *The Pageant and Ceremony of the Coronation of their Majesties King Edward the Seventh and Queen Alexandra* (New York, 1902).

CORONATION, THE. A play licensed by Shirley in 1635. It was, however, wrongly included in the earlier editions of Beaumont and Fletcher, as theirs.

CORONATION CHAIR. The ancient throne used at the coronation of English kings since Edward I. It is kept in a fair state of preservation in Westminster Abbey. Beneath the seat rests the famous Lia Fail, the Stone of Destiny, on which Scottish kings were crowned. The stone is said to be the one used by Jacob as a pillow and to have been taken to Tara in Ireland in the fifth century B.C., whence it was brought to Scotland and removed to England by Edward I.

CORONATION GULF. An inlet of the Arctic Ocean, penetrating the continent of North America, north of the Arctic circle, and included between long. 107° and 116° W., Bathurst Inlet being an extension towards the southeast. It is connected with other Arctic channels by Dease Strait on the northeast and Dolphin and Union Strait on the northwest (Map: America, North, G 3). It is studded with islands and receives the waters of the Coppermine River from the south.

CORONATION OATH. See CORONATION.

CORONEL, kō'rō-nĕl' (Sp., from Lat. *coronalis*, pertaining to a crown, from *corona*, crown). A port in the Province of Concepción, Chile, situated on the Bay of Arauco (Map: Chile, C 11). It is the commercial centre for the highly productive coal-mining district in the vicinity and is a coaling station. Pop., 1895, 2292; 1907, 5,258.

CORONELLI, kō'rō-nĕl'lē, MARCO VINCENZO (1650–1718). An Italian geographer, born in Venice. He became a monk and devoted himself to cosmography in Venice. He then went to Paris, where he was commissioned by Louis XIV to construct two large globes 4 meters in diameter, which are in the Bibliothèque Nationale in Paris. They are considered among the greatest curiosities of the science of the seven-

teenth century. In 1685 Coronelli returned to Venice, was made geographer of the Republic in 1702, and in that capacity published a number of maps and histories. His works include *Isola di Rodi, geografica, storica, antica e moderna* (1685–1702), and *Memorie istorico-geografiche del regno della Morea* (1685).

CORONER. A very ancient and important county officer in England, Ireland, and Wales, whose original duty appears to have been that of keeping, as distinguished from holding, the pleas of the crown; for coroners are designated in the earliest charters alluding to the office as *custodes placitorum coronæ* and *coronatores*. The exact date of origin of the office is not known, but the better modern view is that it was firmly established under Henry II in the twelfth century. From England the office of coroner has found its way to the United States and the self-governing English colonies.

The chief duty of the coroner was described by Lord Chancellor Campbell as follows: "The coroner, next to the sheriff, is the most important civil officer in the county, and he performs the duty of the sheriff when the sheriff is disabled from doing so; and there are peculiar duties prescribed to him, more particularly to inquire into the manner in which persons have come to their deaths where there is any reason to suppose that it may not have been by natural means; and, on the inquiry, the jury being sworn, the jury have all the rights of a grand jury to find a verdict of murder, and on that finding the accused may be tried and may be sentenced to death." The coroner's duties in respect to this inquiry as to suspicious deaths has hardly varied at all from the fourteenth century to the present time, except as regards the methods of procedure, such as summoning jurors, witnesses, etc.

Besides his duty of inquiring into causes of suspicious deaths, his other peculiar duties included that of inquiring concerning various classes of personal property, such as treasure-trove, wrecks. The goods thrown away by a thief in his flight (known as "waifs"), to which the crown laid claim; the holding of inquests on certain felonies, such as the breaking of a house and the sudden injury of a person under suspicious circumstances. Until 1888, in England, the coroners were chosen by the freeholders at a county court held for the purpose, but by the Local Government Act of that year the county council were made the electors. The coroner is also ex officio a conservator of the King's peace, and in this capacity may act as a magistrate; his ministerial office is exercised only when he acts in place of the sheriff.

In the United States and in some of the colonies of Great Britain the duties and powers of coroners have been enlarged or restricted, and in some cases the office has been entirely abolished. The coroner is vested by statute in some jurisdictions with the power and duty to investigate into the causes and origins of fires which appear to be of incendiary origin or of such a nature as to require investigation; but ex officio the coroner has no authority to inquire into the cause or origin of a fire except when death has resulted from it.

For a fuller description of the manner of choosing coroners and of their duties and powers, the statutes of the jurisdiction must be consulted.

Consult: *Encyclopædia of the Laws of England*, vol. iii (London, 1897); Binmore, *Instructions for Sheriffs, Coroners, and Constables* (2d ed., Chicago, 1894); Bordern D. Smith, *Powers, Duties, and Liabilities of Sheriffs, Coroners, and Constables* (2d ed., Albany, 1897); Jarvis, *Office and Duties of Coroners, with Forms and Precedents* (5th ed., London, 1888); Stephen, *History of the Criminal Law* (ib., 1883); Pollock and Maitland, *History of English Law* (2d ed., London and Boston, 1899); Boys, *Treatise on Coroners* (Toronto, 1893).

COR'ONET. A special crown worn by princes and nobles on state occasions and always represented above their coats of arms. Coronets were apparently intended originally as fillets to confine the hair, and during the reign of Edward III, when they were not yet used as distinctions of rank, were ornamented with leaves. Later they came to be recognized as distinctions of nobility, but were assumed arbitrarily without royal warrant or restriction as to use. In more modern times they have been strictly regulated, especially in England. The following rules apply to that country: the coronet of the Prince of Wales differs from the crown of England only in having a single instead of a double arch; a duke's coronet has on the rim eight strawberry leaves of equal height; that of a marquis, four strawberry leaves and four pearls or balls of silver, alternately; that of an earl, eight pearls set on lofty spikes, alternating with strawberry leaves set lower; that of a viscount has 14 or 16 pearls close together; that of a baron, six pearls. The privilege of wearing coronets was first granted to viscounts by James I and to barons by Charles II. The French rules are essentially the same.

CORONINI-CRONBERG, kō'rō-nē'nē-krōn'-bĕrk, Franz, Count von (1833–1901). An Austrian statesman, son of the following, and one of the early companions and schoolmates of Emperor Francis Joseph. After studying philosophy and law, he entered the army in 1850, served in the campaigns of 1859, 1864, and 1866, and was promoted to the rank of colonel in recognition of his distinguished services at the battle of Königgrätz. He was President of the Chamber of Deputies from 1879 to 1881 and in 1882 founded the Coronini Club (Liberal Centre). He became a member of the Upper House in 1897.

CORONINI-CRONBERG, Johann Baptist Alexius, Count von (1794–1880). An Austrian general, father of the foregoing, born at Görz. He entered the army in 1813 and participated in the campaigns of 1813 and 1814. After serving for several years in Italy, he was in 1836 appointed chamberlain of the Archduke Francis Charles, in which capacity he became preceptor of the Emperor Francis Joseph. As major general he defended the passes of the Tirol against the Italians in 1848, and in the Crimean War (1854) was intrusted with the chief command of the army of occupation in Wallachia. He was commanding general in Upper and Lower Austria, Salzburg, and Styria in 1860, and in 1861 was appointed to the same position in Hungary. He retired in 1865.

COROT, kŏ'rŏ', Jean Baptiste Camille (1796–1875). A French landscape painter, born in Paris, July 17, 1796. His father was a petty official who married a milliner and by shrewd management of her business gained a competence. Camille was educated in the college in Rouen and at a school in Poissy, and on his return to Paris was apprenticed to a draper,

in accordance with his father's wishes. But trade had no charms for him, and in the meanwhile he had acquired a taste for painting. After seven years of apprenticeship with the draper he resolved to be a painter. Upon the death of his sister his father made over to him her allowance, upon which Camille managed to subsist until financial success crowned his efforts. He first studied with Michallon, and upon the latter's death with Victor Bertin, a Classicist and an apostle of the historical landscape. The years 1825 to 1827 he spent in Italy, and in the latter year he made his début at the Salon with two Italian landscapes—a "View of Narni" and the "Campagna at Rome." He again went to Italy in 1834 and in 1843, besides traveling in France, Switzerland, the Netherlands, and England. But the greater part of his life was passed in Paris and Ville d'Avray, in the forest of Fontainebleau and the valley of the Seine. In these places he found subjects for his most beautiful pictures.

It was some time before his works were recognized, but in his later life honors were heaped upon him. He received medals in 1848, 1855, and 1857; in 1846 he received the cross of the Legion of Honor, and in 1867 he was made a commander. The younger artists almost worshiped him, and in 1874 his friends gave him a gold medal to atone for the neglect of the Salon. Dealers sought his pictures, and it is said that in the time of his prosperity his income from sales alone amounted to 200,000 francs a year. But Corot never cared for money except to help his friends, which he did with a lavish hand. He was gentle, jovial, and kind, and the figure of Père Corot, in his blue blouse and woolen cap, with his long white hair and the inevitable pipe, brought joy and sunshine. He never married, but was devotedly attached to his sister and his mother. He died in Paris on Feb. 22, 1875.

Corot's art naturally falls into two periods, divided from each other by about the year 1843. During the first of these he painted like the contemporary Classicists, very detailed, with careful and severe drawing, but not without a certain charm of color. The influence of this classical training may be seen in the nymphs with which he loved to people his landscapes, and the absolute mastery over technique which we see in his second period. This may be said to have begun with his return from Italy in 1843, when he adopted the method of painting in the open air, which had been introduced from England by Constable and others. The works of his second period are the works from which we chiefly know him and which made him famous.

Corot was the great lyric poet of the Barbizon school, as Rousseau was the epic, and Dupré the dramatic. As Rousseau portrayed the strong and vivid side of nature—the oak, of all the trees, the plains, the hills, the river, and the forest—so Corot painted the tender, the wavering, the feminine side—the poplar, the birch, the willow, the wild flowers, sweet and shrinking. He was a painter of the misty morning and of the shadowy evening, of the hazy springtime. A light mist or a haze of atmosphere usually envelops his pictures. As with Rousseau drawing was the most important feature, so with Corot it was the tone and values of color. His pictures are always in a low key: browns, pale greens, and silvery grays are among his favorite colors, but in this sad setting the occasional touches of bright color appear all the more effective. His values are perfect, and, above all, each picture is an expression of deep sentiment—"the confession of a beautiful soul." His works have well been called "painted music," and it is no accident that he was himself a gifted musician.

His landscapes have often been criticized because of their similarity, but they are only similar in theme; the treatment is infinitely varied. It has also been urged that his works are too even; that they do not contain certain acid tones and little defects which are found in nature and add to the effect of the picture. Such blemishes might indeed have made his work more realistic, but they would not have harmonized with the softness and delicacy of effect, which it was his chief effort to obtain. As regards the figures which usually form a part of his picture, whether they be nymphs and goddesses or French peasants, they rather heighten the effect of the landscape than otherwise, and with it they are always in perfect harmony. So great was his technical ability and so vivid his imagination that his usual method was to paint his works in his studio from sketches and notes taken from nature.

Corot has left a large number of works on a great variety of subjects. During his early period he painted many Italian landscapes and even religious subjects. Of these landscapes there are two good examples which he himself bequeathed to the nation, viz., the "Roman Forum" and "The Coliseum"; the latter is now in the Louvre, which also possesses "The Bridge of Narni" (1827). Of his religious pictures the "Baptism of Christ," in the church of St. Nicolas du Chardonnet in Paris, is a good specimen, and the Walters Gallery, Baltimore, the Havemeyer collection, New York, and the Boston Art Museum contain examples of his historical compositions. The landscapes of his later period are incomparably his best works. Among the best known is the "Dance of the Nymphs" (Louvre), a fresh morning scene of a peculiar blue tone, and the incomparable "Paysage," in the same collection, showing his marvelous treatment of a lake with overhanging foliage. There are about 80 of his pictures in the Louvre, including, besides those mentioned, "Morning" (1850), "Souvenir of Castelgandolfo" (1855), the "Road of Sin-le-Noble" (1874), and "The Fisherman." Other good examples are in the provincial museums and private collections of France and indeed of all Europe. Corot is especially well represented in the United States. The Metropolitan Museum in New York possesses three good examples, including "Ville d'Avray," a fine specimen of Corot's dainty treatment of water, foliage, and distant buildings in the early morning light. The faint rose of the sky suggests the coming dawn, and the touches of yellow and blue in the garb of the woman lend a soft brightness to the scene. There are other good examples in the Vanderbilt collection (Metropolitan Museum) and the Corcoran Gallery at Washington, in the Art Institute of Chicago, and the Walters Gallery, Baltimore. But not until the centenary exhibition in Paris in 1889 did men know what modern art possessed in Corot, "the greatest poet and the tenderest soul of the nineteenth century."

Bibliography. The principal authority for Corot is the monumental work of Robaut, *L'Œuvre de Corot* (4 vols. fol., Paris, 1905),

with admirable illustrations and a complete list of his paintings. Briefer biographies, with account of his work, are by Rousseau (ib., 1884); Roger Milès, in *Les artistes célèbres* (ib., 1891); Robinson, in Van Dyke's *Modern French Masters* (New York, 1896); *Michel* (Paris, 1905); Hamel (ib., 1905); Cornu (ib., 1911). Consult also: Alexandre Geoffroy, *Corot and Millet*, with critical essays (New York, 1903); Meyer-Graefe, *Corot et Courbet* (Leipzig, 1905); Gensel, *Corot und Troyon* (Bielefeld, 1906); Meynell, *Corot and his Friends* (New York, 1910); Muther, *History of Modern Painting* (London, 1907), and the bibliography under BARBIZON, PAINTERS OF.

COR'PORAL (Fr. *caporal*, It. *caporale*, corporal, from *capo*, head, from Lat. *caput*, head; influenced by popular etymology with *corporal*, bodily, or *corps*, body of troops). A military title of similar relative noncommissioned rank throughout the armies of the world. In the United States it is the lowest noncommissioned rank. It may be preceded by the appointment of lance corporal, given to private soldiers desirous of and selected for promotion. In the British navy the term "ship's corporal" is applied to a petty officer who takes orders from the master at arms.

CORPORAL (Lat. *corporale*, from *corpus*, body, because the host or sacramental body of Christ rests upon it). A square linen cloth which is spread upon the altar during the mass and upon which rest the chalice and paten. It was originally large enough to be folded over the chalice, but this was later displaced by a separate piece, now known as the pall (q.v.). The older usage was long preserved in the French church and is still the custom in the Carthusian Order. Both corporal and pall must be blessed, and when not in use are carried in the burse, a square pocket of cardboard covered with silk, none except those in holy orders being allowed to touch them when they are in use.

CORPORAL, THE LITTLE (Fr., *Le petit caporal*). A term of familiarity and affection applied by the French soldiery to Napoleon I, who began his military career as a *sous-lieutenant* in Corsica.

CORPORAL PUNISHMENT. Punishment by the infliction of pain or hardship upon the body, as by confinement in the stocks, branding, or flogging. Ordinarily the term is understood to refer only to flogging or whipping of the body.

Much has been said for and against this last kind of punishment, as a means of both public and private correction. The contention of those who oppose its use and deny its value is that it degrades the one punished and the one who executes the punishment, and that it tends to deteriorate the character of the person punished by taking away his self-respect. Those who favor it generally admit that severe floggings which lacerate the body or which are so contrived as to cause extreme agony, as in the bastinado, do cause a degeneration in the moral character of the victim which increases his tendency to repeat his offense or commit others in spite of the danger of the second punishment, and that this is especially the case when such punishment is inflicted publicly. But the practice is supported by the argument that whipping which produces stinging but transient pain, without mangling the body and without such public disgrace as to destroy the sense of shame, is an efficient corrective for those cruel or brutal or intractable offenders, such as wife and child beaters, who are insensible to the punishment of confinement or other ordinary penalties. Corporal punishment at the hands of public officers as a punishment for crime is usually inflicted by flogging in prison or at the public whipping post. The practice has generally been abandoned in civilized communities, though it still survives in England and in many American States as a means of discipline of convicts confined in prisons. Further information will be given under the titles CAT; FLOGGING; WHIPPING.

The authority of the husband, parent, guardian, and schoolmaster to inflict corporal punishment upon the wife, child, or pupil will be considered under HUSBAND AND WIFE; GUARDIAN; WARD; PARENT AND CHILD; SCHOOLMASTER; ETC. See also APPRENTICE. For a bibliography of corporal punishment as a punishment for crime, consult the authorities referred to under PENOLOGY; CRIMINOLOGY.

CORPORAL TRIM. An old soldier, the servant of Uncle Toby in Sterne's *Tristram Shandy*.

CORPORAL VIOLET, or FATHER VIOLET. A name given to Napoleon Bonaparte by his adherents in France when he was in exile. The violet typified the Empire, which, in the person of Corporal Violet, it was predicted, would return in the spring.

CORPORATION (Lat. *corporatio*, from *corporare*, to embody, from *corpus*, body; the classical terms were *corpus*, *universitas*, *collegium*).

Roman and Civil Law.—The legal conception of the corporation was clearly worked out at Roman law. As a ship remains the same ship, although all its parts be gradually renewed by successive repairs; as a human body remains the same body, although waste and repair periodically change all its minutest particles; so a body of human beings, like a bench of judges, a legion, or the Roman people, remains the same body in spite of all changes in its composition. In all cases in which such a body of persons is recognized as a separate legal entity—in all cases, i.e., in which the body itself is regarded as owning property, holding claims, and owing debts—a *corpus* or *universitas* exists; where, on the other hand, the members of an association are treated as joint proprietors, joint creditors, and joint debtors, all that exists is a *societas* or partnership.

The Roman law recognized both *private* and *public* corporations. Private corporations (at least in the Imperial period) could not be established except by special authorization or under certain general statutes. In the field of public law the towns (*municipia*), or, rather, the town councils (*collegia decurionum*), were regarded as corporations; and the Imperial treasury (*fiscus*) was recognized as an entity distinct from the Empire. From this latter theory was derived the valuable conclusion that the fiscus could be sued by private persons to recover property or enforce contractual claims. Charitable corporations were recognized; when the Empire became Christian, churches and monasteries received the rights of corporations; but where property was devoted to a permanent charitable use (*pia causa*) it was not necessary to give it to an existing charitable corporation nor to create a new corporation to hold it. The Roman law did not treat the persons who administered such property as titular owners sub-

ject to a trust, nor was it usual, as at English law, to incorporate boards of managers and to treat the corporations thus created as owners of the property. The Roman law, in its final development, treated the foundation itself as a legal entity, and viewed the persons who managed the property as mere officers and representatives of the foundation.

Modern civil law uses these Roman conceptions without substantial change. The German jurist Gierke, indeed, maintains that mediæval German law developed, and modern jurisprudence is bound to recognize, a third type of association, intermediate between corporation and partnership, which he terms the *fellowship* (*Genossenschaft*); but his theory has obtained no legislative or judicial recognition. The German civil code (1896) declares that "societies which are not incorporated are governed by the rules relating to partnership."

As regards the theory of the "juristic person," modern civilians generally regard corporations and foundations as persons only by virtue of a legal fiction. This legal fiction is generally regarded as useful and indeed necessary; but a few writers regard it as unnecessary and harmful. These assert that a corporation is nothing but a plurality of natural persons acting under special rules as regards presentation (i.e., agency) and governed by special rules as regards succession; and they assert that harm is done by obscuring the fact that the private corporation is simply a particular method in which natural persons hold property and do business. Still another school maintains that permanent associations, public and private, have a character and a will which are not the sum or the resultant of the characters and wills of the individuals who compose them; and that such associations have thus a true personality which the law does not create, but merely recognizes. This is sometimes described as the anthropomorphic theory.

English Common Law.—Three distinct factors are to be recognized as essential to the existence of a corporation: (1) one or more natural persons, who are the incorporators, or so-called members; (2) one or more trustees, managers, or directors, who have the general control of its affairs and may or may not include all, and be coincident with, the incorporators; and (3) the corporation, or artificial person, created by the fiat of the law, and always separate and distinct from both its members and its trustees or managers. It is this separate existence, as a legal entity, which distinguishes it from a partnership and from a joint-stock company.

Classification.—Corporations are classified as to either the number of members, or the objects for which they are formed, or the fullness and completeness of their powers. With regard to the number of members, they are either *aggregate* or *sole*. An aggregate corporation has more members than one and is the more common form. A sole corporation consists of a single member and his successors, who are by law invested with the same capacities as an aggregate corporation. Thus the King of England, or a bishop, is a sole corporation. A very few sole corporations exist in the United States. In New York, e.g., a joint-stock company composed of seven or more members may sue and be sued in the name of its president, and the president is for this purpose a sole corporation.

With respect to the purposes of their existence corporations are classified as *ecclesiastical* and *lay*, and the lay are subdivided into *civil* and *eleemosynary*. Ecclesiastical corporations are concerned wholly with religious matters, including the management of ecclesiastical property, and are composed wholly of spiritual persons, as distinguished from laymen. There are none such, properly so called, in the United States. An eleemosynary corporation is one formed for purposes of charity, in the legal sense of that word, i.e., general public benefit and utility. Examples are found in schools, colleges, and hospitals. *Civil corporations* are those that are formed for temporal purposes. They are either (1) *public*, or *municipal*, i.e., created for governmental purposes, such as cities and villages; or (2) *private*, including others of a civil nature, such as railroad companies and manufacturing and general business corporations. Since municipal corporations are part of the machinery of government, they may be dissolved, restricted, or modified at the will of the legislature; but an act which creates a private corporation has in the United States been deemed to be in the nature of a contract, and (because of that provision of the United States Constitution which forbids the States to pass any laws impairing the obligation of contracts) cannot be repealed or materially altered or impaired without the consent of the corporation. This doctrine of the inviolability of a corporate charter rests upon the authority of the celebrated Dartmouth College Case (q.v.). The operation of this rule is obviated in some States by constitutional provisions, or by special clauses in the acts creating corporations, to the effect that the legislature shall have power to abrogate or modify such acts. The divisions of corporations with reference to their powers is into *complete* and *quasi*. Those are *quasi* which possess some, but not all, of the ordinary powers of a corporation. Counties, school districts, and in some States, as New York, towns, afford examples of *quasi* corporations.

Corporations are created by charter or letters patent from the crown, by legislative act, and by prescription. Some corporations which trace their origin to royal charter exist in the United States; while others may be found which derive their franchise from immemorial usage or prescription; but the most common mode of forming them is by act of the legislature. This latter method is either by special act or charter, or by a general law which enables persons so desiring, by conforming to prescribed conditions and formalities, to become ipso facto a corporation. The formation under a general law is most favored, and is made mandatory by the constitution of some of the States.

Corporate Powers.—The powers of a corporation are those given by its charter, or the general law under which it is organized, or fixed and determined by usage when it exists by prescription, together with those which are implied by law as reasonably necessary or proper to enable it to exercise its express powers and to realize the objects for which it exists. They generally include the power to make contracts, to sue and be sued, to hold property, to have a corporate seal, to make by-laws, and to elect and remove members and officers. If a corporation exceed its proper functions, it is said to act ultra vires. An ultra vires act is, according to the weight of authority, void; but money

paid, or the value of property given, to a corporation under an ultra vires contract may be recovered. In a few jurisdictions, e.g., New York, if the person dealing with a corporation has performed on his part an ultra vires contract, the corporation is held to be estopped from setting up its want of power. (See Estoppel.) Corporations have been held liable for torts resulting from their negligent performance of an act, whether authorized or unauthorized, and it is now generally held that a corporation may be liable for any tort, the malice or negligence of the agent being imputed to the corporation. It was formerly held that a corporation could legally perform no act except under its corporate seal, but it may now act without a seal where natural persons may do so. The quantity of land which a corporation may hold is usually fixed by its charter, or a general law, and is commonly restricted in this country to so much as is necessary for the proper performance of its authorized functions.

Public Control of Corporations.—The right of *visiting* a corporation, conferred by charter or legislative appointment, is that of exercising legal superintendence and control over its actions. It is an absolute, summary power which is not reviewable by the courts, unless its arbitrary exercise would result in gross injustice. It is strictly applicable only to ecclesiastical and eleemosynary corporations; the visitor of the former being the bishop of the diocese, and of the latter, the founder and his heirs, or persons appointed by the founder. In the United States the visitors of charitable corporations are usually their trustees, the right of visitation being determined wholly by statute. Civil corporations are subject to the general law, and are amenable to the process of the courts, and for misuse of powers or flagrant wrongs may be dissolved by proceedings instituted in behalf of the State.

A corporation may be dissolved by legislative act, by judicial decree, by surrender of its franchise and acceptance of the same by the State, or by the death of so many members that enough are not left to elect new members pursuant to its charter. The power to dissolve by legislative act is unlimited in England, but in the United States it is restricted as pointed out above. A judicial decree dissolves for the violation of the conditions of the charter or the law under which it exists. Upon dissolution the property of the corporation becomes a trust fund for the benefit of the State or the stockholders, usually the latter. If the institution were charitable, this fund is administered by new trustees appointed by the court.

Strictly speaking, a corporation can have no legal existence outside the jurisdiction of the sovereignty under which it was created. By a legal fiction, however, and by the comity of nations and states, a corporation is held to exist legally wherever it is doing business, and it may sue and be sued, acquire property, etc., outside of the state of its creation by authority of the foreign state in which it is operating and subject to such restrictions as the latter may see fit to impose.

Citizenship of a Corporation.—Under the Constitution of the United States a corporation is deemed not to be a citizen of a State, so that it cannot as a foreign corporation claim equal protection of the law with the citizen of a State other than the State of its creation. It follows that a State may impose any terms as a condition of a foreign corporation doing business within the State, provided it does not interfere with the corporation's constitutional right to carry on interstate commerce. A corporation, however, is a citizen within the meaning of the clause of the Constitution conferring jurisdiction on the Federal courts, and it may sue or be sued in the Federal courts, and may in a proper case remove a cause from a State to a Federal court. Consult: Angell and Ames, *Treatise on the Law of Private Corporations* (Boston, 1882); Cook, *Treatise on the Law of Corporations Having a Capital Stock* (Chicago, 1898); Thompson, *Commentaries on the Law of Corporations* (San Francisco, 1895–99); Clark and Marshall, *Treatise on the Law of Private Corporations* (St. Paul, 1901); Purdy, *Treatise on the Law of Private Corporations* (Chicago, 1905). See Charter; Certificate; Dartmouth College Case; Contract; Citizen; etc.; Municipal Corporations and its bibliography; and for the treatment of the subject of corporations in its relation to civil and Roman law, see article on Civil Law. Consult also such general treatises as those of Kent and Blackstone.

CORPOSANTS. See Castor and Pollux.

CORPS, kōr (Fr. *corps*). A military term denoting a body of officers, or officers and men, generally a distinct military organization, as the signal corps, corps of engineers, and the coast artillery corps, in the United States army; and the various battalions of volunteers throughout England, locally known as the volunteer corps. More specifically it applies to the corps d'armée, or army corps, which in the United States formerly consisted normally of about 25,000 men, divided into three divisions, each of three brigades of three regiments of infantry, with cavalry and artillery in proportion, commanded by a lieutenant general or major general. The term "army corps" was abolished in the British army in 1906. In the United States army the corps has been replaced by the field army, consisting of two or more divisions, and is the appropriate command of a lieutenant general. Some European armies are organized by combining army corps of varying strength and composition. (See Army Organization.) In the navy it is used in the first sense; as the medical corps, the pay corps, the marine corps, etc. See Navy.

CORPS DIPLOMATIQUE, kōr dē'plō'mȧ'tēk' (Fr., diplomatic body). The entire body of foreign ambassadors and diplomatists assembled at the court, or the capital, of a country.

CORPSE (OF., Fr. *corps*, body, from Lat. *corpus*, body). A dead human body is not property in the ordinary commercial sense of the term. In the absence of a statute authorizing it, a contract for the sale of such a body is void, as tending to outrage decency, humanity, and sound public policy; and an officer who seizes or holds the body under any legal process issued against the person while living is guilty of a criminal offense. But while a dead body is not property, it is the object of certain well-defined rights. The possessor of these rights is the surviving husband or wife, or the next of kin of the deceased, unless the deceased has made a valid disposition of his body by will. Accordingly, if one mutilates a dead body, or prevents its burial, or unlawfully interferes with it after burial, he may not only be punishable criminally,

but be liable in an action for damages to the husband or wife, or next of kin, of the deceased.

Controversies between persons as to the place of burial of a dead body, or as to its proper treatment, are within the jurisdiction of a court of equity in the United States and are not subject to ecclesiastical decision, as has from an early period been the case in England. This is upon the theory that the rights in a dead body are in the nature of a sacred trust, in the proper performance of which all are interested who were allied to the deceased by family ties.

Not only is a dead human body the object of legal rights, but it is also the object of legal duties on the part of the living. The husband or the wife, or the nearest of kin, or, in the absence or poverty of these, a stranger under whose roof a death occurs, is bound to give the body of the deceased a decent burial. Any one who casts it away without funeral rites or indecently exposes it is liable to criminal punishment. On the other hand, the expenses of a proper burial have priority over every other claim against the estate of the deceased. Consult the authorities referred to under SALE (*of personal property*). See BURIAL; BODY SNATCHING.

CORPS LÉGISLATIF, kōr' lā'zhē'slā'tēf' (Fr., legislative body). The name of the Lower House of the French national legislature from 1852 to 1870. The number of members was 251, elected by universal suffrage for a term of six years. They were largely the creatures of Napoleon III. Consult the histories of the period by Granier de Cassagnac, Taxile Delord, Beaumont-Vassy, and De la Gorce. See FRANCE; NAPOLEON III.

CORPS OF ENGINEERS. See ENGINEERING, MILITARY; ARMY ORGANIZATION; UNITED STATES, *Army*.

CORPULENCE. See OBESITY.

COR'PUS CATHOL'ICO'RUM and **COR'PUS E'VANGEL'ICO'RUM** (Lat., body of Catholics and body of Evangelicals). The names given in Germany after the Peace of Westphalia (q.v.) to the Roman Catholic and Protestant divisions of the empire respectively. The Elector of Mainz was at the head of the former as president. It generally held its meetings in a convent of that city in which the Diet happened to meet. The Elector of Saxony was at the head of the latter. When the Electoral House of Saxony became Roman Catholic, the control was given to the Privy Council, which was a Protestant body. Both were extinguished by the dissolution of the German Empire in 1806.

CORPUS CHRIS'TI (Lat., body of Christ). An important festival of the Roman Catholic church, in honor of the sacrament of the Eucharist. It was first celebrated in Liége in 1246 and decreed for the whole church in 1264 by Urban IV, partly in consequence of the vision of a Flemish nun named Juliana, and partly because the anniversary of the sacrament's institution fell at the most solemn and mournful time of the Christian year, when services of a festal character were impossible. It was assigned to the Thursday after Trinity Sunday, and this day is still observed in most parts of continental Europe by magnificent processions through streets decked with flowers and green boughs. In the United States and some other countries the solemnities are celebrated on the Sunday after Trinity. The office of Corpus Christi, composed by St. Thomas Aquinas, is one of the most beautiful in the breviary.

CORPUS CHRISTI. A city, port of entry, and the county seat of Nueces Co., Tex., 130 miles (direct) south by east of San Antonio, on Corpus Christi Bay, and on the National of Mexico, the San Antonio and Aransas Pass, and the St. Louis, Brownsville, and Mexico railroads, and on the line of the Texas and Gulf Steamship Company (Map: Texas, D 6). Corpus Christi is a popular health resort, has fine boating and bathing facilities, hotels, and boarding houses, and the vicinity abounds in ducks, geese, and other game. It contains a public library, sanitarium, and a fine county courthouse. The city is the centre of a market-gardening region, has a canning factory, and exports large quantities of fish and oysters. There is a good harbor, attracting considerable coasting trade. Corpus Christi adopted the commission form of government in 1909. The city owns its water works. Gen. Zachary Taylor encamped here during the Mexican War, and his intrenchments are still preserved. Pop., 1900, 4703; 1910, 8222; 1920, 10,522.

CORPUS CHRISTI COLLEGE (Cambridge). In 1352 the two guilds of Corpus Christi and St. Mary in the town of Cambridge united to found a hall or college for educating clergy to fill the places of those carried away by the recent visitation of the black death. The master and two fellows of this new foundation served as chaplains of the guild and officiated also in St. Benet's Church, at which the members of the fellowship of Corpus Christi worshiped and which was impropriated to the college. The college was known as Benet College down to 1827, when the present and more official title was adopted. In the sixteenth century the patronage of Sir Nicholas Bacon, who was a member and a benefactor of the college, together with the mastership of Archbishop Parker, brought the foundation much profit and honor. The unrivaled collection of manuscripts, collected by the latter at the dissolution of the monasteries and bequeathed to the college, are among its chief treasures. Besides this and the Lewis collection of printed books, the college owns the most interesting collection of plate in the university. Christopher Marlowe and John Fletcher were members of Corpus Christi. The buildings are of much interest, including the earliest closed quadrangle in the university, standing almost unaltered since its erection in the fourteenth century. The college consists of a master, 11 fellows, and 22 scholars, besides undergraduates, who in 1913 numbered 103. Consult H. P. Stokes, *Corpus Christi* (London, 1898).

CORPUS CHRISTI COLLEGE (Oxford). One of the smaller colleges in the university. It was the first of the Renaissance foundations, and its establishment marks an epoch in the intellectual history of the university. It was founded in 1516 by Richard Foxe, Bishop of Winchester, and Lord Privy Seal, the principal Secretary of State and chief counselor and diplomat of Henry VII, partly at the suggestion and cost of Hugh Oldham, Bishop of Exeter, and founder of the Manchester Grammar School in 1515. In Corpus Christi College we find the first noteworthy attempt to depart from the older educational tradition of the university, in the establishment of an endowed chair of Greek, the first in Oxford, and in throwing open the professorial lectures to all members of the university. The honor of founding the

professorial system Foxe shares with Bishop Waynflete and Margaret of Richmond, whose executor he was. The statutes of his foundation contain the most stringent rules for life and work. These, with the liberal provisions for the study of Latin and Greek, and humanistic studies in general, called forth the high praise of Erasmus. Though his prediction of the future preëminence of the college in the university has not been fulfilled, Corpus Christi has always maintained an excellent reputation for scholarship. It has counted among its members John Keble, Thomas Arnold, "the judicious Hooker," his patron Bishop Jewell, Nicholas Udall, the author of the first English comedy, and, for a very brief period, Oglethorpe, the founder of Georgia, Chief Justice Coleridge, and Thomas Day, author of *Sandford and Merton*. The buildings of the college are among the most harmonious in Oxford, and in this, as in its size, character, and standing, it has been aptly reckoned among the three typical colleges of the university. Its statutes were revised in 1881, and the new provisions are not as yet fully carried out. It consists on its present foundation of a president, 14 fellows, of whom 3 are professorial fellows, 27 scholars, and 5 exhibitioners, besides undergraduates. In 1913 the latter numbered 89. Consult T. Fowler, *Corpus Christi* (London, 1898).

CORPUS'CULAR THEORY OF LIGHT. See LIGHT.

COR'PUS DELIC'TI (Lat., body of the offense). In criminal law, the essential element of the alleged crime. If a person is charged with murder, the prosecution must prove the death, as by the finding and identification of the corpse, or by evidence of criminal violence adequate to produce death and to account for the disappearance of the body. In other words, the *corpus delicti* in such a case consists in the death of the person alleged to have been murdered and the criminal agency of the alleged murderer in producing that death. The same doctrine is applicable to other offences. If one is charged with larceny, the prosecution must prove that the crime of larceny has been actually committed. See CRIMINAL LAW, and consult the authorities there referred to.

CORPUS DOCTRI'NÆ (Lat., body of doctrine). A collection of writings intended to have authority in the Protestant churches of Germany. The chief of such collections was the *Corpus Philippicum* (Leipzig, 1560), containing the Apostolic, the Nicean, and the Athanasian creeds, the Augsburg Confession, and Melanchthon's *Loci Communes*. This and similar collections were superseded by the *Formula Concordiæ*. See CONCORD, BOOK OF.

CORPUS INSCRIP'TIO'NUM LA'TINA'RUM (Lat., body of Latin inscriptions). A great collection of Latin inscriptions, geographically arranged in 15 volumes, published by the Royal Academy in Berlin. The first volume appeared in 1863, the last in 1891. This work is the most important authority in the study of Roman epigraphy. Consult Egbert, *Latin Inscriptions* (New York, 1896).

CORPUS JU'RIS (Lat., body of law). A comprehensive collection of the entire body of law of a given jurisdiction. The phrase has been specifically applied to two great compilations of law, both based on the jurisprudence of the Roman Empire, viz.:

1. The *Corpus Juris Civilis*, or body of the civil law known, by way of eminence, as *the* Corpus Juris, is made up of the Code, the Pandects, or Digest, and the Institutes, compiled and promulgated by the authority of Justinian (528–534 A.D.), and the Novels (*Novellæ Constitutiones*), subsequently promulgated by him to correct errors and defects in the previous work. The first instance of the use of the expression *Corpus Juris Civilis* to describe the collection is found in the year 1583. As a whole, the work became the textbook of mediæval law, was the basis of instruction in the great law schools of the Middle Ages, and is the foundation of the scientific study of law in all the universities of continental Europe to-day. It has been truthfully said that, "with the exception of the Bible, no book was ever more widely studied by the Caucasian races." The best edition is that of Mommsen (who edited the Digest), Krüger (Institutes and Code), and Schael (the Novels). It has been translated into German, but never as a whole into English, though the Institutes and some portions of the Digest have been made available for English readers. See CIVIL LAW; CODE; DIGEST; and consult Lee, *Historical Jurisprudence* (New York, 1900); Hadley, *Roman Law*.

2. *Corpus Juris Canonici.*—The corresponding body of the canon law of the Church of Rome had a slower growth. The first compilation to which the name was applied was the *Decretum* of Gratian, a learned professor of the canon law at the University of Bologna, published about 1150 A.D. This was a private, unofficial collection of synodical canons and papal decretals, made for use as a textbook in the law school, but it at once became a leading authority in the Church. Subsequent official collections—principally the *Libri Extra Decretum* of Pope Gregory IX, the *Liber Sextus* of Boniface VIII, and the compilation of Clement V, known as the "Clementine Decretals"—were embodied in the *Corpus* and became parts of it. Thus completed, the entire work has continued to be the standard of the canon law. The best editions are those of Böhmer (1747) and Richter (Leipzig, 1833, 1877–81). See CIVIL LAW; CANON LAW; and consult Lee, *Historical Jurisprudence* (New York, 1900).

CORRAL, kôr-räl', PONCIANO (c.1810–55). A Central American general, born in Costa Rica. He settled in Nicaragua early in his youth and became Minister of State in 1853. Subsequently he became identified with the Legitimist government and commanded the army which defeated William Walker (q.v.) at Managua (1855). Shortly after the battle of La Virgen (Sept. 3, 1855) and the occupation of Granada, he made terms with Walker, who, however, afterward accused him of treasonable negotiations with leaders of the Legitimist party. After a brief court-martial Corral was shot, Nov. 8, 1855. There seem to be no grounds for Walker's accusation. See the life of Corral by Cortés.

CORREA DA SERRA, kôr-rā'à dà sĕr'rà, JOSÉ FRANCISCO (1750–1823). A Portuguese politician, scholar, and botanist, who was educated and took orders in Rome. With the assistance of the Duke of Lafões he founded the Portuguese Academy of Sciences in Lisbon and was made its perpetual secretary. He soon came into conflict with the Church, through the Inquisition, and fled to France, where he remained until the death of Pedro III, when

he again took up residence with Lafões. Later he was obliged (because he aided a French Girondist) to flee to England, where he became secretary to the Portuguese embassy. In 1813 he came to New York, and in 1816–20 he was Portuguese Minister at Washington. In this latter year he was called back to Portugal to become a member of the financial council; and he was elected to a seat in the Cortes. He had high rank as a botanist, but his principal work is the exceedingly important and well-edited *Collecção de livros ineditos da historia portugueza* (4 vols., 1790–1816).

CORREC'TION. See CRIMINOLOGY; PENOLOGY; CHARITIES AND CORRECTION, THE NATIONAL CONFERENCE OF.

CORREGGIO, kôr-rĕd'jô. A city in the Province of Regio nell' Emilia, north Italy, situated on a canal connecting with the river Secchia, 27 miles east of Parma (Map: Italy, E 3). In the Piazza is a statue of the painter Antonio Allegri, known as Correggio (q.v.), who was born here in 1494. The town was once the capital of a principality belonging to the Duchy of Modena, and the princely castle still remains. Pop. (commune), 1881, 12,587; 1901, 14,437; 1911, 16,996.

CORREGGIO, properly ANTONIO ALLEGRI (c.1494–1534). A Lombard painter of the Renaissance, the greatest master of the Emilian school. His family name was Allegri, but he is usually called Correggio from his birthplace, a small town near Modena. We are less informed about his life than about that of any other of the chief Italian painters. According to the traditional accounts, as given by Vasari and the local historians, Correggio was humble and poor and passed his life in drudgery. He made an unhappy second marriage and died under distressing circumstances. But in contemporary documents it appears that his parents were tradespeople in comfortable circumstances, that he inherited property from his uncle, and was well paid for his work. For his frescoes in the cathedral of Parma alone he received 1000 gold ducats, besides materials. If he did not seek the courts of princes, where he might have gained high prices, it was because of his financial and moral independence.

Allegri's earliest years were passed in his native town. The lords of Correggio at that time maintained a number of artists and scientists at their court, and it was in this atmosphere that the young artist grew up. It is generally believed that he acquired the rudiments of painting from his uncle, Lorenzo Allegri, an unimportant local painter. It is also supposed that he was a pupil of Francesco Bianchi-Ferrari at Modena, but late research has pointed out that this is unlikely, because his earliest work bears no resemblance to Bianchi's. Moreover, the latter died in 1510, when Correggio was not over 16 years old. On the other hand, he may have learned anatomy and optics, in which he excelled, from Giambattista Lombardi, head of the academy at Correggio. He seems ere this to have attracted the attention of Lady Veronica Gambara, of Correggio, about whom the scientific and artistic culture of the little court centred. A probable tradition represents him as having gone with her to Mantua during the plague in 1511. Certain it is that his first works show the influence of Andrea Mantegna, particularly in his taste for mythological subjects, his love for illusions of perspective, and in the beautiful nude figures of children and genii which abound in his works. It is also likely that he studied under Lorenzo Costa (q.v.), who was at that time head of the school of Mantua, and perhaps under Dosso Dossi (q.v.), who was for a time in Mantua. In Correggio's earlier works we also find traces of the influence of Leonardo da Vinci. This influence appears in the handling of light and the modeling of figures, and is particularly evident in two paintings now considered to be early works of Correggio, viz., a "Holy Family," in the Malaspina Gallery, Pavia, and a "Madonna," in the Museo Civico of Milan, both of which were formerly in possession of Milanese families. But it is not necessary to assume, as Ricci, the chief authority on Correggio, does, that he must have therefore studied in Milan. He may have become acquainted with Leonardo's work in some other way. A similar supposition is made by Thode, that because of resemblances of Correggio's frescoes in the convent of San Paolo, Parma (1518–19), with Raphael's in the Farnesiana and elsewhere in Rome, the former must therefore have visited Rome in 1517–18. Even granting this resemblance, which is not generally conceded, this conclusion seems unwarranted. An artist of Correggio's merit could not have visited Rome in 1517 without attracting some attention, and Vasari's relations with the artists in Rome were such that Vasari could not have been misinformed when he made the statement that Correggio never visited the Eternal City. Correggio united in himself the tendencies of all the Lombard schools—of Mantua, Milan, Bologna, and Ferrara—but it is unwarranted to infer that he studied in all of them.

In 1513 he returned to Correggio, and in 1514 he signed a contract to paint an altarpiece for the Franciscan church in that town. In 1518 he removed to Parma in response to an invitation to decorate with frescoes the chamber of the Abbess of San Paolo. In this city he passed the greater part of his remaining life and painted his greatest works; here also he founded his school. Besides numerous easel works and altarpieces, he was engaged from 1520 to 1524 in painting the frescoes of the cupola of San Giovanni in Parma, and from 1526 to 1530 he adorned the great cupola of the cathedral. In 1530, probably because he was displeased with the criticisms of this last great masterpiece, he returned to his native town and there passed the remainder of his life in peace and quietness, under the patronage of Veronica Gambara, occupying himself with mythological subjects. He died on March 5, 1534. He was married in 1520 to Girolama Merlini, a maiden of 17. She may have been the inspiration of three of his most charming Madonnas, which seem to have been suggested by domestic scenes. She bore him four children, of whom a son and a daughter survived. This son, Pomponio, was a painter, but, unlike his father, a very mediocre one. Girolama died in 1529.

Correggio's individuality is so marked, and his mastery of technique was developed at such an early age, that it is impossible to divide his work into distinct periods such as in the case of Raphael. We may, however, distinguish two periods separated by the year 1518,

when his great decorative works began. His earliest works are those executed before 1514, of which, according to the researches of Morelli, there are nine in all, to which modern critics add six more. A characteristic example is a charming "Madonna" in the Uffizi in Florence. She sits enthroned in the clouds, with two angels making music on either side. The general disposition of the picture resembles Mantegna's, but the execution and the delicate transitions from light to shadow, the soft, round figures, and the dreamy, magical tone are characteristics of Correggio. The two paintings mentioned above as showing the influence of Leonardo also belong to this period.

In his large altarpiece for the Franciscans of Correggio (1514), now in Dresden, the painter appears before us with a style already developed, showing the influence of Mantegna and the Emilian school. The Madonna sits on a high Renaissance throne, with two saints on either hand. The most interesting figure of the composition is St. Francis, whom she is blessing. He seems the incarnation of the happy and gentle spirit that softened and changed the Middle Age. A number of other works of a religious nature belong in the period of 1514–18, among which is the charming "Zingarella" of the Naples Gallery.

The frescoes in the convent of San Paolo (1518) form an epoch in Correggio's career, for they were his first monumental efforts, and with them he may be said to have begun the school of Parma. They reveal him as a master of mythological representation, the peer of Raphael himself. On the principal wall of the Abbess's chamber is the figure of Diana returning from the chase, in a car drawn by white stags. The ceiling is decorated with a trelliswork of vines, from which peer 16 little cupids, bearing attributes of the chase—the most bewitching figures imaginable. Lower on the walls are 16 lunettes filled with the mythological figures, like the Fates, the Graces, and Satyrs.

In the cupola of San Giovanni of Parma Correggio attempted a grander style of composition (1520–24). This was the first example of a cupola to be treated with frescoes, and Correggio had no precedents to follow. He treated the cupola as if it were the heavens, portraying Christ and the Apostles amid the clouds. In the centre was Christ in glory, a specimen of keenest foreshortening. The Twelve Apostles, rapt in deepest wonder, are seated upon the cloud below, and in the pendentives are the four Evangelists and four fathers of the Church in groups of two—all figures of the utmost nobility of conception. The decorations of the cupola of the cathedral of Parma (1526–30) are grander still and constitute his most ambitious effort. Their subject is the "Ascension of the Virgin." In the upper half of the cupola Christ goes forward to meet the Madonna, who is borne upward by a host of angels. In the lower part stand the Apostles gazing in rapt wonder upon the scene, and behind them are a large number of beautiful genii with candelabra and the like, as if preparing for a great celebration. The innumerable hosts of the angels seem to float beneath the Madonna, and the whole picture is animated with ecstatic joy. The color is beautiful and soft—the great fresco has well been termed an apotheosis of color.

These three series of frescoes were his greatest works. But in addition to these Correggio painted many other pictures during the period 1520–30. The famous "Marriage of St. Catherine," in the Louvre, was painted in 1522. It is impossible to conceive more beautiful and expressive heads than these, or hands and hair more perfectly painted. Correggio's works of this period may best be studied in the galleries of Parma and Dresden. Foremost among them is a series of five great altarpieces, the best of which are the so-called "Night" and "Day." The latter, which is in Parma, represents the Madonna and a very beautiful Magdalen, painted in the full light of the day, which is wonderfully diffused. The famous "Night," in Dresden (ordered in 1522, but not painted until 1529), is in reality a birth of Christ, in which the light issues from the new-born infant, lighting with wondrous radiance the Madonna, and the faces of the two women and the shepherds, which stand out in vivid contrast to the darkness above. Never were light and shade better handled than in these two pictures. On the other hand, Morelli has conclusively shown that the well-known "Reading Magdalen" of the Dresden Gallery is no Correggio at all, but probably a copy by Adrian van der Werff, or, as later critics assume, by an Italian painter.

The last period of Correggio's life was chiefly spent in painting mythological pictures. Earthly love was the theme he sought to portray, and none could portray it better than he. His work is sensuous, but not sensual. His "Io" and his "Leda" are as innocent and charming as the Greeks themselves conceived them. Perhaps the finest of these productions are the "Jupiter and Antiope" in the Louvre, and the "Danaë" of the Borghese Gallery, Rome.

Correggio's canvases are peculiarly impressive because of his wonderful treatment of light and shade, of which he was the greatest master among the Italians. He generally represents the chief figures in high light, which is vividly contrasted with the surrounding gloom. His colors are soft and harmoniously blended, and the values are accurately given; his carnation is perfect. His figures are faultlessly modeled, and with him a picture is no longer a flat surface. Another chief characteristic of his work is the dramatic action of his figures, which is sometimes so pronounced that their movements seem exaggerated, as was also the case with those of Michelangelo. But in the case of Correggio the effect is softened by the mystic light which envelops the picture. His drawing is said to be inaccurate, but such cases are certainly exceptional. Correggio drew with his brush, so to speak, and the general effect of the pictures is most charming. In the strength of his individuality, in the subjectivity of his pictures, he is second only to Michelangelo. His place in the history of art is among the five great Italian painters, with Michelangelo, Leonardo, Raphael, and Titian. The school of Parma which he founded was not of great importance, Parmigiano (q.v.) being the only pupil of note. But Correggio exercised great influence upon the Carracci in the following century and was the great model of the Baroque painters.

Bibliography. The researches of Morelli, epoch making for Correggio, are still an authority. Of the earlier monographs the most important was the comprehensive work by Landon (Paris, 1803–20). By far the most important work is that of Ricci (Eng. trans., Lon-

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"HOLY NIGHT," FROM THE PAINTING IN THE ROYAL MUSEUM, DRESDEN

don, 1896). Others are by J. Meyer (Eng. trans., ib., 1876); Heaton (ib., 1882); Thode, "Correggio" in *Künstler-Monographien* (Bielefeld, 1898); Sturge Moore (London, 1896); and Gronau (Stuttgart and Leipzig, 1907). See also Berenson, *Studies in Italian Art* (London, 1901).

CORREGIDOR, kŏr-rĕj'ĭ-dôr, *Sp. pron.* kōr-rā'hē-dōr' (Sp. *corregidor*, Portug. *corregedor*, corrector). The Spanish and Portuguese title of the principal magistrate of a town. The term is sometimes applied also to certain provincial magistrates in Spain.

CORREGIDOR ISLAND, Philippine Islands, lies in the entrance to Manila Bay (Map: Luzon, D 9), and divides the entrance from the China Sea into two channels—the Boca Chica to the north, 3 miles wide, parting the island from Bataan on the mainland of Luzon; the Boca Grande, 6½ miles wide, from Cavite. The island is 4 miles in its greatest dimension, from east to west; its area is 2 square miles, and 5 dependent islands cover 2 square miles. The greatest elevation is 639 feet, near the western end. Three springs afford an abundant supply of water conveniently placed for shipping. There are four lighthouses. San José is the only town; its fixed population is about 500. The dependent islands are El Fraile, Horadada, La Monja, Pulo Caballo, and Santa Amalia. The island is the first post of the inner line of defense of Luzon and is heavily fortified. In the storming of Manila Bay, May 1, 1898, Admiral Dewey steamed safely past the island, which was supposed to have been strongly fortified by the Spanish, containing the base operations for the submarine defense of the bay.

COR'RELA'TION (ML. *correlatio*, from Lat. *com-*, together + *relatus*, p.p. of *referre*, to refer, from *re-*, back + *ferre*, to bear). The reciprocal influence of plant organs. The removal or unusual development of one organ may affect the mode of development of others. For example, if the terminal shoot of a pine be cut away, one or more neighboring laterals will grow erect and in a measure take its place, and branches will be formed on all sides of the new leader. Otherwise it would have grown almost horizontal and become branched only in a horizontal plane. See GROWTH.

CORRENTI, kôr-rĕn'tê, CESARE (1815–88). An Italian statesman and revolutionist, born in Milan and educated in that city and in Pavia. He originated several important statistical works and the almanac *Nipote del Vestaverde*. As one of the strongest opponents of Austrian domination in Italy, he contributed materially towards the establishment of unification. In the work entitled *L'Austria e la Lombardia* (1845). he set the popular sentiment against Austria, and during the insurrection at Milan (March 18–22, 1848) was appointed Councilor of War and Secretary General of the provisional government, of which he eventually became in some respects the central figure. In 1860 he was appointed Councilor of State; in 1866 he was intrusted with the organization of the Venetian Provinces, and subsequently he served as Minister of Education in the Ricasoli (1866) and Lanza (1869–72) cabinets. Correnti had exceptional oratorical power and marked literary ability. The publications with which he became identified, either as editor or as collaborator, have advanced statistical science in Italy.

COR'RESPOND'ENCE (Lat. *com-*, together + *respondere*, to answer, from *re-*, back + *spondere*, to promise). A term used in mathematics to express certain reciprocal relations. If each individual of one group of objects bears a certain relation to a definite number of individuals of another group, and a definite number of individuals of the first group bears the same relation to each individual of the second group, there is said to be a correspondence between the objects of the groups. If 1 of the first group corresponds to B of the second, and 1 of the second group corresponds to A of the first, the relation is called an A to B correspondence. If $A = B = 1$, it is called a 1 to 1 ($= 1$) correspondence; e.g., two numbers are said to be equal when there exists a 1 to 1 correspondence between their units. In geometry the simplest cases of 1 to 1 correspondence, or "conformal representation," are furnished by two planes superposed one upon the other. Here to every point of the first figure there corresponds one and only one point of the second figure, and to every point of the second figure there corresponds one and only one point of the first. The simplest case of Chasles's (q.v.) correspondence formula may be stated thus: If two ranges of points R_1 and R_2 lie upon a straight line so that to every point x of R_1 there correspond in general α points y of R_2, and again to every point y of R_2 there always correspond β points χ of R_1, the configuration formed from R_1 and R_2 has $(\alpha + \beta)$ coincidences, or there are $(\alpha + \beta)$ times in which a point χ corresponds with a point x. From these linear transformations Poncelet, Plücker, Magnus, Steiner, passed to the quadratic, where they first investigated 1 to 1 correspondence between two separate planes. The "Steiner projection" (1832) employed two planes E_1 and E_2 together with two straight lines g_1 and g_2 not coplanar. If we draw through a point P_1 or P_2 of E_1 or E_2 the straight line x_1 or x_2 which cuts g_1 as well as g_2, and determines the intersection X_2 or X_1, with Σ_2 or Σ_1, then are P_1 and X_2 and P_2 and X_1 corresponding points. In this manner to every straight line of the one plane corresponds a conic section in the other. In 1847 Plücker had determined a point upon the hyperboloid of one sheet, like fixing a point in the plane, by the segments cut off by two fixed generators upon the two generators passing through the point. This was an example of a uniform representation of a surface of the second order upon the plane. Correspondence relative to surfaces has been studied by Chasles, Clebsch, Cremona, Cayley, and others. In space of three dimensions, only a beginning has been made in the development of this theory. Consult: Schubert, *Kalkül der abzählenden Geometrie* (Leipzig, 1879); Klein, *Vergleichende Betrachtungen über neuere geometrische Forschungen* (Erlangen, 1872); Möbius, *Der barycentrische Calcul* (Leipzig, 1827); Holzmüller, *Theorie der isogonalen Verwandtschaften* (ib., 1882); Riemann, *Ueber die Hypothesen, die der Geometrie zu Grunde liegen* (ib., 1854); Pasch, *Vorlesungen über neuere Geometrie* (ib., 1882).

CORRESPONDENCE SCHOOLS. Institutions for the provision of instruction in all branches of education by mail to those who are unable to avail themselves of the opportunities of attending ordinary schools and colleges. The system aims to provide plans of work, outlines, and exercises by correspondence. The method probably originated with the University Exten-

sion movement in England, there organized in 1868 and introduced in America in 1873. In 1883 a Correspondence University was established in Ithaca, N. Y. The system received its greatest extension through the work of Pres. William R. Harper in connection with the Chautauqua Institution, which abandoned this function when it was taken over by some of the universities, notably Chicago and Wisconsin, and many private institutions established for this purpose, notably the International Correspondence Schools at Scranton, Pa. Almost every branch of knowledge, both for self-improvement generally or in connection with the trades or vocations, can be studied in this way.

CORRESPONDING STATES, Theory of. See Critical Point.

CORRÈZE, kô'rĕz'. A south central department of France (q.v.), formerly part of the Province of Limousin, taking its name from an affluent of the Vezère, the Corrèze, which traverses the department from northeast to southwest (Map: France, S., F 3). Area, 2273 square miles; pop., 1896, 310,514; 1901, 318,422; 1906, 317,430; 1911, 309,646. The surface of the department is mountainous, especially in the north and east, where it is broken in upon by offsets from the Auvergne Mountains, which range from 2500 to 3320 feet (Mont Besson) above the sea. It produces wheat, oats, barley, rye, maize, and potatoes, though not in quantities sufficient for its own needs. Grazing is also carried on. Coal, iron, lead, antimony, and copper are found in considerable quantities. Flour, beer, oil, lumber, dyestuffs, hats, woolens, shoes, chairs, paper, and leather are manufactured. Capital, Tulle.

COR'RIB, Lough. A lake with an area of 68 square miles, which divides Galway, in the western part of Ireland, into an eastern and a western section (Map: Ireland, B 3). From its southern end, 4 miles north of Galway, it discharges its surplus waters by Galway River into Galway Bay. It receives the waters of the Clare and smaller rivers, and those of Lough Mask, subterraneously through the Pigeon Hole and other caves at its northern end. On its sides are metamorphic rock, Carboniferous limestone, and marble. Near it are many monumental heaps and megalithic circles. It contains 300 islets, and to the west are mountains 3000 feet high.

CORRIENTES, kôr-ryān'tās. A city of Argentina and capital of the province of that name, situated on the Paraná, just below the mouth of the Paraguay and not far below the mouth of the Bermejo (Map: Argentina, F 9). It has several plazas, hospitals for men and women, a poorhouse, a national college, a normal school, a theatre, and a library. The natural-history museum was at one time managed by the naturalist Bonpland. The city is the centre of a fertile district and has considerable trade in lumber and oranges. Its chief industry is shipbuilding, but there are also meat-curing establishments and a foundry. Pop., 1909, 23,904. Corrientes was founded in 1588. It occupied a place of considerable prominence in the revolutionary movements during the latter half of the nineteenth century.

COR'RIGAN, Michael Augustine (1839–1902). An American Roman Catholic prelate, born at Newark, N. J. He graduated in 1859 at Mount St. Mary's College (Emmitsburg, Md.), pursued a theological course at the American College of Rome as one of the 12 students with whom that institution was begun, was ordained priest in 1863, and from 1864 to 1868 was professor of dogmatic theology and sacred Scriptures in the Diocesan Seminary of Seton Hall College (South Orange, N. J.). From 1868 to 1873 he was president of the college and in 1873 was appointed Bishop of Newark. During his administration of the diocese he greatly increased the number of churches, introduced religious communities, and founded charitable institutions. In 1880 he became coadjutor (with right of succession and the title of Archbishop of Petra) to Cardinal McCloskey, Archbishop of New York, and from that time directed the larger part of the work of the archdiocese. He entered into the office of Archbishop of New York in 1885 and received the pallium in 1886. His administration was marked by the prolonged controversy between Dr. Edward McGlynn (q.v.) and the Roman Catholic church. He effectively developed the archdiocese, which at the time of his death was one of the largest and most important in the world. Although personally retiring and unobtrusive, he became known, through his many activities, as one of the most prominent Roman Catholics in the United States. He was a scholar of high attainments. Consult J. A. Mooney, *Michael Augustine Corrigan: A Memorial* (New York, 1902).

CORROB'OREE (Australian). A sort of ceremonial dance, of a more or less public character, in vogue among the Australian aborigines. The corroboree is held at night, and various types of it occur all over the country, or are borrowed from tribe to tribe, some of a warlike, some of an historical, others of a lascivious character. Generally the men do the dancing, and the women furnish the accompanying music. The songs that go with the corroboree give scope for individual and tribal invention. The corroboree combines in itself the elements of the public celebrations among civilized races and the opera of to-day. It is the nearest approach to a national institution among these primitive people. The corroboree serves also as a peace ratification and as a means of intercommunication, etc. Consult Roth, *Ethnological Studies among the Northwest-Central Queensland Aborigines* (1897).

CORRODI, kôr-rō'dē, Wilhelm August (1826–85). A Swiss poet and draftsman, born at Zurich. He studied theology, but became a painter and from 1862 to 1881 taught drawing in Winterthur. In his poems, many of which are written in the popular dialect, he mirrors the life of his native canton, celebrating its customs and reviving many of its best traditions. His works, which are generally distinguished by a fine sense of humor, include: *Dur und Moll: Aus Natur und Leben* (1855); *Ein Buch ohne Titel, aber für Kinder von sieben bis siebenmal sieben Jahren* (1855); *Waldleben*, a lyrical novel (1857). The works of Corrodi written in the dialect of Zurich include: *De Herr Professer*, an idyl (1858); *Der Herr Vikari* (1858); *De Herr Dokter*, an idyl (1860, dramatized by the author in 1872); *Wie d'Warret würkt*, a comedy (1887); and a translation of the works of Robert Burns into Swiss German (1872). Corrodi illustrated several of his own books.

CORROSIVE SUBLIMATE. See Mercuric Chloride.

CORROZ'OZO NUTS. See Ivory, Vegetable.

COR'RUGATED IRON. A name given to sheet iron or steel in which grooves and ridges have been produced by passing the sheet between rollers, the surfaces of which are formed into rounded grooves and ridges, the ridges of one roller filling the grooves of the other. By corrugation the stiffness of the metal sheet is greatly increased, and it is adapted for use in many places where a metal covering of lightness and strength is required, such as roofs, awnings, and the side walls of sheds and factory buildings. Corrugated iron is frequently galvanized with a thin layer of zinc to make it less liable to corrode or rust; a small percentage of copper is also alloyed with iron before corrugating for the same purpose. It is manufactured in a variety of thicknesses and with corrugations varying in size.

CORRUP'TION OF BLOOD. The blasting of inheritance: one of the consequences of an attainder for treason or felony under the old common law, whereby the offender was cut off, or outlawed, from all of his blood relationships and so rendered incapable of inheriting lands or of transmitting them by descent to his natural heirs, lineal or collateral. The effect of the corruption of blood being the extinction of the line of heirs of the person attainted, his lands at once, upon his execution, became subject to the law of escheat and became vested in his superior lord. In cases of treason the principle of forfeiture gave the lands to the king absolutely, and in cases of ordinary felony they went to the crown for a year and a day before escheating to the lord. This barbarous penalty survived in England, nominally at least, until 1870, when it was abolished by the Forfeiture Act. It has never been tolerated in the United States and is expressly forbidden by the Constitution, which declares (Art. III, Sec. 3, n. 2) that "no attainder of treason shall work corruption of blood, or forfeiture, except during the life of the person attainted." The constitutions of the several States contain similar provisions. See ATTAINDER; FORFEITURE; TREASON.

CORRUPT PRACTICES. Dishonest methods employed with the intent to influence the results of public elections. The practices to which the expression refers are the use of bribery, treating, undue influence, personation of voters, making false election returns, and knowingly making a false declaration as to election expenses. Of these, bribery, personation, and making false returns are common-law offenses and render the offender liable to indictment, and so, it has been held in England, is the giving of entertainment to voters with the corrupt intention of influencing an election. Any of the acts enumerated above, excepting that of making a false declaration as to election expenses (which is purely a statutory offense), whether criminally punishable or not, will at common law vitiate the result produced by them, and, if the corruption be general, will have the effect of nullifying the election itself.

The prevalence of bribery and other corrupt practices at parliamentary elections in England, and at all partisan contests in the United States, has in recent years led to the enactment of statutes in both countries to check the evil. The English Parliament led the way in these reforms by enacting the Corrupt Practices Prevention Act in 1854, which was aimed particularly at the practice of electoral bribery. This was followed in 1868 by the Parliamentary Elections Act, and in 1883 by the Corrupt and Illegal Practices Prevention Act. Altogether these statutes constitute a most comprehensive and well-devised body of legislation, and they have proved themselves to be admirably adapted to the end in view. They define with great particularity the acts which shall constitute the prohibited offenses, and prescribe the severe penalties of disfranchisement and the avoiding of the elections for their commission. The personation of voters is made a felony, and bribery and the other practices enumerated are declared to be misdemeanors. Many of the best provisions of these statutes have been incorporated in the election laws of American States. For the history and scope of these laws, see ELECTION; ELECTORAL REFORM. The English law may be further studied in Rogers, *Elections* (17th ed., London, 1895); Mattinson and Macaskie, *Law Relating to Corrupt and Illegal Practices* (3d ed., London, 1892).

COR'RY. A city in Erie Co., Pa., 37 miles by rail southeast of Erie, on the Erie and the Pennsylvania railroads (Map: Pennsylvania, B 2). The State Fish Hatchery and the high-school buildings are prominent features. Corry has steelworks, machine shops, flour and feed mills, brickworks, and manufactures of tram locomotives, stationary, gas, and steam engines, leather goods, corsets, furniture, radiators, shovels, wrenches, brushes, toys, etc. It has also extensive dairying interests. There are three mineral springs of value in the vicinity. Settled in 1860, Corry enjoyed a rapid growth, due to the existence of petroleum in the vicinity. The city adopted the commission form of government in December, 1913. Pop., 1890, 5677; 1900, 5369; 1910, 5991.

COR'RY (from OIr. *coire*, ravine, Swiss *Kahre*). A name applied to the recesses in a mountain slope beneath a sharp peak with serrate spurs, characteristic of the high Alps. These are referred by E. Richter to glacial erosion under specific conditions, although no glaciers occur in them at the present time. See CIRQUE.

COR'SAC (native name), or ADIVE. A small fox (*Vulpes corsac*) of the deserts of Central Asia, its range extending through the open country from the Ural Mountains and Caspian Sea to Mongolia. It is pale, reddish yellow in hue, white on the ventral surface, and with the tip of the long bushy tail black. In the sixteenth century it was fashionable as a ladies' pet in France. It digs holes for itself or seizes upon marmot burrows, preys, chiefly at night, on young marmots, small rodents, insects, etc., and resembles the American kit fox (q.v.). The Russian traveler Przevalsky reports it as abundant in Tibet, where it is called *karsa* by the Mongols, and is both trapped and run down by dogs. During the breeding season, in February, the high deserts resound with its owl-like cries, night and morning. See FOX; and Plate of FOXES AND JACKALS.

COR'SAIR (Fr. *corsaire*, from Prov. *corsari*, Sp., Portug. *corsario*, It. *corsaro*, corsair, from *corsa*, Sp., Portug. *corso*, It. *corsa*, course, from Lat. *cursus*, course, from *currere*, to run). A pirate or freebooter, or the vessel used by one. The term was used with special reference to the marauding vessels of the Barbary Powers.

CORSAIR. One of the smallest and most brilliantly orange-red rockfish (*Sebastichthys rosaceus*) of the California coast. See ROCKFISH.

CORSAIR, The. A narrative poem by Byron (1814). The romantic adventures of the lofty-spirited pirate who is its hero are supposed to be continued in *Lara.*

CORSE, John Murray (1835–93). An American soldier, born in Pittsburgh, Pa. In his eighteenth year he entered at West Point, which he left to take up the study of law. He enlisted in the Union army at the outbreak of the Civil War, commanded a division at Memphis, and became brigadier general in 1863. He distinguished himself in the Chattanooga campaign, was in command of a division in General Sherman's "March to the Sea," and was brevetted major general for his heroism at Altoona Pass (q.v.). While defending this place Sherman sent him a sun telegram saying, "Hold the fort, for I am coming," an exhortation taken by Ira D. Sankey as the topic of a hymn. He was afterward collector of revenue in Chicago and postmaster of Boston.

COR'SET (Fr., dim. of *corps,* OF. *cors,* body, from Lat. *corpus,* body). An article appertaining to the costume of women, which was introduced into France about the time of the Revolution, when the French ladies adopted the Greek dress. Previously they had been worn by Germans, by whom they were invented. Bandages resembling corsets were used in Rome during the early ages, but only as a support, until a slender waist was considered a mark of beauty, when they were made to compress the form. Modern corsets, which vary with the dictates of fashion as regards shape, design, and material, are usually made of two thicknesses of white jean, silk, or other material, quilted together so as to form vertical cases, in which steels or whalebones are inserted, or they may be wholly, or in part, of some elastic or webbing material. Usually they are in two pieces, closed in front with steel or whalebone plates, which rest on the breastbone vertically, and laced at the back as tightly as the wearer may desire. With the more general participation of women in various athletic sports there have been many modifications in corsets aimed to secure freedom of movement, while the change from the hourglass figure, at one time fashionable, to classical or Empire costumes led to important innovations. As these styles demanded straight lines in preference to curves, corsets were modified accordingly, and at the same time a tendency developed to do away with these one-time essentials to dress and to emphasize the more natural figure. Whatever the changes called for by designers of fashions, the corset maker was always ready with new contrivances or substitutes to secure the desired figure. The manufacture of corsets in the United States more than doubled in value in the decade 1899–1909, and in 1909 the United States Census of Manufactures reported 138 establishments (a decrease from 205 in 1890, but increase in capital and product), with a capital of $18,033,000, devoted to the manufacture of corsets. The value of the product in 1909 was $33,257,000. As showing the tendency towards concentration and consolidation in this industry, it may be said that while the number of establishments in 1909 was no greater than in 1899 (138 at each census) the amount of capital invested increased from $7,290,000 in 1899 to $18,033,000 in 1909 and the value of the output from $14,451,000 to $33,257,000.

COR'SICA (Gk. Κύρνος, *Kyrnos,* Κορσίς, *Korsis,* Lat. *Corsica,* Fr. *Corse*). An island belonging to France (the fourth in size of the islands in the Mediterranean), situated between lat. 41° 21′ and 43° N. and long. 8° 32′ and 9° 31′ E. (Map: France, S., L 7). It is separated by the Strait of Bonifacio from Sardinia, on the south, and occupies an area of nearly 3368 square miles. In the northeast is a long, narrow peninsula, pointing in the direction of Genoa and terminating in Cape Corso. In its physical formation Corsica undoubtedly belongs more to Italy than to France. Its surface is traversed by numerous mountain ranges of rugged appearance and covered with beautiful forests. The principal chain runs from north to south, sending off numerous offshoots in every direction. The highest summits of the island are Monte Cinto, 8881 feet; Monte Rotondo, 8612 feet; Monte Padro, 7851 feet; and Monte d'Oro, 7845 feet high. The coasts are precipitous on the west, while on the east they are low and in some parts even swampy. The chief geological formation is granite, occasionally interspersed with porphyry and serpentine. There are a number of short and swift streams on the island, the principal of which are the Golo, Tavignano, and Taravo. The climate is generally healthful and the temperature moderate, the average for the summer being about 75° F. The lower parts of the island are occasionally visited by malaria, but the mountain regions are very salubrious. The vegetation of the island is rich, and the fine forests of chestnut, pine, and beech for which Corsica was famous in ancient times are still found on the mountain slopes. The flora of the valleys does not differ materially from that of Italy. There is an abundance of olives, oranges, citrons, vines, and other Mediterranean plants. The inhabitants, numbering about 300,000, are not enterprising, and, because the island is somewhat apart from the lines of regular traffic and intercourse with other peoples is wanting, they have retained many of their primitive customs.

The soil is very fertile, but agriculture is in a low state, less than half the total area being cultivated. There is scarcity of both labor and capital. The chief products are wheat, barley, rye, corn, wine, fruits, and chestnuts, the latter being used extensively for food. The agricultural work is done in part by laborers who come over from Tuscany. The number of cattle and horses is small, but sheep and goats are numerous. The silkworm is cultivated. There are also good fisheries of tunny and pilchard. Among the minerals mined are iron, lead, copper, and antimony, and there are quarries of granite, marble, and alabaster. The chief imports are foodstuffs, building materials, and metal ware. The exports consist mostly of wine, olive oil, fruits, and chestnuts. Corsica forms a department of France, and is divided into the five arrondissements of Ajaccio, Bastia, Calvi, Corte, and Sartène. The population in 1901 was 295,589; in 1906, 291,160; in 1911, 288,820, or 85.8 per square mile. The Corsicans are of mixed origin, independent in spirit, passionate and revengeful. (See Vendetta.) They are simple and sober, but scorn work and pay little attention to the development of the natural resources of their island. The vernacular is a corrupt Italian. The capital is Ajaccio, with a communal population of 19,227 in 1911; Bastia had 29,412 inhabitants. There are no other large towns; Corte had in 1911 5211 inhabitants, and Sartène 4746.

Corsica is supposed to have been originally in-

habited by Ligurians. It was settled in succession by the Etruscans, the Phœnicians, and the Phocæans, and finally came into the possession of the Carthaginians in the fifth century B.C. Wrested by the Romans from the Carthaginians in the second half of the third century B.C., the island remained for seven centuries under the sway of Rome, until, after repeated attacks by the Vandals, it finally fell into their hands in 469. After the conquest of the Vandals by Belisarius in 534, Corsica was occupied successively by the Byzantine Empire, the Goths, Franks, and the Saracens. Towards the end of the eleventh century it came into the possession of the Pisans, by whom it was ceded in 1347 to the Genoese. The rule of the latter was marked by continuous revolts on the island, and the ruling city found itself compelled on several occasions to ask assistance from Austria and France. In 1736 a German adventurer, Baron Theodor von Neuhof, became King of Corsica, but soon was obliged to leave the island, and was never able to return. The uprisings under the leadership of Paoli during the second half of the eighteenth century were of the most serious nature. In 1768 Genoa made Corsica over to France. Paoli made an attempt to resist the French rule, but the dispatch of French troops to the island compelled him to seek safety in England. He returned in 1790, and in 1793 headed a successful rising, in which the British lent assistance to the patriots. In the following year Corsica came under the protection of Great Britain, from which it obtained a constitutional form of government. Two years later the British were forced by the French to evacuate the island, which has ever since remained in the possession of France. Corsica is noted as the birthplace of Napoleon. Consult: Girolami-Cortona, *Géographie générale de la Corse* (Ajaccio, 1893); Vuillier, *The Forgotten Isles* (New York, 1896); Caird, *The History of Corsica* (London, 1899).

CORSICANA, kôr'sē-kă'nȧ. A city and the county seat of Navarro Co., Tex., 62 miles, by rail, south-southeast of Dallas; on the Houston and Texas Central, the St. Louis Southwestern, and the Trinity and Brazos Valley railroads (Map: Texas, D 3). It is the seat of the State Orphan Asylum and has an Odd Fellows' widows' and orphans' home, a Carnegie library, sanitariums, a fine courthouse, Federal and high-school buildings, a natatorium, and an Elks Home. Corsicana is a progressive manufacturing centre, having among its industries large cotton mills, gins, and compresses, sheet-metal works, broom, harness, candy, overall, and soda-water factories, cottonseed-oil mills, brickyards, flour mills, a grain elevator, foundry and machine shops, planing mills, etc., an extensive oil industry flourishes, there being a number of wells, oil machinery factories, and two large refineries. The sewage system is owned by the city. Pop., 1910, 9749; 1920, 11,356.

COR'SICAN BROTHERS, The. A romantic drama adapted by Boucicault from a French play, *Les frères corses.*

CORSINI, kôr-sē'nē. A celebrated Florentine family, which from the thirteenth century was prominent in the history of Italy. The most famous was Andrea (1302–73), Bishop of Fiesole, who was canonized in 1629. He was for 40 years a monk in Florence and then was made Bishop of Fiesole, and later legate to Bologna. That town was in the midst of a civil war, but the eloquence of Corsini was successful in subduing it. Austere in his life and ambitious only for his church, he was a type of the mediæval bishop. Lorenzo became Pope Clement XII in 1730. He restored the Corsini Palace in Rome, now containing the interesting Corsini Gallery.

CORS'NED (AS. *corsnæd,* from *coren,* p.p. of *cēosan,* Goth. *kiusan,* OHG. *kiosan,* Ger. *kiesen,* to choose + *snæd,* bit, from *snīþan,* Goth, *sneiþan,* OHG. *snīdan,* Ger. *schneiden,* to cut). A form of ordeal in early English law, which consisted in administering to the accused a morsel of barley bread, about an ounce in weight, which had previously been endowed by execration with the magical power of exposing his guilt or innocence. If the accused was innocent, the bread was readily swallowed; if guilty, it struck in his throat and killed him. It was in this way (the chroniclers tell us) that Godwin, Earl of Kent, met his fate in the reign of Edward the Confessor when accused of the death of the King's brother. Compare the similar ordeal of the "water of jealousy," which, according to the Mosaic law, was administered among the Jews to a woman charged with adultery (Num. v.). Consult Blackstone, *Commentaries on the Laws of England,* bk. iv, p. 345. See Ordeal.

COR'SO (It., course). A word used to express not only the racing of riderless horses, but also the slow driving in procession of handsome equipages through the principal streets of a town, such as almost always takes place in Italy on festive occasions. This custom has given the name "Corso" to the principal streets in almost all the larger towns of Italy. The best known of these is the Corso in Rome.

COR'SON, Hiram (1828–1911). An American scholar, born at Germantown, Pa. He held positions in the Library of Congress and the Library of the Smithsonian Institution from 1849 to 1856, and taught in Girard College, Philadelphia (1865–66), and St. John's College, Annapolis (1866–70), and was professor of the English language and literature at Cornell University in 1870–1903. In 1906 he became a pensioner under the Carnegie fund. His publications include: *Handbook of Anglo-Saxon and Early English* (1871); *Introduction to the Study of Browning* (1886); *Introduction to Shakespeare* (1889); *Primer of English Verse* (1892); *The Aims of Literary Study* (1895); *Selections from the Canterbury Tales* (1896); *The Voice and Spiritual Education* (1896); *Introduction to the Prose and Poetical Works of John Milton* (1899). His Shakespearean textual criticism is of the highest value, and his interpretation of poets, especially of Browning, is luminous and sympathetic.

CORSON, Juliet (1842–97). An American educator and author, born in Boston. She was secretary of the New York Free Training School for Women in 1872–73 and devoted herself to study and experiments on healthful and economical cookery and dietetics. In 1876 she established the New York School of Cookery. She wrote several popular books, among them *Fifteen-Cent Dinners for Workingmen's Families* (1877); *Dietary for Schools* (1878), prepared at the request of the United States Commissioner of Education; *Cooking Manual* (1878); *Local American Cookery* (1885); *Living on Five Hundred a Year* (1886).

CORS'SEN, Wilhelm (1820–75). A noted German philologist, who devoted himself espe-

cially to the ancient Italic languages and dialects. He was born in Bremen, Jan. 20, 1820, studied philology in Berlin (1840–44), and became professor of classical philology at Schulpforta in 1846. On account of ill health he retired in 1866 and dedicated the remaining years of his life to research at Berlin. He died at Lichterfelde, near Berlin. His most important work, *Ueber Aussprache, Vokalismus und Betonung der lateinischen Sprache*, was published in 2 vols. in Leipzig (1858–59), receiving the prize offered by the Royal Prussian Academy of Sciences for the best work on that subject. A second edition appeared in 1868–70. It was followed and completed by *Kritische Beiträge zur lateinische Formenlehre* (1863) and *Kritische Nachträge* (1866). Corssen afterward visited Italy and then set himself to prove that the Etruscans were an Italic people, allied closely to the Latins, in support of which theory he published a monumental work, *Ueber die Sprache der Etrusker* (2 vols., Leipzig, 1874–75). His arguments met at once violent and universal opposition (see especially Wilhelm Deecke, *Corssen und die Sprache der Etrusker, eine Kritik*, Stuttgart, 1875) and have never found support.

COR'STORPHINE, George Steuart (1868–). A British geologist, born in Edinburgh. He was educated at the universities of Edinburgh and Munich, in 1895 became professor of geology and mineralogy at the South African College and keeper of the geological department of the South African Museum, in 1896 director of the Geological Survey of Cape Colony, and in 1902 consulting geologist of the Consolidated Gold Fields of South Africa, Ltd. From 1908 to 1912 he was in private practice; after 1913 he served as principal of the South African School of Mines and Technology. Besides his annual reports of the Geological Survey of South Africa (1896–1901), and papers in the *Transactions of the Geological Society of South Africa* (1903–04), he is coauthor with F. H. Hatch of *The Geology of South Africa* (1905).

CORT, kôrt, Cornelis (c.1533–78). An eminent Dutch engraver and etcher. He was born in Hoorn, Holland, but removed to Antwerp, where he was first instructed by Hieronymus Cock, for whom he executed plates which were published with the signature of his master, as well as original landscapes. In 1566 he visited Venice, where, under the personal influence of Titian, whose best pictures he reproduced, he developed an admirable style. In 1571 he went to Rome and established an influential school there. The art of engraving had previously been confined to small plates, and Cort was the first to use a larger size. He was the chosen engraver of the two Zucchari, Miziano, and the miniature painter Clovio, besides reproducing works of Raphael, Michelangelo, and other Italian and foreign painters in Rome. His work furnished a model for an entire generation in Italy, and until the appearance of Goltzius he was considered the foremost engraver. Among his pupils were Philippe Thomassin and Agostino Carracci. Consult Longhi, *Calcographia* (Milan, 1830), and Bartsch, *Anleitung zur Kupferstichpunde* (Vienna, 1821).

CORT, Frans de (1834–78). A Flemish lyrical poet, born in Antwerp. After being associated with the publication *Grondwet*, he was appointed editor of the *Schelde* (1858). He was secretary to the general auditor of the military court at Brussels from 1861 until his death. He was one of the most distinguished lyrical poets of Belgium, and his songs, although not conspicuous for fancy or imagination, are full of deep and genuine sentiment. His works comprise: *Liederen* (1857–59); *Zing-Zang* (1866); *Liederen* (1868). He translated lyrics of Burns and Jasmin and German verse, and after 1861 conducted the periodical *De Toekomst*. He edited (1869) the posthumous poems of Dautzenberg (q.v.), his father-in-law.

CORTE, kôrt. The capital of an arrondissement in the Department of Corse (Corsica, q.v.), at the confluence of the Tavignano and Restonica, 52 miles northeast of Ajaccio by rail (Map: France, S., M 6), picturesquely situated among the mountains and protected by a commanding citadel which has sustained many notable sieges. Corte was the seat of Paoli's reform government. A university founded by that patriot bears his name; a communal college, an ancient palace, from which Paoli ruled, and an old Franciscan monastery which served as the parliament house in 1765, and the house in which Paoli lived also remain. There are monuments to Paoli, General Gaffori, and General Casanova, Duke of Padua. Marble is quarried extensively in the neighborhood; lumber, wine, oil, and cheese are the staple products. Pop., 1901, 5425; 1911, 5211.

CORTEGIANO, kôr'tå-jä'nō, Il (the Courtier). A famous work on etiquette by Baldassare Castiglione (q.v.), published in 1528. There are English translations by Thomas Hoby (1561) and by L. E. Opdycke (New York, 1903).

CORTELYOU, kôr'tĕl-yo͞o, George Bruce (1862–). An American public official and capitalist. He was born in New York City, graduated from the State Normal School of Westfield, Mass., in 1882 and in law from Georgetown University in 1895, and was engaged in teaching until 1889, when he entered public service as a post-office inspector. He became stenographer to President Cleveland in 1895, assistant secretary to President McKinley in 1898, and two years later secretary. He was reappointed by President Roosevelt in 1901, and in 1903–04 was the first Secretary of the Department of Commerce and Labor. As chairman of the Republican National Committee he conducted the campaign of 1904. He was Postmaster-General of the United States in 1905–07, and Secretary of the Treasury in 1907–09, and in the latter year became president of the Consolidated Gas Company.

CORTE-REAL, or **CORTERREAL,** kôr'tå-rå'äl', Gaspar and Miguel (c.1450–c.1501). Portuguese navigators. In 1500 Gaspar seems to have visited the North American coast at various points between Labrador and the Bay of Fundy. From his last voyage, begun in 1501, he did not return, although he sent back two of his vessels which did arrive safely. His brother Miguel in 1502 set out to find him and reached the northeast coast of America, but he too failed to return. In 1503 King Manuel of Portugal sent an expedition to learn their fate, but in vain. Consult Harrisse, *Les Corte-Real et leurs voyages au nouveau monde* (Paris, 1883).

CORTES, kôr'tås (Sp., Portug. pl. of *corte*, court). The name given in Spain and Portugal to the assembly of representatives of the nation. As one district of Spain after another was recovered by the Christian princes from the Moors,

there arose in each a corporation composed of the different "estates" or orders of the population, limiting the power of the princes. From the union of several of these territories were formed the three leading kingdoms of Castile, León, and Aragón, each having its Cortes, representing the clergy, the nobility, and the cities. In Aragón the Cortes appointed a judge, known as the *Justicia*, who decided disputes between the King and his subjects and confined the royal power within constitutional limits. In Castile the rights of the burghers were less extensive than in Aragón, but in both states the King was dependent on the Cortes. After the union of Castile and León with Aragón the crown succeeded in greatly lessening the powers of the Cortes. After 1713 it did not meet till 1789, on the accession of Charles IV. In 1809 the Cortes, as composed in 1789, was assembled by the Junta, and framed a new constitution, called the "Constitution of 1812," which, however, was set aside at the Restoration. See SPAIN, *Government*.

The history of the Portuguese Cortes is very similar to that of the Spanish. In 1826 Dom Pedro promulgated a new constitution after the model of the French, calling the Cortes again into life, and abdicating at the same time in favor of his daughter, María da Gloria. This constitution was set aside during the usurpation of Dom Miguel, but was restored in 1842. The Constitution of the Republic, adopted Aug. 21, 1911, provides for a Cortes of two chambers, the lower house chosen by the people, and the upper by the municipalities. The Cortes elects the president, who serves four years, is not reeligible, and cannot be present at the debates of the chambers. The members of the cabinet have a right to the floor of both chambers. Consult: Muro y Martinez, *Constituciones de España* (Madrid, 1881); Desdevises du Dezert, *L'Espagne de l'ancien régime* (Paris, 1897–99); Colmeiro, *Cortes de los antiguos reinos de León y de Castilla* (2 parts, Madrid, 1883–84); Stephens, *Portugal*, in the "Stories of the Nations Series"; Prescott, *Ferdinand and Isabella*.

CORTÉS, kôr-tās′, HERNÁN or HERNANDO (1485–1547). Conqueror of Mexico. He was born at Medellín, in Estremadura, Spain, and was sent to the University of Salamanca, but his superabundant animal spirits and unrestrained passions for the fair sex cut short his university career. The same cause made it impossible for him to remain at home, and so he decided to try his fortune in the New World. An accident, received in scaling a tumble-down wall while on his way to a final clandestine rendezvous, postponed his departure until the spring of 1504, when he sailed for Santo Domingo. There he joined the forces engaged in suppressing a native revolt and quickly won promotion, so that in 1511 he was the chief executive officer with the expedition dispatched under Velásquez for the conquest of Cuba, becoming subsequently alcalde of Santiago. Mining and stock raising, although profitable, were not sufficiently to his taste, and he persuaded Velásquez to give him the command of an expedition to the mainland, made known at that time by the discoveries of Grijalva. No expense was spared in equipping a fleet of seven vessels, carrying 300 men. Velásquez, however, became suspicious lest Cortés should refuse to recognize his authority when once he was in a position to establish himself independently. Learning that he was to be superseded, Cortés gathered his forces and set sail, on Nov. 17, 1518, before Velásquez could order him to resign the command. Stopping for supplies at the settlements on the coast of Cuba, he proceeded to Cozumel Island, sailed along the Yucatan coast, and fought a bloody battle with the natives at Tabasco. In the early spring of 1519 he landed at San Juan de Ulloa. There he obtained numerous captives, one of whom was the famous Mariana, whom he made his mistress, and who, out of devotion to him, acted as the interpreter, guide, and counselor of the Spaniards, and frequently saved them from serious reverses. Finding a better harbor a little north of San Juan, the Spaniards removed thither and established a town, naming it La Villa Rica de la Vera Cruz. An independent government was organized by vote of the settlers, who determined to renounce their allegiance to Velásquez and to acknowledge only the supreme control of the King in Spain. In order to prevent those who opposed this movement from deserting him and carrying the news to Cuba, Cortés dispatched one vessel to Spain with messengers to represent his cause at the court, and then sank the rest of his fleet.

Starting on his march inland, Cortés entered the country of the Tlascalans, who fought him vigorously for a few days, but soon came to terms with the strangers and joined them against the Aztecs, by whom the Tlascalans had been subjugated not long before. From this time until the conquest was achieved, the tribe continued the most important and trusty of all the native allies of the Spaniards. Advancing into the country of the Cholulans, Cortés succeeded, after a little fighting, in persuading the people to accept a reconciliation with their traditional enemies from Tlascala and to join them in his train for the march on Mexico. Motecuhzoma, or Montezuma, the Aztec chieftain, pursued an irresolute policy and finally determined not to oppose the Spaniards directly by force of arms, but to await their arrival and learn more of their purposes. On Nov. 8, 1519, Cortés entered the city of Mexico and established himself in one of its large communal dwellings, which had belonged to the family of Motecuhzoma's predecessors. The Spaniards were allowed to roam through the city at their pleasure and found much gold and other treasures in the storehouses. Realizing that a party among the native leaders were talking of driving the strangers out of town, Cortés induced Motecuhzoma to come to his house, where he was kept as a hostage. Shortly after, in April, 1520, messengers brought word that an expedition sent from Cuba by Velásquez under the command of Narváez, had landed at San Juan de Ulloa, with orders to arrest Cortés and send him to Cuba for punishment. Cortés promptly started for the coast with a small force. He found the camp of his enemies unguarded, entered on a dark night, captured Narváez, and the next day induced nearly all the soldiers to join his own standard. Meanwhile, in Mexico, Alvarado, who had been left in command, had learned that the Aztecs intended to attack him at the close of a great religious ceremony which was then being held. To prevent this, Alvarado suddenly surrounded the leaders, who were all busy with the sacrifices in one of the large courtyards of the town, and killed most of them. Cortés, as soon as all danger from Narváez was

past, hastened back to Mexico. He was allowed to enter the city peaceably, with his followers, but was immediately surrounded and attacked. As there was no possibility of maintaining his position in the city, for lack of food or water, and as all hope of persuading the natives to desist vanished when Motecuhzoma died, an immediate retreat was decided on. Selecting a dark, rainy night—the famous *Noche Triste*, on June 30—the Spaniards and their native allies started out of the city. The Mexicans pressed on behind them. The Spaniards were hurried along the causeways or driven into the water, where they were seized by Mexicans in canoes and dragged off to the city for sacrifice. Some 40 Europeans were captured alive, the great object of their enemies. Luckily for their fellows, the prospective sacrifices attracted the larger part of their assailants back into the city. Cortés retreated towards Tlascala. At Otumba he was confronted by an overwhelming force of his enemies. In despair the harassed Spaniards hurled themselves upon the Aztecs and crushed them. They nevertheless continued their retreat to Tlascala, where they recuperated during the summer.

The arrival of several vessels with men and war munitions enabled Cortés to reorganize his army, so that he was prepared to take the field again in October. The outlying Aztec strongholds were captured one by one, and the various subject tribes, ever ready to rebel against their native conquerors, gradually recovered confidence in the white men. Carpenters had been set to work at Tlascala in constructing a fleet of small vessels, which were hauled along a canal dug for the purpose into the Mexican lake, so that it became possible to attack the city by water as well as along the causeways which connected Mexico with the land. By the end of April, 1521, with a force of over 900 Spaniards, and 87 horses, Cortés again approached the capital. The city was attacked by columns along each of the three causeways from the shore, while the fleet of brigantines, with cannon, engaged the vast number of canoes on the lake. For three months the Aztecs defended their homes stubbornly. Street by street was taken by the Spaniards, who were obliged to tear down each house as soon as they had stormed it, to prevent the natives from returning to the attack. At last, on August 13, the chief, Guatemozin, who had been the principal organizer of the defense, was captured while trying to escape in a canoe, and the war ended. Cortés promptly set to work to repair the loss he had caused. The ruins of the city were used to fill in the marshy ground so as to afford a secure foundation for new edifices. Colonists were brought from Spain, and in a very short time the city of Mexico became the principal European city in America. Numerous expeditions were sent off in all directions, to Tampico, across Honduras to the Gulf coast, and to the Pacific, where Cortés established a shipyard in which were built the vessels he used later in his explorations of the Pacific coast.

Meanwhile his enemies in Cuba and Spain were planning Cortés's destruction. Officials were sent to Mexico to investigate his acts and supersede him, but he succeeded in persuading them to return without disturbing him. In 1528, however, when Estrada arrived with explicit orders to take over the government, Cortés yielded without opposition and took ship for Spain. There he was welcomed with royal honors, was created Marquis of the Valley of Oaxaca, the fairest domain in the New World, and was reappointed captain general, although not restored to the civil governorship of Mexico. He married the daughter of the Count of Aguilar and niece of the Duke of Béjar. In 1530 Cortés returned to Mexico, where he amused himself for the next 10 years with schemes for further conquests. But the civil government being in other hands, he found himself constantly checked in his activity, his property detained from him, his rights interfered with, and his prestige rapidly waning. In 1536 he discovered Lower California and explored the Pacific coasts of Mexico, but no second treasure-trove awaited him. In 1539 Coronado secured the right to seek for the "Seven Cities" of Marcos de Niza, and in disgust Cortés went back to complain to the court. He was received with honor, but could secure no substantial assistance towards recovering his rights or his property. Joining an expedition to Algiers, he was shipwrecked, losing a large part of his fortune. He then retired to a small estate near Seville, where he died, Dec. 2, 1547. Prescott's *Conquest of Mexico* is, so far as Cortés is concerned, little more than an admirer's abstract of the conqueror's official dispatches, which may be consulted in Folsom's translation (New York, 1843). The "Fifth Letter," describing Cortés's adventurous trip across Honduras in 1524, is in the "Hakluyt Society Series" for 1868. Consult: Ober, *Hernando Cortéz* (New York, 1905); Antonio de Solís, *Historia de la conquista de Méjico* (Madrid, 1684; and a convenient edition in 5 small vols., Paris, 1827); and especially two recent works by F. A. MacNutt, *Letters of Cortés to Charles V, Translated and Edited, with a Biographical Introduction and Notes* (2 vols., New York, 1908), and *Fernando Cortés and the Conquest of Mexico: 1485–1547*, in "Heroes of the Nation Series" (ib., 1909).

CORTÉS, José Domingo (c.1830–84). A Chilean author, born at Coquimbo. He was successively journalist, member of the Chilean Legation in Belgium, and director general of libraries in Bolivia. He published anthologies, histories, and biographical works, such as *Diccionario biográfico americano* (1876), *Historia de Bolivia, Los revolucionarios de la independencia de Chile*, and *República de Méjico* (1872).

CORTES, Sea of. See California, Gulf of.

COR'TEX (Lat., bark). That region of a stem or root which occurs between the central vascular region (*stele*) and the epidermis. In those stems which increase in diameter each year the cortex becomes very much modified by the development of cork cells, being then usually called "bark." See Morphology of Plants.

CORTEX. See Nervous System and Brain.

CORTHELL', Elmer Lawrence (1840–1916). An American civil engineer, born at South Abington (now Whitman), Mass. From 1861 to 1865 he served in the First Rhode Island Light Artillery in the Civil War, returning to graduate from Brown University in 1867 and take up the practice of civil engineering. He served on railroad surveys and construction in Missouri and Illinois; with James B. Eads was resident engineer in constructing Mississippi jetties, and also coöperated with him in building a ship railroad over the Isthmus of Tehuantepec, Mexico; was chief engineer of the New

York, West Shore, and Buffalo Railroad, of the Merchants Bridge, St. Louis, the Brazos River jetties, Texas, Tampico (Mexico) harbor works, and the port of Pará, and Rio Grande do Sul, Brazil. From 1900 to 1902 he was consulting engineer of the National Public Works of the Argentine government. He is author of *History of the Mississippi Jetties* (1880); *Report on Brussels Navigation Congress* (1898); *Maritime Commerce of the World: Past, Present, and Future* (1898); *Some Ports of the World* (1901); *Argentine: Past, Present, and Future* (1903); *Allowable Pressure on Deep Foundations* (1907); *Engineering and Commercial Conditions and Problems in Latin America* (1911).

CORTINA, kôr-tē'nȧ, JUAN NEPOMUCENO (1830–). A Mexican soldier and brigand, born in La Higuera, State of Tamaulipas. During the Mexican War he organized a band of cowboy guerrillas, later incorporated in the Mexican army. He fought at Palo Alto, rose to the rank of captain, but at the conclusion of the war was refused a commission in the regular army. Thereupon he turned smuggler. Later he rose to be a general in the liberal-revolutionist forces, but after his defeat by General Hinojosa was forced to escape to the United States. From 1859 to 1863 he held sway on the frontier, devastating the country and making such official appointments as he saw fit. He supported the cause of Maximilian in 1864, in 1867 again joined the Republicans, and in 1869 was appointed, by Juarez, federal chief of Tamaulipas. In 1876 he was arrested by General Canales, but instead of being executed, as General Diaz had directed, was incarcerated without trial in the military prison of Santiago Tlaltelolco.

CORTINA'RIUS. See FUNGI, EDIBLE, and Plate.

COR'TISSOZ, ROYAL. An American art critic, born in New York City. He became literary and art editor of the New York *Tribune*, lectured on art, edited an edition of *Don Quixote* and *The Autobiography of Benvenuto Cellini*, and, besides contributions to magazines, is author of *Augustus Saint-Gaudens* (1907); *John La Farge* (1911); *Art and Common Sense* (1913). His wife, ELLEN MACKAY HUTCHINSON CORTISSOZ, associated with him in critical work, is author of *Songs and Lyrics*, and acted as associate editor of *The Library of American Literature* (11 vols.).

CORTLAND. A city and the county seat of Cortland Co., N. Y., 37 miles by rail south of Syracuse; on the Tioughnioga River, and on the Lackawanna and the Lehigh Valley railroads (Map: New York, D 5). It is the seat of a State normal school and the Cortland County Hospital, and, as a manufacturing centre, produces extensively wire, wire cloth, carriages and wagons, carriage trimmings, drop forgings, corundum wheels, motor trucks, broad silk, flour, piano cases, wall paper, etc. The government, under a charter of 1900, is vested in a mayor, a municipal council, and administrative boards and officials appointed by the executive, the appointments, except the board of education, being subject to the consent of the council. First settled in 1792, Cortland was included in the township of Homer until set off as Cortlandville in 1829. The water works are owned by the city. Pop., 1900, 9014; 1910, 11,504; 1920, 13,294.

CORTONA, kôr-tō'nȧ. A city in the Province of Arezzo, central Italy, situated 2170 feet above the sea, 72 miles southeast of Florence and 4 miles north of Lake Trasimeno (ancient Trasimenus) (Map: Italy, F 4). It has well-preserved cyclopean walls, built more than 3000 years ago, 8500 feet in circumference, the ruins of old Roman baths, a museum of Etruscan antiquities, including a remarkable candelabrum with 16 lights, assembled by the Etruscan Academy, founded in 1726; the cathedral of Santa Maria, containing paintings by Luca Signorelli (q.v.), who was born here in 1441, as was Pietro Berettini, known as Pietro da Cortona (q.v.) in 1596. The fifteenth-century church of San Domenico also contains excellent paintings. The ancient Cortona, called "Kyrtonia" by Polybius, was the strongest of the 12 cities of the Etruscan League. As a Roman colony it lost its importance, but in the eleventh century again prospered. It sided mostly with the Ghibellines, came into the possession of the Casale family in the fourteenth century, in 1409 was given by the last of the house to King Ladislaus of Naples, and by him in 1412 to Florence. Pop. (commune), 1881, 26,353; 1901, 29,343; 1911, 29,659. Consult: G. Dennis, *Cities and Cemeteries of Etruria* (London, 1883), and A. Della Cella, *Cortona Antica* (Cortona, 1900).

CORTONA, PIETRO DA, properly PIETRO BERETTINI (1596–1669). An Italian painter and architect, born at Cortona. He studied under Commodi and Ciarpi in Rome, where the greater part of his life was passed. He was the most important painter of his day, and was employed by popes, cardinals, and princes. Among the great decorative works intrusted to him were the frescoes of the ceiling in the hall of the Barberini Palace, Rome; decoration of the suite of rooms in the Pitti Palace, Florence, with paintings representing the seven virtues necessary for a sovereign (1640–47), and the frescoes in the church of Santa Maria in Vallicella. He was also superintendent of the mosaics for St. Peter's, and himself designed those of the chapels of the right aisle. Among his oil paintings are "The Battle of Arbela" (Louvre), painted for Louis XIV; a "Nativity" (Prado), painted for the Spanish King; "Daniel in the Lion's Den" (Accademia, Venice). Cortona founded a new style in Rome and did for painting what Bernini did for sculpture, accentuating the personal individual tendency in opposition to the classical trend of his age. He had a remarkable power of heightening the illusion in his frescoes, and the warm golden tones of his later works are admirable. As an architect, he designed the façade of Santa Maria in Via Lata, the portico of Santa Maria della Pace, and the church of Santa Martina, all in Rome. Consult his biographies by Fabbrini (Cortona, 1896); Geisenheimer (Florence, 1909); Pollak, in *Kunstkronik*, Neue Folge, xxiii (1912).

CORUMBA, kô-rōōm'bȧ. A town of Brazil, in the State of Matto Grosso, on the west bank of the Paraguay River, about 325 miles southeast of Matto Grosso (Map: Brazil, F 7). The naval arsenal of Brazil is on the east bank of the river. Pop., 10,000.

CORUÑA, kô-rōō'nyȧ. A fortified seaport of Spain, capital of the province of the same name, in Galicia, situated on a small headland in the Atlantic, formed by two bays: the Ría de la Coruña and the cove of El Orzán, 315 miles northwest of Madrid (Map: Spain, A 1). It is built partly on the slope and partly at the foot

of a hill and is divided into the upper and lower towns, the former being the more ancient. The lower town, which was formerly an insignificant fishing village, is now more important and is well built, with broad and well paved streets. The ancient section, which is partly surrounded by the old walls, contains the more prominent edifices, though there are comparatively few public buildings of note in Coruña. The churches of Santiago and Santa María del Campo, of the twelfth century; the barracks, the Capitanía-General, and the modern military hospital of San Carlos, are worthy of mention. The provincial institute has a considerable library and valuable scientific collections, and the city contains also a meteorological observatory, and various educational institutions, including a marine school. Other features of interest are the grave of Sir John Moore (q.v.), with a monument in the garden of San Carlos, and the so-called Torre de Hércules, of doubtful Phœnician origin, having been built more probably in the time of Trajan, which has served as a lighthouse for more than a century. The harbor, protected by five forts, two of which, San Antón and San Diego, defend the entrance, is safe and commodious. Coruña is the centre of an extensive commerce, the exports comprising live stock, fruits, vegetables, wine, hams, sardines, leather, peat, etc., while the principal imports are sugar, hides, coal, oil, and manufactured articles. There is also an important coastwise trade. The city has a variety of manufactures, including cigars, linen goods, canvas, cordage, lumber, barrels, paper, etc., and many of the inhabitants are employed in the fisheries. Pop., 1897, 40,500; 1900, 43,971; 1910, 45,650.

The chronicled history of Coruña dates from the Roman occupation. In the Middle Ages it was called Caronium. It was part of the emirate of Córdoba for some time, and suffered severely, with the rest of Galicia, in the reconquest. The Portuguese captured the town in 1370. Here John of Gaunt landed in 1386, to urge the claims of his wife, Doña Constanza, to the Castilian crown, and in 1554 Philip II sailed from the port to marry Queen Mary of England. Coruña was the point of departure of the "Invincible Armada" in 1588, and in the following year it was taken by Drake and Norris and nearly destroyed. The harbor was the scene of English naval victories over the French in 1747 and 1805. Coruña is famous for the repulse, on Jan. 16, 1809, of the French under Marshal Soult, by Sir John Moore, who succeeded in withstanding the French attempt to stop the English embarkation, but lost his life in the battle. The engagement took place on the heights of Elviña. In 1823 the city fell into the hands of the French. In 1836 it was captured by the Carlists. The result of the Spanish-American War in 1898 was disastrous to Coruña's trade with Cuba and Porto Rico.

CORUN'DUM (Neo-Lat., from Hind. *Kurand*, corundum), or ADAMANTINE SPAR. An anhydrous aluminum peroxide that crystallizes in rhombohedral forms of the hexagonal system. Owing to their extreme hardness (in which corundum ranks next to the diamond) and their high specific gravity (from 3.95 to 4.10), the colored varieties are much sought after as gems. According to their colors, they are called sapphire, which is blue; Oriental ruby, which is red; Oriental topaz, which is yellow; Oriental emerald, which is green; and Oriental amethyst, which is purple. In addition to these there is the *asteriated* or *star* sapphire, which exhibits an opalescent star of six rays. The dark-colored varieties are called *corundum*, and granular corundum is known as *emery*. The colored varieties of corundum are found chiefly in Burma, China, Ceylon, and in the United States, where it occurs in the crystalline rocks along the Appalachian Mountains, at Chester, Mass., in northern Georgia, and in Montana, where sapphires of gem grade have been found. Emery (q.v.), which is used as an abrasive material, is found in Asia Minor, at Chester, Mass., and in Canada. The imports into the United States are about $100,000 annually, chiefly from Canada. See ABRASIVE.

CORUN'NA. A city and the county seat of Shiawassee Co., Mich., 30 miles (direct) northeast of Lansing, on the Shiawassee River, and on the Ann Arbor and the Grand Trunk railroads (Map: Michigan, E 5). The public library and McCurdy Park are among the features. It has a trade in coal and manufactures flour, buffalo and astrachan cloths, vitrified brick, and furniture. Pop., 1900, 1510; 1910, 1384.

CORVAL'LIS. A city and the county seat of Benton Co., Ore., 96 miles south by west of Portland, on the Southern Pacific, the Portland, Eugene, and Eastern, the Oregon Electric, and the Corvallis and Eastern railroads, and on the Willamette River (Map: Oregon, B 3). Corvallis is the seat of the State Agricultural College and contains a fine courthouse and city hall and a large college armory. River steamboat lines add to the transportation facilities. There is a considerable trade in grain, lumber, flour, live stock, and wool. Dairying, stock raising and the raising of fruit and berries are important occupations. The manufactures include lumber, flour, brick and tile, ice cream, cigars, etc. Pop., 1900, 1819; 1910, 4552.

CORVÉE, kôr'vā' (Fr., from ML. *corvata*, demanded, from Lat. *corrogata*, demanded, sc. *opera*, work, from *com-*, with + *rogare*, to demand). An obligation imposed under the Roman law and continued under feudal law, whereby the inhabitants of a district performed certain services, such as repairs of the highway and bridges, for the sovereign or the feudal lord. Under the feudal lords corvées were greatly increased and diversified, but were usually determined by the local customs. Gradually the people succeeded in escaping from most of the corvées by substituting payments. But in some countries some burdens were long continued; e.g., French peasants were subject to some corvées until the French Revolution. Under the name of *prestation* the corvée system was revived, and was made the subject of various legislative modifications in 1824 and 1871. In some arrondissements all able-bodied men may be called upon to give three days' work for the upkeep of the roads. In England the Highways Act of 1837 did away with all statutory labor on the roads, but in Scotland the practice persisted until 1883, when it was abolished by law. The system was enforced by the Dual Control in Egypt, where, in 1882, 234,000 *fellaheen* were called out for 100 days to clean the irrigating canals; but the obligation was gradually abolished until, in 1887, through the efforts of the British, the corvée for this purpose was wholly done away with, and the labor performed by contract. Other corvées were abolished by 1891, except the forced labor to guard against floods.

For the feudal corvées, consult Luchaire, *Manuel des institutions françaises* (Paris, 1902).

CORVEI, kôr'vī (ML. *Corbeia Nova,* New Corbeia, as it was first occupied by monks from Corbie). A Benedictine abbey of Germany, on the Weser, near Höxter, the oldest and most famous abbey in Saxony. It was founded by Louis the Pious in the beginning of the ninth century, being a colony from the monastery of the same name in Picardy. It received rich endowments and was the centre of great agricultural improvement and prosperity during the earlier part of the Middle Ages, besides being the seat of a famous school. In 1793 it was made a bishopric by Pius VI. Its territory then embraced about 22 square miles, with 10,000 inhabitants. In 1802 it was secularized and annexed to Nassau, from which it was transferred, in 1807, to Westphalia, and in 1815 to Prussia. The church of the abbey is built in Gothic style, magnificently adorned in the interior, and contains a multitude of monuments of successive dynasties. The library and archives of the cloister, which contained most valuable records of the early ages of German history, have all been destroyed, the *Chronicon Corbeiense,* an alleged record of this abbey from its foundation to the end of the twelfth century, being a forgery. Certain brief *Annales Corbeienses* from 648 to 1148 are, however, printed in the *Monumenta Germaniæ Historica.* Consult Wigand, *Geschichte der Abtei Korvey* (Höxter, 1819).

CORVETTE, kôr-vĕt' (Fr., from Sp. *corveta, corbeta,* It. *corvetta,* corvette, from Lat. *corbita,* slow ship of burden, from *corbis,* basket). In the days of sailing men-of-war, a corvette was a ship-rigged vessel (i.e., having three masts, all square rigged), carrying all her broadside guns on one covered deck. The upper deck, above the guns, was *flush* (i.e., was continuous from stem to stern, without poop or topgallant forecastle). Corvettes occasionally had a bow or stern chaser on the upper deck.

COR'VIDÆ (Neo-Lat. nom. pl., from *corvus,* crow). A family of passerine birds which includes the ravens, crows, magpies, jays, etc. See these words, and Plate of JAYS, MAGPIES, ETC.

CORVI'NUS, MATTHIAS. See MATTHIAS CORVINUS.

CORVIN-WIERSBITSKI, kôr-vēn'-vêrs-bĭt'-skê, OTTO VON (1812–86). A German author, born at Gumbinnen. He took part in the revolutionary uprising in Baden in 1848 and 1849, and became chief of the general staff of the Republican forces at Rastatt. He was condemned to death, but the sentence was commuted to six years' solitary confinement. In 1855 he went to London, whence in 1861 he proceeded to the United States to act as the war correspondent of the Augsburg *Allgemeine Zeitung.* During the Franco-German War he was the correspondent of the Vienna *Neue Freie Presse,* and his experiences are admirably described in his well-known book, *In France with the Germans* (1872). In his earlier years Corvin devised "Corviniello," a species of metal work inlaid with mother-of-pearl, stones, or other materials. His numerous historical and other writings include: *Historische Denkmale des christlichen Fanatismus* (1845), the second edition of which appeared under the title *Pfaffenspiegel* (1869), and was further supplemented by *Die Geissler* (3d ed., 1892–93). Consult his *Erinnerungen aus meinem Leben* (4th ed., Rudolstadt, 1890–92).

COR'VO (Sp., crow). The most northerly and the smallest of the Azores (q.v.) (Map: Portugal, A 4).

COR'VUS, MARCUS VALERIUS (c.370–270 B.C.). A general of the early Roman Republic. He was twice dictator and six times consul, and occupied the curule chair 21 times. He defeated the Gauls, the Volsci, the Samnites, the Etruscans, and the Marsi. He owed his name, tradition said, to the *corvus,* raven, which helped him to defeat a gigantic Gaul.

COR'WIN, EDWARD TANJORE (1834–1914). An American writer, and historian of the Reformed Dutch church. He was born in New York City, July 12, 1834; graduated at the present College of the City of New York in 1853, and at the Theological Seminary in New Brunswick, N. J., in 1856. He has held various pastorates, but his reputation rests upon his literary work, which has made him the recognized historian of his denomination. His publications include: *Manual of the Reformed Protestant Dutch Church in North America* (1859; 4th ed. 1902); *Millstone Centennial* (1866); *A History of the Reformed Church, Dutch* (1895); *Ecclesiastical Records of New York* (6 vols., Albany, 1901–05). This is a translation and elaborate annotation of the letters which passed between the Classis of Amsterdam and the churches in the New Netherlands and Province of New York, and so are an important historical source. It is published by the New York State Library. He contributed to the first edition of the NEW INTERNATIONAL ENCYCLOPÆDIA.

CORWIN, THOMAS (1794–1865). An American lawyer and statesman, born in Bourbon Co., Ky. He studied and practiced law in Ohio, where his eloquence soon won him prominence. He was a member of the State Legislature from 1822 to 1823 and in 1829, and of Congress from 1831 to 1840, when he was chosen Governor of Ohio. From 1845 to 1850 he was a member of the United States Senate, and in the latter year he became Secretary of the Treasury in President Fillmore's cabinet. He was again in Congress (1859–61) and was Minister to Mexico from 1861 to 1864. As an orator he won his greatest distinction, his speeches both on the stump and in debate being examples of remarkable eloquence. His arraignment of the administration for the war with Mexico in the Senate, Feb. 11, 1847, was a notable effort, which made him many enemies and damaged his political career. Consult Russell, *Thomas Corwin* (Cincinnati, 1882), and J. Morrow, *Life and Speeches of Thomas Corwin* (Cincinnati, 1896).

CO'RY, CHARLES BARNEY (1857–1921). An American ornithologist, born in Boston. He became professor and honorary curator of zoölogy in the Field Columbian Museum in Chicago. His publications include: *Birds of the Bahama Islands* (1880); *The Beautiful and Curious Birds of the World* (1880); *Southern Rambles: Florida* (1881); *Montezuma's Castle* (1899); *The Birds of Illinois and Wisconsin* (1909); *Mammals of Illinois and Wisconsin* (1912); *Description of Twenty-eight New Species and Subspecies of Neotropical Birds* (1913).

CORY, WILLIAM JOHNSON (1823–92). An English poet, son of Charles Johnson, of Torrington, Devonshire; his mother was a grandniece of Sir Joshua Reynolds. He was educated at Eton, and at King's College, Cambridge; was

graduated B.A. in 1845, and in the same year became fellow of his college. He was at once appointed assistant master of Eton, where he won great distinction as a tutor. In 1872, having inherited an estate at Halsdon, he retired from Eton and changed his name to Cory. His subsequent home was Hampstead, where he died, June 11, 1892. Cory is mainly known for a volume of verse entitled *Ionica* (1858, republished with additional poems in 1891), containing "Mimnermus in Church" and other poems of great tenderness and beauty. The volume was reissued, with additions, in 1891. He is also author of an agreeable *Guide to Modern English History from 1815 to 1835* (1880–82), of *Lucretilis*, a treatise on writing Latin verse (1871), and of *Iophon* (1873), on Greek Iambics. After his death appeared his *Letters and Journals* (Oxford, 1897).

CORYAT, kôr'yat, or **CORYATE,** THOMAS (1577–1617). An English traveler and author, born at Odcombe and educated at Oxford. He made an extensive tour of Europe, traveling mostly on foot, and published his experiences in a volume entitled *Coryat's Crudities* (1611; new ed., 1905). It was the first manual of continental travel and was illustrated with engravings. Parts of this work, consisting of mock verse commending the author, were published separately under the title *Odcombian Banquet* (1611). Coryat made other voyages through Greece, Asia Minor, north Africa, and India, where he died.

CORYBANTES, kŏr'ĭ-băn'tēz (Gk. Κορύβαντες, *Korybantes*). Mythical beings, attendant upon the Phrygian Cybele (q.v.), as the Curetes (q.v.) belong to the Cretan cult of Zeus and Rhea. Unlike the Curetes, with whom they were sometimes confused, the Corybantes were not believed to dance in armor, but rather to perform wild and orgiastic dances which frequently ended in ecstasy. The name does not properly denote priests, or human beings at all, since the Corybantes represent rather gods of procreative significance; but, as the priests of Cybele imitated these dances, the name is sometimes extended to them. Consult Frazer, *Adonis, Attis, Osiris* (London, 1907), Part IV of his *Golden Bough*.

CORYCIA, kŏ-rĭsh'ĭ-à (Lat., from Gk. Κωρυκία, *Kōrykia*). The mother of Lycoris, by Apollo. She was a nymph, whose name is preserved in that of the Corycian Cave on Mount Parnassus, and in the appellation Corycides applied to the nymphs of the cave and to the muses, who were worshiped on Parnassus. See CASTALIA.

CORYD'ALIS. See FUMARIACEÆ.

CORYDALIS (Neo-Lat., from Gk. κορυδαλλίς, *korydallis*, κορυδός, *korydos*, crested lark, from κόρυς, *korys*, helmet) or DOBSON. A genus of large, net-veined insects (true Neuroptera), representing the family Sialididæ, and peculiar to America, where its larva, used for bait under the names "crawler," "dobson," "hell devil," and many others, is the largest of our aquatic insects. The single species (*Corydalis cornuta*), often called "hell-grammite," is brownish green in color, about 2 inches in length, and expands its four nearly equal wings fully 6 inches. "In the female the jaws are very large, flat, and toothed at the extremity, but in the male they are remarkably long and slender, not toothed, and the sharp tips crossing each other; their only use is evidently for seizing the soft, somewhat yielding body of the female during the act of pairing; hence during its short life the male, at least, takes no food." The female lays her eggs in midsummer, in white chalky masses almost an inch wide, on tree leaves, rocks, timbers, etc., overhanging water, into which the young drop as soon as hatched. These sink to the bottom and grow rapidly into large, slate-gray, tough, predatory larvæ, which hide under stones, etc., in the rapid streams where they most abound, clinging firmly to some support with their anal hooks, while they seize in their jaws such living creatures as come within their reach. They remain in the water 2 years and 11 months, then creep out upon land, where they wander about at night for a few days, then pupate in some retreat, and speedily emerge as adults. The larvæ (dobsons) are regarded as the most satisfactory bait known for still fishing, and are captured with nets, after overturning stones, etc., and frightening them out into the open water. For the many interesting peculiarities of the structure and economy of this and other species of the Sialididæ (called "adder flies" in England), consult: Howard, *The Insect Book* (New York, 1901); Packard, *Standard Natural History*, vol. ii (Boston, 1884); Miall, *The Natural History of Aquatic Insects* (London, 1895); Kellogg, *American Insects* (New York, 1908); Davis, "Sialididæ," in *Aquatic Insects in New York State* (Albany, 1903).

COR'YDON. A town and the county seat of Harrison Co., Ind., 25 miles west by south of Louisville, Ky., on Indian Creek and on the Louisville, New Albany, and Corydon Railroad (Map: Indiana, C 4). It is known as a summer resort, one of its attractions being a sulphur well. Corydon was the capital of the Territory of Indiana from 1813 to 1816, and of the State of Indiana from 1816 to 1825, when the seat of government was removed to Indianapolis. The old capitol is still standing. The Constitutional Convention of 1816 met here. In 1863 the town was the scene of a sharp skirmish between a small force of State militia and a superior force of Confederate raiders under John Morgan. Pop., 1900, 1610; 1910, 1669.

CORYDON. A town and the county seat of Wayne Co., Iowa, 81 miles (by rail) south by east of Des Moines, on the Keokuk and Western and the Chicago, Rock Island, and Pacific railroads (Map: Iowa, D 4). Corydon is essentially an agricultural town and exports a large amount of timothy seed. The electric-light plant, sewer, and water works are under municipal ownership and control. Pop., 1900, 1477; 1910, 1703.

CORYDON. 1. A shepherd in the *Idyls* of Theocritus, and in the second and the seventh Eclogue of Vergil, and hence a name conventionally used in literature to designate a country swain, as in Spenser's *Faerie Queene* and *Colin Clout*. 2. A shoemaker in Scott's *Count Robert of Paris*. 3. A musical countryman in Walton's *Compleat Angler*, who fraternizes with Piscator.

COR'YLUS. See HAZELNUT.

COR'YMB (from Lat. *corymbus*, from Gk. κόρυμβος, *korymbos*, cluster, from κόρυς, *korys*, helmet). A flat-topped flower cluster, in which the pedicels arise at different levels upon an elongated axis and the outermost flowers bloom first. See INFLORESCENCE.

CORYM'BUS (Lat., cluster). That mode of dressing the hair which prevailed among the Greek women and which may be seen in examples of the antique, particularly in the statues representing Venus. This arrangement of

the hair was also adopted by the Romans. It consisted in gathering it upward upon the crown and back of the head in one knot. It may be seen in its simplest form in the statue of the Venus de' Medici, in the Uffizi Gallery, Florence.

CORYNACTICS. See Sea Anemone.

COR'YPHA. See Fan Palm; Gebang Palm.

COR'YPHENE (Lat. *coryphæna*, from Gk. κορύφαινα, *koryphaina*, a sort of fish, from κορυφή, *koryphē*, summit), Dorado or Dolphin. One of a genus of fishes (*Coryphæna*) of the family Coryphænidæ, to which the name "dolphin," properly belonging to the Cetacea, has been popularly transferred. The coryphenes are allied to the opahs, and are remarkable for the beauty and metallic brilliancy of their colors, which delight the spectator as the graceful fish are seen gliding with extreme rapidity near the surface of the water, gleaming in the light; and the changes the colors undergo while the fish is dying have acquired a poetic celebrity. They have an elongated compressed body covered with small scales, the head rising in a sharp crest, the mouth large. They are large fishes, attaining a length of 6 feet, and are inhabitants of the high seas of warm climates, where they chase the flying fishes and other surface prey with great speed and voracity. The common, almost cosmopolitan coryphene (*Coryphæna hippurus*) occurs on the coast of the United States as far north as Cape Cod. "They are often caught by sailors at sea and are considered most excellent food. It is an almost universal custom before eating them to test the flesh by putting a piece of silver into the vessel in which they have been cooked, it being a common belief that if the flesh is poisonous the silver will turn dark." (Goode.) See Plate of Horse Mackerel.

CORYPH'ODON (Neo-Lat., from Gk. κορυφή, *koryphē*, summit + ὀδούς, *odous*, tooth). A fossil amblypod mammal of the Lower Eocene beds (Wasatch) of western America, related to *Tinoceras* and the *Uintatheria*. A complete skeleton of *Coryphodon radians* has been found, and is mounted in the American Museum of Natural History in New York City. It shows an animal between 5 and 6 feet in length, with large skull, formidable teeth, short neck, rather long body, and short, strong, bowed legs with spreading toes. The brain cavity is remarkably small. The skeleton indicates a heavy, clumsy animal that lived in the bordering marshes of the Wasatch lakes, feeding on succulent water plants. Coryphodon remains have also been found in the Eocene beds of Europe. Consult Osborn, "A Complete Skeleton of Coryphodon Radians," *Bulletin of the American Museum of Natural History*, vol. x (New York, 1898), and Knipe, *Evolution in the Past* (London, 1912). See Tertiary System; Tinoceras; Uintatherium.

CORY'ZA. An inflammation of the nasal and ocular mucous membrane, with discharge of thin mucus. Preceded by a chilly feeling and a slight rise of temperature, it constitutes the invasion of measles, whooping cough, la grippe, and certain fevers, and is constant during hay fever (q.v.). Constipation or uric-acid diathesis is often the underlying cause for its appearance; the exciting cause is nearly always bacterial infection. Relief in the simple forms follows the use of alkaline laxatives, nasal spraying with mild antiseptic solutions, and the correction of any diathesis such as rheumatism. If neglected, the mucous membrane affords an inviting field for the germs of *grippe*, pneumonia, etc.

COS, or **KOS** (Gk. Κῶς, *Kōs*, It. *Stanchio*, Turk. *Istanköi*). One of the Dorian Sporades, off the southwest coast of Asia Minor, now belonging to Turkey. Cos is about 23 miles long, and about 74 in circumference. On the southern side of the island a range of hills, called Prion, extends along the coast; the western half of the island is also mountainous, but the eastern portion north of the jagged ridge of Mount Prion is a fertile plain, producing the grapes and the sultana raisins which furnish the chief modern exports. The population is estimated at about 10,000. In ancient times the island was famous for its perfumes, wines, and silk (probably produced from an inferior variety of worm), from which were woven the transparent Coän garments (*Coa vestis*) worn by the courtesans of Greece and Rome. There are many mineral springs on the island, which early became an important seat of the worship of Asclepius (q.v.). The precinct of Asclepius, on Mount Prion, was excavated in 1900–04; it had a continuous history from the sixth century B.C. to 554 A.D. Cos was the birthplace of the great physician Hippocrates (q.v.) and of Apelles (q.v.). The chief town, Cos, is situated on the northeast coast, on the site of the ancient city. In the centre of the main street is a gigantic plane tree, said to have stood there before the Christian era. To the northwest is an old fortress of the Knights of St. John. The harbor is small and so filled with mud as to be available only for small boats. The inhabitants are employed chiefly in agriculture. Cos is mentioned in the *Iliad* among the allies of the Greeks, and the island seems to have been early colonized. Later it was the seat of a Dorian colony, apparently from Epidaurus (q.v.), and became a part of the Dorian Hexapolis. It was a member of the Athenian League, and in the fourth century B.C. enjoyed a prosperity which increased under Alexander and his successors. It was the birthplace of Ptolemy II Philadelphus, and the home of Philetas, the bucolic poet, who founded on the island a school of which Theocritus (q.v.) was the most distinguished member. From the Latin conquest of Constantinople (1204 A.D.) till its capture by the Turks in 1523, Cos shared the vicissitudes of Rhodes and the neighboring islands. In 1912, in the course of the Turco-Italian War (q.v.), it was seized by an Italian fleet, but Italy, by the Treaty of Lausanne (Oct. 15, 1912), engaged to restore to Turkey the Ægean Islands on condition that a general amnesty should be granted to the inhabitants and that local autonomy and public liberty should be guaranteed. The contemporaneous outbreak of the Balkan War (q.v.) aroused a vigorous agitation among the Greek islanders of Cos for union with the Greek Kingdom. It was agreed by the Treaty of London (May 30, 1913) that the final disposition of all the Ægean Islands should be left to the Powers; in the meanwhile Italian occupation of Cos continued. Consult: Rayet, *Mémoire sur l'île de Cos* (1876); Paton and Hicks, *Inscriptions of Cos* (Oxford, 1891); Herzog, *Koische Forschungen* (Leipzig, 1899); *Archäologische Anzeiger* (1895).

COSA, kō'sȧ, Juan de la (c.1460–c.1512). A Spanish navigator and cartographer, born in Santoña (Santander). He accompanied Colum-

bus on his first and second voyages, and after returning to Santoña for a brief period, settled in the Puerto de Santa María (Province of Cádiz), where he became famous as a cartographer. He was the principal pilot of the expeditions sent out under Ojeda (1499) and Rodrigo Bastidas (1500) to explore the coast of Venezuela. After two other successful voyages (1504–07 and 1507–08) he was appointed by Juana hereditary *alguacil mayor* of Urubá. Isabella, in 1503, had appointed him to this position, but had not made the title hereditary. Late in 1509 he fitted out three vessels with which he set sail for Santo Domingo to meet Ojeda, who had been appointed general of Nueva Andalucía. In Santo Domingo he served as arbiter between Ojeda and Nicuesa in a dispute over the boundaries of their respective territories and jurisdiction. In 1510 Cosa had to defend himself from Portuguese accusations that he had made discoveries and explorations beyond the line set for the Spaniards. Later Cosa accompanied Ojeda to South America, where the entire party, with the exception of Ojeda and one other, was massacred by Indians while trying to land in Cartagena Bay, Cosa losing his life in deliberate defense of Ojeda. In 1500 Cosa made a large map of the world, probably the first to be prepared after 1492 and the first, therefore, to include the New World. For this reason it is of the greatest value to cartographers and historians, and many reproductions of the part relating to America have been made. It was accidentally discovered by Humboldt in the library of Baron Walckenaer in Paris in 1832, and since 1856, when it was acquired by the Spanish government, has been in the Naval Museum in Madrid. On several occasions parts of it have been reproduced; but M. Jomard's is the only reproduction of the whole map, on the original scale and with the original colors.

COSCIN'OMANCY (from Gk. *κόσκινον, koskinon*, sieve + *μαντεία, manteia*, divination). A species of divination, practiced from the earliest times by means of a sieve and a pair of shears or forceps. Tylor (*Primitive Culture*, 4th ed., vol. i, p. 128) says: "The sieve was held hanging by a thread, or by the points of a pair of shears stuck into its rim, and it would turn, or swing, or fall, at the mention of a thief's name, and give similar signs for other purposes." The ordeal of the Bible and key is a survival of the old custom. The fiftieth Psalm is read, and when the verse beginning "When thou sawest a thief" is reached, the apparatus is expected to turn towards the culprit. See SUPERSTITION.

COSE'CANT. See TRIGONOMETRY.

COSEGÜINA, kō'sā-gwē'nä, or **COSIGÜINA,** kō'sē-gwē'nä. A volcano in the extreme northwest corner of Nicaragua, Central America (Map: Central America, D 4). It is situated on a small peninsula which partly separates the Gulf of Fonseca from the Pacific; it has an altitude of over 3000 feet. Its latest eruption, on Jan. 20, 1835, is famous as the most violent in history. The sky was darkened by the ashes during three days for a distance of 100 miles from the crater, and ashes fell as far away as Jamaica and Bogota, Colombia. The explosion was said to have been heard in the city of Mexico, 900 miles away.

CO'SEL, or KOSEL. The capital of a district of Silesia, Prussia, on the river Oder, at the confluence of the Klodnitz, 25 miles southeast of Oppeln (Map: Prussia, H 3). It is a garrison town, has a castle, and was formerly surrounded by walls, the site of which has been converted into boulevards. A fine monument commemorates the unsuccessful siege by the French in 1807. The town manufactures celluloid, lumber, flour, malt, beer, bricks, and refined petroleum. It was the capital of a former duchy in the fourteenth century. Pop., 1905, 7085; 1910, 7832.

COSELEY, kōz'lĭ. A manufacturing town in Staffordshire, England, a suburb of Wolverhampton (Map: England, D 4), with which its industries and public works are identified. It has iron, coal, and cement mines, manufactures of iron goods and stoves. Pop., 1901, 22,219; 1911, 22,834.

COSENTIA. See COSENZA.

COSENZ, kō'sänz, ENRICO (1820–98). An Italian soldier, born at Gaeta. He entered the military service of Naples in 1840, participated in the campaign in Upper Italy (1848), and afterward was prominent in the defense of Venice against the Austrians. In 1859 he became a colonel in the "Hunters of the Alps," Garibaldi's corps, and in 1860 took part in the expedition to Sicily. Upon Garibaldi's assumption of the dictatorship of Naples, he was appointed Minister of War. He commanded a division in the attack on Rome in 1870, and from 1881 until his retirement in 1893 was chief of the general staff of the Italian army. He also held civil office as a deputy from 1860, and senator from 1872.

COSENZA, kō-zĕnt'sä (Lat. *Cosentia*). The capital of the Province of Cosenza (Calabria Citeriore) at the confluence of the Crati and Busento rivers, in south Italy, situated 120 miles southwest of Taranto, and only a short distance from the Mediterranean (Map: Italy, L 8). It is commanded by a castle, whose walls, 9 feet thick, were shattered in the earthquakes of 1783, 1854, and 1870. The older and lower part of the town is infected with malaria in summer. The cathedral, of the thirteenth century, which has been restored, contains the tombs of Louis III of Anjou, and Isabella, consort of Philip III of France, who died here in 1435. In the attractive public gardens, near the prefecture and the new theatre, are a figure of Liberty by Giuseppe Pacchioni, erected in 1879 to the brothers Bandiera and others who took part in the Calabrian rebellion of 1844, and busts of Garibaldi, Cavour, and Mazzini. There are a seminary, a royal college, a technical school, two academies of science and fine arts, and a chamber of commerce. Cosenza markets silk, oil, wine, manna, hemp, grain, and honey, and manufactures faïence, iron and steel ware. Alaric, King of the Visigoths, died here in 410 while on his way to Sicily after the spoliation of Rome. Tradition has it that he and his treasures were buried just below the town in the Busento (ancient Buxentius), where the Crati joins it—a spot now marked by the Ponte Alerico. The city is subject to earthquakes, having suffered many severe shocks. Pop. (commune), 1881, 16,253; 1901, 21,545; 1911, 23,805.

COSETTE, kō'zĕt'. The adopted daughter of Jean Valjean in Hugo's *Les Misérables*.

COSHOCTON, kō-shŏk'ton. A city and the county seat of Coshocton Co., Ohio, 69 miles east-northeast of Columbus, on the Pennsylvania, the Pittsburgh, Cincinnati, Chicago, and St. Louis, and the Wheeling and Lake Erie railroads, on the Ohio Canal, and on the Muskingum River (Map: Ohio, G 5). It con-

tains a city hospital, Carnegie library, park and fair grounds, and a fine courthouse. Coshocton is in the centre of a coal, gas, and oil region, and has several novelty advertising establishments, machine shops, pipe works, automobile, carriage, furniture, and glass factories, potteries, paper and flour mills, etc. Settled in 1811, the city was incorporated in 1833. The water works are owned and operated by the municipality. Here, after a long struggle, Colonel Boquet concluded a treaty with the Delaware Indians in 1765. Pop., 1900, 6473; 1910, 9603; 1920, 10,847.

COSÌ FAN TUTTE (It., all women act alike). An opera by Mozart (q.v.), first produced in Vienna, Jan. 26, 1790.

COSIGÜINA. See COSEGÜINA.

COSIMO, kō'zē-mō, PIERO DI. See PIERO DI COSIMO.

COSIMO DE' MEDICI, dā mā'dē-chē. See MEDICI.

COSIN, kŭz'n, JOHN (1594–1672). An English prelate. He was born at Norwich and was educated at Cambridge. After holding rectorates at Elwick, Brancepeth, and elsewhere, he assumed charge of St. Peter's College, Cambridge, in 1635. Three years afterward he was made vice chancellor of the university and in 1640 was appointed Dean of Peterborough. He was chaplain to Charles I and subsequently joined the royal family in Paris, where for nearly 20 years he conducted religious services in the household of Queen Henrietta. In 1660 he was appointed Bishop of Durham. Although by no means inclined towards Puritanism, he was an inveterate antagonist of Roman Catholicism, and during his long residence in France was regarded as the champion of the Protestant cause in that country. Many of the finest prayers in the English church were written by him, while his other numerous writings are imbued with the force and brilliancy of his interesting personality. He was celebrated for the remarkable frankness with which he defended his views, even under the most unfavorable conditions, and by his splendid administrative ability in the church. His works include: *Collection of Private Devotions,* prepared at the request of King Charles I and first published in 1627; *Scholastical History of the Canon of Holy Scripture* (1657); *Historia Transubstantiationis Papalis* (1675); *Notes on the Book of Common Prayers* (1710). A collected edition of his works was published (5 vols.) in 1843–55, and his *Correspondence* (2 vols.) in 1868–70.

CO'SINE. See TRIGONOMETRY.

COS'MAS (Lat., from Gk. Κοσμᾶς, *Kosmas*), surnamed INDICOPLEUSTES (i.e., Indian navigator). A merchant of Alexandria, in which city he was probably born, who, after having traveled much in eastern Asia, including India and Ceylon, returned to Egypt and ended his days in monastic retirement about the middle of the sixth century. While a monk he wrote a *Christian Topography* in 12 vols., in the Greek language, containing much information about many countries and particularly about India. An attempt to reconcile everything to his notions of the meaning of the Bible led him into many errors; but though deficient, and even absurd scientifically, as a record of travel and geographical information, the eleventh book, which gives a description of the animals of India and of the island of Ceylon, takes high rank. His other works, which seem to have included a treatise of the motion of the stars, and commentaries on the Psalms and Canticles, have perished. *The Topography* (which, among other things, gives the first account of the *Monumentum Adulitanum;* see ADULE) was edited by Montfauçon in the *Nova Collectio Patrum Græcorum,* vol. ii (Paris, 1707), reprinted by Migne, *Patrol. Græca,* lxxxviii, translated by Charton in his *Voyageurs* (Paris, 1854), and in English by McCrindle (London, 1897). An edition was edited by Winstedt (Cambridge, 1910).

COSMAS (Lat., from Gk. Κοσμᾶς, *Kosmas*) and **DA'MIA'NUS** (Lat., from Gk. Δαμιανός). Two Arabian brothers of the third century, Christian martyrs under Diocletian. They practiced medicine without fee (whence they came to be known as "The Silverless") at Ægea in Cilicia, and, having refused to sacrifice on pagan altars, were beheaded in 303. Their day in the calendar of the Roman church is September 27. They are honored as the patron saints of physicians and apothecaries. A short-lived order of knights spiritual, named after them, was instituted during the Crusades. A round temple on the north side of the Roman Forum, built by the Emperor Maxentius to his son Romulus, was converted into a church in their honor in 526. Its mosaics are among the most valuable in Rome.

COSMAS OF PRAGUE (c.1039–1125). A Czech historian, dean of the cathedral at Prague. His works, particularly his "Chronica Boëmorum," printed in the second volume of the *Fontes Rerum Bohemicarum* (Prague, 1874), constitute a very complete and accurate record of the history of the times.

COSMATI, kŏs-mä'tē. The popular name of a group of mediæval Roman architects and decorative marble workers, from Cosmas, the name of two important members. The group was composed of two families: one descending from a certain Tebaldo, who was father of Lorenzo, grandfather of Giacomo, and great-grandfather of Cosmas I, and flourished about 1150–1250; the other founded by Pieter Mellini, father of Cosmas II, the most prominent of whose sons were Giovanni and Deodato, active from about 1250 to 1350. It dispersed with the departure of the popes for Avignon and the fall of Rome as an artistic centre. The specialty of this school was the use of rich mosaic inlay in geometric patterns in architecture and church interiors and furniture—a style often called *Cosmati work.* But it was not confined to this family, being a style common to all the other family groups of artists of mediæval Rome and its neighborhood, such as the families of Paulus and Vassallectus. The beautiful cloisters of St. John Lateran, St. Paul Without the Walls, and Santa Sabina in Rome are the most familiar of their large works. The choir seats at San Lorenzo, the tabernacles at Santa Cecilia and St. Paul's, the pulpits at the Aracœli, the tombs at the Minerva and Santa Maria Maggiore, the paschal candlestick at Santa Cecilia, the pavements of these and many other Roman churches, show the versatility and universal use of this style. But most of the finest works are scattered throughout the province, at Civita Castellana, Subiaco, Corneto, Alatri, Anagni, Alba, Ferentino, Terracina, and other cities. The architectural as well as the decorative work was probably designed and executed by these artists. That the style was Roman is shown by the in-

scription of 1229 in the charming cloister of Sassovivo in Umbria, where the artist calls it *Roman work*. However, there were two other contemporary Italian schools which produced similar work: that of Campania, with centres at Salerno, Sessa, and Gaeta; and that of Sicily, in the churches of Palermo, Monreale, Cefalù, and others.

Consult: Boito, *Architettura Cosmatesca* (Milan); Frothingham, "Notes on Roman Artists of the Middle Ages," in early volumes of *American Journal of Archæology;* G. Clausse, "Les Cosmati," in *Revue de l'art chrétien* (1897); *Les marbriers romains* (Paris, 1897); Tommasseti, *Bolletino della Commissione Architetturale Comunale* (Rome, 1906); Filippini, *La Scultura nel trecento in Roma* (Turin, 1908).

COSMET'ICS (Gk. κοσμέω, *kosmeō*, I adorn). The term is used to indicate (1) all the mixtures and preparations employed for the purpose of beautifying and improving the appearance of the hair or skin; (2) the art which serves to adorn, beautify, and improve a person's looks and appearance.

The preparations used are liquids, ointments, creams, and powders. Liquids are used chiefly for the hair in order to produce a more luxurious growth, or to impart to it a strong gloss, or to effect a change in its color, as by means of hair dyes and hair bleaches. The liquids used usually contain alcohol and oil in dilution; some containing also medicinal substances, such as quinine and cantharides, intended to act as a stimulant to hair growth. These preparations are all applied to the hair and scalp, followed by brisk rubbing or massage. It is the massage chiefly, if not wholly, that brings about the desired result, since the friction improves the circulation of the scalp and thus by nourishing the hair roots causes a more healthful condition and rapid growth of the hair. The cleanliness imparted to the scalp by the liquid preparation used and the rubbing likewise enhances hair growth. The ordinary hair tonic is not injurious, but hair dyes and hair bleaches frequently contain poisonous ingredients and are apt to be injurious both to the hair and to the general health.

For the face and hands various massage creams, vanishing creams, ointments, and powders are prepared. Some of the creams have carmine red incorporated into them to act as a rouge and to give a pink color to the skin of the face. The massage creams are made of casein, glycerine, fat, and water with some perfume added thereto. There are other preparations made of starch or chalk; and still others, like the pearl white, contain a white bismuth powder which is deposited as a fine white flour upon the skin. All these preparations for the skin are more or less harmful, because they clog up the skin's pores, thus interfering with its proper physiological functions and with its nutrition.

The cosmetic art includes a variety of procedures and manipulations by means of the hand and by the assistance of certain electrical appliances and vibrators. Manicuring and artistic hair dressing properly belong to the cosmetic art. Facial massage and the removal of wrinkles manually and by the vibrator are likewise cosmetic procedures. Cosmetic surgery is that branch of the surgical art practiced expressly for the purpose of improving a person's looks and not to cure disease. The procedures are various, ranging from the removal of superfluous hairs by means of the electric needle to the removal of nævi, or birthmarks and moles. The correction of harelip and certain nasal deformities, as the hammer nose, are procedures of cosmetic surgery. See PERFUMERY; ROUGE.

COS'MIC DUST. See DUST.

COSMOG'ONY (Gk. κοσμογονία, *kosmogonia*, from κόσμος, *kosmos*, order, world, universe + γονή, *gonē*, birth, origin). A name used by astronomers to designate theories concerning the origin and development of the solar system, stellar systems, or the universe in general. Many remarkable facts connected with our solar system tend to show that its present condition cannot be the result of a purely accidental action of natural forces. Thus, the orbits of all the important planets are very nearly circular and are situated nearly in the same plane; the directions of the planets' motions in their orbits are the same for all; all the planets, with the probable exception of Uranus and Neptune, rotate in the same direction on their own axes, and that direction is the same as the direction of their orbital revolutions, etc. Even the planetary satellites share in these peculiarities of the solar system; the planes of their orbital revolutions about the primary planets are always very near the corresponding planes of the planets' own axial rotations, and the directions of the satellites' revolutions also coincide with the directions of the planets' axial rotations.

The Nebular Hypothesis. Kant and Laplace have given us the well-known "Nebular Hypothesis," later developed by Sir W. Herschel, to account for the state of affairs existing in the solar system. According to this hypothesis, the material composing the system was originally a mass of intensely hot nebulous or gaseous matter that tended to assume a rotating globular form under the action of gravitational forces. Gradually the mass contracted, and successive rotating rings of matter were from time to time, as it were, left behind. These rings, in turn, broke up, and the matter of each formed a planetary system in which again rings and satellites could form just as in the parent nebular mass.

Darwin's Hypothesis. In 1885 Sir George Howard Darwin showed mathematically that the present condition of our earth and moon (the revolution of the moon and its axial rotation being synchronous) might have been brought about by the action of the tidal friction working continuously through successive ages of cosmic time. Indeed, it is quite reasonable to suppose that, when earth and moon were nearer together, and as yet in a more or less plastic condition, very gigantic tides must have been set up—tides involving the earth's semisolid matter, as well as the oceans of water and air. Darwin's researches have brought out the fact that such tides must produce important modifications in any system of celestial bodies.

The Meteoric Hypothesis. Sir Norman Lockyer's so-called Meteoritic Hypothesis assumes that space was originally occupied by swarms of meteors (q.v.), and that collisions between these swarms gave rise to condensations from which the stars have been gradually built up by accretion.

The Planetesimal Hypothesis. Modern research has shown that the nebular hypothesis is unable to explain all the phenomena presented by planetary systems, and, in order to overcome

the difficulties which arise, Professors Chamberlin and Moulton, of the University of Chicago, have recently put forward a theory which the former calls the "Planetesimal Hypothesis." It may be regarded as a combination of the nebular and meteoritic hypotheses. Led to the conclusion by the large number of spiral nebulæ which have been brought to light by modern telescopes, the propounders of this theory suppose the solar system to have developed from such a nebula. This they imagine to have had its origin at a time when another sun passed near our own. This nebulous mass was composed of a great number of small masses, but throughout it there were primitive nuclei of considerable dimensions around which have gathered accretions of the scattered material, thus giving rise to the planets. See NEBULÆ; SOLAR SYSTEM; SUN; ETC.

Ancient Cosmogonies. Scarcely any people, either ancient or modern, has been without some theory concerning the creation of the world. The cosmogonies of chief interest in connection with our own views are those of Babylonia, India, Iran, Greece, and ancient Germany. The Babylonian system resembles in many respects the cosmogony of the Bible. There was darkness and water, with strange monsters. Into this chaos the god Bel entered, and clove the cosmic sea, and parted the darkness. Animals took the place of the former monsters, and man himself was created, as well as the sun and moon and five planets. In some of the latest hymns of the Rigveda (q.v.) water was the source of all, whence came fire and wind—the breath of divinity. Or, again, the world arose from the sacrifice of Man (Skt. *purusha*), whose head became the sky, his feet the earth, his eye the sun, his breath the wind, while from his mouth, arms, thighs, and feet the four castes sprang. These ideas, developed more fully in the pseudoepical Sanskrit *Purānas* (q.v.), exhibit clearly the pantheistic trend of Hindu thought. The rôle of Kāma or Love in Indian cosmogony bears some resemblance to that of the Greek Eros. Iranian cosmogony, as we find it in the *Avesta* and the writings in Pahlavi (q.v.), corresponds to the dualistic character of the Zoroastrian religion. Ormazd, the god of everlasting light, created the good in opposition to Ahriman, the devil, who dwells in eternal darkness. In the course of a period of 3000 years Ormazd created the heaven, water, earth, plants, animals, and man. In the following 3000 years Ahriman produced evils to combat these creations of Ormazd; but, despite some temporary success, he was finally forced to yield to the powers of good.

Greek cosmogony is more varied. The Homeric poems regard Ocean as the source of the world, while the Hesiodic account ascribes the first beginnings to Chaos. Thales followed the first theory, and Anaximander the second, which has its parallel also in India. Anaximenes considered air to be the source of all, while Heraclitus postulated fire as the primal element, and supposed a constant flux of all things, where only the divine law (Zeus) was immutable. The notion of Eros or Love as a cosmic force was introduced into Greek philosophy by Parmenides and Empedocles, for which Anaxagoras substituted Mind (Gk. *νοῦς*). Of special interest in this connection is the atomic theory of Democritus, according to whose view the world is permeated by a soul which is composed of atoms in continual motion, and which partakes of the nature of fire. Later Greek philosophy did hardly anything towards the development of cosmogonic ideas.

For Germanic beliefs on this subject, the most comprehensive source is the *Völuspa*, an Icelandic poem of the twelfth century of our era.

Bibliography. For the cosmogonic ideas of the Egyptians consult the studies of Naville. The cosmological views of the American Indian and Eskimo tribes, of the African races, and of the peoples of Farther Asia and the islands of the Eastern seas, may be gathered from the writings of Brinton, Grey, Tylor, and others. The Hindu theories will be found in Hopkins, *Religions of India* (Boston, 1895), and the Persian in Jackson, "Iranische Religion," in Geiger und Kuhn, *Grundriss der iransichen Philologie* (Strassburg, 1900). Consult also: Lukas, *Grundbegriffe in der Kosmogonie der alten Völker* (Leipzig, 1893); Jensen, *Kosmologie der Babylonier* (Strassburg, 1890); Meyer, *Eddische Kosmogonie* (Freiburg, 1891); Faye, *Sur l'origine du monde . . . théories cosmogoniques des anciens et des modernes* (2d ed., Paris, 1885); Plunket, *Ancient Calendars and Constellations* (London, 1903); Chamberlin, "Fundamental Problems in Geology," in *Year Book No. 3 of the Carnegie Institution;* Clerke, *Modern Cosmogonies* (London, 1905); Lagrange, *Etudes sur les religions sémitiques* (Paris, 1905); Moulton, "On the Evolution of the Solar System," in *Astrophysical Journal* for October, 1905; Hale, *Study of Stellar Evolution* (Chicago, 1908); Lowell, *The Evolution of Worlds* (New York, 1910).

COSMOP'OLIS (from Gk. *κόσμος, kosmos*, order, world, universe + *πόλις, polis*, city). A French novel by Paul Bourget (1892). The characters come to Paris from all quarters of the earth, forming an international society. The theme of the action is the persistence of ethnical differences even where a complete cosmopolitanism has apparently been reached.

COSMOP'OLITE (Gk. *κοσμοπολίτης, cosmopolitēs*, citizen of the world, from *κόσμος, kosmos*, order, world, universe + *πολίτης, politēs*, citizen, from *πόλις, polis*, city). A plant which grows spontaneously in every climate. Not to be confused with ubiquist (q.v.).

COSMORAMA, kŏz'mŏ-rā'mȧ (from Gk. *κόσμος, kosmos*, order, world, universe + *ὁραμα, horama*, sight, from *ὁρᾶν, horan*, to see). An arrangement of lenses and mirrors for viewing pictures, so that they appear as natural as possible. The name was applied to exhibitions where representations of landscapes, buildings, and other features of places in different parts of the world could be seen. By properly arranging the lenses, mirrors, and illumination, the pictures were produced not only enlarged, but with the effect of perspective. Cosmoramas were first introduced in France at the beginning of the nineteenth century.

COS'MOS (Neo-Lat., from Gk. *κόσμος, kosmos*, order, world, universe). A genus of annual and perennial herbs of the family Compositæ. The 20 or so species comprised in this genus are natives of tropical America, mostly Mexico. A few annual species are cultivated in flower gardens and have within recent years come into increased prominence and popularity, especially in the United States. (For illustration, see Plate of CRANBERRY, ETC.) The plants branch freely and are sometimes 10 feet high, leaves pinnately cut, flowers mostly rose, crimson,

purple, yellow, or white; generally solitary on a long peduncle. A sandy soil not too rich is preferred. The seeds are sown indoors, and the plants when large enough are set in the garden, after danger of frost is past. *Cosmos bipinnatus* and *Cosmos sulphureus* are the species most commonly grown. The former grows 7 to 10 feet high, blooms in the late fall, and has many different forms. A dwarf variety about 4½ feet high blooms in July. *Cosmos sulphureus* grows 2½ to 4 feet high, with sulphur or rich orange-yellow flowers 1 to 3¼ inches in diameter. It comes into blossom in some of the more southern States in late spring and continues to bloom without cessation until killed by fall frosts. The black cosmos (*Cosmos diversifolius*) is a tender annual, growing only 12 to 16 inches high.

COSMOS. A great scientific work in four volumes, by Alexander von Humboldt, which appeared at intervals from 1845 to 1858. It is a physical description of the universe, setting forth physical laws in logical order, though modern science shows it faulty in some of its matter.

COSQUIN, kō'skăN', Emmanuel (1841–). A French writer on folklore. He was born at Vitry-le-François, Marne. In his *Contes populaires de Lorraine* (1887) he follows Benfey in an attempt to show that the folklore of Europe has been derived from India. He also wrote on ecclesiastical subjects, chiefly for the paper *Le Français*, and translated into French the works of Joseph Fessler (q.v.) on papal infallibility (1873) and the Vatican Council (1877).

COSS. See Algebra.

COS'SA, Francesco (c.1435–c.77). An Italian painter of the Renaissance. He was a pupil of Tura of Ferrara and was also influenced by Piero della Francesca, worked at Ferrara and Bologna, and is considered, with Ercole Roberti, to have been the founder of the Bolognese school. He and his contemporary, Cosimo Tura, are the most important representatives of Ferrarese art. In the Palazzo Schifanoja at Ferrara there is a curious fresco by him, "The Glorification of March, April, and May," the other months having been done by lesser artists. In this composition there are a number of portraits of his contemporaries, remarkable for their fidelity to nature and for the valuable studies of costume. Indignant at the slight compensation he received from Duke Borso d'Este, he left Ferrara and settled at Bologna. Among his finest works are a Madonna in the Pinacoteca, Bologna; a Madonna in the Johnston collection, Philadelphia (attributed to Tura), and "Autumn" in the Berlin Museum. A distinguishing characteristic of his art is his command of movement and of line. Consult Berenson, *North Italian Painters of the Renaissance* (New York, 1907).

COSSA, Luigi (1831–96). An Italian economist. He was born in Milan, studied at the universities of Pavia, Vienna, and Leipzig, and in 1858 was appointed professor of political economy in Pavia. His most important work is the *Primi elementi di economia politica* (8th ed., 1889), which has been translated into English and several other languages. Among his other publications may be mentioned: *Scienza della finanze* (1875; Eng. trans., 1888, under title *Taxation, its Principles and Methods*); *Guida allo studio dell' economia politica* (1876; Eng. trans., 1880); and *Saggi di economia politica* (1878).

COSSA, Pietro (1830–81). An Italian romantic dramatist, born in Rome. He fought in the campaign of 1849, going thereafter into brief exile in South America. His first dramatic success was the *Nerone* (1870), followed by *Plauto e il suo secolo* (1876), *Messalina* (1876), *Cleopatra*, and other plays of classic subject matter. In his best work Cossa frees the classic drama from Alfierian imitation and the aridity of the classic tradition, attaining great excellence of historical coloring, reducing his characters from abstractions to concrete vital human beings, combining beauty of lyric movement with delicate humor, sound psychology, and realistic truth. Consult: Mazzoni, *L'Ottocento* (Milan); Franchetti, in *Nuova Antologia* (1881); *Works* (Turin, 1887).

COS'SACK ASPARAGUS. See Typha.

COSSACK POSTS. The name of an observation group of four men sent out from the support of an outpost. The *cossack post* is now included in the general term *outguards*, which vary in size from four men to a platoon. Consult *Field Service Regulations, U. S. A.* (1913). Each post consists of four men—three reliefs of one sentinel each and a non-commissioned officer as commander, or, failing such, an old and experienced soldier. They are a substitute for the usual line of pickets and sentinels. They are sufficient in number to cover the front of the support and to connect with the outguards of adjoining supports. The interval between posts and their distances from the support depends upon the situation and terrain. The sentinels are seldom posted more than 30 to 40 yards in front of the Cossack posts and are kept under constant observation by the other members of their post. They are relieved every hour, and the posts every three hours. The advantages claimed for the Cossack system are that it is more economical in point of men required than is the usual method and is besides less fatiguing and consequently more effective, and that, above all else, it enables the sentries to be more resolute in the performance of their duties, because, backed up by the nearness of their post, they are freed from any timidity of loneliness. See Outpost.

COSSACKS (Russ. *kozakŭ*, *kazakŭ*, from Turk. *kazāk*, robber; the same word in Tatar designating a light-armed warrior). A name borne by a people living under a peculiar military organization, who for several centuries have constituted an important element in the population of southern Russia. Their principal homes are the steppes of the Don and of Ciscaucasia and a region at the southern end of the Ural Mountains, on the borders of European Russia and Siberia. They are a mixed race, of Russian, Polish, Tatar, and other elements, with the Russian predominating. In fact, they are distinguished from the other Russians by their unsettled mode of life rather than by any difference of race or fundamental character. The Cossacks make their appearance in history about the close of the Middle Ages as a frontier people, on the border of Slavdom (Russia and Poland) on the one hand and the Tatar regions to the southeast on the other. A free, wild people, accustomed to live in the saddle and in constant warfare, they acquired by inheritance the qualities of courage, endurance, self-reliance, and good horsemanship which gave them high

rank among the irregular cavalry of the world. Long unaccustomed to the restraints of civilized government, they distinguished themselves by their predatory habits. The Don Cossacks, who at the present time constitute the principal body of the Cossacks, became powerful about the close of the sixteenth century. The town of Tcherkask became the seat of their government. At the head of their democratic organization was the Ataman (Hetman). In 1773 the Don Cossacks joined the pretender Pugatcheff against Catharine II, for which they were deprived of all of their liberties and their democratic institutions. Yermak Timofeyeff, a Don Cossack, belonging to a lawless band, the Good Companions of the Don, entered the service of the Stroganoffs, a wealthy family living in the Ural region and holding special trading privileges, crossed the Urals with a few hundred followers in 1581, and in a few years conquered and brought into a rude kind of subjection all of western Siberia. From this time the history of the Cossacks is closely connected with that of the Russian progress eastward through Siberia. With wonderful persistence and endurance, and a spirit of enterprise that would have been impossible in the stolid Russian village peasant, they explored and subdued this vast addition to Russia's territory. The Malorussian (Little Russian) Cossacks, or Cossacks of the Ukraine (Border Land), were organized in the second half of the sixteenth century by Stephen Báthory, King of Poland, into a defensive bulwark on the southeastern frontiers of the realm. In the middle of the seventeenth century, harassed by Polish oppression, they revolted under the lead of their Ataman, Chmielnicki (q.v.), and placed themselves under the protection of Russia. Under the lead of Mazeppa they joined Charles XII against Peter the Great, whose victory at Poltava sealed their fate. Their liberties were abolished, and they were treated with great harshness. The Zaporogian Cossacks (Russ. *Zaporog*, beyond the rapids), on the Dneiper, were one of the most notable of the tribes down to the middle of the seventeenth century, when they submitted to Russia. Their predatory incursions were not confined to the land, but included naval expeditions against the Turkish towns of Asia Minor. Among their peculiar tribal institutions was the celibacy imposed upon the ruling class.

The Cossacks are regarded by the Russian government as a military division of the population. They are organized in 11 *voiskos*, or *corps* (Don, Kuban, Terek, Astrakhan, Orenburg, Ural, Siberia, Semiryetchensk, Transbaikalia, Amur, Usuri). Their military training begins in boyhood; compulsory service in the *stanitsa*, or Cossack post, begins at 18; field service begins at 20, 12 years being spent in active service and five years in the reserve. This service is divided into three classes—active, on furlough with arms and horses, and on furlough with arms but without horses. Each *voisko* equips and clothes its soldiers and receives an allowance of land from the crown. The Cossacks wear a distinctive uniform of dark green. Part of them, in addition to other arms, still carry a long lance. The Kuban *voisko* enrolls six battalions of Cossack infantry, and there are also 15 batteries (44 on a war footing) of Cossack field artillery. The title of Ataman, or chief of the Cossacks, is now vested in the Imperial family. The Cossacks probably number nearly 3,000,000, and it is estimated that over 300,000 could take the field within a comparatively short space of time. The Cossack regiments are armed with a short magazine rifle of 0.299 inch calibre, sighted to 3000 paces. Every cossack up to any age can be called out in time of emergency to assist in the national defense. Consult Erckert, *Der Ursprung der Kosaken* (Berlin, 1882), and Tettau, *Die Kosakenheere* (ib., 1892). A realistic picture of Cossack life may be found in Gogol's celebrated novel *Taras Bulba*.

COSSACKS, The. A novel by Count Tolstoy (1852). It was translated into English in 1878.

COSSON, kô'sôn', Ernest (1819–89). A French botanist, born in Paris. He carried on extensive botanical studies in Algeria and explored the flora in the suburbs of Paris. His published works include the following: *Flore descriptive et analytique des environs de Paris*, jointly with Saint-Pierre (1845); *Synopsis analytique de la flore des environs de Paris* (1845); *Atlas de la flore des environs de Paris* (1882); *Compendium Floræ Atlanticæ, ou Flore des états barbaresques: Algérie, Tunisie, Maroc* (1881–87); *Conspectus Floræ Atlanticæ* (1881); *Illustrationes Floræ Atlanticæ* (1883–92).

COSSUTIUS, kŏs-sū'shĭ-ŭs. A Roman architect noted for his selection by King Antiochus Epiphanes (175–164 B.C.) to rebuild the great temple of the Olympian Zeus at Athens in the Corinthian style. He did not live to complete the temple, which was finished by Hadrian in the early second century A.D.

COST. See Cotise.

COSTA, kô'stȧ, Alfonso Augusto de (1871–1915). A Portuguese statesman, born in Ceia, Guarda, Portugal. He studied at Coimbra, receiving his doctor's degree in 1895, and in the following year became professor of law. Known as an eloquent speaker, he affiliated himself with the Republican party and was elected by a great majority deputy to the Cortes, in spite of the machinations of government agents (Nov. 26, 1899). The ministry annulled his election on a futile pretext, but in the new elections, on Feb. 18, 1900, he was again triumphantly elected. In the Cortes he was received as a recognized enemy of the monarchical régime, and he soon gave more than ample proof of his enmity by introducing, amid great protest, a resolution in the Cortes in which he proposed the abolition of the monarchy. After the fall of the ministry he failed to be reëlected, but threw himself enthusiastically into the preparations for the revolution which resulted in 1910 in establishing the Republic. Under the new régime he became Minister of Justice, and in January, 1913, Minister of Finance and Premier. The exiled Royalists in July, 1913, made an attempt on his life, but he escaped with slight injuries; another plot to kill him in September, 1913, was also frustrated. Dr. Costa, more than any other one man, typifies the spirit of the new Republic of Portugal. His publications include: *A Egreje e a questão social; O serviço de peritos no proceso criminal: legislação portugueza, critica e reforma; Direito civil* (1896); *Economia politica* (1896–98); *Organização judiciaria* (1897–1901).

COSTA, kô'stȧ, Claudio Manuel da (1729–?90). A Brazilian poet, statesman, and jurisconsult. He was born at Mariamo (Province

of Minas Geraes). He studied law at the University of Coimbra, and on his return to Brazil in 1751 devoted himself to his profession and to political economy. From 1780 to 1788 he was second Secretary of State. His works, which are numerous, are highly valued by the Portuguese, who consider them classics. The best of them is *Villarica*, composed about 1773, but not published until 1841.

COSTA, Isaac da. See Da Costa, Isaac.

COSTA, Lorenzo (1460–1535). An Italian painter of the Renaissance. He was a pupil of Cosimo Tura in his birthplace, Ferrara, and was influenced at first by Ercole Roberti and Francesco Cossa. Of his supposed early paintings only the St. Sebastian (Dresden Museum) is authentic. In 1483 he went to Bologna, where he remained almost constantly until the fall of his patrons, the Bentivoglio family, in 1506, and there he began his connection with Francia. The artists had a joint school and worked as copainters. Costa first influenced Francia, and was in turn influenced by him. His landscape backgrounds are among the best of his day. He was a master of linear composition, and in his best pictures the color is clear and refulgent, the figures dignified, and the whole effect pleasing. Among his best paintings in Bolognese churches are: "A Madonna with Members of the Bentivoglio Family" (1488) in San Giacomo Maggiore, a characteristic example, admirable in its fresh, simple, sincere treatment and masterly drawing; "The Triumph of Life and Death," in the same church; a Madonna (1497), in San Giovanni in Monti; a "Santa Conversatione," in San Petronio; and frescoes in the Misericordia and Santa Cecilia. After leaving Bologna he was appointed court painter in Mantua, where his chief work was the decoration of Palazzo San Sebastiano. Other works include "Isabella d'Este Crowned by the Muse" (Louvre) and the "Dead Christ" (1504, Berlin Museum). Costa played an important part in the history of the schools of Bologna and Ferrara. The young Correggio, who accompanied him to Mantua, was his principal pupil.

Consult: Morelli, *Italian Painters: Critical Studies of their Works*, translated by Constance Jocelyn Ffoulkes (London, 1892–93); Berenson, *North Italian Painters of the Renaissance* (New York, 1907); Gardner, *The Painters of Ferrara* (London, 1911).

COSTA, Sir Michael, really Michele (1808–84). An Italian composer and conductor, born in Naples. He was taught by his father and Zingarelli (q.v.). When the latter's psalm was to be performed at the Birmingham Festival (1828), he sent Costa, then only 18 years old, to conduct it. Owing to a misunderstanding, Costa had, instead, to sing the tenor part, but acquitted himself of the task brilliantly, and his reception induced him to settle in England. He became conductor of Italian opera in 1830 and in 1847 assumed the same post in the Covent Garden Opera. In addition he was appointed conductor of the Philharmonic Society (1846), Sacred Harmonic Society (1848), Birmingham Festivals (1849), and Handel Festivals (1857). His principal work, the oratorio *Eli*, was successfully produced at the Birmingham Festival of 1855 and *Naaman* in 1864. In 1869 he was knighted by Queen Victoria and also received the royal order of Frederick from the King of Württemberg. Costa wrote several ballets and operas, of which the most successful were *Don Carlos* and *Malek Adel*. He died at Brighton, England.

COSTA, Paolo (1771–1836). An Italian author, born in Ravenna, educated at Padua, and a teacher successively at Treviso, Bologna, and Corfu. He published a commentary on Dante, a revision of the Dictionary of the Crusca, and translations of the *Batrachomyomachia* and of Schiller's *Don Carlos*. *Works* (Florence, 1839–40); biography by Mordani (Forli, 1840).

COSTA CABRAL, kô'stȧ kȧ-brȧl', Antonio Bernardo da, Count de Thomar (1803–89). A Portuguese statesman. He became judge of the Supreme Court in Oporto and in Lisbon, and in 1835 was elected to the Chamber of Deputies, where at first he was one of the leaders of the Radicals, but soon joined the Conservative party. He was appointed Governor of Lisbon in 1838 and Minister of Justice in 1839. For the purpose of setting aside the constitution of 1820 with its restrictions of the royal power, he fomented, in 1842, an insurrection in Oporto, assumed control of the army, established a censorship of the public schools, suppressed the universities, and so oppressed the people with taxes that he was driven from power in 1846. Once more appointed Prime Minister, in 1849, he again played the dictator, to the detriment especially of the state finances, but was compelled to resign. The Queen refused to accept his resignation, and a revolution was started against him under the leadership of Saldanha, which overthrew his administration in April, 1851. He fled to England, but returned the next year, and from 1859 to 1861 was Ambassador to Brazil. In 1862 he became a member of the Council of State and president of the Superior Administrative Court.

COSTANOAN. A linguistic family of Indians, formerly occupying territory north of San Francisco Bay. In 1910 there were but 17 passing under the name "Santa Cruz."

COSTA RICA, kô'stȧ rē'kȧ (Sp., rich coast). The most southern of the Central American States, bounded by Nicaragua on the north, the Caribbean Sea on the east, Panama on the southeast, and the Pacific on the southwest (Map: Central America, E 5). Its area is estimated at 18,700 square miles. Lake Nicaragua forms part of the northern boundary.

Topography. The interior of the country is taken up partly by the Talamanca Range of mountains (a continuation of the Cordillera of Chiriquí), which runs from the southeast to the northwest as far as lat. 10° N. The Talamanca is of volcanic origin and reaches in its highest peaks an altitude of over 12,700 feet. North of the Cartago highland commences the second mountain range, which extends in the same (northwesterly) direction to the northern boundary of the Republic. There are several volcanoes in this range. Of them, however, but two—the Irazú (11,500 feet) and Turrialba (11,350 feet)—show any signs of activity. Since 1841, when the town of Cartago was almost completely destroyed, no serious eruption has occurred. Earthquakes are of frequent occurrence. The last serious shock occurred in 1910, when the Peace Palace and other buildings at Cartago were destroyed, and 1000 lives were lost. The Atlantic coast, which, according to the adjustment of the southern boundary in 1900, reaches only to a point a little north of the mouth of the river Teliri or Sixola, is gen-

erally low, and, with the exception of Port Limón, without any inlet. The Pacific coast, on the contrary, has a more elevated surface and forms the two spacious gulfs of Nicoya and Dulce, which are protected by two mountainous peninsulas. There are a number of smaller inlets in the northern part. The rivers of Costa Rica are short and, although abundant in water, unnavigable. Most of them flow into the Atlantic or the Pacific, while some join the San Juan, which forms the eastern half of the northern boundary.

Geology. The interior highland region is composed of Paleozoic and Mesozoic strata, in places broken through by ancient eruptives and overlain by more recent lava flows. Many districts are known to be mineralized; the deposits of gold are especially important and have attracted the attention of foreign capitalists, who are now engaged in developing this branch of the mining industry. The east coast of Costa Rica is an alluvial plain.

Climate. In regard to its climate Costa Rica may be divided into three zones. The torrid zone, below 3000 feet, comprising the coast lands, has an average temperature ranging from 72° to 82° F. The temperate zone, lying between 3000 and 7500 feet, has the most salubrious climate and a mean temperature ranging from 57° to 68° F. Above 7500 feet the temperature is much lower, and frosts are frequent, but snows rare. On the table-lands of San José, lying at an elevation of 3000 to 4000 feet, the climate is very agreeable, the temperature having a range of only about 5°, the mean for the year being 67° F. The average yearly rainfall is about 100 inches, but occasionally it reaches 130 inches. The dry season lasts from December to May, while the months of December, January, and February are the coldest of the year. Owing to the proximity of the two oceans, winds blow almost continually and occasion considerable discomfort during the dry season. On the whole, the climate of Costa Rica is healthful and fevers occur only in regions below an elevation of 150 feet.

Flora. The vegetation of Costa Rica is characteristically tropical in its nature. In the forests are found mahogany, brazilwood, cedar, evergreen oak, and ebony. Coffee and banana are the principal cultivated plants.

Fauna. Animal life is abundant and varied. The tapir and other South American animals are found. Bird life is represented by about 700 species, including parrots, toucans, humming birds, and members of the gallinaceous family. There are over 130 species of reptiles and batrachians. The most important life in the surrounding waters are the pearl and mother-of-pearl oysters.

Agriculture. Costa Rica is essentially an agricultural country and is chiefly dependent on the cultivation of coffee and bananas. Notwithstanding the sparse population of the country and the lack of transportation facilities, agriculture is in a flourishing condition, as evidenced by the constantly increasing exports of agricultural products. This is due partly to the fertility of the soil and favorable climatic conditions, and partly to the fact that more than two-thirds of the inhabitants belong to a class of peasant proprietors. The state domain is sold or leased on advantageous terms in lots of not over 500 hectares. The presence of so large a proportion of working landowners makes not only for the development of agriculture but for the political stability of the country. Coffee cultivation was retarded during the first decade of the century by the prevailing low prices. In 1894 the export amounted to 23,129,000 pounds; it increased to over 43,000,000 in 1898, decreased to about 24,000,000 in 1904, advanced to about 35,000,000 pounds in 1905, and in 1911 was 27,150,000 pounds. This latter figure represents the approximate annual export from 1909 to 1912. Banana growing has developed rapidly, chiefly under American management; over three-fourths of the export goes to the United States. In 1881 about 3500 bunches were exported; by 1890 the exports had increased to 1,034,765 bunches, while in 1905 they amounted to 7,283,000, in 1910 to 9,097,285, and in 1912 to 10,647,702 bunches. Besides coffee and bananas, there are raised sugar, cacao, rice, corn, and beans, but none of them is exported to any extent. Stock raising, though relatively unimportant, is developing. The forests are exploited on a steadily increasing scale.

Mining and Manufactures. The precious metals, particularly gold, are mined to some extent, principally with the aid of American capital. Their export, which was valued at about $283,000 in 1905, increased to over $1,184,000 in 1911 and then declined to about $764,000 in 1912. Of manufacturing establishments Costa Rica has very few, the largest being the national liquor factory and the national foundry at San José.

Transportation and Communication. The transcontinental railway connects the Caribbean port Limón with the Pacific port Puntarenas, by way of San José. There are branches to the north and the south of the main line, and these it is planned to extend to various parts of the country and ultimately to connect with railways in Nicaragua and Panama. The railways aggregate over 430 miles. There are over 130 telegraph offices, with upward of 1520 miles of wire.

Commerce. The chief ports are Limón and Puntarenas. In 1912 there entered at the former 538 vessels, of 1,129,606 tons, and at the latter 87 vessels, of 178,904 tons. Imports increased from $6,175,637 in 1909 to $10,187,686 in 1912, and exports from $8,264,174 to $10,071,144. Of the imports in 1912, the value of $5,865,908 represented the United States, $1,503,944 Germany, and $1,391,003 the United Kingdom. The coffee export in 1912 was valued at about $4,950,000, about five-sixths of it going to the United Kingdom; the banana export, about $3,503,000, over three-fourths to the United States. Other exports are gold bars, woods, hides, rubber, and cacao. About 46 per cent of the imports are drawn from the United States, and about 55 per cent of the exports are to that country. Costa Rica is economically one of the more promising Latin-American countries. Its favorable climate and soil and its comparative freedom from political disturbances have attracted foreign capital.

Government. In its form of government Costa Rica is a republic. It is governed under a constitution adopted in 1871; but this did not come into force until 1882, and it has been repeatedly modified. The executive power is vested in the president, elected indirectly for four years; he is ineligible for the next succeeding term. He is assisted by a cabinet of four members. The congress consists of a

single chamber of 43 representatives elected indirectly for four years. For administrative purposes the republic is divided into seven provinces, administered by governors appointed by the president. Justice is administered by a supreme court, two courts of appeals, a court of cassation, and also provincial courts. Capital punishment is prohibited. The constitution provides for compulsory military service in time of war. On a peace footing the standing army has a maximum strength of 1000 men and the militia about 5000. See ARMIES AND NAVIES. For national colors see Colored Plate of FLAGS.

Finance. The standard of value is gold; the monetary unit, the colon, par value 46.536 cents. The budget for 1914 showed estimated revenue of 9,200,000 colones and estimated expenditure of 9,013,635 colones. The estimated receipts from customs were 5,500,000 and from liquor excise 2,200,000 colones. Public debt, as converted at the end of 1911: foreign, £1,617,200; internal, $6,553,950. The metric system is legally established in the country, but Spanish weights and measures are generally used.

Banks. There are 5 banks in Costa Rica, with a combined capital of 6;365,000 colones. At the end of 1911 notes in circulation amounted to 4,097,405 colones. Foreign gold is legal, but not foreign silver.

Population. Although there are many mixed bloods in Costa Rica, the percentage of Spanish blood is greater than in the other Central American republics. The majority of the inhabitants claim descent from the Spanish colonists, chiefly Galicians, who arrived in the sixteenth century and subsequently. Through the industry and peaceful disposition of the people, Costa Rica presents a favorable contrast to the rest of Central and much of South America. The population in 1904 was reported at 331,340. The enumeration of Dec. 31, 1911, showed 388,266 inhabitants, several districts being omitted. Estimated population, Dec. 31, 1920, 468,373. The largest town is the capital, San José (31,688). In 1910 and 1911 immigrants numbered 11,233 and 9537; emigrants, 7236 and 8170; births, 15,847 and 16,839; deaths, 9723 and 9483.

Elementary instruction is free and compulsory, but the majority of the inhabitants are still illiterate. In 1911 about 30,000 pupils were enrolled in the elementary schools. There are several institutions for secondary and professional education. The Roman Catholic church is recognized and supported by the state, but other religions are tolerated.

History. Costa Rica was first visited, and probably named, by Columbus in 1502 and settled permanently about 1530. It formed a part of the audiencia and captaincy-general of Guatemala till 1821. With other Central American States, Costa Rica was a part of Mexico till 1823, when the proclamation of a Mexican republic caused them to withdraw from a connection which had always been distasteful and which in effect had been merely nominal. A federal republic of the seceding states was first tried. It lasted until 1839, but its authority does not seem to have extended over the Costa Ricans, who busied themselves with commerce and took little interest in public matters. Affairs remained in an unsettled condition, however, and Costa Rica's exact status was not definitely determined until 1848, when she successfully declared herself an independent republic. In 1856 Costa Rica was involved in war against the filibuster William Walker (q.v.). The country has been freer from revolution than its neighbors. The present constitution dates from 1871. In 1897 Costa Rica became a member of the short-lived Greater Republic of Central America, established in 1895 by Honduras, Nicaragua, and Salvador for the purpose of common defense and the harmonious adjustment of foreign relations. Since then nothing more serious than boundary disputes has disturbed the government of Costa Rica. The most important of these, with Colombia, was adjusted in 1900, in favor of Costa Rica, by the award of President Loubet of France. But as Loubet in making that award had been guilty of extralimitation, the award was rejected, and after many attempts to reach a settlement (made somewhat more complicated by the fact that Panama had become independent and had to be dealt with instead of Colombia), the whole matter was again submitted to arbitration, with the Chief Justice of the United States Supreme Court as arbitrator, by a protocol signed at Washington March 17, 1910. Besides the general works on Central America, of which Squier, *States of Central America* (New York, 1858), is the best, and Bancroft, *Central America*, vol. iii (San Francisco, 1890), is the most copious, consult the English translation of Calvo, *Republic of Costa Rica* (Chicago, 1890). This is a popular and patriotic work, authorized by the Costa Rican Government, and gives the version of political and commercial events most acceptable to the men in power in 1890.

Consult: Barrantes, *Geografía de Costa Rica* (Barcelona, 1892); Villafranca, *Costa Rica, the Gem of American Republics: The Land, its Resources and its People* (New York, 1895); Biolley, *Costa Rica and her Future* (Washington, 1889); Schroeder, *Costa Rica State Immigration* (San José, 1894); *Revista de Costa Rica, en el Siglo XIX* (ib., 1902); Barrantes, *Elementos de Historia de Costa Rica* (ib., 1892). For detailed bibliography, consult D. J. Maluquer, *República de Costa Rica* (Madrid, 1890). Maps are published by the Bureau of American Republics (Washington, 1903), and the Royal Geographical Society (London, 1897), the latter being physical.

COSTE, kōst, JEAN VICTOR (1807–73). A French naturalist, noted for researches in embryology and for efforts towards the cultivation of fishes in his country. In 1841 he became professor of embryogeny at the Collège de France. Mainly through his influence 600,000 salmon and trout were placed in the Rhône. In 1862 he was appointed inspector general of the river and coast fisheries. He published: *Cours d'embryogénie comparée* (1837); *Instructions pratiques sur la pisciculture* (1853); *Ovologie du Kanguroo* (1838); *Histoire générale et particulière du développement des corps organisés* (1847–59); *Voyage d'éxploration sur le littoral de la France et de l'Italie* (1855).

COSTEANING (kŏs-tēn'ĭng) **DITCH** (from *costean*, from Corn. *cothas*, dropped + *stean*, tin, Welsh, *ystaen*, Gael. *staoin*, Manx *stainny*, Lat. *stannum*, tin). A ditch dug through the surface soil to bed rock, at right angles to the strike of the formation, for the purpose of prospecting for or locating the outcrop of the continuation of a mineral deposit, the presence of which is suspected. In the United States,

this method is known as *trenching*. In the Cobalt District of Ontario many miles of such trenches were dug in prospecting for silver veins in the ore-bearing formation. The same method was adopted in the Porcupine District of Ontario in the search for gold veins. It is the usual method followed in preliminary prospecting when the presence of mineral is suspected or known from surface float, and the overlying soil is not too deep.

COSTEL'LO, Louisa Stuart (1799–1870). An English author and miniature painter. For a time she occupied herself entirely with painting miniatures and copying illuminated manuscripts, but having attracted the attention of Scott and Moore, she adopted literature as her profession and produced many works which attained popularity. Some of them are: *Songs of a Stranger* (1825); *The Maid of the Cypress Isle and Other Poems* (1815); *Specimens of the Early Poetry of France* (1835); *The Rose Garden of Persia* (1845), with illuminations by herself and her brother Dudley; and a number of semihistorical novels, of which the most prominent is *Memoirs of Mary, the Young Duchess of Burgundy* (1853).

COSTER, kŏs'tĕr, Lourens Janszoon. A native of Haarlem, Holland, reputed inventor of printing (about 1440). He is said to have printed sentences from beech-bark blocks, to have discovered a suitable ink, and to have substituted types of lead and later of pewter for beech wood. As he is alleged to have endeavored to counterfeit manuscript, he is supposed to have worked in secret, but to have taken apprentices, one of whom, Johann Gänsfleisch, a member of the Gutenberg family, is said in 1441 after Coster's death to have stolen types and matrices and fled to Mainz, where he might have revealed the secret to Gutenberg (q.v.). Coster's claim, vigorously maintained by many Dutch scholars, was disproved by Van der Linde (1870), who showed that Coster was a tallow chandler and tavern keeper, that he was confused with Lourens Janszoon, a wine merchant and town officer, and that the claim for him as inventor was first made by Gerrit Thomaszoon in 1550. Consult Morley, *English Writers*, vol. vi (London, 1890), also Wysz, *Zentralblatt für Bibliothekswesen* (1888).

COSTER, Samuel. See Koster, Samuel.

COS'TIGAN, Captain. A retired shabby-genteel Irish officer in Thackeray's *Pendennis*.

COSTIGAN, John (1835–1916). A Canadian statesman. He was born at St. Nicholas, Quebec Province, and was educated at St. Anne's College. He became a judge of the Inferior Common Pleas Court, was in 1861–66 a Conservative member of the New Brunswick Legislature, and after confederation in 1867 was elected to the Dominion House of Commons, of which he remained a member until 1896. During the earlier part of his parliamentary career he took a prominent part in amending the school law of New Brunswick, which contained a provision obnoxious to Roman Catholics. In 1882–92 he was Minister of Inland Revenue, from 1892 to 1894 was Secretary of State, and in 1894–96 was Minister of Marine and Fisheries. In 1882 he procured the adoption by the House of Commons of a notable series of resolutions praying the British government to concede home rule to Ireland. The resolutions were politely disregarded in London. In 1896 he was a delegate to the National Convention, Dublin, in the interest of Irish home rule. In the same year he left the Conservative party and became a supporter of the Laurier administration. In 1907 he was appointed to the Dominion Senate.

COST'MARY (from *cost*, Lat. *costum*, an Oriental aromatic plant, from Gk. *κόστος, kostos*, spice root + *-mary*, Fr. *marine*, Lat. *marinus*, pertaining to the sea, from *mare*, sea, but confused by popular etymology with *Mary*). The rayless form of *Chrysanthemum balsamita*, a perennial plant of the family Compositæ, a native of western Asia, long cultivated in gardens for the agreeable fragrance of the leaves. The root leaves are ovate, of a grayish color, on long footstalks; the stem is 2 to 3 feet high; it has small heads of deep yellow flowers in loose corymbs.

COSTS (from *cost*, OF. *coster, couster*, Fr. *coûter*, ML. *costare*, to cost, from Lat. *constare*, to cost, stand together, from *com-*, together + *stare*, Gk. *ἱστάναι, histanai*, Skt. *sthā*, to stand). In a litigated case, the sum of money which the successful party is allowed to recover from his opponent, as a partial compensation for the expenses of the litigation. In actions at common law costs are the creation of statute; but in equity and admiralty suits they are fixed by the court, except where this power has been taken away or modified by legislation. Even in common-law actions discretion is often vested in the court to grant an allowance to the prevailing party in addition to the ordinary costs, and in some jurisdictions paupers and seamen may be relieved from costs altogether.

Costs are either (*a*) *interlocutory*, i.e., such as are awarded upon motions or similar proceedings during the pendency of the action, or (*b*) *final*, i.e., such as follow upon the determination of the action. Upon the decision of a motion, or upon a judgment on appeal reversing the judgment appealed from and awarding a new trial, costs are often ordered *to abide the event*. In such a case, if the final judgment is in favor of the party who succeeded on the motion or appeal, he gets his costs of those proceedings; otherwise he loses them.

The *taxation of costs* is the official adjustment, on notice, of the various items to which the successful party is entitled. For details relating to costs, consult the authorities referred to under Practice.

COS'TUME (Fr. *costume*, from It. *costume*, from ML. *costuma*, from Lat. *consuetudinem*, custom or habit).

Costume is dress (q.v.) regarded from the point of view of style, the distinctive garments worn at different periods by different human groups, and including not only gowns, shirts, drawers, coats, vests, trousers, petticoats, skirts, hoop skirts, waists, corsets, stockings, hats, boots, shoes, collars, belts, fans, garters, gloves, but also jewelry, modes of dressing the hair and beard, military and naval uniforms, ecclesiastical vestments, university robes, armor and coats of arms. See Heraldry; Armor; Costume, Ecclesiastical; Hair Dressing; Beard; Uniforms, Military and Naval; Jewelry; Dress; Fashion; Crown; Coronet; Umbrella; Parasol; Shoes; Corset; Crinoline; Tatooing; etc.

Once it was the generally accepted opinion that the primary object of clothing is to conceal nakedness and satisfy innate feelings of modesty. This view was perhaps based to some extent on the third chapter of Genesis, where,

after Adam and Eve ate of the fruit, "the eyes of them both were opened, and they knew they were naked; and they sewed fig leaves together and made themselves aprons . . . and hid themselves from the presence of the Lord God amongst the trees in the garden." During the past few years, however, anthropologists have accumulated and arranged facts about primitive peoples which, in the works of Westermarck, "appear to prove that the feeling of shame, far from being the cause of man's covering his body, is, on the contrary, the result of it; and that the covering . . . owes its origin, at least in a great many cases, to the desire of men and women to make themselves mutually attractive.

Certainly, when we turn from primitive to modern civilized humans, it is obvious that the primary object of costume, which is merely clothing that has style, is to increase the attractiveness of the individual or class of individuals and to enhance the curiosity and desire of the sexes for each other by exaggerating the difference between them and the mystery of it. Structurally as well as decoratively the difference between "pants and petticoats," "trousers and skirts," is fundamental—so thoroughly fundamental that when women "wear the trousers" we are said to have "petticoat government."

Climatically, clothing may be divided into two classes (with apologies to Dr. Stratz)—one tropical, based on skirts; the other arctic, based on trousers—both developed from the girdle or waist cloth. In the arctic regions both men and women wear trousers; in the tropics both wear skirts; while in between, the men adhere to the arctic costume, the women to the tropical one, apparently because most of the women lead an inactive and house-sheltered life, while the men are active out-of-doors. It is noteworthy that when women work as laborers they are apt to don trousers, e.g., in the Belgian mines or the Swiss fields. The ancient Greeks and Romans were much impressed by the fact that the barbarians to the north wore trousers. Cicero speaks of the Transalpine tribes as the "panted people" (*nationes bracatæ*), while Pliny's term for what was afterward called *Gallia Narbonensis*, is *Gallia bracata* (Breeches Gaul). However, it will not do to push the geographical division too far, for trousers were the national costume not only of the peoples to the north of the Greeks and Romans—Gauls, Belgians, Franks, Britons, Germans, Scythians—but also of those to the east—Medes, Persians, and Parthians, as well as Armenians and Phrygians.

To judge from the artistic remains of ancient Egypt and Assyria, the use of rich stuffs was the primary thought of those Egyptians who sought to be splendid in appearance. Beauty of material and of pattern at least held an even place in their minds with jewelry. Thus, from the earliest era known to us by the painted monuments down to a period later than the Macedonian conquest, the little-changing adornment of the Egyptian official or court lady was something very magnificent indeed, in the way of broad necklaces made up apparently of ring within ring of carved gems, mounted in gold with exquisite handling and taste, and covering the shoulders and the junction of the throat with the breast, as completely as the steel gorget of the sixteenth century. The full significance of these collars is not entirely certain. It may be that in some cases the jewelry was sewn upon a collar-shaped piece of stuff, which has fallen away from those jewels which are found in the ancient tombs. Armlets worn on the upper arm and also on the wrist, like the modern bracelet, are as common as the necklaces, and there are evidences of a jewelled girdle as rich and as broad as the combination of necklaces, although this, being worn, as the necklaces are, directly upon the skin, is only in part seen, being often covered by the folds of the skirt, which is sometimes secured to the belt and falls below it. The stuffs themselves are found of still greater splendor in the representations of upholstered furniture; but this appears to be in part because a larger surface could be presented there than in the garment worn by man or woman. The patterns are so similar to the earlier painted designs of the tomb interiors that there becomes evident a close connection in the mind of the Egyptian designer between one surface and another, the beautifying of which was to be intrusted to color. There are, however, stuffs of the eighteenth dynasty, and perhaps earlier, usually of linen, which have been found in a more or less fragmentary condition in the tombs, and many of these are of the most exquisite beauty, equaling in the perfect intelligence of the design adapted to textile fabrics the finest work of the Byzantines or Persians 2000 years later. In the warm climate of Egypt the clothes even of persons of rank were very slight and rather for ceremonial purposes than for utility. In the Assyrian monuments, on the other hand, there is a marked tendency towards covering the whole person with what seem to be heavy draperies, whereas in the Egyptian bas-reliefs the lines of the body are often made visible through the opening which represents the outer garments, suggesting either a partly transparent material or at least a material so little adjusted to the person and so slight that the body itself was never forgotten. The monuments of the Assyrian tombs, on the contrary, show wrappings apparently opaque and stiff. It is evident, however, that embroidery was much used; for parts of the garments, as of a king, are sculptured in low relief upon relief, and in a way which resembles closely the representation of the embroideries upon priestly robes in the sculpture of the Italian Renaissance. As for jewelry, it was as rich and splendid in Assyria as in Egypt, though the forms differ.

Among the peoples of western Asia even partial nudity was considered dishonorable, or at least the badge of inferiority. Accordingly, the heavy garments shown in the works of art of Mesopotamia are easy of explanation, for where only slaves are wholly or partially naked, the tendency is strong towards the association of high rank with complete clothing. But then another tendency appears, that of making the garments of plainer stuff when the body is covered by them from shoulders to ankles, and using the richer stuffs, as above explained, for borders and the like. The Egyptian, with body, arms, and feet bare, might make his kilt of the most splendid piece of weaving obtainable, but the Assyrian, using yards of material for his garment, would naturally employ a simpler stuff: not to avoid expense, but because people of such refined taste as those of Mesopotamia would shun the use of large surfaces, of uniform

patterns, or the contrast, side by side, of differing patterns, of about equal size and brilliancy.

This tendency is not maintained, however, in that other ancient civilization in a sense equal in antiquity as in importance to the civilization of western Asia. The Chinese, from the oldest times of which we have any knowledge, have been among the greatest artists in textile fabrics, as in other industrial arts, and history does not tell us of the time when the population, whether of true Chinese origin or of conquering Tatar dynasties and their followers, have not been more and more clothed in proportion to their rank and station. Porters may go barelegged and barearmed, and, in warm weather, with the body naked above the belt, but as one ascends in the orders of rank, the clothing becomes more and more complete. This tendency is not, however, accompanied by any objection to brilliant and rich stuffs. The more abundant the means of the wearer, the richer his costume—that seems to have been the rule from all time; and this is partly explained by the beauty of the floral and foliated designs. Embroidery, too, is used to heighten and complete the splendid weaves, and at least from the tenth century of our era until the present day, the most magnificent stuffs in texture and in color are those used by the ladies and gentlemen of the court. On the other hand, personal jewelry, that which is worn apart from the garments, is not very rich nor very costly, though it may be effective. Strings of pearls are known, and many stones that we in the West ignorantly despise because they are inexpensive, are made much of by the Chinese, who will use a rough turquoise, a piece of veined or spotted agate, or even a beautiful piece of glass accidentally rich in its veining and cut deliberately from the vessel to which it belonged—setting them in bronze or silver gilt, and making a very decorative clasp, or buckle, or pommel of a sword hilt. Chinese costume should be most carefully studied, because it has been maintained in its traditional character even to our own time. The blue cotton blouse of the workingman, and the garment of delicate blue and gold silk, woven in very elaborate patterns expressly for this garment, with gold or gilt buttons spherical in shape and working in loops, are mainly the same garments as those of a century ago.

The people of India are even more divided among themselves in details of costume than are the people of Europe. The general character of the different races, north and south, leads towards a great distinction between classes of the population. The simple piece of stuff, 4 feet wide by thrice as long, worn by the women, is most gracefully draped about the shoulders and breast; in very recent times it is often a piece made in Europe of three large handkerchiefs, with their several borders complete. This is worn over a petticoat; arms and legs are bare, and the feet, except for occasional use of sandals; but the dark skin is barred and spotted with many and large jewels. Necklaces, broad armlets and wristlets, rings for toes and fingers, earrings, and nose rings, are all made of silver wire for the poorer women, who often put their whole savings into these adornments. The necessity of providing for a very warm summer climate, and in the south for a wholly tropical year, has caused the making of muslins of a fineness and perfection of weave never approached in Europe, though these native manufactures have been destroyed by the competition of British cottons. A few of the native princes alone encourage the making of these exquisite weaves. Besides these there are figured cottons of such perfect make and so beautiful in design that they are worn even by princes, as if of equal importance with silk. The gold-flowered and silver-flowered textiles of silk and cotton, or even of fine cotton alone, are famous in Europe, under the name "kinkab" or "kincob." The costume of India in general is mainly an affair of beautiful stuffs, very little shaped to the body and usually worn loosely, and of jewels in great abundance.

Among the people of the tropical islands, the Malays, and the black and brown inhabitants of Polynesia, the art of weaving has never reached sufficient perfection to allow the stuffs to be sought for their own sake. Very beautiful patterns are printed upon cotton by the women of the larger islands, wood blocks being used for the purpose in a way almost exactly like that employed in the printing of cretonnes and wall papers among the Western nations; but these stuffs, however attractive to our eyes, however superior in design, are yet inexpensive—they could be produced by any one who has a little skill in the use of the hands, and are therefore not a part of ceremonial or decorative costume. A few very beautiful weaves exist, as in the Solomon Islands, and especially in New Zealand, but still they are not of rare material, nor is the elaboration of the design very great. The skill in the working of metals, which is great among the Indians of the continent, is much smaller among the islanders, and so it happens that personal jewelry also is but little sought for by the chiefs. The result of all this is seen in the simple and tasteful use of natural productions, brilliant flowers, and richly colored fruits and seeds, which, strung as necklaces or worn as pendants, have especial significance and are attached each in its way to the traditional ceremonies of these curiously civilized peoples.

If now we turn to the race which of all peoples has had the most influence over modern intellectual life, we shall find that the Greeks of antiquity limited their desires in the way of textile fabrics to very simple patterns, as of stars or round spots diapered over the surface of a stuff, with somewhat more elaborate patterns of zigzags and frets in the borders. Their costume, including their jewelry, was, in fact, marked throughout by extreme simplicity, which increases as our studies bring us to a later time. The statues discovered on the Acropolis at Athens since 1883 are certainly of the century before the Persian invasion of 480 B.C. They show a number of garments, certainly as many as three, worn one over the other by the priestesses represented in the statue; and each of these garments is made of a different stuff, all the stuffs, or all but the craped undershirt (the *chiton* of later dress), covered with elaborate patterns in several colors. There is nowhere a more interesting study of brilliant coloring in costume than were these statues when first discovered, and fortunately the finest of them have been reproduced in water-color painting, and these water colors often multiplied in chromolithography, and published by the archæological societies. It is clear that, immediately after the Persian War, during the period of the Athenian hegemony in Greece, beginning with 477 B.C., the use of these striped and spotted

stuffs becomes much less common, at least in the mainland of Greece, and the use of plain materials, white, bordered with stripes, or of one rather subdued color perhaps striped at the edge, becomes the rule. Those admirable bronze statues which were discovered in the famous villa at Herculaneum and now stand in the Museum of Naples (the Room of the Greater Bronzes) show perfectly well—better than any bas-reliefs, however elaborately detailed—the true Greek sense of what was beauty in costume. The long *chiton*, which, left ungirdled, would sweep the floor, is belted up so far as to allow a foot or more of its length to hang over the girdle outside of the skirt or lower part, forming a sort of pocket, known as the *kolpos*. Outside of this is seen hanging what looks like a cape, and which generally reaches just the line of the girdle or may fall a little below it. This, however, is not a cape nor a separate garment at all: it is the reverse or turning over of the chiton at the top. Of the chiton there were several forms. The earliest was not sewn at all, and therefore left the right side, thigh and leg, exposed on the slightest movement. A later form was a sewn-up cylinder, a long shirt in the modern sense. The stately maidens of the reliefs and the vase paintings often wear one of these two forms of chiton, and nothing else. To such a dress, even on occasions of great ceremony, there is nothing to be added, except perhaps a more splendid brooch on the shoulder, a broader and more brightly colored border to the chiton, perhaps an armlet, perhaps richer and more glittering earrings. Splendor in the more modern sense was hardly desired, and beauty was shown in the perfect taste with which these simple appliances were disposed. Other garments, however, are seen in the sculptures and vase paintings: the *himation* and a variety of it, the *chlamys*, were square or oblong pieces of woolen cloth, draped about the left shoulder and covering the body more or less as it might be adjusted; it was held sometimes by brooches. Statues show a garment arranged nearly as the Scotch plaid is, at times folded long and narrow, falling over one shoulder and passing around the waist; and this is thought to be a long and narrow himation. It is impossible to distinguish these garments from the *epiblemata*. The essential fact is that the Greeks, both women and men, wore a long shirt and a loose, square shawl over it, and nothing else on body or limbs.

The Etruscans were quite as simply clothed as the Greeks. The later Etruscan work passes by insensible gradations into that Italian work of the centuries during which the Roman Republic and the early Empire controlled the whole peninsula, and introduced insensibly its own strongly Hellenic tendencies into the arts of the subject countries. The effect of this on the art of northern Italy was altogether fortunate, except in so far as the lover of strongly accentuated national peculiarities found reason to regret their partial disappearance. The terra-cotta sarcophagi, with high reliefs and with what are almost statues wrought upon the covers; the bronze statues and groups, the jewelry of the fourth century B.C., and the following epoch, are almost Greek in their charm, while preserving a certain attractive local color. It is probably because of this constantly increasing influence of the Grecian artistic sense upon all the nations of Italy that the Roman dress from the earliest times known to us remains Greek in its simplicity, although very different in form. There were different ways of wearing the toga, some of which were connected with ceremonial occasions. Thus, when a statue or a bas-relief shows a Roman draped in a large and elaborately folded toga, one fold of which is brought over the head, he is assumed by modern students to be a person who is performing a sacrifice. The toga, as ordinarily worn, showed the *tunica* in front, from the throat nearly to the waist, but the long end could be thrown over the right shoulder so as to cover the tunica entirely, and in this way the toga would cover the whole person, from the neck to the ankles. Here, as among the Greeks, good taste dictated the utmost simplicity of effect, except in the mere arrangement and careful disposition of the folds. There was no other garment of the men while in the city which in any way concerned their appearance, as the only leg coverings known were bandages or wrappers, not unlike those worn to-day by the peasantry in some parts of Europe. On the other hand, the *toga prætexta*, which was worn by certain officials and even by some priests, had a "purple," i.e., a dark crimson border, and the *trabea* seems to have been a sort of cloak with still more elaborate stripes, including perhaps one made entirely of red cloth, which generals were allowed to wear on the day of their triumph. It is probable, however, that in this last usage the military cloak of red was worn during the triumphal procession, that being the one occasion when the soldiers of the Republic were allowed to appear within the walls with their arms and military trappings. The women were dressed as simply as the men, wearing over the tunica merely a garment called the *stola*, which replaces for them the toga of the men, and when the woman of rank went abroad, usually in a litter, a shawl-like garment called the *palla* might also be added. That which makes the peculiar stateliness of the dress seen in female statues of the early Empire is the contrast of the folds of the long tunica, reaching the floor, nearly covering the feet, and forming a strongly marked base, as it were, for the whole figure, while the more loosely folded stola above it seems to reinforce the lines of the undergarment. A veil of more or less thin and floating material covered the head and could be brought around to the front to hide the face at pleasure. It must be constantly kept in mind that the idea of beauty in dress was simply uniform whiteness and many skillfully contrived folds; the whiteness was kept up by the use for woolen garments of the most elaborate system of cleansing applied by the *fullones*, or cleansers, and, for the folds of the drapery, highly trained experts—body servants who knew their business—were employed. It is evident that these peculiarities of dress had much influence upon the art of sculpture.

In all the above discussion of costume one thing is very noticeable—the absence of anything like tailoring, except, perhaps, among the Chinese. The clothes of the Greeks and the Romans, like those of the people of the Pacific islands, always approximated to the ideal of an uncut, unsewed, unaltered piece of textile fabric; square or oblong, as in the himation, chlamys, sagum, or paludamentum; semicircular or semioval in shape, or approximately so, as in the toga, or simply sewn down one side so as to make a tubular garment of one piece of stuff, as in the

COSTUME

1. GREEK.
2. ROMAN.
3. GERMANS (Third and Fourth Century).
4. FRANKS (Eighth and Ninth Century).
5. GERMANS (Thirteenth Century).
6. NOBLES (Fourteenth Century).
7. SPANIARDS (Sixteenth Century).
8. ENGLISH (Henry VIII., 1509–1546).

later chiton, and in the tunica. A curious reproduction of this characteristic of ancient costume exists among the wilder Arabs, the Bedouins of the desert, and the horsemen of the uplands. They wear a shirt, indeed, and this is of thicker stuff and covers the body more completely than what we know by that name, but apart from this their covering is almost wholly a matter of unaltered or scarcely altered pieces of woolen. Perhaps two breadths of the narrower stuff are sewn together to make the *haick*, or, as in the north of Africa, a square of striped woolen stuff is caught up in the middle of one side so as to form a sort of hood, as in the *burnous;* or, as in the *aba* or *abayeh*, the square of stuff may have its two outer edges folded over towards the middle, so that the two edges meet or nearly meet, and then two openings are made in the two outer folds where the stuff is actually creased, which serve as armholes, so that the square blanket resembles an overcoat. But in all this there is absolutely no fitting of the piece of stuff to the body. It is a heavy woolen blanket, which is adapted more or less to the shoulders so as not to slip off, but is not otherwise altered in any way, and might cover a man or a woman, and a person of any stature. What is curious about this costume is the enormously heavy woolen dress worn in the desert and under the semitropical sun. It is evident that nothing but a heavy material is expected to keep off the heat of the sun or the burning wind of the desert; and therefore a man who wears only the long shirt, and has the legs and feet, arms and neck, absolutely naked, will pile two or three of these heavy woolen things upon his shoulders and head. The result of this arrangement is that the only decoration sought for is in the beauty of two or three colors arranged in stripes of different widths, and broken more or less by the carrying of threads of different colors across the stripes, like the countercharging of heraldry. A much greater development of design by stripes alone is in the cotton *dhurries* of India. The aba may indeed be further adorned by very simple embroidery in woolen thread.

The first appearance of any tendency to fit the garments to the person among nations more western than the Chinese is probably in the leg coverings of the Persians and Syrians, as represented in Grecian and Greco-Roman art; and yet these garments are of extreme simplicity and there is no appearance of tailoring in any modern sense in connection with them. They are merely loose trousers, gathered at the ankles, or sleeved tunics; and their use seems to have come from the mountain regions of Asia Minor and the shores of the Caspian Sea. The barbarians of Europe, Gauls, Scandinavians, and Germans, made up suits of clothes in a not dissimilar way; but it does not seem that their example affected the Greco-Roman world very much.

The beginning of change is to be looked for in the Byzantine Imperial epoch. From a time as early as the seventh century A.D. there is a constant increase in the number of garments worn, and in the elaboration of their shape and their combination, while at the same time the costliness and splendor of the stuffs are in no way diminished, and the custom begins which was destined to have so much effect on the costume of later times in Europe, the sewing of jewels, mounted in slender rings, or *chatons*, of gold or silver gilt, to the material. Sometimes smaller fragments of glittering material of no value were used in this way, as in a later time pieces of mirror were used throughout the lands influenced by Persian decorative ideas. In the Byzantine Empire the dress of the officials shows a certain disposition to follow early Roman traditions, but only in the general shape of outer garments and to a certain extent in their names. The general aspect of a member of the Imperial family, or an officer of the court, as it is seen in the mosaics of Ravenna, or in the illuminated manuscripts of the time, is altogether different from that of higher antiquity. The robes reached to the feet; they were closely sewed up and not very loose or flowing, not greatly tending towards elaboration of folds or to what we commonly call "drapery"; and over them are worn dalmatics, maniples, and stoles, not merely by the clergy, but by the laity as well, and showing plainly where the peculiar clerical dress took its origin. See COSTUME, ECCLESIASTICAL.

The Eastern influence was still strong, and all costume which was at all splendid was a matter of long and ample robes, made of stuffs of almost incredible richness, and more or less richly decorated by embroidery. Western dress was at this early time very different from anything in common use in the Byzantine Empire, except in so far as that the poorer people, and those engaged in out-of-door work, would naturally dress in almost the same careless fashion East and West. For one thing, it was more nearly classical Roman in character. If the costume of the eleventh and twelfth centuries, in the lands which are now France and Germany and England, be studied in the sculptures of Romanesque and Gothic buildings, or in the rare illuminations of manuscripts of that time, it will be seen that a certain antique or early Roman character obtains in the garments worn by persons presented as kings and princes, which had already been lost in the Eastern Empire. The robed figures of the porch of Chartres, or the doorways of Le Mans, do not seem to record much that was splendid in the way of stuffs or of jewelry, loose or applied to the garment. Their robes are still simply falling in loose folds, girded at the waist and differing from the garments of antiquity mainly in this, that the arms are always covered by sleeves. Men and women alike wore a gown, that garment which in the French archæological vocabulary is called the *robe*. This garment, which is treated under DRESS, served for people of every rank and of both sexes, but its fashion changed very much, and in like manner the resulting appearance of the clothed figure in the sculptures changed greatly between the twelfth and the fourteenth centuries. In the fourteenth century it grew more and more into that stately but most inconvenient garment, well known to us from the paintings in manuscripts of the time of Richard II of England and his immediate successor, and Charles VI of France. This garment swept the floor. It was girded around the waist with the military belt, or some modification of it; it had sleeves, which also reached the floor, and were of fullness equal to that of the skirts, covering the hands also when the arms hung down. The collar covered the neck completely in a solid cylinder, and rose on the sides nearly to the ears. How this rich and grandiose dress could be used at all in summer, and how it could be girded and shortened in any way, in time of necessity, does not appear, nor is it

known whether the men wore complete leg coverings of some kind beneath this long and completely closed skirt. The dress of elegant women of the same epoch was less elaborately conceived; the same habit of long sleeves prevailed, but the upper part of the sleeve was pierced with a slit through which the forearm could be extended. The result of this was that the robe, as a garment for women, hardly changed during the next two centuries, whereas the use of it for men went out very soon, and while there are still representations of gentlemen of the first half of the fifteenth century dressed in robes reaching the ground, those robes are far more convenient than before; they are evidently capable of being tucked up, and the man is dressed beneath his skirt, which can either be removed or shortened up to nothing when the occasion of ceremony is passed. Finally, as early as the second decade of the fifteenth century, it disappears from the dress of men, and from that time on the short-skirted garment, called *rochet*, or corset, became the dress of business, while the name *cotte* was then and thereafter given to a very tight-fitting garment, laced or buttoned close to the body and having a skirt reaching only to mid thigh. This last-named garment existed under the name of *cotte d'armes* as long as the complete suit of armor was worn by gentlemen, and in this case it was embroidered with the armorial bearings of the wearer. The French terms were commonly used in England as well, as Chaucer lets us know; and in modern study we can hardly find English equivalents. Under all these garments were worn the long, close-fitting stockings, serving as the only covering from the waist to the toes, except as the skirt covered the upper part of the thigh. These changes involved the complete establishment of tailoring as the main thing in elegant costume. From the middle of the fifteenth century on, the dress of nobles and courtiers, and of men who affected elegance, was a matter of cutting out and shaping, fitting in gores and gussets, and, in fact, adapting garments closely to the body in the first place, and then covering them with elaborate adornment. This might be applied in the way of *passementerie*, or by modifying the whole surface of the stuff by what we now call quilting and the like. A piece of brocade used for a doublet or the body of a gown would be gathered up into puffs and projecting rounded surfaces, the lines of sewing between those projections being themselves decorated and even including the setting of a pearl or of a jewel of some other kind set in a gold *chaton* at the junction of these two lines of stitching. The stockings were the only part of the dress that was not elaborately decorated; and these stockings were half concealed in the sixteenth century by the enormous *hauts de chausses*, which, in 1530 and the following years, are sometimes in two or three rings of puffs like rounded ridges, passing horizontally around the thigh, and which, in the closing years of Elizabeth's reign and the corresponding times in France, the reigns of Henry III and Henry IV, are closer in their fit and resemble not distantly the knee breeches of the eighteenth century. They are, however, made of costly stuff, and elaborately adorned almost in the style of the body garment. Still again, in the time of James I of England, the *hauts de chausses* were stuffed (bombasted), or held with springs in a single rounded projection, as if the man had been thrust feet foremost through a rather flat, oblate spheroid. This projected so much all around the hips that the sword had to be hung in a horizontal position and great pains taken to prevent its being entirely dislodged by the monstrous garment.

At no time during the Middle Ages and the epoch of the Renaissance was the tailoring and mantuamaking more rich and fantastic than during the French religious wars and the succeeding reign of Henry IV. Painted portraits, prints from famous engravings, carved ivories, medallions, and painted enamels of the time, exist in some quantity; and they agree in telling the most extraordinary tale of splendid extravagance in the dress of both sexes. Embroidery was loaded upon bodice and doublet, or was dispensed with only when a very rich brocade was employed; and lace, or its earlier forms of cut work and drawn work, and needle embroidery in pierced patterns like filigree, were used with freedom. The circular ruff, projecting like a dish on which the head seems to lie, appears, but is not yet so popular as the broad and flat laced collar, sometimes lying on the shoulders, sometimes standing stiffly out horizontally, or for women in steep, upward slope behind the head and neck. The fashion of bombasted thigh coverings for the men is identified in artistic history with the reign of Henry IV of France, but it did not last very long, being replaced by the loose, short trousers of about 1625 and after. No costume in the modern sense is perhaps more graceful and spirited at once than the dress of the gentlemen of the time of Louis XIII, which, with its short trousers, the stocking below covering the calf of the leg, which was concealed by the boots commonly worn out of doors, the doublet, reaching a little below the waist, and worn loose, generally unbuttoned in front and showing the shirt in its full folds, the short cloak, worn on the left shoulder, except when it was gathered around the body, the flat hat, with very broad brim, and soft falling feather, and the broad, loose collar, is a complete and graceful translation into form of those ideas which the modern world has conceived—ideas absolutely contrary to those of antiquity. Simplicity and grace have given place to picturesque combination of small details; and here is the new theory, perfectly put into practice. The reign of Louis XIV had but little influence on this dress of men, except to stiffen it and make it rigid and hard, but the dress of women improved, on the whole, in tastefulness throughout the seventeenth century, and as late as 1670 was introduced that admirable costume which we identify with Madame de Sévigné—a skirt not very full, over which was worn a short upper skirt, open in front; a bodice fitting snugly, but not involving very tight lacing; a stomacher, but not excessive in its length; sleeves reaching the elbow, and accompanied by lace ruffles, which partly shroud the lower arm; the bodice cut low, but not to excess, and a cape worn over the neck and shoulders on occasion of going out-of-doors. The same thing, in simpler stuffs and in graver colors, was worn by the wives of the wealthier *bourgeois*, and this is the dress which we identify with the women of Holland and the English Puritans. It is preserved for us in a great number of paintings, and in the prints from Hollar's engravings; and it has impressed itself upon modern designers as the most complete type of womanly costume which we know;

COSTUME

1. ENGLISH WOMEN (1590).
2. ENGLISH NOBLEMEN (1625-40).
3. FRENCH (1660-1700, Louis XIV.).
4. FRENCH (1700-40).
5. FRENCH (1780).
6. FRENCH (1808—Empire).
7. EARLY NINETEENTH CENTURY.

but that is because the richer dress of the time is impossible to realize nowadays—it seems nonhuman, as if of fairyland. The eighteenth-century dress in England, which was at times popular and acceptable in decorative design, is a modification of it, not for the better. The fop of 1750 is less beautifully dressed than the *muguet* of 1650, and the ladies of 1775, with their enormous hoops, far less charming in appearance than Madame de Sévigné 100 years earlier.

The French Revolution in 1789 brought in a number of strange vagaries in dress — red and white striped waistcoats, stockings striped blue and white in horizontal rings, white cravats wound round and round the neck until they reached the point of the chin, while at the same time the women wore the lightest and thinnest costume possible, in fancied imitation of the Romans. Cocked hats of exaggerated shape for the men alternated with steeple-crowned hats with curly brims; while the female costume was finished by the most elaborate pile of curls and crimps, crowned by an enormous cap, either simply of muslin and lace, or with these combined with a sort of hat half concealed with feathers, flowers, and ruffles of lace. The momentary prohibition of elegances of this sort under the Revolution led to a change in the dress of both sexes, which was not to be temporary, except in details. Thus the dress which we call that of the "Empire," the famous "pink nightgown," girded immediately below the breasts and hanging thence to the ankles, but so close that a woman could hardly walk and was utterly unable to step across a gutter, was worn with low shoes and with an unprotected neck, while the cold of winter was met by a *pelisse*, generally worn open in front and affording merely shelter for the shoulders and back, however richly it might be furred. The men fell immediately into the simple and not impressive dress of a time when the civilian was of little account, and any man who was elegant in his aspirations found some excuse to wear a military or official uniform. The civilian dress was then merely a waistcoat, over which was worn a long-skirted coat, and the *pantalon*, or tight-fitting breeches reaching to the ankle instead of the knee. The large and loose white cravat still continued. From these dresses all our modern fashions have followed. See FASHION.

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There is also a wealth of material available in the form of prints, paintings, and photographs, as well as in books about engravings and paintings.

COSTUME, ACADEMIC. See DEGREE.

COSTUME, ECCLESIASTICAL. The dress worn by ministers of religion acting in their official capacity, in distinction from the dress of ordinary life in different lands and periods. While practically all such officials do wear such distinctive dress, even though in certain cases it is very simple, it is necessary, in view of many and often bitter controversies on the subject of the relation between such costume and religious doctrine, to emphasize the fact that costume belongs to the discipline, not the doctrine, of religious, more especially Christian, bodies. The competence of any such body acting in its corporate and legislative capacity to prescribe a uniform dress for purposes of edification, indication of functions, or liturgical propriety, is undoubted, and is analogous to the requirement of distinctive uniform, e.g., in the army or the law courts. An association of such dress with

official powers or as essentially doctrinal in itself is erroneous, though often popularly assumed. The Christian era has witnessed the development of ecclesiastical costume in so marked a way as to make the subject one of importance more than archæological.

History of Development. Under the Jewish dispensation the costumes of the officiating priests and Levites, like everything else pertaining to the divine worship, was minutely prescribed and rigidly observed. The purpose seems to have been, as with other parts of the Jewish system, to distinguish the Jews as a people from all other nations, and their religion from all other religions as one of special revelation and positive injunctions rather than natural religion accompanied by a system of human origin. The attempt to trace the vestments used in the Christian Church to the Jewish vestments has been made at different times. The theory breaks down historically and when applied carefully in detail. Certain features which are found in common are accidental, not fundamental. Underlying the prescribed Jewish system of vestments, however, is the principle that the divine sanction is given to the use of such costume for such purposes as are mentioned above. This principle, rather than any special application of it, is characteristic of both the Jewish and Christian development of costume.

In all probability the Christian clergy at first used no distinctive dress, and so long as the garb of daily life continued unaltered in the higher ranks of society, a celebrating or officiating bishop, priest, or deacon differed only possibly in a few slight variations from a well-dressed layman. This very absence of distinctive costume, however, was really an indication that the Christian clergy differed from the Jewish orders and from the non-Christian *sacerdos* or other minister. From this early stage two principles entered into the development of a more or less characteristic dress for the clergy—the principle of fixity as opposed to changing fashions in lay costume, and the principle of putting on the best apparel when employed in the service and worship of God. The former resulted in the style and articles of vestments becoming permanent and subject to authoritative prescription; the latter introduced the element of refinement, beauty, and dignity in the dress of the clergy. The recognition of Christianity by the Roman Empire under Constantine gave an impetus to external splendor in all parts of Christian worship. Canonical legislation prescribed as a rule many things which had been heretofore hallowed by custom and religious association and also put a check upon the discretion or caprice of individuals. The growth of such regulation was slow and local rather than general from the third to the eighth century. In the revival of interest in the details of the Christian religion which characterized the age of Charlemagne in the eighth and ninth centuries is to be found explicitly the teaching that the vestments of the Christian clergy are a matter of great importance, and also in this period there is found the custom of giving a mystical interpretation to these vestments in relation to the services and functions where they were worn. The process in development was practically the same throughout the Church. The gradual tendency of the East and the West to diverge in matters political and social also worked out in the externals of religion, and the breaking off of intercommunion between the Eastern and Western parts of the Church, which reached a crisis in 1054, emphasized this tendency. Although the principles are the same throughout the Church, it is convenient to consider the specific developments of vestments under different heads.

Vestments in the Western Church. In the West the use of ecclesiastical vestments developed with considerable uniformity so far as the employment of certain articles of dress for certain liturgical offices was concerned, but with latitude so far as specific shape, material, and rigidity of use were concerned. There grew up a variety of uses, largely coterminous with national or diocesan subdivisions, e.g., Gallican, Italian, Sarum (Salisbury), Milanese. Not until the sixteenth century and the Reformation movement do we find divergences relating to the authoritative employment of certain vestments. Since the sixteenth century the Roman Catholic discipline on the subject of vestments has tended strongly towards absolute uniformity, while the Anglican discipline has tended more towards specifying what is legal and what is allowable. In general, the same vestments are legal in all parts of the Western church—Roman, Anglican, American, and Canadian. Hence they may be described as belonging to all and not confined to any one section. Specific variations will be mentioned. The laws governing the use of costume are set forth for the Roman communion in the *rubricæ generales* of the missal and are in form historical and descriptive, not imperative (e.g., *celebrans semper utitur*, etc.), while the Council of Trent merely mentions *vestes* as part of the Apostolic traditions of the Church. The Anglican communion sets forth the use of vestments in canons and in rubrics of the Book of Common Prayer and in statements of general adherence to the customs of the Western church.

Vestments, Sacrificial. The *chasuble* is the principal vestment regarded as strictly sacerdotal

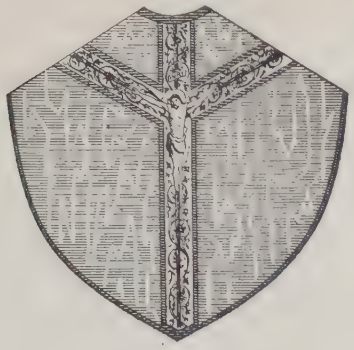
CHASUBLE, MODERN FORM.

or sacrificial. It was originally an ample round mantle falling over the arms, and was an outdoor garment gradually introduced inside the

COSTUME, ECCLESIASTICAL

1. JEWISH HIGH PRIEST.
2. WESTERN BISHOP, with mitre, cope, rochet, stole and crosier.
3. ROMAN CATHOLIC BISHOP, in rochet and mantelletta.
4. EASTERN BISHOP.
5. ANGLICAN BISHOP, in rochet and chimere.
6. Geneva gown and bands.
7. Dalmatic and alb.
8. Surplice, stole, cassock, and biretta.

Church. From its shape and fullness it was found an inconvenient garment to wear in ministrations at the altar, and it was gradually modified by cutting it away so as to leave the arms



CHASUBLE, OLDER FORM.

free until, from the older form, or the Gothic chasuble, it assumed after the seventeenth century in the West very commonly the extreme modern, or fiddle-back style, as seen in the accompanying illustrations. The older shape has been retained in the Spanish and Anglican uses and is to some extent being revived elsewhere. Traces of the use of the chasuble as a distinctively ecclesiastical vestment are found as early as the first half of the sixth century, and the Fourth Council of Toledo (633) expressly mentions it as such. Its use seems to have been confined at first to priests; and even at the present time, in Advent, Lent, and other penitential seasons, the chasuble is worn at solemn mass in the Roman communion by the deacon and subdeacon, but laid aside when they sing the Epistle and Gospel. Chasubles are sometimes worn in the Roman rite by canons and other dignitaries simply present at a pontifical mass. In most Western countries a large cross, either in the Latin or in the Y form, is embroidered on the back, while on the front is either a cross or a long, straight piece of embroidery. The *stole* is a narrow strip of the same material as the chasuble, with more or less elaborate embroidery. The usual decoration consists of a cross where it will be in the middle at the back of the neck and a cross on each end as it hangs down. It is considered a symbol of priestly jurisdiction, in which sense the Pope may wear it constantly, even when not officiating; and this is also the use of priests in the Roman and other communions when present at certain offices without officiating. It is worn, as a rule, in the ministration of all the sacraments. At the altar the priest wears it crossed over the breast and the deacon over the left shoulder; at other times, and also by a bishop, it is worn hanging straight down. The earliest traces of its use in the West as a sacerdotal vestment are found in Spain, where the Council of Braga (563) speaks of the *orarium* as worn by deacons, and the Fourth Council of Toledo mentions it as a vestment of bishops, priests, and deacons. The name "stole" (Gk. *στολή*, stolē) may indicate that a Western piece of apparel, adopted into Eastern use, came back to the West later and passed into ecclesiastical use. The earlier use of the term "stole" in Greek ecclesiastical writers is not consistent with the article later called by the same name. It seems to have been at first a linen handkerchief longer and narrower than our modern handkerchief. The *maniple* is like a short stole and is worn hanging from the left wrist by the celebrant, deacon, and subdeacon at the altar. Its origin seems to have been in the napkin with which the consul gave the signal for the start in a chariot race. The *alb* (Latin, *albus*, white) is a close-fitting garment with sleeves, of plain white linen, reaching to the feet, though the lower part may be made of lace. It sometimes has pieces of embroidery, called "apparels," sewn on it in four places. Originally it was probably nothing more than the ordinary tunic of Greek and Roman costume. It is confined around the waist by a linen girdle. The *amice* is a piece of fine linen, oblong in shape, which the priest rests for a moment on his head and then spreads on his shoulders, tying it by strings in front. It originally covered the head, and to this day, in the rites of certain monastic orders which have preserved some traditional peculiarities, the priest wears it in that position until he reaches the altar to begin the service. These vestments are put on in the following order: amice, alb, girdle, maniple, stole, chasuble. The special vestments of the deacon and subdeacon are the *dalmatic* and *tunicle*, respectively, which differ very slightly, both being close-fitting vestments of the same material as the chasuble, reaching to the knees and having sleeves.

The color of all vestments seems to have been white at the first. The introduction of colors was very gradual and not without opposition. To Innocent III (1198–1216) is traced the setting forth of the simple sequence of colors which has largely prevailed in the West. The customary modern use prescribes *white* for the feasts of our Lord, for feasts of the Blessed Virgin, and for other virgins who were not martyrs, and for confessors; *red* (the color of fire and of blood) for the Feast of Whitsunday and of all martyrs except the Holy Innocents; *violet*, the color of mourning and of penitence for the season of Advent, from Septuagesima to Easter, the Ember days, except in Whitsuntide, and the Rogation days; *green*, the color of hope, for ferial or ordinary days. White is also used at confirmations, ordinations, consecration of churches, baptisms, and weddings. *Black* is worn on Good Friday and in services for the dead. Vestments of cloth of gold or very rich and costly material are considered festal and allowed to be used in place of white, red, or green. This sequence was adopted generally on the Continent and in England in the important churches of Canterbury, York, London, and Exeter, while the diocese of Salisbury developed a use of its own confining the colors almost exclusively to white and red.

Vestments, Episcopal. The vestments officially worn by a bishop in the exercise of his functions are numerous. In part they indicate his position as including all the powers of the Christian ministry, in part they are peculiar to his episcopal office. The full vestments of a bishop when at the altar include (over a purple or black cassock) the amice, alb, girdle, stole, maniple, tunicle, dalmatic, chasuble, and mitre, while the pastoral staff is carried in the hand. At this and at other times the bishop wears a ring and pectoral cross. Sandals and gloves are included in the Roman use. The *gremial veil* is an embroidered cloth which is spread over his knees when he sits during the service. In other functions, such as confirmation, he wears cope

and mitre with a stole for the administration of the sacraments. In ministrations of certain functions of less solemn kind he may wear simply the rochet. The *mitre* is the ornament worn in solemn services by bishops and abbots of certain monasteries which carry with them a quasi-episcopal jurisdiction. The mitre may be described as a tall, tongue-shaped cap, terminating in a twofold point, which is supposed to symbolize the cloven tongues in the which form the Holy Ghost came upon the Apostles. The *pastoral staff*, or *crozier*, in the case of bishops resembles a shepherd's crook, and is given at their consecration as a symbol of the authority with which they are to rule their flocks. An archbishop's pastoral staff does not differ from a bishop's, but he sometimes has carried in front of him a staff surmounted by a cross or crucifix —that of a patriarch having two cross bars. The *pallium* is a circular band of white woolen stuff surrounding the neck, with a pendent strip before and behind. It is generally richly embroidered and marked with several crosses. There is much controversy among historical and archæological scholars as to the origin and significance of the pallium. The two main theories are that it represents a vestment used in the Imperial court and sent at first to certain ecclesiastics as a mark of Imperial favor, whence it passed into similar use by certain bishops of patriarchal rank to confer upon archbishops in the patriarchate; or that it is a symbol of jurisdiction and is worn by the Pope to indicate universal jurisdiction, and conferred by him upon archbishops who acknowledge his supremacy. It is worn by such only within their own territorial jurisdiction, at high mass on solemn days. The sandals were not originally confined to bishops; the earliest authors who mention them allude to a special shape worn by deacons and subdeacons. The *pectoral cross* is a small gold cross adorned with jewels which is worn by bishops and mitred abbots as a mark of their office. The *episcopal ring*, worn on the middle finger of the right hand and generally set with a large amethyst, is supposed to symbolize that the bishop is wedded to his diocese. Among less formal vestments the *rochet* alluded to above is a close-fitting vestment of linen, somewhat like a shorter alb or surplice with tight sleeves. It is confined to bishops and abbots, also sometimes worn as a special privilege in the Roman use by canons. The *mozetta* is a short cape covering the shoulders, a part of the state dress of the bishop when not officiating, and is worn with the rochet. The *mantelletta* is a sleeveless garment of silk or woolen stuff reaching to the knees, worn according to Roman use by cardinals, bishops, and other prelates. It is used to cover the rochet, so that bishops wear it when out of their own dioceses, the uncovered rochet being a symbol of jurisdiction. A bishop when wearing a pectoral cross does not cross the stole when preparing to celebrate.

Vestments, general. The most important vestment to be mentioned under this head is the *cope*, a wide cloak of silk or other costly material reaching nearly to the feet and fastened in front by a clasp called the *morse*, and having a semicircular hood at the back. While it is worn by the officiating priest in benediction and other solemn rites, it is not distinctly a sacerdotal vestment, and is worn by cantors at solemn vespers and by other laymen. The *humeral veil* is an oblong scarf of the same material as the chasuble, worn by the subdeacon at high mass when he holds the paten from the offertory to the Paternoster, and by the priest when giving benediction or carrying the blessed sacrament in procession. It is worn over the shoulders, the paten, pyx, or monstrance being wrapped in it. The Levites (Num. iv.) were allowed to bear the sacred vessels only when wrapped in coverings; and although those in holy orders (and they alone) are allowed to touch the eucharistic vessels with the bare hands, the use of the veil is probably an expression of the feeling of reverence inculcated by the Jewish rule. The *surplice* (called also *cotta* at first in Italy, now generally) is a garment of linen worn by all clerics and assistants in choir and by priests in the administration of the sacraments. As late as the twelfth century it was supposed to reach to the ankles, but in modern times it has been very much curtailed, and since the seventeenth century commonly ornamented with lace. Under all the other vestments is worn the cassock, a close-fitting garment reaching to the feet, which is the distinctive dress of clerics, in church and out. The color varies, being black for a simple priest, purple for a bishop, and red for a cardinal; the Pope alone wears a white cassock. The *berretta* (or *biretta*), which is also a part of the priest's street or house dress, must be mentioned under official costume, as the rubrics prescribe it for the sacred ministers going to the altar and for ecclesiastics in choir. It is a square cap with three ridges extending outward from the centre of the top—four in the case of doctors of divinity. "At Rome," says Benedict XIV, "and in most churches the berretta was unknown as late as the ninth century. Its ecclesiastical use began when priests gave up the ancient custom of covering their heads with the amice till the actual beginning of the mass." The *zucchetto* is a small, round skullcap, of color suited to the wearer's rank, which, if worn in church, is removed only at the most solemn parts of the services.

Eastern Vestments. The influence which between the eighth and twelfth centuries in the West bore so strongly upon the development of ecclesiastical costume, that of the numerous liturgical writers, was almost wholly lacking in the East, where between the Patriarch Germanus of Constantinople in the eighth century and Simeon, Archbishop of Thessalonica, in the fifteenth, scarcely one of importance is to be named. The natural conservatism of the Oriental mind has also militated against change in the ecclesiastical usages. The Western maniple, amice, and cope are unknown in the Greek and Russian churches; in place of the first named, somewhat similar bands (*epimanikia*) are worn around both arms by bishops, priests, and deacons, those of the bishop being richly ornamented. The lector and readers wear an ample white or reddish vestment, called *phelonion*, but differing from the priestly chasuble in reaching only to the waist. The subdeacon wears the *sticharion*, a sort of dalmatic, narrower and shorter than that of the deacon, who wears in addition the *orarion*, or stole, hanging before and behind over the left shoulder. The sticharion has undoubtedly developed from the alb, but more closely resembles the dalmatic both in shape and material. The priest wears the sticharion, the *epitrachelion* (a long narrow stole something like an archiepiscopal pallium in the West), the *zone*, or girdle, and the phelonion, or

chasuble, which in Russia is much abbreviated in front, but hangs down to the ankles behind. The episcopal vestments are in the main similar to those of the priests, but more richly decorated; the bishop's phelonion is adorned with many small crosses. Instead of this vestment the Greek metropolitans, and in Russia all bishops since the time of Peter the Great, wear the *sakkos*, a tight-fitting garment supposed to symbolize the seamless robe of Christ. The episcopal gloves, sandals, and ring are not in use. The head covering resembles a crown more than the Western mitre.

Anglican Usage. The Anglican communion, as a part of the Western church, has the same history in regard to vestments, subject to the same constitutional right to regulate vestments as a part of discipline. In the Reformation movement of the sixteenth century in England, which differs in essential features from the contemporaneous movement in Germany and France, an element of confusion was introduced by the influence of Lutheran and Calvinistic reformers. The continental reformers had assumed that vestments might be identified with doctrine and hence had reacted from Western custom. The disciplinarian Puritanism in the reign of Elizabeth concentrated itself against externals in liturgy and worship. Two parties accordingly sprang up—one holding to the general use of the Western church, the other desiring to abandon absolutely that use. The tendency of Queen Elizabeth in aiding the action of the Church was in favor of the Western system. The vagueness and indefinite character of legislation in the reign of Edward VI and the resulting doubt led to the setting forth of the so-called "Ornaments Rubric," which authorizes the "ornaments of the Church and of the ministers thereof as used by the authority of Parliament in the second year of King Edward VI." The contest, however, for the principle of distinctive dress for the clergy was at first, in the latter part of the sixteenth and the seventeenth centuries, fought out on the minimum of the surplice, and again, in the middle of the nineteenth century, in the Surplice Riots, principally in London. The principle of vestments being thus established, the character of such vestments was not pressed. The limited use of most of the Western vestments, and the more rapid restoration of the elaborate eucharistic and other vestments in connection with the Oxford movement of the nineteenth century, have illustrated the position in general of the Anglican communion as a national church and belonging to the Western Catholic church as distinguished from such sections as pay obedience to the Bishop of Rome. A simpler use, however, sprang up during these troubled centuries which has remained to a large extent. This use provides, for the general dress of the clergy, the surplice. With it are worn at certain offices the stole, while dignitaries—e.g., chaplains to bishops, canons in cathedrals, and members of university colleges of clergy—wear for choir offices the broad black scarf, and over it the hood indicating the academic degree of the wearer. The cope has in English cathedrals become an altar vestment, and is also worn by bishops at great state functions, such as the coronation of the sovereign. The more usual dress for a bishop of the Anglican communion in ordinary ministrations consists of a rochet with black or scarlet chimere, a development of the street dress or convocation robes of earlier times in England, analogous to the original development of ordinary costume into ecclesiastical use. At present both the Western and local Anglican uses are followed, as one finds in other countries to some extent, e.g., in Spain, where the Spanish use prevails, but the Italian use is also found.

Protestant Usage. The universal tendency of the Reformers was naturally to dissociate themselves from the older Church by abandoning to a greater or less extent the ceremonies and vestments used by it. The Lutherans, however, showed a more conservative spirit than the others. Luther himself considered the matter one of indifference; and his followers for a long time retained most of the old vestments, even the chasuble being worn in Sweden and Denmark, where the Lutheran bishops also wear copes and pectoral crosses. But the Calvinists and other more extreme Reformers on the Continent abolished the older vestments completely and adopted the black Geneva gown, or *robe de Calvin*. This, which is nothing more than the ordinary dress of a scholar in the sixteenth century, with the white bands at the neck, has become a distinctive costume of Protestant ministers for officiating. In recent years there has been a notable tendency, especially among the Scottish Presbyterians, towards the restoration or adaptation of ancient customs, and surpliced choirs have been introduced among other "ritualistic" usages. The semimilitary costume of the Salvation Army officers may be referred to as in some degree illustrating the same tendency.

Monastic Costume. The principle of uniformity of dress to mark those who lived a common life was adopted even among the early monks of the Egyptian deserts. The character of the Eastern religious costumes was usually, as far as can be determined from the vague descriptions of early writers, such as to express a spirit of penitence and differentiate their wearers from the gayly dressed worldlings. The early Western founders, St. Benedict and even St. Francis, prescribed the general char-

FATHER ADAM SCHALL, S. J., IN MANDARIN COSTUME.

acter, but not the exact shape and color, of the garments to be worn by their followers. Custom gradually, in a community life, crystallized into rule. But since the thirteenth century the

founders of orders have usually laid down the exact details of the habit to be worn, as a sort of regimental uniform. The notable exceptions are St. Ignatius, St. Philip Neri, and St. Vincent de Paul, whose followers have never worn anything but the ordinary dress of secular priests. The wearing of the habit at all times is most strictly enjoined upon members of religious orders, except when it is sometimes dispensed with in non-Catholic countries; the early Jesuits in China, in pursuance of their policy of adapting themselves to the customs of the country, wore the native costume. (See illustration of Father Adam Schall in the dress of a mandarin.) Normally, however, the habit is always worn, taking the place for preaching (and in some places for administering the sacrament of penance) of the surplice and stole. For specific details of the costume of the various orders, see the articles under their titles.

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COS'WAY, Richard (1742–1821). The most celebrated English miniature painter. He was born at Okeford near Bampton (Devonshire) and studied under Thomas Hudson, at several London drawing schools, and at the Royal Academy. He was the greatest miniature painter of his age and raised this art, which had fallen into disrepute, into universal favor. In 1785 he was appointed principal painter to the Prince of Wales and numbered the members of the fashionable world of London and Paris among his sitters. He amassed a large fortune and acquired a valuable collection of pictures and curios, but with his success he developed many eccentricities, which caused him to be often caricatured. He was the first to bring out the beauties of the ivory background in miniature painting; his color is brilliant, his brushwork of extraordinary delicacy and skill, and he expressed with consummate skill the rather artificial grace and charm which characterized the age. He made use occasionally of parchment and enamel as backgrounds. The largest collections of his miniatures are in Windsor Castle and in the J. Pierpont Morgan collection. Among the most celebrated are Lady Beechy (sold in Paris, 1912, for 18,000 francs); Mrs. Fitzherbert (Wallace collection, London); "The Prince of Wales as St. George" (Grimthorpe Castle); the artist's wife and daughter Angelica; Madame du Barry (Morgan collection); Lady Diana Sinclair; and the heads of the so-called "Ancaster Box," owned by the Earl of Ancaster. His oil portraits and religious pictures are greatly inferior to his miniatures. In 1781 Cosway married Maria Hadfield, a well-known painter and etcher. Consult his biography by G. C. Williamson (London, 1905).

COT, kôt, Pierre Auguste (1837–83). A French painter. He was born at Bedarieux (Harault) and studied under Cogniet, Cabanel, and Bouguereau. He painted at first historical subjects in the academic style of his masters, later also portraits, and acquired great reputation, especially by his female heads. Among his most noteworthy works are: "Spring Time" (Brooklyn Museum); "Day of the Dead at the Campo Santo of Pisa"; "Dionisia"; "The Storm" (Metropolitan Museum, New York); "Prometheus"; "Mireille" (Museum, Montpellier).

COTA DE MAGUAQUE, kō'tȧ dā mȧ-gwā'kā, Rodrigo (died c.1498). A Spanish poet of the fifteenth century, born at Toledo. His reputation rests upon the dainty, witty *Diálogo entre el Amor y un caballero viejo,* which appeared first in the *Cancionero general* in 1511. The authorship of this poem has been much disputed, but it seems quite safe to attribute it to Cota. He was less certainly the author of *Las Coplas de Mingo Revulgo* (c.1472), and the attribution to him of the first act of the comedy *Celestina* (first known edition, Burgos, 1499, but certainly not the first edition) has been made on wholly unacceptable grounds. He also produced some satiric poems. Consult Foulché-Delbosc's ed. of the "Epithalame burlesque," in *Revue Hispanique,* vol. i, pp. 69–72 (Paris, 1894), and remarks by Bonilla y San Martín in his *Anales de la literatura española,* pp. 164–167 (Madrid, 1904).

COTAN'GENT. See Trigonometry.

COTÉ, kôtā', Aurele Suzor (1870–). A Canadian painter. He was born at Arthabaska, P. Q., and was educated at the Commercial Academy there. After some experience as a church decorator, he went to Paris in 1891 and studied under Bonnat and Lefebvre. He exhibited at the Salon in 1894, where his pictures "Pastourelle" and "Retour des Champs" were much admired, the former being admitted to the reward list. In 1898 his picture "The Death of Archimedes" won the grand prize. He was appointed an officer of the Academy by the French government in 1901, and in 1908 he was commissioned by the Dominion government to execute panel decorations and illustrations for the Parliament buildings, Ottawa. Among his best-known works are a portrait of Sir Wilfrid Laurier, for the Dominion Parliament buildings; "The Landing of Champlain at Quebec"; and "The Discovery of Canada by Jacques Cartier."

CÔTE-D'OR, kōt'dôr' (Fr., golden hill). A department in the east of France (q.v.), formerly part of the Province of Burgundy (Map: France, N., K 5). Area, 3393 square miles; pop., 1896, 368,168; 1901, 361,626; 1911, 350,044. The surface is in general elevated and is traversed by the Côte-d'Or ('golden hill'), which gives its name to the department and is so called on account of the excellence of the wines produced on its slopes. A great part of the department is covered with forests; there are mines of iron, coal, marble, and gypsum; stone is quarried; the valleys and plains are fertile, producing wheat, oats, barley, potatoes, and tobacco, and there is good pasture land, but the

peasants are not skilled in agriculture. Manufactures include iron, steel, machinery, bricks, leather goods, oil, and beer. Côte-d'Or is watered by the Seine, which rises in the northwest, and by several of its affluents; by the Saône; by the Arroux, a tributary of the Loire; and the Armançon. Capital, Dijon.

COTELIER, kôt'lyâ', or **COT'ELE'RIUS,** JEAN BAPTISTE (1627–86). A French Hellenist. He was born in Nîmes, studied theology and philosophy in Paris, and in 1654 became counselor of the Archbishop of Embrun. He was appointed assistant librarian in the Royal Library in 1667, and in 1676 he became professor of Greek at the Collège de France. His principal publication, and one which made him widely famous, was his edition of the *Sanctorum Patrum qui Temporibus Apostolicis Floruerunt Opera Græce et Latine* (Paris, 1672).

COTENTIN, ANNE HILARION DE. See TOURVILLE, COUNT DE.

COTES, kōts, ROGER (1682–1716). An English mathematician and physicist. He was born at Burbage, in Leicestershire; was graduated at Trinity College, Cambridge; became a fellow in 1705; and in 1706, on the recommendation of Newton, Whiston, and Bentley, was made Plumian professor of astronomy. Cotes was editor of the second edition of Newton's *Principia* (1713). Various mathematical papers of his own, bearing on logarithms, trigonometry, and geometry, were published posthumously under the title *Harmonia Mensurarum* (Cambridge, 1722). The only independent publication of his own, during his lifetime, was his essay entitled *Logometria.* This treated of methods of constructing the Briggs logarithms (q.v.) and applied the theory laid down to the quadrature of the hyperbola and other problems. Several theorems are known by his name, e.g., to determine the harmonic mean between the segments of a secant to a curve of the *n*th order reckoned from a fixed point (see CURVE; CIRCLE); and also the well-known theorem of trigonometry: If A is any point on the radius OB of circle O, and if the circumference is divided into n equal parts BP_1, P_1P_2, P_2P_3 ... and into $2n$ equal parts BQ_1, Q_1P_1, P_1Q_2 ..., the product $AP_1 \cdot AP_2 \cdot AP_3 \cdot \ldots$ (n factors) $= \pm (OA^n - OB^n)$, and $AQ_1 \cdot AQ_2 \cdot AQ_3 \cdot \ldots$ (n factors) $= OA^n + OB^n$.

Cotes was held in the highest esteem by the scholars and scientific men of his time. Newton remarked of him: "If Cotes had lived, we might have known something."

COTES, SARA JEANNETTE DUNCAN (1861–1922). An English novelist. She was born at Brantford, Ontario, Canada, and was educated at the Collegiate School there. She found her way to the novel through letters and sketches contributed to newspapers and periodicals and made a brilliant success in *A Social Departure,* the observations of a tour round the world in 1889–90 with Mrs. Lilian Rood. In 1891 Miss Duncan married Everard C. Cotes, a press correspondent of Simla, India. Among her novels are: *An American Girl in London* (1891); *A Daughter of To-Day* (1894); *Vernon's Aunt* (1894); *The Simple Adventures of a Memsahib* (1893); *The Story of Sonny Sahib* (1894); *His Honour and a Lady* (1896); *A Voyage of Consolation* (1898); *The Path of a Star* (1899); *The Other Side of the Latch,* the diary of an invalid in Simla (1901); *Those Delightful Americans* (1902); *The Pool in the Desert* (1903); *The Imperialist* (1904); *Burnt Offering* (1910); *The Consort* (1912).

CÔTES-DU-NORD, kôt'-dụ-nôr'. A department in northwest France (q.v.), formerly a part of Brittany, bounded on the north by the English Channel (Map: France, N., C 4). Area, 2787 square miles. Pop., 1896, 616,074; 1901, 609,349; 1911, 605,523. The Armoric hills, called also the Montagne Noire, and the Mene Mountains cross the department from east to west, giving a rude and broken aspect to the coasts. The chief rivers, which are short but navigable, are the Rance, Gouët, Trieux, and Arguenon. The cultivation of flax and hemp, with the pasturing of cattle, and iron, coal, and lead mining, supply employment in the mountainous districts; while in the sheltered valleys and on the coast levels grain, potatoes, flax, with pears and apples and other fruits, are produced. It builds ships, makes linen and paper, and is a noted horse market. Along the seacoast are many large fisheries, and sardines are canned. Capital, Saint Brieuc.

COT'GRAVE, RANDLE (?–c.1634). An English lexicographer, born in Cheshire and educated at St. John's College, Cambridge. It was while secretary to William Cecil, Lord Burghley, that he compiled his French-English dictionary (1611, 1632, 1650, 1660, and 1673). The work contains many absurd errors, but is still much used by philologists.

CÖTHEN, or KÖTHEN, kē'ten. An ancient town of the German Duchy of Anhalt, situated on the Ziethe, about 22 miles north of Halle (Map: Germany, D 3). It is surrounded by high and ancient walls. Among its notable public buildings are the Jakobskirche, a Lutheran church of the Gothic order, the church of St. James, with some fine old stained glass and a handsome organ, and the former palace of the dukes of Anhalt-Cöthen, now used as a museum and containing a library of about 20,000 volumes. Cöthen boasts a technical institute, a school of gardening, and a school of forestry. The chief industry is the manufacture of beet sugar; there are also iron foundries, machine works, boiler shops, and malting works; it also manufactures cigars, vehicles, and leather. Pop., 1890, 18,215; 1900, 22,100; 1905, 22,978. Cöthen was an old Slavic settlement, and received municipal privileges in the twelfth century. In 1547 it joined the Schmalkaldic League and was taken by Charles V. Until 1853 it was the capital of the Principality of Anhalt-Cöthen. A monument has been erected to Sebastian Bach, who was music director here 1717–23.

COTHUR'NUS. See BUSKIN.

COTI'DAL LINES. A system of lines on a globe or chart which show the movement of the ocean tidal waves. The lines join the places where high water occurs at the same moment.

COTILLON, kō-tĭl'yon, *Fr. pron.* kō'tē'yôN'. A dance of French origin and performed to quadrille music. It was a fashionable dance at the court of Charles X, where it had been adapted from a peasant dance. At first for one, then for two performers, it soon became a *ronde* dance, in which form it was introduced into England. There are hundreds of possible figures in the modern dance, and the accessories are most elaborate. The cotillon is begun by a small number of couples, who occupy the floor while the rest of the guests sit about the ballroom. These couples select others from among

those seated, and after going through a figure all take seats and are replaced by other couples until the whole company has danced that particular figure. Another method is for each set of couples to dance a different figure. For some account of the dance and descriptions of many of the figures, consult Grove, *Dancing*, "The Badminton Library" (London and Boston, 1895).

COTIN, kō'tăn', Charles (1604–82). A French poetaster, born in Paris. He was royal councilor and almoner to the King under Louis XIV, and in 1655 was admitted to the Académie Française. His knowledge of Oriental and classic languages was extensive, and he was a member of the literary circle of the Hôtel Rambouillet. He was an abbé and a successful preacher. His verse, of which the *Poésies chrétiennes* (1657) are the most creditable, is of no importance. He is famous as the object of Boileau's ridicule (*Satires*, 3, 8, 9) and the original of Trissotin in Molière's *Femmes savantes*.

COTINGA, kō-tĭŋ'gȧ, or Chatterer (native South American). A bird of the family Cotingidæ, allied to the waxwings and manakins. Cotingas are numerous, both in species and individuals, inhabit tropical America exclusively, feeding on insects and fruit, and are remarkable for the splendor of the nuptial plumage worn by the males in many cases, or for eccentricities of ornament. The bell bird and umbrella bird, elsewhere described, are cotingas exemplifying such peculiarities, and the cocks-of-the-rock are included by some systemists. They have been specially studied by Dr. Leonard Stejneger, who refers to the group as follows in the *Standard Natural History*, vol. iv (Boston, 1885): "The greater number of the species of cotinga are plain-colored, gray, rufous, or greenish . . . though even among these rather modest forms there are some which are more or less highly adorned. Among these is the rose-breasted 'fly-catcher,' or Xantus's Becard (*Platypsaris aglaiæ albiventris*), with a beautiful crimson rosy patch on the breast, which just enters our fauna across the southern frontier. Nevertheless, the cotingas are, generally considered, especially bright-colored and curiously adorned birds. . . . From Central America we have the exquisite *Carpodectes*, white all over, with a delicate tinge of bluish gray washed over the upper surface; from Guiana to Brazil are found the deep purplish-carmine *Xipholæna*, with white remiges, and the great wing coverts singularly lengthened, narrow and stiffened, like a woodpecker's tail feathers; the glorious cotinga, shining azure blue, with purple throat, from the same countries; the greenish, fork-tailed *Phibalura* from Brazil; and the small, pipra-like *Iodopleura*, curious on account of the rare lilac color of the sides of the body hidden under the wings." Of all these the females are plainly colored, mostly gray, and are therefore inconspicuous when making their nests or brooding—an important precaution against the extinction of the race; and the gaudy hues of the males are molted to a great extent during the off season, when their dress is much plainer than in the season of courtship. None of these birds are notable as singers, though several utter loud and singular cries. See Plate of Cotingas.

COTISE, kŏt'ĭs, or **COST** (Fr. *côte*, side). In heraldry (q.v.), one of the diminutives of the bend.

COT'MAN, John Sell (1782–1842). An English landscape painter and etcher. He was born at Norwich, the son of wealthy parents, and in 1798 was sent to London. There he joined the group of water-color painters led by Girtin and Turner, but without adopting their naturalistic tendencies. Cotman is now more appreciated than when he was alive and is considered the most gifted artist, after Crome, of the Norwich school. In versatility he is equaled only by Turner, his draftsmanship is excellent, and his color is of unusual breadth and often very beautiful. The British Museum possesses nearly 300 of his water colors and drawings, including "Greta Bridge" and the famous India-ink drawing, "Breaking the Clod." Among his much rarer oil paintings are: "Wherries on Breydon" (National Gallery); "Fishing Boats off Yarmouth" (Norwich Museum); the "Waterfall," a fantastic landscape in classical style; an "English Village" and "Worcester Cathedral" in the Metropolitan Museum, New York. He is widely known through his architectural etchings: such as his *Etchings of Architectural and Picturesque Remains* (1838) and *Architectural Antiquities of Normandy* (1822). His sons Miles Edmund and Joseph John were able landscape painters, and his nephew Frederick George Cotman was an able painter in water color. Consult Binyon, *John Crome and John Sell Cotman* (London, 1906).

COTO'NEAS'TER (Neo-Lat., from Neo-Lat. *cotonea*, quince, Lat. *cotonea*, wallwort). A genus of plants of the family Rosaceæ, allied to the apple and quince. The species are shrubs or small trees, some of them evergreen, with simple, undivided leaves, more or less woolly beneath, small flowers in lateral cymes, and small fruit not agreeable to the palate, but the bright color of which, and its remaining on the tree in winter, make them very ornamental. These plants, while common in Europe, seem little known in the United States. Most of the species are natives of mountainous parts of Asia; they are sufficiently hardy for the climate of Great Britain, where they are among the most common ornamental shrubs.

COTOPAXI, kō'tō-păk'sē, *Sp. pron.* kō'tō-pä'hē. The loftiest active volcano in the world. It is in Ecuador, in the eastern chain of the Andes, about 40 miles nearly south of Quito, and about 50 miles south of the equator, in long. 78° 42′ W. (Map: Brazil). La Condamine estimated the height at 18,860 feet; Reiss, the first to ascend it (in 1872), found it to be 19,500 feet; and Whymper (in 1880), 19,613 feet. The valley at its foot, however, is itself over 9000 feet above the sea. The upper part of Cotopaxi, a perfect cone for a distance of 4400 feet, is entirely covered with snow, with the exception of the immediate margin of the crater, which is a bare parapet of rock. The snow line on the northern exposure is 15,600 feet, and on the southern exposure 15,200 feet, above sea level. Reiss, whose measurements are largely accordant with the more recent ones of Whymper, estimated that the crater, which is elliptical, has a depth of 1500 feet and a maximum diameter of about 2600 feet. Below the snow line is a well-marked barren belt covered with lichens and shrubs, below which again is forest. Smoke issues from the summit; sounds as of explosions are occasionally heard; and, also, a fiery glow is often visible by night. Lava rarely flows even during eruptions, but flame, smoke, and immense volumes of ashes are

1. BAND-TAILED PLANT CUTTER (Phytotoma rara).
2. INDIAN PITTA (Pitta brachyma).
3. AMAZONIAN COCK-OF-THE-ROCK (Rupicola rupicola).
4. GOLDEN-CAPPED MANAKIN (Pipra auricapilla).
5. ECUADORIAN UMBRELLA-BIRD (Cephalopterus penduliger).

then ejected; and when the heat melts large masses of the snow lying on the sides, destructive floods are occasioned in the valleys beneath. The first eruption recorded was in 1532, and tradition makes a secondary cone, "the Luca's head" on the slope of Cotopaxi, the peak of the volcano blown off at this time. Others followed in 1698 and 1743, since which date numerous eruptions have occurred. One of the most violent was that of 1768, during which ashes, thrown high into the air, were transported by the winds and thickly strewn over an area of about 250 miles in diameter. The more recent violent eruptions were in 1877 and 1903.

COTRONE, kō-trō′nā. An episcopal city (since the sixth century) on the Gulf of Taranto, southern Italy, 146 miles, by the winding railway, south of Taranto (Map: Italy, M 8). It has a castle of the time of Charles V, a cathedral, and an excellent, though small, harbor. Of the temple of Hera on Cape Colonne, sometimes called Cape Nau, 7 miles to the southeast, which was the most magnificent structure of the kind in Magna Græcia, only one solitary Doric column remains. The worship of Hera has been replaced by that of the Madonna del Capo, to whose church, near the temple, the young girls of Cotrone go in barefoot procession every Saturday. The town markets oranges and other semitropical fruit, oil, licorice, wine, olives, grain, and turpentine. Cotrone is the modern name for the ancient Crotona, founded by the Achæans about 710 B.C. About 530 B.C. Pythagoras, after being banished by Polycrates of Samos, established his brotherhood here and acquired such influence in the oligarchical council that the people rebelled, and expelled the Pythagoreans and established a democracy. Crotona suffered severely during the Pyrrhic wars (see PYRRHUS) and in the later years of the Second Punic War was Hannibal's headquarters for three successive winters. It did not appear again in history until the wars of Narses and Belisarius (q.v.) against the Goths. In the days of Herodotus, and long after, the medical school of Crotona was the most famous in the Greek world. This city has given many famous champions to the Olympian games of the Greeks, among them Milo. Pop. (commune), 1881, 9649; 1901, 9610; 1911, 10,162. See CROTONA.

COTS′WOLD. See SHEEP.

COTSWOLD, or **COTESWOLD HILLS** (village meadow, from *cot,* hut + *wold,* meadow). A range of hills, running through the middle of Gloucestershire, England, from Chipping Camden in the northeast to near Bath in the southwest, and forming the inner ridge of the English coastal plain (Map: England, D 5). They are 54 miles long, in some parts 8 miles broad, and cover 312 square miles, with an average height of 500 to 600 feet. The highest points are Cleave Hill (1134 feet) and Broadway Hill (1086 feet). The surface is generally bare, but corn, turnips, and sainfoin, a perennial herb cultivated as a forage plant for sheep, are grown, and coarse-wooled sheep are raised less for the wool than for their value in crosses with less hardy breeds. Consult Evans, *Highways and Byways in Oxford and the Cotswolds* (New York, 1905).

COT′TA. The name of a family of German publishers, whose establishment was founded in Tübingen in 1659. It included the eminent theologian, JOHANNES FRIEDRICH COTTA (1701–79), and his grandnephew, JOHANN FRIEDRICH, FREIHERR COTTA VON COTTENDORF (1764–1832), the most eminent publisher in German history. Educated for the law, he entered the book business at Tübingen in 1787 and in 1795 began to publish Schiller's *Horen,* the *Politische Annalen,* and an architectural annual. In 1798 he issued *Die Allgemeine Zeitung* (q.v.), the *Damenalmanach,* and other such publications. The *Litteraturblatt* and the *Kunstblatt* followed. Cotta was publisher for nearly all the distinguished literary men of the classical epoch. In 1810 he moved his printing house to Stuttgart; in 1824 at Augsburg he introduced the first steam printing press into Bavaria. In politics Cotta was a moderate but steadfast Liberal. He was a practical social reformer, abolishing serfdom on his estates, building model farms, and making them in effect neighborhood experiment stations. The house of Cotta is still among the greatest publishing firms in Germany, since 1899 a stock company in Stuttgart.

COTTA, BERNHARD VON (1808–79). A German geologist, born at Zielbach, near Eisenach. After studying at the School of Mines at Freiberg and at the University of Heidelberg, he was associated with Naumann in the publication of a geological map of Saxony (12 sections, 1833–42), and from 1841 to 1874 was professor of geology at Freiberg. His publications, many of which have been translated into English, include: *Geognostische Wanderungen* (1836–38); *Anleitung zum Studium der Geognosie und Geologie* (3d ed., 1849); *Deutschlands Boden* (1854); *Die Lehre von Erzlagerstätten* (1854–61); *Die Geologie der Gegenwart* (5th ed., 1878). In the latter work he proved himself an evolutionist and an adherent of Darwin's theory of the origin of species. He was one of the first geologists to accept this theory and apply it to organic remains in sedimentary rocks. His treatise on ore deposits contributed greatly to the development of that branch of geology.

COTTA, GAIUS AURELIUS (c.124–73 B.C.). A Roman, distinguished as statesman and orator. He was an intimate friend of M. Livius Drusus, the champion of the people. (See DRUSUS, 2; SOCIAL WAR.) In 91 he sought unsuccessfully the tribuneship of the people. Soon afterward, by the terms of the Lex Varia, a law aimed at all who had supported the Italians against Rome, he was accused, and went into voluntary exile. He returned in 82. As consul in 75, he championed the popular cause by carrying a law freeing the tribunes of the people from legislation by which Sulla had disqualified them from holding higher magistracies. He died suddenly, in 74, from the breaking out of an old wound. Cicero praises him highly as an orator and makes him a participant in the dialogue of his *De Oratore* and his *De Natura Deorum.* Consult the introduction to Wilkins's edition of the *De Oratore* (2d ed., Oxford, 1888).

COTTA, HEINRICH (1763–1844). A German forester of distinction, born near Wasungen. He studied at Jena, in 1801 became a master forester and a member of the Eisenach College of Forestry, and from 1795 to 1811 conducted at Zillbach a school of sylviculture, founded by himself. In 1811 he was summoned to Saxony as counselor of forestry, and thither removed his school, which in 1816 received the title of "Royal Academy of Forestry." He wrote a number of volumes, including: *Systematische Anleitung zur Taxation der Waldungen* (1804); *Anweisung zum Waldbau* (1817·

9th ed., 1865); *Die Verbindung des Feldbaues mit dem Waldbau* (1819–22); *Hilfstafeln für Forstwirte und Forsttaxatoren* (1821; 2d ed., 1841); *Grundriss der Forstwirthschaft* (1832; 6th ed., 1872).

COTTABUS (Gk. *κότταβος, cottabus*). A game said to have originated in ancient Sicily, widely popular in Greece at dinner parties, in the fifth and fourth centuries B.C., especially at Athens. The purpose of the game was to throw wine at a mark, so that the wine should make a clear noise as it struck. In its simplest form a number of saucers were set floating in a crater or mixing bowl filled with water; the guests in turn, without rising from their places, flung wine at the saucers, seeking to sink them; the player who sank most saucers was the winner. Other more intricate forms of the game, in spite of many descriptions in Greek writers, most of which, however, were written when the game was no longer played, and the discovery, near Perugia, of two sets of apparatus used in playing the game, are not clearly understood. The game was much used as a love augury; the player, as he threw, named his beloved or thought of her and augured success or failure in his suit from the nature of his throw. Consult: Becq de Fouquières, *Les jeux des anciens* (1873); Helbig, *Mittheilungen des Kaiserlich Deutschen Archäologischen Instituts, Römische Abtheilung* (1886); Sartori, *Das Kottabos-Spiel der alten Griechen* (1893); Higgins, "Recent Discoveries of the Apparatus Used in Playing the Game of Kottabos," in *Archæologia* (1888).

COT'TAGE (OF. *cotage*, ML. *cotagium*, from AS. *cot*, Icel. *kot*, hut). Formerly a term used in Great Britain for a small dwelling house of a poor family, especially in the country, detached from other buildings. It had no second story (though sometimes garret rooms) and was built usually of stone or brick and thus distinguished from wooden cabins or huts, though wood was not excluded. Recently the term has been extended to mean country houses of moderate extent, especially summer residences for well-to-do families; and finally it is often but improperly applied, in the United States, to the most sumptuous summer residences at places like Newport and Bar Harbor.

COT'TAR'S SATURDAY NIGHT, THE. A poem by Robert Burns, published with a volume of other verse in 1786.

COTTBUS, or **KOTTBUS,** kŏt'bus. A town of the Prussian Province of Brandenburg, situated on the Spree, about 70 miles southeast of Berlin. It has been noted since mediæval days for the manufacture of cloth, and to this has been added linen, wool, yarn, jute, carpets, tobacco, machinery, and beer. (Map: Germany, F 3.) A government tuberculosis sanitarium is just outside the town. Pop., 1890, 34,910; 1900, 39,327; 1905, 46,269. Cottbus was founded in the tenth century by Henry I. In 1445 it was sold to the Elector of Brandenburg. It belonged to Saxony from 1807 till 1813, when it passed to Prussia.

COTTE, kŏt, ROBERT DE (1656–1735). A French architect. He was born in Paris and was a pupil and brother-in-law of J. H. Mansard. As assistant to, and later as superintendent for, his master, he collaborated in the erection of the chapel of Versailles, the dome of the Invalides, and the Hôtel de la Vrillière (now the Bank of France). He appears to have designed the colonnade of the Trianon, and left designs for the portal of Saint-Roch and for many buildings outside of his own country. De Cotte was made director of the Academy for Architecture in 1699, and first architect to the King (1708), after the death of Mansard.

COTTENHAM, kŏt'en-am, EARL OF. See PEPYS, CHARLES CHRISTOPHER.

COT'TER, JOSEPH B. (1844–1909). An American Roman Catholic bishop, born in Liverpool. He came to America in his youth and was educated at St. John's University. After holding a pastorate at Winona, Minn., for 18 years, he was in 1889 consecrated first bishop of that diocese. He was active in the temperance movement and thrice president of the Total Abstinence Union of America.

COTTEREAU, kŏt'rō', JEAN. See CHOUANS.

COTTET, kō'tā', CHARLES (1863–). A French landscape and genre painter and etcher. He was born in Puy (Haute Loire) and studied under Maillard at the Académie Julian and under Roll. He at first joined the Impressionists and later helped to found the Société Nationale des Beaux-Arts. He is known chiefly as a painter of Breton subjects. A cycle of 10 landscapes, entitled "The Country of the Sea" (1905), several of which are now in the Luxembourg, attracted wide attention. He also painted many Venetian and Spanish subjects. In his early impressionistic work his color is light and delicate; later it grew darker and heavier, and an element of pathos was introduced. His paintings include "The Port of Camaret," and others, in the Luxembourg Museum; "Going to Church in Brittany" (Vienna); "A Moonlight Night" (Philadelphia); "Breton Women in Mourning" (Cincinnati).

COT'TIDÆ (Neo-Lat. nom. pl., from Neo-Lat. *cottus*, Gk. *κόττος, kottos*, a sort of river fish, probably the bullhead). A family of small, ugly-looking, spiny-rayed fishes, having a large depressed head, usually armed with spines or tubercles, and a tapering body, which may be naked or irregularly armed with scales or bony plates. There are about 60 genera and 250 species. The typical genus is *Cottus*. Nearly all are small. They inhabit the rocky shores and pools of the northern regions, some of the species descending to great depths. Many inhabit fresh waters, occupying the clear, cool streams of northern regions. The family includes the sculpins, miller's-thumb, grubby, father-lasher, etc. Very few are used as food. See SCULPIN.

COTTIERS, kŏt'ti-ērz. A term originally indicating tenants who rented cots or cottages, or at the most a plot of land too small to be designated a farm; but later the term had a more general application to peasant farmers whose rent was determined not by custom, but by competition. The most notable case of this system of land tenure was in Ireland, where the capitalist farmer was scarcely represented in the population. The same class in the western parts of Scotland are called "crofters." Among both the lack of capital and the competition for land, including rack rent, has provoked much misery. It has been partially alleviated in Ireland by the gradual diminution of the population, and still more by the acts of Parliament known as the "Land Laws." See IRISH LAND LAWS.

COTTIN, kō'tăN', SOPHIE RISTEAU (1770–1807). A French novelist, born at Tonneins, and generally known to a now past generation as the author of *Elisabeth ou les exilés de Sibérie,* which

won the praise of imitation from Xavier de Maistre in *La jeune Sibérienne* (1825). Its translation in English by G. R. Lockwood (New York, 1869) is still popular among old-fashioned English readers. In France her vogue was not lasting. Her *Mathilde* (1805), a tale of an intense love between a Christian Crusader and a Saracen, may be considered as the precursor of the Romanticist novels of the Châteaubriand school, especially by reason of its very creditable local color. She died in Paris, Aug. 25, 1807, too early to fulfill the promises of an interesting and sympathetic genius. Consult Sainte-Beuve, *Causeries du Lundi*, vol. xi, and Julia Kavanaugh, *French Women of Letters* (Leipzig, 1862).

COT'TLE, Joseph (1770–1853). An English publisher, born probably in Gloucestershire. He opened a bookshop in Bristol and was instrumental in publishing some of the first poems of Southey, Coleridge, and Wordsworth. He remained in business from 1791 to 1799. After his retirement he produced several volumes of poetry, such as *Malvern Hills* (1798), *John the Baptist* (1801), *Messiah* (1815), which awoke the satire of Byron. His *Early Recollections, Chiefly Relating to Samuel Taylor Coleridge* (1837), with a second edition under the title *Reminiscences of Coleridge and Southey* (1847), contains interesting information on the early lives of Coleridge and Southey, but is disfigured by many details that show Cottle himself in an unpleasant light.

COT'TON (Fr., Sp. *coton*, from Ar. *quṭun*, *quṭn*, cotton, from *qaṭana*, to inhabit). An important vegetable fibre, distinguished from all other fibres by the peculiar twist it possesses, which makes it exceedingly valuable for spinning. It is cultivated in those parts of the globe between the two thirty-fifth parallels of latitude (a region which contains the largest portion of the land surface of the globe), although its most profitable cultivation is between the twentieth and thirty-fifth parallels north of the equator. Within this belt lie the cotton districts of the United States, northern Mexico, Egypt, northern Africa, and Asia, except the extreme southern parts of India and the Malay Peninsula. South of the equator cotton is grown in Brazil, nearly all of which country is said to be favorably adapted to its cultivation; in Argentina; in Australia, though not to any great extent; in Africa, where efforts to extend its production are being made; and in the islands of the Pacific. Cotton is grown under wider range of climatic conditions, over a greater area, and by a greater variety and number of people, and is useful for a larger number of purposes, than any other fibre. Its cheapness and the extent of its production preclude the demand ever exceeding the supply except locally and temporarily. Although cotton is grown mainly for the fibre surrounding its seeds, its by-products, the seeds as a source of oil and cake, and also the fibre of the stalks, are of great importance. The cottonseed products of the United States in 1912 were valued at $132,230,000. See Cottonseed and its Products, and Colored Plate of Fibre Plants in article Hemp.

Botanical and Commercial Classifications. The cotton of commerce is the product of a few species of *Gossypium*, a genus of the family Malvaceæ, to which also belong the hollyhock, mallow, hibiscus, etc., as may be readily seen by a comparison of their flowers. (For illustration, see Plate with article Hemp.) There are numerous species of *Gossypium*, only three or four of which are economically important. They are small trees, shrubs, or herbaceous plants, and in their duration are perennials, biennials, or annuals. The leaves of the cultivated species are three to seven, or even nine, lobed, and are more or less sprinkled with small black or pellucid dots. The flowers vary in color, are white or light yellow, with purple spots at base, and are usually borne singly in the axils of the leaves except in the "cluster" type, where a number occur together. At their bases the flowers are surrounded by three or more green heart-shaped bracts, which constitute the "squares." The fruit, known as the boll, is a three to five celled capsule, containing the numerous seeds, more or less covered with lint, which is white or tawny. All of the species are of tropical origin, yet their most successful cultivation is in temperate climates where there is a period of six months free from frosts and where there is an abundant and well-distributed rainfall throughout the growing season.

The botanical origin of plants that have long been in cultivation is always a source of perplexity, and the exact species to which the different varieties of cotton belong has been the subject of much controversy. By almost common consent it is now agreed that most of the cotton of commerce is the product of three or four species and their hybrids. These species are *Gossypium arboreum* and *Gossypium peruvianum*, arborescent species grown only in the tropics, *Gossypium barbadense*, the source of the celebrated Sea Island and Egyptian cottons, and *Gossypium herbaceum*, the species from which most of the crop of India is grown. The American upland cotton is believed to have originated from *Gossypium hirsutum*. There is perhaps no other plant that responds so quickly to changes in environment and improved cultivation, and to this are doubtless due the many varieties and species.

The Sea Island and Egyptian cottons, *Gossypium barbadense*, with their beautiful, long, and silky staple, are among the most valuable of the races or species of cotton. The flower is of a rich cream color, and its seeds are black, small, and easily separable from the lint. This species attains the highest perfection along the coast region of South Carolina, Georgia, and Florida, with well-known varieties grown under irrigation in Egypt from American seed. The fibre of Sea Island cotton averages about 1¾ inches in length, with 1½ to 2½ as the extremes. It is adapted to the finest thread and lace work, and other products for which the short staple is not suited. The Egyptian varieties are usually a little shorter in staple and are of a tawny color. These are often used for the natural-colored balbriggan underwear, hosiery, etc., where a smooth finish and silky lustre are desired. The cultivation of Sea Island cotton is highly developed, and the United States crop of 1912 was 73,777 bales of 382 pounds each. The value of the Sea Island cotton crop is about 5½ million dollars annually. The Department of Agriculture has in recent years imported a quantity of seed of the Egyptian cotton and by a series of experiments demonstrated the feasibility of its production. The quantity of Egyptian cotton imported in 1913

was approximately 100 million pounds, valued at about $20,000,000. Most of this comes direct from Egypt, but a small part from England.

The upland cotton of the United States is mostly derived from *Gossypium hirsutum*. In this country the varieties of this species have white flowers, which turn red the second day after opening. The fibre of this series is shorter, but the plant can be cultivated over a much greater extent of territory than the others. The seed of the upland varieties is usually of a greenish color and has a closely adherent gray fuzz in addition to the longer lint, making the process of ginning more difficult. There are doubtless many hybrids between these series, as may be seen in the character of some upland cottons. In 1896 descriptions were published in the United States Department of Agriculture, Office of Experiment Stations, *Bulletin 33*, of more than 130 varieties of cotton in cultivation in the United States at that time, together with about an equal number of so-called varieties which were only old ones renamed. Most of these varieties were upland cottons, and they varied widely in their production and character of lint. *Gossypium arboreum* is a small tree rather common about the temples of India and China, and also grows wild in Abyssinia and Senegal, but it is said never to be cultivated as a regular crop. The trees are rather short-lived, and they yield a fine, silky fibre an inch or more in length. This is called Nurma or Deo cotton and is little used except by the priestly class. It is probable that its value has been overrated. It will not mature in the United States. The origin of the cottons supposed to be derived from *Gossypium peruvianum* is somewhat in doubt. They are South American, as their name would indicate, and their smooth black seeds adhere in a reniform mass, hence the name "kidney cotton," which is usually applied to them. Their fibre is strong, rather coarse and woolly, 1½ inches or less in length, and from its great resemblance to wool is frequently used in combination with that staple. About 4½ million pounds, valued at nearly $1,000,000, are annually imported into the United States, and it is claimed that most of it is used by woolen manufacturers to mix in making underwear, hosiery, etc., much of the material being sold as all-woolen goods.

In *commercial usage*, to fibres under 0.98 inch, or 25 millimeters, in length there has been given the name "short staple"; "medium" means from 0.98 to 1.17 inches (25 to 30 millimeters), and "long," 1.18 to 1.57 inches (30 to 40 millimeters); "extra," including those which are 1.58 inches (40 millimeters) or more. The extra and the long in the United States seem to come from Sea Island cotton or some of its hybrids; the short and medium from *Gossypium hirsutum*.

The commercial classification of cotton in New York is as follows: The "full grades" are fair, middling fair, good middling, middling, low middling, good ordinary, and ordinary. Half grades are designated by the prefix "strict," quarter grades by prefixes "barely," meaning the point above half grade and the next full grade above, and "fully," meaning the mean point between the half grade and the next full grade below. Liverpool high grades are lower, and low grades higher, than New York. Acting under authorization from Congress, the United States Department of Agriculture established nine grades of cotton based on middling cotton. They are: middling fair, strict middling, good middling, strict good middling, middling, strict low middling, low middling, strict good ordinary, and good ordinary. Standard sets of these grades have been prepared, and they have been officially adopted by the leading cotton exchanges of this country.

Cultivation. The plant requires for its best development a peculiar soil and climate. While the method of cultivation is about the same in the various countries where it is grown, that in the United States is the most perfect. Although the plant is not really an annual, and in the tropics it can be grown as a perennial, yet it is treated as an annual in its cultivation in most countries. The land is prepared in winter or early spring, the time of beginning varying with the locality. After thorough plowing, and after all frost has gone, the ground is bedded into rows from 3 to 4 feet wide, according to situation and the quality of the soil; the seed is sown along the centre of these beds, either in a straight furrow made with a small plow or opener, or in holes 12 to 18 inches apart. Flat culture is also used. Where artificial fertilizers or cottonseed meal is drilled in, this method of preparation is indispensable. The usual date to begin preparing land is from January 15 in southern Texas to March 5 in South Carolina. Sowing usually commences March 10 to April 15 and continues to May 15; but late spring frosts may delay it longer. The young shoots, which appear in from 10 to 15 days, are weeded and thinned when they have attained a height of 2 to 6 inches, say, when the third or first true leaf appears. The average date of bloom is June 5. As a general rule, cotton is a dry-weather plant, heavy rainfall interfering with both the culture and the stand, although an extremely dry spring interferes with the growth. For plowing it is best to have just enough rain to make the soil moist and spongy. When young, the crop flourishes best with warm steamy weather, with an occasional shower until blooming. An excess of rain produces weeds and wood; severe drought stunts the plant, matures it too early, and causes a small light-stapled crop. Early frost causes the plant to turn brown; cold nights cause many of the plants to die. Lands in hilly or upland districts require more moisture than those lying in the plains and river bottoms. Overflowing often causes injury on bottom and flat prairie lands, but replanting or recuperation often redeems the most hopeless cases. Where, however, overflowing causes "sanding," the land is rendered utterly useless for cotton culture that year. The experiment stations in the Southern States have aided in introducing improved methods of cultivating, fertilizing, and handling the crop. Rotation of crops and green manuring have been shown to be of great advantage. From the date of bloom, warm, dry weather is needful, until picking time, which usually commences from July 10 in southern Texas up to September 10 in Tennessee, and continues until frost puts a stop to further growth. During the harvest all available hands are called into full employment. The cotton is gathered into baskets or bags hung from the shoulders of the pickers, and as the crop is secured it is either sent directly to the gin or dried, and then the fibre separated from the seeds. Recent investigations have

shown the quality of the fibre is improved by storing cotton for a time before ginning. For long-staple or Sea Island cotton in South Carolina the usual date to begin preparing land is February 1; planting begins April 1 and ends May 1; picking is from August 25 to December 10.

The occurrence of the cotton-boll weevil over much of the cotton area has caused some modification in the growing of the crop. Clean cultivation, earlier planting, wider spacing, and the use of early maturing varieties are recommended for infested regions.

Insect Enemies of the Cotton Plant. See COTTON INSECTS.

Cotton Diseases. There are a number of well-characterized diseases of the cotton plant, some of which are due to disturbances in the nutrition of the plant, others are caused by fungus attacks, while still others are attributed to the presence of minute worms, called "nematodes," in the roots. Attention to the requirements of the plants will correct the first class of diseases. For the fungus troubles but little in the way of prevention is known. Among the most important diseases due to physiological causes are those known as the "mosaic disease," or "yellow leaf blight," and the shedding of bolls. In the first, small areas of the leaves become yellow, giving to the leaf a peculiar checkered appearance. Later these areas turn brown and dry up, leaving the leaf in a more or less ragged condition. At this stage the disease is usually referred to as the "black rust." Heavy applications of kainite or similar fertilizer are said to correct this evil. The shedding of the bolls, or their drying up while still attached to the plant, is often a serious trouble. Extreme dry or wet weather causes this disease by interfering with the proper supply of moisture and nutriment furnished the plant through its roots. Among the diseases due to parasitic fungi a few of the most serious and widely distributed may be mentioned. Damping off, sore shin, or seedling rot is caused by *Pythium debaryanum* and a number of other fungi. They attack the young plants at or near the surface of the ground, producing ulcer-like spots, and later rot the plant off. The sunken, ulcer-like spots can be readily seen on the affected stems. Another common disease is anthracnose (q.v.), due to *Glomerella*, or *Colletotrichum, gossypii*. It is a widely distributed fungus that attacks the bolls, stems, and leaves, and is probably the most destructive of cotton diseases. Upon the bolls small reddish spots appear which later become black. The centre then becomes gray or pink, and the spots enlarge in a concentric manner with well-marked zones of color. The boll is killed outright or has its development checked so that the lint is worthless. Upon the stems the fungus is somewhat similar in its behavior, although the spots are not quite so definitely marked. Upon the leaves the disease is not very well characterized. Cotton anthracnose is carried with the seed, and it may be prevented by the use of good seed and rotation of crops. A root rot is very destructive in some places. Its behavior is so marked as to need no description. It is due to a rather widely distributed fungus that has been called *Ozonium auricomum*. It attacks a number of plants in addition to cotton. Rotation of crops is about the only method of relief known. A leaf blight (*Sphærella gossypina*) and a mildew (*Ramularia areola*) are common diseases in the cotton field, but they seldom occasion much injury.

Another of the serious fungus diseases to which the cotton plant is subject is the wilt disease. It makes its appearance usually in May, when the plants are 6 or 8 inches high. The plants are dwarfed, have an unhealthy appearance, the leaves turn yellow between the veins, and their margins dry up. Sometimes plants wilt and die at once, while at other times the progress of the disease is slower and the plant may partly recover. A plant attacked by this disease will show a brownish stained color in the wood when cut across. The cause of the trouble is a fungus, *Fusarium vasinfectum*, and the same or a closely related form occurs on the okra and watermelon. Some varieties and individual plants seem less liable to this disease, which attacks the plants through the soil, and it is thought the means for overcoming this trouble lies in resistant plants. This disease, as well as some others, is very much complicated by the presence in the roots of the cotton of nematodes (*Heterodera radicicola*), minute worms that enter the roots of cotton and a number of other plants, causing a large number of galls to be formed. The plant is injured by the nourishment being taken from other parts of the plant to make the galls. This weakens the plant so that it is more liable to fungus attack. When nematodes occur in abundance in the field, no entirely efficient means of eradication is known as yet.

Production and Distribution. The oldest-known cotton-producing country is India, where for 30 centuries the plant has been grown and its fibre manufactured. For 400 years before the Christian era cotton was well known in what was then the civilized world, the writings of the Greeks and Egyptians plainly indicating the knowledge of the value of this fibre. Columbus found it in the Western world, although not so extensively cultivated as in the East; but during the past 50 years its culture here has distanced in quantity and in quality the produce of the Old World. Down to 1800 the cotton consumers of Europe depended upon the Indies and the Levant for their raw material; but by 1860, so far had the inventive genius, the superior farming, and the greater energy of the planters of our Southern States pushed the production of the fibre, that they furnished the greater part of the cotton used by Great Britain and the continent of Europe. From 1858 to 1860 America furnished 79 per cent of the cotton imported into Great Britain. During our Civil War this dropped to 3½ per cent, rising to 58 per cent in 1871, and amounting to 80 per cent in 1900 and 62.8 per cent in 1912. During the Civil War, when the price of cotton was abnormally high, attempts were made to grow cotton in many countries. The industry flourished there for a while, but it has ceased to be profitable in Europe, Australia, etc. Russia in her Asiatic possessions has developed cotton growing greatly in recent years, so that the imports into the Empire have fallen off 50 per cent in the past decade. Great Britain, Germany, and France are making especial efforts to develop cotton growing in Africa, and in 1912 nearly 60,000 bales were produced in their colonies, mostly in Africa.

Cotton Production of the World. This is difficult to state except approximately, as a large

proportion and amount consumed is produced in uncivilized or in semicivilized countries, where no accurate record is kept; and in many countries and districts absolutely no data are available—as in China, where soil and climate are favorable and the clothing of the population is largely of cotton, yet the extent of its cultivation is a close secret; and in some parts of India, where the production can be estimated only by the amount in sight and the known or assumed requirements for dress. The amount produced in the vast unknown continent of Africa is even more of a mystery, although native cottons form there a large proportion of the dress.

The world's production of cotton has increased more rapidly in recent years than that of any other of the chief materials of clothing, wool, silk, or flax, and the growth in world consumption has been far greater than that of population. The total cotton production of the world in 1850 was approximately 3 million bales, in 1900, 12½ million, and in the cotton year 1911–12, 25 million, the production of 1912 being practically double that of 1900 and fully eight times that of 1850. As the world population increased but about 50 per cent from 1850 to 1912, while cotton production increased 700 per cent and that of wool about 200 per cent, it is apparent that the popularity of cotton as an article of clothing has greatly increased.

Cotton in the United States. The first authentic record of cotton cultivation in the United States was at Jamestown, Va., in 1607. The first exportation was in 1747, when eight bags were sent to England, the first shipment of any importance being 2000 pounds in 1770. In 1791, 189,316 pounds were exported; Whitney's invention of the saw gin in 1793 raised this amount to 17,789,803 pounds by 1800. The production reached 1,920,000,000 pounds in 1860; 3,178,000,000 in 1880; 5,133,000,000 in 1900; 6,840,000,000 in 1904; and 7,157,000,000 in 1912. Cheapening the processes of cultivation and cleaning, and increase of acreage, have so lowered the cost of the fibre that while the average price in Liverpool was 1s. 6d. (say, 36 cents) per pound in 1793, it was 5¾d. (say, 11½ cents) in 1851; averaging 7d. (14 cents) for the five years ending 1861. During the period of the Civil War in the United States the prices were very high owing to the small production, the quantity produced being less than half a million bales in 1863 and but about one-fourth of a million in 1864, against 4½ millions in 1861. In 1867 there was a decline from the high prices consequent upon the Civil War to 7⅜d. (14¾ cents), but in a few months it reached 1s. 1d. (26 cents). In 1890 it ranged from 5⅛ d. to 6¾d. in Liverpool, and from 10¼ cents to 12¾ cents in New York. From 1891 to 1901 prices were low, falling to an annual average of 5.94 cents per pound in New York in 1898, advancing to 11.18 cents per pound in 1911 and an annual average of 15.11 cents per pound in 1910—the highest record since 1875. In 1912 the average price of middling cotton in New York was 11.52 cents and in 1914 about 12.4 cents.

The acreage and yield of cotton, including linters, for the season of 1912, as reported by the United States Bureau of the Census, were as follows:

STATE	Acres	Running Bales
Alabama	3,730,000	1,367,136
Arkansas	1,991,000	805,021
Florida	224,000	60,248
Georgia	5,335,000	1,888,963
Louisiana	929,000	392,720
Mississippi	2,889,000	1,049,604
North Carolina	1,545,000	935,080
Oklahoma	2,665,000	1,057,125
South Carolina	2,695,000	1,259,672
Tennessee	783,000	289,731
Texas	11,338,000	4,888,623
All others	159,000	96,850
Total	34,283,000	14,090,863

The accompanying Table No. 1, taken from *Bulletin No. 116, United States Census Bureau*, gives the cotton crop in the United States by States, according to censuses of 1870, 1880, 1890, 1900, and 1910 for the crops of the preceding year. The bale measurement of 1910 was 502.6 pounds; in 1890 it was 477 pounds; in 1880 it was 433 pounds; in 1870 it was 440 pounds. The early settlers north of the Ohio River planted cotton for domestic uses between 1749 and 1780. The census for 1860 gave for Illinois 1482 bales, or 659,490 pounds, of cotton.

TABLE I

COTTON GROWN IN THE UNITED STATES IN THE YEARS 1869, 1879, 1889, 1899, AND 1909 IN BALES

STATE	1869	1879	1889	1899	1909
Alabama	429,482	699,654	915,210	1,095,329	1,065,377
Arkansas	247,968	608,256	691,494	711,739	718,117
Florida	39,789	54,997	57,928	56,875	62,936
Georgia	473,934	814,441	1,191,846	1,300,184	1,901,830
Louisiana	350,832	508,569	659,180	713,929	269,573
Mississippi	564,938	963,111	1,154,725	1,257,772	1,109,580
North Carolina	144,935	389,598	336,261	477,070	649,886
Oklahoma*	.....	17,000	34,540	212,010	573,786
South Carolina	224,500	522,548	747,190	881,192	1,164,309
Tennessee	181,842	330,621	190,579	215,668	253,397
Texas	350,628	805,284	1,471,242	2,556,413	2,554,520
All others	3,148	41,280	22,326	29,605	62,898
Total	3,011,996	5,755,359	7,472,511	9,507,786	10,386,209

* Includes Indian Territory.

Among the States classed as "all others" are Missouri, Virginia, California, Kansas, Arizona, all of which are producing cotton in commercial amounts, and a number of other States where its cultivation as a crop has been abandoned. Stimulated by the high prices following the Civil War, the cultivation of cotton was con-

ducted to a limited extent in California, Illinois, Indiana, Nevada, Utah, and West Virginia. With the coming of low prices cotton culture gradually disappeared from those sections not peculiarly adapted to it, and censuses after 1870 credited none to Illinois, Indiana, Nevada, Utah, or West Virginia. Natural selection continues to eliminate the industry from sections less favored by climatic conditions. To illustrate: Kentucky is credited by the censuses of 1880 and 1890 with 1367 and 873 bales respectively, but the census of 1900 finds in this State only 84 commercial bales. The loss in those States lying along the northern border of the cotton belt is more than offset by the increase found in the territory west and southwest of the Mississippi River. According to the eleventh census 2,872,524 bales, or 38 per cent of the entire American crop of 1889, was grown in that region, while in the census of 1900, in the same territory, the production reached 4,250,940 bales, or 45 per cent of the whole crop. In 1912 the States of Arkansas, Louisiana, Oklahoma, and Texas, all west of the Mississippi River, produced 7,169,604 bales, or 52.3 per cent of the entire crop.

The exports of cotton from the United States averaged less than 2 billion pounds per annum in the decade ending with 1880, and between 2 and 3 billions per year up to 1895. During the next decade the exports averaged over 3 billion pounds per annum, and from 1907 to 1914 averaged over 4 billion pounds per annum, the quantity exported in the fiscal year 1911 being 5,535,125,000 pounds, the high record up to that date, and in 1913 was 4,562,926,000 pounds. The high record in value of exports was in 1911, being $585,318,869, that of 1913 being $547,357,195. The exports to the principal countries in 1913 were to Great Britain, $224,783,457; Germany, $144,175,157; France, $64,137,024; Italy, $30,169,663; and Japan, $25,022,050. The imports of cotton for 1913 were valued at $22,987,318, of which $18,753,197 was imported direct from Egypt, and between one and two million dollars' worth of Egyptian cotton from England. For the same fiscal year the exports of cotton goods were valued at $53,743,977, and the imports at $66,065,857, of which $35,776,301 was laces, embroideries, and other articles of this character.

The amount of cotton consumed by all the mills in the world for the year ending Aug. 31, 1913, was approximately 21,000,000 bales. At the same date there were 30,590,553 active spindles in the United States, 11,971,092 of which were in the cotton-producing States and 18,619,461 in all other States. The consumption of domestic cotton in the United States for the above period was 5,786,061 bales. About one-third of the cotton grown in the United States is consumed in domestic manufactures, and about two-thirds is exported, chiefly to Europe.

Manufacture. The process of transforming cotton from its raw condition into the thread or cloth that is such an essential of daily life is one which involves many different operations. It must first be cleaned to remove sand, dust, and other foreign substances. It then contains about two-thirds of its weight in seeds, which must be removed.

Cotton Ginning.—Before Eli Whitney's invention of the cotton gin, the removal of the seeds by hand was so difficult a task that very little cotton was raised. It would take one person two years to turn out an average bale of cotton 3 to 15 of which are produced by one machine in one day. Before the Civil War the gins were run chiefly by mule power, which, when operated in connection with slave labor, was cheaper than steam. Whitney's cotton gin, known as the saw gin, may be briefly described as a series of circular saws with fine teeth, revolving with an arc of their circumference projecting through a guide into a receptacle for seed cotton. These saws tear the lint from the seed and carry it through the guide. It is removed from the saws by a brush and carried to a condenser. Great care must be exercised not to injure the cotton (1) by having the saws too close to the bars of the grate, so as to rub, (2) by having them revolve too fast, or (3) by having the teeth too sharp. The roller gin is growing in favor among cotton producers, especially for the long-staple or Sea Island cotton, and in the United States and Egypt all long-staple cotton is ginned in this way. It removes the seed with only one-fifth the rapidity of the saw gin, but it does not injure the fibre. In a primitive form it has been used in Egypt and India for many centuries. It consists of two rollers, revolving in opposite directions, between which the cotton is passed and the smooth, hard seeds thrown off. Both the saw gin and roller gin have been much modified and their effectiveness increased by successive improvements.

In 1912 there were 28,358 ginneries in the United States, 25,279 of which were reported as active by the Census Bureau. The average outturn was 535 bales, a somewhat lower average than that of 1911, but a decided increase over the average for the preceding five years. The number of idle ginneries was 3079, or 203 more than in 1911. While the crop of 1912 was somewhat less than that of 1911, yet it would seem from the steady increase in the number of idle gins that the process of ginning is being gradually concentrated in the larger establishments.

In *Bulletin No. 58*, on Cotton Ginning, Twelfth United States Census, Daniel C. Roper divides cotton ginneries into three general classes: Those conducted exclusively for the public, those conducted exclusively for the plantation, and those conducted for both the public and plantation. The *Bulletin* states that "the rapidity with which the private or plantation ginneries have been supplanted by public and more modern equipments is noteworthy. Through inquiries of the census of 1880, covering the power and machinery of cotton-ginning establishments, it was ascertained that a large percentage of the crop of 1879 was handled by ginneries of a private character. The motive power of these ginning and baling plants consisted of horses or mules, and each had a daily capacity of from three to five bales. The general introduction of steam power brought economic methods that have crowded out primitive horse ginneries to such an extent that they are now curiosities."

Baling.—The cotton having been separated from the seed, the next step is to pack it in bales for shipment. Different methods of baling prevail among the cotton-producing countries. The American product, as put up in the old-fashioned tortoise-back bales, has the reputation of being the worst-baled cotton in the world. East Indian cotton is shipped in cubical

bales, weighing about 400 pounds, covered with thick Indian hemp and held together with strong iron bands. The Egyptian bale weighs about 700 pounds, is a little thicker and not so long as the American, and has 11, instead of 7 or 8, bands around it. Brazilian cotton comes in very light bales, weighing only 200 pounds, which are tied with trailing vines. In the cotton States of America the cotton which is not consumed by the Southern mills is shipped to the exporting city by rail, steamboat, or wagon. It is there graded by the exporter, who fastens a tag to each bale and also to a sample taken from it. It is from these labeled samples that the foreign manufacturer makes his purchases. The bales are then subjected to enormous pressure, usually by the transportation company, to reduce the size of the export bale, a standard bale weighing 500 pounds. During its progress from the farm to the factory a bale of cotton is given a series of brands, by the farmer and the ginnery, as well as the exporter, so that fraud can easily be traced. One of the objections to the American baling methods, however, is that the covering becomes so torn that the marks on it cannot be deciphered.

The manner in which American cotton is generally baled and pressed for transportation to the markets and mills is not only needlessly expensive and wasteful, but fails to protect the cotton from damage and theft. The bales are covered with jute cloth, made of thread so coarse and loosely woven that, while it adds unnecessarily to the weight of the bale, it does not protect the cotton. The bales are held together by steel bands, which still further increase the weight. The weight of the bagging and ties on a bale weighing 500 pounds is about 23 pounds. Besides the increased freight rates due to this bulky method of baling, the necessity of a second pressing, and the bad condition in which the cotton reaches the factory, a more grave defect is its excessive inflammability, resulting in high insurance charges. So great is this risk that on some passenger steamers cotton is not carried, on account of the danger of fire. An illustration of this danger was afforded by the terrible fire which occurred on the docks of the North German Lloyd Steamship Company at Hoboken, N. J., on June 30, 1900. The fire started in some unknown manner in a lot of cotton bales and spread with such rapidity that efforts to check it were unavailing. The loss of property caused by this cotton fire has been estimated variously at from $4,000,000 to $6,000,000, and the loss of life was about 200 persons.

Some years ago a cylindrical bale was devised that is made directly from the gin. This seemed to meet with favor for a time, but the census reports show a diminishing number of round bales, only 99,916 such bales being reported for the crop of 1913. The American Cotton Company makes a bale 4 feet long and 2 feet in diameter, weighing over 35 pounds per cubic foot. The cotton is pressed gradually, so as not to injure the fibre, and is in the form of a continuous lap or roll. Since the air is pressed out of the cotton, it has no tendency to expand, and the covering is only sufficient to keep the cotton clean. The heavy bagging and ties are entirely dispensed with. The cotton is compressed as fast as ginned and is shipped direct from the ginhouse to the warehouse or mill. The cylindrical bale of the Planters' Compress Company is 36 inches long, 18 inches in diameter, and weighs 250 pounds. This bale is held together by wires passing from end to end through a small opening in the centre. It is covered with cotton duck, and the weight of the cloth and wire is about three pounds per bale. Most satisfactory tests have been made with each of these types of bales, showing that they are both fire and water proof. The other objections to the old-fashioned methods of baling are also met by the cylindrical bales described. The reason for the failure of the round bale to be more widely adopted is not evident.

Spinning.—When the cotton bales are received at the factory, the cotton from the different bales is first mixed in order that the yarn produced may be of uniform quality. It is next submitted to a process of opening and picking that loosens the fibres which became closely packed together when the bale was pressed. Then follow the processes of *carding*, *drawing*, *slubbing*, *roving*, *spinning*, and *doubling*, by which the cotton fibre is reduced by successive stages from a web or sheet into cotton yarn. The process of carding is described under that title. Its object, besides cleaning the cotton of any foreign substances still adhering, is to reduce the lap into a thin fleece and then contract it into a ribbon or sliver. The sliver, after being doubled so that inequalities in the single slivers are counterbalanced, is put through a drawing machine, consisting of successive pairs of rollers, each of which revolves more rapidly than the preceding one, and which reduces the sliver to a finer and finer thread. By slubbing and roving, the process of attenuation is continued, the thread in each case taking the name of the machine through which it has just passed. The thread is also twisted, and when it leaves the roving machine it is strong enough to be wound on a bobbin. Spinning is the concluding process, and in this the thread is given the requisite firmness and twist. Doubling is the combining of two or more threads into a single cord. Every step in the manufacture of cotton yarn has for its object (1) the removal of finer and finer impurities, (2) the attenuation and strengthening of the thread, (3) correcting the mistakes of the preceding process. The whole process is described in more detail in the article SPINNING.

The thread may be subjected to the additional processes of *gassing* and *polishing*. The object of gassing is to singe off all the loose fibres and so produce a very smooth yarn. This is accomplished by passing the thread through a very fine jet of gas, as it is wound from one bobbin to another. The yarn is polished by applying a sizing made of starch, beeswax, or other materials. This not only gives the yarn a gloss, but increases its strength and weight. The process of weaving cotton into cloth does not differ materially from that of silk and wool and is treated in the article WEAVING.

The bulk of the world's cotton is shipped into foreign countries and often across the ocean twice—once to the factories to be transformed into yarn and cloth, and again, perhaps, back to the very region where it was first raised, in the form of cotton goods. The best example of this fact is offered by the United States, which raises nearly three-fourths of the world's cotton, yet in 1911 exported less cotton goods, measured by values, than the Republic of Swit-

zerland, which raises not a pound of cotton and has not even a seaport. Of course the United States is an enormous consumer of cotton, one-third of its large crop being consumed by its own mills, and this fact must be remembered in considering the extent of her export trade. Obviously the amount of cotton goods imported,

TABLE II

VALUE OF THE WORLD'S EXPORTS OF COTTON GOODS BY COUNTRIES

(From *Bureau of Census Bulletins, 106, 110, 113,* and *115*)

COUNTRY	1909	1910	1911
Austria-Hungary	$13,257,962	.....	$18,153,373
Belgium	54,004,530	.....	62,367,303
France	64,619,295	$63,768,744	67,789,127
Germany	95,524,870	103,466,692	114,108,624
Great Britain	558,269,108	515,222,235	595,584,160
Italy	25,646,333	.....	42,003,541
Netherlands	16,116,466	26,369,009	.....
Russia	10,689,328	13,155,995	.....
Switzerland	52,967,250	.....	52,206,307
United States	31,878,566	33,398,672	40,851,918
British India	37,428,252	40,216,450	48,478,362
Japan	29,260,177	38,446,485	34,049,000

and the amount produced and consumed at home, are also important factors.

Table II gives the value of the world's export trade in cotton, by countries, for 1909, 1910, and 1911. The table is compiled from *Bureau of Census Bulletins.* Of more value, however, as showing the actual extent of the cotton industry, including both home and foreign consumption, and its geographical tendencies as well, are the Tables III and IV, showing the number of cotton mills and spindles, the amount consumed, and the value of the output. By studying these tables certain facts and tendencies in the cotton trade are apparent. Great Britain is and for many years has been at the head of the cotton-goods trade, both in the amount exported and in the actual amount produced. It is interesting to note that this enormous industry is concentrated about Lancashire, in a district whose area is about 50 per cent greater than that of the State of Rhode Island. In the United States the most marked development is the relative importance of Southern factories, situated in the very locality where cotton is produced. Since 1890 the number of spindles has greatly increased and now more than one-third of the whole number in the country are in the cotton-producing States. The number in the Southern States grew from 4,368,000 in 1900 to 11,583,000 in 1912, while those in the Northern States only increased from 15,104,000 to 18,996,000 in 1912. Other industrial conditions besides the nearness to the cotton crop produced this growth, chief of which has been the general industrial awakening experienced by the South. Capital, however, in this section, has shown greater progress than labor, so that the latter is still cheap; a working day is long, and there are comparatively few labor laws restricting the age, sex, and other conditions of labor.

In 1909, according to the census report, there were in the United States 1324 establishments engaged in the manufacture of cotton goods. The materials used cost $371,009,000 and the manufactured products were valued at $628,392,000. There were 387,771 persons engaged in these industries and the wages paid in 1909 were $132,859,000 against $66,025,000 in 1889, having thus doubled in 20 years.

During the closing years of the nineteenth century the manufacture of cotton was much advanced in China and Japan. In China cotton has been made into cloth since 1260, and for four centuries it usurped the place of silk. Steam power was introduced into Chinese cotton factories in 1865–67 and into Japan in 1889. Great difficulty has been experienced in both China and Japan in getting laborers. There is no factory legislation in either country limiting the hours of labor, and in China children

TABLE III

NUMBER OF SPINDLES IN COTTON MILLS

SEASON OF	Great Britain	Continental Europe	Northern United States	Southern United States	Total United States	India
1889–90	43,750,000	25,460,000	12,800,000	1,605,000	14,405,000	3,274,000
1899–1900	45,500,000	33,000,000	14,400,000	4,700,000	19,100,000	4,945,000
1909–10	53,729,000	40,190,000	17,770,000	10,490,000	28,226,000	6,053,000
1912–13	55,576,000	43,400,000	18,700,000	11,700,000	30,500,000	6,400,000

TABLE IV

COTTON CONSUMPTION OF THE WORLD, IN 500-POUND BALES

YEAR	Great Britain	Continent of Europe	United States	India	All Others	Total World
1889–90	3,227,000	3,432,000	2,185,000	791,000	.....	9,635,000
1899–1900	3,334,000	4,576,000	3,856,000	980,000	789,000	13,535,000
1900–1	3,269,000	4,576,000	3,727,000	1,060,000	784,000	13,416,000
1901–2	3,253,000	4,836,000	4,037,000	1,384,000	905,000	14,415,000
1902–3	3,185,000	5,148,000	4,015,000	1,364,000	766,000	14,478,000
1903–4	3,017,000	5,148,000	3,908,000	1,368,000	869,000	14,310,000
1904–5	3,620,000	5,148,000	4,310,000	1,474,000	1,060,000	15,612,000
1905–6	3,774,000	5,252,000	4,726,000	1,586,000	1,097,000	16,435,000
1906–7	3,892,000	5,460,000	4,950,000	1,552,000	1,145,000	16,999,000
1907–8	3,690,000	5,720,000	4,227,000	1,561,000	1,083,000	16,281,000
1908–9	3,720,000	5,720,000	4,912,000	1,653,000	1,159,000	17,164,000
1909–10	3,175,000	5,460,000	4,533,000	1,517,000	1,304,000	15,989,000
1910–11	3,776,000	5,460,000	4,485,000	1,494,000	1,400,000	16,615,000
1911–12	4,160,000	5,720,000	5,211,000	1,600,000	1,788,000	18,479,000

begin to work at a very early age. The working day is 11 or more hours long, and the factories run seven days in the week. Labor is also very cheap, as estimated by the amount of money paid for a day's work, which averages from 10 to 15 cents; but the standard of intelligence and faithfulness among operatives is so low that, measured by the amount and quality of the product, the real cost of labor is high. In Japan it is particularly hard to keep steady employees. The girls are used to the freedom and out-of-door life of the country and will not stay long at their situations, so that mill operators are constantly hampered with green hands. In Japan the weaving of cotton and other fabrics is still largely a household industry. In 1896, according to the French Consul at Yokohama, 660,408 dwellings or establishments contained 949,123 looms, at which 1,043,866 persons were engaged in weaving. The yarn used in this household art is largely factory spun, thus increasing rather than diminishing the demand for cotton factories.

The preceding Table IV, compiled from various sources, shows the cotton consumption of the world for a number of years. In China most of the cotton cloth made is produced by hand labor, in part from yarns made by the Chinese mills, and in part from yarns imported from India and Japan. The cotton mills of China up to 1905 produced only yarn, but since that time have begun the manufacture of cloth.

Japan had 200,000 spindles in operation in 1889; 1,358,125 spindles in 1899; and 2,192,000 in 1912. Japan consumed 99,375 bales of cotton in 1890; 644,818 bales in 1898; and 1,190,000 bales in 1912. China had 570,000 spindles in operation in 1899 and 831,000 in 1912. It is estimated that on July 1, 1900, the world's working spindles numbered 105,000,000, and 140,996,000 in 1912.

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COTTON, Artificial. Artificial cotton is the term sometimes applied to the products obtained by treating wood pulp or other forms of cellulose in various ways in order to make filaments capable of being woven into textile material. These filaments are also called artificial silk, or, from their source, wood-pulp yarns. See Wood-Pulp Yarns.

COTTON, Mercerized. See Mercerized Cotton.

COT'TON, Charles (1630–87). An English translator and poet. He was a friend of Izaak Walton, to whom he addressed several poems, and to the fifth edition (1676) of whose *Compleat Angler* he contributed as the "second part" an essay on fly fishing. His works, nearly all in verse, include a translation of Corneille's *Horace* (1671); the *Life of the Duke d'Espernon* (1670); *The Fair One of Tunis*, published anonymously (1674); *The Scarronides, or Virgil Travestie* (1664), a coarse burlesque of the *Æneid* that ran through 15 editions; *The Voyage to Ireland in Burlesque* (1670); *The Wonders of the Peak* (1681). Cotton was a famous angler and was horticulturist enough to write an excellent *Planters' Manual* (1675). Some of his poems have been much admired for their sweetness and directness of style, and a volume of his *Lyrical Poems* was edited by J. R. Tutin in 1903. Wordsworth and Lamb particularly praised his "Ode to Winter." His best work, the English version of Montaigne's *Essays* (1685 and frequently since), places him among the greatest of translators.

COTTON, Charles Stanhope (1843–1909). An American naval officer, born in Milwaukee, Wis., and educated at the Naval Academy. In 1861 he entered active service and participated in several of the principal naval engagements of the Civil War. He was on the frigate *St. Lawrence* when that vessel captured the *Petrel* (July 28, 1861) and took part in the fight between the *Merrimac* and the *Monitor* (March, 1862). Soon after the close of the war he was appointed lieutenant commander. During the Spanish-American War he was in command of the auxiliary cruiser *Harvard*, and after the war he became commandant of the navy yard at Norfolk, Va. He was made a rear admiral in 1900 and was placed in command of the European squadron in 1903.

COTTON, George Edward Lynch (1813–66). An English divine and educator. He was born

at Chester and was educated at Trinity College, Cambridge. From 1837 to 1852 he taught at Rugby, being the "young master" mentioned in *Tom Brown's School Days*. He was for six years principal of Marlborough College and in 1858 was made Bishop of Calcutta. He founded many schools and effected great improvement in the education of the poorer classes of the Anglo-Indian population. He was drowned in the Ganges. Consult the *Memoir* (London, 1871) by his wife.

COTTON, JOHN (1585–1652). An eminent Puritan divine, known as "The Patriarch of New England." He was born in Derby, England, and was educated at Trinity College and Emmanuel College, Cambridge, at the latter of which he was successively a fellow, head lecturer, dean, and catechist. Inclining towards Puritanism, he left Cambridge about 1612, and for the next 21 years, with one short intermission, he had charge of the church of St. Botolph's, at Boston, in Lincolnshire, where he had an extraordinary influence over his congregation, gained a wide reputation for learning and godliness, and trained many young men for the ministry. When Archbishop Laud became Primate of England (in 1633), Cotton was summoned to appear before the Court of High Commission, but escaped the pursuivants sent to apprehend him and, after lying in concealment for some time in London, embarked for Boston, New England (which had been named in compliment to him), where he landed in September, 1633. Almost immediately thereafter he was chosen as teacher of the First Church in Boston, of which the Rev. John Wilson was then pastor, and he continued to act in this capacity until his death. Here, as in England, he had a wide reputation for learning and piety and soon came to wield a powerful influence over affairs both ecclesiastical and secular in New England and especially in Massachusetts. According to William Hubbard (q.v.), a contemporary historian, whatever he "delivered in the pulpit was soon put into an order of court . . . or set up as a practice in the Church," and the enthusiastic Cotton Mather, speaking of his learning, says that he was "a most universal scholar, and a living system of the liberal arts, and a walking library." "He was," says Tyler, "the unmitred pope of a pope-hating commonwealth." He took an active part in the Antinomian controversy, first supporting and afterward opposing Anne Hutchinson (q.v.), and conducted an extended controversy with Roger Williams, whose expulsion from Massachusetts he approved. He was a voluminous writer and published as many as 50 volumes, the most important of which are: *Set Forms of Prayer* (1642); *The Keys to the Kingdom of Heaven and the Power Thereof* (1664); *The Bloody Tenent Washed and Made White in the Blood of the Lamb* (1647), written in answer to a letter from Roger Williams; *A Brief Exposition upon Ecclesiastes; A Brief Exposition upon Canticles; A Treatise of the Covenant of Grace as It Is Dispensed to the Elect Seed; A Treatise Concerning Predestination;* and the famous catechism, entitled *Spiritual Milk for Babes, Drawn Out of the Breasts of Both Testaments, Chiefly for the Spiritual Nourishment of Boston Babes in Either England* (1646). A part of the controversy between him and Roger Williams may be found in the *Publications of Narragansett Club*, vols. i and ii (Providence, 1866–67). Consult: McClure, *The Life of John Cotton* (Boston, 1846); Norton, *Abel Being Dead, Yet Speaketh: or, the Life and Death of That Deservedly Famous Man of God, Mr. John Cotton* (London, 1658; republished, Boston, 1834); an interesting sketch in Mather, *Magnalia* (London, 1702); *John Cotton: Memorial Exercises, Boston First Church* (Boston, 1908); and a critique of Cotton's writings in Tyler, *A History of American Literature* (New York, 1878).

COTTON, NATHANIEL (1705–88). An English physician and poet, the friend of Young, author of *Night Thoughts*, and of the poet Cowper, whom he cared for in 1763–65 in his sanitarium, or, as he rather grandiloquently styled it, "Collegium Insanorum," at St. Albans, Hertfordshire, where he treated mental diseases with success. His *Visions in Verse* (1751) is his best-known volume, and among his shorter poems, "The Fireside" and "To a Child Five Years Old" are still found in anthologies. Consult *Select Poems of Dr. Cotton: with a Life of the Author*, in the series "The Works of the British Poets" (Philadelphia, 1819–23).

COTTON, SIR ROBERT BRUCE (1571–1631). A distinguished English antiquarian, founder of the Cottonian Library, now in the British Museum. After his education at Westminster School under the famous Camden, and at Cambridge, where he took a B.A. degree in his sixteenth year, he began those archæological pursuits which made his name famous, and which proved of immense value to historians. As the dissolution of the monasteries, about half a century before, had dispersed many valuable collections of manuscripts among private persons, Cotton sought out and purchased these documents wherever practicable. On account of his ability and knowledge he was frequently consulted by ministers of state on difficult constitutional points and international questions. In 1600, at the request of Queen Elizabeth, who desired antiquarian authority on the matter, he wrote *A Brief Abstract of the Question of Precedency Between England and Spain.* King James, who knighted him in 1603 and gave him a baronetcy in 1611, employed him to vindicate the conduct of his mother, Mary, Queen of Scots, and also to examine whether the Roman Catholics, on account of whom some alarm was then felt, should be imprisoned or put to death. Cotton advocated tolerance. His intimacy with the Earl of Somerset led him to be suspected of complicity in the death of Sir Thomas Overbury, and in consequence he was imprisoned for about eight months. In 1629 a tract entitled *A Project How a Prince May Make Himself an Absolute Tyrant* was obtained from his library, the tendency of which Charles I and the Star Chamber considered dangerous to the liberty of the state. His library was accordingly declared unfit for public inspection, and he himself was denied all use of it. Depression at this edict caused his death, less than two years afterward. His son, Sir Thomas (1594–1662), regained possession of the library, and his grandson, Sir John (1621–1701), and great-grandson, Sir John (1679–1731), added to it considerably. The latter bequeathed it in public trust to the nation in 1700. In 1730 the library was lodged with the royal collection in Ashburnham House, Westminster. The following year a fire occurred in which 114 out of 958 manuscript volumes were reported as "lost, burned, or entirely destroyed;

and 98 damaged so as to be defective." Fortunately a great number of these injured volumes were skillfully restored, so that the library now consists of nearly 900 volumes, of which, says Mr. Edwards in his *Memoirs of Libraries*, "nearly 200 are state papers of the highest value. They include a vast series relating to the diplomatic intercourse between England and almost every state of Europe, extending from the reign of Edward III to that of James I. A large proportion of these documents consist of the original letters of sovereigns and of statesmen. Even those papers which are not original have a high degree of authority as coeval transcripts." The Cottonian Library was transferred to the British Museum (q.v.) in 1757. In addition to the manuscripts, the collection includes many valuable coins and antiquities. Among Cotton's works may be mentioned, in addition to those referred to above: *Povver of the Peeres and Comons of Parliament in point of Judicature* (1640); *Cottoni Postuma—Choice Pieces of that Renowned Antiquary* (1672); *Divers Short Pieces Exposed to Publick Light by J. Howell* (1679); "Speech before the Privy Council touching the Alteration of Coyn," in Shaw, *Select Tracts and Documents* (1896). Consult also: *Calendars of State Papers* (London, 1591–1631); *Parliamentary Journals* (ib.); Planta, *Catalogue of the Manuscripts in the Cottonian Library* (ib., 1802); Smith, *Catalogue* (Oxford, 1696), containing a memoir; Kippis, "Robert Bruce Cotton," in *Biog. Brit.* (London, 1797); D'Ewes, *Autobiography* (2 vols., ib., 1845); Nichols, *Progresses of James I* (4 vols., ib., 1828); id., *Leicestershire* (ib., 1795–1811); Gardiner, *History of England* (ib., 1883–84).

COTTON BIRD. A small South African titmouse (*Ægithalus capensis*), called *kapok vogel* (i.e., 'cotton bird') by the Cape Colony Dutch on account of its wonderful nest, made of cottony materials, which closely resemble the nest of its congener, the penduline titmouse of Europe, illustrated on the Plate of PENSILE NESTS OF BIRDS with the article NIDIFICATION. (See also TITMOUSE.) This nest, first figured by Le Vaillant (*Oiseaux d'Afrique*, Paris, 1806), whose picture has been widely copied, is usually wrongly assigned to an entirely different bird. Consult Shelley, *Birds of Africa* (London, 1900).

COTTON FAMINE. The name given to an industrial crisis in the manufacturing towns of northern England, occasioned by the almost complete disappearance of cotton imports from the United States during the last three years of the Civil War. As a result of the blockade of the Southern ports by the Federal government, the importation of cotton from the United States into Great Britain sank from more than 1,000,000,000 pounds in 1860 to 816,000,000 pounds in 1861, 13,000,000 pounds in 1862, and 6,000,000 pounds in 1863; and as the imports from the United States constituted more than three-fourths of the total supply, the blow to the cotton industry in Lancashire was a stunning one. The suffering fell most heavily on the mill operatives, who, as a body, were brought to the verge of starvation by the partial or complete suspension of production. In November, 1862, it was estimated that more than 350,000 persons in Lancashire were subsisting on parochial relief or private charity. It is a notable fact that, in spite of their great privations, the factory population of Lancashire was in thorough sympathy with the Northern cause, which they regarded as a crusade against slavery. Consult Arnold, *History of the Cotton Famine* (London, 1865).

COTTON GIN. A machine for separating the cotton fibre from the seed, invented by Eli Whitney of Massachusetts and patented March 14, 1794. Previously the work had been done by hand, a slow and tedious process. Two types of gin are now in use—the saw gin of the Whitney type, which does very rapid work, and is generally used, and the roller gin, which is much slower, but is less likely to injure the fibre and is therefore preferred for the long staple Sea Island and Egyptian cottons. See COTTON, *Manufacture*.

COTTON GRASS (from its cottony spike), *Eriophorum*. A genus of plants of the family Cyperaceæ, having the fruit accompanied with long, silky hairs which spring from the base of the ovary. The species, which are about a dozen, are natives chiefly of the colder regions of the Northern Hemisphere. Several are found in America, and their white, cottony fruit-bearing spikes are well known in our swamps and bogs. The cottony substance is used for stuffing pillows, etc., and it is claimed that cloth may be made from it. The fibre lacks the twist of the cotton fibre and cannot be spun as readily. The stems of a Himalayan species, *Eriophorum cannabinum*, called *bhabhur*, yield a very strong fibre and are much employed for making cordage, being simply twisted into cables, of which rope bridges are usually made; but they are not durable and require much repairing every year. Cotton grass is said to be valuable for sheep pasture.

COTTON INSECTS. One of the most important insects injurious to the American cotton culture is the cotton worm, the larva of a noctuid moth (*Aletia xylina*), which sometimes defoliates whole districts. It is believed to be South American, and first became strikingly harmful in the Southern States in 1804. It is now known all over the Union, but its Northern food plant is unknown. A government commission reported in 1879 that the average loss to the cotton-growing States due to its ravages was then from $15,000,000 to $20,000,000 annually. The moth is 1½ inches in spread of wings, the fore wings and body reddish brown, with delicate zigzag markings, and the hinder wings pale gray-brown. It flies at night and deposits eggs singly or sparsely on the underside of the leaves of the cotton plant, where they hatch in midsummer in about 50 to 60 hours. The caterpillars begin at once to devour the leaves, and so many are they, sometimes, that whole fields have been defoliated in three days, when the caterpillars swarm elsewhere in search of more food. In midsummer the caterpillars remain about 13 days, then fold a leaf about themselves and spin a cocoon in which they pupate. In two to four days after issuing from the chrysalis the female moth begins to lay—her average product being 400 eggs in the season. The natural food is the juice exuding from the glands on the leaf's midrib and at the base of blooms and bolls; but it will feed on any kind of fruit as it ripens. Until the worms are numerous enough to riddle the leaves badly, the moths continue to lay near their birthplace; then they migrate to considerable distances—seldom, however, until after the third generation of worms, say July 1, in southern Texas. Migrations are most common in the fall months, the moths flying at night and on

cloudy days. In the Southern States only the moths hibernate (the worms never, nor anywhere), hibernation being more frequent in the Southwestern than in the Atlantic States. The moths hibernate under bark, in logs and timbers, etc., and mild winters are more severe on them than cold ones, which keep them torpid.

In some districts there are as many as seven generations in a season. The average time from the egg of one generation to that of the next is a month.

The caterpillars visit earliest low alluvial lands where the plants are luxurious and thrifty. Moisture is favorable to their development; hot, dry weather unfavorable. The damages to the crop may reach 25 per cent in the Southern districts; but in the Northern the worms may do similar insects, viz., *Prodenia littoralis* and *Earias insulana*.

The cotton stainer, or red bug (*Dysdercus suturellus*), is a small suctorial bug, "which drains the sap from the bolls by its puncture, causing them to become diminutive or abortive; but the principal injury it does is by voiding an excrementitious liquid which stains the cotton fibre yellow or reddish and very much depreciates its value in the market, the stains being indelible." It is also troublesome to orange growers in cotton-growing districts. See *Insect Life*, vol. i (Washington, 1888), illustrated. Several plant bugs, such as the capsid (*Psallus delicatus*), known in Texas as the cotton flea, and certain small beetles, are also injurious to cotton. For a description of the weevil, see WEEVIL.

THE COTTON BOLLWORM.

1. Adult moth (*Heliothis armigera*). 2. Destructive larva (the "bollworm" or "bud worm"), with a small boll pierced by a young caterpillar. 3. Vertical section of a newly expanded cotton flower, showing a young bollworm at work. 4. Section of a large green boll, which contains a caterpillar that has devoured the contents of the cell. 5. A pupa within its earthen case.

more good than harm, by removing superabundant leaves, thus facilitating the ripening of the bolls.

For further and extensive information and preventive measures, consult: Comstock, "Report on Cotton Insects," in *United States Department of Agriculture* (Washington, 1879), illustrated; Riley, *United States Entomological Commission, 4th Report* (ib., 1885); *Bulletin No. 18*, N. S. (ib., 1898).

The bud worm is scarcely second in its evil effects. (See BOLLWORM.) It is hatched from eggs deposited singly on all parts of the plant, taking only three to five days to hatch in summer. The worm is much like the cotton caterpillar, but larger. Its principal food is the flowers and bolls. The chrysalis is found a few inches underground. The chrysalis state lasts 7 to 10 days in midsummer, double that in cooler weather. The moth is in appearance and habits much like the *Aletia*, but seldom appears before July or August. Hibernation is in the chrysalis state only and underground. Breeding continues until cold weather; but the first three generations of each year generally feed in the cornfields, the first lot seen on cotton being the fourth brood.

Other injurious moths infesting cotton and eating the foliage include the yellow bear (*Spilosoma virginica*), the io (*Saturnia io*), the basket worm, or bagworm (q.v.), and several others. Cotton culture in Egypt is afflicted by two very

The natural enemies of the cotton worm and of the bollworm are domestic fowls, birds, spiders, beetles, wasps, ants, parasites, etc. As preventive measures, the free use of poisons is good for both, and fall plowing, which upturns the chrysalids of the bollworm, exposes these to the attacks of fowls and the fatal influences of cold.

Consult: "Mexican Cotton Boll Weevil," *Senate Document No. 305* (Washington, 1912); "Control of the Boll Weevil," *Farmers Bulletin No. 500* (ib., 1912); "The Boll Weevil Problem," *Farmers Bulletin No. 512* (ib., 1912); "The Cotton Boll," *United States Department of Agriculture, Bureau Entomology, Bulletin No. 50* (ib., 1905).

COTTON MOUSE. A field mouse (*Peromyscus gossypinus*), dark brown, with grayish feet, prevalent in the southern United States and injurious to cotton plants. Its habits are similar to those of the common white-footed mouse of the North. See MOUSE.

COT'TONMOUTH' (so named from the white, cotton-like streak about its mouth). Properly, the moccasin snake (q.v.), but also a name in the southern United States of the copperhead.

COTTONSEED AND ITS PRODUCTS. *Cottonseed Oil.*—Cotton, which is described in the article bearing that title, when it is picked consists of the seeds and the lint or fibre adhering to and covering the seeds. The seeds constitute about two-thirds of this product. The

census of 1910 estimated the production of seed at 5,324,634 tons, valued at $121,076,984. It constitutes a very valuable part of the product and is used for manufacturing cottonseed oil, for feeding animals, and for fertilizer. The cottonseed, after the removal of the fibre "linters" and hulls, yields, upon pressure, a large amount of yellow oil, with a bland, nutlike taste. Even before the invention of the cotton gin in 1794, the utilization of cottonseed was attempted, and in 1770 samples of the oil were exhibited by the Moravians in Bethlehem, Pa. Previous to that time the seed had been allowed to rot on the ground by many of the planters, while others more intelligent had utilized it as food for cattle, sheep, and horses. Others dug furrow trenches and buried it in the rows on which the next crop of cotton would be planted. Some fed it raw to their stock, while others boiled or roasted it to make it possibly more palatable. In 1820 a patent was granted for a process for extracting the oil, but the construction of the mills was so slow that at the end of 50 years only 26 cotton-oil mills had been erected. Towards the close of the nineteenth century the value of the cottonseed began to be more generally appreciated. In 1909 there were in the United States 817 cotton-oil mills, which crushed a total of 3,798,549 tons of cottonseed, yielding 157,145,689 gallons of crude oil, 1,661,734 tons of cottonseed meal, and 1,258,612 tons of hulls. The product of these mills had a combined value of $147,867,894 against total of $58,727,000 in 1899.

In addition to the oil extracted from the cottonseed, it yields the following by-products: *Linters*, or short bits of lint that adhere to the seed in the ordinary process of ginning, and are stripped by a specially constructed gin. These short fibres are used for the manufacture of batting and wadding. *Hulls*, the outer casings of the seed, used extensively for cattle food, whose properties are discussed below. *Cottonseed meal*, the residue left after the oil is expressed from the meats. This is extensively used as a cattle food and as a fertilizer. *Sludge*, which settles at the bottom of the oil tanks and is used in the making of soap, stearin, etc.

The process of manufacture is briefly as follows: The seed is shoveled from the cars into conveyors, which are spiral screens revolving in troughs with perforated bottoms through which any loose soil, sand, and stones are shaken. This process of cleaning is continued in a separator, where by means of different-sized screens all dirt and impurities are removed. A strong magnet is also used to draw out bits of nails and other iron. The seed being sifted and cleansed, it is now passed through the linter, a specially constructed gin for removing these short fibres. The lint is ginned twice, the second process removing the shorter fibres, so that two brands or qualities are thus obtained. The next process is to crack the hulls in a machine between revolving blades and bars, and then the meats and hulls are separated, the latter being sold either loose or in 100-pound bales. The meats are now ready to be passed through heavy calender rolls to crush the oil cells. There are two processes of making cottonseed oil. It may be expressed directly from the cold meats, this process making a high-grade oil; or the meats may first be heated in cookers. These cookers are steam-heated metal pans, covered with nonheat-conducting material and holding 700 pounds. The seeds are cooked from one-quarter to three-quarters of an hour, according to their condition as determined by the judgment of the operator, too little or too much cooking giving a smaller yield of oil. The cooked meats are dropped into a camel's-hair sheet, spread out on a steel plate. Wrapped in this sheet the meats are subjected to pressure, which is gradually increased till it reaches 3500 pounds per square inch. Under this pressure a dark, murky oil flows out in streams and is received in reservoirs beneath the presses, whence it is pumped into settling tanks. The cakes are now taken from their wrappings of camel's-hair, cooled, and dried. They are then cracked and ground into meal, which is shipped directly in sacks or pressed again into cakes. After the crude oil has settled, it is drawn off and refined by treating it to a 10 or 15 per cent solution of caustic soda and then allowed again to settle. As it settles, the mucilaginous, albuminous coloring matters and other impurities sink to the bottom, leaving a clear yellow oil, which may be still further filtered and purified if desired. The white oil of commerce is produced by shaking up the oil with a 2 or 3 per cent mixture of fuller's earth and then allowing it to settle.

The commercial cottonseed oils are classified as crude, summer yellow, summer white, winter yellow, and winter white. The winter oils are made by cooling the summer oils to the freezing point, when the palmitin crystallizes and the oil is pressed out of the remaining solidified material. Cottonseed oil consists chiefly of palmatin and olein, the winter oils being almost entirely olein. It stands midway between the drying and nondrying oils, its drying properties being inferior to those of linseed oil. (See OILS.) It solidifies at from 32° to 38° F., is almost odorless, and has a slight nutty taste. Its uses are constantly increasing. It is employed extensively in cooking and, prior to the passage of pure-food laws, was also used as an adulterant of lard, olive oil, and other staples. Large quantities are used in making oleomargarine (q.v.). It is used in pharmacy, in making soap and paint, as a lubricator and an illuminant. Consult Brooks, *Cotton and its Uses* (New York, 1898).

Feeding and Fertilizing Value.—Brief mention has already been made of the use of cottonseed products for feeding cattle and for fertilizer. Whole cottonseed has been shown by a large number of analyses to range in composition as follows:

PERCENTAGE COMPOSITION OF WHOLE COTTONSEED

	Water	Ash	Protein	Fibre	Nitrogen-free extract	Fat
Maximum	17.51	8.00	29.70	32.40	36.70	29.34
Minimum	8.00	2.89	13.62	17.60	7.58	10.40
Average..	9.92	4.74	19.38	22.57	23.94	19.45

This material was used in the past to considerable extent as a feeding stuff for cattle, hogs, and sheep, and was fed either raw, cooked, or roasted, but, with the advent of oil mills, its use for this purpose is much less in the vicinity of these, because the seed is disposed of to better advantage to the millers or can be exchanged for cottonseed meal. There are also the further reasons that the lint on the seed and the dust it collects are likely to be injurious, while at the

same time it is not easy to mix the seed itself thoroughly with other coarse feeds. It is a very rich feeding stuff, and animals must be accustomed to it gradually. The whole seed is sometimes used for fertilizer, and then it is partially rolled.

Cottonseed meal is the ground residue left in the manufacture of oil from the seed. It is sometimes called cottonseed cake and belongs to the class of feeding stuffs known as oil cakes. Cottonseed cake is of two kinds—undecorticated, or that from the whole seed, and decorticated, or made from the kernels after the hulls have been removed. Undecorticated cake was formerly largely used, but most of the mills now remove the hulls before expressing the oil. Cottonseed meal is bright yellow in color, with a sweet, nutty flavor. It deteriorates and becomes discolored with age. The following summary of over 400 analyses shows its range in composition, which is due to differences in the composition of the seed and the completeness with which the hulls are separated and the oil expressed:

PERCENTAGE COMPOSITION OF COTTONSEED MEAL (DECORTICATED)

	Water	Ash	Protein	Fibre	Nitrogen-free extract	Fat
Maximum	18.52	10.60	52.88	15.15	38.68	20.66
Minimum	5.29	1.72	23.27	1.88	9.13	2.18
Average..	8.52	7.02	43.26	5.44	22.31	13.45

This material is one of the richest feeding stuffs in use, considerably exceeding in protein and fat such materials as linseed meal, but, in spite of this, it is quite well digested when fed in moderation. On an average, 88.8 per cent of the protein, 57 per cent of the fibre, 77.6 per cent of the nitrogen-free extract, and 88.6 per cent of the fat has been found to be digested by ruminants. It is fed extensively in the United States to cows, cattle, sheep, and nearly all kinds of farm stock. Pigs do not seem, for some reason, to be able to eat the meal for any considerable length of time without danger of injurious effects. An apparent antidote for cottonseed-meal poisoning has been found by Withers in iron salts. Young animals, like calves, have also often been injured by cottonseed meal, and its use with them is attended with danger. All experience goes to show that the fresh meal can be fed to other kinds of animals without danger and in large quantities after they become accustomed to it. Six, 8, and even 10 pounds of cottonseed meal per head is often fed to steers for short periods with good results, using no other kind of grain except the hulls. It is undoubtedly best to mix some material like corn meal with it. For cows about two pounds a day seem to be a safe limit for continued feeding, although three and often four pounds are often fed. It tends to give a firmer, harder butter, which will stand shipment better, but large rations injure the quality. Larger quantities can be fed with safety in winter than in summer. The meal was formerly adulterated with finely ground hulls, but the foodstuff laws now require the composition to be stated.

Cottonseed meal is rich in fertilizing materials, as shown by the following average of over 200 analyses: water, 7.8; ash, 7; nitrogen, 6.8; phosphoric acid, 2.9; and potash, 1.8 per cent. It is chiefly used as a source of nitrogen, and finds quite extensive use for that purpose through the southern portion of the United States. It has given excellent results with sugar cane, cotton, and corn, and has been successfully substituted for barnyard manure in the culture of tobacco. But its use as a fertilizer is of course wasteful, as the food constituents are not utilized in that case. A more rational practice in many cases is to feed the meal and apply the resulting manure to the soil, since from 80 to 90 per cent of the fertilizing materials would be recovered in the manure, and additional benefit would be secured in the production of meat, milk, etc.

Cottonseed hulls, which are removed at the mills by means of crushers, screens, and shakers, also possess some feeding value and are much used with the meal. They constitute nearly one-half of the weight of the ginned seed. They contain about 11 per cent of water, 4 of protein, 46 of fibre, 33 of nitrogen-free extract, and 2 per cent of fat. Their digestibility is low, less than 40 per cent of the total dry matter being assimilated. They are hard and dry, usually covered with a fuzzy lint, and very bulky. They are used principally as a cheap substitute for hay and for the purpose of giving bulk to the ration. Large numbers of cattle are fattened in the Southern States of the United States on cottonseed meal and hulls exclusively, in proportions varying from two to six pounds of hulls to one pound of meal. The practice is claimed to be economical and profitable. Cottonseed hulls were formerly burned at the oil mills as fuel, the resulting cotton-hull ashes being rich in potash and much used as a fertilizer. (See ASHES.) Consult: Roper, "Cottonseed Products," in *Twelfth United States Census*, vol. ix, part iii (Washington, 1902); *Thirteenth Census*, vol. viii (Washington, 1913); Tompkins, *Cotton and Cotton Oil* (Charlotte, N. C., 1901); Tamborn, *Cottonseed Products* (New York, 1905).

COTTON STATE. Alabama. See STATES, POPULAR NAMES OF.

COT'TONTAIL'. Any of the smaller American hares, especially the common wood hare, or gray rabbit. The name refers to the fluffy white scut and is often personified as "Molly Cottontail." See HARE, and Plate of HARES AND PIKA.

COTTON WHIGS. See CONSCIENCE WHIGS.

COT'TONWOOD'. A name applied to a number of species of *Populus* on account of the abundant white cottony hairs surrounding the seed. The trees are widely distributed. Some attain large size and are valuable for many purposes. See POPLAR.

COTTRELL, FREDERICK GARDNER (1877–). An American chemist, born at Oakland, Cal. He was educated at the universities of California, Berlin, and Leipzig, from 1897 to 1900 taught chemistry at the Oakland High School, and between 1902 and 1911 was instructor and assistant professor in the department of physical chemistry at the University of California. In 1911 he became chief physical chemist of the United States Bureau of Mines. He is author of *Der Restrom bei galvanischer Polarization betrachtet als Diffusionsproblem* (1903).

COT'YLE'DON (Gk. κοτυληδών, *kotylēdōn*, cup-shaped hollow socket, from κοτύλη, *kotylē*, hollow cup). The first leaf or leaves of an embryo. In seed plants the cotyledons are usually formed within the seed, and in most cases they escape during germination, but are usually

very different in appearance from the later leaves. See SEED.

COT'YLOSAU'RIA (Neo-Lat. nom. pl., from Gk. *κοτύλη, kotylē*, hollow cup + *σαῦρος, sauros*, lizard). The order which includes the most ancient reptiles, fossil in rocks of the Carboniferous and Permian ages. The Cotylosauria are generally agreed to be the ancestors of all later reptilian types and are most nearly allied to the turtles among living reptiles, though they are much more primitive and show no evidences of a carapace. The cotylosaurians are thus characterized by Cope: "Quadrate bone united with adjacent elements by suture; temporal regions with roof of a few symmetrical segments. No distinct postorbital bars; vertebræ amphicœlous; ilium narrow, vertical; feet ambulatory."—*Report United States National Museum, 1898* (Washington, 1900). Consult Case, "A Review of the Cotylosauria of North America," *Carnegie Institution Publication* (Washington, 1911).

CO'TYS, or **COTYT'TO** (Lat., from Gk. *Κότυς, Kotys,* *Κοτυττώ, Kotyttō*). A Thracian goddess, whose festival, the Cotyttia, was held at night and was notorious for its debaucheries. Her worship was adopted by some of the Greek states.

COTYTTIA. See COTYS.

COUCAL, kōō'kăl (probably an African word, although according to Cuvier it was coined in 1796 by Le Vaillant in his *Oiseaux d'Afrique,* from Fr. *couc*-ou, cuckoo + *al*-ouette, sparrow). A kind of cuckoo, many species of which are widely distributed throughout Africa and southeastern Asia to Australia, constituting the subfamily Centropodinæ, especially characterized by having the hind toe terminated by a straight, spinelike claw, whence they have been called "lark-heeled." They are large, ground-keeping birds, generally red and black, more or less glossed, and sometimes banded with brown, and are known generally as "ground cuckoos." A species of the Philippines has a rounded crest and black, horny appendages to the feathers of the head and throat. Some other Asiatic species mimic pheasants in appearance and gait and are called "pheasant cuckoos." The best-known one, the very common Indian "crow pheasant" (*Centropus sinensis*), is nearly 2 feet long, black, with the mantle and wings chestnut, and utters a curious howling cry, followed by a series of rattling exclamations. All these birds make their own nests, sometimes elaborate roofed structures in thorny bushes, and lay white eggs incrusted like those of ani. They are closely allied to the American road runner. See CUCKOO.

COUCH, DARIUS NASH (1822–97). An American soldier. He was born at South East, N. Y., graduated at West Point in 1846, served in the Mexican War (1846–47), and was brevetted first lieutenant in 1847 for services at Buena Vista. In 1849–50 he served against the Seminoles and in 1853 made an important exploring expedition into northern Mexico. In 1855 he resigned from the army to become a merchant in New York, but in June, 1861, reëntered the service as a colonel of volunteers, and in August became brigadier general. He served in 1861–62 with the Army of the Potomac, rendering valuable services at Fair Oaks, Williamsburg, and Malvern Hill; was promoted to be major general in July, 1862; commanded the Second Army Corps at Fredericksburg and Chancellorsville; was in command of the Department of Susquehanna in 1863 and 1864; and was at the head of a division at the battle of Nashville. He resigned in 1865, and in the same year was an unsuccessful candidate on the Democratic ticket for the governorship of Massachusetts. He was subsequently collector of the port of Boston in 1866–67, was quartermaster-general of Connecticut in 1877–78, and was adjutant general of that State in 1883–84.

COUCHANT, kou'chant (Fr., pres. part. of *coucher*, to lie down). In heraldry, a beast lying down, with his head up, is couchant. If the head is down, he is dormant. See HERALDRY.

COUCH GRASS (corrupted from *quitch grass, quick grass;* so called from its rapid growth), *Agropyron repens.* Also called wheat grass, dog grass, quickens, and squich or quitch. A grass chiefly known as a troublesome weed. It is common in most parts of Europe and North America. See AGROPYRON.

COUCY, kōō'sē', THE CHÂTELAIN DE. A French troubadour, whose name was Guy—although he has sometimes been identified with Renaud, Guy's successor, as Châtelain of Coucy. Guy became Châtelain of Coucy in 1186, took part in the Third Crusade (1189–91), and was killed by the Saracens about 1203. His work consists of about 16 songs, in the troubadour style, but with more sincerity and originality than the usual *chansons courtoises* of the time. They were published by Fath as *Die Lieder des Castellan von Coucy* (Heidelberg, 1883). The legend connected with his name is found in the literature of many countries, though it is most likely of Breton origin. About the end of the thirteenth century there appeared a story, or *roman,* in verse by Jakemon Sakesep, of whom nothing is known, and whose name is taken from an acrostic given in his work, *Roman d'aventure.* He tells of the loves of the Châtelain de Coucy and the Dame de Fayel. Falling ill on his way from the Holy Land, the Châtelain ordered that after his death his heart be taken to his lady. But her husband intercepted the messenger, took the sacred souvenir, and forced his wife to eat it. Thereupon the Dame starved herself to death. The story was published with a modern version by Crapelet (Paris, 1829), and an English romance on the same subject is printed in vol. iii of Ritson's *English Metrical Romances* (1885). See CABESTAING, GUILLAUME DE.

COUCY-LE-CHÂTEAU, kōō'sē'le-shâ'tō'. A small village and cantonal seat in the Department of Aisne, France, 10 miles north of Soissons (Map: France, N., J 3). It is celebrated for the remains of its mediæval castle of the thirteenth century, standing on an acclivity, accessible on one side alone, and one of the most formidable fortresses of its period. The castle covers an area of 10,000 square yards and is surrounded by lofty walls and a moat. Four towers flank the donjon, which is 210 feet high, 100 feet in diameter, and has walls 34 feet thick. Pop., 1901, 683; 1911, 657. Built by Enguerrand III, a pretender to the throne of France, it was purchased in 1396 by Louis of Orléans and in 1498 became crown property. It was dismantled by Mazarin's order in 1652.

COUDER, kōō'dâr', LOUIS CHARLES AUGUSTE (1790–1873). A French historical, religious, and decorative painter. He was born in Paris and studied at the Beaux-Arts under David and Regnault. He first attracted favorable attention in the Salon of 1817 with "The Levite of Ephraim" (Luxembourg), which was followed by several historical and religious pictures. His frescoes in the Rotunda of the Louvre (1820)

were severely criticized, but he was more successful with his decorations of several Parisian churches and with his series of large historical compositions in the gallery at Versailles, beginning with the "Battle of Lawfeld" and including the "Siege of Yorktown." Couder was one of the most important representatives of the Classical school in France. He was a member of the *conseil supérieur* of the Ecole des Beaux-Arts and wrote some critical works on art. Consult Jules Breton, *Nos peintres du siècle* (Paris, n. d.).

COUDERSPORT, kou'dĕrz-pōrt. A borough and the county seat of Potter Co., Pa., 110 miles (direct) east by south of Erie, on the Allegheny River, and on the Coudersport and Port Allegany Railroad (Map: Pennsylvania, F 2). It contains a public library and a hospital. The borough has flour mills, a foundry, a tannery, and manufactures of furniture, rubber goods, mangle rollers, condensed milk, barrel headings, etc. Pop., 1890, 1530; 1900, 3217; 1910, 3100.

COUDERT, kōō-dĕr', Frederic Rene (1832–1903). An American lawyer, born of French parents in New York. He graduated at Columbia College in 1850 and was admitted to the New York bar three years later. In 1877 he was a delegate of the New York Chamber of Commerce to the Antwerp Congress, which was held for the purpose of establishing a universal system of general average. He was counsel for the United States before the International Bering Sea Commission (Paris, 1893–95); a member of President Cleveland's Venezuela Boundary Commission (1896–98). He received the Cross of the Legion of Honor and also decorations from Italy and Venezuela. His publications include: *International Law, the Rights of Ships* (1895), and *Addresses, Historical-Political-Sociological* (1905).

COUDES, or **COUDIÉRES.** See Elbow Pieces.

COUDREAU, kōō'drō', Henri Anatole (1859–1899). A French explorer, born in the Department of Charente-Inférieure and educated at Cluny. In 1881 he explored French Guiana and the adjacent territory, and in 1895 he was commissioned by the government of Parâ to explore the Tapajos, Xingu, and other branches of the Amazon. These explorations are described in several interesting volumes published in 1897. His other publications include: *Voyage au rio Branco et aux Montagnes de la Lune* (1886); *Etudes sur les Guyanes et l'Amazonie* (1887); *Chez nos Indiens* (1892); *Quatre années dans la Guyanne française* (1893); *L'Etat de Para* (1897); *Voyage au Tapajoz* (1897); *Voyage au Tocantins-Araguaya* (1897); *Voyage au Xingu* (1897); *Voyage à Itaboca et à l'Ilacayuna* (1898); *Voyage entre Tocantins et Xingu* (1899); *Voyage au Yumunda* (1899).

COUES, kouz, Elliott (1842–99). An American naturalist, particularly known for his researches in ornithology. He was born at Portsmouth, N. H., graduated at Columbian (now George Washington) University in 1861, from the medical department of that institution in 1863, became an assistant surgeon in the United States army, and made extensive studies of the flora and fauna in the vicinity of the various posts at which he chanced to be stationed. In 1873–76 he was attached as surgeon and naturalist to the United States Northern Boundary Commission, and from 1876 to 1880 as secretary and naturalist to the United States Geological and Geographical Survey of the Territories, directed by Dr. F. V. Hayden. He resigned his commission in 1881, and thenceforth was occupied wholly with scientific pursuits. From 1877 to 1887 he was professor of anatomy at the National Medical College at Washington, D. C. He was elected to the National Academy of Sciences in 1877, was a founder of the American Ornithologists' Union, and an editor of the *Auk*, the journal of that society. About 1880 he became interested in spiritualism, theosophy, and allied matters, and for a time was affiliated with the Theosophical Society. He was known as a student of comparative anatomy and general biology, and for seven years was connected with the *Century Dictionary* as editor and contributor in the departments of general zoölogy, biology, and comparative anatomy. But while his field of activity was wide, he was prominent chiefly as a writer on ornithology and in particular on that of North American birds. His *Key to North American Birds* (1872; rewritten 1884; again, 1901; 5th ed., 1903) has perhaps had a greater influence on American ornithology than any other work. With this should be named his *Field Ornithology* (1874); *Birds of the Northwest* (1874); *Fur-Bearing Animals* (1877); *Birds of the Colorado Valley* (1878); an incomplete *Bibliography of Ornithology* (1878–80); *New England Bird-Life* (1881; with W. A. Stearns); *Dictionary and Check-List of North American Birds* (1882); *Biogen* (1882; 4th ed., 1884); *The Dœmon of Darwin* (1884). He also made investigations regarding the early exploration of the trans-Mississippi region, and edited (1893) the *Journals* of Lewis and Clark. As a contributor to the technical advance of ornithology in America he ranked as not greatly inferior to Spencer Baird (q.v.), and as a popular expositor of the subject probably had no equal.

COUGAR, kōō'gĕr (Fr. *couguar*, Sp. *cuguardo*, from native South American *cuguaçuara, cuguaçuarana*). One of the names of the American panther (*Felis concolor*), described in this work under Puma (q.v.). Although widely in use, the name should be abandoned because it perpetuates an error of identification. Cuvier explained its origin in his *Règne animal* (Griffith's version, *The Animal Kingdom*, vol. ii, London, 1827) as follows, speaking of the puma: "It is called by the Mexicans *Mixtli;* in Peru, *Puma;* in Brazil, *Cuguaçuarana* (the word Cougoua is contracted by Buffon from this latter barbarous appellation); and in Paraguay *Guazuara*. . . . The name Cougoua, by which it is most commonly known in Europe, particularly in France, appears, probably, to have been borrowed from that proper to another animal; . . . but puma is its native name." Elsewhere it appears that the "other animal" was the eyra (q.v.). A drawing of this cat brought to Europe by John Maurice, Count of Nassau, when Governor of Dutch Guiana in the seventeenth century, was labeled "çuguaçuarana" and "çuguaçguarana." This was copied by Marcgrave and Piso and applied by Buffon, in the contracted form above noted, probably under the belief that the eyra (which is concolorous) was the same animal as the puma.

COUGH'ING (AS. *cohhetan*, Dutch *kugchen*, to cough, MHG. *kūchen, kīchen*, Ger. *keuchen, keichen*, to gasp; imitative of the sound). Considered physiologically, coughing consists, first, in a long inspiration which fills the lungs to a greater extent than usual; second, in a closure of the glottis, or narrow opening in the organ of

voice (see LARYNX), at the commencement of the act of expiration; and third, in a sudden forcing open of the glottis by the violence of the expiratory movement. In this way a blast of air is driven upward from the lungs through the mouth, which carries with it anything that may be present and cause irritation in the air passages. Coughing may occur from irritation in the back of the throat, in the larynx, trachea, or bronchial tubes, and may be excited by irritant gases, or by articles of food or drink—such as even a drop of water or a crumb of bread—making their way into the air passages instead of into the œsophagus, or by excessive or morbid secretion from the walls of the air tubes, or even by the entrance of cold air, when the lining membrane of the air passages is abnormally irritable, or by the tickling due to an elongated uvula. Reflex cough is often set up by irritation of the external ear canal, as by the presence of cerumen. Cough is reflex and involuntary generally, and is due to irritation of the terminal fibres of the pneumogastric nerves, which are distributed to the mucous membrane of the respiratory tract. The object of coughing in the animal organism is unquestionably to guard against the danger of the entrance of mechanical and chemical irritants into the air passages; and accordingly the mucous membrane, especially of their upper part, is endowed with a most exquisite sensibility, which, when aroused by mechanical irritation or by disease, provokes incessant coughing until the cause of the irritation is removed. Cough is a common symptom of all diseases of the organs of respiration, as well as of inflammatory affections of the throat, tonsils, and nose. The treatment of cough depends upon the cause. See PNEUMONIA; BRONCHITIS; PLEURISY: TUBERCULOSIS.

COUIY. A tree porcupine. See PORCUPINE.

COULANGES, kōō'länzh', FUSTEL DE. See FUSTEL DE COULANGES.

COULANGES, PHILIPPE EMMANUEL, MARQUIS DE (1633–1716). A French courtier, famous for his correspondence with his cousin, Madame de Sévigné (q.v.). His writings include: *Recueil des chansons* (1698); *Lettres* (published with those of Madame de Sévigné); and *Mémoires*, edited by Monmerqué (Paris, 1820).

COULIN, kōō'lĭn. In Spenser's *Faerie Queene*, a British giant killed by falling into a chasm when pursued by Debon.

COULMIERS, kōōl'myā'. A village in the Department of Loiret, France, 13 miles northwest of Orleans. Population, 1901, 368; 1911, 404. On Nov. 9, 1870, the German and French forces, under Von der Tann and Aurelle de Paladines respectively, met here in a seven hours' battle, the former suffering a loss of 1166 and being compelled to retreat to Artenay, the French losing 1500 and taking prisoners 1000 sick and wounded Germans. Consult Lehautcour, *Coulmiers et Orléans* (Paris, 1893).

COULOMB, kōō'lôN' (named after the physicist Coulomb). The practical unit of quantity of electricity. In the United States the legal unit is the international coulomb, "which is the quantity of electricity transferred by a current of one international ampere in one second." Therefore, if in the ordinary form of silver voltameter, m grams of silver are deposited, $m \div 0.001118$ is the number of coulombs which have passed, assuming that an ampere deposits 0.001118 gram of silver per second. See AMPERE; ELECTRICAL UNITS.

COULOMB, CHARLES AUGUSTIN (1736–1806). A French physicist, celebrated for his researches particularly in electricity and magnetism. He was born at Augoulême in 1736 and in early life became an officer of engineers. In 1777 he gained a prize by an essay on the construction of magnetic needles (*Sur les aiguilles aimantées*). In 1779 his *Théorie des machines simples* gained the prize offered by the Academy, and in 1781 he was a third time successful in an essay on the friction and resistance of cordage, etc., used in machines. In the same year he was elected a member of the Academy, and his services were employed on all the most difficult problems in mechanics. He is known as the inventor of the torsion balance (q.v.), by which the attraction of electricity and magnetism can be measured, while his memory has been perpetuated by the use of his name for the unit of electric quantity. Having offended certain influential persons by reporting unfavorably on a project for a navigable canal in Bretagne, Coulomb was for some time imprisoned, but received from the states of Brittany a present of a handsome watch, as a reward of his firm opposition to an expensive and unprofitable scheme. He lived in retirement during the Revolution, but took part in the investigations attending the introduction of the metric system of weights and measures by the new government, being a member of the commission of 12 appointed under the provisions of the Law of April 7, 1795.

COULOMMIERS, kōō'lô'myā'. The capital of an arrondissement and a garrison town in the Department of Seine-et-Marne, France, on the Grand-Morin, 38 miles east of Paris (Map: France, N., J 4). Its parish church of St. Denis dates from the thirteenth century, and it has remains of a castle built in 1613. There is a monument to the heroic Beaurépaire, who killed himself in 1792 rather than surrender the town of Verdun. It boasts a college, library, and museum of antiquities. Printing is the chief industry. It has woolen mills, tanneries, flour and sugar mills, and manufactories of starch and cheese. Market gardening is largely carried on. Jean de Boullonge or Le Valentin, the artist, was a native of Coulommiers. Pop., 1901, 6505; 1911, 7224.

COULTER, kōl'tĕr, JOHN LEE (1881–). An American statistician, born at Mallory, Minn. He was educated at the universities of North Dakota, Wisconsin, and Minnesota, and at Iowa State College. Between 1907 and 1909 he was an instructor at Iowa State College, the University of Wisconsin, and the University of Minnesota, where he also served for two years as assistant professor of rural economics. From 1910 to 1912 he was expert special agent of the United States Census Bureau, and during the same period he also lectured at George Washington University. He is author of *Economic History of the Red River Valley of the North* (1910); *Co-operation among Farmers* (1911); *The Problem of Rural Credit, or Farm Finance in the United States* (1913).

COULTER, kōl'tĕr, JOHN MERLE (1851–). An American botanist and educator, brother of Stanley Coulter, born at Ningpo, China. He received his education at Hanover College, Ind., and subsequently studied at Harvard. After serving for two years (1872–73) as botanist to the United States Geological Survey in the Rocky Mountains, he was made professor of natural science at Hanover College, where he

remained for five years. He was appointed professor of biology at Wabash College in 1879; from 1891 to 1893 he was president of Indiana State University, and from 1893 to 1896 he presided over Lake Forest University. In 1896 he became head of the department of botany in the University of Chicago. His works include: *Manual of Rocky Mountain Botany* (1885; rev. ed., 1909); *Manual of Texan Botany* (1892–93); *Plant Relations* (1899; 3d ed. rev., 1910); *Plant Structures* (1899; 2d ed., 1904); *Morphology of Spermatophytes* (1901) and *Morphology of Angiosperms* (1903), with Charles J. Chamberlain; *Plant Studies* (1902; rev. ed., 1905); *A Text-Book of Botany* (1906); *Elementary Agriculture* (1909); *Morphology of Gymnosperms* (1910); *A Text-Book of Botany for Colleges and Universities* (2 vols., 1910–11); *Elementary Studies in Botany* (1913); *Plant Breeding* (1914). In 1875 he founded the *Botanical Gazette* and thereafter continued to be its editor. He had charge of the department of botany in the first (1903) and second (1914) editions of the NEW INTERNATIONAL ENCYCLOPÆDIA.

COULTER, STANLEY (1853–). An American biologist, brother of John M. Coulter, born at Ningpo, China. He was educated at Hanover College. In 1887 he was appointed professor of biology and director of the biological laboratory at Purdue University and in 1907 dean of the School of Science. In 1902 he became a member of the State Board of Forestry. His publications include more than 125 pamphlets on nature study, scientific researches, sketches, and also *Flora of Indiana* (1899), and *A Key to the Genera of the Native Forest Trees and Shrubs of Indiana* (1907).

COUMARIN, kōō′mȧ-rĭn. See CUMARIN.

COUMOUNDUROS, kōō-mōōn-dụ′rŏs, ALEXANDROS. See KUMUNDUROS.

COUN'CIL (OF. *concile, cuncilie,* Lat. *concilium,* from *com-,* together + *calare,* Gk. καλεῖν, *kalein,* to call). In Church usage, an assembly of ecclesiastical dignitaries held for the purpose of regulating the doctrine or discipline of the Church. As early as the second century Church councils were convened in which only one or two provinces took part, the bishops and presbyters binding themselves to carry out the decisions arrived at in their own communities. These assemblies were commonly held in the chief town or metropolis of the province, and the bishops of such capitals—who, after the third century, bore the title of *metropolitan*—were wont to preside over the meetings and to consider questions of doctrine and discipline which had arisen within the territory. Over these metropolitan councils were established, at a later period, the provincial synods, exercising authority over several united provinces, and, finally, the national councils. After the fourth century, when the Christian religion was established in the Roman Empire, we read of *ecumenical,* i.e., universal councils, so called because all the bishops of Christendom were invited or summoned by the Emperor. In some early synods we find bishops, presbyters, and others taking part in the deliberations; but after the opening of the fourth century only the bishops were convened. According to the doctrine of the Roman Catholic church, the Pope alone, or, by way of exception, in some cases the College of Cardinals, had the power of convening ecumenical councils, which, in the Catholic view, represent the universal Church under the guidance of the Holy Ghost. Questions were determined by the majority of votes, and the Pope or his proxy presided and confirmed the resolutions carried in the council. In matters of faith the Holy Scriptures and the traditions of the Church were the guide, while in lighter matters human reason and expediency were consulted. In the former, ecumenical councils are held to be infallible, but in other matters of discipline, etc., the latest council decides questions. The question of the Pope's subordination to the decrees of the ecumenical councils was long and warmly debated during the Middle Ages, but is not asserted by any Roman Catholic theologian to-day.

Twenty ecumenical councils are recognized by the Roman Catholic church. 1. The first Council of Nicæa, held 325 A.D., in the height of the Arian controversy to define the doctrine of the Godhead of Christ, and to settle the proper time of keeping Easter (q.v.) against the Quartodecimans. 2. The first Council of Constantinople (381) completed the Nicene symbol by the definition of the Godhead of the Holy Ghost. 3. The Council of Ephesus (431) defined the unity of person in God the Son, against Nestorius, and guarded the definition by applying the term θεοτόκος, *theotokos,* to His mother. 4. The Council of Chalcedon (451), against the opposite heresy of Eutyches, asserted the twofold nature of Christ. 5. The second Council of Constantinople (553) condemned some survivals of Nestorianism. 6. The third Council of Constantinople (680–681) condemned the Monothelites. 7. The second Council of Nicæa (787) was directed against the iconoclasts and defined the respect to be paid to images. 8. The fourth Council of Constantinople (869–870) was called to secure the peace of the Eastern and Western churches, by the deposition of Photius, who had unjustly intruded into the see of Constantinople. The following councils, all held in the West, were subsequent to the schism between the Eastern and Western churches, and are consequently not recognized as ecumenical by Easterns or by Anglicans. Over the next seven councils, four held in Rome and three in southern France, the popes presided in person, without Imperial cooperation; they were held now, not so much to condemn heresy as to deal with other pressing needs of the Church, such as the encroachments of the Imperial power and reform in ecclesiastical discipline. 9. The first Lateran Council (1123) was called to settle the dispute between the spiritual and temporal powers on the question of investiture. 10. The second Lateran Council (1139) condemned the errors of Arnold of Brescia and others. 11. The third Lateran Council (1179) condemned the Albigenses and Waldenses and passed a number of reforming decrees. 12. The fourth Lateran Council (1215), the most important ecclesiastical gathering of the Middle Ages, formulated a more detailed confession of faith in opposition to the Albigenses and other innovators, and passed 70 reforming decrees. 13. The first Council of Lyons (1245) threatened the Emperor Frederick II with excommunication and deposition and called on Christendom to take up arms against the Mohammedans. 14. The second Council of Lyons (1274) strove for the reunion of the Greek and Latin churches and regulated papal elections. 15. The Council of Vienne (1311–12) suppressed the Knights Templars and condemned various sects of the time, such as the Fraticelli and Beghards. 16. The Council of Constance

(1414–18) was called to restore the unity of the Church by the recognition of a legitimate pope and condemned the doctrine of Wiclif and Huss. 17. The Council of Basel, convoked in 1431 and later removed to Ferrara and Florence, discussed ecclesiastical reformation and made a determined attempt, in consultation with Greek deputies who came to Florence, to bring about a union with the East. 18. The fifth Lateran Council (1512–17) annulled the Pragmatic Sanction and confirmed the bull *Unam Sanctam*, besides occupying itself with ecclesiastical discipline. 19. The Council of Trent (1545–63, with some interruptions), called to meet the problems presented by the Reformation, was very rich in consequences both for the confirmation of doctrine and the establishment of discipline. 20. The Vatican Council (1870) decreed the infallibility of the Pope. For further details of important councils, see NICÆA; BASEL; CONSTANCE; TRENT; CHALCEDON; CONSTANTINOPLE; EPHESUS; LATERAN; LYONS; VATICAN.

Among Congregationalists and Baptists the term "council" is applied to an assembly of ministers and delegates from neighboring churches, called by a local church, as occasion arises, to act or assist in ordaining a minister, or give advice on matters referred to it, beyond which its power does not extend. They have also a national council, composed of delegates from all parts of the denomination and meeting for conference concerning its work. The Par-Presbyterian Alliance, as the association of the reformed churches holding the Presbyterian system is called, holds a council every four years for conference on matters of general interest to the allied churches. So the Evangelical Alliance, a loose, undenominational body, holds councils, and the Methodists throughout the world held one in 1901.

In England, the convocations of the Church of England are practically councils, while the dissenting bodies are represented in the Free Church Council, meeting annually.

The great history of the councils of all kinds from the Apostolic age to the Council of Trent is by C. J. Hefele, assisted in the latter part by A. Knöfler and Cardinal Hergenröther (9 vols., Freiburg, 1855–90); there is an English translation by Clark and Oxenham of the first two volumes, and up to the eighteenth book of the original (4 vols., Edinburgh, 1871 et seq.). Consult also the great collection of canons and other acts of the councils, by G. D. Mansi (31 vols., Florence and Venice, 1759–98). A study of the first seven ecumenical councils from a doctrinal standpoint is presented by W. P. du Bose (New York, 1897), and their *Canons and Dogmatic Decrees*, annotated with much additional matter, all in English, by H. R. Percival (ib., 1900). See SYNOD.

COUNCIL, PRIVY. See PRIVY COUNCIL.

COUNCIL BLUFFS. A city and the county seat of Pottawattamie Co., Iowa, 5 miles east of Omaha, Neb., near the Missouri River, and on the Union Pacific, the Chicago and Northwestern, the Chicago, Burlington, and Quincy, the Chicago, Rock Island, and Pacific, the Illinois Central, the Chicago, Milwaukee, and St. Paul, the Chicago Great Western, and the Wabash railroads (Map: Iowa, B 3). The city is well laid out, with brick-paved streets, and lies to a great extent on a plain underlying high bluffs. Electric lines connect Council Bluffs with Lake Manawa, a beautiful summer resort 3 miles south of the city, and with Fairmount and other parks. Council Bluffs is the seat of the Iowa School for the Deaf, and has a fine public-library building. Railroad and wagon bridges over the Missouri, and electric lines, afford communication with Omaha, with which city there is extensive traffic. The exceptional railroad facilities of Council Bluffs make it an important manufacturing and transportation point. It is one of the great agricultural-implement trade centres of the world and also has a large trade in fruit and produce. There are eight large grain elevators. The city government, under a general State incorporation law, revised in 1897, is vested in a mayor, elected for two years, and a city council, composed of representatives from the six wards of the city and two members at large. The water works are owned and operated by the municipality. In 1804, on the site of Fort Calhoun near by, Lewis and Clark conferred with the Indians—hence the name. Here, in 1846, the Mormons established a settlement, called "Kanesville," which, however, they soon abandoned for Salt Lake City. The city was chartered in 1850. Pop., 1900, 25,802; 1910, 29,292; 1920, 36,162

COUNCIL GROVE. A city and the county seat of Morris Co., Kans., 24 miles northwest of Emporia, on the Missouri, Kansas, and Texas, and the Missouri Pacific railroads, and on the Neosho River (Map: Kansas, F 3). It is in a fertile agricultural and stock-raising region, and has important dairying interests. The city is situated on the old Santa Fe trail. It contains a public library. Council Grove was settled in 1847 and is one of the oldest towns in the State. It adopted the commission form of government in 1911. Pop., 1900, 2265; 1910, 2545.

COUNCILMAN, WILLIAM THOMAS (1854–). An American pathologist, born at Pikesville, Md. He was educated at St. John's College (Annapolis, Md.) and at the universities of Maryland, Vienna, and Leipzig. From 1886 to 1891 he was associate and associate professor of pathology at Johns Hopkins University. In 1892 he became Shattuck professor of pathological anatomy at Harvard University. In 1904 he was president of the Association of American Physicians. His publications include: *A Study of the Bacteriology and Pathology of Two Hundred and Twenty Fatal Cases of Diphtheria* (1901); *Pathology* (1902); *Pathology: A Manual for Teachers and Students* (1912); *Disease and its Causes* (1913).

COUNCIL OF ANCIENTS. See DIRECTORY.

COUNCIL OF BLOOD. See ALVA.

COUNCIL OF FIVE HUNDRED. See DIRECTORY.

COUNCIL OF TEN (*Consiglio di dieci*). The supreme body in the Venetian government from the beginning of the fourteenth century till the overthrow of the republic in 1797. The creation of the Council of Ten was but the final step in the process by which the oligarchic party succeeded in obtaining sole control of the government, beginning with the so-called "Closing of the Grand Council" in 1297. Its immediate cause was a popular uprising in 1310 headed by the noble families of Tiepolo and Querini. After the suppression of the revolt the Council of Ten was constituted as a secret body for the purpose of discovering and punishing all the participants in the conspiracy. Created at first for a few days, its existence was prolonged from time to time until, in 1335, it was

made permanent. In times of great emergency the council was augmented by a *giunta* of 20 or more of the noblest citizens, so that until 1595 it was officially known as the *Consiglio di dieci e giunta*. The powers exercised by the council were unlimited and touched upon every affair of public and private life. Its decisions, from which there was no appeal, were arrived at in secret, and its sentences were often carried out in the same manner. It employed assassins and used poison to remove dangerous individuals. In spite, however, of its arbitrary acts and the relentlessness with which it visited punishment upon those who offended it, the Council of Ten insured internal tranquillity and the administration of justice and preserved the state against the ambition of powerful nobles. In 1539 the discovery of treasonable behavior on the part of certain of the Ten led to the creation of the *Inquisitori di stato*, or Council of Three, to whom the council delegated its police functions and the trial of offenders. From 1527, possibly earlier, the council exercised a censorship over the press. The archives of the council, extending from 1315 to the end of the republic, are of great importance, as they deal with political, ecclesiastical, and criminal subjects. "There we find such papers as still survive in connection with the cases of the Carraresi, of Carmagnola, of Foscari, of Caterina Cornaro, and of Foscarini." Consult Brown, *Studies in Venetian History* (2 vols., London, 1907).

COUNCIL OF THE INDIES, The. A governing council formed in 1511 by King Ferdinand for the regulation of Spanish colonial affairs.

COUNCIL OF WAR. A conference of officers in war time, whom the commander voluntarily calls together to discuss matters of moment. It is an unwritten but generally understood rule that the commandant of a garrison will accept, or at least solicit, the opinion of a council of war before surrendering to an enemy.

COUNCILS, County. See County Councils.

COUN'SEL (OF. *conseil, cunseil, consel*, from Lat. *consilium*, consultation, from *consulere*, to consult). A term applied to attorneys and counselors who become associated together in the conduct of a cause at any stage of the proceedings, or who jointly act as legal advisers in any matter, whether litigated or not. It is less frequently used in speaking of a single lawyer acting in any of the above capacities. The term "of counsel" is employed to designate a lawyer who assists the attorney of record in the management, trial, and conduct of a case. See Advocate; Attorney; Lawyer.

COUNSEL, Book of Good. See Hitopadesa.

COUN'SELOR. In law, a person admitted to practice law in any capacity, and who is by reason of that fact an officer of the court. The term was formerly used to distinguish those lawyers who were licensed to appear in court, corresponding to the barrister in England and the advocate in Scotland. The distinction has, however, been abolished in most, if not all, of the United States, and the term "counselor" is now used synonymously with "attorney." See Attorney; Lawyer.

COUNT (OF. *conte, comte*, Fr. *comte*, from Lat. *comes*, companions, from *com-*, together + *ire*, Gk. *lévai, ienai*, Skt. *i*, to go). In classical writers down to the end of the fourth century the meanings attached to the word *comes* were comparatively few and simple. At first the word signified merely an "attendant," and differed from *socius* chiefly in expressing a less intimate and equal relation to the persons accompanied. A little later, in Horace's time, it was applied to those young men of family whom it had become customary to send out as pupils under the eye of a governor of a province or the commander of an army. Very soon the fashion of having attendants at home was introduced. The Emperor had many *comites* in this sense, and to these, as he gradually became the centre of power, he transferred the various offices of his household and of the state. The example of the emperors of the West was followed by the emperors of the East. Most of the titles at present applied to court officials are translations of the names applied to similar offices in the Byzantine Empire. The *comes sacrarum largitionum* was grand almoner and practically chancellor of the exchequer; the *comes curiæ* was the grand master of ceremonies; the *comes equorum*, the grand equerry. The *comes marcarum*, or count of the marches, was the original of the later marquis.

In France the count of the palace (*comes palatii*) was the highest dignitary in the state after the mayor of the palace, and in the eleventh century had already acquired a rank apart from that of the other counts. He presided in the court of the sovereign in his absence and possessed sovereign jurisdiction. The habit of instituting counts palatine was adopted by Spain and England. The counts of Chartres, Champagne, Blois, and Toulouse arrogated to themselves the authority to appoint palatine counts, and the ancient houses of Chartres and of Blois continued to claim in perpetuity the title of count palatine as that of their eldest sons. Counts of this sovereign class owed their origin to the feebleness of the later Carolingian kings, under whom they contrived gradually to convert the provinces and towns which they had governed as royal officers into principalities hereditary in their families. It was then that the counts came to be known by the names of their counties. The title was never used in England, though its Latin equivalent has always been the common translation for "earl," and the wife of an earl from a very early period has been styled "countess." For the history of the office in Germany, where it was of great importance, see Graf. Consult: Rambaud, *L'Empire grec au Xe siècle* (Paris, 1870); Luchaire, *Histoire des institutions monarchiques de la France sous les premiers Capétiens* (ib., 1883); Maury, "La noblesse et les titres nobiliaires en France," in *Revue des Deux Mondes* (December, 1882); Pfaff, *Geschichte des Pfalzgrafenamtes* (Halle, 1847); Luchaire, *Essai sur l'origine de la noblesse en France au moyen âge* (Paris, 1902).

COUNTERCHANGED. A term in heraldry (q.v.). When several metals and colors are interchanged, one being set against another, they are said to be counterchanged.

COUN'TERCLAIM'. In the law of pleading, an affirmative cause of action asserted by the defendant against the plaintiff and introduced in connection with his answer or defense proper. The counterclaim is a modern statutory device for enabling a person who is sued on a claim against him to procure an adjudication, at the same time, of a legal claim which he has against the party suing him. Its purpose is to consolidate the causes of action which two parties may have against one another, reducing the amount and cost of litigation and compelling the adjudi-

cation, so far as possible, of all open controversies between them. No such practice existed at common law, but every claim, no matter how closely related to another and opposing claim, constituted a separate cause of action and had to be separately prosecuted. As early as the year 1729, however, an act of the British Parliament introduced the principle of the set-off (q.v.), whereby, in case of mutual indebtedness growing out of the same transaction, the defendant was enabled to set off his claim against that of the plaintiff and have it allowed on the judgment. It was not until the Judicature Acts in 1875, however, that the defendant acquired the right of setting up a counterclaim, constituting a distinct cause of action.

Both the set-off and the counterclaim exist in the United States, the former generally, but the latter only in the so-called "code States," which have adopted the reformed procedure. These differ among themselves, however, as to the nature of the actions which can be pleaded by way of counterclaim—some following the modern English practice, under which any cause of action, however divergent from that alleged in the complaint, may be set up, and others, like New York, limiting the right of counterclaim to a matter arising out of the same transaction as that on which the action is based, or, in an action on contract, any other cause of action on contract (New York Code of Civil Procedure, § 501). See PLEA; PLEADING; RECOUPMENT; and consult the authorities referred to under PLEADING.

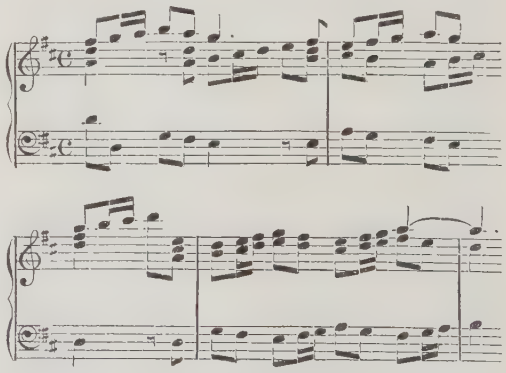
COUN'TERFEITING (from *counterfeit*, from OF., Fr. *contrefait*, counterfeit, from ML. *contrafacere*, to imitate, from Lat. *contra*, against + *facere*, to make). The criminal offense of falsely and fraudulently making an article in the semblance of another with the intent to induce the acceptance and use of such spurious article for the genuine one. The term "counterfeit" is used most frequently of imitations of coined money or of the paper currency of the government or of a bank, but is applied also to other cases of fraudulent imitation, as spurious trade-marks or dies. The most important British statute on this topic is the Coinage Offense Act, 1861 (24 and 25 Vict., c. 99). In this country the subject is dealt with in the Revised Statutes of the United States (§§ 5413 et seq.), especially so far as it relates to Federal coinage and securities and the money or securities of foreign nations; and other forms of counterfeiting are made punishable by State legislation. See COINAGE; FORGERY.

COUNTERIRRITANTS. Medical agents applied to the skin so as to redden (rubefacients), to vesicate (blisters or vesicants), or to produce pustules, purulent issues, or even sloughs of skin and of the subcutaneous textures (pustulants). Counterirritants act by reflex influence upon central nerve centres which control the blood supply to diseased internal organs or deep-seated structures. The milder counterirritants are mustard, turpentine applied on hot cloths, and tincture of capsicum. The stronger are blisters of cantharides or of ammonia; croton oil or tartar emetic in ointment; and the actual cautery or hot iron. Setons, moxæ, and caustics are rarely, if ever, employed. None of the stronger counterirritants should be used without medical advice, great mischief being done by their improper use. Counterirritants relieve internal pain and tend to promote the absorption of effusions. They should be applied at a distance from the site of the inflammation. Counterirritants are much used for strains and diseases of the joints in horses, but should never be applied, as they too often are, in recent cases, or while the part is hot or inflamed. Preparations of cantharides (q.v.) and ointment of mercuric biniodide (red iodide of mercury) are the most convenient. For cows, use hot fomentations, followed by the smart infriction of mustard paste; for dogs, soap liniment, strengthened, if required, by ammonia or turpentine. See MOXA.

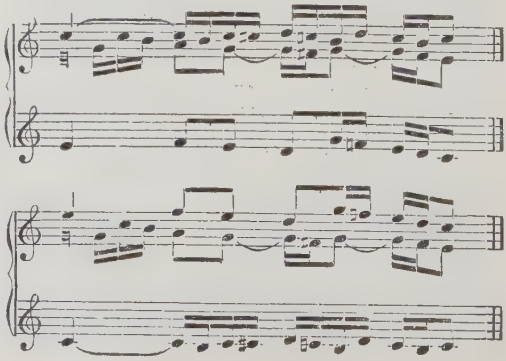
COUNTERMINE. See MINES AND MINING, MILITARY.

COUN'TERPAS'SANT (Fr. *contre-passant*, passing opposite, from *contre*, Lat. *contra*, against + *passer*, ML. *passare*, to pace, from Lat. *passus*, step, from *pandere*, to stretch). In heraldry (q.v.), a term denoting two beasts bound in opposite directions passing each other.

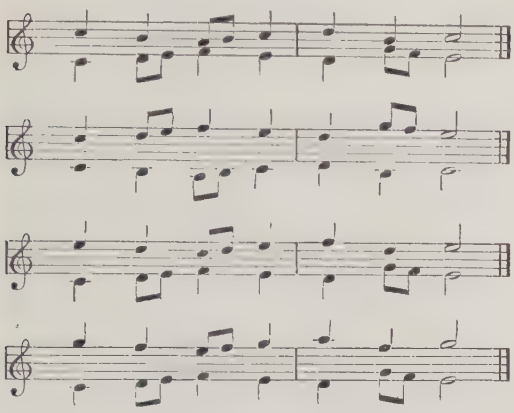
COUN'TERPOINT. In music, the setting of one or more parts against a given melody, so that all the voices are of equal importance and independence. The name was first used in the fourteenth century. It suggested itself from the fact that one note (*punctus*) was set against another, *punctus contra punctum*. A counterpoint may be written in various ways against a given melody, as one, two, four, or even more notes against one of the cantus. The counterpoint most useful in practical composition is one where the different parts are variously constructed, as in the following (Handel):



When two voices are used the counterpoint is called two-part; when three, three-part, etc. When the counterpoint lies uniformly above or below the cantus, it is single. If the parts be constructed in regard to one another so that they can be changed or transposed over or under each other, without alteration in the movement, or injury to the harmony, it is then called double counterpoint, e.g.:



The intervals most frequently used for transposition in double counterpoint are the octave, decima, and duodecima. The following admits of different transpositions:



When three voices are constructed so that they can be exchanged one against the other, the counterpoint is triple; when four, quadruple. The first indications of counterpoint we find in the thirteenth century in the works of Adam de la Hale. The development of the art of contrapuntal writing was then very rapid, and in the school of the Netherlands (in the fifteenth and sixteenth centuries) the acme of technical skill was reached. But counterpoint was then less a genuine musical art than an exhibition of astounding technical tricks. The great Italian schools (see PALESTRINA) returned to a simpler and artistic style. As a genuine art counterpoint culminated in the form of the fugue (q.v.). The latest and best treatises on counterpoint are those of Dehn, Richter, Marx, Lobe, Prout, Jadassohn, and Riemann.

COUN'TERPOISE CARRIAGE. See ORDNANCE.

COUN'TERPO'TENT. A fur used in heraldry (q.v.).

COUN'TERPROOF'. An impression which is obtained from a freshly printed proof of an engraving, by laying it, before the ink is dry, upon plain paper and passing it through the press. By this means the ink is transferred from the wet proof to the plain paper, and a reversed impression is obtained, which is often of use in enabling the engraver to judge of the success of his work. See ENGRAVING.

COUN'TER-REFORMA'TION. The term used to describe the period of Catholic revival between about 1560 and 1648. The Catholic church undertook (1) to reform abuses, (2) to counteract the Protestant movement in those lands where it threatened to succeed, and (3) to uproot it where it had entirely or very considerably succeeded. Long before the Protestant revolt took place there had been a demand upon the part of faithful sons of the Church for a reform in "head and members," from the Pope down to the humblest Christian. Efforts had accomplished something, as in the Council of Basel (1431), but not enough to stay the tide of unrest. At last the Council of Trent was assembled, which, lasting with interruptions from 1545 to 1563, solemnly reaffirmed and defined Catholic doctrine and enacted disciplinary measures to rectify widespread and prevalent abuses. Of the agents most active in raising the tone of the Church, animating its pulpit and its schools, and inspiring self-sacrifice and ardent piety, the chief have been the Jesuits—so much so, indeed, that the counter-reformation is frequently spoken of as their work. The other measures spoken of have naturally incurred more censure. The check or extirpation of Protestantism has been accomplished necessarily with violence, though it must be said that the intolerance of the Roman Catholic ruler or prelate was matched, when opportunity served, by that of Protestants in similar positions. In Bavaria the nobility which had favored Protestantism were expelled in 1564. At Treves the Elector, James of Eltz, in 1572, forbade Protestants his court. In other ecclesiastical states of the Empire, as Bamberg and Salzburg, the rulers drove out the evangelical clergy and gave the laity the alternative of conformity to the Catholic church or exile. Austria attempted to uproot religious liberty in Hungary, but was forced to restore it. In Bohemia Protestantism was extirpated during the Thirty Years' War. As far as the German Empire was concerned, the arbitrary exercise of power to repress Protestantism ended with the Peace of Westphalia in 1648. In such countries as Spain and Italy Protestantism never had more than a feeble existence and so was rather easily suppressed by the Inquisition. In France there was never more than a possibility of Protestantism gaining an ascendancy, but in the sixteenth and seventeenth centuries it had many influential adherents. Civil wars, the result of political intrigue, and the acceptance from personal ambition of Romanism by Henry IV, ruined whatever prospects the Protestants had; and with the revocation of the Edict of Nantes in 1685, all semblance of state favor to Protestantism was removed and the faith outlawed. In the Netherlands persecution and war wrested the southern provinces from Protestant domination, but it remained in the northern. Scandinavia was not seriously shaken in her acceptance of Protestantism. In England, after tireless, ingenious, and heroic attempts of seminary priests, upon whose head a price was fixed, to effect a return to Catholicism, with the secret coöperation of many nobles and other prominent men, the scheme had to be abandoned, mainly because the invasion of England by the Spanish Armada in 1588 welded the nation into a whole against foreign political or religious dominion. This was also the period of greatest heroism and success in Catholic missions.

Consult: Ranke, *History of the Popes* (Eng. trans., London, 1867); A. Ward, *History of the Counter-Reformation* (New York, 1889); A. R. Pennington, *History of the Counter-Reformation* (London, 1900).

COUN'TERSCARP. The side of the ditch of a fortification opposite to the parapet. The slopes of the scarp, which is the side of the ditch next to the parapet, and of the counterscarp will depend on the nature of the soil, and the action on it of frost and rain. The scarp, or outside slope of the parapet, is less steep than the counterscarp, because it has to sustain the weight of the parapet. See FORTIFICATION.

COUN'TERSIGN. A watchword or sign disclosed only to persons authorized to pass a line of sentinels. The countersign may be changed at any moment, or any number of times, but is usually altered each 24 hours. It is given primarily to commanders of guards, and outposts and their sentries, to reconnoitring and visiting

patrols, and to the field and regimental officers of the day. All others desiring to pass through the lines must first be supplied with the countersign, which is thus a guard against spies, strangers, and surprise.

COUNTERSUBJECT. A musical term. See FUGUE.

COUN'TERTEN'OR. The highest adult male voice; most commonly the male alto (q.v.).

COUN'TERVAIR'. A fur used in heraldry (q.v.).

COUN'TESS'S POWDER. See CINCHONA.

COUN'TIES COR'PORATE. In England, cities and towns which possessed the privilege of being governed by their own sheriff and magistrates independently of the county in which they are situated.

COUNT'ING-OUT' RHYMES. See NURSERY RHYMES.

COUNT ROB'ERT OF PARIS. A late novel of Sir Walter Scott (1833), the scene of which is laid at Constantinople in the eleventh century.

COUNTRY-DANCE. An old English dance of rustic origin, in lively movement, usually in 2–4 time (occasionally 6–8). It was performed by several pairs dancing against one another. Originally the music was performed on a bagpipe or fiddle or a pipe and tabor. When introduced into refined society, the music became more refined and was written for orchestral instruments. The oldest collection of country-dances was published in 1651 under the title, "The English Dancing Master." In the eighteenth century it was introduced into France, where it was first known as *Anglaise.* From the fact that the couples danced against one another it also was called *contredance.* From France it soon spread to Germany, where it became exceedingly popular, and was known under its French name. The etymology regarding *contredance* as a corruption of *country-dance,* or vice versa, is wrong.

COUN'TRY LASSES, or THE CUSTOM OF THE MANOR. The title of a play by Charles Johnson (1715), based on Fletcher and Massinger's *Custom of the Country* and Middleton's *A Mad World, My Masters.*

COUNTRY PARTY, THE. The anti-Royalist party in England in Charles II's time, which opposed the court party. It finally developed into the "Whig" party.

COUNTRY WIFE, THE. A comedy by Wycherley (1673), drawn largely from Molière's *L'Ecole des maris* and *L'Ecole des femmes.*

COUN'TY (OF. *counte, contee,* Fr. *comté,* It. *contado,* from Lat. *comitatus,* county, escort, from *comes,* count, companion). Either (*a*) one of the civil divisions of a country, for judicial and political purposes; or (*b*) a local subdivision of a state created by the sovereign power of its own will; or (*c*) a "local organization which, for the purpose of civil administration, is invested with the functions of a corporate existence." The Saxon term was "shire," a name still preserved in England. In the United States counties are divided into a number of townships or towns. Cities and incorporated towns and villages are, generally speaking, subdivisions of counties and townships, but in some instances a city may be geographically coterminous with a county, as is the case with St. Louis and Philadelphia, while "the city of New York" includes within its municipal limits five distinct counties. In Louisiana the similar division is called a "parish." For purposes of local government, each county has at least one court and one prison and usually an almshouse. The smaller divisions are townships, or precincts, according to the system of local government, each of which by popular suffrage chooses supervisors or commissioners, who form an administrative board to conduct the financial and other county affairs. Counties are the creatures of the legislative will. They are vested with certain corporate powers in order to enable them to perform the duties required of them as part of the machinery of the state; and, inasmuch as all their powers are derived from the legislature, the latter may enlarge, modify, or diminish them at any time. Counties are generally invested with the following corporate powers: to sue and be sued by a corporate name; to have a county seat, a courthouse, and prison; to acquire and hold title to real estate; to levy taxes and to make such contracts as may be necessary for their corporate existence. For an historical sketch of the English county, consult Pollock and Maitland, *History of English Law* (2d ed., Boston, 1899). See SHIRE; MUNICIPAL LAW, and consult authorities there referred to.

COUNTY COUNCILS. Until 1888 the county government of England was conducted in the quarter sessions, held by justices of the peace. As these magistrates were appointed by the crown to attend to all administration and the minor judicial business of the county, there was practically no local self-government. To remedy this, the first Local Government Act was passed in 1888 by a Conservative ministry. It established representative county councils elected every three years by all ratepayers, male and female, of the shire, besides other nonresident property holders, under certain conditions. Practically the same qualifications are necessary for membership in the council, except that women are not eligible. The elected councilors choose additional members called "aldermen," one-third of the council in number, and also a mayor, who may or may not be of their number. The council controls all the administrative functions of the county, such as the management of the roads, insane asylums, county jails, and the issue of liquor licenses; it shares the police control with the justices of the peace.

Mr. Henry Fowler's second Local Government Act, passed by the Liberals in 1894, perfected the first by transforming the ancient vestries of a population of 300 and over into parish councils, for the management of local business. Smaller parishes, if they so desire, may, with the consent of the county council, have the same privilege. The system closely resembles the American township organization. In Scotland and Ireland counties have since been organized along similar lines, except that there are no coöpted aldermen in the former country.

Previous to 1885 all London lying without the ancient city had no local government except the church vestries. It was brought under the operation of the Act of 1888 and given a county government. In 1899 the administrative functions of the vestries not ecclesiastical were turned over by the county council to subordinate boroughs having mayors, aldermen, and councilors of their own. The old city, though represented in the county council, retains most of its antiquated constitution. The *personnel* of the London County Council is very high, and the amount of work it has accomplished is remarkable. It has successfully provided public baths

and libraries, parks and playgrounds, better dwellings for the poor, besides giving large sums for technical education. Consult Macmorran and Dill, *The Local Government Act of 1894* (London, 1896).

COUNTY COURT. In English and American law, a judicial tribunal of considerable dignity and importance, whose jurisdiction is coextensive with the limits of a county (q.v.). The county courts are among the most ancient institutions in England, dating back to the popular tribunals of the Anglo-Saxon period. We find provisions regulating their procedure as far back as the laws of Edward the Elder (901–925) and of Canute (1014–35). Under the system of local self-government which was characteristic of that period, the county courts (*shire gemots*) were the chief ordinary tribunals of the English people, their judicial authority being superseded by that of the *Witenagemot*, or Great Council of the Kingdom, only for particular purposes and on rare occasions.

It will be remembered that in England the county, or shire, is not merely a political subdivision of the state for administrative purposes, as it is in most cases in the United States, and as are the departments into which the territory of France is divided; but it is a separate and distinct political division, in many cases antedating, in organization and in its functions, the state itself. As the supreme judicial tribunal, therefore, of such an ancient political organization, the county court was not only the fountain of justice for the people of England, high and low, but a court of great dignity and authority as well. It was presided over by the sheriff (*shire reeve*), who was the high judicial officer of the county, and, like the court baron and other popular tribunals, was composed of the freeholders of the county who should be summoned by the sheriff for that purpose. Its original jurisdiction extended to all civil and criminal matters, and it was the common court of appeal from all the minor courts of the county. Under the Saxon régime there was no regular tribunal of appeal from the judgments of the county court, but after the Conquest the superior authority of the new national tribunal, the *Curia Regis*, or King's Court, drew to it appeals from the county courts. The rapid growth in power and importance of the King's courts, especially of the so-called common-law courts—the King's Bench, Common Pleas, and Exchequer—tended to reduce the authority of the more ancient tribunals, and their jurisdiction was impaired by successive acts of Parliament. They still exist, however, with a limited though considerable authority. See County Courts Act, 1888 (51 and 52 Vict., c. 43).

County courts in the United States exercise both civil and criminal jurisdiction, and in some of the States the functions of probate, or surrogates, courts as well. They are held by a county judge, usually at the county seat or principal town of the county. The county judge is usually elected by popular vote for a specified term. See Court. See also Curia Regis; Sheriff. Consult *Encyclopedia of the Laws of England* (London, 1897), and Raikes, *Admiralty Jurisdiction and Practice in County Courts* (ib., 1896).

COUP, kōō (Fr., stroke). A word often used in a figurative sense. *Coup d'état*, 'stroke of state,' means an arbitrary encroachment suddenly effected by the governing authorities upon the constitution of the state, altering or setting aside the prerogatives of other parts of the body politic. The *coup d'état* which is usually understood by this term is that effected by Louis Napoleon in making himself practically dictator (Dec. 2, 1851). *Coup de main*, a 'stroke of the hand,' is applied, in the language of war, to a sudden and successful attack. *Coup de foudre*, a 'thunderbolt,' applied figuratively to any astonishing occurrence. *Coup d'œil*, a 'stroke (or glance) of the eye,' is applied in speaking of persons who have the faculty of comprehending all the relations of a complicated matter at one survey; or, in art, it expresses the general effect of a picture or group at first sight. *Coup de théâtre* means properly a trick of the stage to produce a shock by surprise, and is hence applied to any analogous dramatic effect.

The word is also used in Canada to designate a war custom of the Plains Indians. Among many of these tribes the first warrior to touch an enemy or his body was credited with a "coup," or deed of honor. The social rank of an individual was largely dependent upon the number of coups to his credit. Thus Red Cloud (q.v.) claimed 80 coups—an unusual number, since 4 coups were generally considered sufficient to give distinction. Consult Grinnell, "The Coup," in *American Anthropologist* (1911).

COUPÉ, kōō'pā' (Fr., literally, section, cut, from *couper*, to cut). A four-wheeled, one-horse, closed carriage, holding two persons, with separate seat for the driver. (See Carriage; Motor Vehicle.) The name is also given to a compartment of a railway carriage in continental Europe.

COUPED, kōōpt (hybrid Eng., p.p. of Fr. *couper*, to cut). In heraldry, a term used to describe the head or any limb of an animal, or a part of a plant, represented as cut off smoothly from the trunk. It is distinguished from *erased* —i.e., forcibly torn off. A distinction is made also between *couped* and *couped close*, the latter signifying that the head or limb is cut off close, leaving no part of the neck or trunk attached to it. When crosses, bars, and bends are cut so as not to touch the sides of the escutcheon, they are also said to be couped.

COUPER, kōō'pẽr, William (1853–). An American sculptor. He was born in Norfolk, Va., and studied at the Cooper Institute, New York, and the Royal Academy at Munich. In 1875 he removed to Florence and entered the studio of Thomas Ball. In 1897 he returned to America and established himself in New York. His art is modern Italian in manner, but its beauty and technique are somewhat marred by overelaborate detail and neglect of powerful lines and planes. His management of drapery is especially good. Among his works are "Mother's Love," "The Falconer," "Beauty's Wreath for Valor's Brow," the marble statue of "Moses" on the Appellate Courthouse, New York City, "Te Deum Laudamus," and several peculiarly sympathetic and exquisitely executed angels for funeral monuments. His portraits include the heroic bronze bust of Prof. Thomas Eggleston, Columbia University, New York, and that of President McKinley. He won the competition for the monument to Colonel Hawkins, at Pittsburgh, Pa. Consult Lorado Taft, *History of American Sculpture* (New York, 1903).

COUPERIN, kōō'p'-răn'. The name of a family of famous French musicians.—The first members who became famous were three brothers, Louis (1630–65), François (1631–

98), and CHARLES (1638–69). The latter's son, also called FRANÇOIS (1668–1733), was the greatest of all the Couperins, and is generally spoken of as *François le Grand*. He studied under J. Thomelin. In 1693 he was appointed court cembalist and teacher of the princes; and in 1698 he succeeded his uncle François as organist of Saint-Gervais, in Paris. As a composer Couperin occupies an important position in the history of piano music. His works for the harpsichord were not only the first of their kind, but also developed a new style of music, characteristic of the instrument, whereas his predecessors had cultivated the organ style. His compositions are not very profound, are overloaded with embellishments, but exerted a decided influence upon the style of his younger contemporaries, Handel and Bach.

COUPLE (OF. *cuple, cople*, Fr. *couple*, Sp. *cópula*, from Lat. *copula*, bond, from *co-*, together + *apere*, Gk. ἅπτειν, *haptein*, to join). A couple is the name given in statics to a pair of equal parallel forces acting in opposite directions and at different points of a body. It is shown in the article MECHANICS (q.v.) that, when two parallel forces act in opposite directions on a body, they may be replaced by one equal to their difference, acting parallel to them and in the same plane with them, the point of application of this resultant being *beyond* the points where they are applied. This point recedes farther from the points of application of the original forces the nearer they approach equality, getting to an infinite distance when they become equal and when their resultant accordingly is zero. In this limiting case the forces constitute a couple. They have no tendency to *translate* the body; their action goes wholly to make it rotate about an axis passing through its centre of inertia and perpendicular to the plane in which the couple acts. Such being the case, a couple cannot be replaced or counteracted by any single force, for such a force would produce translation; it can only be replaced or balanced by other couples. The length of the straight line which meets the lines of action of the forces at right angles is called the "arm" of the couple, and the product of the arm and either force is called the "strength" or the "moment" of the couple. It is evident that a couple can be replaced by one of equal strength. Consult Routh, *Treatise on Analytical Statics* (Cambridge, Eng., 1892); Minchin, *Statics* (New York, 1892); Johnson, *Theoretical Mechanics* (ib., 1901); Ziwett and Field, *Introduction to Analytical Mechanics* (ib., 1912). See MECHANICS.

COUPLET (Fr., dim. of *couple*, pair, from Lat. *copula*, bond). Any two lines which rhyme together. They usually contain the expression of a complete idea. The poetic wits of the age of Queen Anne excelled in this kind of aphoristic versification. Pope, it has been said, reasons in couplets. For example:

> "'Tis with our judgments as our watches, none
> Go just alike, yet each believes his own."

COUPON, kōō′pŏn (Fr. *coupon*, from *couper*, to cut, from *coup*, It. *colpo*, Lat. *colpa*, from Gk. κόλαφος, *kolaphos*, blow with the fist, from κολάπτειν, *kolaptein*, to strike). An undertaking on the part of an obligor on a money bond or other interest or dividend bearing obligation to pay a definite amount of accrued interest or dividends to the holder thereof at a specified date. It is usually so attached to the bond, debenture, or other principal instrument that it can conveniently be cut off (whence the name) and presented for payment. Each interest or dividend coupon constitutes in law a separate claim or demand and may be separately enforced. Corporate bonds and similar securities are usually issued in this form, and so, sometimes, are shares of preferred stock, in which case the coupons represent the guaranteed dividend payments. Of course the coupon does not, in any of these forms, confer any additional legal rights on the holder of the security against the person bound thereby nor increase the liability of the latter. A general agreement to pay interest or dividends at such a rate would be equally valid and efficacious. The advantage of the coupon lies in the convenience to the holder of furnishing him with a separate undertaking for each interest or dividend payment for presentment and collection, and in the fact that corporate coupons are usually of a negotiable or quasi-negotiable character, facilitating their transfer from hand to hand. See NEGOTIABLE INSTRUMENTS.

COURANT, kōō-ränt′ (Fr., pres. part. of *courir*, to run). In heraldry, a term used for running.

COURANTE. An old French dance, originated about the middle of the sixteenth century. The oldest specimens are rather rapid, in 3–2 time, beginning on the beat. Later, the dance became confused with other dance forms of similar character, especially the 3–2 time (three beats) was frequently confused with 6–4 time (two beats). At the beginning of the eighteenth century it became one of the movements of the Suite (q.v.), where it usually follows the Allemande (q.v.), and is contrasted with it. At the same time the tempo became slower and, instead of proceeding mainly in notes of even value, dotted notes became the usual movement. The Italian form (corrente) always preserved the rapid tempo and even movement.

COURAYER, kōō′rā′yâ′, PIERRE FRANÇOIS LE (1681–1776). A French Catholic theologian. He is chiefly known for the part which he took in the discussion, which so interested Leibnitz and others at the time, on the possibility of the reunion of Christendom, and especially of uniting the Church of England with the Roman Catholic communion at the Reformation. In 1723 he published anonymously a *Dissertation sur la validité des ordinations des Anglais* (Eng. trans., London, 1725; new ed., Oxford, 1844), in which he endeavored to prove that there had been no break in the line of ordination from the Apostles to the English clergy. This was naturally received with enthusiasm in England, and Oxford conferred the degree of D.D. on him; but it subjected him to so much criticism and unpopularity in France that he presently fled to England, where he remained until his death. In 1736 he published a French translation of Sarpi's *History of the Council of Trent*, and in 1767 a translation of Sleidan's *History of the Reformation*.

COURBET, kōōr′bâ′, AMÉDÉE ANATOLE PROSPER (1827–85). A French admiral, born at Abbeville. He was educated at the Ecole Polytechnique and entered the navy in 1849. In 1880 he was made rear admiral and, after being Governor of New Caledonia, in 1883 commanded the French fleet in the campaign of Tongking. After the violation of the Treaty of Tientsin by the Chinese, Courbet, in a naval engagement (1884),

destroyed the entire Chinese fleet without losing a vessel. In 1885 he started to return to France, but his strength had given out and he died at sea. Consult the biographies by Julien (1888) and De la Faye (1891); Loir, *L'Escadre de l'amiral Courbet* (Nancy, 1886); Cahu, *Courbet en Extrême-Orient* (Paris, 1896).

COURBET, GUSTAVE (1819–77). A French landscape, figure, and portrait painter, founder of the modern Realist school. He was born at Ornans (Franche-Comté) on June 10, 1819, of wealthy peasant parents. His first instruction in art was acquired at his home under Flageoulet, a pupil of David. In his twentieth year he went to Paris, where he worked in different studios, but he was in the main self-taught. He speedily found recognition, and soon became the chief leader of the Realists, in opposition to both Classicists and Romanticists. Courbet was of a very independent character, and had so little regard for the opinions of the judges of the Salon that he returned for six successive years a picture rejected in 1841. When in the Exposition of 1855 his pictures were refused, he held a separate exposition, which attracted wide attention. In 1870 he returned the cross of the Legion of Honor to Napoleon with a protest. He was Radical and Socialist in politics, and under the Commune he was made director of the fine arts. As such he saved the collections of Thiers and of the Luxembourg from the infuriated populace, but he sacrificed the Vendôme Column in order to appease the crowd. For this act he was imprisoned after the downfall of the Commune, and all of his paintings were sold at public auction. In order to avoid the payment of further damages he went into voluntary exile, and died broken-hearted near Vevey, in Switzerland, Dec. 31, 1877. He was a strong but rather coarse character, blustering but good-natured—a healthy animal without the least spirituality.

His paintings portray nature exactly as it is, without the least addition of sentiment or idealism, for he conceived realism to be possible only through the absolute negation of idealism. As he confined himself to the reproduction of nature, there could be no refined composition or real action in his work, for these depend on the painter himself. His figures were no more than models in the positions painted, his landscapes mere patches of forest or country taken at random. In figure painting he was partial to the coarse types preferred by the Flemish school, and he always painted them life-size. His coloring was excellent, and in his figure subjects, which are chiefly brushworks, it was pure, strong, and mellow. In his landscapes he used the palette knife very freely, obtaining brilliant and sparkling effects of color. His chief defect is his lack of strength in drawing.

The volume of Courbet's work was enormous, and his activity extends over a variety of subjects. Among the best of his figure paintings are the "Man with a Leather Belt" (Louvre); the "Stone Breakers" (Dresden), representing two workmen breaking stones, as one can see them in the street; the "Demoiselles des bords de la Seine" (Petit Palais), two typical grisettes reclining in ungraceful attitudes on the grass, yet a picture of great beauty of color. The most ambitious of all is his "Burial at Ornans" (1850, Louvre), a village funeral. This picture is composed of 39 life-size figures, admirably balanced. On the one hand are the perfunctory mourners, such as the priest, beadles, pallbearers, gravediggers; on the other, the real mourners. The Louvre also possesses two of his landscapes—the "Combat of the Stags" and the "Retreat of the Deer"—a marine painting, "The Wave," the portrait of Champfleury, and other of his works. In the Petit Palais are "The Father of the Artist," "Prudhon and his Children," and several others. In the Metropolitan Museum, New York, are "The Woman with a Parrot," a marine, and a landscape. Courbet is also represented in the chief provincial museums in France and in the galleries of Berlin, Frankfort, Cologne, Munich, Vienna, Amsterdam, The Hague, Copenhagen, and Chicago, and in many private collections, including the Widener and Johnson collections, Philadelphia, and the Allston Club, Boston.

Bibliography. Monographs on the art and life of Courbet have been written by Estignard (Paris, 1874), D'Ideville (ib., 1878), Silvestre in *Les artistes français* (ib., 1878), Isham in Van Dyke's *Modern French Masters* (New York, 1896), Meier-Graefe, *Corot and Courbet* (Leipzig, 1905), Cazier (Paris, 1906), Riat (ib., 1906), Muther (Berlin, 1906), Robin (Paris, 1909), Benedite (ib., 1911), and Lázár Béla (ib., 1911). Consult also Muther, *History of Modern Painting*, vol. ii (London, 1896, 1907); Patoux, "Courbet," in *Les artistes célèbres* and *La vérité sur Courbet* (Paris, 1879).

COURBEVOIE, kōōr'b'-vwä' (Fr., crooked way). A town in the Department of Seine, France, on the left bank of the Seine, opposite Neuilly, 5 miles northwest of Paris. Courbevoie has well-built houses and large barracks erected by Louis XV for the Swiss Guards. In 1883 a bronze group, the *Monument de la défense de Paris*, by E. Barrias, was erected here. Its principal manufactures are white lead, brandy, carriage bodies, and drugs. Pop., 1896, 20,105; 1901, 23,765; (commune) 25,330; 1911, 38,138.

COURCEL, kōōr'sĕl', BARON ALPHONSE CHODRON DE (1835–). A French diplomatist. He was educated in France and Germany, and entered political and diplomatic life in 1859. From 1881 to 1886 he was Ambassador to Germany. In 1884–85 he was joint reporter with Baron Lambermont of the Berlin Conference. Courcel was an arbitrator appointed by the French President on the Bering Sea Arbitration Commission in 1892, and was elected president of that body by his associates. He became Senator in 1892, and was made Ambassador to Great Britain in 1894, but resigned in 1898. With Lair and others he edited for the Société de l'Histoire de France the *Mémoires of Richelieu* (2 vols., 1907–09).

COURCELLE, kōōr'sĕl', DANIEL DE RÉMY, SIEUR DE. French Governor of Canada from 1665 to 1672. He succeeded Mézy and preceded Frontenac. In 1666, in the depth of winter, he led a force of 300 men by way of Lakes Champlain and George to the country of the Mohawks, who had persisted in attacks upon the colony. He returned, having accomplished nothing, and having lost a large number of his troops through the severity of the weather. Not long after, with Tracy, the lieutenant general, and an army of 1300, he undertook a second expedition, which resulted in the complete destruction of the five Mohawk forts. The English were considerably alarmed at this invasion of territory claimed for the British crown, and there ensued a correspondence between Tracy

and Governor Nicolls of New York. Courcelle projected the post at Kingston (Katarakoui), afterward established by Frontenac.

COURCELLE-SENEUIL, kōōr'sĕl' sə-nē'y', JEAN GUSTAVE (1813–92). A French political economist, born at Seneüil (Dordogne). He occupied the chair of political economy at the University of Santiago de Chile from 1853 to 1863 and became a member of the French Academy of Moral and Political Sciences in 1882. Among his principal publications are the following: *Traité théorique et pratique des opérations de banque* (1853; 6th ed., 1876); *Manuel des affaires* (4th ed., 1883); *Traité d'économie politique* (1858; 3d ed., 1890); and *Liberté et socialisme* (1868), in which, as in several others of his writings, he defends the principle of individualism. He translated into French the *Principles* of J. S. Mill and some of the writings of W. G. Sumner.

COURCILLON, PHILIPPE DE. See DANGEAU.

COURDE DE MONTAIGLON, A. DE. See MONTAIGLON, A. DE COURDE DE.

COUREURS DE BOIS, kōō'rēr' də bwä (Fr., wood runners). Canadian bushrangers of the seventeenth century who forsook their families and homes and took to the woods to engage in the beaver trade. The movement became so general that whole communities were virtually deprived of their male support, and much destitution ensued. Stringent measures to restrain the movement were taken by the French King, but without much result. The rangers, declared outlaws, built palisade forts at Detroit, on Lake Superior, and at various points in the West and Northwest.

COURIER, kōō'rĭ-ēr (OF., Fr. *courrier*, runner, from *courir*, Lat. *currere*, to run). A bearer of dispatches or letters, usually sent on public business. Such messengers were extensively used up to comparatively recent years—indeed, until the establishment of the postal and telegraph systems. Organized courier service existed among the Medes, Assyrians, and Egyptians from very early times, and relays of runners were employed by the ancient Greeks until the system of mounted couriers was introduced by the Persians. Among the Romans the change from runners to mounted men took place in the time of Augustus. During the Middle Ages, besides the staff of couriers in the service of sovereigns, the English and French nobility employed professional runners, called in France *laquais* and in England "running footmen." They wore an elaborate costume, and carried a long cane topped with a large, hollow silver apple containing provisions for the journey. Towards the middle of the fifteenth century formal permission was given to the government couriers of Germany and Spain to carry unofficial letters.

In modern times correspondence between diplomatic representatives and their home government is sometimes conducted by means of special couriers, who, unless they happen to fall into the hands of a hostile power in time of war, are considered inviolable messengers. The office of King's messenger in the English diplomatic service used to be an honorable and coveted position, but is now practically obsolete. The word "courier" also signifies a hired attendant who accompanies travelers abroad, and whose special duty consists in making arrangements for the journey, attending to passports, settling hotel bills, and the like. An important qualification for a courier in the latter capacity is the ability to speak several foreign languages.

COURIER DE MÉRÉ, kōō'ryā' də mā'rā', PAUL LOUIS (1772–1825). A French Liberal politician and classical scholar. He was born in Paris, Jan. 4, 1772, entered the army in 1792, and served without distinction until 1809, pursuing his studies as he found opportunity, and publishing unimportant critical articles and translations. He from his youth cherished a bitter aversion to the nobility and a passionate love of Greek literature. On resigning from the army he went to Florence and discovered there a complete manuscript of the Greek pastoral *Daphnis and Chloe* (see LONGUS), which he edited (1810) and translated into exquisite French. At the Restoration (1815) he became active as a political pamphleteer, writing letters for *Le Censeur*, comparable to *Les provinciales* of Pascal or the satires of Junius. Fined and imprisoned for his *Simple Discours* (1821) ridiculing a plan to endow the royal family, he published a report of his trial that had a sensational success throughout France. His last political satire, *Le pamphlet des pamphlets* (1824), is among the bitterest and best; witty, classical in form and scholarly allusion, epigrammatic in its common sense. A few months after, he was assassinated (April 10, 1825), by whom the government could or would never discover. His rare style has saved his writings from oblivion. Through communication with the classics he acquired a poetic grace, a vividness of description, and a Socratic irony which transformed vituperation into literature. Courier's *Œuvres complètes* were published in 4 vols., with an essay on his life by Armand Carrel (Paris, 1830; new ed., 1890). Consult: Gaschet, *La jeunesse de Paul-Louis Courier, étude sur sa vie et ses œuvres de 1772 à 1812* (ib., 1911), and the same author's *Les pastorales de Longus, édition critique, suivie d'une étude sur l'essai de style vieilli de Courier* (ib., 1911); Schwab, *Vie politique de P.-L. Courier* (*Mercure de France*, 1909); Sainte-Beuve, *Causeries du Lundi*, vol. vi (1857–72).

COURLAN, kōōr'lăn (Fr., probably from native South American). The French book name for a limpkin (Aramidæ), called also "crying bird" and "mad widow" (*viuda loca*) by Spanish Americans. See LIMPKIN.

COURLAND, kōōr'lând, or **KURLAND** (trans. of Lett. *Kursemme*, from *Kur*, Finnish tribe inhabiting the region in mediæval times + *semme*, land, OCh. Slav. *zemlya*, OPruss. *same*, land, Gk. χαμαί, *chamai*, on the ground, Lat. *humus*, soil). One of the "Baltic provinces"; a government of European Russia, bounded by the Gulf of Riga and the Government of Livonia on the north, Vitebsk on the east, Kovno on the south, and the Baltic Sea on the west (Map: Russia, B 3). Area, 10,435 square miles. The surface is undulating, broken only by isolated hills, while the coasts are very low. There are a number of lakes, and a large portion of the area is covered with forests. The climate is damp, with very cold winters. The chief occupations are agriculture, cattle raising, and fishing. There are also a number of breweries, distilleries, and textile mills, but the manufacturing industries are very little developed. The commerce, on the other hand, is considerable. The seaport of Libau is the commercial centre. Courland had a population, Jan. 1, 1911, of 749,100. Letts form the bulk of the population, a few owning farms, but the majority working

as agricultural laborers. Large estates are scientifically conducted under German management, and produce cereals, flax, potatoes, etc. The majority of the population are Lutherans. Capital, Mitau.

Courland came under the rule of the Teutonic Order in the thirteenth century. In the second half of the sixteenth century it became an hereditary duchy under the sovereignty of Poland. After a long internal struggle between the Russian and the Polish parties the duchy came under Russian influence with the appointment of Biron as Duke of Courland in 1737. It was annexed to Russia in 1795. In 1905 it was the scene of a violent revolutionary uprising. See RUSSIA.

COURLAND, DUKE OF. See BIRON, ERNST JOHN.

COURNOT, kōōr'nō', ANTOINE AUGUSTIN (1801–77). A French mathematician, philosopher, and economist. His work in philosophy was important, anticipating in some particulars the doctrines of Bergson relating to the adjustment of rational processes to inanimate physical nature and their consequent inadequacy for the analysis of vital phenomena. But his fame rests chiefly upon his application of mathematical methods to the investigation of problems of economic theory. The chief results of Cournot's studies were the simplification of the theory of the equilibrium of demand and supply, the discovery of the theory of monopoly price now generally accepted in its essentials by economists, and a theory of the incidence of excise and customs taxes levied under conditions of monopoly and of competition which, as further elaborated by Marshall, Bastable, and Seligman, is generally accepted in public finance. Perhaps the most important service of Cournot to economic and social science was his demonstration of the applicability of the mathematical theory of probabilities to the problems of statistics. His most important works are: *Recherches sur les principes mathématiques de la théorie des richesses* (1838); *Exposition de la théorie des chances et des probabilités* (1843); *Traité de l'enchainement des idées fondamentales dans les sciences et dans l'histoire* (1861); *Principes de la théorie des richesses* (1863; revised under the title *Revue sommaire des doctrines économiques* 1877); *Considérations sur la marche des idées et des événements dans les temps modernes* (1872).

COURSE OF TIME, THE. A religious epic in blank verse by Robert Pollok (1827).

COURS'ER (Fr., *coursier*, from OF., Fr. *course*, Lat. *cursus*, course, from *currere*, to run). The French name of 8 or 10 species of plovers of various genera inhabiting desert regions of Africa and Asia. The best known is the cream-colored courser (*Cursorius gallicus*), common on arid plains from the western Sahara to northern India. All are sand-colored above, swift-footed, and wary, and conceal themselves by simply squatting and remaining motionless and so practically invisible; their food consists of insects, mainly locusts. The name "black-backed courser" is frequently given to the crocodile bird (q.v.).

COURS'ING (from *course*, OF., Fr. *course*). The pursuit of a hare by greyhounds, who follow it by sight and not by scent, is one of the most ancient of field sports. Arrian (150 A.D.) made its history the subject of much research. There are two kinds of coursing—"open," which may be described as the haphazard pursuit of any hare that can be discovered, without regard to any set rules or regulations; and "close" coursing, in which the course is determined by fixed boundaries, or otherwise fenced in. In the latter case the hares, which have been previously secured, are released, and after sufficient law (time or distance) has been allowed them, the dogs are slipped, and the pursuit begins. Both these kinds of coursing are practiced under similar rules in Great Britain and America. The oldest coursing club in England was that established at Swaffham in Norfolk in 1776, and of existing organizations the most important is the Altcar Club, established in 1825. In America the sport has been in existence since the middle of the nineteenth century, but open meetings, in which competitors from regular organizations take part, are of comparatively recent date. The supervising and controlling body of the sport is "The American Coursing Board," and the principal meets, or meetings, are in the two Dakotas, Kansas, Nebraska, Iowa, and Minnesota. The open coursing of the coyote (prairie wolf) is frequently practiced (especially by stockmen and cowboys) in this country and is an exciting and somewhat dangerous sport, often involving a long chase on horseback over a rough country.

In England the sport is conducted under the laws and rules of the National Coursing Club, and the principal meet is that held every February over the Altcar Course near Liverpool, for the Waterloo cup, a prize instituted in 1836. It was originally an 8-dog course, increased the next year to 16, the year after to 32, at which it stood until 1857, when it became a 64-dog stake, and as such it remains. The best dogs of the world compete. In competitions the judge follows the dogs throughout the course, noting every movement from the moment they are slipped until the "kill," or conclusion of the course—his decision being based on the following general rules: I. For *speed*, according to the degree of superiority shown, 1, 2, or 3. II. For the *go-by*—the starting of a greyhound a clear length behind its opponent, passing it in a straight run and obtaining a clear length ahead —2 points or, if gained on the outer circle, 3 points. III. The *turn*—a sharp turn of not less than a right angle in the hare's course when pressed by a dog, 1 point. IV. The *wrench*—a change of less than a right angle in a hare's course when pressed, one-half point. V. The *kill*, 2 points, or in a descending scale in proportion to the merit displayed, which may be of no value. VI. The *trip*—an unsuccessful effort which threw the hare off its legs, or the getting so close as to snatch it and lose hold, 1 point. Consult *The Encyclopædia of Sports and Games*, ed. by the Earl of Suffolk (London, 1911).

COURT (Fr. *cour*, It. *courte*, from Lat. *cohors*, inclosure, from *co-*, together + **hors*, connected with Lat. *hortus*, garden, Gk. χόρτος, *chortos*, hay, OIr. *gort*, sedge, Goth. *gards*, court, OHG. *garto*, Ger. *Garten*, AS. *geard*, Eng. *yard*). Courts, in the legal sense—i.e., authorities empowered to try and punish persons charged with offenses against the public or state, and to settle disputes regarding the rights and duties of individuals—have existed among all peoples that have emerged from savagery. There is no single root from which early judicial authority springs; nor is there, even among the Aryan peoples,

any single typical form of primitive court. The right of the community to punish offenses against the community—a right which expresses itself originally in lynch law—may beget a popular jurisdiction in criminal cases; and the interest of the community in preventing feuds may make the popular assembly competent to decide civil cases. The belief that flagrant breaches of the social order are offenses against the gods may vest criminal jurisdiction in the priests; and the duty of the priests to see that vows and promises under oath are performed may be expanded into a fairly broad civil jurisdiction. The attribution to the king of disciplinary powers over the popular army, and the concentration in his hands of the power of preserving internal peace, may create an extensive royal jurisdiction over crimes and also over torts; and the king's civil jurisdiction may be widened by ascribing to him a patriarchal authority analogous to that exercised by the heads of houses and of clans. Private disputes may be referred, voluntarily at first, to the decision of king or priest or assembly, and when such references have become customary the duty of decision may be transformed into judicial authority. Traces of all these ideas and influences are discernible in the early judicial systems of the Aryan peoples.

Roman Courts. Among the ancient Romans criminal jurisdiction was exercised by the King or by officials appointed by the King. From the decisions of such officials appeal to the popular assembly was sometimes granted. In the Republican period such an appeal (*provocatio*) lay against all sentences condemning a citizen to death, or scourging, or exile, and also against fines beyond a certain amount; and this appeal became the real trial. The forms observed were substantially the same as in legislation. A proposal to condemn the accused to a certain punishment was submitted to the people, debated before them in informal assembly (*contio*), and accepted or rejected by them in formal assembly (*comitia*). (See COMITIA.) During the last century of the Republic criminal courts of a different type, the *quæstiones*, gradually absorbed the jurisdiction previously exercised by the assembly. The *quæstio* was a body of select jurors sitting under the presidency of a special magistrate, usually a prætor. The jurors were drawn from a small panel, which included only the most distinguished and wealthy citizens.

Civil jurisdiction, also, is said to have been exercised by the Roman kings. It is probable, however, that the King did not decide the controversies submitted to him; but, like the prætor in later times, heard the pleadings only and then sent the parties to a *judex*, or referee, nominated (or at least accepted) by the parties themselves. It also seems probable that, in the royal period, the referees were usually priests (*pontifices*). In the Republican period there were elected boards of *judices* (*decemviri*, *centumviri*), to which cases were sent by the prætor; but reference to a single *judex*, regularly a senator, seems to have been customary in actions on tort or on contract, and was admissible, during the last century of the Republic, in all cases.

The fundamental principle which controlled the administration of civil and criminal justice, and the composition of the courts, in the Republican period, was the separation of jurisdiction (*jus*) and judgment (*judicium*). Pleas were made and the case was formulated before a magistrate, but the decision was rendered by a private citizen or by a body of private citizens. In the Imperial period this system (*ordo judiciorum*) was gradually supplanted by the *cognitio extraordinaria*, in which an Imperial official conducted the trial and rendered the decision. Under this system the administration of justice was taken out of the hands of the people and became a part of the general administration created and controlled by the Emperor. As in the general administration, so in the administration of justice, there were courts of lower and higher instance, and appeals could be taken from the former to the latter.

Teutonic and Mediæval Courts. The primitive Teutonic court was a folkmoot, or popular court, in which the decision was proposed by the presiding dignitary (king or prince or hundredman), or by a law speaker appointed by the presiding dignitary, and was approved or disapproved by the assembled freemen. In the later Frankish (Carolingian) Empire, special judgment finders (*scabini*, *Schöffen*, *échevins*) gradually took the place of the body of freemen. These judges or assessors were at first appointed by the count; but, after the dissolution of the Empire, their office, like most offices, became hereditary.

The early Teutonic courts were those of the hundred, of the county, and of the tribe. In the Frankish Empire the court of the tribe was replaced by the royal court, held by the count palatine; and in the Carolingian period circuit courts were held by Imperial *missi*. Even in the Carolingian period the courts of the hundred and of the county were being supplanted by manorial courts, held by the bailiffs of the seigneurs, and after the dissolution of the Empire the popular free courts disappeared in many parts of Europe. During the Middle Ages appeared special feudal courts and independent city courts. Nearly all the mediæval courts were courts at once of first and last instance; there was no system of appeals; the King's court was usually nothing but a feudal court for the great vassals. In all of these courts, from the King's court down to the manorial court, the decision was usually rendered (or at least approved) by a limited number of judges or assessors, who were regularly the *pares* of the defendant—i.e., persons of the same class and rank. Throughout the Middle Ages there were also special ecclesiastical courts (see CANON LAW), with jurisdiction not only over church matters, but over the persons of the clergy and over many matters to-day regarded as civil. In these courts the judicial organization and procedure of the late Roman Empire were perpetuated. From the ordinary (bishop's) courts appeals ran to Rome, and the Pope could appoint legates to hold special courts.

Modern European Courts. When the administration of justice was reorganized by the absolute monarchy, the new royal courts were modeled on the ecclesiastical courts of the Middle Ages. Professional or "learned" judges replaced the mediæval lay judges; the judge or bench of judges rendered decision both upon the law and the facts; appeals ran from the courts of lower instance to those of higher, and finally to the King's court. The modern European courts are still, essentially, courts of this Roman-Imperial-ecclesiastical type, except that the court of last instance has usually cassational jurisdiction

only, not reformatory jurisdiction. The only important modification which has been introduced is jury trial in criminal cases. Lay assessors have been retained or reintroduced, in some countries, in the police courts and in the commercial courts. These latter courts, with special jurisdiction over merchants and commercial cases, are survivals of the independent city courts of the Middle Ages. The number of judges in a European court is usually proportional to the amount of business with which the court has to deal. In the larger courts the judicial force is divided into sections (sometimes termed "senates"), and the judicial business is distributed according to its character—criminal cases going to one section, commercial cases to another, etc. When a doubtful question of general importance comes before such a section, a session of the entire court may be called. In all the leading European states the independence of the judge is safeguarded by life tenure and fixed salary, and in the German Empire by the rule that a transfer, even when it is technically a promotion, cannot be made without the consent of the judge concerned.

English and American Courts. Originally of wider signification, the term "court" has come to represent a permanent organization or tribunal for the public administration of justice, composed of one or more judges, who, when engaged in the transaction of business, are attended ordinarily by attorneys and counselors, who represent the litigants; by clerks, who keep records of what is done; and by marshals, sheriffs, constables, or like officers, who enforce judicial mandates and preserve order.

In primitive communities courts perform legislative and executive as well as judicial functions. The *scyresgemot*, county court, or sheriff's turn of Anglo-Saxon England was not simply a judicial tribunal presided over by a bishop and sheriff, but was an assemblage of freemen for the discussion and transaction of local affairs generally. The *Aula Regis*, or Great Council of the Kingdom, in early English history performed legislative as well as judicial duties; and so did the stated assemblages of the ruling class in some of the English colonies in this country. In Massachusetts the present names of the legislative and the judicial bodies—the General Court and the Supreme Judicial Court respectively—bear testimony to the fact that the primitive court of the colony performed both legislative and judicial functions.

I. English courts may be classified in various ways. One basis of classification is their relative authority; and this divides them into superior and inferior courts. (*a*) The latter class includes those tribunals over which courts of the former class may exercise a supervisory jurisdiction by writs of mandamus (q.v.), certiorari (q.v.), or prohibition. They are of four kinds:

1. Local courts of criminal or quasi-criminal jurisdiction, such as *borough sessions*, held by a recorder or the justices of a municipal borough; *licensing sessions*, held by borough justices for granting or withdrawing liquor licenses; *petty sessions* and *special sessions*, or courts held by two justices or a borough police magistrate in the exercise of a summary jurisdiction over minor offenses; *general* or *quarter sessions* of the borough and of the county, for the trial of felonies and misdemeanors within the borough or county jurisdiction, and for appeals from petty and special sessions.

2. *Local civil courts of record*, such as borough civil courts and county courts. The latter are lineal descendants of the *scyresgemots* of King Alfred; but their present constitution, jurisdiction, and practice are regulated by the County Courts Act, 1888 (51 and 52 Vict. c. 43). Under this statute, England, with the exception of London, is divided into 491 county-court districts, each court having a judge who must be a barrister of at least seven years' standing, and who is appointed by the Lord Chancellor, is allowed traveling expenses (except the judge within the Duchy of Lancaster, who is paid by salary), is addressed as "His Honor Judge ——," and ranks next after knights bachelors. Some of these judges have a high professional reputation. From the decisions of these courts an appeal lies in many cases to the High Court, and the latter possesses the power of supervising the proceedings of the former by writs of certiorari and prohibition, and by orders to show cause, which have been substituted for the old writ of mandamus.

3. The *university courts* of Oxford and Cambridge, which exercise civil jurisdiction in some cases in which members of the university are concerned.

4. *Manorial courts*, having a limited jurisdiction in some parts of the kingdom. See MANOR; COURT BARON.

(*b*) The *superior courts* of England, prior to the Judicature Act of 1873, embraced those of Common Law and of Equity, the Probate and Divorce Court, the Admiralty Court, and the London Court of Bankruptcy. The superior courts of common law and of equity were evolved from the *Aula Regis*, or Great Council of the Kingdom. It was provided by Magna Charta that "common pleas shall not follow one court, but shall be holden in some certain place." Accordingly new justices were appointed, and the *Court of Common Pleas* was established at Westminster Hall, with jurisdiction over all civil actions between individual litigants, i.e., over all common pleas or suits, as distinguished from pleas of the crown or criminal actions. A century later Edward I detached from the *Aula Regis* the *Court of King's Bench*, the *Court of Exchequer*, and the *Court of Chancery*, thus settling the superior courts of law and equity upon the basis which they occupied until recently.

Originally the *King's Bench* (or *Queen's Bench* during the reign of a queen) was a criminal court and the conservator of the public peace. By a series of fictions, however, its jurisdiction was extended to civil actions.

So the *Exchequer*, which at first was a court of revenue only, extended its jurisdiction by a series of legal fictions to a variety of suits between individual litigants.

Under Edward I the *Court of Chancery* (q.v.) became an established judicial tribunal. It was presided over by the Chancellor, who had the custody of the Great Seal, and with it the power to issue writs returnable in chancery, and thus to act as a check upon the common-law courts. Later the Lord Chancellor was assisted in the performance of his judicial functions by the Master of the Rolls and by vice chancellors. For the influence of this court upon the development of English law, see CHANCERY; EQUITY.

(*c*) Reference has been made already to the fact that one of the presiding officers of the Anglo-Saxon local courts was a bishop. After

the Norman Conquest the bishops ceased to take part in those assemblies and were accorded exclusive cognizance of spiritual matters. This jurisdiction was steadily extended until it embraced not simply the discipline of the clergy and the regulation of ecclesiastical affairs, but also the control of marriage and divorce, and the disposition of the estates of deceased persons. At present, however, *ecclesiastical courts* in England are confined to the decision of ecclesiastical questions, while divorce and matrimonial causes, as well as the probate (q.v.) of wills and testaments and the administration of decedents' estates, are within the jurisdiction of secular courts.

(*d*) The *Court of Admiralty* is one of great antiquity, having its origin, undoubtedly, in the period when the King was in truth the source of all judicial power. After the courts of common law, described above, acquired a degree of independence of the sovereign, they did not hesitate to issue writs of prohibition to the Court of Admiralty and to treat it as an inferior tribunal. Its present jurisdiction is mainly statutory.

The London *Court of Bankruptcy* was created and regulated by modern bankruptcy (q.v.) statutes.

(*e*) By a series of judicature acts, beginning with that of 1873, all of the foregoing secular courts were consolidated into one *Supreme Court*. This consists, at present, of two permanent divisions, one of which, styled *His Majesty's High Court of Justice*, has original jurisdiction of all actions formerly brought in either of the superior courts of common law or of equity, or in the admiralty, or probate, or divorce, or bankruptcy courts; and an appellate jurisdiction over various cases brought up from inferior courts. The other division is styled *His Majesty's Court of Appeal*, its jurisdiction being almost exclusively appellate. The High Court is separated into three parts, known respectively as the *Chancery Division*, with the Lord Chancellor as president and five judges; the *King's Bench Division*, with the Lord Chief Justice as president and 14 judges; and the *Probate, Divorce, and Admiralty Division*, with a president and a judge; the general character of the subjects of which each division has cognizance being indicated by its name.

The Court of Appeal consists of the Lord Chancellor, every living person who has held the office of Lord Chancellor, the Lord Chief Justice, the Master of the Rolls, the president of the Probate, Divorce, and Admiralty Division, and five judges, with the title of Lords Justices of Appeal. It is an august tribunal, whose decisions of appeals from the various branches of the High Court command great respect.

In addition to this permanent and impressive Appellate Division of the Supreme Court, there are divisional courts, in the King's Bench Division and in the Probate, Divorce, and Admiralty Division, composed of two judges, ordinarily, for the disposition of appeals from the petty or quarter sessions, from the county court, and from divers other inferior tribunals.

(*f*) Above the Supreme Court, as a final court of appeal, is the *House of Lords*, whose appellate jurisdiction dates back to the thirteenth century. At present, however, only a few of its members take any part in the performance of its judicial functions. They are known as *Lords of Appeal*. The Lord Chancellor presides over them. (See LORDS, HOUSE OF.) The final court of appeal for cases arising in India and the colonies is the Privy Council (q.v.), which has also final appellate jurisdiction over judgments of the ecclesiastical courts and of the Naval Prize Court.

From the foregoing sketch of the English courts it is apparent that a litigated case may be passed upon by four successive tribunals. It may be instituted, e.g., in a county court, thence appealed to a divisional court, thence to the Court of Appeals, and finally to the House of Lords. A similar series of appeals may terminate in the Privy Council.

II. In the United States distinct systems of courts exist—one organized under the Federal Constitution and statutes, the others under the constitutions and statutes of the several States.

1. **Federal Courts.** (*a*) Sec. 1 of Art. III of the Federal Constitution declares that "the judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as Congress may from time to time establish." By the second section of the same article, as modified by the Eleventh Amendment to the Constitution, the judicial power of these courts is extended to all cases in law and equity arising under the Federal Constitution, laws, and treaties; to all cases affecting foreign ambassadors, ministers, or consuls; to all admiralty and maritime cases; to controversies to which the United States shall be a party; to controversies between two or more States, between citizens of different States, between citizens of the same State claiming lands under grants of different States, between a State or the citizens thereof and foreign States, citizens, or subjects; and to suits by a State against a citizen of another State.

(*b*) Under the power conferred upon it to establish judicial tribunals inferior to the Supreme Court, Congress has established a Court of Claims, district courts, and circuit courts; the latter having formerly an extensive original jurisdiction, but now, by a recent Act of Congress (Judicial Code, 1911), only an appellate jurisdiction. Besides these it has provided for various courts in the Territories. The latter are not, however, United States courts under Article III of the Constitution, but are rather congressional courts. They are called into being as an incident to the congressional authority to make all needful rules and regulations respecting the territory of the United States. Their judges are not entitled to hold office during good behavior, but may be appointed for a term of years, and may be subject to suspension or removal from office by the President.

(*c*) The *Court of Claims* was established in 1855 to hear and determine certain classes of claims against the United States, thus permitting citizens in many cases to sue the government. See CLAIMS, COURT OF.

(*d*) The *Commerce Court*, instituted by Act of Congress for the enforcement of orders and decrees of the Interstate Commerce Commission (q.v.), with power to set aside, modify, or annul such orders, consisted of five circuit judges of the United States. After a brief existence it was abolished by Act of Congress, 1914.

(*e*) By the Act of 1789 the States were divided into 13 districts, which have increased to 76 (1906), each district usually having a judge, a clerk, a marshal, and an attorney appointed by the Federal government. The dis-

trict courts have an extensive jurisdiction, embracing jurisdiction over admiralty (q.v.) and maritime causes; suits arising under the revenue laws, the civil-rights statutes, and various other legislation; prosecutions for crimes against the United States or for the recovery of penalties under Federal laws; proceedings in bankruptcy, and many other subjects of litigation. See DISTRICT COURT.

(*f*) By an Act of Congress passed in 1911 (the Judiciary Code), the appellate jurisdiction formerly exercised by circuit courts was transferred to the circuit courts of appeal, of which there are nine—one in each circuit. Each of these courts consists of three judges, any two of whom constitute a quorum. Its members are selected from the following list: the Supreme Court justice assigned to the circuit in question, the circuit judges and the district judges of that circuit; but no justice or judge is allowed to sit in this tribunal in a case which was tried before him while holding a circuit or district court. It is apparent, therefore, that the *personnel* of these courts changes frequently.

(*g*) The final appellate tribunal of the Federal judiciary is the *Supreme Court*, which is unique and probably the most influential judicial body in the world. See SUPREME COURT OF THE UNITED STATES.

2. The **State courts** are modeled after those of England. It is true they do not include admiralty nor ecclesiastical tribunals; but this is because admiralty and maritime jurisdiction is confined exclusively to the Federal courts by the Federal Constitution, and because there is no state church in any of the various States. That part of the powers of the English ecclesiastical courts relating to the estates of deceased persons and kindred subjects has been devolved in many States upon tribunals bearing various names, such as surrogates', probate, or orphans' courts. Most of the local or inferior courts, however, as well as the superior courts of law and of equity, were copied by State constitutions and statutes from English originals. In many of the States courts of chancery (q.v.) and of common law (q.v.) have been united into a single supreme court. It is impossible in this article to describe the judiciary system of each of the States, for in matters of detail they differ not a little; but a brief sketch of the New York courts will give the reader an idea of those existing in other States.

(*a*) To some extent these courts correspond to the territorial subdivisions of the State. For example, each town (q.v.)—the territorial unit in New York—is required to elect *justices of the peace* (q.v.), who are empowered to hold courts and to exercise a limited criminal as well as civil jurisdiction. In each county a *county court* is provided for, and also a *surrogate's court*, although in some counties these courts are held by the same judge. Other local courts, with a limited jurisdiction, have been erected by the Legislature, especially in cities and large villages. The *Supreme Court* possesses a general jurisdiction in law and equity throughout the State. It is composed (1914) of 100 justices, each of which is empowered to hold court in any county, although they are not elected by the State at large, but each is chosen by the electors in one of the nine judicial districts into which the State is divided. Some of these justices hold courts for the trial of cases or the determination of motions; while others, upon the selection of the Governor, constitute four courts of appeal, called *appellate divisions*, the State being divided into four departments, in each of which one of these courts has appellate jurisdiction. From determination by an appellate division an appeal may be taken in many cases (see Art. VI, § 9, of New York Constitution) to the *Court of Appeals*, the highest regular judicial tribunal of the State, from whose decision there is no appeal. It consists of a chief judge and six associate judges. A *Court of Impeachments* is also provided for by the State constitution. This, however, is not a regular, but an extraordinary, tribunal, which rarely assembles.

(*b*) In some States the Supreme Court possesses original jurisdiction and is also the final court of appeals. That is the case in Massachusetts, where an action brought in the Supreme Court may be tried and decided by a single justice, and from his decision an appeal may be taken to the full court. In that State the Supreme Court is the final tribunal for appeals from the decisions of a single justice; also from the Probate Court, the Insolvency Court, and the Superior Court—the Superior Court, in turn, possessing both original and appellate jurisdiction, appeals running to it from municipal, district, police, and justice courts.

Consult: *Encyclopædia of the Laws of England* (London, 1897); Curtis, *Jurisdiction of the United States Courts* (2d ed., Boston, 1896); Foster, *Treatise on Federal Practice* (Chicago, 1901); Cummings and Gilbert, *Official Court Rules of New York* (New York, 1900); the United States Constitution and Revised Statutes; the constitutions and statutes of the several States. For a separate treatment of special courts, see individual titles such as COMMON PLEAS, COURT OF; SURROGATE; COURTS, MILITARY; PROBATE COURT; ARCHES, COURT OF; SUPREME COURT OF THE UNITED STATES; ETC. Consult also the authorities referred to under such titles as CIVIL LAW; ADMIRALTY LAW; PLEADING; ETC.

COURT. 1. A name originally applied to the square or space inclosed by the buildings of a feudal castle. In time it came to denote the persons immediately surrounding a feudal chief or superior. Its application is now confined to the residence and surroundings of sovereign princes, together with such persons of distinction as are in the habit of approaching the monarch and of associating with the other members of the royal family, both in a public and a private capacity. In this sense its use is sometimes extended to the government of which the sovereign is the titular head, as when an ambassador is said to be appointed to (or "near") the court of St. James, i.e., of Great Britain.

2. In architecture, an open space around which a building is constructed. The term is commonly used even where the space is not entirely surrounded, as in many modern public and commercial buildings which inclose three sides of a reserved space left open on the fourth. An inclosed space is still called a "court" when roofed with glass, but not when covered with an opaque roof or vault: it is then called a "hall."

In ancient times, before the invention of glazed windows, light and air for dwellings, as for temples, was obtained through unprotected openings. For greater safety and privacy such

windows, as well as the doors to the various rooms, were made to open upon a common area, walled in from the street or public land. In order to economize footsteps as well as space, it early became the custom to build the house entirely around one or more such courts, as in Babylonian and Assyrian palaces, and the great Minoan palace group at Cnosus (q.v.) in Crete. This arrangement of the house plan has persisted in various forms to the present day in the subtropical and warmer temperate climes. It is seen in a highly developed form in Pompeiian houses, in which different types of court were called "atrium," "cavædium," "peristyle," etc. Except in the closer-built quarters of the cities, the houses in Spain and Spanish-American cities are still commonly built around a court called a *patio*. In France, also, the larger city houses are built at the back of a court, of which the other three sides are occupied by the dependencies, the entrance from the street being through an imposing doorway and passage called the *porte-cochère*, or carriage door.

All the great palaces of Europe erected since the fifteenth century are built around courtyards (this term is synonymous with "court"). In this they follow the precedents set by the later feudal fortresses and castles, as at Chambord and Saint-Germain in France, the Louvre, Heidelberg Castle, and many others, sometimes following the very outline of the mediæval bailey. The Alhambra and several other Moorish buildings in Spain preserve for us the rich decoration of the Moslem courtyards of the twelfth to the fifteenth centuries. In Italy the Renaissance architects developed several types of court architecture, and made of the courts of their palaces structures of extraordinary beauty and dignity. Three main types are recognizable: the Florentine, in which the upper walls of the court are borne on an arcade of arches carried by columns; the Lombard, in which the court arcade is in two superposed stories; and the Roman, in which the arcade in one or more stories does not carry the court walls, and is designed after the Roman fashion, with arches borne on piers fronted by columns or pilasters. The Riccardi and Strozzi palaces and the Palazzo Vecchio at Florence illustrate the first; the Bevilacqua Palace at Bologna and the Brera at Milan, the second; the Farnese Palace at Rome, the third of these types. Incomparably the finest of French courtyards is that of the Louvre at Paris. Perhaps the most famous of European courts is the lesser Belvedere Court of the Vatican at Rome, which has given its name to two celebrated sculptures exposed in or near it—the Apollo and the Hercules torso; next to it in artistic fame is the court of San Damaso, with its beautiful arcades called the Loggie, decorated by Raphael and his successors. In England and the United States and other northern countries the court is usually less an architectural than a utilitarian feature to provide light and air, and as such its minimum dimensions are prescribed by the laws of many cities in the case of dwellings and tenements. The Public Library of Boston is a fine example among the few modern public buildings in the United States which are built around an architecturally imposing court.

Closely related to the courts of houses and palaces are the cloisters (q.v.) or cloister garths of monasteries and cathedral chapters; the forecourts or atria of ancient basilicas, surrounded by arcades, as at San Ambrogio, Milan (see ATRIUM); the courts of ablution of Mohammedan mosques (see MOSQUE); and the great pillared courts of Egyptian temples. See HOUSE; PALACE.

COURT, CONTEMPT OF. See CONTEMPT.

COURT, PRESENTATION AT. What in monarchical countries is considered the honor of being presented at court or formally introduced to the sovereign, is valued not only for the éclat of the ceremonial, but also for its service as a credential. Having been received by his *own* sovereign, a person may expect to be received anywhere else, and may claim to be presented by the representative of his country at any foreign court. The privilege is therefore carefully guarded from abuse. Thus Queen Victoria, during her long reign, exercised the most scrupulous personal supervision over the names of those who sought the honor, excluding all whose reputation was in the least tarnished. In England the names of those desiring to be presented and of their presenters must be sent to the Lord Chamberlain's office several days previously for approbation. Those who are not British subjects may be presented by their own Ambassador. An elaborate ceremonial, including the wearing of full court dress, is connected with the ceremony. For fuller information as to court dress, etc., consult Armytage, *Old Customs and Modern Court Rules* (London, 1883); Trendell, *Dress Worn at His Majesty's Court, Issued with the Authority of the Lord Chamberlain* (ib., 1908); Hodgetts, *The House of Hohenzollern: Two Centuries of Berlin Court Life* (ib., 1911).

COURT, TERM OF. See TERM OF COURT.

COURT, kōōr, ANTOINE (1696–1760). A French Reformer, called the "Restorer of Protestantism in France." He was born at Villeneuve de Berg, in Languedoc, March 27, 1696. His parents were peasants, adherents of the Reformed church, which was then undergoing cruel persecution. When but 17 years old, Court began to speak at the secret meetings of the Protestants, held literally "in dens and caves of the earth," and often in darkness, with no pastor present to teach or counsel. He entertained a great desire to build up the church so ruthlessly persecuted; and to this end he proposed four things: (1) regular religious meetings for teaching and worship; (2) suppression of the fanaticism of those who professed to be inspired, and of the consequent disorders; (3) restoration of discipline by the establishment of consistories, conferences, and synods; (4) the careful training of a body of pastors. To the performance of this great task he devoted his life. From audiences of half a dozen meeting in secret, he came to address openly 10,000 at one time. In 1715 he convoked the first Synod of the Desert. In 1724 further fury was hurled at the Protestants in a decree which assumed that there were no Protestants in France and prohibited the most secret exercise of the Reformed religion. A price was set on Court's head, and in 1730 he fled to Lausanne. There, after great exertion, he founded a college for the education of the clergy, of which, during the remaining 30 years of his life, he was the chief director. This college sent forth all the pastors of the Reformed church of France until the close of the

eighteenth century. He died at Lausanne, June 13, 1760. Court intended to write a history of Protestantism and made extensive collections for the purpose, but he did not live to do the work. He wrote, however, *An Historical Memorial of the Most Remarkable Proceedings Against the Protestants in France from 1744–51* (Eng. trans., London, 1732); *Histoire des troubles des Cévennes ou de la guerre des Camisards* (1760; new ed., 3 vols., Alais, 1819). Consult his *Autobiography*, ed. by E. Hugues (Toulouse, 1885); his *Letters*, from 1739, ed. by C. Dardier (Paris, 1885, 1891); E. Hugues, *Antoine Court* (ib., 1872); id., *Les synodes du désert* (3 vols., ib., 1885–86); H. M. Baird, *The Huguenots and the Revocation of the Edict of Nantes* (New York, 1895); *Bulletin de la Société de l'Histoire du protestantisme français* (Paris, 1893–1906).—His only son, ANTOINE COURT DE GÉBELIN (born at Nîmes Jan. 25, 1725, died in Paris May 10, 1784), who took the name of his grandmother, was a literary man of recognized rank, and rendered excellent service, first as his father's amanuensis and assistant and afterward as a scholar at the capital. He is remembered in connection with the famous case of Jean Calas (q.v.) by his work *Les Toulousaines, ou lettres historiques et apologétiques en faveur de la religion réformée* (Lausanne, 1763).

COURT BARON (Lat. *Curia Baronis*). In mediæval England, the local court of a manor. Such courts were incident to every manor, barony, or lordship of land, in the Norman and Angevin period of English history, and in subsequent ages came to be regarded as the characteristic and essential quality of a manor, insomuch that Coke declares that "a court baron is the chief prop and pillar of a manor, which no sooner faileth, but the manor falleth to the ground." Being of customary origin, and custom being a matter of immemorial usage, no new courts baron, and consequently no new manors, can be created, and it is asserted by Blackstone that all manors existing in his time "must have existed as early as King Edward the First." However this may be, the manorial courts of which we have any knowledge are of great antiquity, though those that remain have by successive acts of Parliament and social changes been reduced to mere shadows of their former authority and importance, most of them having to-day only a nominal existence.

The court baron was and is the court of the freeholders of the manor. The lord, or his steward, is the presiding officer of the court, which is composed of those freehold tenants of the manor who owe, as one of the services or incidents of their tenure, the service of "suit," or attendance, at the court. While the judicial functions of the court varied considerably, according to the customs of the manor, in general it exercised an ordinary jurisdiction in civil suits among the tenants of the manor, determined proprietary rights of land, regulated rights of common, sanctioned grants of the waste, etc. Until the reform of legal procedure in England in 1833, the great proprietary action for the recovery of land, known as the "writ of right," was properly instituted in the court baron, though the great authority of the regular tribunals of the kingdom had long since brought safer and more convenient processes within the reach of persons asserting claims to land. Many of the manorial courts have died out from the lack of a competent number of "suitors," i.e., freemen subject to attendance at court.

A species of court baron existed in the manors created by royal patent in the Province of New York in the seventeenth and eighteenth centuries. These were modeled after the historic courts baron of the mother country and for a time enjoyed considerable authority. They were abolished with the manors to which they were incident in the revolutionary legislation of 1787. Consult: Bolton, *History of the Several Towns, Manors, and Patents of the County of Westchester, New York;* Digby, *History of the Law of Real Property* (5th ed., Oxford, 1898); Pollock and Maitland, *History of English Law* (2d ed., London, 1899); Maitland, *Select Pleas in Manorial Courts* (Selden Society, 1889), Introduction; Gurdon, *History . . . of Court Baron and Court Leet* (ib., 1731). See COURT LEET; CUSTOMARY LAW; MANOR.

COURT BEGGAR, THE. A play by Richard Brome (1632).

COURT CEREMONIAL. See CEREMONIAL COURT.

COURTEILLE, ABEL PAVET DE. See PAVET DE COURTEILLE.

COURTENAY, kērt'nâ, EDWARD HENRY (1803–53). An American mathematician, born in Maryland. He graduated in 1821 at the United States Military Academy, where until 1824 he was an assistant professor. In 1829–34 he was professor of natural and experimental philosophy there, in 1834–36 professor of mathematics at the University of Pennsylvania, and in 1842–53 professor of mathematics at the University of Virginia. He was an engineer in the construction, in 1837–41, of Fort Independence in Boston harbor, and in 1841–42 was chief engineer of the dry-dock work in the Brooklyn Navy Yard. He translated and edited the *Elementary Treatise on Mechanics* of Boucharlat (1833), and prepared a *Treatise on the Differential and Integral Calculus, and on the Calculus of Variations* (1855).

COURTESY TITLES. See TITLES OF HONOR.

COURT FOOL. From very ancient times there existed a class of persons whose business it was to while away the time of the noble and the wealthy, particularly at table, by jests and witty sayings. The custom is so old that it is mentioned in the great Sanskrit epic *Ramāyana* (q.v.). Plutarch speaks of a jester owned by the King of Persia. Philip of Macedon, Attila, Harun al-Rashid, and even Montezuma employed them. Only in the Middle Ages, however, did the office of court fool become a regular and indispensable function. At the end of the fourteenth century the fashion developed rapidly. Queens, dauphins, dukes, and wealthy barons all maintained their fools. The symbols of such a personage were: the shaven head; the fool's cap of gay colors with ass's ears and cock's comb; the fool's sceptre, which was variously formed; the bells, which were mostly attached to the cap, but in some cases to other parts of the dress; and a large collar. The rest of the costume was regulated by the taste of the master. Of these professional fools, some obtained an historical reputation, as Triboulet, jester of King Francis I of France, and his successor, Brusquet; Klaus Narr, at the court of the Elector Frederick the Wise of Prussia; and Scogan, court fool to Edward IV of England. The kings and regents of Scotland had

their jesters; and the sarcastic sayings of some of these privileged personages—such as those of Patric Bonny, jester to the Regent Morton—are still remembered. English court jesters died out with the Stuarts, one of the last of the race being the famous Archie Armstrong (died 1672). Besides the regular fools recognized and dressed as such, there was a higher class, called "merry counselors," generally men of talent, who availed themselves of the privilege of free speech to ridicule the follies and vices of their contemporaries. Of these, Kunz von der Rosen, jester to the Emperor Maximilian I; John Heywood, a prolific dramatic poet and epigrammatist at the court of Henry VII; and Angeli, a French courtier, were particularly distinguished for talent and wit. In all times there have existed at courts persons who, without becoming jesters by profession, were allowed the privilege of castigating the company by their witty and satirical attacks, or who served as an object for the wit of others. Among these were the Saxon general Kyaw, celebrated for his blunt jests; and the learned Jacob Paul, Baron Gundling, whom Frederick William I of Prussia, to show his contempt for science and the artificial court system, loaded with titles. Often imbecile or weak-minded persons were kept for the entertainment of the company. The custom survived long in Russia, where Peter the Great had so many fools that he divided them into distinct classes, and kept them with him wherever he went. As late as the nineteenth century the Czar of Russia kept a jester at court, and in France just before the Revolution Marie Antoinette had her fool. Consult: Nick, *Die Hof und Volksnarren* (Stuttgart, 1861); Flögel, *Geschichte der komischen Litteratur* (Leipzig, 1784); Doran, *History of Court Fools* (London, 1858).

COURT'HOPE, William John (1842–1917). An English scholar and author; educated at Harrow and at New College, Oxford, where his career was most distinguished. He was professor of poetry at Oxford (1895–1901) and was appointed honorary fellow of New College in 1896. He gave promise of distinction in the kind of poetry exemplified in his *Ludibria Lunæ* (1869) and *The Paradise of Birds* (1870), but scholarship and criticism of a distinctively academic stripe came to occupy him almost exclusively. Among his more important works are: *Addison* ("English Men of Letters Series," New York and London, 1882); *The Liberal Movement in English Literature* (1885); *Life in Poetry* (London, 1901); *History of English Poetry* (6 vols., ib., 1895–1909). He was made C.B. in 1892, and received the degrees of D. Litt. and LL.D. respectively from Durham (1895) and Edinburgh University (1898). He also edited, with biography, the last five volumes of the standard edition of Pope (10 vols., 1871–89), which was begun with Whitwell as editor.

COURT LEET (from *court* + *leet*, AS. *lēode*, OHG. *lint*, Ger. *Leute*, people; connected with OCh. Slav. *Gudŭ*, Lett. *laudis*, people, and ultimately with Skt. *ruh*, to grow). In English law, a local customary court of great antiquity and of a popular character, having a limited criminal jurisdiction. It has been declared to be "the most ancient court in the land for criminal matters, the court baron being of no less antiquity in civil," and it is supposed to have been derived from the Anglo-Saxon "folkmote," in contradistinction, perhaps, to the "hallmote," or court baron, which consisted of the freeholders, sitting in the hall of the manor.

Though usually found in connection with manors, the leet was not, properly speaking, a manorial court. There were town leets, borough leets, and hundred leets. But it was in connection with the manor, to whose internal organization it was peculiarly adapted, that the court leet reached its highest development. Though held by the steward, with the aid of the freemen of the manor (they were not required to be freeholders, as in the court baron), it was still regarded as belonging to the King. It was, in effect, a royal magistrate's or police court, having complete jurisdiction only of minor offenses (misdemeanors) and the jurisdiction of a committing magistrate in cases of felony and treason. These latter it referred to the superior tribunals of the country for trial and punishment. The court has now completely lost its importance, having been superseded by the police and county courts, though it still has a nominal existence in some manors. See Court Baron; Manor; and consult the authorities referred to under Manor; also Jacob, *Law Dictionary*, title "Court Leet" (London, 1809); Pollock and Maitland, *History of English Law* (2d ed., London and Boston, 1899); Gurdon, *History . . . of Court Baron and Court Leet* (London, 1731).

COURTLEIGH, William Louis (1869–). An American actor, born at Guelph, Ontario, Canada. In 1889 he made his first appearance on the stage in *Brother and Sister* under John Dillon. He appeared in more than 50 plays: in *Northern Lights* (1896) as John Swiftwind; in *The Great Northwest* (1897) as Donelli, and in *Hedda Gabler* (1898); *A Rich Man's Son* (1899); *Lost River* (1900); *The Merchant of Venice* (1901); *Sherlock Holmes* (1905); *What Ails You* (1912), and *Divorçons* (1913).

COURT'LY, Sir Harcourt. An old beau in Dion Boucicault's *London Assurance*. His son Charles wins away from him the heiress he was to marry.

COURTLY NICE, Sir. An insignificant fop, the principal character of Crowne's comedy *Sir Courtly Nice*.

COURTMANS-BERCHMANS, kōōrt'mȧns bĕrk'mȧns, Joanna Desideria (1811–90). A Flemish author, born (Joanna Berchmans) at Oudegend, East Flanders. After the death of her husband, in 1856, she conducted a school at Maldegem. She was closely identified with the movement aiming at the advancement of Flemish literature. Several of her poems and even more of her stories enjoy great popularity. They include: *Het geschenk van den jager* (1864), which won the Flemish literature prize in 1864; *De zwarte Hoeve* (2d ed., 1866); *De Koewachter* (1873); *De Hoogmoedige* (1882).

COURT-MARTIAL. See Courts, Military.

COURTNEY, kōrt'nĭ, Leonard Henry Courtney, Baron (1832–). An English Liberal-Unionist statesman, born at Penzance. He graduated at Cambridge in 1855 and was called to the bar three years later. From 1872 to 1875 he occupied the chair of political economy at University College, London. He was a member of Parliament in 1876–1900, and became Undersecretary of State for the Home Department in 1880, and for the Colonies in 1881; Governor of Madras in 1882; and Privy Coun-

cilor in 1889. He served on the Labor Commission in 1893–94, and became known as a strong advocate of proportional representation. In 1906 he was raised to the peerage as Baron Courtney of Penwith. He favored the woman's movement. He wrote *The Working Constitution of the United Kingdom* (1901) and contributed to the *Times* and *Nineteenth Century*.

COURTNEY, William Leonard (1850–). An English author, born at Poona, India, and educated at Oxford. In 1873 he became headmaster of Somersetshire College, Bath, and in 1894 editor of the *Fortnightly Review*. Among his works are: *Studies on Philosophy* (1882); *Constructive Ethics* (1886); *Studies New and Old* (1888); *Life of John Stuart Mill* (1889); *The Idea of Tragedy* (1900); *The Development of Maeterlinck* (1904); *The Feminine Note in Fiction* (1904); *Rosemary's Letter Book* (1909); *In Search of Egeria* (1911).

COURTNEY, William Prideaux (1845–1913). An English retired official and writer, brother of Baron Courtney. He was born at Penzance and early (1865) entered the office of the Ecclesiastical Commissioners, from which he was retired in 1892. He wrote on political biography and history and published *Register of National Bibliography* (3 vols., 1905–12), and, with G. C. Boase, *Bibliotheca Cornubensis* (3 vols., 1874–82), and contributed to the *Encyclopædia Britannica* and the *Dictionary of National Biography*.

COURT OF CHIVALRY. See Chivalry, Court of.

COURT OF CLAIMS. See Claims, Court of.

COURT OF COMMERCE. See Commerce Court.

COURT OF COMMON PLEAS. See Common Pleas, Court of.

COURT OF INQUIRY. See Courts, Military.

COURT OF LIONS. The most famous court of the Alhambra, taking its name from 12 white marble lions from whose mouths streams of water flowed into a central alabaster basin. The tiled court is surrounded by 124 columns delicately ornamented in filigree and colors, supporting a low gallery. For illustration, see Alhambra.

COURT OF LOVE (Fr. *Cour d'Amour*). The name applied in the later Middle Ages to groups of noble ladies who often, while assembled to listen to the declamations of the troubadours, took occasion to decide upon questions of courtesy and etiquette, particularly in affairs of love. According to some authorities these courts formed regular institutions during the twelfth century, the custom flourishing especially in Provence. There was a code (still preserved) of 31 articles called *De Arte Amatoria et Reprobatione Amoris*, by André, a royal chaplain, who lived in the middle of the twelfth century. Decisions are said to have been based upon this code. A typical example of the questions submitted to such tribunals is the following: If a lady listened to one admirer, pressed the hand of another, and touched with her toe the foot of a third, which of these three was the favored suitor? Among the eminent ladies who presided over these "courts" were Queen Eleanor of Guienne and her daughter Marie de France, Countess of Champagne. René of Anjou, in the fifteenth century, made an ineffectual effort to resuscitate these "courts." Consult: Meray, *La vie au temps des cours d'amour* (Paris, 1876), and Reynouard, *Choix de poésies originales des troubadours*, vol. ii (ib., 1817).

COURT OF LOVE, The. A poem assigned to Chaucer, but possibly of later origin. It appears in the edition of 1561.

COURT OF REQUESTS. An inferior court of equity jurisdiction, instituted in the reign of Henry VIII for the purpose of affording relief to the Lord Chancellor. Its authority was limited to cases coming within the jurisdiction of the High Court of Chancery, but deemed of too small importance to engage the attention of that august tribunal. It was presided over by the Lord Privy Seal, assisted by judges known as Masters of Requests. It never attained great importance, and was abolished by Act of Parliament in 1641 (Stat. 16 and 17 Car. I, c. 10).

The courts of conscience were also known as courts of requests. See Conscience, Courts of.

COURT OF SESSION. The highest civil tribunal in Scotland, instituted in the reign of King James V. The object of its institution was to discharge the judicial functions which originally belonged to the King and his council, and which, since 1425, had in a great measure devolved on a committee of Parliament, as the great council of the nation. The Court of Session consisted at first of 14 ordinary judges and a president. One-half of these judges and the president were churchmen, and the practice of appointing ecclesiastics to the bench did not cease for some time even after the Reformation. The King had the privilege of appointing, in addition to the ordinary judges, three or four peers or members of his great council to sit and vote with the Lords of Session. The president of the court was the Lord Chancellor. His office was abolished at the union, and the practice of appointing peers to sit as members of the court gradually fell into disuse.

From its foundation, till 1808, the Court of Session consisted of one court; in that year it was divided into what are known as the first and second divisions, constituting ordinarily two separate courts possessing coördinate jurisdiction. The Lord President is still president of the whole court when called together for consultation, but on ordinary occasions he officiates simply as president of the first division. In 1830 the number of judges in the Court of Session was reduced to 13, and that is still the full number. Of the five lords ordinary, only four sit daily. The judgments of the outer house, with a few statutory exceptions, are appealable to the inner house. The youngest judge, or junior lord ordinary, officiates in a separate department of the outer house, called the "bill chamber," where summary petitions and other branches of business peculiarly requiring dispatch are disposed of. This department alone is open during the vacations of the court, the judges, with the exception of the Lord President and Lord Justice Clerk, officiating in it in rotation. Either division of the Court of Session may call in the aid of three judges of the other, when equally divided in opinion. In cases of still greater difficulty, the lords ordinary are also called in, and a hearing before the whole court, or *in presence*, as it is called, takes place.

Since the Act 31–32 Vict., c. 100, no hearings before the whole court have taken place; the cases being decided on written arguments submitted to the judges. The judges of the Court of Session are appointed by the crown and hold their offices for life. No one is eligible to the

office unless he has served as an advocate or principal clerk of session for five years or as a writer to the signet for 10 years. See COURT.

COURTOIS, kōōr'twä', GUSTAVE CLAUDE ETIENNE (1852–1923). A French figure and portrait painter, born at Pusey, Haute-Saône. He studied with Gérôme in Paris and in 1889 won the gold medal at the Paris Exposition. His genre and historical pictures include "Narcisse" (Marseilles) and "Dante and Virgil in Hell" (Besançon). Among his recent works, exhibited at St. Louis in 1904, are "Adam and Eve in Eden," "Cupid Feasting," and a portrait of Mme. G. From 1880 to 1890 he was the most fashionable portrait painter in Paris.

COURTOIS, JACQUES (1621–76), called Le Bourgignon (the Burgundian) and known in Italy as Giacomo Cortese and Il Borgognone. A Roman battle and historical painter and etcher. He was born in St. Hippolyte (Franche-Comté) and was a pupil of his father, Jean Courtois, but went to Italy at the age of 15 and spent three years with the Spanish army in Lombardy. He then worked in Bologna, Florence, Siena, and Rome, influenced successively by Guido Reni and Francesco Albani in Bologna, and by Cerquozzi and Pieter de Laar in Rome. Cerquozzi encouraged him to make battle scenes his specialty. His compositions, which usually represent cavalry combats, are remarkable for their fresh and spirited conception and their masterly treatment of light and atmosphere. They excited great admiration and found many imitators, and are to be seen in most of the principal galleries of Europe. At the age of 36 he entered a Jesuit convent and thereafter devoted himself to religious pictures. His brother GUILLAUME, or Guglielmo, also called Il Borgognone, painted frescoes in the Quirinal Palace and in several Roman churches, among others the Lateran Basilica and San Marco.

COURT PARTY, THE. A term applied as early as 1620 to the supporters of the political policy of the Stuart dynasty as opposed to the *Country party,* during the disputes of King and Commons. At the end of the century the party represented high Toryism, Jacobitism, and High Church principles.

COURTRAI, kōōr'trâ' (Flemish *Kortryk*). A town in the Province of West Flanders, Belgium, on the Lys, 26 miles southwest of Ghent (Map: Belgium, B 4). Courtrai is built on both sides of the river, surrounded by walls, has a castle, a citadel, a fine old bridge flanked with Flemish towers, a noble town hall, and a beautiful Gothic church, founded in 1238 by Baldwin, Count of Flanders. The town hall, dating from the sixteenth century and now restored, contains fine chimney pieces, frescoes, and statuettes. Behind it is the museum of antiquities. In the church of Notre Dame is one of Van Dyck's most celebrated paintings, "Raising of the Cross." An old belfry is an interesting antique. Table damask, cotton, woolen, and bleached goods, sugar, tobacco, and oils are the articles of manufacture for which Courtrai is celebrated, as well as its Valenciennes lace and the excellent flax grown near by. The city boasts a college, an academy of painting and architecture, and an industrial school. Pop., 1890, 30,400; 1905, 34,760; 1910, 35,872. Courtrai dates back to Roman times, when it was called Cortoriacum. During the Middle Ages it was an important industrial centre. On July 11, 1302, the Flemings, citizens of Ghent and Bruges chiefly, numbering 20,000, won a splendid victory over 47,000 French beneath the walls of Courtrai. More than 700 pairs of golden spurs, worn by the French nobility, were gathered by the Flemings, and the battle was henceforth called the "Battle of the Spurs." The town suffered greatly in the French wars of the seventeenth and eighteenth centuries.

COURTS, CHILDREN'S or JUVENILE. See JUVENILE OFFENDERS.

COURTS, MILITARY. Military courts are distinguished from civil courts both in their organization and procedure. They are divided into courts-martial and courts of inquiry, which in their various forms are described below.

Courts-Martial (Fr., military courts) are statutory institutions for the enforcement of order and discipline in armies and navies. The American army is governed by a military code mainly derived from that of England. The military tribunals instituted in America and England for the administration of this code do not differ materially in composition, power, or procedure. The court of the constable and marshal recognized in the Statute of Richard II, c. 2, appears to have been the first in England to administer military justice. The office of high constable was abolished in the reign of Henry VIII, and with it lapsed all the criminal jurisdiction of this court. From this time until 1689, when military courts were recognized by statute, military law was administered by means of commissioners, by the general in command of troops, or by means of deputies appointed by him. These commissioners or deputies were usually officers of the army and constituted courts or councils of war. Some time prior to the passing of the Mutiny Act these councils of war were called courts-martial, and with few modifications are now the existing military tribunals.

American courts-martial are instituted by authority of Congress, in pursuance of a power, conferred by the Constitution, to try offenses committed while the party is in the military service. These courts are (1) the general court-martial; (2) the special courts-martial; (3) the summary courts-martial. The jurisdiction of the general court-martial extends to every person subject to military law for any offense within the cognizance of a military court. It is the only military court that can try a commissioned officer, and it takes cognizance of the serious offenses committed by enlisted men. The power to assemble a general court-martial is given by statute to the President of the United States, the commanding officer of a territorial division or department, the superintendent of the military academy, the commanding officer of an army, a field army, an army corps, a division, or a separate brigade, and, when empowered by the President, the commanding officer of any district or of any force or body of troops. The statute provides that a general court-martial may consist of any number of officers from 5 to 13 inclusive, and that it shall not consist of less than 13 when that number can be convened without manifest injury to the service. The officers who are competent to appoint a court-martial are competent to appoint a judge advocate for the same. The judge advocate prosecutes in the name of the United States and is, under certain circumstances, counsel for the prisoner. He summons witnesses for prosecution and defense. The original charges are sent to this officer, and if he considers any amendment necessary he communi-

cates with the officer appointing the court. When the convening officer has satisfied himself that the charge preferred discloses an offense under the Articles of War (q.v.), and that the evidence forthcoming is sufficient to justify the trial of the accused, he issues an order defining the place and time of the meeting of the court, and naming, in the order of their rank in the service, the officers who are to compose it.

When a commissioned officer is to be tried, the officer appointing the court details, if he can, without prejudice to the service, officers of rank equal or superior to that of the accused. He also avoids detailing the officer who has investigated the charges against the accused, or one who will be a principal witness against him, or the immediate commanding officer of the accused. A member of a court of inquiry respecting the matter on which the charges are founded, or an officer who has a personal interest in the case, is not detailed. An officer who is the accuser or is a witness for the prosecution is forbidden by statute from sitting as a member of the court-martial for the trial of the case in which he is such witness or accuser. Court-martial procedure does not differ materially from that of the ordinary criminal courts of the country. This court is, however, a judge of the law as well as of the facts of the case it tries. Before it proceeds upon any trial the judge advocate administers an oath to each member which requires him, as a juror, to well and truly try and determine, according to evidence, the matter . . . before him, etc., and as a judge to duly administer justice without partiality, favor, or affection, etc. This oath includes also one of secrecy as to the votes of members, and of the sentence of the court, until approved. The judge advocate is also required to take a similar oath of secrecy. Congress has power to prescribe not only the organization and jurisdiction of courts-martial, but also their practice, and the mode of executing their sentences. It has secured to the accused a right of challenge to a member of his court, and immunity from a second trial for the same offense. It has fixed the period of time within which the accused must be prosecuted. The form of procedure for a general court-martial is laid down in works treating of the subject of military law and in the "Manual for Courts-Martial," a government publication issued generally to the service.

Special Courts-Martial were established by the Act of March 3, 1913, which became effective July 1, 1913. By the operation of this act the garrison and regimental courts formerly provided for cases not capital were abolished. Special courts-martial may consist of any number of officers, from three to five inclusive, and a judge advocate. The same eligibility rules as in general courts-martial apply. Special courts-martial may be appointed by the commanding officer of a district, garrison, fort, camp, or other place where troops are on duty, and the commanding officer of a brigade, regiment, detached battalion, or other detached command, may appoint special courts-martial for his command, but such special courts-martial may in any case be appointed by superior authority when by the latter deemed desirable. Special courts-martial may try any person subject to military law, except an officer, for any crime or offense not capital made punishable by the Articles of War. These courts have power to adjudge punishment not to exceed confinement at hard labor for six months or forfeiture of pay for six months, or both, and in addition thereto reduction to the ranks in cases of noncommissioned officers. The procedure and record are the same as for general courts-martial, except that testimony is not ordinarily recorded.

Summary Courts-Martial consist of one officer and may be appointed by the commanding officer of any fort, garrison, or other place where troops are on duty or of any regiment, battalion, or detachment. Its proceedings are summary in character, and its record is meagre. It may try any soldier, except one holding a certificate of eligibility to promotion, for any offense not capital and may adjudge punishment not to exceed confinement at hard labor for three months or forfeiture of three months' pay, or both, and in addition thereto reduction to the ranks in cases of noncommissioned officers. The authority appointing a summary court approves or disapproves its action. This court, as instituted in the United States, has no power to try capital cases or commissioned officers. In England this court has been instituted for the purpose of trying offenses committed in active service, which, with due regard to the public service, could not be tried by the ordinary courts. It is competent to try any officers, soldiers, or other persons subject to military law for any offense, and, if composed of three officers, can award all the punishments of a general court-martial.

A Court of Inquiry is, in its function, analogous to a grand jury in civil procedure. It is convened to examine into the nature of any transaction of, or accusation or imputation against, any officer or soldier in the service. Unless specially ordered to do so, it does not give an opinion on the merits of the case it investigates. A dissenting opinion is authorized. A court of inquiry may be ordered by the President or by any commanding officer, but shall never be ordered by a commanding officer, except upon a demand by the officer or soldier whose conduct is to be inquired into. It consists of one or more officers, not exceeding three, and a recorder. The order convening a court of inquiry details the members and recorder by name, specifies the subject matter of inquiry, and directs a report of the facts, or of the facts with opinion. Under the military laws of the United States a court of inquiry and the recorder thereof have the power to summon witnesses and to take evidence on oath. This is not so in the English service, where it has no judicial power, and is simply a board directed to collect evidence with respect to a transaction into which the commanding officer himself cannot conveniently inquire. A court of inquiry, wrote Sir Charles Napier, "ought generally to be a closed court, no one allowed to enter but such individuals as are called for, and who, being privately examined, are sent out. . . . It is generally objectionable to make a court of inquiry an open court."

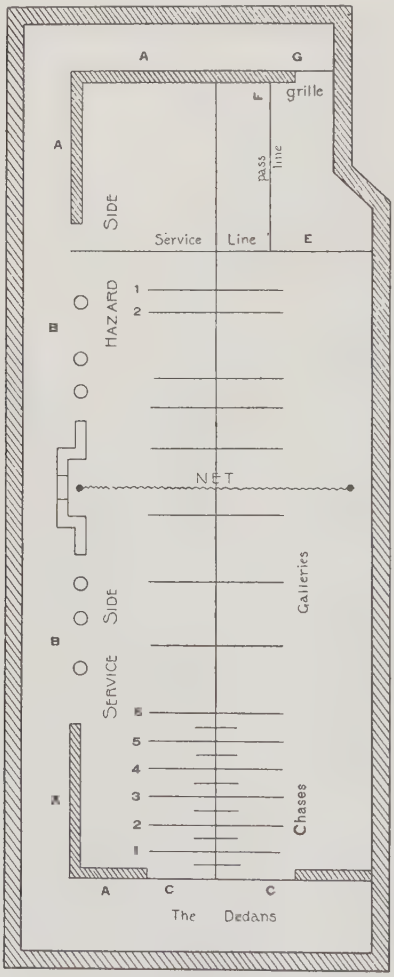
Military Courts of Other Countries. In the army of Germany there are general and regimental courts. In trials of enlisted men a certain proportion of the members of the court are of the rank of the accused. In the Russian army there is a supreme tribunal at St. Petersburg, and district and regimental courts-martial. In the French army individual officers have large powers of imprisonment, and there are regiments and courts of discipline for hard characters. In the Austrian army there are courts of first instance, and courts of appeal from the former.

Military lawyers are also attached to each regiment to help in the administration of military justice.

Bibliography. A *Manual for Courts-Martial* was prepared by direction of the Secretary of War for the use of the army of the United States in 1910 and has been amended to contain all changes up to August, 1910. For the English practice, Simmons, *Courts-Martial* (London, 1873), may be consulted. See MILITARY LAW.

COURTSHIP OF MILES STANDISH, THE. A hexametric poem by Longfellow (1858).

COURT TENNIS. Indoor tennis (see diagram). Usually the court occupies an entire



COURT TENNIS.

building and is lighted from the roof. The playing space is usually about 96 by 32 feet, surrounded on three sides by a corridor about 6 feet wide (the penthouse), which has a sloping roof about 7 feet high. The spectators occupy the *dedans*, or the part of the penthouse situated in the rear of the court, and separated from the same by an open grating. The most complete courts have floors of asphalt, and cement walls painted black to a height of 18 feet. The nets divide the court, and also the *service* and *hazard* sides of the game. The *tambour* is a projection on the hazard side, resembling a chimney, and near it (in the penthouse) is the *grille*. The *chases* are numbered on the floor (from 1 to 6) and are employed to divide part of the court into the number of spaces required by the game. In playing the game the server must stand in the service court and serve the ball over the penthouse, it being required to strike on the penthouse roof and then roll off into the receiving court. The player on the hazard side strikes it on the bound wherever he chooses, if only it first strikes the ground on the opposite side of the net; e.g., he may strike it against the nearest wall, so that it rebounds across the net. A "chase" is called when the player fails to strike the ball before the second bound, unless he is on the hazard side and beyond the service line. Further, a record is made of the cross lines at which the ball bounds; which, however, does not affect the score unless the game stands at 40, in which event sides are changed and the contestants play for the "chase." The player responsible for the "chase," by permitting the same to be made, will attempt to return the ball nearer to the end wall than the point at which it was marked, to insure its bounding a second time, making the attempt as often as his opponent returns the ball until he either succeeds or misses. In the former event he is credited with the "strike"; while in the latter his opponent scores. For more detailed information regarding the game, its scoring, and its history, see TENNIS.

COURT THEATRE, THE. A playhouse for comedies and farces, situated in Sloane Square, London. Originally a chapel built in 1818, it was turned into a theatre.

COUSA, JOHN. See ALEXANDER JOHN I.

COUSE, E(ANGER) IRVING (1866–). An American painter. He was born in Saginaw, Mich., and studied at the Art Institute, Chicago, the National Academy of Design, New York, and in Paris at the École des Beaux-Arts and Académie Julian under Bouguereau and Robert Fleury. He lived 10 years in France, where he painted charming scenes of the Normandy coast. After his return to America he devoted himself to depicting the life and habits of the Taos Indians, a Pueblo tribe in New Mexico. He reveals the poetical and philosophical rather than the savage and warlike side of the Indians, and his skillfully executed pictures are full of sentiment. Among those in public galleries are: "Elkfoot" (National Gallery, Washington); "The Forest Camp" (Brooklyn Museum); "The Tom-Tom Maker" (Lotos Club, New York); "Medicine Fires" (Montclair Gallery, New Jersey); "Shapanagons, a Chippewa Chief" (Detroit Museum). He was elected to the National Academy of Design in 1911. Among his more recent works are: "Mending the War Bonnet"; "Making Pottery" (awarded the Carnegie prize); "Rushing Water" (1912); "Twilight, Taos Pueblo" (1913).

COUSIN, kōō′zăn′. The name of two prominent French artists of the sixteenth century.—JEAN the elder (1490–1560), sculptor, painter, and wood engraver, was probably born at Sens, where he passed most of his life, and is said to have designed some of the stained-glass windows in the cathedral. In 1540 he was occupied in Paris with the festive decorations for the entry of Emperor Charles V. His only authentic painting is "The Last Judgment" (Louvre), although many others have been ascribed to him. As a sculptor he modeled the fine tomb of

Admiral Chabot, now in the Louvre, and the sculptures formerly in the chapel of Pagny (Burgundy). A large number of wood engravings have also been credited to him. Shortly before his death he published *Livre de Perspective de Jean Cousin, Senonois* (1560).—His son and pupil, JEAN the younger (c.1522–94), was born in Sens. He certainly designed the glass windows and probably the sculptures of the castle of Fleurigny (Sens), and probably the glasses in the church of Saint-Gervais, Paris, but not those of the Sainte-Chapelle at Vincennes. He painted five portraits of the Bouvyer family, and was the author of a book on *The True Science of Portraiture*, and also probably a *Book of Fortune*, containing 200 drawings. He is said to have illustrated many other works, including Ovid and Æsop. Consult: Roy, "Les deux Jehan Cousin," in *Mem. de la Société Archéol. de Sens*, vol. xxiv (1909); Dimier, *French Painting in the Sixteenth Century* (1904); id., *Bulletin de l'art ancien et moderne* (1909).

COUSIN, VICTOR (1792–1867). A French philosopher and historian. He was born in Paris and studied with such brilliant success at the Ecole Normale that in 1815 he was appointed assistant to Royer-Collard in the chair of philosophy at the Sorbonne. He threw himself heartily into the reaction against the sensationalistic philosophy and literature of the eighteenth century, which was then in possession of the field. (See SENSATIONALISM.) In 1817 he visited Germany, where he was introduced to bolder and more speculative systems of philosophy than any he had yet known, becoming acquainted with Jacobi, Schelling, Hegel, and Goethe. During a later visit to Germany, in 1824–25, he was suspected of revolutionary tendencies, and imprisoned in Berlin, where he was detained for six months. He took advantage of his compulsory detention in Prussia to study the philosophy of Hegel, which had no small influence on his susceptible intellect. On his return to France he took a decided stand against the reactionary policy of Charles X, and in 1828, when the comparatively liberal ministry of Martignac came into office, Cousin, who had for some years been suspended from his professorial functions, was reinstated in his chair. Meanwhile he had become known as an author by his editions of Proclus and Descartes (1820–26), and by the earlier volumes of his celebrated translation of Plato, which was finished in 1840. Cousin reached the height of his popularity and influence as a philosophic teacher in the years 1828–30, when often as many as 2000 enthusiastic hearers gathered around him. He was young, simple, and pure in his habits; his doctrines were for the most part new to his audience, bold, and in harmony with the spirit of the time. The finest qualities of the national genius appeared in his lectures—a wonderful lucidity of exposition, an exquisite beauty of style, such as few philosophers have equaled, a brilliancy of generalization and criticism, and a power of coördinating the facts of history and philosophy so as to make each illustrate the other and reveal their most intricate relations. At this period Cousin was one of the most influential leaders of opinion among the educated classes in Paris. After the revolution of 1830, when his friend Guizot became Prime Minister, he was made a member of the Council of Public Instruction, in 1832 a peer of France, and later director of the Ecole Normale and virtual head of the University. His efforts for the organization of primary instruction are to be seen in the valuable reports which he drew up from personal observation on the state of public education in Germany and Holland. His influence shows itself in this sphere even to the present day. In 1840 he was elected a member of the Académie des Sciences Morales et Politiques, and in the same year became Minister of Public Instruction in the cabinet of Thiers. After the revolution of 1848 Cousin aided the government of Cavaignac, and published an antisocialistic brochure called *Justice et charité*. After 1849 he disappeared from public life.

Cousin was greater as an expounder of historical systems of philosophy than as an original thinker. At first a disciple of Royer-Collard and the Scottish school, he was attached to the psychological method of investigating; afterward a keen student of the German school, he expounded the views of Schelling and Hegel with such enthusiasm that he might legitimately enough have been considered a "German idealist." But he endeavored to mediate between the German standpoint of an impersonal reason and that of empirical psychology. In the later years of his life his views carried him to a modified Cartesianism. See DESCARTES.

Cousin's chief works, besides those already mentioned, are: *Fragments philosophiques* (1826); *Du vrai, du beau, et du bien* (1837; Eng. trans., 1854); *Cours d'histoire de la philosophie morale au XVIIIe siècle* (1839–42, containing discussions of the Sensationalistic school, the Scottish school, and Kant); *Cours de philosophie* (1828, containing an introduction to the history of philosophy, and lectures on the philosophy of the seventeenth and eighteenth centuries). He also contributed a great variety of papers to the French reviews. Besides his philosophical work he rendered a very real service to the history of the seventeenth century in France by his luminous and stimulating sketches of Mesdames de Longueville, de Hautefort, de Sablé, and a number of other great personages of the period. Consult: Hamilton, *Discussions on Philosophy, Literature, Education, and University Reform* (London, 1852); Taine, in *Les philosophes français du XIXe siècle.* (Paris, 1857); Janet, *Victor Cousin et son œuvre* (ib., 1885); Barthélemy Saint-Hilaire, *Victor Cousin, sa vie et sa correspondance* (3 vols., ib., 1895); Jules Simon, *Victor Cousin* (ib., 1887); Charles Waddington, "Un grand homme et son secrétaire," in *Séances et travaux de l'académie des sciences morales et politiques*, vol. clxx (ib., 1908); Babbitt, *The Masters of Modern Criticism* (Boston, 1912).

COUSINE BETTE, kōō'zēn' bĕt, LA. A novel by Balzac (1846) dealing with the love of an aunt and a niece for the same youth.

COUSIN MICHEL, mē'kel. A humorous appellation for the German native, corresponding to Brother Jonathan as applied to the American.

COUSIN-MONTAUBAN, kōō'zăN' môN'tô'băN', CHARLES GUILLAUME MARIE. See PALIKAO, COUNT OF.

COUSIN PONS, kōō'zăn' pôN, LE. A novel by Balzac (1847), dealing with the last moments and death of an old bachelor whose invaluable collection of paintings made him an object of solicitude and intrigue to relatives and strangers.

COUSINS, kŭz'nz, SAMUEL (1801–87). An English mezzotint engraver. He was born in

Exeter and was early apprenticed to the mezzotint engraver S. W. Reynolds. The famous plates of Lady Acland and children, and of Master Lambton (after Lawrence) are among his first independent works. These were followed by many portraits and pictures after Reynolds, Lawrence, Gainsborough, J. E. Millais, Wilkie, Landseer, and others. His work is characterized by extreme delicacy and versatility of treatment and interprets the originals in a truthful and graphic manner. The British Museum contains a large collection of his mezzotints. Cousins was the first to receive the rank of Academician Engraver (1855). Consult his biography by A. Whitman (London, 1904).

COUSSEMAKER, kōōs'mȧ'kâr', Charles Edmond Henri de (1805–76). A French historian of music, born at Bailleul (Nord). He studied at the Douai Lycée and completed his musical education under Moreau and Lefebvre. He devoted himself principally to researches on mediæval music and published *Histoire de l'harmonie au moyen-âge* (1852); *Drames liturgiques du moyen-âge* (1861); *Les harmonistes des XIIème et XIIIème siècles* (1864); *Les harmonistes du XIVème siècle* (1869); and *Scriptores de Musica Medii Ævi* (1866–75), his principal work, reprinted by Moser in 1908.

COUSTOU, kōō'stōō'. A family of French sculptors.—Nicolas (1658–1733), born in Lyons, studied first with his father, François, a wood carver, and later with his uncle Antoine Coyzevox in Paris. After three years in Rome he returned to Paris, where he was appointed rector of the Academy in 1720, and chancellor in 1733. His extremely numerous works include decorations for the palaces of Versailles, Trianon, and Marly, in which he was assisted by his brother Guillaume; they include: "Union of the Seine and the Marne" and "Daphne Pursued by Apollo," in the Garden of the Tuileries; statues of Julius Cæsar and of Louis XIV, in the Louvre; and "The Descent from the Cross," in the choir of Notre Dame. His younger brother, Guillaume the Elder (1677–1746), studied under his father and Antoine Coyzevox and spent several years in Rome, where he assisted Pierre Legros. Besides work done in collaboration with his brother, and many portrait busts and mythological statues, he modeled the kneeling statue of Louis XIII in Notre Dame, the fine group of "Ocean and Mediterranean," and the vigorous and spirited marble groups of the "Horses of Marly" at the entrance to the Champs Elysées, which inaugurated a new and more natural era of French sculpture. He was appointed director of the Academy in 1735.—Guillaume the Younger (1716–77), son and pupil of the former, won the Prix de Rome in 1735. His works include religious and mythological statues, such as "Apotheosis of St. François Xavier" in the Eglise Saint-Paul, Bordeaux, and "Mars and Venus" in the castle of Sans Souci, Potsdam, and the tomb of the Dauphin, father of Louis XVI, in the cathedral of Sens. Consult Lady Dilke, *French Architects and Sculptors of the Eighteenth Century* (1900), and "Les Coustou," *Gazette des Beaux-Arts*, vol. i (1901).

COUTANCES, kōō'tänS'. A picturesque town in the Department of La Manche, France, on the Soulle, 41 miles south of Cherbourg (Map: France, N., D 3). An old city, it is built on a conical hill 7 miles from the English Channel, and is the seat of a bishopric. Its cathedral of Notre Dame is one of the finest specimens of ecclesiastical architecture in the early Pointed style of Normandy. Other noteworthy features are the Gothic church of Saint-Pierre, the public gardens and museum, and the ruins of an ancient aqueduct. Coutances has manufactures of muslins, lace, yarns, cotton goods, pianos and organs, and a trade in grain. Marble is quarried, and there is a good market for horses and cattle. Pop., 1891, 8145; 1901, 6991; 1911, 6599. The town is the Constantia of the Romans. For a history and description, consult *Annuaire guide de Coutances* (Coutances, 1897); U. Chevalier, *Repertoire des sources et topobibliographie* (Montbeliard, 1894–99).

COUTHON, kōō'tôN', Georges (1755–94). A French politician and revolutionary leader, born at Orsay, in Auvergne, Dec. 22, 1755. He practiced law successfully at Clermont, where he acquired great popularity on account of his fine intellectual powers and grave gentleness of character. At first a moderate Republican, he was elected to municipal office and later, in 1791, was sent by the electors of Puy-de-Dôme to represent them in the Legislative Assembly. He became more and more radical with the progress of the Revolution, and, though a chronic invalid, he poured forth invectives against royalty and the Church from the tribune. He voted for the death of the French monarch without delay or appeal to the country. Elected to the Convention, Couthon attached himself to Robespierre, was appointed a member of the Committee of Public Safety in 1793, and sent against the insurgent city of Lyons. After the entrance of the Republican army Couthon showed comparative moderation and controlled the soldiery. Only 24 of the insurgents were put to death, and though property was ruthlessly destroyed, the lives of the citizens were respected until the arrival of Collot d'Herbois (q.v.). Couthon returned to Paris, formed with Robespierre and Saint-Just a supreme tribunal, and made himself conspicuous by his extreme virulence against England. He assisted Robespierre in destroying the partisans of Hébert and Danton, but was himself involved in the ruin which overtook his chief. After a vain attempt at suicide Couthon was borne to the guillotine, July 28, 1794, together with Saint-Just and Robespierre. Consult: Mège, *Correspondance de Couthon* (Paris, 1872); Aulard, *Les orateurs de la législative et de la convention* (Paris, 1885–86); Morse-Stephens, *The French Revolution* (New York, 1891).

COUTRAS, kōō'trȧ'. A town in the Department of Gironde, France, on the left bank of the Dronne, 26 miles northeast of Bordeaux (Map: France, S., D 3). Coutras has a trade in flour, and the district produces red wine and brandy. The place is noteworthy on account of the bloody victory gained here in 1587 by Henry of Navarre over the forces of the Catholic League. Pop., 1891, 4231; 1901, 4062; 1911, 4807.

COUTTS, kōōts. See Burdett-Coutts.

COUTURE, Guillaume (1851–). A Canadian musician and composer, born and educated in Montreal. He early manifested an unusual talent for music and, when 13 years old, became organist of St. Bridget's Church, Montreal, and, when 16, organist of the church of St. James. Later he studied for five years in Paris, where he was admitted to the National Society of Music and the Paris Conservatory of Music and was appointed organist of Sainte-Clothilde's Church. He returned to Canada in

1878, founded the *Société des symphonistes*, and in 1880 became director of the Montreal Philharmonic Society. He was appointed professor of musical theory in several educational institutions in Montreal, including the McGill Conservatory of Music, and became director of the Amateur Operatic Club and of the Montreal Symphony Orchestra. He published many musical compositions, some of which were accepted and performed by the National Society of Music, Paris—the only Canadian compositions thus honored. In 1900 he was named, by the French government, Officier d'Institut Public.

COUTURE, kōō'tŭr', THOMAS (1815–79). A French historical and genre painter. He was born at Senlis, Dec. 21, 1815. He studied under Gros and Delaroche without being a follower of either. In 1837 he obtained the Prix de Rome, and in 1845 his picture, "The Thirst for Gold" (Toulouse Museum, replica in Amsterdam), brought him a wide reputation. His "Romans of the Decadence" (1847) obtained a first-class medal and created a great and lasting sensation and is now in the Louvre. Among his other works are the "Falconer" (1855), "Damocles" (1872), and "Day Dreams" (1855, in the Metropolitan Museum). Under Napoleon III he became court painter, but he was not enough of a courtier to please the Emperor and resigned his position. In 1869 he retired to Villiers-le-Bel, near Paris, where he died. He was neglected in France, but his pictures were purchased by foreigners, especially by Americans. He also painted the frescoes in the chapel of the Virgin, Saint-Eustache, Paris, and during his last period many portraits, of which there are frequent examples in the museums of southern France. The chief beauty of his art is its rich, glowing color, and it is also good in line. He was very important as a teacher, counting Fuerbach, Victor Muller, Puvis de Chavannes, Manet, and many Americans, Russians, and Germans among his pupils. His book, *Conversations on Art Methods*, was translated by Stewart and published in New York in 1879. Consult: Healey, "Couture," in Van Dyck's *Modern French Masters* (New York, 1896); Claretie, *Peintres et sculpteurs contemporains* (Paris, 1873); Flat, "Un peintre assimilateur," in *Revue Politique et Littéraire* (Paris, 1913).

COUVADE, kōō'vȧd' (Fr., a brooding, from *couver*, to hatch, from Lat. *cubare*, to lie down). A custom of certain primitive peoples in accordance with which the father of a new-born babe adopts the rôle of invalid while the mother goes about her ordinary occupations. The custom was well developed on both hemispheres. On the authority of Strabo and later writers it was ascribed to the Basques of Europe, a theory which has been much discussed, while Ripley is skeptical as to the present existence of the custom among the Basques. Traces of it are found in Asia and in North America, and it has been well observed in South America by Rodway (*In the Guiana Forest*, 1895) and others. Indeed, South America and the West Indies are the areas in which the couvade has been developed to the highest degree. Tylor was at first inclined to explain the usage as implying a physical bond between parent and child, so that the father's actions are believed to affect the child's condition. Later Tylor adopted Bachofen's theory that the couvade was the signpost of a change from maternal to paternal descent; the motive he originally assigned to the practice remains valid, but the "sympathetic prohibitions may be interpreted as originally practiced by the mother only, and afterward adopted by the father also." This later explanation was in accord with the theory, until recently current among anthropologists, that maternal descent invariably preceded paternal descent. This position, however, has been so vigorously assailed that Tylor's original interpretation of the couvade as simply a result of belief in sympathetic magic seems preferable. Consult further: Ripley, *The Races of Europe* (1899); McGee, "The Seri Indians," *17th Rep. Bur. Am. Ethnology;* Tylor, *Researches into the Early History of Mankind*, pp. 291 ff.; id., "On a Method of Investigating the Development of Institutions," *Journal of the Anthropological Institute*, vol. xviii, pp. 254 ff. (1889); Ploss, *Das Weib* (1897); etc. See MAN, SCIENCE OF.

COUXIA, kōō'shē-ȧ, or **COUXIO,** kōō'shē-ō. A South American monkey. See SAKI.

COVA'RIANTS. See FORMS.

COVE (AS. *cofa*, chamber, Icel. *kofi*, hut, MHG. *kobe*, Ger. *Koben*, stall). In architecture, a long concave surface approximately a quarter circle in section, interposed in place of a cornice between the wall and ceiling, or employed to support a projecting story or balcony, or even to form a crowning feature to a structure, as on the gateway of the Certosa at Pavia, or the front of San Lorenzo *fuori* at Rome. The coves (or coving) of many splendid Italian and French ceilings of the sixteenth to the eighteenth centuries were intersected by vaulted lunettes called *penetrations*, and both coves and penetrations were richly decorated with paintings, stucco relief, and gilding. Famous examples are in the library of Siena Cathedral and the Loggia of the Farnesina at Rome, decorated by Raphael and his pupils.

COV'ENANT (OF. *covenant*, Fr. *convenant*, It. *convenente*, from Lat. *convenire*, to agree, from *com-*, together + *venire*, to come). A term much used in theology, derived from the Hebrew *berith* of the Old Testament and the Greek *diathēkē* of the New, both meaning "covenant." It was emphasized in the federal theology during the constructive Protestant period (by Cocceius, 1603–69 (q.v.)), and was incorporated in the Westminster Confession. God is represented as making successively, with Adam, Noah, Abraham, and all Israel, covenants, which are substantially the same covenant, under which Israel is adopted as God's special and chosen people and is bound to Him in close and mutual obligations. The covenants of the Old Testament are all substantially "covenants of works," putting blessing upon the basis of obedience; the one covenant of the New Testament, which replaces the others, conditions blessing upon faith in Jesus Christ. See FEDERAL THEOLOGY.

COVENANT. In English law, a contract by deed or specialty, i.e., one in which the validity of the promise does not depend upon consideration (q.v.) as in the case of simple contracts, but upon the formality of execution of the contract by sealing and delivery. The essential characteristic of covenants distinguishing them from other specialties is the express promise to pay a sum of money or to perform a certain act. Thus a bond differs from a covenant only in that it is a mere acknowledgment of indebtedness without an express promise to pay the amount of the bond.

The term "covenant" is also used in a nar-

rower sense to indicate the promise or stipulation contained in a specialty or deed which is incidental to its main purpose, as, e.g., the covenants of warranty contained in a deed of conveyance. Although consideration was not required to render a covenant valid and enforceable at law, courts of equity deemed the seal to be presumptive evidence of consideration only, and would not compel the covenantor to perform his promise if it appeared that no consideration was given for it. This is probably the effect of modern statutes providing that the seal on sealed instruments is only presumptive evidence of consideration.

In general, covenants, from their nature, are required to be expressed in the instrument by which they are created, but in certain exceptional cases they are implied from the character of the instrument itself, as, e.g., the covenants implied in a lease (q.v.).

At common law the form of action used to recover damages for breach of covenant was also known as covenant. Under modern codes of procedure and practice acts, the action of covenant has become obsolete, the same office being performed by the various statutory forms of contract action. Covenants contained in the same instrument are said to be *mutual, concurrent,* or *dependent.* Covenants are said to be *mutual* when performance by each of the parties entering into the covenant is a condition of performance by the other, so that no action for breach of covenant will lie unless the party suing has performed or tendered performance of his covenant before bringing his action. An *independent covenant* is one which must be performed by the covenantor, irrespective of the performance of the covenantee's covenant in the same instrument.

Real covenants, or covenants which at early common law bound the covenantor's heirs to the extent to which they inherited real estate, are now of slight importance, since all of the property of a deceased person, real as well as personal, may be subjected to the payment of his debts. See ADMINISTRATION.

Covenants running with the land are real covenants which relate to the use of real estate or require the covenantor to do something with reference to it. Their peculiarity is that any subsequent transferee of the real estate is entitled to the benefit of the covenant, and may sue upon it, and that, in certain exceptional instances, when the covenant imposes a burden upon the owner of the real estate, the liability to perform the covenant passes to the transferee of the real estate. Strictly speaking, at common law, the burden of a covenant will run with the land only where the relation of landlord and tenant subsists between the parties or, in some of the United States, where the covenant relates to a subordinate interest, as an easement, which the covenantee has in the land of the covenantor. In equity, however, land may be subjected to certain restrictions by covenant of the owner which are enforceable against a subsequent purchaser with notice. See ASSIGNMENT; EASEMENT.

Covenants for title are particular forms of covenant which run with the land and are made by the grantor in a deed or instrument conveying real estate. The usual covenants for title are: "The covenant of seisin (i.e., that the grantor is seised of the estate which he undertakes to convey); the covenant that the grantor has the right to convey; the covenant for quiet enjoyment (i.e., that the grantor will not interfere with the use or enjoyment of the real estate by his grantee); the covenant for further assurance (i.e., that the grantor will make any further necessary conveyance to perfect his grantee's title); and the covenant of warranty, which binds the covenantee to warrant and defend the title against any one claiming under paramount title or interest in the real estate conveyed.

Formerly the effect of the covenant of warranty was to require the covenantor or his heirs to give the grantee other lands in case the title proved to be defective. In modern practice the effect of breach of any covenant for title is to entitle the covenantee or his grantee to recover damages. Covenants for quiet enjoyment and warranty, however, are not deemed to be broken until the grantee is actually disturbed in his possession. An important effect of certain covenants for title is to estop the grantor, and all claiming under or through him, from claiming any interest in the property conveyed, thus conferring upon his grantee a title by estoppel. See ESTOPPEL; WARRANTY.

Covenants to stand seised, formerly of great importance, were covenants by the owner of real estate to hold it to the use of, or in trust for, a relative. See USES; TRUST.

Consult Sims, *Treatise on Covenants* (Chicago, 1901), and Rawle, *Treatise on the Law of Covenants for Title* (5th ed., Boston, 1887). See BOND; CONTRACT; SPECIALTY; RESTRAINT OF TRADE; ETC.; and consult the authorities there referred to.

COVENANTERS. See COVENANTS, THE; PRESBYTERIANISM.

COVENANTS, THE. A term by which the Scottish people denoted association of "bands" under oath to support each other in times of danger or to maintain some principle. The most famous ones are the *National Covenant* of 1638, and the *Solemn League and Covenant* of 1643, which are often referred to simply as the Covenant, though they should be clearly distinguished. The *National Covenant* was an agreement signed by all classes in Scotland to resist by force the introduction into Scotland by Charles I of a modified form of the English *Book of Common Prayer,* and a new body of canons increasing the nominal power of the Scottish bishops. The nobles disliked the increased power of the bishops because they were beginning to look upon them as rivals, and because they feared that Charles would proceed to a recovery of the church lands; while the commons disliked the Prayer Book, not only because it was English, but also because they looked upon it as a popish innovation. The Covenant was based upon a previous one of 1581, whose object was to maintain the Scottish Presbyterian church against a Catholic conspiracy, but it added numerous citations of parliamentary acts bearing upon the subject of religion, and a mutual oath "to labor by all means lawful to recover the purity and liberty of the gospel as it was established and professed before the aforesaid innovations." It became the basis of the Scotch resistance to the King, which culminated in the two Bishops' wars and the termination of Charles's arbitrary rule.

The *Solemn League and Covenant* was an agreement between the English and Scottish parliaments by which the Scotch came with an army to the assistance of the English Parliament in the war against Charles I on condition

that Presbyterianism should be introduced into England and Ireland. The Parliament accepted the condition somewhat unwillingly, but in view of the Royalist successes in 1643, Scottish aid seemed indispensable. The Covenant was generally signed by the members of the House of Commons and the Assembly of Divines. It was imposed by ordinance upon all persons over 18 years of age, upon members of the universities, and upon officers and soldiers of the New Model; although the ordinances could not be strictly enforced. It was not only the bond of union between England and Scotland during the war, but was used as a test against the rising Independents and, as such, encountered lively opposition. The signers took oath to labor for "the preservation of the reformed religion in the Church of Scotland, in doctrine, worship, discipline, and government, . . . the reformation of religion in the kingdoms of England and Ireland, in doctrine, worship, discipline, and government, according to the Word of God, and the example of the best reformed churches," and to endeavor "to bring the churches of God in the three kingdoms to the nearest conjunction and uniformity in religion, confession of faith, form of church government, direction for worship, and catechizing." The force of the Solemn League and Covenant of 1643 was greatly hampered in England by the success of Cromwell and the Independents, who desired a wider form of toleration, but the final blow did not come until the Restoration, when both covenants were abolished and their adherents severely persecuted. That the idea of the Covenant has not died out among the Scotch is seen by the Covenant drawn up in 1912 by the Scottish Presbyterians of Ulster in their resistance to the Irish Home Rule Bill introduced by the Liberal government of Mr. Asquith. This solemn covenant was first signed by Sir E. Carson on September 28. In its general phases it follows the earlier covenants, viz., in its declaration of resistance to religious change or anything that might endanger Protestantism. This new Covenant proves how deep-seated is this method of procedure with Scottish Presbyterianism.

The covenants of 1638 and of 1643 are printed in Gardiner, *Constitutional Documents of the Puritan Revolution* (London, 1897). Consult also: Gardiner, *History of England* (ib., 1883–84); id., *Great Civil War*, vol. i (ib., 1886); Smellie, *Men of the Covenant* (New York, 1904).

COVENT (kŭv'ĕnt) **GARDEN** (properly *Convent Garden*, from having been originally the garden of Westminster Abbey). A square in London, chiefly notable for its celebrated history and for its great market of fruit, vegetables, and flowers. As the kitchen garden of the Westminster monks it was a walled inclosure, which extended from the Strand to Longacre. It came, as a crown gift, into the possession of the Bedford family in 1552, and remained in the same hands until sold by the Duke of Bedford Dec. 16, 1913. The price paid was from $25,000,000 to $50,000,000 and closed the largest real estate deal ever made in London. The square was laid out by Inigo Jones in 1632, and the ancient garden was perpetuated by the continued sale of vegetables. (See COVENT GARDEN MARKET.) Here also is the famous opera house. (See COVENT GARDEN THEATRE.) In the seventeenth century the neighborhood of Covent Garden was a very fashionable quarter of the town, and frequent allusions are made to the place in plays of Charles II's time. It has artistic associations of Marvell, Dryden, Fielding, Steele, Otway, Foote, Garrick, Hogarth, Voltaire, De Quincey, Charles and Mary Lamb, Turner, and other celebrities.

COVENT GARDEN JOURNAL. A short-lived bi-weekly periodical first issued in January, 1752, by Henry Fielding, under the name of "Sir Alexander Drawcansir, Knight of the Censor of Great Britain." It soon involved Fielding in literary quarrels.

COVENT GARDEN MARKET. A great London vegetable, fruit, and flower market, established in the first half of the seventeenth century by small gardeners from the suburbs. In 1829 the rough sheds were succeeded by a market house, covering about three acres of ground, from designs by Mr. Fowler. In 1859 a flower market, covered with glass, was built on the south side of the Opera House.

COVENT GARDEN THEATRE. A famous London theatre on Bow Street, the home of grand opera. It was built in 1731 by the harlequin Rich, under a patent from Charles II to Sir William Davenant, 1662. It has been several times rebuilt. It was burned in 1808, and rebuilt in 1809 at great cost. The increased prices of admission, intended to defray part of the expenses, gave rise to the Old Prices Riots. In 1847 it was called the Royal Italian Opera House. On March 4, 1856, it was burned again, and the present structure was erected in 1858.

COVENTRY, kŭv'en-trĭ (OE. *Coventre*, AS. *cofatrēo*, cove tree, from *cofa*, cove + *trēo*, tree, or tree of Cofa; popularly etymologized as Convent Town, from the convent established there by Leofric). A manufacturing city, parliamentary and municipal borough in Warwickshire, England, on the Sherbourne, 18½ miles east-southeast of Birmingham (Map: England, E 4). It stands on a gentle eminence in a valley with a ridge of hills on the south, and contains many old houses with timbered fronts projecting into narrow streets and belonging to the fifteenth and sixteenth centuries. The modern part of Coventry, however, is well, though not regularly, built. Its most interesting public buildings are the three churches composing the "three tall spires" of Coventry. St. Michael's, built of red sandstone, in the Perpendicular style, about the fourteenth century, is said to be the largest parish church in England; Trinity Church, another Perpendicular structure, has a spire over 230 feet high; the third of the spires is that of the old Gray Friars' church. St. Mary's Guildhall, built in 1450, for the united guilds, is one of the finest examples of ornamental architecture in England. The rapid industrial growth of Coventry is responsible for the recent extension of its boundaries and the widening of many of the old streets. The municipality owns its water supply, on which it nets a substantial annual profit. It also supplies gas and electricity and maintains public baths, libraries, a technical institute, markets, crematory, and cemeteries. The city has an excellent modern sewerage system, with which is connected a sewage farm. The chief manufactures are ribbons, artificial silk, watches, sewing machines, and naval ordnance. It is the centre of the cycle and motor-car industries. The town sends one member to Parliament. Pop., 1891, 58,500; 1901, 69,900; 1905 (est.), 75,134; 1911, 106,377.

History. Coventry is a very ancient place. In 1044 Earl Leofric and his wife, Lady Godiva,

founded here a magnificent Benedictine monastery. For many years the traditional deed of Godiva (q.v.) was celebrated by a procession. In 1344 the town was incorporated. In the fifteenth century religious mysteries or plays were often acted here by the members of the various guilds before kings. Henry VIII demolished the beautiful cathedral of Coventry, as well as the ancient walls which formerly surrounded it. Here occurred the famous meeting for the intended trial by battle between the Dukes of Norfolk and Hereford, immortalized in Shakespeare's *Richard II.* Two memorable parliaments were held in the monastery of Coventry in the fifteenth century. The one contained no lawyers, while the other passed many attainders against the Duke of York, etc. In the fifteenth and sixteenth and seventeenth centuries Coventry was famous for woolens, broadcloths, caps, and blue thread bonnets. Consult Fretton, "Antiquarian Losses in Coventry," in *Archæological Journal*, vol. xxxvi (London, 1880), and Dormer, *History of Coventry* (New York, 1898).

COVENTRY. A town in Kent Co., R. I., 13 miles (direct) southwest of Providence, on the Pawtuxet River, and on the New York, New Haven, and Hartford Railroad (Map: Rhode Island, B 3). The chief industries are agriculture and the manufacture of cotton and woolen goods, and dyeing, bleaching, and mercerizing. The government is administered by town meetings. Coventry, taken from Warwick and incorporated in 1741, was the home of Gen. Nathanael Greene (q.v.) after 1770. Pop., 1900, 5279; 1910, 5848.

COVENTRY PLAYS. A set of 42 plays, combining the "Morality" and the "Mystery," acted during the sixteenth century at Coventry or thereabouts on Corpus Christi Day and probably written by the clergy. They were extremely popular and widely attended. The following reference is made to them by the elder Heywood:

> "Thys devyll and I were of olde acquentaunce,
> For oft in the play of Corpus Christi
> He hath played the devyll at Coventry."

For further information, consult Morley, *English Writers*, iv (London, 1887 et seq.).

COVE OF CORK. See QUEENSTOWN.

COV'ERDALE, MILES (1488–1568). An English Bible translator. He was born at Coverdale, in Yorkshire, was educated at Cambridge, was ordained in 1514 at Norwich, and became the same year an Augustinian at Cambridge. By 1526, however, his religious opinions had so far changed that he left his convent and devoted himself earnestly to the work of the Reformation. Dressed like a secular priest, he preached against confession and image worship. Shortly after that he went abroad. In 1535 he brought out his first translation of the Bible "out of Douche (German) and Latyn into Englishe," with a dedication by himself to Henry VIII. This was the first complete translation of the Bible printed in the English language. The Psalms of this translation are those still used in the Book of Common Prayer. The vexed question as to the printer of the volume has been settled, probably, by recent discoveries in favor of Christopher Froschouer, the famous Zurich printer. It also seems probable that Jacob Van Meteren, the Antwerp printer, employed Coverdale to make the translation, which was done in Antwerp. The basis was the Zurich Swiss-German Bible and Tyndale's New Testament, along with the Vulgate. It was reprinted in London in 1537, with the royal license. In 1538 Coverdale, with the consent of King Henry VIII and with the permission of Francis I, went to Paris to superintend another English edition of the Scriptures, his reason for going to Paris being that paper and workmanship were there cheaper and better than in England. The Inquisition, however, notwithstanding the royal license of Francis, interfered, seized the whole impression, consisting of 2500 copies, and condemned them to the flames. But through the cupidity of one of their executive officers, who sold a considerable number of the heretical books to a haberdasher as waste paper, some copies were saved and brought to London, along with the presses, types, etc., which had been employed in printing them. Several of the workmen also came over to London; and Grafton and Whitchurch, the noted printers of that day, were thus enabled to bring out in 1539, under Coverdale's superintendence, the "Great Bible," as it is called on account of its size. Coverdale also in 1540 edited a second edition, commonly called Cranmer's Bible, because that prelate wrote a preface to it. From 1540 to 1548 Coverdale was on the Continent. He married in the former year. On his return he became a royal chaplain and in 1551 was appointed to the see of Exeter, the duties of which office he discharged with great zeal, until the accession of Mary in 1553, when he was ejected and thrown into prison, from which he was only released after a year's confinement, on the earnest intercession of the King of Denmark, whose interest was evoked by his chaplain, Coverdale's brother-in-law, and on the condition that he should leave the country. Coverdale went to Denmark and subsequently to Westphalia, Deux Ponts, and Geneva. In 1558 he was in Geneva and is said to have had some part in the preparation of the Geneva Bible. In 1559, after the accession of Elizabeth, he returned to England, but certain notions concerning ecclesiastical ceremonies, imbibed at Geneva, operated against his restoration to the see of Exeter, and made him refuse an appointment as Bishop of Llandaff. In 1564 he was collated to the rectory of St. Magnus, London, but, owing to age and infirmities, he resigned it in 1566 and died about two years afterward. He was buried Feb. 19, 1568. Coverdale was the author of several tracts designed to promote the Reformation and made various translations from the works of the continental reformers. His works and letters were published with a memoir, by the Parker Society (Cambridge, 1844–46). Consult also *Memorials of Myles Coverdale* (London, 1838), and F. Fry, *The Bible by Coverdale* (ib., 1867). For his work on the English Bible, consult Hoare, *The Evolution of the English Bible* (ib., 2d ed., 1902), and Pollard, *Records of the English Bible* (Oxford, 1911).

COVERED WAY, or **COVERT WAY.** A term used in fortification to describe a passage constructed on the side of the ditch towards the enemy. As its name indicates, this passage affords covered communication along the ditch for sentinels and small bodies of men posted therein. See FORTIFICATION.

COVERLEY, kŭv'ĕr-lĭ, SIR ROGER DE. An old English dance, so called from the tune used during its performance. Neither the author of the tune nor the date of its composition is known, but the editor of the Skene Manuscript

claims the tune as Scotch, on the authority of a manuscript dated 1706, and says that north of the Tweed it is known as the "Mautman comes on Monday." The tune is variously called "Old Roger of Coverly for evermore, a Lancashire Hornpipe"; "Roger of Coverly"; "Roger a Coverly," in Gay's opera *Polly;* and "Roger de Coverly," in *Robin Hood;* and "Sir Roger de Coverly," in Fielding's *Tom Jones.* A song, "O Brave Roger de Coverly," is contained in *Pills to Purge Melancholy.* The dance is an old-fashioned country dance (or *contredanse*) and is known in the United States as the "Virginia reel." Addison took the name for his Sir Roger de Coverley in the *Spectator.*

COVERLEY, SIR ROGER DE. A quaint and amiable country gentleman who makes repeated appearances in Addison's *Spectator.* The portrayal of Sir Roger and his friends, by its completeness, vitality, and literary deftness, and by the ingenious selection of incident and situation as vehicles for expressing character, had a marked effect upon the development of English fiction. The papers concerning Sir Roger have been many times collected and published and now are accepted as English classics. See ADDISON, JOSEPH.

COVERSED (kō-vĕrst′) **SINE.** See TRIGONOMETRY.

COV′ERTURE (OF. *coverture,* Fr. *couverture,* covering, from ML. *cooptura,* from Lat. *cooperire,* to cover, from *co-,* together + *operire,* to cover, for *opverire,* Lith. *uzh-veriù,* I shut). Under the common law, the legal condition or status of a married woman. By that law an unmarried woman, whether spinster or widow, is a "complete juristic person," having the same standing before the law as a man. Upon marrying, however, i.e., coming under the protection of a man, her legal position is radically altered, and in many respects completely merged in that of her husband. This is especially true of her property rights. Her goods and chattels at once become his property. He acquires custody of her claims against others (*choses in action*) and may collect them for his own benefit. Her land passes under his control, and he acquires a joint seisin with her therein and may take the rents and profits to his own use during the continuance of the marriage relation. On the other hand, he becomes liable to pay her debts, those contracted before as well as those contracted after marriage, and under some circumstances he is responsible for her torts and crimes. The modern legislation which has almost restored to the married woman her lost personality will be described under the titles HUSBAND AND WIFE and MARRIED WOMAN. Consult the authorities referred to under these titles, and also those under COMMON LAW.

COVIELLO, kō′vyĕl′lō. The clown of old Italian popular comedy.

COVILHÃO, kō′vē-lyoun′. A town of Portugal, in the modern District of Castello Branco (but formerly included in the Province of Beira), situated on the southeastern slope of the Serra da Estrella at an altitude of 2180 feet (Map: Portugal, B 2). It is commanded by a castle and is one of the chief centres of cloth manufacturing in Portugal. Pop., 1890, 17,562; 1900, 15,469.

CO′VILLE, FREDERICK VERNON (1867–). An American botanist, born at Preston, N. Y. He received his education at Cornell University and was instructor in botany there from 1887 to 1888. In the latter year he became connected with the United States Department of Agriculture, and after serving five years as assistant in botany, was made botanist and also curator of the United States National Herbarium. In 1899 he was elected president of the Biological Society of Washington. His publications include a monograph on the *Botany of the Death Valley Expedition* (1893), the author having taken part in the expedition during 1890–91. He also prepared a number of reports, including: *Botany of Yakutat Bay, Alaska* (1896); *Crimson Clover Hair Balls* (1896); *Experiments in Blueberry Culture* (1910); *The Agriculture Utilization of Acid Land* (1913).

COVINGTON, kŭv′ĭng-tŏn. A city and the county seat of Newton Co., Ga., 41 miles east-southeast of Atlanta, on the Georgia and the Central of Georgia railroads (Map: Georgia, C 2). The city has a public library, and Emory College (Methodist) is situated 1 mile to the north. Covington is in a fertile cotton-growing region and has cotton and oil mills, marble works, and manufactories of ice and fertilizer. The water works and electric-light plant are owned by the municipality. Pop., 1890, 1823; 1900, 2062; 1910, 2697.

COVINGTON. A city and the county seat of Fountain Co., Ind., 72 miles west by north of Indianapolis, on the Cleveland, Cincinnati, Chicago, and St. Louis, and the Wabash railroads, and on the Wabash River (Map: Indiana, B 2). There is a canning factory, and the city has a Carnegie library and municipal water works and electric-light plant. Pop., 1900, 2213; 1910, 2069.

COVINGTON. A city and one of the county seats of Kenton Co., Ky., at the junction of the Ohio and Licking rivers, opposite Cincinnati, of which it is practically a suburb (Map: Kentucky, F 1). It is on the Louisville and Nashville and the Chesapeake and Ohio railroads, and electric railroads also connect it with the neighboring towns. Bridges to Cincinnati and to Newport, Ky., add to the facilities for communication, the great suspension bridge to the former city being a noteworthy specimen of engineering. (See CINCINNATI.) Covington occupies an area of about 5¼ square miles on a beautiful plain partly surrounded by hills, and resembles Cincinnati in its general arrangement. The city has many fine residences, a public library, city hall, race track, and a Federal building noteworthy as a specimen of modern Gothic; and among charitable institutions, a hospital for contagious diseases, Catholic and Protestant orphan asylums, and a home for aged women. Covington is an important centre of Roman Catholic influence, the cathedral, a type of flamboyant Gothic, being one of the finest ecclesiastical structures in the State. Connected with this denomination there are also a Benedictine priory, a convent, a hospital and foundling asylum, Notre Dame Academy, and La Sallette Academy. The facilities for transportation, both by rail and by water, placing the city in communication with a wide territory possessing valuable natural advantages, have contributed to the city's commercial importance. Its industrial interests are also important, and include extensive pork-packing establishments, distilleries, breweries, steam-engine factories, tobacco factories, cotton factory, ironworks, and manufactures of vinegar, furniture, stoves, tinware, bricks, tile, pottery, rope, contractors' machinery,

metal signs, automobile trucks, X-ray machines, circus tents, pianos, cordage, etc. Covington has adopted the commission form of government. There are municipal water works, built in 1887, furnishing an abundant supply of water drawn from the Ohio River at a distance of about 13 miles above the city. Covington's annual budget approximates $660,000, the main items of expense being $108,000 for schools, $111,000 for interest on debt, $47,000 for police department, $35,000 for the fire department, $55,000 for street expenditures, and $15,000 for public library fund. Settled in 1812 and laid out three years later, Covington was chartered as a city in 1834. Pop., 1860, 16,471; 1880, 29,720; 1890, 37,371; 1900, 42,938; 1910, 53,270; 1920, 57,121.

COVINGTON. A city and the parish seat of St. Tammany Parish, La., 66 miles by rail north of New Orleans, with which it has steamboat connection on the Bogue Falaya River; on the New Orleans Great Northern and the Yazoo and Mississippi Valley railroads (Map: Louisiana, E 3). It contains St. Paul's College, St. Scholastica's Academy, a fine public park, and high school. There are lumber, turpentine, bottling, and canning interests. Pop., 1900, 1205; 1910, 2601.

COVINGTON. A city and the county seat of Tipton Co., Tenn., 37 miles northeast of Memphis, on the Illinois Central Railroad (Map: Tennessee, A 3). It is a shipping point for cotton and oil, and has flour and saw mills, cotton and cottonseed-oil mills, cotton compress, etc. The water works and electric light plant are owned by the city. Pop., 1900, 2787; 1910, 2990.

COVINGTON. A town and the county seat of Alleghany Co., Va., about 50 miles (direct) northwest of Lynchburg, on the Chesapeake and Ohio Railroad, and on the Jackson River (Map: Virginia, D 4). It has several manufacturing plants including a large pulp and paper mill, iron-furnace, tannery, foundry, ice, extract and fertilizer plants, and planing and flouring mills. The town contains a home for homeless boys and owns its water works. Pop., 1900, 2950; 1910, 4234.

CO'VODE, JOHN (1808–71). An American legislator, born in Westmoreland Co., Pa. He worked for several years on a farm, was apprenticed to a blacksmith, and afterward attained considerable wealth as a woolen manufacturer. He served for two terms in the Pennsylvania Legislature and was a member of Congress, first as an anti-Masonic Whig and then as a Republican, from 1855 to 1863, and again from 1867 to 1870. In politics he took a leading part as a supporter of Lincoln and as an opponent of Johnson, but is chiefly remembered for his connection as chairman with the special congressional committee appointed in 1860 to investigate the charges brought against President Buchanan in connection with the passage of the Lecompton Bill. See COVODE INVESTIGATION.

COVODE INVESTIGATION. An investigation (1860) by a congressional committee of five, headed by Covode of Pennsylvania, into the charge made by two anti-Lecompton Democrats that the administration had endeavored to persuade them corruptly to support the Lecompton Bill. (See LECOMPTON CONSTITUTION.) President Buchanan vigorously protested against the appointment of a committee for such a purpose, on the ground that it would detract from the dignity and independence of the executive office, but his protests were unheeded, and in June the committee made its report, the Republican majority supporting the charge and the Democratic minority denouncing it. The committee, however, was considered to have brought forward sufficient evidence to prove Buchanan's favoritism and his questionable use of patronage. The report was printed in a bulky volume. For a defense of Buchanan, consult Curtis, *Life of Buchanan* (New York, 1883).

COW. See CATTLE; DAIRYING.

COW'AGE, COW'HAGE, or **COW'ITCH** (from Hind. *Kawānch, Koānch*). Short, slender, brittle hairs, which grow on the outside of the pods of plants of the genus *Mucuna*, natives of the tropical parts of America and Asia. The genus belongs to the family Leguminosæ and has a knotted, two-valved pod, divided by transverse partitions. The species, about 25 in number, are twining plants, shrubby or herbaceous, with leaves of three leaflets. That which yields most of the cowage brought to market is *Mucuna pruriens*, a native of the East Indies, with racemes of fine purple flowers, which have a disagreeable alliaceous smell, and pods about 4 inches long. *Mucuna urens*, the oxeye bean of the West Indies, yields cowage of similar quality. The hairs readily stick in the skin and cause intolerable itching. Cowage is sometimes used in medicine, acting mechanically in killing and expelling worms, particularly the species of *Ascaris* (q.v.). That it does not act on the inner surface of the intestinal canal is supposed to be owing to the mucous secretion. It is generally administered in syrup or honey. Before the pods of cowage plants are ripe, they are used as a vegetable, like kidney beans, and are very palatable. *Mucuna utilis*, velvet bean, is usually considered specifically the same as *Mucuna pruriens*, but velvet-bean pods are without the stinging hair of the other. The velvet bean has lately attracted much attention as a forage crop. It is well adapted to Florida and the Gulf States, having about the same value as the better varieties of cowpeas. As a green manure and mulch crop for orchards, it is highly considered.

COW ANT. See HORSE ANT.

COWARD, EDWARD FALES (1862–). An American playwright, born in New York City and educated at Lyons Collegiate Institute and at Columbia College. During a long period of active interest in amateur dramatics he played more than 150 parts. For two years he was dramatic editor and critic of the New York *Evening Sun*, and for more than six years, of the New York *World*. He also wrote for *The Theatre;* adapted *The Belle's Stratagem;* collaborated on *The Lady from Chicago*, and *Around New York in 80 Minutes* (musical comedies); and wrote *Hearts Are Trumps*, a comedy, and *King Stephen: An Historical Drama in Seven Tableaux Completed from John Keats' Fragment* (1912).

COWBERRY. See CRANBERRY.

COW'BIRD. A small North American blackbird (*Molothrus ater*), closely related to the redwing, remarkable for its parasitic habits, and frequenting in small flocks fields where cattle pasture, often alighting upon them to eat parasites, or clustering about their feet to snap up the insects disturbed by their movements; to this habit it owes its names, cow blackbird, cowpen bird or bunting, buffalo bird, etc. This

common species (see Plate of BLACKBIRDS) is about 8 inches long; the adult male is rich glossy black, with greenish reflections, except the head, which is chocolate brown; the female and young are simply brownish gray, paler beneath. The cowbird is found throughout the United States, from Texas northward nearly to Hudson Bay. In the north it is migratory, but south of the Ohio it is a permanent resident. It is to be seen in small bands frequenting fields and pastures, where its principal food is vegetable (mainly seeds of weeds), with insects caught upon the ground and about cattle. There are usually several more males than females in each band, for these birds do not pair; and the antics and spluttering and guttural squeaks with which the males try to attract the females are most queer and amusing. In the autumn they gather in large flocks and associate with other blackbirds. Other species are found in the southwestern United States, in Mexico and Central America, and several in various parts of South America.

The *parasitism of the cowbirds* is their most striking characteristic, their behavior resembling that of the European cuckoo. None, except one, takes a mate, or makes a nest, or incubates its eggs. Instead of this, when the breeding season (May and June) is at hand, the female ready to lay an egg quietly leaves the flock and stealthily seeks the home of some bird, from which the mother is temporarily absent, incubation not having begun. There she deposits her egg (see Colored Plate of EGGS OF AMERICAN SONG BIRDS), to which she pays no more attention. It matters not whether the nest she visits has already its full supply of eggs, or even whether it already contains one or several eggs of her own species; she will sometimes throw out eggs of the owner to make room for her own. The egg of the cowbird usually hatches in less time than do the eggs of the bird on which it is imposed, whereupon the rightful eggs may be abandoned or thrown out; or, if some of them hatch, the young are speedily starved or smothered or elbowed out of the nest, while the foster parents devote themselves to the care of the greedy stranger. He remains in the nest until it is really outgrown, but even after he has left it he is cared for, for a time, by the birds that brought him up. But at last, when well able to fly, he seeks out others of his own kind, and the birds that have devoted themselves to him so assiduously have nothing to reward their pains. Over 100 species of birds are thus burdened with more or less frequency; but some will desert the nest rather than incubate the strange egg; others build a second story on the nest, leaving the cowbird's egg to perish below, while they raise their own brood in the superstructure.

The egg of the cowbird is a rather blunt oval, measuring, on the average, .84 by .65 of an inch, and is white or grayish, profusely speckled with browns, the general effect of which is indistinct and pale; it is not easily mistaken for any other bird's egg of its size. Several species of cowbirds inhabit Central and South America, and have similar habits, except in one instance, the bay-winged cowbird (*Molothrus badius*) of Argentina and Bolivia, which differs from the ordinary type in several ways, among others in having a low and pleasing song, which it delivers more or less all the year around. It does not abandon its eggs to the care of other nurses, but forms conjugal ties and occasionally makes a nest of its own; more often, however, it seizes upon the nests of other birds and in their despoiled property lays its eggs and rears its own young. A circumstantial history of this interesting group and a discussion of bird parasitism may be found in Sclater and Hudson, *Argentine Ornithology* (London, 1888–89), largely reprinted by Bendire, in "The Cowbirds," in *Report of the National Museum for 1893* (illustrated, Washington, 1895).

COW'BOYS. 1. The name applied during the Revolutionary War to robbers, usually of cattle and sometimes of other property, who infested the roads east of the Hudson River between the British and American lines. They professed to be Tories. A similar band, professing to be Whigs, called "Skinners," plundered wayfarers at the same period and in the same places. See Cooper's romance *The Spy*.

2. The name given to the mounted herdsmen hired by the owners of cattle in the United States to look after their stock. In the great herding districts of the West, where cattle roam over vast areas without fences or roads and with only scattered and irregular places for water and shelter, the cowboys occupy an important place. It is their business to keep the cattle together, to guide them to pasture, to prevent their being mixed with other droves, to protect them from Indian and other thieves, to brand them at the proper seasons, and to drive them to the shipping point when they are "beef."

COW CREEK INDIANS. An Athapaskan tribe in Oregon and also a division of the Seminoles in Florida.

COW'DRAY, OF MIDHURST, WEETMAN DICKINSON PEARSON, BARON (1856–1927). A British capitalist. He became president of the contracting firm of S. Pearson and Son, Ltd., and in this connection he superintended the construction of the Dover Harbor Works, the tunnels under the East River, New York, and the Blackwall Tunnel, London. In 1894 he was made a baronet and in 1910 a baron. He was a member of the House of Commons for Colchester from 1895 to 1910, when he took his seat in the House of Lords and also became high steward for Colchester. The Pearson syndicate acquired extensive oil concessions in Ecuador and in Mexico. Its interests in the latter country, which were obtained from the Porfirio Diaz government, covered an area of more than 500,000 acres and represented a capitalization of $50,000,000 (Mexican currency; $25,000,000 American). It is considered by many that the rival giant oil interests of Mexico, the Pearson syndicate and the Standard Oil Company represented by the Waters-Pierce Oil Company, had an important if not a leading part in the revolutions of that country. It is known that Francisco Madero, the leader of the successful revolt (1913) against the Diaz régime, was favorable to the interests of the Standard Oil Company, and, although Lord Cowdray denied the charge, it was asserted that the Pearson interests aided Huerta and Felix Diaz in the counter revolution against Madero. In November, 1913, Lord Cowdray formally requested the United States government to protect his oil properties in Mexico. See MEXICO, *History*.

COW'ELL, EDWARD BYLES (1826–1903). An English Sanskrit scholar. Born at Ipswich, he was educated at Oxford. He went to Calcutta in 1856, where he was professor of history in

the Presidency College and later (1858) principal of the Sanskrit College. He left India in 1864, and in 1867 he was made professor of Sanskrit in the University of Cambridge. His contributions to advancing the knowledge of India were made not only through his writings, but also through the inspiration he gave to his pupils, whose numbers were large. His association with Edward FitzGerald of Omar Khayyam fame is of interest in English literary history. Among Cowell's more important works may be mentioned: *The Prákrit Grammar of Vararuci* (1854; 2d ed., 1868); *The Black Yajur Veda*, books i, ii, edited in collaboration with Roer (1858–64); the *Kusumāñjali* (1864); *The Hindu Law* (1871); *The Hindu Digest* (1873); *The Aphorisms of Sāndilya* (1878); *The Sarvadarśana-Saṃgraha*, translated conjointly with Gough (1882); *The Harṣa-Carita of Bāna Bhaṭṭa* (1897); and *The Buddha-Carita of Aśvaghoṣa*, in Sanskrit and English (1892–94). At the time of his death he was editing the translations of *The Jātaka; or, Stories of the Buddha's Former Births* (7 vols., 1895–1913), of which the sixth volume, published in 1907, was translated by him in conjunction with Rouse. His *Life and Letters* were edited by George Cowell, his kinsman (Oxford, 1904).

COWEN, kou'en, Sir Frederic Hymen (1852–). An English musician, born at Kingston, Jamaica. His parents took him to London when four years old, and he became a pupil of Benedict and Goss in that city. In 1865 he went to Leipzig, where he studied under Hauptmann, Moscheles, Reinecke, Richter, and Plaidy. In 1882 he became director of the Edinburgh Academy of Music, and in 1887 succeeded Sir Arthur Sullivan as conductor of the London Philharmonic. He was musical director of the Melbourne Centennial Exhibition (1888–89), and in 1896 was chosen conductor of the Liverpool Philharmonic and of the Manchester Concerts. In 1900–10 he was conductor of the Scottish Orchestra at Glasgow. In 1903, 1906, 1909, and 1912 he directed the Crystal Palace Handel festivals. He was knighted in 1911. His compositions include the operas *Pauline* (1876), *Thorgrim* (1890), *Signa* (1893), and *Harold, or the Norman Conquest* (1895); *A Phantasy of Life and Love* (1901); *Coronation Ode* (1902); *Indian Rhapsody* (1903); four oratorios, *The Deluge* (1878), *St. Ursula* (1881), *Ruth* (1887), *The Veil* (1910); and a number of cantatas, including *The Corsair* (1876) and *John Gilpin* (1904); six symphonies; four overtures; three suites for orchestra; a piano concerto; a string quartet; a trio; and over 300 songs. He published his memoirs under the title *My Art and my Friends* (London, 1913).

COWES, kouz. A seaport and watering place on the north coast of the Isle of Wight 12 miles southeast of Southampton (Map: England, E 6). It consists of East and West Cowes, lying on opposite sides of the Medina. West Cowes is the headquarters of the Royal Yacht Squadron, located since 1856 in an old castle once used as a fort. Over 2000 of the pick of English sailors are employed as crews of the numerous yachts of the members. Several regattas are held annually, the one held in the month of August attracting crowds of visitors. Near East Cowes are several fine countryseats, Whippingham Church, East Cowes Castle, and Osborne House, the former royal seaside residence of Queen Victoria, now, with its grounds, a public memorial and park, donated to the nation by Edward VII. Cowes is famous for its yacht-building yards and engineering works, and has a considerable trade as the port of the island. Pop., 1901, 11,834; 1911, 14,294.

COW'FISH (so named from the shape of its head). 1. A trunkfish (*Lactophrys tricornis*) of the tropical Atlantic, varicolored in bright hues, and also called "cuckold." (See Cow Pilot and Plate of Plectognath Fishes.) 2. A grampus (q.v.). 3. A cow shark (q.v.).

COW'GATE, The. A well-known street in the Old Town, Edinburgh. It was once a fashionable place of residence, but is now given over to the poorer classes.

COW'HAGE. See Cowage.

COW'HEEN. The local name in eastern Canada of the long-tailed duck, or old squaw (q.v.) *Harelda*, or *Clangula, hyemalis*).

COWICHAN. See Salishan Stock.

COWIE, kou'ĭ, Frederick William (1863–). A Canadian civil engineer. He was born in Haldimand Co., Ontario, and graduated at McGill University in 1886. For three years (until 1889) he was a member of the engineering staff of the Montreal Harbor Commission, organized to increase the capacity of Montreal as a great shipping port, and in 1907 he was appointed chief superintending engineer of this commission. Meanwhile, in 1889–97, he had been chief assistant engineer of the Department of Public Works, Ottawa, and in charge of the St. Lawrence channel between Quebec and Montreal; chief superintending engineer of the channel from 1897 to 1907, and in 1892–97 engaged in making surveys and reports on most of the harbors of the Great Lakes. When a Royal Commission was appointed in 1903 to inquire into the St. Lawrence route and winter navigation, Cowie became its consulting engineer. He invented a contrivance for facilitating the loading and discharging of ships' cargoes; and he published: *Report on British and Continental Ports, with a View to the Development of the Port of Montreal and Canadian Transportation*, with G. W. Stephens (1908); *Winter Navigation* (1908), designed to show that the Hudson Bay route is not practicable; and *Navigation on the St. Lawrence River* (1910).

COW'ITCH. See Cowage.

COWL (AS. *cūle, cuhle, cugle*, Icel. *kufl*, OHG. *cuglā*, Ger. *Kugel, Kogel*, OF. *coule*, It. *cuculla, cocolla*, from Lat. *cucullus*, cap). A hood, varying in length in different ages, generally attached to a loose cloak and worn on the head. It was common in England in the Middle Ages, but has come to be used chiefly by monks or members of some religious order, such as the Benedictines and Franciscans. See Costume, Ecclesiastical.

COWLES, kōlz, Henry Chandler (1869–). An American botanist, born at Kensington, Conn. He was educated at Oberlin College and at the University of Chicago, and in 1894–95 was professor of natural sciences at Gates College (Neb.) and a special field assistant of the United States Geological Survey. At the University of Chicago he was instructor in botany in 1902–07, assistant professor in 1907–11, and in 1911 became associate professor. He contributed to the first edition of the New International Encyclopædia. His publications in-

clude: *Vegetation of Sand Dunes of Lake Michigan* (1899); *Text-Book of Plant Ecology* (1911); *Plant Societies of Chicago and Vicinity* (1913).

COWLES, kōlz, WILLIAM LYMAN (1856–). An American scholar and educator, born at Belchertown, Mass. He graduated at Amherst College in 1878, was instructor in Latin there from 1880 to 1883, studied at the universities of Berlin, Göttingen, and Leipzig in 1883–84, and became associate professor of Latin at Amherst in 1884. In 1894 he was appointed a professor. From 1886 to 1894 he was lecturer in Latin literature at Smith College, where he was also acting professor of Latin in 1899–1900. In the study of classical archæology he traveled extensively throughout the Italian peninsula. His publications include, besides articles for periodicals, an annotated edition of the *Adelphæ* of Terence (1896); *Selections from Catullus* (1900); and *Selections from Ennius, Catullus, Tibullus, and Propertius, with Parallel Passages from Horace, Ovid, and Martial* (1909).

COWLES, kōlz, WILLIAM SHEFFIELD (1846–1923). An American naval officer, born at Farmington, Conn. After graduating from the United States Naval Academy in 1867, he was promoted through the various grades to be captain in 1902 and rear admiral in 1908. Besides serving at the Mediterranean, North Atlantic, Pacific, and Asiatic stations he was on duty at the Isthmus of Panama in 1884 to guard the property of American citizens. He was naval attaché at London in 1893–97, assistant to the Bureau of Navigation and aid to the President in 1899, commanded the Missouri in 1903–05, and became chief of the Bureau of Equipment and a member of the Board of Construction in 1906. He was in Mexican waters on the cruiser *Pittsburgh* in 1913–14, looking after American interests during the Mexican troubles.

COWLEY, kou'lĭ, ABRAHAM (1618–67). An English poet and essayist. He was born in London and was educated at Westminster School and Trinity College, Cambridge. According to his own statement, he received his poetical inspiration from Spenser's *Faerie Queene*, a copy of which lay in his mother's parlor. A volume of poems, entitled *Poetical Blossoms*, was published by him at the age of 15, and one of the pieces contained therein was written when he was only 10 years old. At Cambridge he obtained distinction for the elegance of his translations; and while there he composed the greater part of the *Davideis*, an epic in four books on the life of David—a work which he never completed. He was attached to the court party, and, in consequence, was ejected from his college in 1643, after he had taken his degree of M.A. In 1646 he followed the Queen to Paris, where he remained 10 years; and on his return to England, being under suspicion, he was seized and bound in heavy securities for his future behavior. In the same year (1656) he published an important collection of his poems, including his elegies on Harvey and Crashaw, Pindaric odes, *The Mistress*, and the *Davideis*. He now studied medicine, receiving his degree the following year. After the Restoration he obtained a lease of the Queen's Lands at Chertsey in Surrey, whither he retired in 1665. He was buried in Westminster Abbey, near Chaucer and Spenser. Cowley belongs to what Dr. Johnson called the "metaphysical" school of poets. He abounds in subtleties of thought and expression, enjoyed in his own day, but long since out of fashion. To us his fanciful love poems, displaying no emotion, seem very strange. Of his longer poems, the elegies cited above are the best. His most natural verse is scattered through his essays, which are graceful and beautiful. Convenient modern editions are: *Complete Works* (ed. Grosart, London, 1880–81); *Poems* (ed. A. R. Waller, Cambridge, 1905); *Essays, Plays*, etc. (ed. A. R. Waller, ib., 1906). Johnson's *Lives of the Poets* may be consulted.

COWLEY, ARTHUR ERNEST (1861–). An English Hebrew scholar. He was educated at St. Paul's School and at Trinity College, Oxford. He was assistant master at Sherborne School in 1885–89, became fellow of Magdalen College, and, in 1900, sublibrarian of the Bodleian Library. He wrote for reviews and reference works on Hebrew language and literature and cognate topics, and published: *The Original Hebrew of a Portion of Ecclesiasticus* (1897, with Neubauer); an English version of Gesenius' *Hebrew Grammar* (1898; 2d ed., 1910); *Aramaic Papyri* (1906, with Sayce); the second volume (1906) of a *Catalogue of Hebrew MSS. in the Bodleian Library; The Samaritan Liturgy* (1909).

COWLEY, HANNAH (1743–1809). An English poet and playwright. She was born at Tiverton, Devonshire, where her father, Philip Parkhouse, was a bookseller. It was not until several years after her marriage to Cowley, a captain in the East Indian service, that she began to write plays. Her first production, *The Runaways*, she wrote in less than a fortnight. It was presented by Garrick at the Drury Lane in 1776, and was instantly successful. Her other comedies include the following, played at Drury Lane, *Who's the Dupe?* (1779), and at Covent Garden: *The Belle's Stratagem*, which is still popular (1780; pub., 1782); *Which Is the Man?* (1782); *More Ways than One* (1783); and *A Bold Stroke for a Husband* (1783).

COWLEY, HENRY RICHARD CHARLES WELLESLEY, first EARL (1804–84). An English diplomatist, nephew of the Duke of Wellington and of Marquis Wellesley. He was an attaché at Vienna in 1824 and was promoted to be Secretary to the Legation at Stuttgart and to the Embassy at Constantinople. He became Minister Plenipotentiary to Switzerland (1848) and to the Germanic Confederation (1851), and in 1852 succeeded the Marquis of Normanby as Ambassador at Paris, and he held the appointment, whether his party was in or out of office, through a particularly trying period, till 1867, when he resigned. With the Earl of Clarendon he represented Great Britain at the Paris Congress of 1856. He was created Viscount Dangan and Earl Cowley in 1857.

COWLITZ. See SALISHAN STOCK.

COW PARSNIP (*Heracleum*). A genus of plants of the family Umbelliferæ. One species, *Heracleum spondylium*, is a native of Great Britain, the common cow parsnip, or hog weed, called *kiesh* in Scotland; a common and rank weed, with coarsely hairy leaves, and stem about 3 to 5 feet high. It is gathered in some parts of England for fattening hogs and is said to afford wholesome food for cattle. Some Siberian species are much larger and have been recommended for cultivation on account of the great quantity of herbage which they yield very early in the season, particularly *Heracleum*

panaces, which sometimes attains a height of 10 feet, and whose root leaves are 3 to 5 feet long. *Heracleum lanatum*, a tall, stout, wooly perennial with grooved stems and large compound leaves, is known as cow parsnip in the United States and Canada, being quite widely distributed. In Alaska the leafstalks are peeled and eaten. It is there sometimes called "wild celery." The stalks when drying exude a sweet substance, and they are said to be fermented and a liquor distilled from them in Siberia.

COW'PEA (*Vigna sinensis*). A leguminous plant closely related to the asparagus bean (*V. sesquipedalis*) and the catjang (*V. catjang*), the other cultivated species of the genus. All readily hybridize, and intermediate forms exist. The cowpea, by far the most important of the group, was cultivated in prehistoric times in India, China, and the Malayan region, and was known in southern Europe at the beginning of the Christian era. It is now widely distributed in the torrid and temperate zones. It was introduced into the United States early in the eighteenth century. At present it is a very common forage crop in the South, and is also grown to some extent in the Northern States. The tendency of the cowpea to vary in habit of growth, color of leaf, stem, and pod, and in the shape and color of the seed, gives rise to numerous varieties. These include prostrate, procumbent, bushy, and tall and erect forms. (For illustration, see Plate of LEGUMES.) In addition to being a very important forage plant, it is especially valuable as a soil renovator, having the power of gathering the free nitrogen of the air in common with the clover (q.v.). Consult *United States Department of Agriculture, Farmers' Bulletin 318*, and *Bureau of Plant Industry, Bulletin 229*.

Food and Feeding Value.—The green fodder has the following average percentage composition: water, 83.6; protein, 2.4; fat, 0.4; nitrogen-free extract, 7.1; crude fibre, 4.8; and ash, 1.7; the cowpea hay the following: water, 10.7; protein, 16.6; fat, 2.9; nitrogen-free extract, 42.2; crude fibre, 20.1, and ash, 7.5. The silage resembles the green crop in composition, containing some 80 per cent of water, 3 per cent of protein, and 8 per cent of nitrogen-free extract, in addition to small amounts of the other constituents. Young pigs thrive on the cowpea forage and well-filled pods, and it is a custom to turn them into the fields planted for green manuring about the time the first pods are ripening. An acre will pasture 15 or 20 pigs for several weeks. The manure more than compensates for the vines eaten. Turkeys and chickens eat the ripe peas and do well on them. Cattle, sheep, and horses are sometimes pastured on cowpea, but the safest and most economical method is to cut or pull the vines and feed them partially wilted. Cattle and sheep are liable to bloat if they are allowed to eat too ravenously of cowpea vines, as is the case with other succulent crops. Cowpea hay compares favorably with other leguminous hays in digestibility; 59 per cent of the total dry matter, 65 per cent of the protein, 71 per cent of the nitrogen-free extract, and 42 per cent of the crude fibre being digested on an average. Like other leguminous seeds, the cowpea seed is rich in protein. It contains on an average: water, 14.8; protein, 20.8; fat, 1.4; nitrogen-free extract, 55.7; crude fibre, 4.1; and ash, 3.2 per cent. Cowpeas, whole or ground, are sometimes fed to farm animals, but it is usual to harvest only enough for seed.

As a food for man, some varieties of cowpeas are much relished. The shelled peas are cooked in the same way as shell beans or garden peas. The whole pod when young is also eaten like string beans. For winter use the dry cowpeas are cooked like other dry beans and have a very agreeable flavor. In composition and digestibility cowpeas closely resemble navy beans and are an important foodstuff. The plant is injured by a weevil (*Bruchis chinensis*), to be recognized by two elevated, ivorylike lobes on the thorax; and by the September brood of the bollworm (q.v.).

COW'PEN. A town in Northumberland, England, on the south shore of the Blyth Estuary, 6½ miles east-southeast of Morpeth. The town owns its markets and water works. Its industries are coal mining, glass manufacture, and shipbuilding. Pop., 1891, 13,000; 1901, 17,879; 1911, 21,295.

COW'PENS. A town in Spartanburg Co., S. C. (pop., 1909, 1101), noted chiefly for the battle which took place there on Jan. 17, 1781, between 1100 British under Colonel Tarleton and about 1000 Americans under General Morgan. This engagement, sometimes called the "Bennington of the South," for its decisiveness, was won for the Americans, partly by the rashness of the impetuous Tarleton, but especially by the daring position assumed by the American commander and the tactical skill he displayed in defending it. Losses—British, 800 killed, wounded, and captured; American, 12 killed, 60 wounded.

COWPER, kōō'pĕr *or* kou'pĕr, FRANCIS THOMAS DE GREY, EARL (1834–1905). An English statesman. He was educated at Christ Church, Oxford, and succeeded to the hereditary title in 1856. His grandmother's death (1869) and his mother's (1880) greatly enlarged his estates. He was a Liberal in politics and would have entered Parliament as a career, had he not so early succeeded his father. He was Lord Lieutenant of Ireland, with W. E. Forster as Chief Secretary, from 1880 to 1882, when he was succeeded by Lord Spencer, and proved an able administrator during the critical period of the Land League. He opposed Gladstone's Home Rule policy. He was one of the founders of the Unionist party and presided as chairman at the so-called "Opera House Meeting" to oppose the first Home Rule Bill. Upon the installation of Lord Salisbury he was appointed chairman of the commission in the Irish Land Act of October, 1881. He was also a member of the Gresham University Commission of 1892.

COWPER, FRANK CADOGAN (1877–). An English genre and historical painter. He was born at Wicken (Northamptonshire) and studied at St. John's Wood School, the Royal Academy, and under Abbey and Sargent. He began as a portrait painter, then turned to imaginative genre in the English Pre-Raphaelite style, which quickly brought him into prominence. Among the best known of his paintings are: "The Churchyard Scene from Hamlet" (1902, National Gallery, Brisbane); "St. Agnes in Prison" (1904, National Gallery, London); "The Devil and the Nuns" (1907); "Venetian Ladies Listening to the Serenade" (1909). His water colors, which are usually illustrations of fairy tales and fanciful stories, are brilliant in color and charming in conception. Good ex-

amples are: "Molly, Duchess of Nona" (1905); "Patient Griselda" (1807); "Rapunzel Sings from the Tower" (1908). In 1910–12 he painted, in a cleverly archaic style, a series of mural decorations in the east corridor of the London Houses of Parliament. He was elected associate of the Royal Academy and a member of the Water Color Society.

COWPER, WILLIAM, EARL (c.1664–1723). An English judge, the first Lord Chancellor of Great Britain. He was called to the bar in 1688, joined the Prince of Orange as soon as he landed, and was made King's Counsel in 1694. In the following year he entered Parliament, where he became known as an excellent debater, and was made Lord Keeper of the Great Seal. In 1706 he was one of the commissioners to negotiate the union of Scotland with England and was made a peer. In 1707 he was made Lord Chancellor, in 1716 Lord High Steward, and in 1718 became an earl. He was a great orator, but neither a logical nor well-trained lawyer. Consult his *Private Diary*, edited (1833) by Hawtrey, covering 1705–14; and Lady Cowper's *Diary* for the next two years, edited (1864) by Spencer Cowper.

COWPER, WILLIAM (1666–1709). An English surgeon, born at Petersfield in Sussex. He was made a barber surgeon in 1691 and became known not only as a skillful practitioner, but also as a thorough anatomist and pathologist. Among his permanent contributions to anatomical science the discovery of the now so-called Cowper's glands (q.v.) will preserve his name. In 1696 he was made a fellow of the Royal Society. His published works include the following: *Myotomia Reformata* (1694; 2d ed., rev. by Jurin, Pemberton, and Tanner, 1724); *The Anatomy of Human Bodies* (1698; 2d ed., 1737), the best English work on anatomy up to that date; *Glandularum Quarundam nuper Detectarum Ductuumque earum Excretionum Descriptio cum Figuris* (1702).

COWPER, kōō'pẽr *or* kou'pẽr, WILLIAM (1731–1800). An English poet, son of John Cowper, D.D. He was born at his father's rectory at Great Berkhampstead, Hertfordshire. Losing his mother when he was only six years old, Cowper, who was naturally a delicate and sensitive child, became, as a boy, very deeply melancholy and depressed. Just after his mother's death he was placed in the school of a Dr. Pitman, in Market Street, Hertfordshire. Removed because of cruel treatment by another boy, he was sent, at the age of 10, to Westminster School. The period he spent here was very miserable and laid the foundation of that settled gloom which oppressed him till death. It is to the remembrance of these wretched days that we are indebted for the fierce invective that burns in the *Tirocinium, or a Review of Schools* (1784). Shortly after leaving Westminster Cowper was articled to a Mr. Chapman, an attorney in London. Upon leaving Chapman's office he entered the Middle Temple. In 1754 he was called to the bar, but never practiced. His father died in 1756 and left him a small patrimony. In 1759 he removed to the Inner Temple, but his hatred of the law was so great that he seldom opened a book that bore on his profession. Yet he was industrious enough; he scribbled poetry, read Homer, and, in conjunction with his brother, translated some of the books of Voltaire's *Henriade*. In 1763 his cousin Major Cowper offered him the office of clerk of the journals of the House of Lords, which he accepted, but having to undergo an examination at the bar of the House, he was seized with nervousness and could not appear. He even attempted suicide, but fortunately failed for want of courage. In December, 1763, he was removed to the private asylum of Dr. Cotton at St. Albans, a prey to the deepest remorse. After his removal from St. Albans (1765) he went to reside in the town of Huntingdon. Here he met Mrs. Unwin—the Mary of his poems—an acquaintance which ripened into the deepest friendship and continued till death. After a few months in lodgings he resided with the Unwins and enjoyed much tranquil happiness under that religious roof. Soon after the death of Mr. Unwin (1767) Mrs. Unwin and Cowper removed to Olney in Buckinghamshire. Here Cowper's malady returned. At this time he was engaged to marry Mrs. Unwin. She carefully tended him through his long and slow recovery. He found amusement in gardening, writing playful poems, and in building the famous summer house. Mrs. Unwin also suggested, as a subject suited to his genius, *The Progress of Error*. During the winter of 1780–81 he wrote *Truth, Table Talk, The Progress of Error,* and *Expostulation*, published in 1782. In 1781 Cowper made the acquaintance of Lady Austen, who suggested to him *The Task*, urged him to translate Homer, and—what the world is perhaps still more grateful for—she related to him the history of John Gilpin. *The Task* was begun in the summer of 1783 and published in 1785. Its success was great, and Cowper began to be considered the first poet of his day. In 1784 he began the translation of Homer, which appeared in 1791. It was received with great applause. Though Cowper wrote after this the beautiful and tender poem *To Mary*, his powers rapidly declined. He died at East Dereham, Norfolk. The centenary of his death was appropriately observed at Olney. Cowper's poetry is eminently healthy, natural, and unaffected. He and Burns brought back nature to English poetry. Besides being a poet, he was perhaps the most delightful letter writer in the English language. Nothing can surpass the charm of his epistles—full of humor, gentle sarcasm, anecdote, acute remark, and a tender shadow of melancholy thrown over and toning down the whole. See Southey, *Life and Letters*, etc. (15 vols., London, 1834–37, and reprinted in Bohn Library); *Poems of William Cowper* (1905, ed. J. C. Bailey); the Globe Edition of *Poetical Works*, ed. Benham (London, 1870); the Aldine Edition, by Bruce (ib., 1896); *The Unpublished and Uncollected Poems*, ed. Wright (ib., 1900); *Correspondence*, id. (New York, 1904); J. Neave, *A Concordance to the Poetic Works of William Cowper* (1887); S. A. Brooke, *Theology in the English Poets* (New York, 1910); and the lives by Smith (London, 1880) and by Wright (ib., 1892).

COWPER'S GLANDS (discovered by the English anatomist William Cowper). Two small yellow glands, which are situated beneath the anterior portion of the membranous urethra in the male. The glands are of the racemose variety (see GLANDS), each one being made up of a number of small lobes, which are again subdivided into lobules. The acini are lined with columnar epithelium. The gland secretes mucus, which is carried by a small duct, nearly an inch in length, to the posterior part of the

bulbous urethra. These glands diminish in size as age advances. The vulvovaginal glands, or glands of Bartholin of the female, are the analogues of Cowper's glands.

COW-PILOT. A small fish (*Pomacentrus saxatilis*), so called in Bermuda because it is believed always to accompany the cowfish (*Ostracium*). It is one of the demoiselles and is also called "mojarra."

COWPLANT. See GYMNEMA.

COW'POX. *Variola vaccina*, or "cowpox," as it is more commonly known, is a contagious disease of cattle characterized by an elevation of temperature, a shrinkage in milk production, and characteristic pustular eruptions, especially upon the teats and udders of dairy cows. The disease, which is benign in its course, is quite common in the United States, especially in the Eastern States. The cowpox virus, which appears to be ultramicroscopic, is usually transmitted from one animal to another by the hands of milkers, by calves, or by direct contact. In about a week after a cow becomes infected small pimples appear on the skin, which at first contain a watery fluid and later turn to pus. After the pustule is broken a thick dark scab forms, which later comes off, leaving a small pock mark.

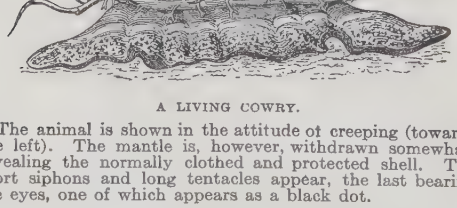
Cowpox can be transmitted to man by direct inoculation as by sores on the hands, the fluid from the pustules being used to vaccinate persons against smallpox.

Treatment consists in the application of softening and disinfecting agents, such as carbolized vaseline and zinc oxide ointment. In more persistent cases a milking tube may be used in order to prevent opening of the pustules during milking.

Milk from affected cows should not be used for food, since it may become contaminated from the pustules and ulcers on the teats and in the sinuses of the udder, and produce infection by the alimentary canal of young children if it is consumed in a raw state.

Consult Hutyra and Marek, *Pathology and Therapeutics of Diseases of Domestic Animals*, vol. i, and E. W. Hoare, *A System of Veterinary Medicine*, vol. i. See also VACCINATION; SMALLPOX.

COW'RY (Hind. *kaurī*, Beng. *kari*, from Skt. *kapardikā*, shell). A gastropod mollusk of the family Cypræidæ, whose shells are shaped somewhat like coffee beans, richly enameled and often beautifully marked. They are most abundant and attain their largest size in the seas of warm



A LIVING COWRY.

The animal is shown in the attitude of creeping (towards the left). The mantle is, however, withdrawn somewhat, revealing the normally clothed and protected shell. The short siphons and long tentacles appear, the last bearing the eyes, one of which appears as a black dot.

climates. The money cowry (*Cypræa moneta*) has long been in general use as a substitute for coin in many parts of Asia and Africa. It is yellow or white, about an inch long and nearly as broad; is found on the Indian coasts, and in particular abundance on those of the Maldive Islands, and has been one of their principal exports. In Bengal 3200 cowries were reckoned (in 1900) equal to a rupee, so that a cowry was then about equal in value to $\frac{3}{200}$ of a cent. Yet cowries to the value of 200,000 rupees are said to have been at one time imported annually into Bengal. Many tons of cowries are annually used in trade with west-central Africa, but their circulation is fast disappearing. Consult Stearns, "Ethno-conchology: A Study of Primitive Money," in *Smithsonian Reports for 1897*, part ii (Washington, 1889). See SHELL MONEY; also Colored Plate of MARINE GASTROPODS with the article GASTROPODA.

COW SHARK. A large shark of the tropical family Hexanchidæ. See Plate of LAMPREYS AND DOGFISH.

COW'SLIP (AS. *cūslyppe, cūsloppe*, from *cū*, cow + *slyppe, sloppe*, sloppy droppings, from *slūpan*, to dissolve, Eng. *slop;* alluding to the pastures where it is usually found; according to a euphemistic popular etymology *cow's-lip*) (*Primula officinalis* or *Primula vulgaris*). A common native of pastures in Europe; a delicate and modest little flower, a universal favorite, both for its beauty and its fragrance. (For illustration, see Plate of CRANBERRY, ETC.) The flowers have sedative properties and are sometimes used as an anodyne and antispasmodic. They are fermented with sugar to make cowslip wine, an agreeable and favorite soporific domestic medicine. The name "American cowslip," or "shooting star," is given to *Dodecatheon meadia*, a perennial plant, also of the family Primulaceæ, a native of North America, with a stalk about 8 inches high, bearing an umbel of gracefully pendant lilac, rose-color, or white flowers, the petals reflexed over the calyx, the stamens and pistil long, and the anthers of a golden color. It is very ornamental in the flower border, resembling a cyclamen. There are a dozen or more additional species and numerous varieties in the United States. See PRIMULA.

COWTREE. See GALACTODENDRON.

COX, DAVID (1783–1859). An English painter in water colors and oils, the greatest English water-colorist. He was born at Deritend, near Birmingham, April 29, 1783, the son of a blacksmith. He studied drawing under Joseph Barber of Birmingham, and water color under John Varley in London. He was at first a scene painter in theatres, and for a long time supported himself by teaching drawing and selling water-color sketches, until at length there came patronage sufficient for his moderate desires. In 1805 he traveled in Wales, the scenery of which from this time became the favorite subject of his paintings. In 1813 he was made a member of the Society of Painters and Water-Colorists, and in 1814 he published his *Treatise on Landscape Painting and Effect in Water Colors*. He did not begin the study of oil painting until his fifty-sixth year, under Müller in London, but he attained great proficiency. Indeed, there is some reason to believe that had he practiced it from the beginning he might have equaled Constable. In 1841 he retired to Harbourne, near Birmingham, where he resided until his death on June 7, 1859. Although his true greatness was never recognized during his lifetime, Cox is certainly the most important of the successors of Constable. His work

is bold and aims at a general effect, disregarding small and conflicting details. His colors are those of nature, pure, fresh, and rich, and he handles light with consummate skill. His treatment of atmosphere and atmospheric mood is of the highest order. His small productions are usually better than the larger. He is the great painter of Welsh scenery, of which he was particularly fond. The British Museum and the South Kensington Museum possess some of his water colors and drawings, but the best of his work is in the Birmingham Art Gallery and in private possession. Several general exhibitions of his work have been held, the best of which was that of Manchester in 1887. Among his best water colors are the "Hay Field" (1843), "Bolton Abbey" (1847), and the "Welsh Funeral" (1850); among his oils, the "Vale of Clwyd" and "Peace and War." His son DAVID COX, the younger (1809–85), was also a water-colorist of repute, but not of the same ability as his father. Consult: Hall, *Biography of David Cox* (London, 1881); Solly, *Memoir of David Cox* (ib., 1875); Baldry, in *Masters of English Landscape Painting*, ed. by Charles Holmes (New York, 1903).

COX, GEORGE ALBERTUS (1840–1914). A Canadian capitalist and financier. He was born at Colborne, Ontario, and was educated at the Colborne grammar school. In early life he became an employee of the Montreal Telegraph Company, but removed to Peterboro in 1858, where he entered municipal life and lived for thirty years. He was mayor during seven terms. He engaged in many and various business enterprises with much success and rapidly amassed a considerable fortune, which was greatly increased after his removal to Toronto in 1888. In 1890–1907 he was president of the Canadian Bank of Commerce. He was also president of the Canada Life Assurance Company, and either president of, or a prominent director in, a large number of financial, manufacturing, and industrial concerns. In 1872 he was an unsuccessful Liberal candidate for the Ontario Legislature; and in 1887 he was again an unsuccessful Liberal candidate for the House of Commons. In 1896 he was appointed to the Senate.

COX, SIR GEORGE WILLIAM (1827–1902). A British divine and author. He was born at Benares, India, but was taken to England when eight years old. He studied at Rugby and Oxford, took orders in 1850, was appointed curate of Salcombe Regis, near Sidmouth, and later was rector of Scrayingham, York, from 1881 to 1897. He was a leading exponent of the sun-myth theory in comparative mythology, and published: *Poems, Legendary and Historical* (1850), with E. A. Freeman; *Life of St. Boniface* (1853); *Tales of Ancient Greece* (1868); *Latin and Teutonic Christianity* (1870); *Mythology of the Aryan Nations* (1870); *History of Greece* (1874); *The Crusades* (1874); *The Athenian Empire* (1876); *British Rule in India* (1881); *Lives of Greek Statesmen* (1885–86); *Life of Bishop Colenso* (1888); *The Church of England and the Teaching of Bishop Colenso* (1888). In 1891 he was chosen Bishop of Natal by the friends of Bishop Colenso (q.v.), but the archbishops and bishops of England refused him consecration.

COX, HAROLD (1859–). A British editor and economist, educated at Jesus College, Cambridge. He lectured on political economy for the Cambridge University Extension Society, made special investigation of farm-labor conditions in Kent and Surrey, and taught mathematics for two years in the Mohammedan College at Aligarh, India. After his return to England in 1887 he studied for the bar, but eventually gave up law for journalism as a profession. He was secretary of the Cobden Club (1899–1904), a member of Parliament (1906–09), alderman in the London County Council (1910–12), and published *Land Nationalization* (1892); *American Progress and British Commerce* (1902), and pamphlets on free trade and economics. In 1912 he became editor of the *Edinburgh Review*.

COX, ISAAC JOSLIN (1873–). An American professor of history, born at West Creek, Ocean Co., N. Y., and educated at Dartmouth College and at the universities of Texas, Chicago, Wisconsin, and Pennsylvania. Between 1896 and 1906 he was instructor and vice principal at San Antonio (Tex.) Academy and instructor in history at the University of Cincinnati, where he was afterward assistant professor. In 1911–12 he was Shaw lecturer at Johns Hopkins University. Besides writing articles for the first edition (1903) of the NEW INTERNATIONAL ENCYCLOPÆDIA, he published: *The Journeys of La Salle and his Companions* (2 vols., 1905); *The Early Exploration of Louisiana* (1906); *The Indian as a Diplomatic Factor in the History of the Old Northwest* (1910).

COX, JACOB DOLSON (1828–1900). An American soldier, politician, educator, and military historian. He was born in Montreal, Canada, was taken by his parents to New York City in 1829, graduated at Oberlin College in 1851, taught school at Warren, Ohio, in 1852, and there in the following year began the practice of law. From 1859 to 1861 he was a member of the State Senate, and in April, 1861, upon the outbreak of the Civil War, was appointed brigadier general of Ohio volunteers. He took an important part in the Kanawha Valley campaign under McClellan in the summer of 1861; commanded the Ninth Corps of the Army of the Potomac in the battles of South Mountain and Antietam in 1862; was promoted major general of volunteers, Oct. 6, 1862; commanded the Federal forces in West Virginia in the winter of 1862–63 and the military district of Ohio from April to December, 1863; was occasionally commander of the Twenty-third Army Corps during General Sherman's Atlanta campaign; was recommissioned major general of volunteers in December, 1864, having been reduced from this rank in April, 1863, on account of the number of appointments being in excess of those provided for by law; and early in 1865 was sent to North Carolina to open communications with General Sherman, with whom he effected a junction at Goldsboro soon afterward. In 1866 he resigned from the service. After the close of the war he served as Governor of Ohio in 1866 and 1867, attracting attention by his opposition to the policy of his party (the Republican) on the question of negro suffrage; and from March, 1869, until December, 1870, when he resigned, was Secretary of the Interior in the cabinet of President Grant. He then again practiced law, was president of the Wabash Railroad for several years, was a Republican member of Congress from 1877 to 1879, was dean of the Cincinnati Law School from 1881 to 1897, and from 1885 to 1889 was

also president of the University of Cincinnati. He wrote many magazine articles, mostly on subjects connected with the Civil War and with microscopy, in which he attained considerable eminence, and published the following works on the military history of the Civil War: *Atlanta* (1882); *The March to the Sea: Franklin and Nashville* (1882); *The Second Battle of Bull Run as Connected with the Fitz-John Porter Case* (1882); *The Battle of Franklin* (1897). His *Military Reminiscences of the Civil War* (2 vols.) were published posthumously in 1900. Consult J. R. Ewing, *Public Services of Jacob Dolson Cox* (Washington, 1902).

COX, James M. (1870–). An American newspaper proprietor and public official, born at Jacksonburg, Ohio. After a public-school education he worked in a printer's office, taught a country school, then became a newspaper reporter, and was for a time on the editorial staff of the Cincinnati *Enquirer*. In 1898 he became proprietor of the Dayton *Daily News* and in 1903 also of the Springfield *Press-Republic*, thus forming the News League of Ohio. From 1909 to 1913 he was a member of Congress. He became Governor of Ohio for the term of 1913–15.

COX, Kenyon (1856–1919). One of the foremost American mural and figure painters, also a writer on art. He was born in Warren, Ohio, the son of Gen. J. D. Cox, who later became Governor of Ohio. He studied at the academies of Cincinnati and Philadelphia and for five years in Paris under Carolus Duran and chiefly under Gérôme. On his return to America he settled in New York, becoming a prominent leader of the younger element which founded the Society of American Artists; and for years he was an influential teacher in the Art Students' League (q.v.). He soon became known for his figure subjects and especially, among his fellow artists, for his nudes, painted in conservative academic manner. But his great reputation rests upon his mural paintings, which rank among the finest in America. Important examples of the latter are: "Venice," Bowdoin College, Me.; "Art and Science," in the Library of Congress, Washington; eight lunettes illustrating "The Progress of Civilization," in the State House, Des Moines, Iowa; "The Beneficence of the Law," in the Essex County Courthouse at Newark, N. J.; and paintings in the Appellate Court, New York, the State Capitol at St. Paul, the Citizens Bank and Federal Building in Cleveland, the Luzerne County Courthouse at Wilkes-Barre, Pa., and the Public Library at Winona, Minn. Among the best of his pictures are: "Hope and Memory," in the collection of J. D. Cox, Cleveland; "The Hunting Nymph," in the Lotos Club, New York; "A Book of Pictures" (1910, awarded the Isidor medal); "A Vision of Moonrise" (1911); "October Afternoon" (1913). In the Metropolitan Museum, New York, are his "Harp Player" and the portrait of Saint-Gaudens (1887), awarded a medal at the Paris Exposition. Cox is one of the most prominent representatives of the academic tendencies in American painting. His line is strong and vigorous, yet rhythmic, the figures show sound knowledge of anatomy, his composition is dignified, but the color is sometimes harsh. He received medals at various expositions, and was awarded the medal of honor for mural painting by the Architectural League in 1909. He was elected a member of the National Academy of Design in 1903. His sound and scholarly writings on art subjects include: *Mixed Beasts* (1904); *Old Masters and New* (1905); *Painters and Sculptors* (1907); *The Classic Point of View* (1911).

COX, Louise Howland King (1865–). An American painter, born in San Francisco. She studied at the New York Academy and Art Students' League under Kenyon Cox, the well-known figure painter, whom she married in 1892. Mrs. Cox ranks amongst the foremost American women artists. Her decorative work is similar to that of her husband and, if less robust, is more graceful. Good examples are her mural painting of "The Fates" (1894) and the decorative canvases "Psyche" (1893), "The Annunciation" (1895), and "Pomona" (1896, third Hallgarten prize). She is at her best, however, in her charming portraits of children, whom she portrays with a delightful naturalism. Good examples are "Master Austin Smithers" and "Lucile" (1910); "My Children" and "Goldilocks" (1911); "The Wonder Book" and "Mrs. Homer Saint-Gaudens and Child" (1913). She was elected a member of the National Academy of Design, and won, besides the third Hallgarten prize in 1896, a bronze medal at the Paris Exposition of 1900.

COX, Palmer (1840–1924). An American illustrator and author, born in Granby, Province of Quebec. He lived for a time in California and began his career by writing for the *Golden Era* and other Western papers, but in 1875 went to New York City, where he still lives. Mr. Cox's productions are almost exclusively in the field of humorous fancy, the most widely known being his sprightly verses and drawings of the *Brownies*, whose experiences fill several volumes.

COX, Richard (1500–81). An English bishop born in Buckinghamshire. He was educated at Eton and Cambridge and was tutor to Prince Edward, who, when he became King, made Cox one of the Privy Council and King's almoner. In 1537 he had been made chaplain to Archbishop Cranmer and in 1542 to Henry VIII, and a member of the commission that nullified the marriage of Anne of Cleves. In 1549 he was made Dean of Westminster and one of the seven royal visitors who led Edward's attack on religious, educational, and charitable establishments. Mary put him in prison, but he escaped to Frankfort, where he became the bitter opponent of John Knox. Elizabeth restored him to the see of Ely (1559), from which he resigned in 1580 after a quarrel with Elizabeth over a grant to Sir Christopher Hatton. He translated the Gospels, the Acts, and the Epistle to the Romans, for the Bishop's Bible, and helped compile the Book of Common Prayer.

COX, Samuel (1826–93). An English Baptist biblical expositor, born in London. He graduated at Stepney Baptist Theological College, London, in 1851; was pastor at Southsea (1852–54) and at Ryde, Isle of Wight (1854–59). He was compelled by throat trouble to stop preaching for a while, but was pastor in Nottingham from 1863 till 1888, when failing health compelled his resignation. He died at Hastings, March 27, 1893. His fame rests upon his biblical exposition and his connection with *The Expositor*, a monthly devoted to biblical topics, which he originated and whose first 20 volumes he edited (1875–84). Having become an advocate of Universalist views, he was obliged

to resign his position. His publications were very popular and merited their wide sale. Of them may be mentioned: *The Private Letters of St. Paul and St. John* (London, 1867); *The Quest of the Chief Good* (1868; rewritten as *The Book of Ecclesiastes, with a New Translation*, 1890); *An Expositor's Note-Book* (1872); *The Pilgrim Psalms* (1874); *Salvator Mundi* (1877) and *The Larger Hope* (1880), which two books on eschatology stirred up much controversy; *A Commentary on the Book of Job, with a Translation* (1880); *Expositions* (4 vols., 1885–99); *The Bird's Nest and Other Sermons for Children of All Ages* (1886); *The Hebrew Twins: A Vindication of God's Ways with Jacob and Esau* (London, 1894). Consult the prefatory memoir by his wife in the last-mentioned work.

COX, Samuel Hanson (1793–1880). An American clergyman, born at Rahway, N. J., of Quaker ancestry. He began to study law, but left it for theology, and was ordained a Presbyterian minister in 1817. Four years later he took charge of a church in New York City, where he was mobbed for his antislavery sentiments, his house and church being sacked. He was one of the founders of what is now New York University. In 1834 he became professor of sacred rhetoric in the theological seminary at Auburn, N. Y., and in 1837 pastor of the First Presbyterian Church in Brooklyn, where he remained until 1854, being professor of ecclesiastical history in Union Theological Seminary, and a leader of the "New School" Presbyterians. In 1854 his voice failed, and he resigned his pastorate. He wrote *Quakerism not Christianity* (1833) and *Interviews, Memorable and Useful* (1853).

COX, Samuel Sullivan (1824–89). An American politician and author, born in Zanesville, Ohio. He graduated at Brown University in 1846 and was later admitted to the bar, but forsook the law in 1853 to become editor of the *Ohio Statesman* at Columbus. For one year he was Secretary of Legation in Peru. He represented Ohio in Congress for eight years (1857–65), and New York, whither he removed in 1866, for 20 years (1869–85, and 1886–89). In 1885–86 he was Minister to Turkey. He was popularly known as the "letter-carriers' friend" in reference to legislation proposed by him for increase in their salary and the concession to them of a vacation with pay. A statue of him was erected by the letter carriers in New York City. Mr. Cox wrote and lectured a great deal, some of his works being: *Eight Years in Congress* (1865); *The Buckeye Abroad* (1851); *Why We Laugh* (1876); *Arctic Sunbeams* (1882); *Orient Sunbeams* (1882); *Three Decades of Federal Legislation* (1885); *Diversions of a Diplomat in Turkey* (1887). A glowing piece of descriptive writing published in the *Statesman* during his editorship won him the nickname "Sunset," which clung to him through life.

COXAL'GIA (Neo-Lat., from Lat. *coxa*, hip, Gk. ἄλγος, *algos*, pain), or Coxitis. An obsolete name of hip-joint disease. Inflammation, with or without suppuration, occurs in the joint, with the result that its usefulness is destroyed either from stiffness or necrosis.

COXCIE, kŏk'sē, or **COXIE,** Michiel (1499–1592). A Flemish painter. He was born in Mecklin and studied with Barend von Orley in Brussels, spent many years in Italy, and though probably not a pupil of Raphael, imitated him closely. He was the first Fleming to attempt life-size frescoes in the style of the Roman school, which gives historical importance to his decoration of the Santa Barbara Chapel in Santa Maria dell' Anima. He was appointed court painter by Philip II of Spain and commissioned to copy the altarpiece of the brothers Van Eyck (q.v.) in Ghent. Although his art is cold and rather unpleasing, he was something of an innovator, and his style is clearly defined. Good examples of his painting are in the Escorial and the Museums of Brussels, Antwerp, Madrid, Vienna, and Prague.

COXCOMB, kŏks'kōm, The. A comedy by Beaumont, Fletcher, Rowley, and others (1612).

COX'COX'. The legendary Noah of the Mexican tribes, who with his wife escaped the Deluge. In its present form the legend shows probable Christian influence from early Spanish missionaries.

COXE, Arthur Cleveland (1818–96). An American prelate, second Protestant Episcopal Bishop of Western New York, son of Samuel Hanson Cox. He was born at Mendham, N. J., graduated at the University of New York in 1838, and at the General Theological Seminary in 1841, and in 1842 was ordained priest. Rector in Hartford, Conn. (1842–54), Baltimore, Md. (1854–63), and New York City (1863–65), he was in 1865 appointed Bishop of Western New York. In 1872 he visited Haiti, to establish churches and ordain clergy. He also founded the Christian Literature Company, of whose publications he edited a series of the Ante-Nicene Fathers. His writings include several volumes of verse, of which the *Christian Ballads* (1840; rev. ed., 1887) is the best known; and several theological works, such as *The Criterion* (1866), in opposition to the Tractarians, though he had been in sympathy with the earlier Oxford movement; *Apollos, or the Way of God* (1873); *The Institutes of Christian History* (1887).

COXE, Henry Octavius (1811–81). An English scholar. He was born at Bucklebury and was educated at Oxford. From his appointment as underlibrarian at the Bodleian Library in 1838 until his death he devoted himself to the compilation of the colossal catalogue, comprising 723 folio volumes. In 1857 he was sent by the British government to inspect the libraries in the monasteries of the Levant, and in 1860 he became chief librarian of the Bodleian Library. His other important publications include Roger de Wendover's *Chronica sive Flores Historiarum* (5 vols., 1841–44); *Metrical Life of Edward the Black Prince* (written in French, by Chandos Herald), with a translation and notes (1842); Gower's *Vox Clamantis* (1850).

COXE, Tench (1755–1824). An American economist, born in Philadelphia. He served in the Continental Congress (1788) and was appointed Assistant Secretary of the Treasury in 1789. In the same year he proposed the introduction of Sir Richard Arkwright's cotton-spinning frame into the United States. The extensive planting of cotton in the South was due chiefly to his initiative; for this reason he is frequently called the "father of the American cotton industry." Among his works on economic subjects are: *An Inquiry into the Principles for a Commercial System for the United States* (1787); *View of the United States*

(1787–94); *On the Navigation Act* (1809); *Statement of the Arts and Manufactures of the United States for the Year 1810* (1814).

COXE, William (1747–1828). An English historian. He was born in London and was educated at King's College, Cambridge. In 1771 he took the curacy of Denham, but soon resigned to become the tutor of several young noblemen. With them he spent many years in travel, and with great industry collected information of all kinds, which appears in many volumes of travels and history, all of which are characterized by close observation, care, and research. In 1786 he became a vicar again. He was made prebend of Salisbury in 1791 and archdeacon of Wiltshire in 1804. One of his best-known works is his *History of the House of Austria from 1218 to 1792* (1807). He also wrote: *Memoirs of the Bourbon Kings of Spain from 1700 to 1788* (1813); *Memoirs of John, Duke of Marlborough* (1818–19); a *Life of Gay*, published separately from his *Fables* (1897); *Memoirs of Sir Robert Walpole* (1798); *Memoirs of Horatio, Lord Walpole* (1802).

COXIE, Michiel. See Coxcie, Michiel.

COX'SWAIN (also *cockswain*, from *cock*, from OF., Fr. *coque*, boat, probably from ML. *concha*, small boat, from Lat. *concha*, Gk. *κόγχη*, *konchē*, Skt. *śaṅkha*, shell + *swain*, AS. *swein*, from Icel. *sveinn*, OHG. *swein*, herdsman). A petty officer in the navy who has charge of a boat and crew in the absence of officers. In double-banked boats he steers, and has a small seat in the *coxswain's box*, or after part of the boat abaft the stern sheets. The coxswain of a steam launch or large motor launch always stands while steering. The steering station is forward, aft, or on deck, depending upon the size and type of boat. In single-banked boats the coxswain usually pulls the stroke oar. The steersman of a racing or other crew is also known as a coxswain.

COX'WELL, Henry Tracey (1819–1900). An English aëronaut. He was born at Wouldham, near Rochester Castle, and was educated at the Chatham Military School. He invented a balloon from which aërial torpedoes could be discharged, and made hundreds of ascensions, the most important being that undertaken with Glaisher in 1862, when the balloon sailed to a height of seven miles. (See Aëronautics.) During the Franco-German War he joined the aëronautic corps of the German Army. In 1845 he established the *Aërostatic Magazine*. Consult his *Life and Balloon Experiences* (1887–89).

COYLE, Robert Francis (1850–). An American Presbyterian clergyman, born in Roseneath, Ontario. He got his early education in Canada, graduated at Wabash College in 1877, studied theology at Auburn Seminary, and was ordained to the Presbyterian ministry in 1879. He held pastorates at Fort Dodge, Chicago (1885–91), Oakland, Cal. (1891–1900), and Denver, and in 1903 was moderator of the General Assembly. He wrote: *Foundation Stones* (1887); *Workingmen and the Church* (1896); a volume of sermons called *The Church and the Times* (1905).

COYOTE, kī-ō'tē *or* kī'ōt (Sp., from Mex. *coyotl*). The modified native Mexican name of the prairie wolf (*Canis latrans*), now universally adopted throughout the western United States. The coyote in several varieties is abundant almost everywhere from the Plains to the Pacific, south of central British Columbia, and is famous for its monotonous and reiterated yelping at night. This more resembles the barking of a dog than the howl of the ordinary wolf, and an early name was "barking wolf." One thinks half a dozen are yelping in chorus as he listens to it. It generally travels in packs, like other wolves, but, unlike them, it never attacks human beings. It is of rather small size, about as big as a setter dog, of a light-reddish or yellowish-gray color, the longer hairs of the back tipped with black. The pelage is rather full and soft, the tail is bushy, the ears are upright, and the muzzle is slender and pointed. About 12 species are recognized by naturalists, while there are a number of subspecies or well-marked geographical races. Coyotes live in hollows among rocks, or take possession of old burrows in the ground, and usually produce four puppies in late spring, although the number varies from three to ten. They hunt chiefly in the dusk. They are very fleet of foot, and two or three by acting in concert will run down a pronghorn; they seek to detach and seize the fawns, however, rather than to pull down adults. Their food consists mainly of gophers, ground squirrels, mice, ground-nesting birds, and similar small animals; and they have become a great nuisance in the neighborhood of ranches and isolated settlements, especially in winter, by attacking sheep, poultry, calves, etc. To such an extent do they destroy sheep that many of the Western States offer a bounty for the scalp and forepaws. Adapting themselves thus readily to circumstances, and having extreme cunning in avoiding traps and poison, they survive among the sparser settlements of the West and in some regions increase rather than diminish. They will cross with the domestic dog, producing fertile hybrids; and the Indians were accustomed to induce such mixture of blood. This animal entered more largely than almost any other into the mythology and folklore of the aborigines, especially west of the Rockies. Consult: Ingersoll, *Wild Neighbors* (New York, 1897); Elliot, *Synopsis of Mammals* (Chicago, 1901); and especially Seton, *Life Histories of Northern Animals* (New York, 1909). See Wolf; and illustrations on Colored Plate of Canidæ and on Plate of Wolves and Wild Dogs with the article Wolf.

COYPEL, kwä'pĕl'. A family of French painters.—Noel (1628–1707), the eldest, was a follower of LeBrun, in whose theatrical style he painted, though with more individuality and greater regard to color than most of his contemporaries. He was employed by Louis XIV on decorative work in Versailles, the Trianon, the Tuileries, and the Hôtel des Invalides; he also painted religious pictures and published several works on art. In 1672 he was appointed director of the French Academy in Rome, and in 1695 director of the Academy in Paris.—His son and pupil Antoine (1661–1722) became a member of the Academy at 20, enjoyed high protection at court, and was charged with important commissions by the King. He furnished many cartoons for tapestries, and his paintings are found in most French museums. His art marks the transition from the style of LeBrun to that of Watteau. His color is cold and hard, especially in his later works, and his manner artificial.—His half brother, Noel Nicolas (1690–1734), painted mythological and religious pictures and portraits in pastel.—Charles Antoine (1694–1752), son and pupil of Antoine

Coypel, was the most celebrated of the family. He was admitted to the Academy at 21 and was appointed director in 1747. He painted religious pictures in many churches, and decorations for Versailles and the Trianon, but was most successful in his genre pieces. Modern critics reproach him with lack of originality, power, or charm. His discourses at the Academy, published in 1721, and theatrical pieces written for the court, procured him quite a literary reputation. Consult Caylus, *Vie des peintres* (Paris, 1910).

COYPU, koi-pōō′ (native South American name), or NUTRIA. An aquatic rodent (*Myopotamus coypu*, or *Myocastor coypus*), widely common in South America. Its name in Chile is "coypu," and on the Pampas "quuiya," but it is always called by Spanish-speaking people of education "nutria" ("otter"), by which name its fur is known in commerce. It is not an otter, however, but is nearly allied to the beaver, yet somewhat smaller, and with a ratlike tail. It is dull brown, with a grayish muzzle and bright red incisors; the nostrils are very high, allowing it to breathe with only the tip of the nose above water; and the teats are high on the flanks. When the beaver became scarce, the fur (nutria) of this animal was in great demand for making hats, etc., and the coypus were nearly exterminated, but with less demand and the protection of local laws they have again become numerous. It is thoroughly aquatic, dwelling preferably in the permanent ponds (lagunas) of the La Plata valley, and inhabiting burrows in the banks, where there are banks, or making a platform nest among the rushes. "Of an evening they are all out swimming and playing in the water, conversing together in their strange tones, which sound like the moans and cries of wounded and suffering men; and among them the mother coypu is seen with her progeny, numbering eight or nine, with as many on her back as she can accommodate, while the others swim after her, crying for a ride." For further interesting facts, consult: Hudson, *The Naturalist on the La Plata* (London, 1875); *Proceedings Zoölogical Society* (ib., 1894); Semper, *Animal Life* (London and New York, 1881). See Plate of BEAVER, ETC.

COYZEVOX, kwä′z'-vōks′, ANTOINE (CHARLES ANTOINE) (1640–1720). A French sculptor. He was born in Lyons, studied with Lerambert, and also trained himself by careful study of the antique. He was admitted to the Royal Academy in 1676 and was employed by Louis XIV in decorating Versailles and the palace at Marly. His most notable works are many portrait busts and statues of the most famous men of the day. They include Richelieu, Mazarin, Bossuet, Condé the Great, Fénelon, Racine, Charles LeBrun, also Louis XIV, Louis XV, and Maria Theresa of Spain. Coyzevox also carved a number of memorials.

COZENERS, kŭz''n-ērz, THE. A comedy by Samuel Foote (1774).

COZENS, kŭz'nz, JOHN ROBERT (1752–99). An English landscape painter in water color. His father was one of the two natural sons of Peter the Great of Russia by a woman of Deptford. He traveled in Italy and the Tirol and left valuable drawings made on that tour. Towards the end of his life he became insane. In his day water-color landscapes were very conventional in drawing and dry in color. Cozens was one of the first to show the value of this medium in the poetical quality of his work, and attained hitherto unseen atmosphere effects. His conception of nature ranks him as a precursor of the Impressionists. Turner and Constable owe much to Cozens and have spoken in terms of admiration of his landscapes. There are a number of them in the British and South Kensington museums, but the most famous in his day was "Hannibal Crossing the Alps" (1776), which cannot now be located.

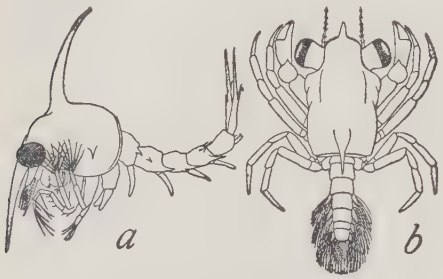
COZUMEL, kō′sōō-māl′. An island off the east coast of the Mexican Province of Yucatan, in lat. 20° N. and extending east of long. 87° W. (Map: Mexico, P 7). It is about 40 miles long and about 15 miles wide. Its surface is low, and the coasts are bordered by reefs. There is a small Indian settlement at San Miguel. The chief industry is cattle raising. The island was discovered in 1518, and here in 1519 Cortés first landed.

COZZENS, kŭz'nz, FREDERICK SWARTWOUT (1818–69). An American humorist, born in New York City. He became in early life a wine merchant, and later editor of the *Wine Press*. He had previously contributed humorous poems and articles to magazines, and in 1853 he issued his first volume, *Prismatics*, under the pen name "Richard Haywarde." Then came the *Sparrowgrass Papers*, his best performance, first published in the *Knickerbocker Magazine*, and in 1856 as a widely read volume. They dealt with the trials of a city man who undertakes to run a country home (near Yonkers), and although their humor is mild, they are still fairly readable. Three years later (1859) he published a volume of travel sketches, *Acadia; or, A Sojourn among the Blue Noses*. Soon after the war he failed in a business for which he had labored earnestly, especially by promoting the sale of native wines, and retired from Yonkers to Rahway, N. J. Of his other works only *Poems* (1867) and a *Memorial of Fitz-Greene Halleck* (1868) need be named.

CRAB (AS. *krabba*, Icel. *krabbi*, Ger. *Krabbe*). A crustacean of the order Decapoda and suborder Brachyura, characterized by the small size of the abdomen, which resembles a short tail curved under the thorax, all important viscera being included in the thorax. The term extends also to some of the suborder Anomura (purse crabs, hermit crabs, etc.), characterized by a condition of abdomen intermediate between that of the Brachyura and that of the Macrura, or long-tailed decapod crustaceans, such as the lobster, crayfish, etc. All the crabs, besides many other crustaceans, were comprehended in the Linnæan genus *Cancer;* but the number of species is very great, considerably more than 1000, and the Brachyura alone are now arranged in many genera and families.

These various crabs differ very much in the form of the carapace (the back), which in some is orbicular or nearly so; in some, much broader than it is long; in others, longer than broad; in some, prolonged in front into a kind of beak, etc.; also in its smoothness, or roughness with hairs, tubercles, or spines; in the length of the legs, etc. The eyes are compound, with hexagonal facets, and are elevated on stalks, which are generally short, but sometimes considerably lengthened, and which have the power of motion, so as to turn the eye in different directions. The first pair of limbs are not used for locomotion, but exhibit in great perfection the characteristic claws or pincers (*chelæ*) of the decapod crustaceans. Crabs are inhabitants of

almost all seas; most of them, however, are found chiefly near the coast. Some crabs inhabit fresh water, particularly in the warmer parts of the world; and others, known as land crabs, live among moist herbage, or burrow in sand or earth. Crabs are generally flesh or carrion eaters, though some forms seem to prefer a vegetarian diet. They are always active and are noted for running sideways rather than straight ahead. Some have the last pair of limbs expanded at the extremity into a broad blade for swimming, and some have even all the four pairs of limbs intended for locomotion thus expanded, and sometimes occur far out at sea.



LARVAL STAGES OF CRABS.
a, zoea stage; *b*, megalops stage.

Their development is accomplished by metamorphosis through succeeding stages. "In the crabs the nauplius stage (see CRUSTACEA) is passed through in the egg, and the young is hatched in the form of a peculiarly modified *zoea*, with an immense cephalothorax produced into spines, large stalked eyes, and a slender abdomen. This passes by successive molts into the *megalops* stage, which resembles an adult macruran [and] . . . passes by successive molts into the adult form."

Crabs, like all arthropods (see ARTHROPODA), molt or change their shell, not at fixed intervals or seasons, but according to the exigencies of their growth, the change being made with great frequency when they are very young, but rarely in advanced age; indeed, from the mollusks and other animals sometimes found adhering to the carapace, it is inferred that the same covering is sometimes worn for a number of years.

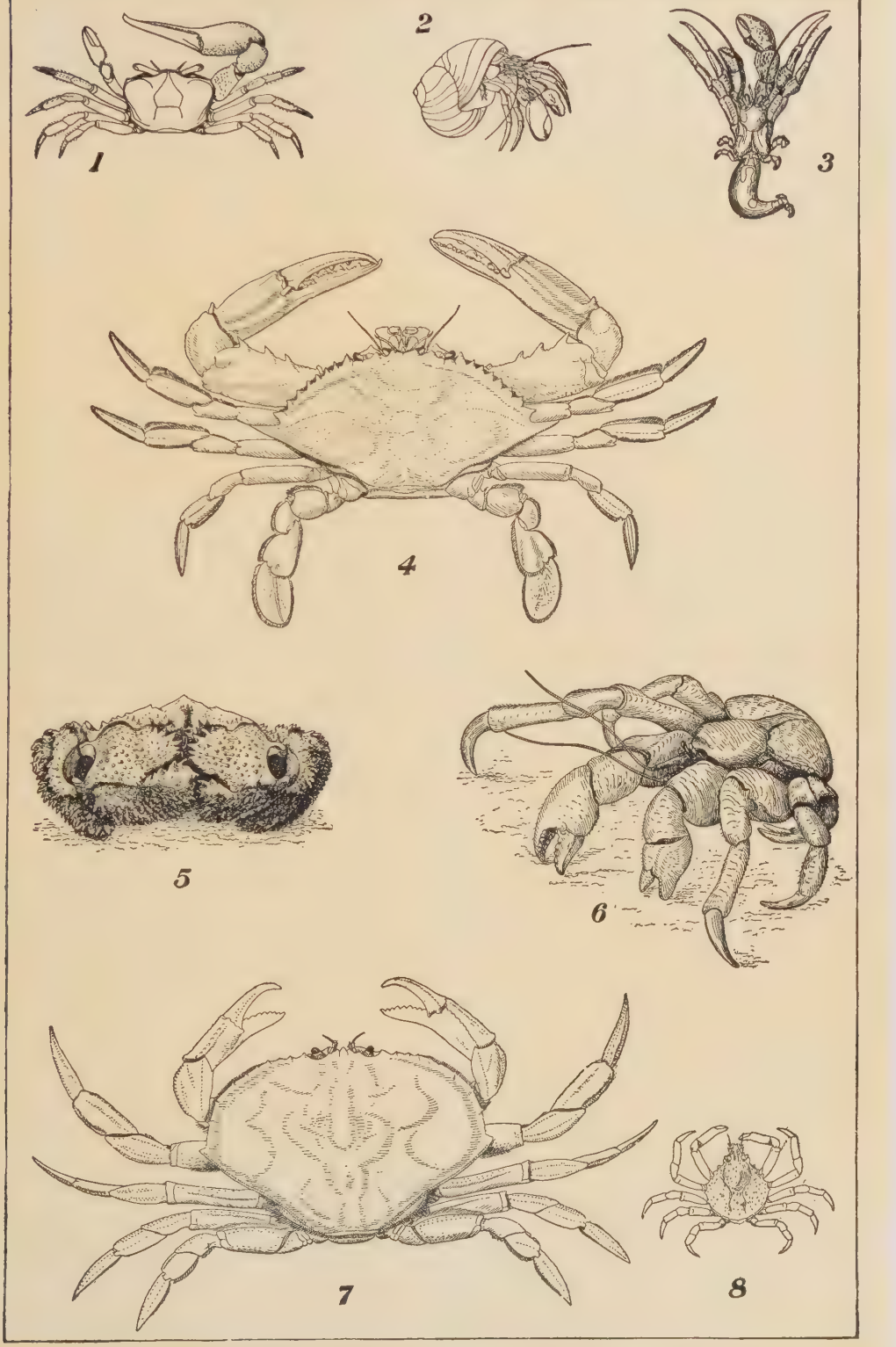
Crabs become interesting in the aquarium, from their readiness in seizing food, their activity in tearing and eating it, and their pugnacity. The number of specimens is apt, however, to be soon diminished by the stronger killing and eating the weaker. Crabs vary greatly in size and color, as might be expected from the great number of species and their wide distribution. The giant crab of Japan (*Macrocheira kæmpferi*), although only a foot across the disk, which is 18 inches long, has such long legs as occasionally to be 15 to 18 feet from tip to tip of the first pair. The great stone crab of Tasmania, which has short and very thick legs, has been known to reach a weight of over 30 pounds. On the other hand, many species of crab are only a fraction of an inch across. In color crabs vary from black to white, through all the colors of the rainbow. Shades of green, blue, and gray are perhaps the most common, but the brightest shades of red and yellow are by no means rare. The sexes of crabs are easily distinguished, as the females are usually larger, and their abdomens broader and more oval, while males have the chelæ more powerfully developed—notably so in the fiddlers.

Economic Importance of Crabs.—These animals supply food for food fishes, are of great service as scavengers, and are used as human food in various parts of the world. In the United States the principal crab so used is the blue crab (*Callinectes hastatus*), hundreds of thousands of which are sent to market every year from the waters of Chesapeake Bay alone. The little pea crabs (*Pinnotheres*) often found in oysters (see COMMENSALISM) are regarded as a great luxury. In Europe the species most frequently used are those of the genus *Cancer*, especially the great *Cancer pagurus*, and there is no reason why the two eastern American species of this genus, the "rock" and "Jonah" crabs (qq.v.), should not be far more utilized as food than they are. To this group belong the principal edible crab of the American Pacific coast (*Cancer magister*), and others smaller which are eaten by the Chinese, etc. This species usually measures 7 to 9 inches in breadth of body and abounds from Alaska to Mexico, usually below low-tide level on sandy bottom. Crabs which have just shed their shell, and are covered only by a soft skin, are regarded as best and are called "shedders" or "soft-shelled."

The ways of fishing are various. Many are taken in wicker traps or "pots," baited with meat or offal; another common method is to sink shallow hoop nets of coarse material and mesh, which are baited and hauled up rapidly at intervals, bringing the crabs with them. Hand-line fishing, with bundles of meat to which the crabs cling until lifted out of water, is more a sport than a method of market fishing; but in the Gulf of Mexico trawls or "trot-lines" are set in several ways, and vast quantities of crabs are thus taken. They are kept for market in floating pens or "cars," and shipped alive packed in wet seaweed. They are also preserved by canning, etc. Consult Calman, "Crustacea" in Lankester's *Treatise on Zoölogy* (London, 1909) and Calman, *The Life of Crustacea* (New York, 1911).

Fossil Forms. With the exception of some doubtful genera (*Gitocragnon*, etc.) from later Paleozoic rocks, no unmistakable fossil crabs are known from deposits antedating those of Mesozoic age. Fossil crabs first appear in the Jurassic, where occur members of the family Dromiaceæ, much smaller than the modern species, such as the genus *Prosopon*, which continues into the Cretaceous. In the Upper Cretaceous *Dromiopsis* is the ancestor of *Dromia*, which latter appears in the Eocene and continues to modern time. Several other small genera of this same family are found in Cretaceous rocks, in which the family enjoyed its greatest expansion. The Raninoidea, with elongated carapaces, broadly truncated in front, began in the Upper Cretaceous, had its maximum in the Eocene, and has since then declined to the present. Large numbers of the Oxystomata, or round crabs, are found fossil in the Upper Cretaceous and Eocene rocks. The Oxyrhyncha, which at present are very abundant, have few fossil ancestors, and these are of small size. The arcuate crabs, of the family Cyclometopa, contain the largest number of fossil genera. They appeared in the Cretaceous, attained a great expansion in the Eocene, declined during the later Tertiary, and in modern times seem to be again on the increase. This family con-

TYPICAL CRABS



1. FIDDLER CRAB (Gelasimus pugnax).
2. HERMIT CRAB (Eupagurus longicarpus) in a shell of Natica heros.
3. HERMIT, out of its borrowed shell, showing reduced and defenseless posterior parts.
4. EASTERN EDIBLE or BLUE CRAB (Callinectes hastatus).
5. A DEEP-SEA CRAB (North Atlantic) its arms closed into a defensive box.
6. COCOANUT CRAB (Birgus latro).
7. COMMON CRAB OF PACIFIC COAST (Cancer magister).
8. SPIDER CRAB (Libinia emarginata).

tains most of the modern genera, such as *Cancer, Carcinus, Portunus, Xantho, Neptunus, Panopæus.* Certain of these are of old age. *Xantho* began in the Cretaceous, had a representative (*Xanthopsis*) that is very common in the Eocene of England, France and Germany, and continued with little change to the present day. *Lobocarcinus*, with its broad, nodose carapace, deeply denticulate on the front margin, is a common and often beautifully preserved fossil crab from the Eocene rocks of Württemberg, Germany, and Cairo, Egypt. The Catometopa, or quadrangular crabs, have many ancestors of Eocene age. The first land crab of the modern genus *Gecarcinus*, and the first fresh-water crab, also of a modern genus, *Telphusa*, both members of this family, are found in the Miocene deposits of Oeningen, Germany.

From the above remarks it will be seen that all the families of modern crabs, with the single exception of the Oxyrhyncha, were initiated during Cretaceous time; that they expanded rapidly so that their periods of maximum evolution were during the Eocene, when indeed crabs formed the dominant feature of the fauna in certain seas; that during the Miocene the general expansion was less than before, although certain genera were extremely abundant in particular localities; and that those of the Pliocene are mostly of recent species. During the present time the crabs seem to be enjoying another period of expansion, but along different lines from those of the Eocene evolution. The best collecting grounds are found in the Eocene deposits of the south of England; the nummulitic limestones of southern France, Switzerland, southern Germany, and of northern Italy, and those of central India; and the Miocene beds of Italy, Austria, Hungary, and Germany.

Consult: Zittel and Eastman, *Textbook of Paleontology*, vol. i (London and New York, 1900); Zittel and Barrois, *Traité de paléontologie*, vol. ii (Paris, Leipzig, and Munich, 1887); Bell, "Monograph of the Fossil Malacostracous Crustacea of Great Britain," *Paleontographical Society Monographs* (London, 1857–62); Ortmann, "Das System der Decapodenkrebsen," *Zoologische Jahrbücher*, vol. ix (Jena, 1896); Lorenthey, "Ueber die Brachyuren der paläologischen Sammlung des Bayerischen Staates," *Természetrajzi Füzetek*, vol. xxi (Budapest, 1898). See CRUSTACEA, and special articles under names of various crabs, as KING CRAB; SPIDER CRAB; ETC.

CRAB APPLE. See APPLE.

CRABB, GEORGE (1778–1851). An English lawyer and author, born at Palgrave (Suffolk). He was educated at Oxford, admitted to the bar at the Inner Temple (1829), and practiced his profession in London. For a time, also, he was instructor in the classics in a Yorkshire school. His best-known work is the *Dictionary of English Synonymes* (1816; 10th ed., 1849), a careful, if not always scholarly, reference book, which has appeared in numerous editions. Others of his publications are a *History of English Law* (1829); a laborious *Digest and Index of All the Statutes at Large* (4 vols., 1841–47); *Mythology of All Nations* (1847).

CRABBE, GEORGE (1754–1832). An English poet. He was born, Dec. 24, 1754, at Aldeburgh, Suffolk, where his father was collector of salt duties. Crabbe showed early a love for books, with a bias towards poetry. After some schooling he was apprenticed first to a village doctor and then to a surgeon. By 1772 he was contributing verses to *Wheble's Magazine*, and two years later he published at Ipswich a moral poem entitled *Inebriety*. At this time he was in love with Sarah Elmy, whom he addressed in his poems as "Mira" and whom he afterward married. Continuing his studies in London, he began the practice of medicine in the place of his birth. Disliking a profession in which he was not succeeding, he went to London in 1780 to begin a literary career. In that year appeared a poem called *The Candidate*, which was received coldly. Much distressed, he called upon Burke, who after reading some of Crabbe's verses took him under his protection, getting Dodsley to publish *The Library* (1781). While staying with Burke at Beaconsfield, he began his best-known poem, *The Village* (published 1783). At Burke's suggestion Crabbe took orders. After a short period as rector of Aldeburgh, he was appointed chaplain to the Duke of Rutland (1782) and thus made Belvoir, Leicestershire, his home. After occupying several other church livings, he was given that of Trowbridge, Wiltshire (1814), where he remained till his death (Feb. 3, 1832). Besides the poems already cited, Crabbe wrote: *The Newspaper* (1785); *The Parish Register* (1807); *The Borough* (1810); *Tales in Verse* (1812); *Tales of the Hall* (1819). Crabbe was a popular poet in his own time, numbering friends among the greatest. He was lavishly praised by Dr. Johnson, Scott, Wordsworth, and Byron. Jane Austen, charmed with humor akin to her own, declared that, were she ever to marry, she could fancy herself Mrs. Crabbe. Though his reputation has declined, he nevertheless occupies an important place in the progress of English poetry. Crabbe's stern descriptions of English life in old East Anglia were in marked contrast to Goldsmith's idyllic scenes and led the way to the realism of Wordsworth. What he lacked was the imagination necessary to give lasting interest to his subject. His great excellence is the directness with which he portrays the tragic life of men and women whom he knew and the scenes in which they lived. Consult: *Works*, with memoir, by his son G. Crabbe (8 vols., London, 1834–35; 1 vol., 1901); selections from poems, by Lamplough (ib., 1888), and by Holland (ib., 1899); Stephen's essay in *Hours in a Library* (London, 1876); *Readings in Crabbe* (selected by Edward Fitzgerald, London, 1882); Courthope's essay in Ward, *English Poets* (ib., 1884); the *Life*, by Kebbel (ib., 1888); Ainger, *Crabbe*, in "English Men of Letters Series" (New York, 1902); René Huchon, *George Crabbe and his Times* (1907), trans. from the French by F. Clarke. An excellent recent edition of the *Works* is that of Ward (1906) in *Cambridge Press Classics.*

CRAB-EATER, or COBIA. See SERGEANT FISH.

CRAB-EATING DOG, RACCOON', ETC. See DOG; RACCOON; ETC.

CRABETH, krä'bĕt, DIRK and WOUTER. Dutch painters on glass. They were brothers, born at Gouda, in South Holland, and they flourished in the latter half of the sixteenth century. As the brothers worked together and were the most famous glass painters of their time, they cannot be separated in biography. Very little is known of their lives, but they executed a number of excellent works in the churches of Belgium, France, and Italy. Their chief works are

13 of the 46 colossal windows of the great church at Gouda. Among the best of these are the "Baptism of Christ" and "John the Baptist Preaching," by Dirk, and the "Nativity" and the "Sacrilege of Heliodorus," by Wouter. The latter is superior in drawing and composition but Dirk excels in brilliancy of color. The works of both show a somewhat mannered imitation of the Italian, but they still retain much of the brightness of the mediæval coloring. Dirk died in 1577; his brother about 1590. Consult Westlake, *History of Design in Painted Glass*, vol. iv (London, 1894).

CRAB GRASS. A name applied to *Panicum sanguinale*, also known as *Digitaria sanguinalis*, an annual grass common throughout many parts of the United States. It is frequently seen to spring up in fields after the period of cultivation has passed. It grows to a height of 2 to 3 feet, bearing at the top 3 to 12 spreading purplish spikes which carry the flowers and seed. In many places it is considered a weed, but in the South it is valued for the hay it yields as well as for pasturage. The hay must be cured without rain falling upon it or its value is greatly impaired. It ranks close to Bermuda grass in value and in the cheapness with which a crop may be produced. *Eleusine indica* is sometimes called crab grass.

CRABIER, krȧ'byȧ' (Fr., crab-eater). The name in the French West Indies and Jamaica for several herons, especially the common night herons (*Nycticorax*). See NIGHT HERON.

CRAB'S EYES. See ABRUS; CONCRETION.

CRAB SPIDER. A spider of the family Thomisidæ, so named on account of the short, broad body and the fact that, like a crab, it runs more successfully sideways or backward than forward. These spiders spin no web, but await their prey hidden among foliage, and are colored in harmony with their background; but a few species are bright-colored and hide in flowers. The most common American form (*Misumena vatia*) is milk white, occasionally with light-crimson markings. Another species (*Philodromus vulgaris*) eats house flies almost exclusively. Consult Emerton, *The Common Spiders of the United States* (Boston, 1902), and Fabre, *The Life of the Spider*, trans. by De Mattos (New York, 1913). Compare BIRD SPIDER.

CRAB'S PLOVER. A singular shore bird (*Dromas ardeola*) nearly related to the oyster catchers, but set apart in a family, Dromadidæ, of its own, which is to be found sparingly on the coasts and islands of the Indian Ocean. "Its habits remind us both of the plovers and the terns, and so do the unusually large eggs," but in India, according to Hume, it nests in burrows in sand hills.

CRABTREE, CHARLOTTE (1847–1924). An American actress, known as Lotta. She was born in New York and when a child of six began her career in California. After starring for a time in the West, she came again to New York about 1860. In 1867, as Little Nell and the Marchioness in a dramatization of *Old Curiosity Shop*, she made her first great impression there and became a popular favorite. Her success was entirely due to her personal charm. Critics found little to approve in the pieces in which she appeared, such as *The Little Detective*, *Zip*, *Musette*, and *The Firefly*, but her stage appearance was characterized by a naturalness and grace which won the hearts of the audience. She retired from the stage, still unmarried, in 1891, having acquired a fortune. Consult Welch, in McKay and Wingate's *Famous American Actors of To-Day* (New York, 1896), and Clapp and Edgett, *Players of the Present*, Dunlap Society Publications (ib., 1899).

CRACKED HEELS. See HORSE.

CRACK'ER. See BISCUIT.

CRACKERS. A name given in the southern part of the United States to the poor and ignorant whites, probably because of their usual diet, which is cracked corn ground into a coarse meal. The term "corn-crackers" is employed in the same sense.

CRACKER STATE. Georgia. See STATES, POPULAR NAMES OF.

CRACK'LIN, or **CRACKLE WARE.** A kind of china ware, the glazing of which is purposely cracked in the kiln, as an ornament, the effect being produced by a glaze which tends to contract in the burning more rapidly than the vessel itself. This ware is produced for the most part in China and Japan, but it has also been made at a pottery at Dedham, Mass., where two varieties of crackle ware are made. Both have a gray body, resembling true porcelain and are fired at a high temperature. To one of these various colored glazes are applied, ranging through various shades of red, green, and olive, while the other, the gray crackle ware, differs only in color and is usually decorated in blue. Consult "American Art Pottery" in *Special Reports of the Census Office; Manufactures, part iii, 1905* (Washington, 1908).

CRACOW, krā'kō (Pol. *Kraków*, Ger. *Krakau*, Fr. *Cracovie*, Lat. *Cracovia, Carodunum;* said to be named after its founder, *Krakus*, a legendary Slavic chief). The ancient capital of the Kingdom of Poland and residence of the Polish kings, now a fortified city of the Austrian Crownland of Galicia (Map: Austria, F 1). It is situated on the left bank of the Vistula, at its confluence with the Rudowa, about 10 miles from the frontier of Russian Poland and 200 miles northeast of Vienna. Cracow, with its numerous churches, towers, and old castle, presents an imposing aspect from without. It consists of the inner town and a number of suburbs. The old walls surrounding the inner town have been demolished, and promenades laid out on their site. Cracow is one of the oldest cities of Poland (according to tradition, a stronghold was built here about 700 A.D.), and it bears the marks of its age in its imposing buildings as well as in its general appearance. The city has about 40 churches, scarcely more than half the number it formerly had, and about 25 convents. The most important church is the Stanislaus Cathedral, a Gothic structure, situated near the castle. It was erected under Casimir the Great, being consecrated in 1359. Here the Polish kings were crowned and here are they buried, together with many national heroes, including Sobieski, Poniatowski, and Kosciuszko. Also the remains of St. Stanislaus, the patron saint of the Poles, are said to rest here. The church is also adorned with numerous monuments, several of them by Thorwaldsen, and with notable paintings and other objects of art. The church of St. Mary, a Gothic basilica, was founded early in the thirteenth century and has been rebuilt several times. It contains a magnificent high altar by Veit Stoss and a number of monuments. Besides these churches there are a number of other very interesting mediæval ones. Among the

interesting secular buildings is the former royal castle, situated on a broad hill at the southwestern end of the town; it was built in the thirteenth century (and subsequently enlarged) and suffered greatly from conflagrations. Until 1610 it was the residence of the Polish kings; from 1846 it was used as a barracks and military hospital, but it is now restored. The old cloth hall, dating from the thirteenth century, is now used as an art museum, and contains paintings by Polish artists, such as Matejko, Siemiradzki, and others. In front of the cloth hall is a bronze statue of Mickiewicz, one of Poland's greatest poets. Among other notable buildings and historical monuments are the old and new theatres and the Rondell, a relic of the old fortifications. The chief educational institution is the famous university, styled the Jagellonian University, founded by Casimir the Great in 1364. It developed very rapidly and eventually became the intellectual centre of Poland. It has faculties of jurisprudence, medicine, philosophy, and theology, with an attendance (1911) of 2805 students. The university library contains over 300,000 volumes, besides numerous manuscripts, engravings, ancient documents, etc. Attached to the university are also an observatory, a botanical garden, a natural-history museum, and a number of other institutions. The university occupies a splendid Gothic building erected in 1881–87; the library is housed in the old fifteenth-century buildings. Among other prominent educational establishments are the Royal Academy of Sciences, and the art school (until 1893 under the supervision of Matejko), several seminaries, and a number of artistic and literary societies. The Czartoryski Museum contains a collection of sculptures and antiquities and a fine picture gallery, with examples of the Italian and Dutch schools. Cracow remains the intellectual centre of the Polish nation.

There are manufactures of machinery, textiles, leather, chemicals, etc., but industrially Cracow has not greatly developed. It is more important for its trade in grain, timber, salt, textiles, and cattle. In the vicinity of the city is situated Kosciuszko Hill, a mound 65 feet high, erected in 1820–23 by the residents of Cracow, in honor of Kosciuszko, and since converted into a fort. The fortifications of Cracow are very extensive. Eight miles southeast of Cracow is Wieliczka, famous for its salt mines. Across the Vistula from Cracow is the town of Podgórze, with 22,232 inhabitants. In 1900 the city had 91,323 inhabitants; the census of Dec. 31, 1910, returned 151,886. Of the latter, the vernacular of 133,158 was Polish; Roman Catholics numbered 116,656; Jews, 32,321. In 1912 Plaszów (pop., 2255) was annexed to Cracow.

Cracow rose into importance in the Middle Ages as the seat of a bishopric and a centre of commerce and trade, its prosperity being enhanced by the influx of German immigrants. It suffered terribly at the hands of the Tatars in the thirteenth century. It became the capital of Poland early in the fourteenth century, and after having been superseded by Warsaw in 1610, it still remained, until 1764, the place where the Polish kings were crowned and buried. It later became exceedingly impoverished, so that at the end of the eighteenth century its population was only about 10,000. In 1655 and 1702 the town was taken by the Swedes. It was the starting point of the rising of the Poles for independence under Kosciuszko in 1794, and came into the possession of Austria at the third partition of Poland, in 1795. From 1809 to 1815 Cracow formed a part of the Duchy of Warsaw. The short-lived Republic of Cracow, established at the Congress of Vienna in 1815, under the protectorate of Russia, Prussia, and Austria, was the last remnant of an independent Poland. It consisted of the city of Cracow and some adjacent territory, with a total population of about 140,000. The participation of a portion of the population in the Polish uprising of 1830 gave Russia an opportunity for military occupation. After that Cracow was repeatedly occupied by foreign troops. The little republic took a leading part in the Polish insurrection of 1846. The patriots were at first successful, but their overthrow soon ensued, and Cracow was annexed to Austria in the same year. In 1849 it was incorporated with Galicia. Cracow remains to the present day a great focus of Polish national life.

CRACOW, UNIVERSITY OF. See CRACOW.

CRAD'DOCK, CHARLES EGBERT. The nom de plume of Mary N. Murfree (q.v.), the Southern novelist.

CRADLE OF LIBERTY, THE. The name popularly given to Faneuil Hall, Boston, as the scene of early popular protests against British rule.

CRADOCK, krăd'ok, SIR. See CARADOC.

CRAFTON. A borough in Allegheny Co., Pa., 4 miles west of Pittsburgh, on the Pittsburgh, Cincinnati, Chicago, and St. Louis Railroad (Map: Pennsylvania, B 6). It is in a coal-mining and oil district. Pop., 1900, 1927; 1910, 4583.

CRAFTS, JAMES MASON (1839–1917). An American chemist. He was born in Boston and received his education at the Lawrence Scientific School of Harvard. In 1859 he went to Germany and studied at the Academy of Mines of Freiberg and at the University of Heidelberg. At the latter institution he acted for some time as private assistant to Bunsen. In 1861 he went to Paris, and there, in Würtz's laboratory, he first met Charles Friedel, in conjunction with whom he later carried out some of his most brilliant researches. In 1865 he returned to the United States, and, after devoting some time to mining, accepted the position of head professor of chemistry and dean of the faculty at Cornell University, where he remained until 1870. During the following four years he acted as professor of chemistry at the Massachusetts Institute of Technology, but in 1874 took leave of absence, joined Friedel in Paris, and devoted himself exclusively to scientific research. His investigations were mainly in the field of organic chemistry, but his name is connected also with many interesting achievements in physics and in physical chemistry. He invented a new hydrogen thermometer; measured the densities of iodine at very high temperatures; demonstrated an interesting regularity in the variation of the boiling points of chemically allied substances with the external pressure; prepared a number of new compounds of the element silicon, which are interesting because of their chemical resemblance to the corresponding compounds of carbon; and also prepared new compounds of arsenic. But his most important achievement was the discovery, jointly with Friedel, of one of the most fruitful synthetic methods in organic chemistry. Hundreds of new carbon compounds

have been brought into existence by this method, which is based on the catalytic action of the chloride of aluminum.

In recognition of Crafts's services to science, the French government made him a chevalier of the Legion of Honor (1885), and the British Association for the Advancement of Science made him one of its corresponding members. In 1891 he again returned to this country, and from 1892 to 1897 acted as professor of organic chemistry at the Massachusetts Institute of Technology. In 1898 he became the president of the institute, and in the same year Harvard University conferred upon him the honorary degree of Doctor of Laws. In 1900, however, he resigned the presidency of the Institute of Technology, and again turned to the investigation of problems in organic and physical chemistry. The numerous results of Dr. Crafts's researches were published in various scientific periodicals, mainly foreign. He also wrote a textbook of *Qualitative Analysis* (1869, and several later editions).

CRAFTS, Wilbur Fisk (1850–1922). An American clergyman. He was born in Fryeburg, Me.; graduated at Wesleyan University in 1869 and at the Boston University School of Theology in 1872; held various positions in the Methodist Episcopal church, and in 1880 became a Congregational minister. From 1883 to 1888, however, he was the pastor of the First Union Presbyterian Church of New York. He conducted an International Sunday-School Parliament at the Thousand Islands in 1876–77, wrote many books for the Sunday school, and founded the American Sabbath Union in 1889 and the International Reform Bureau in 1895. He also published: *Must the Old Testament Go?* (1883); *Successful Men of To-Day* (1883); *The Sabbath for Man* (1885); *The March of Christ down the Centuries* (1902); *That Boy and Girl of Yours* (1905); *Internationalism* (1908); *World Book of Temperance* (1908); *Prohibition Hand Book* (1911).

CRAFTSMAN, The. A powerful journal organized in 1726 by Bolingbroke and Pulteney, with Nicholas Amhurst, who conducted it under the name of "Caleb D'Anvers of Gray's Inn." It was the organ of the Opposition against Sir Robert Walpole.

CRAG MARTIN, or Rock Swallow. A swallow (*Clivicola rupestris*), closely allied to the bank swallow (q.v.), which is found from Portugal eastward to China in the breeding season, migrating to the tropics for the winter. It frequents mountains and rocky river banks among hills, but does not ascend to Alpine regions. It builds in niches of the rocks a large, open-topped nest of mud, occasionally (as in the villages of the Pyrenees) placing this on the timbers of buildings or among ruins, and lays profusely speckled eggs. "The general color of the adult bird is a light ashy brown above, the lower parts being creamy buff, and the tail feathers are dark brown, the central and outer pairs being conspicuously spotted with white." Consult Sharpe and Wyatt, *Monograph of the Hirundinidæ* (London, 1885–94).

CRAIG, krāg, Charles Franklin (1872–). An American army officer and bacteriologist. He was born in Danbury, Conn., graduated from the Yale Medical School in 1894, was appointed acting assistant surgeon in the United States army in 1898, and in 1908 became captain and assistant surgeon. Thereafter as biologist and bacteriologist he served in army hospitals at Chickamauga Park, Ga., Fortress Monroe, Havana, the Presidio, Cal., and Manila. In 1896–97 he was a member of the Army Board for the Study of Tropical Diseases; after 1909 he was assistant curator of the Army Medical Museum in Washington, at the same time acting as instructor in clinical microscopy and bacteriology at the Army Medical School in Washington; and in 1910–11 he was also assistant professor of bacteriology in the medical department of George Washington University. He published: *The Æstivo-Autumnal Malarial Fevers* (1901); *The Malarial Fevers and the Blood of Protozoa of Man* (1909); *The Parasitic Amœbæ of Man* (1911); also "Malarial Fevers," in Osler's *Modern Medicine* (1907); "Parasitic Disease," in Hare's *Modern Treatment* (1911).

CRAIG, Edward Gordon (1872–). An English actor, producing manager, and writer on the theatre, the son of Ellen Terry. He was born near London, played his first part in a London theatre when only six years old, and appeared again in Chicago when he was 13; but his regular début was made in 1889 under Sir Henry Irving, his mother appearing in the same performance. He continued with Irving till 1897, when he left the stage and devoted himself to the study of drawing and wood engraving. In 1900 he began a series of operatic and theatrical productions in which he put in practice some novel ideas in regard to scenery and the mechanical details of stage management. His success with these innovations led him to devote his time wholly to the art of production, and in 1913 he founded a school in Florence, Italy, for the dissemination of his theories of theatrical art. He published, besides numerous magazine articles: *The Art of the Theatre* (1905); *On the Art of the Theatre* (1911); *Towards a New Theatre* (1913).

CRAIG, Frank (1874–). An English painter and illustrator. He was born in 1874 in Abbey Wood (Kent), and studied at the Royal Academy under Edwin Abbey. He began as a painter of modern English life and contemporary history, such as the Boer War, and as an illustrator for Kipling's poems and for the *London Graphic* and other magazines. In 1905 he joined the new Pre-Raphaelite movement, and thereafter painted historical pictures full of expressive figures and quaint costumes, in their general color scheme often resembling Gobelin tapestries. Good examples are: "The Heretic" (1906, National Gallery, London); "The Maid" (1907, Luxembourg); and "The Meeting House of Nonconformists" (1908). Among his more recent work the curiously characteristic portraits of Sir John Jardine and Major General Douglas Scott (1910) deserve mention. A good example of his early style is the "Communion on the Velt" (1900, Durban Museum, South Africa).

CRAIG, James Alexander (1855–). An American Semitic scholar, born at Fitzroy Harbor, Ontario. He was educated at McGill, Yale, and Leipzig universities, was instructor and adjunct professor at Lane Theological Seminary (1886–90), professor of Old Testament literature and exegesis at Oberlin Theological Seminary (1891), and, after 1893, professor of Semitic languages and literatures and Hellenistic Greek at the University of Michigan. In 1904 he was a member of the Congress of Arts and Sciences at St. Louis. Besides editing *The Semitic Series of Handbooks* his publications in-

clude: *Inscriptions of Salmanassar, King of Assyria, 859–826* B.C. (1887); *Metrical Translation of the Epic of Ishtar; Hebrew Word Manual* (1890); *Assyrian and Babylonian Religious Texts* (2 vols., 1895–97); *Astronomical-Astrological Texts of Babylonians* (1899).

CRAIG, Sir James Henry (1748–1812). An English soldier, born in Gibraltar, son of the Judge-Advocate-General there. In 1763 he was gazetted an ensign, and in 1771 was appointed captain in the Forty-seventh Foot. He accompanied his regiment to America, was wounded at Bunker Hill, in 1776 was transferred to Canada, and in 1777 was at the capture of Fort Ticonderoga. General Burgoyne before Saratoga intrusted him with dispatches to England. He was promoted to be major in the Eighty-second, proceeded to Nova Scotia, and in 1781 served under Lord Cornwallis in North Carolina. In 1795, having then risen to the rank of major general, he was placed in command of the expedition to the Cape of Good Hope. Aided by Rear Admiral Elphinstone and Major General Clarke, he obtained the surrender of the colony on September 14. He went in 1797 to India; was promoted lieutenant general in 1801; and in 1805, as a local general in the Mediterranean, landed with 7000 troops at Castellamare, with orders to coöperate with the Russian forces under General Lacy in an attack upon the French. After Austerlitz he withdrew to Sicily. In 1807 he was appointed Governor General of Canada. After a somewhat vexed administration he resigned in 1811, and in 1812 was promoted to be general.

CRAIG, John (1512–1600). A preacher of the Scottish Reformation. He was born in Aberdeenshire and educated at St. Andrews. He entered the Dominican Order, but soon fell under the suspicion of heresy and was cast into prison. On his release (1536) he traveled on the Continent, and after some time was, through Cardinal Pole's influence, made novice master in the Dominican convent at Bologna and later was rector. While here Calvin's *Institutes* fell in his way and converted him to Protestant doctrines. He was brought before the Inquisition and sentenced to be burnt—a fate from which he was saved by the mob, on the death of Pope Paul IV, breaking open the prisons of Rome. Craig escaped to Vienna and obtained favor at the court of Maximilian II; but the Pope demanded his surrender as one condemned for heresy. The Emperor, however, instead of complying with the request, gave Craig a safe-conduct out of Germany. He now returned to Scotland (1560) and was appointed the colleague of John Knox in the parish church of Edinburgh. Thinking the marriage of Queen Mary and Bothwell contrary to the Word of God, he boldly refused to proclaim the banns, but afterward yielded under protest. In 1572 Craig was sent "to illuminate the dark places" in Forfarshire until 1579, when he was appointed chaplain to King James VI. He now took a leading part in the affairs of the Church, was the compiler of part of the *Second Book of Discipline,* and the writer of the national covenant signed in 1580 by the King and his household. He was a man of great conscientiousness and was not slow to oppose the proceedings of the court when he deemed them contrary to Scripture and to speak wholesome but unpleasant truths to majesty itself. He died Dec. 12, 1600. Consult the black-letter facsimile reprint of Craig's *Catechisms* (Edinburgh, 1885), with introduction by T. Graves Law.

CRAIG, Katherine L. An American educator. She attended Missouri Valley College, was elected superintendent of public instruction of Colorado in 1904 (reëlected 1906), and became field secretary of Colorado Woman's College in 1909. Besides annotating the school laws of Colorado and compiling Arbor Day, Flag Day, and Washington and Lincoln Day books for the public schools, she is author of *Primary Geography* and a novel, *Judge Greyburn and Kathlene Lee* (1902).

CRAIG, Sir Thomas (1538–1608). A Scottish lawyer, author, and poet. Educated at St. Andrews and in Paris, he passed as advocate at the Scottish bar in February, 1563, and was appointed justice depute. He gained the favor of James VI, who, notwithstanding his modest and persistent refusal, created him a knight in 1603. Besides some much-admired Latin verse and prose, he wrote *Jus Feudale* (ed. Burnet, 1655; new ed., with notes and corrections by James Baillie, 1766). This learned work is still an authority on feudal law.

CRAIGENPUTTOCK, krā'gen-pŭt'tŭk. A farm in the southwestern part of Dumfriesshire, Scotland, situated 12 miles north of Castle Douglas and celebrated as the residence of Thomas Carlyle. It belonged to Jane Welsh before her marriage to the author. The Carlyles lived there most of the time between 1828 and 1834. Much of Carlyle's writing was done at Craigenputtock, and there are frequent references to it in his published correspondence. Consult "Homes and Haunts of Carlyle," in *Westminster Gazette* (London, 1895).

CRAIGHILL, krā'gĭl, William Price (1833–1909). An American military engineer, born at Charlestown, W. Va. He graduated in 1853 at the United States Military Academy; in 1854–55 superintended the building of Fort Sumter, and in 1858 that of Fort Delaware, and was for several years an instructor at the academy. In 1863 he constructed the defenses of Pittsburgh and in 1865 was brevetted a lieutenant colonel for service in the defense of Cumberland Gap. He was promoted to the rank of major, and from 1865 to 1867 was in charge of the defenses of Baltimore harbor. Subsequently he was concerned with several public works, such as the improvement of the Potomac River (1870–74) and the Delaware River (1873). He was chief of engineers of the United States army, with the rank of brigadier general, from 1895 until his retirement at his own request in 1897. In 1894 he was president of the American Society of Civil Engineers. His publications include an *Army Officer's Pocket Companion* (1862) and a translation of Dufour's *Cours de tactique* (1863).

CRAIGIE, krā'gê, Pearl Richards. See Hobbes, John Oliver.

CRAIGLEITH (krāg'lēth') **STONE.** A siliceous sandstone belonging to the Carboniferous series, quarried at Craigleith, near Edinburgh. It is largely used in that city for building purposes, for which it is admirably adapted by its purity, durability, and the ease with which it can be wrought.

CRAIK, krāk, Dinah Maria (1826–87). An English novelist, better known as Miss Mulock. She was born at Stoke-upon-Trent, Staffordshire. In 1849 she published *The Ogilvies,* her first novel, and rapidly afterward: *Olive* (1850); *The Head of the Family* (1851); *Alice Lear-*

mount (1852); *Agatha's Husband* (1853; 6th ed., 1865); *John Halifax, Gentleman* (1857); *A Life for a Life* (1859); *Christian's Mistake* (1865); and a great number of short papers. A pension of £50 was granted to her in 1864. In 1865 she married George Lillie Craik. Among her later works is *Sermons Out of Church* (1875). Her literary reputation rests chiefly upon *John Halifax, Gentleman*, a classic picture of middle-class English life, which had a remarkable success and appeared in frequent later editions. Some of her *Poems of Thirty Years, New and Old* (1881), such as "Douglas" and "Philip, my King," have been popular. She wrote several stories for her own children that ran through many editions. These include *The Adventures of a Brownie* (1872; new ed., 1911), and *The Little Lame Prince* (new ed., 1909).

CRAIK, George Lillie (1798–1866). An English miscellaneous writer. He was born at Kennoway, Fifeshire, and was educated for the Church at St. Andrews University; but, preferring a literary career, he went to London in 1826. His first work of importance was the *Pursuit of Knowledge under Difficulties* (1830–31), forming part of the series of publications issued by the Society for the Diffusion of Useful Knowledge. He also contributed largely to the *Penny Magazine* and the *Penny Cyclopædia*. In 1837 Craik became editor of the *Pictorial History of England*, some of the most valuable chapters of which were written by himself, and afterward enlarged and republished separately as independent works. Such are his sketches of the *History of Literature and Learning in England from the Norman Conquest to the Present Time* (1844–45), and his *History of British Commerce* (1844). In 1845 he published *Spenser and his Poetry*, and in 1846–47 *Bacon and his Writings*. In 1849 Craik was appointed to the chair of history and English literature in Queen's College, Belfast, a situation which he occupied till his death. In 1848–50 appeared his *Romance of the Peerage;* in 1851 his *Outlines of the History of the English Language*, which has passed through various editions; and in 1856 his essays on *The English of Shakespeare*, which passed through several editions. His *Manual of English Literature* was reprinted (1910) in "Everyman's Library."

CRAIK, James (1731–1814). The physician of George Washington, who referred to him as "my compatriot in arms, my old and intimate friend." He was born in Scotland. He accompanied Washington in the Braddock expedition and subsequently entered the medical service of the Revolutionary army and was director of the hospital at Yorktown. He was active in the disclosure of the plot to remove Washington from command during the winter at Valley Forge (see Conway, Thomas) and was present at the surrender of Lord Cornwallis at Yorktown. After the war he settled near Mount Vernon and attended Washington in his last illness.

CRAIK, Robert (1829–1906). A Canadian physician and surgeon. He was born in Montreal and was educated at the public schools and McGill University, where he graduated with the highest honors in 1854. He then became house surgeon to the Montreal General Hospital and in 1856 also entered McGill University as demonstrator of anatomy, becoming professor of clinical surgery in 1860. While in this position he distinguished himself for his work in the resection of joints and for operations in ovariotomy. In 1867–79 he was professor of chemistry. In 1889 he became dean of the medical faculty and from 1889 to 1901 was also professor of hygiene and public health. In addition to his professional work Craik ably assisted in the organization and extension of the medical department during the 17 years that he was dean. He aided in obtaining additional university endowments, in promoting the building and opening of the Royal Victoria Hospital, and in the remodeling of the Montreal General Hospital. As early as 1854 he wrote on the germ theory of infectious diseases. His other publications include: *Papers on Purpura and Tetanus* (1885); *Medical Education* (1890); *Hospital and District Nursing* (1897).

CRAILSHEIM, or **KRAILSHEIM,** krils′hīm. A town of Württemberg, Germany, on the Jagst, 47 miles northeast of Stuttgart (Map: German Empire, D 4). Its municipal offices are situated in the ancient castle of the Hohenlohes; the fifteenth-century church of St. John, a Gothic edifice, contains paintings and other features. It has considerable trade, and manufactures of woolens, cement, leather, lumber, and machinery. It is a centre for agricultural products. Pop., 1900, 5255; 1905, 5747; 1910, 6101.

CRAIOVA, or **KRAJOVA,** krä-yō′vä. The capital of the Province of Doljiu, Rumania, on the river Jiu, 112 miles west of Bucharest (Map: Balkan Peninsula, D 2). It is the centre of a rich agricultural and forest region, and trades in timber, agricultural produce, and cattle. Salt is extensively mined in the neighborhood. It is a garrison town and has large governmental industrial establishments for the manufacture of leather, rope, and carriages. Trade in cattle, cereals, fish, linen, pottery, and glue is important. Being headquarters of the First Army Corps, it has a military training school. It has two old ruined monasteries, Obedeanu and Saint-Démètre. The ancient Roman Castra Nova, in the Middle Ages it became the residence of a ban and the capital of Lower Wallachia. Pop., 1899, 45,438; 1905, 45,756.

CRAIT. See Krait.

CRAKE, or Corn Crake (from Icel. *kraka*, crow, so named from its cry). An English name for the landrail (*Crex crex*), formed in imitation of its familiar cry, "crek, crek," which is heard from every field of grain in valleys and low grounds in Great Britain in early summer and is associated with all that is pleasant in that pleasant season. It is a very pretty bird, of a reddish-brown color, marked with dark brown in streaks along the middle of the feathers, lighter below. (See Plate of Rails, etc.) Several other similar short-billed rails of the genera *Crex* and *Porzana* are often termed "crakes," as the spotted crake (*Porzana porzana*), which is smaller than the corn crake and is very similar to the American sora.

CRAKE, Augustine David (1836–90). An English author. He was educated at London University, entered the ministry of the Church of England, and after holding pastorates at Bloxham and in the Isle of Wight, became vicar of Cholsey, near Wallingford, in 1885, where he remained until his death. He was the author of a number of devotional books and of a long series of historical storybooks, illustrating the history of the Church in England. His works include: *Æmilius* (1871); *Evanus* (1872); *Edwy the Fair* (1874; 5th ed., 1885); *Alfgar the Dane*

(1874); *Fairleigh Hall* (1882); *The Last Abbot of Glastonbury* (1884); *Yule-Log Stories* (1887); *Stories from Old English History* (1887). His best-known historical work is a *History of the Church under the Roman Empire* (1873).

CRAKE'BERRY. See CROWBERRY.

CRAM, RALPH ADAMS (1863–). An American architect and author, born at Hampton Falls, N. H. He began practice as an architect in 1889. As senior member of the firm of Cram, Goodhue, and Ferguson he helped to plan some of the most notable academic and ecclesiastical buildings in the United States. Among these are: Graduate College and Cleveland Tower, Princeton University; Rice Institute, Houston, Tex.; Richmond and Sweet Briar colleges (Virginia); buildings for Williams College and Phillips Exeter Academy; and St. Alban's Cathedral, Toronto, Canada; St. Paul's Cathedral, Detroit, Mich.; St. Thomas's Church, New York; Calvary Church, Pittsburgh, Pa.; Euclid Avenue Presbyterian Church, Cleveland, Ohio; Fourth Presbyterian Church, Chicago, Ill. He became consulting architect for the Cathedral of St. John the Divine, New York City, and, in 1914, professor in Massachusetts Institute of Technology. His writings include: *Church Building* (1901); *The Ruined Abbeys of Great Britain* (1905); *Impressions of Japanese Architecture and the Allied Arts* (1906); *The Gothic Quest* (1907).

CRAMBE. See SEA KALE.

CRAMER, krä'mẽr, GABRIEL (1704–52). A Swiss mathematician. He was born in Geneva and was subsequently professor of mathematics there. His chief work is a treatise on algebraic curves (Geneva, 1750); but he contributed to the subject of equations (q.v.), revived the study of determinants (q.v.), which had been begun by Leibnitz, and wrote on the physical cause of the spheroidal shape of the planets and the motion of their apsides (Paris, 1730). He also edited the works of Johann Bernoulli (4 vols., Lausanne, 1742) and Jakob Bernoulli (2 vols., Geneva, 1744). In his investigation of curves Cramer generalized the problem of Pappus, to inscribe in a given circle a triangle whose sides produced shall pass through three collinear points; proved Newton's rule for determining the infinite branches of a curve; and completed the classification of cubic curves. Consult Cantor, *Geschichte der Mathematik* (Leipzig, 1898), and Muir, *Theory of Determinants in the Historical Order of its Development* (London, 1890). See CURVE.

CRAMER, JOHANN ANDREAS (1723–88). A German preacher and poet, born in Jöhstadt, Saxony. He studied theology in Leipzig, and in 1750 became chief court preacher in Quedlinburg. In 1754 the influence of his friends Klopstock and Bernstorff secured for him an appointment to a similar position in Copenhagen, where he became professor of theology. Owing to the antagonism of Struensee, he was banished, and accepted an appointment as superintendent in Lübeck, whence he was recalled to Denmark after Struensee's execution in 1772, and appointed professor of theology and chancellor at the University of Kiel (1774). As a preacher he was unexcelled in his day, and his odes and hymns were very popular. Many of them, such as "Er ist gekommen her," "Dein bin ich, Herr," and "Der Herr ist Gott und Keiner mehr," are still frequently sung in the Protestant churches of Germany, and some have been translated into English. A hymnal he edited in 1780 remained in use for a century. His collected poems were published under the respective titles, *Sämtliche Gedichte* (1782) and *Hinterlassene Gedichte* (1791). Consult Bluemcke, *Beitraege zur Kenntnis der Lyrik Johann Andreas Cramers* (Greifswald, 1910).

CRAMER, JOHANN BAPTIST (1771–1858). A German pianist and composer. He was born in Mannheim, but in his infancy went to London with his father, the violinist Wilhelm Cramer, who was also his first teacher. Having completed his studies under Clementi, he appeared in public with great success at the age of 17, and after a concert tour in 1788–91 settled in London as a teacher. He repeatedly traveled on the Continent, and from 1832 lived in Paris, whence he returned to London in 1845. He was much admired as a pianist for his correct technique and sympathetic interpretation; his numerous compositions for the pianoforte are now antiquated, with the exception of the *Eighty-Four Studies, Op. 50*, which in their rare combination of superior technical requirements with the highest musical value have become an accepted classic and are used in the entire musical world as models of fundamental studies for the acquirement of solid and tasteful pianoforte playing.

CRAMER, JOHN ANTONY (1793–1848). An English classical scholar, born at Mitlödi, Switzerland, of German parentage, and educated at Christ Church, Oxford. He was professor of modern history at Oxford from 1842 until his death, and during the last four years of his life was also dean of Carlisle. The following are a few of his principal works: *Dissertation on the Passage of Hannibal over the Alps* (in collaboration with H. L. Wickham; 2d ed., 1828), an important work; *Anecdota Græca e Codicibus Manuscriptis Bibliothecarum Oxoniensium Descripta* (4 vols., 1835–37); *Catenæ Græcorum Patrum in Novum Testamentum* (8 vols., 1838–44).

CRAMER, krä'mẽr, KARL EDUARD (1831–1901). A Swiss botanist, born in Zurich. He studied there and in Freiburg, taught for several years at the technological institute of Zurich, and in 1861 was appointed professor of botany at the Polytechnikum. In 1880 he became professor in the university there, and in 1882 was made director of the botanic garden in Zurich. His published works include the following: *Pflanzenphysiologische Untersuchungen*, jointly with Nägeli (1855–58); *Untersuchungen über die Ceramiaceen* (1863); *Bildungsabweichungen bei einigen wichtigeren Pflanzenfamilien* (1864). He was also the author of a number of important monographs on botanical subjects, published in scientific periodicals.

CRAMP (OHG. *chrampfa*, Ger. *Krampe*, cramp, from OHG. *krampf*, curved, Icel. *krappr*, narrow; connected also with AS., OS. *crumb*, OHG. *krump*, Ger. *krumm*, crooked). An irregular, involuntary, and generally painful contraction of a voluntary muscle, without insensibility or other disturbance of the general system. Cramp is often the effect of cold, and has proved fatal to swimmers by attacking them suddenly when in the water. It is readily removed by warmth and friction, when due to a strained position, to cold, or prolonged contraction of a group of muscles, as in lifting a weight above the

head. A swimmer attacked with cramp in the legs should turn on his back and, while floating, grasp and knead the affected muscles violently. Cramps are a distressing symptom in cholera (q.v.). They occur in colic (q.v.), in tetanus (q.v.), and in some cases of poisoning. Writers' cramp is an "occupation neurosis" (q.v.) consisting of a spasmodic closure of the hand on attempting to write, which turns the pen over and prevents its moving. Telegraphers, brakemen on railroads, ballet dancers, cigar makers, glass blowers, violinsts, clarinet and cornet players, and many others suffer from a cramp in the group of muscles which they use constantly in their occupations.

CRAMP, Charles Henry (1828–1913). An American shipbuilder, born in Philadelphia. He became a partner in, and later president of, William Cramp & Co., the largest shipbuilding enterprise in the United States, which has built many of the finest naval and merchant vessels afloat. He built ironclads and monitors for the United States government in the Civil War and assisted in the reconstruction of the United States navy and the reëstablishment of the United States merchant marine. The destroyed battleship *Maine* was built at the Cramp yards, in whose 31 acres of ground nearly 6000 workmen are employed. Consult Buell, *Memoirs of C. H. Cramp* (New York, 1906).

CRAMPEL, krän'pĕl', Paul (1863–91). A French traveler in Africa. He first went to the French Congo in 1886 as secretary to Savorgnan de Brazza, and in 1888–89 conducted most successfully an expedition from the Ogowe River into the Fan country north and back to Corisco Bay. In the following year he was commissioned by the Comité de l'Afrique Française to penetrate to Lake Chad, and started from Stanley Pool with a small force of 30 Senegalese soldiers and 250 carriers and accompanied by three Europeans. Having marched under great difficulties from Bangui on the Ubangi River northward to El Kuti, he was abandoned by his carriers, and, while trying to force their way farther north, he and his remaining companions were surprised and massacred by the Senussi Moslems. Only one European escaped to bring the news to the Congo (July, 1891).

CRAMP'FISH' (so called from the temporary paralysis caused by its shock). The electric ray. See Torpedo.

CRAMP'TON, Charles Albert (1858–). An American chemist, born at Davenport, Iowa. He received his education at the University of Michigan, became assistant chemist in the United States Department of Agriculture in 1883, and, seven years later, was made chemist and in 1893 chief chemist to the Internal Revenue Bureau. In 1910 he became chief of the division of food and drugs products. He carried out a number of investigations in agricultural chemistry and published memoirs and reports on special topics of the chemistry of food and agricultural products, including the composition of plant tissues, the composition of butter and other fats, etc. He contributed to the first edition of the New International Encyclopædia.

CRAMPTON, Henry Edward (1875–). An American zoölogist, born in New York City. He was educated at the College of the City of New York and at Columbia College, where he was an assistant in biology in 1893–95, and to which, after one year as instructor in the Massachusetts Institute of Technology, he returned to be fellow, lecturer, and instructor in zoölogy; adjunct professor in 1901–04, and thereafter professor. He was a member of scientific expeditions to the islands of the South Pacific Ocean in 1906, 1907, 1908, 1909, and to British Guiana and the interior of Brazil in 1911. Besides his monographs in scientific publications he is author of *The Doctrine of Evolution* (1911; 2d ed., 1912).

CRAMPTON, Thomas Russell (1816–88). An English railway engineer. He was born in Kent and was educated by private tutors. Entering the engineering profession, he early turned his attention to locomotive and railway building. In 1843 he designed and patented the locomotive known by his name, which won him the cross of the French Legion of Honor from Napoleon III in 1855. His best-known work was the successful laying of the telegraphic cable from Dover to Calais in 1851. He also constructed the Smyrna Railway, the Varna Railroad in Bulgaria, various lines in England, and the Berlin Water Works.

CRANACH, krä'nâg, Lucas the Elder (1472–1553). A German painter of the Renaissance. He was born at Cronach in Upper Franconia. There is much dispute in regard to his family name; according to Schuchardt, on Cranach's own testimony, it was Müller, others say Sunder. Cranach was a pupil of his father, and in 1504 became court painter to Frederick the Wise, Elector of Saxony, at Wittenberg, by whom he was held in high repute. His office included the duties of master of ceremonies at court, and besides this he found time for different business ventures at Wittenberg. In 1519 he was elected chairman of the town council; he became burgomaster in 1537 and again in 1540. Cranach was in equal favor with the two following Electors of Saxony, and for two years remained with John Frederick during his imprisonment. He died at Weimar, Oct. 16, 1553.

Cranach has been called the painter of the Reformation, because of his active part in spreading its doctrines. This he did by means of paintings and woodcuts ridiculing the Pope and explaining the teachings of the reformers, and by his numerous portraits of Luther (see Plate of Luther) and Melanchthon, who were both his personal friends. Because of this activity and also on account of his great productiveness he became the controlling influence in the art of middle and northern Germany and founded what may be called the Saxon school. He painted with great facility—in fact, the inscription upon his gravestone gives him the title of "celerrimus pictor." His early paintings were carefully executed, but in later life he did much negligent work. He paid great attention to detail, for which reason his smaller pictures were more attractive. His color was bright and clear, but his drawing was deficient, and he failed utterly whenever he attempted to represent the nude on a large scale. His work was always original, and though we see the influence of the Renaissance in his mythological subjects, his art was thoroughly German and national. It was, moreover, naïf and rich in fantasy, being best wherever there was a chance for genre.

Cranach's works survive in large numbers, especially in the German galleries. But he intrusted so much to his large school of pupils that it is difficult to decide how much is actually

CRANBERRY ETC.

1. COSMOS (Cosmos tenuifolius).
2. CRANBERRY (Vaccinium macrocarpon).
3. COREOPSIS (Coreopsis lanceolata).
4. CORN COCKLE (Lychnis githago).
5. COWSLIP (Primula veris).
6. SUNN HEMP (Crotalaria juncea).

due to him. Among his best works are the "Repose in Egypt" (1504), now in the Berlin Museum; "Christ Blessing the Children," in the Baring collection in London; "Samson and Delilah," in the Museum of Augsburg, and the "Fountain of Youth," in the Berlin Museum. All of these pictures possess a charming naïveté. Of his larger religious paintings, good examples are the "Marriage of St. Catharine," in the cathedral of Erfurt, of his earliest period, and his last great work, the "Crucifixion," in the town church of Weimar. This depicts the object of the Reformation, quaintly introducing the figures of Luther and of Cranach himself. His best works are probably his portraits, for in these the detailed execution is more appropriate. But even here he falls far short of the strength of character of Dürer and Holbein. Among the best are "Cardinal Albrecht of Mainz as St. Jerome," in the Berlin Museum; John Frederick of Saxony, in Dresden; and an "Unknown Female" (No. 291), in the National Gallery, London. Cranach was also an excellent painter of miniatures, as may be seen in the album of the University of Wittenberg, now at Halle, and especially in John Frederick's "Book of Tourneys," now at Coburg, a work of 144 leaves. He also executed a few copperplates and a large number of drawings for woodcuts.

Consult: Schuchardt, *Cranach des älteren Leben und Werke* (Leipzig, 1851–71); Dodgson in *Bibliothèque des bibliographies critiques* (Paris, n. d.); Flechsig, *Tafelbilder Lucas Cranaches die Alteren; Cranach Studien* (Leipzig, 1900); also the monographs by Heller (Bamberg, 1844), Warnecke (Görlitz, 1879), Lindau (Leipzig, 1883), and Michaelson (ib., 1902).

CRANACH, Lucas (1515–86) the Younger. A German painter, the second son and pupil of the preceding. His works are hard to distinguish from his father's and are often assigned to him. His coloring is brighter than his father's, and his drawing is worse. A number of his authentic works are in the Dresden Gallery, including "Elijah and the Priests of Baal," "Hercules with the Pygmies," and a portrait of Elector Maurice of Saxony and his wife. A portrait by him of "An Unknown Woman" is in the Boston Art Museum.

CRAN'BERRY (from *crane* + *berry*). A name given to the fruit of a few creeping, vine-like species of the genus *Vaccinium*, family Ericaceæ. The smaller cranberry (*Vaccinium oxycoccus*) grows wild in the peaty bogs and marshlands of the temperate and colder regions of both Europe and America. The larger cranberry (*Vaccinium macrocarpum*) is native in similar situations in the United States and is extensively cultivated for commercial purposes in Massachusetts, New Jersey, Wisconsin, and a few other Northern States. The cranberry is a firm, red, acid berry, of good keeping quality, and is used for sauce, tarts, and the like. In the improved commercial culture of cranberries natural swamps or bogs are selected which can be drained by open ditches and flooded when desired. The native moss and swamp growth are removed, and the peat covered 2 to 4 inches deep with sand. The vines are planted about 14 inches apart, cuttings 6 to 8 inches in length being used. The sand keeps down the weeds, makes cultivation easy, and helps retain the moisture in the soil below. Additional sandings are given every four or five years, which keep the vines short and close. In some localities sanding is omitted altogether. The object of flooding is to protect the vines in winter and from early fall and late spring frosts, to destroy insects, prevent drought, and protect against fire. The berries are gathered preferably by hand, but often with special rakes and combs. There are three principal types of cultivated varieties, determined by the form of the berries—bell-shaped, bugle-shaped, and cherry-shaped—with many varieties of each. Over 1,000,000 bushels of cranberries are marketed in the United States annually.

The cowberry, or mountain cranberry (*Vaccinium vitis-idæa*) is common in both Europe and America, and, like *Vaccinium oxycoccus*, is gathered and sold in considerable quantities, but is not cultivated. The shrub *Viburnum opulus* is known as the high-bush cranberry. The fruit is tart, but is of little value and is seldom eaten. The Tasmanian cranberry is the fruit of *Astroloma humifusum*, of the family Epacridaceæ. Consult Corbett, "Cranberry Culture," *Farmers' Bulletin, No. 176, United States Department of Agriculture* (Washington, 1903); *Year Book of the Department of Agriculture* (Washington, 1911).

CRANBERRY DISEASES. The scald and spot are the most serious fungus troubles of the cranberry, the names being derived from the appearance of the fruit. They are of fungus origin; the scald is due to *Guignardia vaccinii*, and the spot to *Pestalozzia guepini vaccinii* and may be recognized by the appearance of soft spots on one side of the berry. The skin becomes tense and of a reddish-brown color. Later the berry becomes shriveled and may or may not fall to the ground. Distinct brownish spots may also be seen on the leaves. The diseases are most troublesome in hot moist seasons, and the most satisfactory treatment, where it can be followed, is to cover the bog with a thin layer of sand, which can best be done when the bog is flooded, and spraying with Bordeaux mixture, to which is added a resin-fish oil mixture. These diseases have been known to destroy more than half the berries on a bog in a short time. A gall-producing fungus, *Synchytrium vaccinii*, is common on the cranberry and related plants. The presence of the fungus on the leaves and other parts of the plant causes the formation of red galls. Burning over the bog in autumn is recommended as a preventive means, since the spores are ripened the second year. Common and conspicuous malformations of leaves, flowers, and young shoots of the cranberry are due to *Exobasidium vaccinii*. The parts attacked are swollen and the green color replaced by rose or red. This disease is seldom severe. Consult Shear, "Cranberry Diseases," *United States Department of Agriculture, Bureau of Plant Industry, Bulletin 110* (Washington, 1907).

CRANBERRY INSECTS. The worst enemies of the cranberry are two moth caterpillars —the black-headed fireworm (*Rhopobata vacciniana*), which defoliates the bushes, and a spanworm (*Acrobasis vaccinii*), which attacks the fruit. For the first, Prof. J. B. Smith, author of a treatise on "Insects Injuriously Affecting Cranberries," in *Special Bulletin K, New Jersey Agricultural College Experiment Station* (New Brunswick, N. J., 1890), recommends reflowing the land and application of kerosene or Paris green; for the second, Paris green or London purple applied after the leaves are mostly gone and the berries are set. A scale, a leaf

hopper, and certain locusts and crickets are also harmful. Consult Franklin, "How to Fight Cranberry Insects," *Bulletin 126, Massachusetts Agricultural Experiment Station* (Amherst, 1908).

CRAN'BROOK. A town in the Kootenay valley between the Selkirk and Rocky Mountains, Kootenay District, British Columbia, Canada. It is a divisional point on the Crow's Nest branch of the Canadian Pacific Railway, 35 miles west (direct) of Fernie, and is about 330 miles east (direct) of Vancouver (Map: British Columbia, F 5). It is in a rich fruit-growing, agricultural, and mining region, and is the geographical and distributing centre of the southeast part of Kootenay District. Its growth dates from 1901. The principal public edifices are the provincial buildings, and it contains a high school and a manual training school. The manufacturing industries include sash and door factories, saw and planing mills, brickworks, aërated-water works, and foundries. Pop., 1911, 3090.

CRANBROOK, GATHORNE GATHORNE-HARDY, first EARL OF (1814–1906). An English statesman, born at Bradford. He was educated at Oxford (B.A., 1836), studied law, and was appointed Undersecretary of State for the Home Department in 1858, two years after his election to Parliament. In 1865 he was again elected to Parliament as the representative of the University of Oxford, defeating Gladstone. In 1867–68 he was Home Secretary and was subsequently Minister of War (1874–78), Secretary of State for India (1878–80) under Lord Beaconsfield, and Lord President of the Council under the Marquis of Salisbury (1885 and 1886–92). He was raised to the peerage in 1878 as Viscount Cranbrook and was created Baron Medway in 1892. He was a strong churchman. Consult the *Memoir* (London, 1910) by A. E. Gathorne-Hardy.

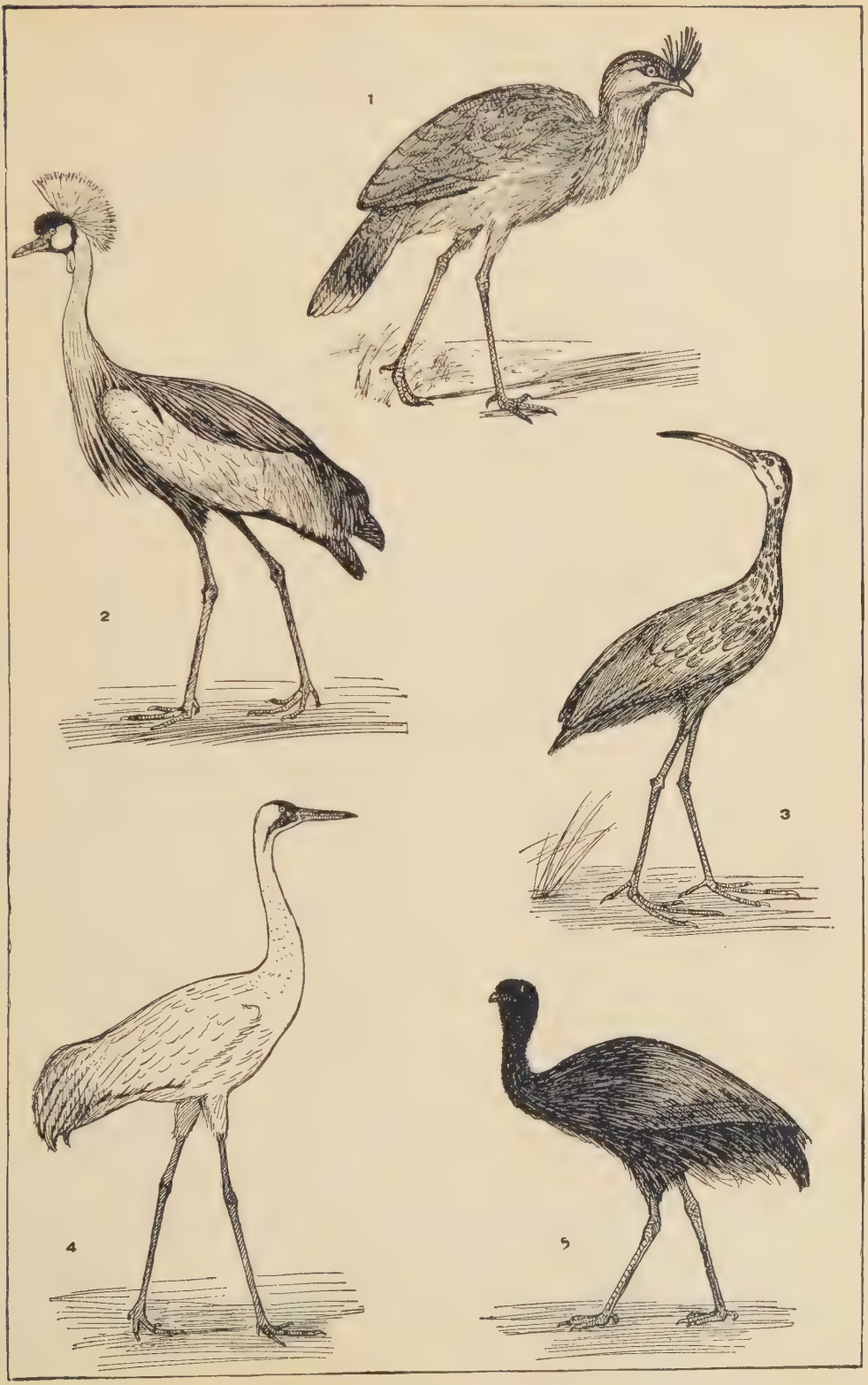
CRANCH, CHRISTOPHER PEARSE (1813–92). An American artist and poet, born at Alexandria, Va. He studied theology at Cambridge, Mass., and became a Unitarian clergyman. In 1842 he retired from the ministry. He associated himself with the Transcendentalists, and wrote verse for *The Dial*, but in 1846 went to Europe to study art, remaining there until 1863. He returned to America in 1864, but after 1871 devoted himself wholly to literature, to which he had already contributed *Poems* (1844), two juveniles, *The Last of the Huggermuggers* (1856), and *Kobboltozo* (1857). His later works include notably *The Bird and the Bell*, with other poems (1875), and *Ariel and Caliban* (1887). He was a man of genuine culture, who, growing up in the midst of more gifted spirits, failed to make a deep impression upon his generation.

CRANCH, WILLIAM (1769–1855). An American judge, born at Weymouth. He graduated at Harvard, and was admitted to the bar in 1790. In 1801 he was appointed a justice of the United States Circuit Court for the District of Columbia and in 1805 was made Chief Justice, and this office he held until his death. He published *Reports of Cases in the United States District Court of the District of Columbia* (1801–41) and the *Supreme Court Reports* (1800–15).

CRAN'DALL (PHILLEO), PRUDENCE (1803–90). An American educator and philanthropist. She was born at Hopkinton, R. I., of Quaker parentage; was educated at the Friends' School in Providence, R. I.; taught for a time at Plainfield, Conn., and in 1831 established a private school for girls in Canterbury. Early in 1833 she admitted a colored girl into the school and thereby aroused the violent opposition of her neighbors. This led her to abandon her original plan and to open her school unreservedly to "young ladies and little misses of color." Accordingly she issued an announcement to that effect in the *Liberator* of March 2 and early in April received 15 or 20 colored pupils. Her neighbors then began a systematic course of persecution and endeavored by boycott, insult, and abuse, and by enforcement of an obsolete vagrancy law, to break up the school. Public meetings were called, petitions were circulated, and on May 24 the celebrated "Black Law" of Connecticut was passed forbidding any one to "set up or establish in this State any school, academy, or literary institution for the instruction or education of colored persons who are not inhabitants of this State," or to instruct or teach in any such school. For refusing to obey this law Miss Crandall was arrested, was imprisoned in the Canterbury jail, and in October was convicted, though the Court of Errors reversed the decision of the lower court on a technicality, in July, 1834. Soon afterward Miss Crandall's house was assaulted and partially destroyed, and she finally decided to abandon her project. The whole affair attracted much attention throughout the country and served to intensify the conflict between the abolitionist and anti-abolitionist elements among the Northern people. A short time after giving up her school Miss Crandall married the Rev. Calvin Philleo, and passed the rest of her life in New York, Illinois, and Kansas. Consult May, *Recollections of the Anti-Slavery Conflict* (Boston, 1869).

CRANE. The largest of the wading birds (Grallæ). They constitute the family Gruidæ, which occupies a very distinctive position between the trumpeters and the rails, being connected with the latter by the limpkins, or Aramidæ. All are tall, long-legged, long-necked birds, with the head more or less naked, but sometimes tufted, rather long, straight, compressed beaks, short but powerful wings, short tails, the feet unwebbed, and the hind toe greatly elevated; they are like herons in appearance, but resemble rails in structure. One remarkable feature is the enormous development of the windpipe within the keel of the breastbone, where it is coiled and twisted before emerging into the neck; the extreme development of this is found in our American whooping crane, where the trachea reaches 4 or 5 feet in length in old age (it is perfectly straight and simple at birth), and the convolutions act like those of a French hunting horn in producing the extraordinary resonance of tone for which the voice of this species (see IBIS) is noted. About 18 species of crane are known, representing three genera and all parts of the world except South America and the Malayan and Polynesian archipelagoes. The best known, perhaps, is the European crane, which is about 4 feet high, ashy gray, with a blackish face and throat. The tertial feathers of the wings are so prolonged as to droop over the quills; their webs are fibrous and disconnected, and formerly they were much used as ornamental plumes. This peculiarity characterizes most other species to a greater or less extent, and some species have the power to elevate these plumes at will, forming a striking ornament. All the cranes of the temperate zone migrate,

CRANES, ETC.



1. SERIEMA (Seriema cristata).
2. CROWNED CRANE (Balearica pavonina).
3. LIMPKIN (Aramus vociferus).
4. WHOOPING CRANE (Grus americana).
5. TRUMPETER (Psophia crepitans).

some going annually to the far north to breed; and the coming of flocks in the spring, always in a V-formation, and the extraordinary "dances" with which some accompany courtship, have been observed for centuries and have caused a large body of myth and folklore to grow up about the bird during classical and mediæval times. On this point, consult C. de Kay, *Bird Gods* (New York, 1898).

The remote breeding of the European crane (*Grus grus*) in Lapland and along the northern border of Russia was little known until the mystery was solved by J. Wolley in 1853, who discovered among other new facts that the young run about as soon as they leave the egg, and that the sitting bird would not carry away eggs that had been handled, as had been commonly believed. The birds make their nests on the ground in the marshy plains that border the Arctic Sea. The whole account (*Ibis*, London, 1859) is exceedingly interesting, and is largely quoted by Stejneger in the *Standard Natural History*, vol. iv (Boston, 1885). Other cranes of the Old World are the northwest African crowned or Balearic crane (*Balearica pavonina*), which has a topknot like that of a peacock; and the smaller Numidian crane or demoiselle (*Grus virgo*), which in summer resides and breeds from Turkey eastward to China, and which is the one most famous for its dancing. The Manchurian crane (*Grus japonensis*, or *viridirostris*) is especially common in winter in Korea, where it is trapped in large numbers and sold to the Chinese and Japanese, who are especially fond of it and endow it with many folklore qualities. The large Australasian crane (*Grus australasiana*) is one of the most conspicuous birds of that region and is known to the Australians as "native companion" because of its friendly disposition. It will sometimes follow the plowman, picking up the insects he turns out of the soil. Consult Blyth, *Natural History of the Cranes* (London, 1881), and Blaauw, *A Monograph of the Cranes* (Leiden and London, 1897).

American cranes are of three species. The greatest is the whooping crane (*Grus americana*, or *Limnogeranus americanus*), which is larger than the European crane and is seldom seen except on the Western plains, where it has become rare. In fact, it may be wholly extinct at present, as none have been seen for several years. There are a few living in zoölogical gardens. Two others are also species of the Western interior and are diminishing in numbers; one is the sand-hill crane (*Grus mexicana*), and the other the little brown crane (*Grus canadensis*) —both until recently regarded as one species. Consult Coues, *Birds of the Northwest* (Washington, 1874). See Plate of CRANES, ETC.

CRANE (AS. *cran, cornoch*, OHG. *cranuh, chranih*, Ger. *Kranich*, crane; connected with Welsh, Corn., Bret. *garan*, OChurch Slav. *zheravi*, Lith. *gérwe*, Gk. *γέρανος, geranos*, crane; so called from the resemblance of the arm of the machine to the neck of the bird). A term used in applied mechanics to designate a hoist which can also move the load in a horizontal or lateral direction. Cranes are divided into two classes, as to their motions—viz., rotary and rectilinear—and into four groups as to their motive power—viz., hand, when operated by manual power; power, when driven by power derived from line shafting; steam, electric, hydraulic, or pneumatic, when driven by an engine or motor attached to the crane, and operated by steam, electricity, water, or air transmitted to the crane from a fixed source of supply; locomotive, when the crane is provided with its own boiler or other generator of power and is self-propelling, usually being capable of both rotary and rectilinear motion. Rotary and rectilinear cranes are thus subdivided: (1) swing cranes, having rotation but no trolley motion; (2) jib cranes, having rotation and a trolley traveling on the horizontal jib; (3) column cranes, identical with the jib crane, but rotating around a fixed column, which usually supports a floor or roof above; (4) derrick cranes, having the head of the mast held in position by guy rods, instead of by attachment to a roof or ceiling, and a boom whose outer end is raised and lowered from the top of the mast to secure the radial motion of the load; (5) pillar cranes, having rotation only, the pillar or column being supported entirely from the foundations; (6) pillar jib cranes, identical with the last, except in having a jib and trolley motion; (7) walking cranes, consisting of a pillar or jib crane mounted on wheels and arranged to travel longitudinally upon one or more rails; (8) locomotive cranes, consisting of a pillar crane mounted on a truck, and provided with a steam engine capable of propelling and rotating the crane and of hoisting and lowering the load; (9) bridge cranes, having a fixed bridge spanning an opening and a trolley moving across the bridge; (10) tram cranes, consisting of a trunk or short bridge, traveling longitudinally on overhead rails and without trolley motion; (11) traveling cranes, consisting of a bridge, traveling longitudinally on overhead tracks, and a trolley moving transversely on the bridge; (12) gantries, consisting of an overhead bridge carried at each end by a trestle traveling on longitudinal tracks on the ground, and having a trolley moving on the bridge; (13) rotary bridge cranes, combining rotary and rectilinear movements and consisting of a bridge pivoted at one end to a central pin or post and supported at the other end on a circular truck, provided with a trolley moving on the bridge.

Cranes are built of wood and iron, but at the present time cast iron and steel are employed nearly exclusively. Hand cranes are employed for handling comparatively light loads, and the manual power is usually applied by means of a crank or cranks operating a windlass, around the drum of which the hoisting rope is wound and unwound. For heavy loads some form of mechanical power is always employed, which is applied through a suitable train of mechanism for performing the various movements of hoisting, rotation, and horizontal travel. A great variety of such mechanisms are in common use for each of the principal kinds of motive power, and for details the reader should consult special treatises on hoisting machinery and the catalogues of manufacturers. Cranes are built with capacities of from a few hundred pounds to as much as 150 tons. The traveling crane in the gun shop at the Washington navy yard has a capacity of 150 tons; the span of the bridge is 59½ feet; the maximum travel of the trolley lengthwise of the bridge is 44 feet 2 inches, and its traveling speed is from 25 to 50 feet per minute; the effective lift is 40 feet, with four speeds of hoist; the speed of travel of the bridge is from 30 to 60 feet per minute.

The Finnisston Quay, at Glasgow, Scotland, is equipped with a pillar crane of 150 tons' capacity. The jib is formed of two steel tubes,

each 39 inches in diameter and 90 feet long; the radius of sweep for heavy lifts is 65 feet; the jib and its load are counterbalanced by a weight of 100 tons; and in a test a 130-ton load was lifted at a rate of 4 feet per minute, and a complete revolution was made with this load in five minutes. The floating crane at Cramp's shipyard, in Philadelphia, Pa., has a steel mast 116 feet high and 3 feet in diameter, carrying a horizontal jib 65 feet long with a counterbalance arm 50 feet long which is stayed to the bottom of the mast and to the hull of the barge. The barge is 69 feet long, 62 feet wide, and 13 feet deep. This crane has a lifting capacity of 125 tons. A floating crane owned by the Chapman Wrecking Company, of New York City, has a mast 92 feet high and a jib 98 feet long, and is capable of lifting a load of 265 tons.

Shears, or shear legs, is a type of crane for shipyard use, in which a long boom made of two converging members is pivoted at the bottom on the ground, and carries the pulley or hoisting purchase at its upper end. It has a small horizontal range by reason of the in-and-out swing of the long-legged boom, but considerable vertical range. It is used for placing boilers and engines in the hulls of vessels.

On board ship cranes are fitted for handling cargo, coal, boats, anchor, etc. The boat crane of a large modern man-of-war is built up, box-girder fashion; it rises 20 or 25 feet above the skid beams on which the boats are stowed, and extends 10 or 15 feet beyond the ship's side when turned out for the purpose of lowering or hoisting a boat. The power is either electricity or steam and serves to hoist and lower the boat, run it in or out on the horizontal arm of the crane, or train (i.e., turn horizontally) the latter. Consult: Glynn, *Treatise on the Construction of Cranes and Other Hoisting Machinery* (London, 1887); Marks, *Notes on the Construction of Cranes and Lifting Machinery* (ib., 1889); and Towne, *A Treatise on Cranes* (New York, 1883). See DERRICK; ELEVATOR.

CRANE, BRUCE (ROBERT BRUCE) (1857–). An American landscape painter. He was born in New York, Oct. 17, 1857, and studied there under Alexander Wyant and later in Europe. His landscapes are idyllic in character and show the influence of the painters of Barbizon. They are veracious but highly poetical interpretations of commonplace nature, treating such subjects as broad stretches of plowed or snow-covered fields, finely modulated in color and often of a rich golden color. Good examples are: "Autumn Uplands" (Metropolitan Museum, New York); "Autumn" (National Gallery, Washington); "March" (Brooklyn Museum); "Springtime" (Peabody Institute, Baltimore); "The Hills," awarded the Saltus prize (National Academy); "Autumnal Hills" and "Indian Summer" (1912); "Grey Morning" and "Golden Afternoon" (1913). He was elected a member of the National Academy of Design (1901) and of the American Water Color Society and received numerous medals and prizes.

CRANE, FRANK (1861–). An American clergyman and author, born in Urbana, Ill., and educated at Illinois Wesleyan University. He was ordained to the Methodist Episcopal ministry in 1882 and preached in Chicago Methodist churches from 1896 to 1903, when he entered the Congregational ministry. From 1904 to 1909 he was pastor of the Union Congregational Church of Worcester, Mass., and then devoted himself to authorship. He wrote articles for syndicated newspapers, daily and weekly, and for women's monthlies, on subjects of contemporary interest, and published in book form: *The Religion of Tomorrow* (1899); *Vision* (1907); *The Song of the Infinite* (1909); *Human Confessions* (1911); *God and the Democracy* (1911); *Lame and Lovely* (1912).

CRANE, ICHABOD. The hero of the adventure with the Headless Horseman, in Irving's "Legend of Sleepy Hollow," in *The Sketch Book.*

CRANE, STEPHEN (1870–1900). An American journalist and novelist, born at Newark, N. J. He was educated at Lafayette College and Syracuse University; began active life as a reporter and newspaper writer; was correspondent for the New York *Journal* in the Greco-Turkish War (1897) and in Cuba, and then removed to England. His first essay in fiction was a story of slum life, *Maggie, a Girl of the Streets* (1891). This was followed by a collection of verses, *The Black Riders and Other Lines* (1895). *The Red Badge of Courage* (1896), a realistic though imaginary presentation of horrors in the Civil War, brought him deserved reputation. Less significant are: *George's Mother* (1896); *The Little Regiment* (1897); *The Open Boat* (1898); *Whilomville Stories* (1900), and other tales; although in such a short story as *The Master* he showed that he still possessed great power. Posthumous manuscripts have been collected by his wife under the title *Wounds in the Rain* (1900) and *Great Battles of the World* (1900). In 1903 appeared *O'Ruddy,* written in collaboration with Robert Barr.

CRANE, THOMAS FREDERICK (1844–). An American folklorist and educator, born in New York. He graduated in 1864 at Princeton, was appointed professor of modern languages at Cornell, and in 1868 professor of the Romance languages. In 1902 he became dean of the general faculty of the university, and in 1909 professor emeritus. His researches in the history of the development of European folklore are especially valuable. His works include: *Italian Popular Tales* (1885); *The Exempla, or Illustrative Stories from the Sermones Vulgares of Jacques de Vitry* (1890); *Chansons populaires de la France* (1891); *Tableau de la révolution française* (6th ed., 1892). He also edited *Le romantisme français* (1887; 5th ed., 1907).

CRANE, WALTER (1845–1915). One of the foremost English illustrators; also a painter, decorator, and writer. He was born in Liverpool, Aug. 15, 1845, received instruction from his father, Thomas Crane, a miniature painter, and afterward studied wood engraving under Linton in London. Although influenced by the Pre-Raphaelite painters, Rossetti, Holman Hunt, and Millais, he was largely self-taught. During his travels in Italy in 1871 and 1888 he was strongly influenced, especially in his painting, by the early Florentines, above all by Botticelli. He is, however, preëminently an illustrator, who has popularized Morris's ideas of bookmaking, and on the Continent he, rather than William Morris, is considered the leader of the Romantic movement in British decorative art. Like Morris, he also seeks to identify art with Socialism and to introduce it into social and domestic life. He is perhaps best known for his illustrations—mostly of juvenile books—published in collaboration with Edmund Evans, contributing largely in reforming the artistic conception of decorative illustration. His drawings, executed

in a kind of antique style, mostly in outlines, are full of imagination, charm, and humor, and show complete mastery of the medium. Among the best are: "The Baby's Opera" (1877); "Pan Pipes" (1882); Grimm's Household Tales (1882); "Echoes from Hellas" (1888); "Flora's Feast"; "Queen Summer" (1889); Shakespeare's Works (1883–94), and Spenser's Faerie Queene. As a painter, he is classed with the Pre-Raphaelites (q.v.). Among his best-known paintings are: "The Birth of Venus" (1877, Tate Gallery); "The Chariot of the Hours" (medal at Munich, 1895); "Mask of the Four Seasons" (1905); "Prometheus Unbound" (1906); portrait of himself in the Uffizi Gallery (1912). He is also known as a designer for glass windows, tapestries, wall paper, and the like, and as a writer, with pedagogical intent, upon subjects of general artistic interest. He received many medals and was chosen president of the Arts and Crafts Society of London. Consult the monographs by Von Berlepsch (Vienna, 1897) and Schleinitz (Bielefeld, 1902), and Konody, *The Art of Walter Crane* (London, 1902).

CRANE, WILLIAM HENRY (1845–). An American comedian. He was born in Leicester, Mass., and was educated in the Boston schools. In 1863, after some amateur experience, he made his début at Utica, N. Y., with the Holman Opera Company, taking the part of the notary in Donizetti's *Daughter of the Regiment.* In 1870 he became a member of the Alice Oates Company, with which he remained for four years. In 1874 he played at Hooley's Theatre in Chicago, filling the leading comedy rôles, and later he acted in San Francisco for nearly a year. Returning East, he made his first marked success with Stuart Robson (1877), at the Park Theatre, New York City, in Grover's farcical play *Our Boarding House.* Among their other successes were those in the *Comedy of Errors* and *The Henrietta* (1889), after which he separated from Mr. Robson. His subsequent plays include: *The Senator; The American Minister; On Probation; A Fool of Fortune; A Virginia Courtship* (1898); *David Harum* (1900); *Business is Business* (1905); *She Stoops to Conquer* (1906–07); *Father and the Boys* (1907); *The Senator Keeps House* (1911); *The New Henrietta,* a revision of *The Henrietta* (1914).

CRANE, WINTHROP MURRAY (1853–1920). An American politician and a manufacturer, born in Dalton, Mass., and educated in the public schools. In 1897 he was elected Lieutenant Governor of Massachusetts, and in 1900 Governor. From 1892 to 1900 and from 1904 to 1912 he was a member of the Republican National Committee. He was appointed to fill the vacancy in the United States Senate caused by the death of Senator Hoar in 1904 and later was elected for the term ending in 1913, when he retired from public life.

CRANE FLY (so called from its long legs). A big, slender-bodied fly of the family Tipulidæ, having excessively long, slender legs. These flies appear, often in swarms, in late summer, and about 300 of the 1000 or more known species belong to the United States. Their modes of life and reproduction are not well known. "The larvæ of most species," according to Howard, "live in the earth, but some live in water, in decomposing wood, and even upon the leaves of plants. Some of the earth-inhabiting forms destroy grass and grain by injuring the roots. . . The wings of the crane flies are generally clear, but are sometimes beautifully marked and spotted." See DADDY LONGLEGS.

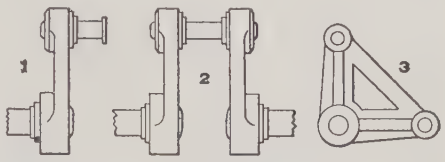
CRANE'S-BILL. See GERANIUM.

CRA'NIAL INDEX. See ANTHROPOMETRY; INDEX, CEPHALIC.

CRA'NIOM'ETRY (from Gk. *κρανίον, kranion,* skull + *μέτρον, metron,* measure) and CRANIOLOGY. Systematic measurement and comparison of human crania. See ANTHROPOMETRY.

CRA'NIUM. See SKULL.

CRANK. A mechanical device consisting of a bend or arm on an axle or shaft by which reciprocating motion is converted into rotary motion. The reciprocating motion of the piston rod of a steam engine is converted into rotary motion of the engine shaft by means of a crank. The crank may consist of an arm on the end of a shaft or of a similarly located disk with a crank pin, or of a U-shaped bend in the shaft between the ends. The piston rod transmits its



CRANKS.

1, single crank at end of an axle; 2, double crank in the middle of a shaft; 3, bell crank.

motion to the crank by means of an intermediate connecting rod. The connecting rod exercises the maximum force on the crank arm when this arm is at right angles to the line of motion of the connecting rod, and it exercises no force tending to produce rotation when the crank arm is parallel to the line of motion of the piston rod. Maximum force occurs at two points in the rotation of the crank, and no force occurs at two points nearly at right angles to the points of maximum force. The two points of no force are called the "dead points"; and in order to carry the crank shaft past these dead points, where only a single crank is used, the shaft is provided with a heavy flywheel, the momentum of which supplies the necessary power to keep up rotation when the connecting rod is not supplying power. When two connecting rods are connected with the shaft by separate cranks, the two crank arms may be set at right angles to each other, so that one rod is exerting its maximum force while the other is at the dead points of the revolution.

CRAN'MER, THOMAS (1489–1556). Reformer of the English church and the first Protestant Archbishop of Canterbury. He was born at Aslacton, in the County of Nottingham, on July 2, 1489. In his fourteenth year he went to Jesus College, Cambridge, of which he was elected a fellow in 1510, but lost his position temporarily by marriage, being reëlected on his wife's death. In 1523 he took his degree of D.D. and was appointed lecturer on theology. In 1529, during the prevalence of the sweating sickness in Cambridge, he retired with two pupils to Waltham Abbey; and Henry VIII, in company with Gardiner and Fox, afterward bishops of Winchester and Hereford, happening to be in the neighborhood, the event proved a turning point in the life of Cranmer. The King was then taking steps to secure his divorce from Catharine of Aragon, and in conversation on the subject with Gardiner and Fox, Cranmer suggested that if the

universities could be induced to declare that, in their opinion, the first marriage was unlawful, the King would be free to marry again. Henry was greatly pleased with this idea, and is said to have sworn, "by the Mother of God, that man hath the right sow by the ear." Cranmer was asked to reduce his suggestion to writing and to have it submitted to the European universities. After this he was appointed archdeacon of Taunton and one of the royal chaplains. He was also sent to Rome on a special embassy in the matter of the divorce, but met with little success. Subsequently he was dispatched to the Emperor Charles V on the same errand; and while in Germany he married a second time, a niece of the German divine Osiander. Shortly afterward, on the death of Archbishop Warham, he was recalled to fill the vacant see of Canterbury. He was consecrated Archbishop March 30, 1533. Under his auspices Henry's divorce was speedily carried through the Archbishop's Court at Dunstable, and on May 28 he announced the legality of the King's marriage to Anne Boleyn, which had taken place four months before. In Anne's subsequent disgrace, and again in the affair of Anne of Cleves, the Archbishop took a part not very creditable to him. His position was no doubt a difficult one; but his character was naturally pliable and timid rather than resolved and consistent. The same spirit characterizes the measures of religious reform which were promoted by him. On the one hand he joined actively with Henry in restricting the power of the Pope, though he seems to have had less to do with suppressing the monasteries; but, on the other hand, he was no less active in persecuting men like Frith, Forrest, and others, who on matters of religious faith were disposed to advance further than himself or the King. The key to the dilemma probably lies in Cranmer's idea of the royal supremacy. To his mind the power of the King in ecclesiastical affairs was absolute, and the duty of the Archbishop was to carry out the views of his royal master. Hence his advocacy of the "via media" under Henry, his advanced Protestantism under Edward VI, and, perhaps, his recantations under Mary. He did what he could, however, to resist the reactionary movement which took place in 1539, and which is known by the institution of the *six articles*. He was also instrumental in promoting the translation and circulation of the Scriptures. On Henry VIII's death Cranmer was appointed one of the regents of the kingdom and, along with Latimer and others, largely contributed to the advance of the Protestant cause during the reign of Edward VI. He assisted in the compilation of the service book and the articles of religion. The latter are said to have been chiefly composed by him. He was also the author of four of the homilies.

On the accession of Mary he was committed to the Tower, together with Latimer and Ridley. In March, 1554, they were removed to Oxford and confined there in the common prison, called the "Bocardo." Latimer and Ridley bore their cruel fate with magnanimous courage; but the spirit and principles of Cranmer temporarily gave way under the severity of his sufferings. He was induced to sign no fewer than seven recantations, though there is no ground for supposing that a hope of pardon was held out to him. On March 21, 1556, he suffered martyrdom, as his fellow reformers had done, opposite Balliol College. His courage returned at the end, and he showed an unexpected fortitude in the midst of the flames.

Cranmer's principal writings have been edited by Jenkyns, *Remains of Archbishop Cranmer* (Oxford, 1833), and by Cox, for the Parker Society, under the titles *Writings and Disputations Relative to the Lord's Supper* (Cambridge, 1844) and *Miscellaneous Writings and Letters* (ib., 1846). Additional material is to be found in the appendix of Strype, *Memorials of Thomas Cranmer* (Oxford, 1848–54), and his *Ecclesiastical Memorials* (ib., 1822); in Nichols, *Narratives of the Reformation*, Camden Society, from the papers of John Foxe (London, 1859); but above all in Brewer and Gairdner, *Calendars of Letters and Papers, Foreign and Domestic, of the Reign of Henry VIII* (ib., 1862–80). Among older works, consult: Foxe, *Acts and Monuments* (ib., 1877); Burnet, *History of the Reformation* (New York, 1842); and the *Lives* by Todd (London, 1861) and Le Bas (ib., 1833). More recent works are: Dean Hook, "Thomas Cranmer," in his *Lives of the Archbishops*, N. S. (ib., 1868); Green, *History of the English People*, vol. ii (New York, 1879); Froude, *History of England*, vols. i–vi (ib., 1870); Pollard, *T. Cranmer and the English Reformation, 1489–1856* (London, 1904).

CRAN'NOGS, or CRANNOGES (Ir. *crannog*, Gael. *crannag*, pulpit, top of a mast, from Ir., Gael. *crann*, tree, Welsh *prenn*, Corn. *pren*, tree; probably connected with Gk. *κράνον*, *kranon*, Lat. *cornus*, cornel tree, Lith. *kirna*, OPruss. *kirno*, shrub). Ancient lake dwellings of Ireland and Scotland. Usually the dwellings were extended into villages, often occupying islands; they were analogous to the lake dwellings (q.v.), or palafittes, of Switzerland, and to types of structure still existing in various regions. Commonly they were supported wholly or in part on piles set in the lake bottom and were connected by platforms. The type persisted in Ireland from an early prehistoric period, when stone implements were used, until the present millennium. The later examples were built by means of bronze and even iron tools, which are sometimes found in the ruins. The refuse heaps below the ancient structures are rich sources of relics, indicating the industrial and artistic status of the builders, their food habits, domestic and game animals, etc. Historical references to the structures began with the earliest Irish annals, about the ninth century, and continued until the middle of the seventeenth century. The archæologic survey and excavation of the ruins began in 1839, when Wilde explored a crannog in Lake Lagore, County Meath. Consult: Wilde's *Catalogue of the Museum of the Royal Irish Academy;* Munro's *Lake-Dwellings of Europe; Ancient Scottish Lake-Dwellings, or Crannogs, etc.;* Reeve's "Crannogs in Antrim and Derry," in *Ulster Journal of Archæology* (Belfast, 1903–04); Arcy's "Account of the Excavations of Two Lake Dwellings," in *Journal of Royal Society of Antiquaries of Ireland* (Dublin, 1900).

CRAN'STON. A residential city in Providence Co., R. I., including several villages, on the New York, New Haven, and Hartford Railroad, and on Providence River (Map: Rhode Island, C 2). Within the precincts of the town are four village libraries, State reformatories for boys and girls, the State prison, almshouse, insane asylum, and workhouse. The principal industries are market gardening, brewing, dairying, and the manufacture of cotton and print

goods, tubing, and wire. The government is administered by a mayor and city council. Cranston, settled in 1638, was set off from Providence and incorporated as a town in 1754 and as a city in 1910. It receives its water supply from Providence. Pop., 1900, 13,343; 1910, 21,107; 1920, 29,407.

CRANSTON, EARL (1840–). An American Methodist Episcopal bishop, born at Athens, Ohio. After graduating at Ohio University in 1861, he entered the Ohio infantry, served until 1864 in it and the West Virginia cavalry, and was advanced to the rank of captain. He was ordained to the ministry in 1867, held various charges, and was publishing agent of the Methodist Episcopal church from 1884 to 1896, when he was elected bishop. In 1904 he became Resident Bishop of Washington. In 1898–1900 he made a tour through China, Japan, and Korea.

CRAN'TOR (Lat., from Gk. Κράντωρ, *Krantōr*). A Greek academic philosopher, who flourished about 300 B.C. He was born at Soli, in Cilicia. He was the first commentator on Plato and wrote among other works, Περὶ Πένθους, *Peri Penthous, On Affliction*, a letter of condolence to a friend on the death of his children, praised by Cicero, *Academica*, ii, 135, as "a book not large, but golden, and to be learned by heart to the last word." Cicero used the treatise in writing his *De Consolatione;* parts of it appear, too, in Plutarch's *Consolatio ad Apollonium*. Consult Kayser, *Dissertatio de Crantore Academico* (1841); Buresch, "Consolationum a Græcis Romanisque scriptarum Historia Critica," in *Leipziger Studien*, ix (1886); Ritter and Preller, *Historia Philosophiæ Græcæ* (9th ed.; Gotha, 1913).

CRAN'WORTH, ROBERT MONSEY ROLFE, BARON (1790–1868). An English jurist, born at Cranworth, Norfolk. He was educated at Cambridge, was called to the bar in 1816, and was a member of Parliament and Solicitor-General from 1832 to 1839, when he became a Baron of the Exchequer. In 1851 he was raised to the peerage, and in the following year was chosen Lord Chancellor in Lord Aberdeen's cabinet. He resigned in 1858, but again occupied the post in 1865–66. Consult J. B. Atlay, *Lives of the Chancellors*, vol. ii (London, 1908).

CRAPAUD, krȧ'pō', JEAN, or JOHNNY. An English nickname for a Frenchman, from the popular belief that all Frenchmen were frog eaters, *crapaud* meaning a 'frog or toad.'

CRAPE (Fr. *crêpe*, OF. *crespe*, crinkled, from Lat. *crispus*, crisp). A thin fabric made of raw silk which has been tightly twisted, without removing the viscous matter with which it is covered when spun by the worm. It is simply woven as a thin gauze, then dressed with a thick solution of gum, which in drying causes the threads partially to untwist, and thus gives a wrinkled and rough appearance to the fabric. It is manufactured both in black and colors. Black crape is usually worn as mourning apparel, a use of the material which originated at Bologna, Italy. The Japanese and Chinese crapes are often white or highly colored and sometimes are adorned with ornamental designs. Crape cloth is made to imitate the silk fabric by passing a form of woolen cloth through rollers which impart the crinkled surface.

CRAPE MYRTLE. See LAGERSTRŒMIA.

CRAP'PIE (possibly connected with Fr. *crape*, crab fish). A sunfish (*Pomoxis annularis*) of the rivers of the Mississippi valley and Alleghanies, a food fish resembling in appearance and habits the calico bass. Also called "bachelor," "new light," "Campbellite," etc. See Plate of BASS.

CRAPS. A game of chance, played by any number of persons with two dice. The person holding the dice "shoots." Should his first throw be 2, 3, or 12, it is "craps," and he loses; should he shoot 7 or 11, he wins. Should he throw any other number, then he continues to "shoot" until he throws that number again and wins, or 7 and loses.

CRAP'SEY, ALGERNON SIDNEY (1847–). A former American Protestant Episcopalian clergyman, born in Hamilton Co., Ohio. He prepared for the ministry at St. Stephen's College, Annandale, N. Y., and at the General Theological Seminary, where he graduated in 1872. He was ordained to the priesthood in 1873, and in 1874 was placed on the permanent staff of Trinity Church, New York, from which he resigned in 1879 to accept the rectorship of St. Andrew's Church, in a newly organized parish in Rochester, N. Y. In 1906 Dr. Crapsey was tried by an ecclesiastical court of his diocese, found guilty of heresy, and deposed, for heterodox views in sermons in 1904–05 denying the doctrine of the virgin birth of Christ, and the resurrection and ascension of the literally physical body of Christ, though he had admitted the spiritual verity of the resurrection. In 1907 he founded in Rochester a brotherhood. His publications include: *The Five Sorrowful Mysteries* (1883); *The Five Joyful Mysteries* (1885); *A Voice in the Wilderness* (1897); *Religion and Politics* (1905), containing the "heretical" sermons; *The Rebirth of Religion* (1907).

CRASH'AW, RICHARD (c.1613–49). An English poet. He was the son of a clergyman in the English church and was educated at the Charterhouse and at Cambridge, where he obtained a fellowship in 1637. In 1643 he was ejected from his fellowship by the Parliament for refusing to take the covenant. He went to France, adopted the Roman Catholic faith, and suffered great pecuniary distress, until, through Cowley's influence, he was introduced to Queen Henrietta Maria, who recommended him to Cardinal Palotta at Rome. The Cardinal made him an attendant, and afterward subcanon in the church of Our Lady of Loretto. Just after this latter appointment Crashaw died, Aug. 25, 1649. In 1634 Crashaw published a volume of Latin poems, in which appeared the famous line on the miracle at Cana, *Nympha pudica Deum vidit et erubuit* ('The modest water saw its God and blushed'). In 1646 appeared a volume of poems in two parts, one containing religious and the other secular poems, under the titles (abbreviated) *Steps to the Temple* and *The Delights of the Muses*. Another (third) edition, with additions, was published in Paris in 1652. This volume is ornamented with 12 vignette engravings, drawn by Crashaw himself. Later editions of Crashaw are by W. D. Turnbull (1858); A. B. Grosart (1872, with supplement in 1888); and A. R. Waller, "Poems," in *Cambridge English Classics* (1908).

CRA'SIS. See ORTHOGRAPHY, FIGURES OF.

CRAS'SUS, LUCIUS LICINIUS (140–91 B.C.). A Roman orator, who excelled all others of his time. In 95 B.C. he was elected consul, with Quintus Mucius Scævola (who had been his colleague in all his previous offices). During their consulship was enacted the *Lex Licinia Mucia de Civibus Redigundis*, banishing from

Rome to their own cities all freemen who had not the full rights of citizens. This embittered the feelings of foreigners towards Rome and partly led to the Social War. As censor (92 B.C.) he closed all the schools of the rhetors, asserting that they exercised a bad influence on the minds of young men. He died in consequence of the excitement attending a debate in the Senate. Crassus is one of the chief speakers in Cicero's *De Oratore*, representing Cicero's own point of view. Consult the Introduction to Wilkins's edition of that work, 8–13 (2d ed., Oxford, 1888).

CRASSUS, MARCUS LICINIUS (c.115–53 B.C.). A Roman triumvir. He was a zealous partisan of Sulla, and rendered him efficient service in the battle at the Colline Gate (q.v.), 82 B.C., which sealed the fate of the Marians. As prætor he crushed the revolt of the gladiators under Spartacus in 71 B.C., and in the following year was made consul with Pompeius, a colleague whom he hated. On the other hand, Cæsar valued the friendship of Crassus, the most wealthy of Roman citizens. During his consulate Crassus gave a feast to the people, which was spread on 10,000 tables, and distributed grain for three months. Plutarch estimates the wealth of Crassus at more than 7000 talents, and Pliny states that his lands were worth 8000 talents. In 60 B.C. Cæsar, Pompeius, and Crassus entered into the first triumvirate. (See CÆSAR.) In 55 B.C., as consul with Pompeius, he obtained the Province of Syria, and professed to make preparations of war against the Parthians; but the acquisition of more wealth seems to have been his main object, and this he effected by plundering the towns and temples in Syria. At length, however, he undertook a campaign in 54 B.C., after which he returned to Syria. In the following year he set out again, but was misguided by a treacherous Arab, and utterly defeated at the river Bilechas by the Parthians. Crassus now retreated to the town of Carrhæ, intending to pass into Armenia, but was beguiled into a conference with the Parthian general, Surenas, and was slain at the appointed place of meeting. His quæstor, Cassius, with 500 cavalry, escaped into Syria; but the remaining Romans were scattered and made prisoners or put to death.

CRATÆ'GUS (Neo-Lat., from Gk. *κράταιγος, krataigos*, a kind of thorn). A genus of plants of the family Rosaceæ, very nearly allied to *Mespilus* (medlar) and *Pyrus* (pear, apple, etc.). The species, which are difficult of limitation, are natives of the temperate parts of the Northern Hemisphere, being well represented in North America, and in general have flowers in beautiful terminal corymbs. They are all large shrubs or small trees, more or less spiny; hence the name "thorn" has been very generally applied to them. The only native of Great Britain is the common hawthorn (q.v.) (*Cratægus oxyacantha*). Most of the species resemble it in habit, size, form of leaf, etc. A number of species are now frequent in plantations and shrubberies. Of these, perhaps the most common is the cockspur thorn (*Cratægus crus-galli*), a native of North America from Canada to South Carolina. Its leaves are not lobed; its fruit is rather larger than that of the hawthorn. The azarole (*Cratægus azarolus*), and the aronia, a native of the south of Europe and of the Levant, are occasionally cultivated for their fruit, which is about the size of the Siberian crab and is used either for dessert or for pies. *Cratægus orientalis* and *Cratægus tanacetifolia* have also fruit of considerable size. The latter is much eaten in Armenia. *Cratægus mexicana* has a large, but inedible, apple-like fruit. It is, however, very ornamental. After the cockspur thorn, the best known of the American species are probably the scarlet thorn (*Cratægus coccinea*), Washington thorn (*Cratægus cordata*), *Cratægus douglasii*, and *Cratægus punctata*. The wood of most of the species much resembles that of the hawthorn. It is common to graft the rarer species on the hawthorn.

CRATCH CRADLE (from OF. *creche*, Ger. *Krippe*, crib), also called CAT'S CRADLE and SCRATCH CRADLE. A childish game played by two persons holding an endless string symmetrically in the fingers of the two hands, and taking it off each other's hands so as to form a new pattern at once.

CRATCH'IT, BOB. The father of Tiny Tim in Dickens's *Christmas Carol*—a good-hearted little man, the poorly paid clerk of the miserly Scrooge.

CRA'TER. See VASE.

CRATER (Lat., from Gk. *κρατήρ, kratēr*, mixing bowl, from *κεραννύναι, kerannynai*, to mix). The bowl-shaped or conical cavity through which materials are ejected during a volcanic eruption. At the bottom the crater communicates by a pipe or chimney with the heated interior of the earth. When of small size a volcano usually erupts through a single crater at the summit, but, as the mountain mass increases by accumulation of material, the lava may find lines of lesser resistance through fissures in the sides. In this way subsidiary craters are formed, one of which in the course of time may become the principal crater, or they all may be buried beneath the renewed outpourings of the primary crater. The Peak of Teneriffe has a number of minor funnels on its sides and summit. In volcanoes of an explosive type the whole top of the mountain may be blown off during an eruption, forming an immense crater, within which subsequently new cones may arise in concentric arrangement. This structure, called "cone-in-cone," is shown by Vesuvius, whose active crater is partially encircled by a rampart (Monte Somma) many miles in diameter. Volcanello of the Lipari Islands has three craters on the summit. The craters of extinct or dormant volcanoes are sometimes filled with water, and thus are formed crater lakes. Many of the beautiful lakes of Italy and the well-known Crater Lake of Oregon originated in this way. See VOLCANO.

CRATER, THE. A novel by James Fenimore Cooper (1847), describing a Utopian settlement on the Pacific coast.

CRATER LAKE. See CRATER LAKE NATIONAL PARK.

CRATER LAKE NATIONAL PARK. A United States government reservation in the Cascade Mountains, in Klamath Co., Oreg., created by an Act of Congress approved May 22, 1902 (Map: Oregon, C 5). It has an area of 249 square miles. Its principal feature is Crater Lake, lying in the crater of an extinct volcano which destroyed what geologists believe to have been a mountain more than 16,000 feet high, perhaps the loftiest peak on the western coast of what is now the United States. The lake is in about the centre of the park, is approximately 6 miles long by 4 miles wide, and has a water surface of 20¼ square miles. The nearly perpendicular walls of the great caldera in which

the lake lies tower from 500 to 2000 feet above its surface, which is 6177 feet above sea level. Soundings have been taken showing a depth of 2001 feet. It was discovered in 1853 by John Hillman, the leader of a party of gold hunters, and was known to United States army officers and enlisted men as early as 1865, but not to the general public until about 1885, since when its remarkable beauty and the majestic grandeur of the surrounding landscape have attracted thousands of tourists to its shores. In 1913 the park contained two hotels (one on the rim of the lake and the other 5 miles distant), and a telephone service connected various buildings within the reserve. Several wagon roads are maintained, and these means of communication are being increased and improved. All hunting is forbidden within the reserve, but fishing is permitted, and the lake contains an abundance of rainbow trout, with which it has been stocked by the government. There are no other fish in the lake, and none in the other waters of the reserve. Consult Diller, *Geological History of Crater Lake, Oregon*, pub. by the Department of the Interior (Washington, 1912).

CRA'TERUS (Lat., from Gk. Κρατερός, *Krateros*). A favorite general of Alexander the Great. He commanded a division of the royal bodyguard in the Asiatic campaigns, and was sent to Macedonia as regent in 323 B.C. After the death of Alexander, Craterus received, jointly with Antipater, the government of Macedonia, Greece, Illyria, and Epirus, Antipater taking command of the military forces and Craterus attending to civil affairs. He formed an alliance with Antigonus (q.v.) against Perdiccas and invaded Asia with an army, but was defeated and slain by Eumenes in Cappadocia (321 B.C.).

CRATES, krā'tēz (Lat., from Gk. Κράτης, *Kratēs*). An Athenian comic poet of the fifth century B.C. He began his career as an actor in Cratinus' plays, and won his first victory in 449 B.C. Aristotle says that he was the first Attic poet to give up personal satire in comedy; he likewise made the innovation of introducing a drunken character on the stage. We have the titles of 15 plays and scanty fragments. Consult Kock, *Comicorum Atticorum Fragmenta* (Leipzig, 1880).

CRATES. A cynic philosopher of Thebes, of the fourth century B.C. Scorning the large property which he inherited, he moved to Athens and became an eager disciple of Diogenes and one of the most eminent of the Cynics. He was an excellent orator and skillful poet. As the teacher of Zeno, the founder of Stoicism, Crates formed the link between Cynicism and Stoicism. Interesting fragments of his poetry have been edited by Bergk, *Poetæ Lyrici Græci* (Leipzig, 1882). Diogenes Laertius states that he wrote letters and tragedies on philosophic subjects. The 36 letters which bear his name are, however, generally thought to be spurious. They are edited by Hercher, *Epistolographi Græci* (Paris, 1873). Consult also Zeller, *Philosophie der Griechen*, vol. i (Tübingen, 1892).

CRATES OF MALLOS. A Greek grammarian and Stoic of the second century B.C., head of the Pergamene Library and the chief opponent of Aristarchus. He devoted himself to the interpretation of Greek authors, especially of Homer; he likewise defended the grammatical theory of anomaly in opposition to the Alexandrian doctrine of analogy. (See ANOMALISTS AND ANALOGISTS.) He enlarged and catalogued the Pergamene Library; his work on the Attic dialect was much employed by later grammarians. About 167 B.C. he was sent by King Attalus on an embassy to Rome, where he introduced the study of formal grammar. Consult: Suetonius, *De Grammaticis*, 2; Wachsmuth, *De Cratete Mallota* (Leipzig, 1860); Susemihl, *Geschichte der griechischen Litteratur in der Alexandrinerzeit*, vol. ii (ib., 1892); Sandys, *A History of Classical Scholarship*, vol. i (2d ed., Cambridge, 1906).

CRATI'NUS (Lat., from Gk. Κρατῖνος, *Kratinos*) (?–c.421 B.C.). An Athenian comic poet. He was born in the latter part of the sixth century B.C., and was one of the seven poets of the Old Comedy named in the Canon Alexandrinus (q.v.). He first presented a comedy in 453; in all he left 21 plays, with which he had won nine victories. He was among the first to give comedy a political turn. By the introduction of a third actor he placed comedy on a level with tragedy. A follower of Cimon and the Conservative party, he sharply attacked Pericles in two plays; in his Ἀρχίλοχοι, *Archilochoi*, he represented a contest of poets which may well have been Aristophanes' model in his *Frogs*. Aristophanes defeated Cratinus in 425 with his *Acharnians*, and in 424 with the *Knights*. In the parabasis of the latter play he refers to his elder rival as "an ancient ruin," "a doting drunkard," whereupon Cratinus retorted in 423 with his *Wineflask*, which won the first prize over Aristophanes' *Clouds*. The 400 fragments of his work then known were collected by Kock, *Comicorum Atticorum Fragmenta*, vol. i (Leipzig, 1880). In the *Oxyrhynchus Papyri*, vol. iv (1904), appeared the newly discovered argument of a play, *Dionysalexander*, of which nine fragments had been known, though they did not reveal the plot; on this consult Körte, *Hermes* (1904), and Morgan, *Addresses and Essays*, 25–33 (New York, 1910).

CRATIP'PUS (Κράτιππος, *Kratippus*). An Athenian historian, of the fourth century B.C., of whom very little is known. He has gained importance in recent times because of an historical fragment discovered by Grenfell and Hunt, and published by them in *Oxyrhynchus Papyri*, v (1907–08). The fragment, which has come to be known as the *Hellenica Oxyrhynchia*, has been ascribed to Cratippus by various scholars. Consult Hunt, in *The Year's Work in Classical Studies* (London, 1908). The present tendency is to ascribe the work rather to some one other than Cratippus. Consult Walker, *The Hellenica Oxyrhynchia: Its Authorship and Authority* (Oxford, 1913). See EPHORUS.

CRATIPPUS (Lat., from Gk. Κράτιππος, *Kratippos*). A Peripatetic philosopher. He was a native of Mitylene and a contemporary of Cicero. He appears to have been held in the highest estimation by the great men of his age. Cicero calls him the prince of all the philosophers whom he had known. Cratippus accompanied Pompeius in the latter's flight after the defeat at Pharsalus, and conferred upon him the consolations of philosophy; and Brutus went to Athens, where Cratippus had lately settled, to listen to his lectures even while making preparations to meet Octavius and Antonius. Nothing that Cratippus wrote has survived.

CRAUK, krâ'ụk', GUSTAVE ADOLPHE DÉSIRÉ (1827–1905). A French sculptor, born in Valenciennes. He was a pupil of Pradier, Ramey, and Dumont, and won the Prix de Rome in 1851. His

works are to be found in many of the public buildings and churches of Paris and the provinces. They include the monument to Admiral Coligny (1889), before the Oratory in the Rue de Rivoli, Paris; the tomb of Cardinal Lavigerie in Carthage (1900); and the ideal works "Youth and Love" (Luxembourg) and "Omphale," in the courtyard of the Louvre. He was one of the most popular portrait sculptors of the Second Empire, and among his sitters were the Empress Eugénie (1863), Marshals McMahon and Niel (1861), General Gallifet, and Casimir Périer.

CRA'VEN, Alfred Wingate (1810–79). An American civil engineer, born in Washington, D. C. He was appointed engineer commissioner to the Croton Water Board in New York City in 1849, and his connection with that board was notable for the number and value of the works which he projected and superintended. Among these were the Central Park Reservoir, completed in 1867, the reservoir at Boyd's Corners, and the survey of the Croton valley. The establishment of the sewerage system of New York is largely due to his endeavors. He was president of the American Society of Civil Engineers in 1870–71.

CRAVEN, Elijah Richardson (1824–1908). An American clergyman, born in Washington, D. C. He graduated at the College of New Jersey (later Princeton University) in 1842 and at Princeton Theological Seminary in 1848 and became a trustee of the former (1859) and a director of the latter (1865). In 1878–84 he was chairman of the committee to revise the Book of Discipline of the Presbyterian church, and he was moderator of the General Assembly in 1885. He was president of the board of directors of the Newark German Theological Seminary, Bloomfield, N. J., in 1889–1902, and for more than 30 years (1854–87) was pastor of the Third Presbyterian Church in Newark, N. J. In 1887–1904 he was secretary of the Presbyterian Board of Publication and Sabbath School Work. He revised (1874) Moore's translation of Lange's *Commentary on Revelation.*

CRAVEN, Elizabeth Berkeley, Lady. See Anspach, Margravine of.

CRAVEN, Pauline de la Ferronays, Madame Augustus (1820–91). A French religious romancer, born in Paris. She is best known for her *Histoire d'une sœur* (1866), an idyllic picture of an aristocratic Roman Catholic French family and of the slow passing away, through consumption, of a simple-minded, noble, and deeply religious woman. Madame Craven's father was at one time French Ambassador to Berlin. In 1834 she married an Englishman, Augustus Craven, a descendant of the famous Margravine of Anspach; he is known only through his *Le prince Albert de Saxe-Cobourg, époux de la reine Victoria* (1883). She traveled widely, and after marriage lived much in England, writing articles on English politics, and biographical sketches of *Sister Nathalie Narishkin* and of *Lady Georgiana Fullerton,* as well as *Reminiscences* of England and Italy. She died in Paris, April 1, 1891. Her novels have been as popular perhaps in English translations as in the original. The best are *Anne Severin, The Enigma's Answer,* and *Fleurange,* in all of which she pleads persuasively the cause of Roman Catholicism and seeks in emotional ecstasy the only life that seems to her worth the living. To some her books will seem morbid, to others strong, but her fervid spirit appeals to all. Consult Mary Bishop, *Memoir of Mrs. Craven* (London, 1894), and J. F. A. Smith, *The Life and Literary Works of Mrs. Augustus Craven, née de la Ferronays* (Nürnberg, 1910).

CRAVEN, Thomas Tingey (1808–87). An American naval officer, born in Washington, D. C. He entered the navy in 1822, took part in the capture of the pirate *Federal* in the West Indies in 1828, and commanded Captain Wilkes's flagship in the Antarctic exploring expedition in 1838. He was commissioned captain in 1861, commanded the Potomac flotilla, and in the same year took part in the capture of New Orleans and the operations on the Mississippi. In 1866 he was assigned to the command of the Mare Island Navy Yard and was raised to the rank of rear admiral. He was retired in 1869.

CRAVEN, Tunis Augustus Macdonough (1813–64). An American naval officer, brother of Thomas Tingey Craven. He was born in Portsmouth, N. H., entered the navy in 1829, took part in the conquest of California, and in 1857 made a survey of the Isthmus of Darien for a prospective ship canal. He saved the fort at Key West for the United States government at the beginning of the Civil War and was promoted to the rank of commander. While chasing the Confederate ram *Tennessee* in the battle of Mobile Bay, his vessel, the monitor, *Tecumseh,* struck a torpedo and sank, with Craven and nearly every one else on board.

CRAW'FISH, or **CRAY'FISH** (OF. *crevice, crevisse,* Fr. *écrevisse,* from OHG. *chrebiz,* Ger. *Krebs,* crawfish). A fresh-water or terrestrial crustacean (*Astacus fluviatilis*), nearly allied to the lobster, from which, however, it differs in having the middle plate of the tail fin transversely divided by a suture. It inhabits the rivers and streams of many parts of Europe, making burrows in clayey banks, and coming forth at night in search of food, which consists chiefly of mollusks, small fishes, larvæ of aquatic insects, and animal substances of almost any kind. It is esteemed for the table, and is readily attracted by a bait of decaying flesh or animal garbage inclosed in a net or in a bundle of twigs, by which many crawfish may be captured at a time. The use of the name has been extended until it is now applied to any of the fresh-water species of the family Astacidæ. In the United States it is universally applied to any one of several species of *Cambarus,* which agree very closely in structure and habits with the common crawfish of Europe. They are 6 inches or so in length and of a greenish-brown color. They frequently do much damage to dikes and levees by opening water passages, as told in *Proc. Assoc. Econom. Entomologists* for 1895 (United States Department of Agriculture, 1896). For general facts, consult Huxley, *The Crayfish: An Introduction to Zoölogy* (London, 1887); "Revision of the Astacidæ," *Memoirs Museum Comparative Zoölogy,* vol. x, No. 4 (Cambridge, Mass., 1885); Sterle, *The Crayfish of Missouri* (Cincinnati, 1902); Fisher, "Crayfish as Crop Destroyers," in *Year Book of the United States Department of Agriculture* (Washington, 1912).

CRAW'FORD, Alexander William Crawford Lindsay, Earl of (1812–80). An English author. After graduating at Cambridge he traveled extensively in Egypt and Asia Minor. He took a considerable interest in astronomical investigations, and the expedition to the island of Mauritius in 1874, to observe the transit of

Venus, was organized by him. For some inexplicable reason his body was stolen shortly after its burial at Dunecht, and was not discovered until about 14 months later in the woods near by. Among his publications are: *Lives of the Lindsays* (1835); *Letters on Egypt, Edom, and the Holy Land* (1838); *Sketches of the History of Christian Art* (3 vols., 1847; 2d ed., 1885); *Argo, or the Conquest of the Golden Fleece*, an epic in 10 books (1876); *The Earldom of Mar* (1882).

CRAWFORD, Coe Isaac (1858–). An American legislator, born near Volney, Iowa. He graduated in 1882 from the law department of the University of Iowa, practiced law for one year in that State and for 15 years in Pierre, S. Dak., was member of the Dakota Territorial Legislature in 1889, and upon the admission of South Dakota into the Union in that year became a member of the first State Senate; was Attorney-General in 1892–96; and, after removal to Huron, S. Dak. (1897), was attorney for the Chicago and Northwestern Railway Company until 1903. In 1907 he was elected Governor of South Dakota on the Republican ticket and in the following year United States Senator for the term expiring March 3, 1915.

CRAWFORD, Francis Marion (1854–1909). An American novelist, chiefly resident in Europe. He was born at Bagni di Lucca, Italy, a son of the sculptor Thomas Crawford. Of cosmopolitan education in America, England, and Germany, his first literary venture was as editor of the Allahabad *Indian Herald* (1879–80). His voluminous fiction was begun by *Mr. Isaacs*, a story of modern India (1882), which promptly brought him a popularity and a fame at home and abroad that its many successors served to widen and make more secure. The more significant of his other works are: *Dr. Claudius* (1883); *A Roman Singer* (1884); *Zoroaster* (1885); *A Tale of a Lonely Parish* (1886); *Saracinesca* (1887); *Paul Patoff* (1887); *Greifenstein* (1889); *Sant' Ilario* (1889); *A Cigarette Maker's Romance* (1890); *The Witch of Prague* (1891); *Don Orsino* (1892); *Pietro Ghisleri* (1893); *The Ralstons* (1894); *Casa Braccio* (1895); *Corleone* (1897); *Via Crucis* (1899); *In the Palace of the King* (1900); *Marietta, a Maid of Venice* (1901); *The Heart of Rome* (1903); *Whosoever Shall Offend* (1904); *Soprano*, a portrait (1905); *Fair Margaret* (1905); and its sequel, *Prima Donna* (1908). The Saracinesca series, stories of modern Rome, is generally regarded as his most important performance. His strictly American fiction is less popular. A romantic novelist, Marion Crawford probed no depths of human nature and untangled no complex psychological knots, but he had the beguiling gift of the born story-teller who has also become an accomplished master of the art of fiction. Ingenious plots, a varied company of interesting *dramatis personæ* faithfully studied and freshly portrayed, picturesque settings, and behind all the attractive personality of an intelligent and cultivated man of the world — these and other characteristics explain and fully justify the delight with which, for more than a quarter of a century, an immense audience, American and European, welcomed the annual appearance of one of the long series of his novels. Though his fame rests on his fiction, he showed, in *Ave Roma Immortalis* (1898), *Rulers of the South* (1900), and *Gleanings from Venetian History* (1905), a gift of conjuring up the life of the Italian past in a manner that makes the spirit and the facts of history as entertaining as a romance.

CRAWFORD, George Washington (1798–1872). An American lawyer and statesman. He was born in Georgia, graduated at Princeton in 1820, and in 1822 was admitted to the bar. From 1827 to 1831 he was State Attorney-General, and from 1837 to 1842, with the exception of one year, was a member of the State Legislature. In 1843 he was in Congress, in 1843 and 1845 was elected Governor of Georgia, and from 1849 to 1850 was Secretary of War in President Taylor's cabinet.

CRAWFORD, Isabella Valancy (1851–87). A Canadian poet. She was born in Dublin, Ireland, went to Ontario as a child, and lived at Peterboro and Toronto. She wrote verse showing marked originality and lyrical power, comprised mostly in *Old Spookses' Pass, Malcolm's Katie, and Other Poems* (1884). Consult the appreciation prefixed to *Poems* (Toronto, 1905, ed. by Garvin) by E. Wetherald.

CRAWFORD, James Ludovic Lindsay, Earl of (1847–1913). A British astronomer, born at Saint-Germain-en-Laye, France. He was educated at Eton and at Trinity College, Cambridge, and from 1874 to 1880 was a member of Parliament. He was also for a time president of the Astronomical Society. His *Bibliotheca Lindesiana* was published in parts from 1883 to 1913; his philatelic library was bequeathed to the British nation.

CRAWFORD. John Wallace (Captain Jack) (1847–1917). An American author, born in County Donegal, Ireland. He served in the Forty-eighth Pennsylvania Volunteers in the Civil War, and while lying wounded in the hospital at West Philadelphia was taught to read and write by a sister of charity. As a scout he served under General Crook in the Sitting Bull campaign in 1876 and later against the Apaches in New Mexico. In 1886 he retired from the army, was a miner and ranchman in New Mexico, was in the Klondike (1898–1900), and finally became a public lecturer. Besides many poems, several songs, and more than 100 short stories, "Captain Jack" is author of *The Poet Scout—A Book of Song and Story* (1885); *Campfire Sparks* (1888); *Tat*, a drama produced in San Francisco in 1900; *Colonel Bob*, a drama, with Marie Madison (1909); *Whar' the Hand o' God is Seen and Other Poems* (1911).

CRAWFORD, Mary Caroline (1874–). An American author, born in Boston. She was educated at Radcliffe College. From 1898 to 1902 she was literary critic of the Boston *Budget* and in 1907–08 was secretary of the Women's Trade Union League; she then became secretary of the Ford Hall meetings. Her publications include: *The Romance of Old New England Rooftrees* (1902); *The Romance of Old New England Churches* (1903); *The College Girl of America* (1905); *Among Old New England Inns* (1907); *St. Botolph's Town* (1908); *Old Boston Days and Ways* (1909); *Romantic Days in Old Boston* (1910); *Goethe and his Woman Friends* (1911; 2d ed., 1913); *Romantic Days in the Early Republic* (1912); *The Romance of the American Theatre* (1913).

CRAWFORD, Thomas (1813–57). An early American sculptor. He was born in New York, March 22, 1814, and in 1834 he went to Rome, where he studied under Thorvaldsen. He passed much of his life in Rome, where his studio was

the resort of travelers and lovers of art. Although his life was comparatively short, he left many interesting examples of his work, and is justly considered one of the most important pioneers of American sculpture. Judged from the pseudoclassic standpoint of his day, his work ranks high, and it always has a distinct literary and poetic flavor. But it is rarely inspired, and in modeling is cold and hard. The figure of "Liberty" on the dome of the Capitol at Washington, the statue of James Otis in Mount Auburn Cemetery, Cambridge, and the statues of Patrick Henry and Jefferson, belonging to the Washington Monument in Richmond, have originality, strength, and nobility. He was less happily inspired in the main figure of the Richmond monument, an equestrian statue of Washington, and in the pediment and bronze doors of the Senate wing of the Capitol. Other interesting works are the bust of Beethoven, now in Symphony Hall, Boston, the casting of which was enthusiastically celebrated in a great festival in Munich; "The Indian" (New York Historical Society); "Orpheus" (Boston Art Museum); "Adam and Eve after the Expulsion" and a bust of Josiah Quincy (Boston Athenæum); "The Dancer," "Dying Indian Maiden," and "Flora" (Metropolitan Museum, New York). Crawford executed many bas-reliefs, and 87 of his plaster casts were presented by his wife to the Commissioners of Central Park, who arranged them in a building for public exhibition. They have since been destroyed by fire. Consult Lorado Taft, *History of American Sculpture* (New York, 1903), and Tuckerman, *Book of the Artist* (ib., 1867).

CRAWFORD, William (1732–82). An American soldier, born in Berkeley Co., Va. He was for a time assistant surveyor to George Washington, and he served as ensign of Virginia Rifles in the French and Indian War. He accompanied Braddock's luckless expedition against Fort Duquesne in 1755, served through the Pontiac War (1763–64), and in 1776 was appointed lieutenant colonel of the Fifth Virginia Regiment. In 1781 he resigned from the army with the rank of colonel. At the request of Washington and of General Irvine, he assumed command in 1782 of an expedition against the Delaware and Wyandot Indians near the Sandusky River, who had long devastated the frontier. On June 4, on the plains northeast of the present site of Sandusky, he encountered a combined force of about 300 Indians and British soldiers from Detroit. His troops having been discouraged by the accession of reinforcements to the enemy, he ordered a retreat which soon became a confused flight. He was himself separated from the main body, captured by a band of Delawares, and burned at the stake amid fearful torture. Notwithstanding his wholly creditable Revolutionary record, his leadership on this occasion appears scarcely to have been efficient. Consult: Butterfield, *Expedition against Sandusky* (Cincinnati, 1873); Roosevelt, *The Winning of the West,* vol. ii (New York, 1896); N. N. Hill, "Crawford's Campaign," in *Magazine of Western History* (Chicago, 1885).

CRAWFORD, William Harris (1772–1834). An American politician. He was born in Amherst Co., Va., Feb. 24, 1772, but removed with his parents to South Carolina in 1779 and to Georgia in 1783, where in 1798 he was admitted to the bar. In 1802 he was chosen a member of the State Senate and in 1807 was chosen to fill a vacancy in the United States Senate. During the canvass he fought two duels, in the first of which he killed a man, while in the second he was himself wounded. He was elected to the Senate in 1811 and in 1812 was chosen president pro tempore of that body. He at first opposed, but finally supported, the war with England. In 1813 he was appointed Minister to France, where he became a general favorite and in particular was an intimate friend of Lafayette. In 1815 he was made Secretary of War and the next year Secretary of the Treasury, an office which he retained until 1825. Crawford had been a candidate for the presidential nomination in 1816 and in 1824 thought himself entitled to succeed Monroe as President, and was regularly nominated by the congressional caucus which was then controlled by him; but the caucus system was then temporarily superseded (see Caucus), and there were four other candidates against him—Calhoun, John Quincy Adams, Jackson, and Clay. Calhoun was pacified with the vice presidency, to which he was chosen by 182 out of 260 votes. There was no choice for President, the vote being: Jackson, 99; Adams, 84; Crawford, 41; Clay, 37. About the time of the election Crawford was stricken with paralysis, from which he never wholly recovered. His condition rendered it impossible to consider him a candidate when the election came to be decided in the House of Representatives, although, even in such a condition, he received four of the 24 votes. From this time Crawford was out of the political field. He served as judge of the northern circuit of Georgia from 1827 until his death, which occurred Sept. 15, 1834.

CRAWFORD, William Henry (1855–). An American educator, born at Wilton Center, Ill. He graduated at the Northwestern University and the Garrett Biblical Institute and became a minister in the Methodist Episcopal church. He was appointed professor of historical theology in the Gammon Theological Seminary, Atlanta, Ga., in 1889, and in 1893 became president of Allegheny College (Meadville, Pa.). His publications include: *Life of Savonarola* (1906); *The Church and the Slums* (1908); *Thoburn and India* (1909).

CRAWFORD NOTCH. A defile in the White Mountains, N. H., at an elevation of 1915 feet, between Mount Webster and Mount Willey, each about 4000 feet high. The Saco River, entering through a narrow passage, traverses the Notch, which is remarkable for its impressive rock scenery.

CRAW'FORDSVILLE. A city and the county seat of Montgomery Co., Ind., 43 miles west-northwest of Indianapolis, on the Cleveland, Cincinnati, Chicago, and St. Louis, the Vandalia, the New York Central, and the Chicago, Indianapolis, and Louisville railroads (Map: Indiana, C 2). It is the seat of Wabash College, established in 1832, and contains a fine county courthouse, a community house for women, a country club, and a Carnegie library. The city is the home of five insurance companies, has manufactures of matches, paving bricks, burial furnishings, flour, foundry products, lumber, metal polish, barbed wire, etc. Settled in 1822, Crawfordsville was incorporated in 1865 and is governed under a charter of that date, which provides for a mayor, elected every four years, and a city council. The electric-light

plant is owned by the city. Crawfordsville was the home of Gen. Lew Wallace, author of *Ben Hur*, to whom a monument has been erected. Pop., 1900, 6649; 1910, 9371; 1920, 10,139.

CRAW'FURD, JOHN (1783–1868). A Scottish Orientalist, born in the island of Islay, Hebrides. He went as a physician to India and served for five years in the army of the Northwest Provinces. Transferred to Penang, Malay Peninsula, he acquired a knowledge of the Malay language, which proved valuable on the occasion of Lord Minto's conquest of Java (1811). From 1811 to 1817 he held various posts in Java, in 1821 was sent as envoy to Siam and Cochin China, from 1823 to 1826 administered the government of Singapore, and in 1827 was sent on a difficult diplomatic mission to the court of Ava. He published, in addition to an account of this mission (1829): *History of the Indian Archipelago* (3 vols., 1820); *Grammar and Dictionary of the Malay Language* (2 vols., 1852); *Descriptive Dictionary of the Indian Islands and Adjacent Countries* (1856); *China and its Trade* (1858); and, finally, the journals of his embassies to the courts of Siam and Cochin China (London, 1828) and to the court of Ava (1829; 2d ed., 2 vols., 1834).

CRAWL-A-BOTTOM. A local name in the Mississippi valley for two small fishes: 1. The largest of the darters (*Hadropterus nigrofasciatus*). See DARTER. 2. The hog sucker, or stone roller (q.v.).

CRAW'SHAW, WILLIAM HENRY (1861–). An American educator and author, born at Newburgh, N. Y. He graduated in 1887 at Colgate University, where thereafter he was an instructor (1887–89), associate professor of English (1889–93); professor of English (after 1893) and also (after 1897) dean. He was also acting president during several years. The University of Rochester conferred on him the degree of Litt.D. (1909), and Syracuse University that of LL.D. (1910). He published an edition of Dryden's *Palamon and Arcite* (1898); two excellently suggestive little works in criticism, *The Interpretation of Literature* (1896) and *Literary Interpretation of Life* (1900); and *The Making of English Literature* (1907).

CRAYER, krī'ēr, *Fr. pron.* krā'yā', GASPAR, or JASPER DE (1584–1669). A Flemish historical and portrait painter, born in Antwerp. He studied under Raphael Coxcie (son of Michiel Coxcie) in Brussels, where he lived many years, and in 1664 went to Ghent, for the churches of which he painted more than 20 altarpieces. He was appointed court painter to the Cardinal Infant Ferdinand and afterward to King Philip II of Spain. Though perhaps the most prolific of all religious painters and prone to exaggerated sentiment, he yet maintained a certain excellence in composition and execution. He was strongly influenced, especially in color, by his friend Rubens. His works are to be found throughout Flanders and Brabant and in the provincial museums in France, where many were carried during the French invasion. Among the best known are: "The Four Crowned Martyrs" (Lille Museum); six pictures celebrating the entrance of the Cardinal Infant (Ghent); "Alexander and Diogenes" (Metropolitan Museum, New York); "Glorification of St. Catharine" (in St. Michael's, Ghent); "The Miraculous Draught of Fishes," "Adoration of the Shepherds" (Brussels Museum); "Decapitation of St. John the Baptist" (Ghent Cathedral); "Judgment of Solomon" and "Martyrdom of St. Blasius" (1668), his last work, both in the Ghent Museum. His portraits include those of the Cardinal Infant (Prado) and Philip IV (Uffizi). Jan van Cleve, the most important of his pupils, assisted him in many of his works. Consult his biography by Maeterlinck, in *Bulletin de la Société d'Histoire et d'Archéologie de Gand* (Ghent, 1900).

CRAYFISH. See CRAWFISH.

CRAY'ON (Fr. *crayon*, from *craie*, chalk, from Lat. *creta*, chalk). A term usually applied to pencils made of charcoal, pipe clay, or chalk, colored with various pigments and used for drawing on paper, wood, or other materials. Blackboard crayons are made largely of chalk, while black crayons are composed of pipe clay and lampblack. Those used for drawing on lithographic limestone are commonly made of a mixture of wax, lampblack, soap, and resin. *Pastel* is a mixture of chalk and coloring materials, worked into a paste with gum water. The vegetable colors used are turmeric, litmus, saffron, and sap green, but should in every case be free from acid, as the latter reacts on the chalk. *Vienna white*, used by artists, is simply purified chalk. *Red chalk* is made from an ochery clay, i.e., one containing much iron oxide. *Briançon chalk* and *French chalk* are popular names for soapstone, which is very different from chalk in its composition, being a silicate of magnesia. See CHALK; PENCIL.

CRAYON, GEOFFREY. The nom de plume adopted by Washington Irving in *The Sketch-Book*, etc.

CRAZY HORSE. A distinguished chief of the Oglala Sioux, who was joint leader with the famous Sitting Bull in the War of 1875 and was prominent in Custer's defeat. He was killed while resisting arrest in September, 1877. Consult Miles, *Personal Recollections* (Akron, 1896).

CREAM (OF. *cresme*, Fr. *crême*, from Lat. *cremor*, thick juice). The thick, light-yellow substance, rich in fat, which rises to the surface of milk on standing. The methods of creaming milks, by setting and by the separator, are described under BUTTER MAKING. The composition of cream is influenced by the method and condition of creaming, and varies within wide limits. Cream contains the same constituents as milk, but in very different proportions. The fat may vary from 10 to 70 per cent; good cream for butter making, or for household use, contains from 18 to 25 per cent of fat, and very rich cream from 35 to 40 per cent. The richness of cream raised by the separator can be regulated at will. Cream is sometimes thickened artificially by adding gelatin, isinglass, etc. Cream which has been pasteurized, or heated to prevent souring, loses some of its thickness or viscosity, and the addition of sucrate of lime has been proposed to make it whip better. The famous clotted or "clouted" cream of Devonshire, England, is prepared by heating milk which has stood for 24 hours in a shallow pan over a slow charcoal fire for a half to three-quarters of an hour, without boiling, allowing it to stand for 24 hours, and then skimming off the cream, which is sprinkled with sugar.

CREAM'ERY. A factory where butter is made by machinery from milk or cream, furnished by the neighborhood. It is an American institution, and originated in New York about

1864, being suggested by the success of the cheese factory (q.v.), which had been in operation for several years. Within the past 15 or 20 years the growth of the creamery system has been very rapid, and creameries are now thickly distributed over the principal dairy regions. They differ in their form of organization and also in the method of operation. Coöperative factories are owned by the farmers ("patrons"), who supply the milk, and who choose from their own number a managing committee, or board. The cost of running the factory, and the proceeds of sales, are divided pro rata according to the milk, cream, or butter fat contributed. This is the oldest and in many respects the most desirable form of organization. In the joint-stock and proprietary creameries the milk or cream is bought of the farmers under a contract, or the factory may make butter and dispose of it for its patrons for a fixed charge per pound. The milk may be delivered at the creamery, where the cream is separated by power, the farmers receiving the skim milk for feeding; or the cream may be raised or separated by the farmers themselves and sent to the factory every two or three days. The latter are called "gathered-cream creameries." The cream-gathering plan originated in Wisconsin, and was the basis upon which creameries were established in New England, where it continues popular. The cream is raised by gravity in deep cans or by means of hand separators, and is paid for by the "space." The "space" has been shown to be an unreliable measure, as the value of a space of cream for butter making varies widely; and payment on the basis of the fat furnished, as determined by test, is now generally adopted.

Where the whole milk is furnished to the creamery, it is delivered daily, which involves a great deal of labor in hauling. In almost all cases the hauling devolves upon the milk producer; often the farmers living near together coöperate in this, or contract with some person who makes a business of doing the hauling. The milk was formerly paid for by the pound, this being a convenient means of measurement; but the injustice of this to the producers of rich milk, and the introduction of the Babcock milk test, have led to payment on the basis of the butter fat. The milk of each patron is weighed as it is received and a sample taken for testing; usually the samples for a week or so are combined into a composite, to reduce the labor of testing. From the amount of milk delivered, and the fat content, the amount of butter fat furnished by each patron is calculated at the end of the month. In most of the leading creamery districts the separator factory is now the favorite system. In many places these creameries have located "skimming stations" at points convenient for the patrons, where the milk is run through the separator and the cream then taken to the creamery. This reduces the labor of hauling to a minimum. The system of making butter at creameries is, in many respects, a vast improvement over the ordinary farm dairy practice. The use of machinery reduces the cost of butter making, and the milk and cream are handled by experienced butter makers according to the most approved methods. The result is a uniform product, equal to the best of the single dairies, and a great improvement over the average, which sells for a high price. Furthermore, there is less loss of fat in making than at farm dairies, and hence a larger quantity of butter is produced from the same cows. The labor and expense of making and marketing the butter are removed from the farms and households. Creameries have been of great advantage to the farmers where they are located, and the payment for milk on its fat content has stimulated the farmers to keep better and more profitable cows. Some of the more modern creameries have a very large capacity. The Franklin County Creamery, at St. Albans, Vt., was formerly the largest in the country, having a capacity of five or six tons of butter a day. There are now a considerable number equally as large, and several much larger, running up to 15 tons of butter a day in some cases. A large creamery in Nebraska has over 100 skimming stations connected with it. The thirteenth census reported 4783 creameries in operation in the United States in 1909, which made 624,764,653 pounds of butter, as compared with 420,126,546 pounds in 1899. Wisconsin led all other States in creamery output. The first Danish coöperative creamery was put in operation in Jutland in 1882. The number at present mounts into the thousands. The creamery or factory system of butter making has spread generally throughout European countries, Australia, and South America, wherever butter is made on an extensive scale. In some countries the coöperative plan predominates, and in others the factories are more largely proprietary or operated by private firms. See BUTTER MAKING.

CREAM NUT. See BRAZIL NUT.

CREAM OF TAR'TAR (OF. *tartre*, from ML. *tartarum*, MGk. *τάρταρον, tartaron*, tartar, probably from Lat. *Tartarus*, Gk. Τάρταρος, *Tartaros;* hardly a corruption of Ar. *durd*, dregs, from *darida*, to lose the teeth). A potassium bitartrate that is contained in argol (q.v.) and is prepared by dissolving the argol in hot water and removing any coloring matter by means of clay or egg albumen; the cream of tartar is then separated from the filtered solution by crystallization and may be purified by recrystallization. Cream of tartar is a white crystalline compound that is soluble in water and is used in medicine as a refrigerant and purgative. With sodium bicarbonate it is used as a substitute for yeast in raising bread. It is also the source of tartaric acid and of tartrates.

CREASE. See KRIS.

CREASOTE. See CREOSOTE.

CREASY, krē'sĭ, SIR EDWARD SHEPHERD (1812–78). An English historian, born at Bexley, Kent. He became fellow of King's College, Cambridge, in 1834 and in 1837 was called to the bar. In 1840 he was appointed professor of modern and ancient history in the University of London, and in 1860, when he was knighted, Chief Justice of Ceylon—a post he held for 10 years. He is most widely known for his *Fifteen Decisive Battles of the World* (1852), a work which has been very favorably received alike by the critic and the general reader. His other works, less known, but in many cases of almost equal merit, include an *Historical and Critical Account of the Several Invasions of England* (1852); *History of the Ottoman Turks* (1854–56); *Imperial and Colonial Constitutions of the British Empire* (1872); and two excellent books on Eton.

CRE'ATIN. See KREATIN.

CREATININ, krē-ăt'ĭ-nĭn. See KREATININ.

CREATION (Lat. *creatio*, from *creare*, to create, connected with *crescere*, to grow). The

act or acts by which the world is supposed to have been brought into existence. When man's mind matures sufficiently to reflect upon cause and effect, it is apt to raise a question as to the origin of the objects by which he is immediately surrounded, and this gradually leads to inquiry in regard to the beginnings of the whole scheme of things. Curiosity, which is the mainspring of all scientific progress, suggests the lines of inquiry and credulity, which is the brake preventing excessive speed, has a tendency to be satisfied with the easiest explanation. As man became himself a creator, fashioning things for his purposes, and grew conscious of the value of his achievements, he naturally began to wonder how various objects had been formed. The simplest explanation occurring to him was that some one had made them. Nor was he at a loss for an answer to the question as to who these producers could have been. They must have been in his neighborhood once and then gone away to live somewhere else. They were not gods, since no worship was paid to them, nor ancestors, since the secret of fatherhood had not yet been discovered, but beings conceived of as man, or animals, or partly human and partly animal, possessed of that extraordinary power which makes some things objects of special interest, wonder, and dread. Such are the conceptions of peoples that have lived until recent times in Stone-age conditions in Melanesia, Polynesia, Australia, America, and Africa, and such in all probability were the ideas of Stone-age peoples in the remote past. Studies of the Melanesian *mana*, or power, the Polynesian *tabu*, or danger attaching to objects possessed of *mana*, the American *totem*, or the animal (or other object) increasing and helping the tribe, the Australian *altjiranga-mitjina*, or the uncreated totemistic producers of early times, and the mystery cults and exogamy of various tribes, the results of which may be best seen in the recent works of Durkheim, Marett, Frazer, W. Schmidt, and Söderblom, as well as of the notions that come to view in man's earliest pictorial representations of himself in the Magdalenian period of the Paleolithic age (see MAN), have led to a growing appreciation of the importance of these primitive creators. Söderblom has shown in his latest work on the subject (1914) that this crude idea of "makers" possessed of extraordinary power cannot be adduced as evidence of an original monotheism, as has been done by Andrew Lang and W. Schmidt, but reveals one of the roots of the god belief, and may be traced into historic times, e.g., in the case of the Chinese Shang Ti.

The predynastic Egyptians represented Horus as a falcon. His totemistic origin is obvious; but, however probable it may be, it has not yet been proved that he was then considered as a creator. But Khnumu, the god of the cataract district, who fashioned on his potter's wheel heaven and earth, gods and men, is always represented with a ram's head, the unmistakable sign of his original character as a totem. Thoth of Hermopolis, who created heaven and earth, had the head of an ibis, probably, before he became the god of the moon; the conception grew up, how early cannot be determined with certainty, that Keb and Nut were created at his command. Ptah, who always appears as a man, formed the sun egg and the moon egg on his potter's wheel; but the priests of Memphis at an early time emphasized that he thought before he spoke, and that things came into existence when he spoke. Re was a beetle before he became the sun god and may already, before this transformation, have been considered, as he was later, the father of gods and fashioner of men and things. Osiris is always represented as a man and may have been thought of as such before he became the god of the Nile and the vegetation dependent upon it. He made the earth and the creatures upon it. In Babylonia the great Sumerian deities—Ellil of Nippur, Anu of Uruk, Ea of Eridu, and Marduk of Babylon—who act as creators are all thought of as men, though connected with earth, heaven, and sea. The earliest version of the Sumerian story of creation, published by Poebel in 1913, assigns different parts to Ellil, Anu, and Ea, which may indicate a fusion of three stories. Another version in Sumerian with an Akkadian translation was already known, and the longest recension, in which Marduk, after a struggle with the chaos monster Tiamat and her helpers, creates heaven and earth, was found in the palace of Asurbanipal in 1875 and deciphered by George Smith. Before that time only the fragmentary quotations from Berosus (q.v.) were known. The German excavations at Assur (q.v.) have brought to light the fact that Sennacherib ascribed the creation of the world to Asur (see ASSUR). The worshipers of Ahura Mazda in Iran regarded him as the creator. Already Darius Hystaspis, in his inscription at Behistun (q.v.), declares that he has created "this earth and yonder heaven." In the Avesta a distinction is introduced between the good things in the world (light, virtue, love, good spirits, life) that are created by Ahura Mazda, and the evil things (darkness, vice, hatred, demons, death) that are the work of Angra Mainyu. The dualism resulting from this is, however, overcome by the ultimate victory of Ahura Mazda. In India the primitive notions of a heaven father and earth mother who made all things, or the Puruṣa, the male principle which originated them, gave place to the idea of Brahma, the creator, which in turn yielded to the pantheistic conception of the universe that left no room for an extra-cosmic divinity or a creation (see VEDANTA) among the more thoughtful, while even the popular cults of the Trimurti (q.v.) and Kali, the symbol of the ruthless forces of nature, are based on the assumption of the infinite and eternal character of the world. Early Greek thought, as seen in Homer, Hesiod, and the Orphic hymns, explained the origin of gods and men by a primeval triad—Night, Heaven, and Earth—and did not attempt to go further. The Ionian philosophers endeavored to find the essential nature of things which would explain the forms they assume; thus, Heraclitus regarded the first principle as on one side Fire, on the other Intelligence. An independent and immaterial world-forming agency, expressing itself in Love and Discord, was assumed by Empedocles, while Anaxagoras found it in Reason. To Plato's thought matter is eternal, and creation means the activity of God by which he impresses upon the shapeless material forms or patterns, conceived of as a system of ideas. "The Creator made the universe because he was good and desired that all things should be as like him-

self as possible" (*Timæus*, iii, 613); but there is something in the intractable material that resists the creator, and in the residue beyond his power evil has its place. Aristotle rejected the system of ideas, but himself retained the essential dualism which Epicureanism sought to overcome by a materialistic, Stoicism by a more idealistic, monism. Ovid's *Metamorphoses* and *Fasti* reveal some of the popular conceptions in the Latin world on the subject of creation, while *De rerum natura* by Lucretius is the grandest and most characteristic effort of the Roman mind to explain the origin of things along Epicurean lines. The Icelandic Gylfaginning and Völuspa have been suspected of showing Christian influence. Such a coloring in transmission is not impossible; but it is likely to have affected the figure of Balder and the eschatology more than the story of the original chaos and the struggle with its powers, the creation of the world by the three Æsir, and the fashioning of the first human pair out of the trees Ask and Embla; and it is difficult to prove anywhere.

In the Hebrew account of creation there seem to be indications of more than one original version. Gen. i. 1–ii. 4a gives a complete description of how the heavens and the earth and all that is in them, including the human race, came into existence during a period of six days at the command of God, who then rested upon the seventh day. On the first day light was produced and day and night divided; on the second day the firmament (q.v.) was created and the waters separated; on the third day the dry land appeared and plant life began; on the fourth day the heavenly luminaries were made; on the fifth day fishes and birds were made; on the sixth day land animals and man were created. The Greek version by its *ἐν ἀρχῇ, en archē*, without the article shows that the first word was read *berēshith* and not *bārēshith* already in the third century B.C. The construct relation with what follows, thus demanded by tradition, is of importance as it suggests this translation: "When God began to fashion the heavens and the earth, the earth was in a chaotic state, and darkness lay upon the great abyss, though the spirit of God was brooding over the waters, but God said, 'Let there be light!' and light came." The correctness of this rendering seems to be indicated also by the fact that the heavens are created on the second day and provided with luminaries on the fourth, and the earth is made on the third. Chaos, with its darkness and its waters, appears, therefore, to have existed before God began to form it into a Cosmos, and the "brooding" hints at the underlying conception of a world egg. The creation of the human race is preceded by a council in heaven; the words "Let us make men in our image" are understood by many scholars as a remnant of the original polytheistic setting, the image referring to the outward form, while others think of the persons of the Trinity, God and His angels, or a plural of majesty (which, however, is without analogy in Hebrew literature), and of "the image of God" as referring to those godlike qualities that distinguish man from the animals. As there are two works on the third and two on the sixth day, it has been supposed that a division into eight classes preceded the arrangement into a week of six days followed by a sabbath. The practical purpose of giving a reason for hallowing the sabbath day is obvious. That an earlier form of the story has been worked over may be inferred from the fact that Job ix. 13, xxii. 12, 13, Isa. li. 9, Ps. lxxiv. 12 ff., and other passages show how familiar the Jewish mind was with the struggle between Yahwe and the chaos monster (Rahab, Tehom, Leviathan) before creation, while this nature myth seems to have been intentionally suppressed in Gen. i. The statement in Isa. xlv. 7, "I form the light and create darkness; I make peace and create evil," is probably not meant either as an attack upon this myth or a correction of the dualism of Avesta, but only as an assertion that prosperity and adversity alike come from Yahwe, the only living God. As the original Mazdaism and Plato, Gen. i. emphasizes the goodness of all the objects in nature as they came from the hand of the creator. Gen. ii. 4b–25 seems to be an excerpt from another story of creation. It begins by relating how on the day when God made earth and heaven there was no vegetation, because no rain had fallen and man did not exist to till the ground, but that a stream began to rise so as to water the ground, from which God then fashioned a man and blew into his nostrils the breath of life. There follows the description of the planting of a garden, the making of animals which are brought to man to be named, and since none of them proves a "help" to him, the creation of a woman out of a rib taken from him while in a deep hypnotic sleep. There is no account of the creation of heaven such as the introduction leads the reader to expect; and it is probable that this version has also been abbreviated by the suppression of some original features. Many scholars consider it the work of a writer whom they call the Yahwist (see ELOHIST and YAHWIST), but N. Schmidt has shown, in *Journal of Biblical Literature*, xxxiii, 1, pp. 25 ff. (1914), that the original text had "Elohim" everywhere, and not "Yahwe Elohim." As to the age of the two narratives in their earliest form nothing is known with certainty. Babylonian influence, mediated through the Amorites, is not improbable, and may be much older than is generally thought in view of the spread of Babylonian myths in the Tell el-Amarna period (see ADAM), but the native element need not be limited to a gradual elimination of the polytheistic features. A creation out of nothing is first taught in 2 Maccabees vii. 28, though the *ex nihilo* of the Latin version is more unmistakable than the *οὐκ ὄντων, ouk ontōn*, 'things not existing,' of the Greek.

The early Christians adopted the views prevalent among the Jews. Those influenced by Hellenistic thought regarded the things seen as having come from "things not seen" (Heb. xi. 3), and the Logos (John i. 3), or the Son (Col. i. 15 ff.), as the medium of creation. Origen considered the work of creation as without beginning or end, and Augustine looked upon the preservation of the world as a continuous creation. Johannes Scotus Erigena also taught that God's working was equally eternal with His being. Through Descartes, Spinoza, Fichte, Hegel, and Schleiermacher it has become a view very widely adopted among theistic philosophers and theologians that the creative activity of God is as eternal as himself. In the sense of *natura naturans* the word has been used even by thinkers who disavow its pantheistic implications, whether denying all

teleology or simply accepting it as inherent in nature; and Haeckel has published a *Natürliche Schöpfungsgeschichte*. The use of such a term may to some extent be justified by the etymological connection with *crescere*, to grow, but has been criticized, not altogether unjustly, on the ground of its departing from the historic meaning attached to the word, though in a measure this criticism also applies to every attempt made in recent times to square the idea of a creation with what are regarded as the established results of natural science. Consult: Lukas, *Die Grundbegriffe in den Kosmologien der alten Volker* (Leipzig, 1893); Tylor, *Primitive Culture* (2 vols., New York, 1891); Andrew Lang, *Making of Religion* (3d ed., New York, 1910); Marett, *The Threshold of Religion* (London, 1909); Schmidt, "Grundlinien einer Vergleichung der Religionen und Mythologien der austronesischen Völker," in *Denkschriften d. k. Ak. d. Wiss. in Wien* (Wien, 1910); Durkheim, *Les formes élémentaires de la vie religieuse* (Paris, 1913); Söderblom, *Gudstrons uppkomst* (Stockholm, 1914); Erman, *Die aegyptische Religion* (Berlin, 1909); Breasted, *Religion and Thought in Ancient Egypt* (New York, 1912); Jastrow, *Die Religion Babyloniens und Assyriens* (Giessen, 1902–12); id., *Hebrew and Babylonian Traditions* (New York, 1914); Poebel, in *Babylonian Publications of the Museum of Archæology of the University of Pennsylvania*, vi (Philadelphia, 1913); Rogers, *Cuneiform Parallels to the Old Testament* (New York, 1912); Rydberg, *Germanisk mythologi* (Stockholm, 1886–89); Müllenhoff, *Deutsche Altertumskunde*, v (Berlin, 1892); Gunkel, *Schöpfung und Chaos* (Göttingen, 1895); id., *Die Urgeschichte und die Patriarchen* (ib., 1911); H. P. Smith, *The Religion of Israel* (New York, 1914); Strachan, "Creation," in Hastings, *Encyclopædia of Religion and Ethics*, iv (New York, 1912).

CREATION, The. 1. A philosophical poem by Sir Richard Blackmore (1712), which was highly commended by Addison and Johnson. 2. A celebrated oratorio by Haydn, first produced in Vienna in 1798.

CREATIONISM. A term applied in the latter half of the nineteenth century to the theory of the origin of man which is opposed to evolution. (See Anthropology; Evolution.) As a theological term, it has long been in use to designate the theory of the origin of man's soul by the special creative act of God in the case of each individual. It is opposed to "traducianism," which is the theory that the soul of the individual is derived by generation from the souls of his parents as truly as is his body. The Scriptures give no decision upon this question. Creationism goes back of the Christian Church and is found in Aristotle. It was the prevailing view in the Church after the fifth century and was held by Jerome and Pelagius and by most of the schoolmen. In modern times it has been frequent in the Reformed (Calvinistic) churches and is generally approved to-day in Catholic teaching. Aquinas distinguished between the sensitive or animal soul, which man has in common with brutes and which is inherited, and the soul which is the basis of the human intellect, which comes directly from God to every individual by creation. This distinction, under the terms of "spirit" and "soul," was often made later by both Catholic and Protestant theologians. Traducianism was advocated by Tertullian (c.200), by Gregory of Nyssa, and some of the other Greek fathers. In modern theology it has been the prevailing Lutheran theory. Augustine is claimed for both sides. He seems to have been really a creationist, but saw some of the difficulties so clearly that he sometimes expressed ideas which imply traducianism. In a letter to Jerome (iii, 166) he begs to know how, if the soul comes from God by creation, it contracts guilt so that children need baptism; but he does not turn to the refuge of traducianism. The ancient Church found arguments for creationism in those passages of the Bible which represented God as the creator of the individual man; in the simplicity of the soul, which could not be divided and so propagated; in the sinlessness of Christ, reasoning that only if souls come fresh from the hand of God could Christ's soul be truly human and yet sinless; in the marked individuality of persons; and in the immateriality of the soul. The doctrine of original sin constituted the great source of argument for traducianism. How could man be guilty of sin unless he had descended, in soul as well as in body, from the source of human sin in Adam? It was also claimed that the theory was analogous with God's action in nature, and that it best explains the complex facts of human heredity. It accords well with the theory of realism, which Augustine held, that human nature was deposited in Adam, and all men share it from him. Many theologians, both ancient and modern, have regarded the whole subject as a mystery and have been willing to agree with Augustine's modest statement, "When I wrote my former book, I did not know how the soul derives its being, and I do not know now." Modern studies of personality and heredity have shifted discussion from this problem to the scientific consideration of the facts of human life, so that most of the historic theoretical arguments on both sides command little interest now. See Traducianism; Original Sin.

CREATIVE EVOLUTION (*L'Evolution créative*). A memorable philosophical treatment of evolution by Henri Bergson (1909), presenting a new and stimulating consideration of its processes in nature and man. See Bergson, Henri.

CRÉBILLON, krā'bē'yôN', Claude Prosper Jolyot de (1707–77). A noted French storyteller and wit. He was born in Paris, Feb. 14, 1707, the son of the dramatist Prosper Jolyot Crébillon. Except for a five years' exile for political and theological allusions in his novels, especially concerning the papal bull *Unigenitus*, which led also to a brief imprisonment in the Bastile, he passed his life in Paris. Though he occupied at one time the office of literary censor, through the good graces of Madame de Pompadour, his fiction is a byword for its licentious suggestiveness. It shows a graceful talent, however, which was unfortunately wasted, together with a thorough mastery of style and keen powers of observation, in the most trivial manner. His best-known tales are *L'Ecumoire ou Tanzaï et Néadarné* (1734), followed in 1736 by the notorious *Les égarements du cœur et de l'esprit*, and in 1745 by *Le sopha*, than which it has not been possible to descend further in the refinements of immorality: not a gross word and not a decent thought. The conversation is witty, the manners refined after their kind. This smirking voluptuousness is only the completest literary expression of the spirit of the time, that

was sapping the foundation of national strength and character and preparing the way for the Revolution. Strange to say, he was irreproachable in his private life and proved to be a model husband to Lady Henrietta Maria Stafford, an Englishwoman, who fell in love with him after reading his works. He died in Paris, April 12, 1777. Consult C. H. Amanton, *Particularités sur les deux Crébillon* (Paris, 1835).

CRÉBILLON, Prosper Jolyot de (1674–1762). A noted French tragic poet, born in Dijon, Jan. 13, 1674. He abandoned the law for the stage on the success of *Idoménée* (1705), and with *Atrée et Thyeste* (1707) took first rank among the tragic poets of his time. Among the more noteworthy of his subsequent tragedies are: *Electre* (1708); *Rhadamiste et Zénobie* (1711), his best work; *Pyrrhus* (1726); *Catiline* (1748). Crébillon became an Academician in 1731 and held several minor public offices, among them that of stage censor. Later he became indigent, but died in comfort through the profits of an edition of his *Works* (1750), made at the royal order and charge. He died in Paris, June 17, 1762. Crébillon suffered, as did his fame, from the envy and enmity of Voltaire, himself a tragic poet of greater polish, though less rugged power. He is apt to mistake the horrible for the grandiose, and inflation for energy in diction, as did Corneille, whom among French dramatists he most resembles both in his qualities and his defects. At a time when France no longer possessed a great tragic poet of the calibre of Racine, capable of fathoming the depths of the human soul, Crébillon was most useful to the drama of his day, if only by the example of his rugged genius for inventing tense and tragic situations, in which very far-fetched mistaken identities helped to prolong the suspense. Voltaire himself used four of Crébillon's plots. Crébillon's *Works* have been often edited, best perhaps by Didot (1812). There is a *Life* by the Abbé de la Porte, and a discriminating critical essay on Crébillon's place in the development of French drama in Brunetière's *Epoques du théâtre français.* Consult also Dutrait, *Etude sur Crébillon* (1895), and C. H. Amanton, *Particularités sur les deux Crébillon* (1835).

CRÈCHE. See Nursery, Day Nursery.

CRÉCY, krā'sē'. A small town of France, in the Department of Somme, on the Maye, about 12 miles north of Abbeville (Map: France, N., G 2). It is celebrated as the scene of a brilliant victory gained Aug. 26, 1346, by Edward III, with about 19,000 English and Welsh soldiers, over a French army amounting to about 60,000 men under the command of Philip VI. In this great battle vast numbers of the French nobility perished as well as King John of Bohemia and 11 other princes, who were fighting on the side of France. Altogether about 30,000 of the French army fell. At Crécy the Black Prince greatly distinguished himself and gained his spurs. Consult George, *Battles of English History* (New York, 1895), and Oman, *History of the Art of War* (London, 1898).

CREDÉ, krā-dā', Karl Sigismund Franz (1819–92). A German gynecologist, born in Berlin. He studied medicine in Berlin and in Heidelberg, and in 1852 was made director of the School of Midwifery and of the obstetric department of the Charité in Berlin. Four years later he was made professor of obstetrics and director of the lying-in hospital in Leipzig. His published works include the following: *Klinische Vorträge über Geburtshilfe* (1853–54); *Die preussischen Hebammen, ihre Stellung zum Staat und zur Geburtshülfe* (1855); *Observationes de Fœtus Situ inter Graviditatem* (1862–64); *Die Verhütung der Augenentzündung der Neugebornen* (1884); *Gesunde und kranke Wöchnerinnen* (1886); *Lehrbuch der Hebammen* (6th ed., revised by Leopold and Zweifel, Leipzig, 1897). From 1853 to 1869 he was coeditor of the *Monatsschrift für Geburtskunde* and, for many years, of the *Archiv für Gynäkologie.*

CRE'DENCE (It. *credenza,* belief, cupboard, ML. *credentia,* from Lat. *credere,* to believe). A side table, buffet, or sideboard, on which dishes were placed or kept before meals; a cupboard in which stores or household gear were kept. Also, in the ecclesiastical terminology of the Roman Catholic and Episcopalian churches, a small table or shelf near the altar or communion table on which the bread and wine are laid before being consecrated; in the Greek church it is called the *trapeza prothesis.* The Oxford movement was largely responsible for its reëstablishment in the Episcopal churches of Great Britain and America.

CREDI, krā'dē, Lorenzo di (1459–1537). A Florentine painter of the Renaissance. He was born in Florence and was a pupil of Andrea Verocchio, at the same time with Leonardo, and Perugino. His style was at first severe, like that of Verocchio, but in later life his manner became softer. He executed his work with great care—in fact, he paid almost too much attention to detail, and, though full of delicate sentiment, his pictures are lacking in originality. Throughout his life he was influenced by the quality of Da Vinci's art. His favorite subject was the Madonna and Child, fine examples of which are in the Louvre, the National Gallery, London, and the galleries of Dresden, Turin, Mainz, and the Holden collection, Cleveland. He also painted the "Adoration of the Shepherds" many times, among the finest examples being those in the Querini Stampaglia Gallery, Venice, and the Florence Academy. Credi is seen at his best in the "Annunciation" and the "Venus" in the Uffizi. He is represented in the Metropolitan Museum, New York, by a "Madonna Adoring the Christ Child" and in the Boston Art Museum by a beautiful boy's head. He was also a sculptor, and was designated by Verocchio to complete his statue of Colleoni.

CRED'IT (Fr. *crédit,* from Lat. *creditum,* a loan, neut. p.p. of *credere,* to trust). In political economy this term indicates broadly the confidence which is reposed in the ability and purpose of men to meet future obligations. It is defined by J. S. Mill as permission to use another's capital, and by H. D. MacLeod as "a right of action." While it rests etymologically upon trust in human nature, the term embraces many operations in which this plays a small part, in which by the establishment of claims to portions of the debtor's estate the creditor assures himself of the repayment. A familiar illustration of such transactions are the loans of bankers upon collateral security.

From an objective point of view the essence of a credit transaction is that on one side the transfer of goods or money is immediate, on the other that the return is deferred. Personal credit resting solely upon the good faith of the creditor is the earliest form in which credit ap-

pears, and is still widely prevalent, as in the book accounts of retail merchants. But in the larger transactions of commerce credit could not have gained its prominent place without the intervention of instruments of credit. These assume various forms, notes, drafts, mortgages, bonds, etc.; but all have a common purpose—to insure the transferability of the claim against the debtor. Without them the lender—for whatever form the credit may assume it is always in the nature of a loan—must await the pleasure of the debtor or the termination of the contract before he can enter into possession of his own. With these instruments of credit he practically has control of his capital whenever he desires to use it. By transferring his claim to others he can secure his capital at any time.

Credit rests ultimately upon the fact that many persons possess wealth who have no present use for it and are willing that it should be employed by others. If circumstances arise, as in times of panic, when each seeks to secure for himself the actual possession of his wealth, then credit cannot be obtained, and those whose transactions require it must either pay exorbitant prices for it or be crushed out. This explanation of credit will serve to indicate the important function which banks play in the world of business. They are reservoirs of credit. In them are gathered claims upon the unemployed wealth of the community, and through them this wealth is directed by loans into channels of usefulness. It is brought together in small and large quantities from all classes of persons who do not immediately need it, and who are unable or unwilling to loan it directly. From the point of view of individuals credit is frequently spoken of as capital, because, like capital, it increases their productive power. But credit from a national point of view is to be regarded as capital only in so far as it diminishes the amount of wealth which would otherwise lie idle and increases that which is devoted to productive purposes. An effective organization of credit does not produce wealth, but draws out wealth and enhances its usefulness. Hence a nation in which credit, as in Anglo-Saxon communities, is highly organized will have a higher productive capacity than one in which a primitive organization prevails. Credit is not without its dangers, and when the credit organization is out of joint the results are disastrous. This is the price of progress. As the disasters to a railroad express train are more severe than those which overtake the lumbering wagons which preceded it, so the commercial disasters of a highly organized nation with a broad development of credit are more serious than those of less advanced peoples. The remedy is not to go back to the wagons, but to apply every device to insure the safety of the modern vehicle. For a clear analysis of credit, consult: MacLeod, *Theory of Credit* (London, 1889–91); Dunbar, *Chapters in the History and Theory of Banking* (New York, 1892); *Report of Comptroller of the Currency, 1896;* Veblen, *The Theory of Business Enterprise* (New York, 1904); W. C. Mitchell, *Business Cycles* (Berkeley, Cal., 1913); Taylor, *The Credit System* (New York, 1913). See BANK, BANKING; CRISIS, ECONOMIC.

CREDIT, AGRICULTURAL. See RURAL CREDIT.

CREDIT, LETTER OF. This term is applied in general to commercial instruments, usually in the form of a letter in which one party addresses a second, requesting him to pay certain sums of money to a third. It is in effect a draft, except that the amount to be paid is stated, not absolutely, but as a maximum not to be exceeded. It presupposes that arrangements exist by which the party who sends the letter shall reimburse him who makes the payment. Such letters of credit may be drawn on one or on several parties, being in the latter case sometimes called "circular letters of credit." They are much used by travelers, and the leading houses issuing them have correspondents in all parts of the world. Those who issue them are generally so well known to the banking fraternity that any banker, whether a correspondent or not, will, upon proper identification, make payment on the letter. When the letter is issued, the person to whom it is given either pays outright the amount named in the letter, or furnishes acceptable security that the maker shall be reimbursed for the drafts upon him.

The alternative for the letter of credit is the travelers' note. This differs from the letter in being issued in coupons, sometimes expressed on the face of the coupons for the currencies of other countries. Such travelers' notes were formerly issued extensively by the Cheque Bank of London, but the business in the United States has recently passed largely into the hands of the express companies. Such travelers' notes are sometimes designated "circular notes."

CRÉDIT FONCIER, krā'dē' fôN'syā' (Fr., landed credit). The French name for a method of borrowing money on the security of landed property which is widely practiced in France and other continental countries. The borrower takes a loan, in return for which he contracts to make certain annual payments, which are so adjusted as to make provision for the interest and for the gradual extinction of the principal, which is fully paid when the term of the contract has been concluded. These contracts are generally made with companies organized for the purpose of loaning their capital in this fashion. Another variety of this form of credit is found in the *Pfandbrief* institute of the large landowners of Germany. Loans are made in the same way, but in return for the debt the borrower receives the securities of the association. He does not actually contract a debt until he sells these securities, which he may do in whole or in part.

CRÉDIT MOBILIER, SOCIÉTÉ GÉNÉRALE DU, krā'dē' mō'bē'yā'. A financial institution chartered by the French government in 1852, with a capital of 60,000,000 francs. As its name indicates, it was intended to furnish loans on personal property, in contrast to the various crédit foncier institutions, which loaned upon real property. The declared object of the new bank was especially to promote industrial enterprises of all kinds, such as the construction of railways and the opening of mines, by placing loans and handling stock. Various privileges were conferred upon it under its charter; among others it was allowed to acquire shares in public companies, and to pay calls made upon it in respect of such shares by its own notes or obligations; also to sell or give in security all shares thus acquired. The operations of the society were conducted upon a very extensive scale. In 1854 it subscribed largely to the government war loan, raised during the Crimean campaign, to the Grand Central Railway Company, to the General Omnibus Company of Paris,

and to various other important undertakings. The dividend declared for 1854 was 12 per cent. In 1855 it loaned two sums to the government—the one of 250,000,000 and the other of 375,000,000 francs, its operations were vast during this year, and the net dividend declared amounted to 40 per cent. The directors then proposed to avail themselves of their privilege of issuing their own obligations under two forms—the one at short dates, the other at long dates, and redeemable by installments. The proposed issue was to amount to 240,000,000 francs; but the public became alarmed at the prospect of so vast an issue, and in March, 1856, the French government prohibited the carrying out of the proposed scheme. This was a severe blow to the institution. In 1856 its dividends did not exceed 22 per cent; in 1857 they were only 5 per cent. Several attempts to resuscitate its credit failed, and finally, in November, 1871, it was reorganized and put under a new board of management. In 1877 its assets were 77,000,000 francs, but its shares, the par value of which was 500 francs, sold for 200 francs only. In 1878–79 the capital was first reduced to 32,000,000 francs and then raised to 40,000,000. In 1884 it was reduced to 30,000,000 francs, but the company never regained its lost ground. The Crédit Mobilier was undoubtedly useful in developing the industrial power of France, but its operations were hazardous, and had they not been checked in time, they would in all probability have ended in disaster. See CRÉDIT MOBILIER OF AMERICA.

CRÉDIT MOBILIER OF AMERICA. A joint-stock company, whose alleged corrupt operations in connection with the building of the Union Pacific Railroad gave rise, in 1872–73, to the greatest congressional scandal in American history. The company was chartered as the "Pennsylvania Fiscal Agency" in 1859, was organized for a general loan and contract business in 1863, and was reorganized under the above name in 1867, for the purpose of building the Union Pacific. This work, completed in 1869, was paid for largely in stock and bonds of the Union Pacific, so that the stockholders of the two companies soon came to be identical. The Mobilier stock, at first almost worthless, soon began to pay enormous dividends; suspicions were aroused; and in the presidential campaign of 1872 the company was charged with gross dishonesty, and many prominent Republicans, including the Vice President, the Speaker of the House, three Senators, and a number of well-known Representatives, were freely accused by the Democratic press of having been bribed in 1867–71 to use their influence and votes in favor of the Union Pacific, the alleged bribes having consisted of the sale of Mobilier stock to the accused at prices below its actual value. A prolonged investigation, conducted in 1872–73 by special committees in both the Senate and the House, resulted in a recommendation of the expulsion of one Senator, upon which, however, no action was taken, and the censure of two Representatives, Oakes Ames of Massachusetts and James Brooks of New York, respectively, for having sold Crédit Mobilier stock to members of Congress "with intent to influence the votes of such members" and for having indirectly received such stock. The scandal caused intense excitement throughout the country, and the Mobilier Company met with almost universal execration; but subsequent investigation has shown that the charges were greatly exaggerated and were at least never conclusively proved. Consult: Crawford, *The Crédit Mobilier of America: Its Origin and History* (Boston, 1880); and Hazard, *The Crédit Mobilier of America* (Providence, 1881), the latter being a paper read before the Rhode Island Historical Society in February, 1881. For an impartial account of the affair, see Rhodes, *History of the United States from the Compromise of 1850*, vol. vii (New York, 1906).

CREDITON, krĕd'ĭ-ton; *colloquially,* kûr'ton, or **KIRK'TON.** A market town of Devonshire, England, in a valley on the Creedy, a tributary of the Exe, 8 miles northwest of Exeter (Map: England, C 6). Its chief industry is the manufacture of boots and shoes, also chemicals, tin plate, and confections. In the Middle Ages it was noted for its looms, and the saying "as fine as Kirton spinning" was proverbial. Crediton was the birthplace of the Anglo-Saxon Winfrid, or St. Boniface. It was the seat of the bishopric of Devonshire until 1050, when the see was removed to Exeter. Pop., 1901, 3974; 1911, 3640.

CREDITOR (Lat. *creditor,* one who trusts, from *credere,* to trust). In its broadest sense, any person in whose favor a legal obligation exists, whether that obligation arises from the mutual assent of the parties, as in the case of *contract* (q.v.), or from a rule of law, as in the case of a *tort* (q.v.), or from a judgment or decree of a court of competent jurisdiction. In legal parlance, however, as in ordinary usage, the term is ordinarily restricted to one who has voluntarily given credit to another.

A *general* (simple or unsecured) creditor is one who has no *lien* (q.v.) on any property of his debtor, but only a personal claim or right of action. If a lien on property has been given to him by way of collateral security, mortgage, or pledge, he is called a *secured* creditor. If the debtor or the law secures a priority to one creditor, or to a class of creditors over others, such favored ones are said to be *preferred creditors.* In the absence of statutory provision to the contrary, a debtor may pay one creditor in preference to others, or he may make an assignment for the benefit of creditors, and direct that one or more shall be paid in full before anything is paid to the others.

The common law gave certain creditors a priority over others. For example, creditors of a deceased person were to be paid out of his estate in the following order: (1) those having claims for funeral and probate expenses; (2) the State; (3) judgment creditors; (4) landlords having claims for rent, and bond creditors, i.e., those who held bonds or sealed contracts of the deceased; (5) creditors by simple contract. This order has been modified to some extent by statute in the different States, and such legislation must be examined for detailed information on this point. The United States Bankruptcy Law of 1898 secures a preference to workmen, clerks, or servants for wages earned within three months before the commencement of proceedings, not to exceed $300 to each claimant.

When a person obtains a judgment for money against another, he is called a "judgment creditor"; and if an execution is issued and levied, he becomes an "execution creditor." See ARREST; ATTACHMENT; DEBTOR; COMPOSITION; ETC., and consult the authorities there referred to.

CREDITOR'S BILL. A proceeding in equity by a creditor to reach assets which could not be levied upon under a common-law execution because of their character or the disposition made of them by the debtor. Thus an interest of a debtor in a trust estate or property conveyed by a debtor in fraud of his creditors, not being legal assets in the hands of the former and therefore not subject to execution on attachment in a common-law proceeding, can be made available for the creditor only by a proceeding in equity. See BILL IN EQUITY.

CREDNER, krād'nĕr, HERMANN (1841–1913). A German geologist, son of the following, born at Gotha and educated at Clausthal, Breslau, and Göttingen. He made extensive geological investigations in North and Central America (1864–68), the results of which were published in the *Zeitschrift der Deutschen Geologischen Gesellschaft* and the *Neues Jahrbuch für Mineralogie*. In 1870 he became professor of geology at the University of Göttingen, and director of the Geological Commission for the Kingdom of Saxony. In 1895 he became regular professor of geology at the University of Leipzig. In addition to a geological chart of the Kingdom of Saxony (1877 et seq.), and numerous works on the geological formations of that country, his works include: *Elemente der Geologie* (8th ed., 1897); *Die Stegocephalen und Saurier* (1881–93); *Die Urvierflüssler des sachsischen Rothliegenden* (1891).

CREDNER, KARL FRIEDRICH HEINRICH (1809–76). A German geologist, born at Waltershausen, near Gotha. He studied at the universities of Freiberg and Göttingen, and in 1836 was appointed by the ducal government warden of the mint. In 1839 he became surveyor of mines, in 1850 mining councilor, and in 1854 state and mining councilor. He was in 1858 appointed by the government of Hanover superior mining councilor, and reporting councilor to the Finance Ministry, in which capacity he had under his supervision all the Hanoverian mining works, including the important ones of the Harz. From 1868 until his death he was mining privy councilor and director of mining in the Halle district. As a scientist, he was known for his study of the geology of those regions of Germany connected with his duties in the mining industry. He discovered a compound of oxides of copper and manganese, called in his honor "Crednerite," and published some valuable treatises, including *Versuch einer Bildungsgeschichte der geognostischen Verhältnisse des thüringer Waldes* (1855), and *Ueber die Gliederung der oberen Juraformation und die Wälder-Bildung im nordwestlichen Deutschland* (1863).

CREE, krē (possibly a corruption of *creek*). One of the largest and most important tribes of Algonquian stock, living chiefly in the British-American territories of Manitoba, Assiniboia, Saskatchewan, about Lake Winnipeg and the Saskatchewan River, and eastward around James Bay. They are on friendly terms with the Assiniboin, but until brought under government control were constantly at war with the Sioux and Blackfeet. They have numerous bands, commonly grouped under two main divisions, viz., Plains and Wood Crees. Soon after obtaining firearms from the traders they began a war of conquest against the weaker Athabascan tribes, as far even as the Great Slave Lake and the Rocky Mountains, but afterward retired to their present position. They number now probably 10,000, on several reservations within the territories mentioned. Consult Skinner, *Notes on the Eastern Cree and Northern Saulteaux* (American Museum of Natural History, 1911).

CREECH, THOMAS (1659–1700). An English translator. He was educated at Wadham College, Oxford, elected fellow of All Saints College in 1683, and was head master of Sherborne School from 1694 to 1696. He afterward returned to Oxford and in a state of melancholy committed suicide. Creech was a man of solid learning. He translated Lucretius (1682); Horace (1684); elegies of Ovid, two eclogues of Vergil, some of Plutarch's *Lives*, Theocritus, thirteenth satire of Juvenal, etc. The *Lucretius* was long ranked by the side of Dryden's *Vergil* and Pope's *Homer*.

CREECH, WILLIAM (1745–1815). A Scottish publisher and author. He was born in Edinburgh, and in 1770 was the traveling companion of Lord Kilmaurs, afterward Earl of Glencairn, on the tour of that nobleman through central and western Europe. His publisher's shop in Edinburgh was much frequented by men interested in literary pursuits. Among the works published by him were those of Burns, Blair, Beattie, Cullen, Mackenzie, and other notables of the time. He made a rather poor translation of Horace, and this led Pope, in the preface to his imitation of Horace, to add the couplet:

> "Plain truth, dear Murray, needs no flowers of speech,
> So take it in the very words of Creech."

Burns's poem *Willie's Awa'* was addressed to him.

CREEDE. A city and the county seat of Mineral Co., Colo., about 165 miles (direct) southwest of Denver, on the Denver and Rio Grande Railroad (Map: Colorado, C 4). It is in a narrow gulch on Willow Creek, high up among the mountains, and is engaged exclusively in mining, having been formerly noted for its highly productive silver mines. Since 1903, however, the mining of lead and zinc has been more profitable. Wagon Wheel Gap, Hot Springs, and Antelope Springs are of scenic interest and make the region attractive for tourists. Creede was founded in 1890 by N. C. Creede, who had established a mining claim there the previous year. It was nearly destroyed by fire in 1892, the year of its incorporation. Pop., 1910, 741.

CREED'MOOR. A village on Long Island, in the county of Queens, now included in New York City, 14 miles east of the borough of Brooklyn (Map: Greater New York, G 5). The rifle range located here was founded as a private enterprise by the National Rifle Association and was later acquired by the State of New York. It is now being used by the New York State Armory Commission. Creedmoor is the seat of a State Insane Asylum. Pop., 1914 (est.), 600.

CREED OF PIUS IV. See PIUS IV, CREED OF.

CREEDS AND CONFESSIONS (AS. *crēda*, OF., Fr., Prov., Portug., Sp., It. *credo*, creed, from Lat. *credo*, I believe, the first word of the Apostles' and Nicene creeds). The names given to the authorized expressions of the doctrine of the Church at large, or of the several main sections into which it is divided. Such statements of doctrine sprang up naturally in the course

of the Church's progress. As controversy and discussion arose, the final opinion of the Church was expressed in a clear, definite, and compact form. The great creeds mark the climax of successive controversial epochs in the Church and are the varying expressions of the *Christian consciousness and reason*, in their efforts more completely to realize, comprehend, and express the growing thought of the Church. Each creed was evolved to meet a special need.

We find that the creeds of Christendom increase in complexity, in elaborate analysis and precision of doctrinal statement, as they succeed one another. The first are comparatively brief and simple in sense and form; the last are prolix and largely didactic. From the Apostles' Creed to the decrees of the Council of Trent, or the chapters of the Westminster Confession of Faith, there is a wide change, during which the Christian consciousness has grown from a comparatively simple faith to a body of comprehensive critical opinions.

In the Christian Church creeds may be divided into ecumenical creeds, Oriental creeds, the creeds of the Catholic church after the Reformation, and the creeds of the Protestant churches. Ecumenical creeds are those which arose before the great historic divisions of the Church, and which are recognized as being the expression of the faith of the early united Church, at least in the West. The simplest, and in its original form the earliest, is that called the Apostles' Creed. The name is a misnomer, the result of a late tradition. The early form of the creed is known as the Old Roman Symbol and was used as a baptismal confession in the church at Rome. Its earliest preserved form in Latin is given by Rufinus (c.400), who, in commenting on the creed used in his church at Aquileia, Italy, gives the variations between it and the Roman form. A Greek version is given by Marcellus of Ancyra, in Galatia (336–341). These do not agree exactly. Tertullian and Irenæus, at the close of the second century, give such informal quotations as make it possible to reconstruct the creed used in Rome between 150 and 200. In English such reconstructions are available in McGiffert's *The Apostles' Creed* (New York, 1902) and an article by Harnack, *Nineteenth Century*, July, 1893. The following is from McGiffert: "I believe in God the Father Almighty and in Christ Jesus His Son, who was born of Mary the Virgin, was crucified under Pontius Pilate and buried; on the third day rose from the dead, ascended into Heaven, sitteth on the right hand of the Father, from whence He cometh to judge the quick and the dead; and in the Holy Ghost, and resurrection of the flesh." This earliest symbol seems to have been made to guard the Church against the Gnostic (q.v.) heresies, which were rife in Rome in the second century; perhaps especially against the doctrines of Marcion (q.v.), who held that Jesus was not the son of the Creator of the world, but of a higher God; that he was wholly spirit, and so was not born in the flesh, did not die nor rise in the flesh; and that the Christian resurrection is from the flesh, not in the flesh. The creed, with its omission of all mention of the ministry and teaching of Jesus, affirms exactly the points that the Gnostics denied. (In both Greek and Latin forms it states the resurrection of the flesh, not of the body, as in the English translation.) The most important of the clauses added before the time of Rufinus were "holy church, and forgiveness of sins." These seem to reflect the Novatian controversy, as to whether the Church could remain holy if it forgave and took back those who had lapsed under the stress of persecution. In the sixth century Rome dropped the use of the Apostles' Creed and put the Nicene Creed in its place as a baptismal symbol. Perhaps this was the better to exclude Arians, who near the end of the fifth century took Rome. Meantime the Roman Symbol lived on, with various changes, in the provinces, and at last, in the time of Charlemagne, was brought back to Rome in its final form, probably from southern Gaul. From here it spread, in the ninth and tenth centuries, throughout the Western church. The first quotation of it in its final form is given in a book entitled *Scarapsus*, by Pirminius, a Benedictine missionary in southern Germany (c.730). Consult Harnack, in Herzeg, *Apostolisches Symbolum*, also his *Geschichte der altchristlichen Litteratur* (Leipzig, 1893).

The *Nicene*, or rather the Niceno-Constantinopolitan, Creed sprang out of the conflict, which had begun even in the second century, as to the explanation of the Christ. From the beginning Ebionitism had looked upon Christ as merely a Jewish teacher of distinction; Theodotus and Artemon openly taught such a doctrine in Rome towards the close of the second century. Others, on the contrary, taught a doctrine which identified Christ with God absolutely in such a manner as to destroy all distinction of persons in the Godhead. Monarchianism, as it was called, which held rigorously and formally to the unity of God, was the ruling principle of both doctrines, opposite as were the expressions it assumed in the two cases.

The controversy thus begun in the second, perpetuated itself in the third, century under various modifications. The problem was to explain the divine nature of Christ. Arius, a presbyter of Alexandria, brought forward the doctrine that Christ, although in a true sense divine, or the Son of God, was yet not the very God. He denied that He was "of the substance of God," or "without beginning"; He was only the highest created being, "promoted" to divinity, but not the same in substance with the Father, nor equal with Him in power and glory. Athanasius, also an Alexandrian, came forward as the opponent of Arius.

The Council of Nicæa was summoned in 325 by Constantine, with the view of settling this controversy, and the Nicene Creed was the result. There were three parties in the council—the Athanasians, or extreme orthodox party; the Eusebians, or middle party; and the Arians, or heretical party. The heretics were few in number and possessed but little influence; but the Eusebians were a strong party, and for some time resisted certain expressions of the orthodox or Athanasians, which seemed to them extreme and unwarranted; but at length the Homoöusians, as the Athanasians were called, carried the day; and Christ was declared not merely to be of *like* substance (*homoiousios*), but of the *same* substance (*homoöusios*) with the Father.

The creed was formed by extending the Apostles' Creed to include the new definitions. The essential parts are: "And [I believe] in one Lord Jesus Christ, the only-begotten Son of God; begotten of the Father before all worlds,

Light of Light, very God of very God, begotten, not made, consubstantial [of one substance, *homoöusios*] with the Father." The Council of Constantinople (381) simply reaffirmed this creed. Later the so-called Niceno-Constantinopolitan Creed arose by the incorporation of the Nicene Creed in the baptismal confession of the Church at Jerusalem, and was erroneously recognized by the Council of Chalcedon (451) as the creed of Constantinople. It adds definitions as to the Holy Spirit, "Lord and Giver of Life, proceeding from the Father [Latin form adds "and the Son" (see FILIOQUE)] who with the Father and Son together is worshiped and glorified, who spake by the prophets." It also adds the word "one" to the definitions of the Church and of Baptism, putting the latter, "We confess one baptism for remission of sins." See NICENE CREED.

The Nicene Creed affirmed the full divinity of Christ, but left undefined the relation of His human nature to His divine nature. A series of controversies arose (see CHRISTOLOGY) which finally issued in the creed of the Council of Chalcedon (451). This creed affirms that Christ "is consubstantial with the Father according to His Godhead, and consubstantial with us according to His manhood—two natures concurring in one person and one substance." This was the final statement of a full and complete humanity and divinity of Christ.

This series of creeds still leaves a certain subordination of Christ to the Father, which was always congenial to Greek thought. The Athanasian Creed does away with the last vestige of subordination and affirms the perfect equality of Christ and the Father. This creed—often called, from its first words, the *Quicunque Vult*—originated in the Latin church, perhaps in Gaul or Africa, after the fifth century. It is first found in its modern form not earlier than the close of the eighth century and was never given full authority in the Greek church. It seems to rest on expressions from Augustine. It is longer than the earlier creeds, and affirms that belief in the equality of the persons of the Godhead is necessary for salvation. "The Father is God, the Son is God, and the Holy Spirit is God, and yet there are not three Gods, but there is one God." See ATHANASIAN CREED.

The creeds of the Oriental churches are of less importance. The Orthodox Greek churches, priding themselves on their unchanging adherence to the ecumenical creeds, have found little need for new creeds. The most important are the confession or catechism of Peter Mogila (1640), the Decrees of the Synod of Jerusalem (1672), and the Confessions of Gennadius (1453) presented to the Sultan as a statement of the Christian faith. The Russian standards are embodied in the Longer and Shorter Catechism of Philaret (1839, 1840). After the Athanasian Creed no important symbol was produced in the Western church till the Reformation. At that time new creeds and confessions began to spring up. On the one hand, Protestantism had to defend and state its position and its scriptural authority, and, on the other hand, the Church of Rome, after many delays, gave forth at the Council of Trent (1545–63) an extended creed. This creed was the result of patient and long-continued labor, and is an elaborate statement of the position of the Roman Catholic church on all the subjects of the controversy in the Reformation. It is divided into Decrees and Canons. The Decrees are the full statements of doctrines, and the Canons following the several Decrees are brief statements and condemnations of the opposing positions, ending with anathemas. The creed is one of the greatest, clearest, and most important statements of religious belief that any of the religions of the world possesses. The *Decrees of Trent*, with the additions made in 1854 and 1870, are the fixed authoritative symbol or confession of faith of the Church of Rome. See TRENT, COUNCIL OF.

Of the Protestant churches, the most notable confessions of faith are the Lutheran; the Continental Calvinistic or Reformed; the Anglican, or Thirty-nine Articles of the Church of England; and the Puritan, or Westminster Confession of Faith.

The Lutherans call their standard books of faith and discipline *Libri Symbolici Ecclesiæ Evangelicæ*, and reckon among them, besides the three Catholic creeds, the Augsburg Confession, 1530 (q.v.), the Apology for that confession by Melanchthon, the Articles of Smalkald drawn up by Luther, 1537, Luther's catechisms, 1529, and, in some churches, the Formula of Concord, 1576, or the Book of Torgau.

The most important of these is the Augsburg Confession, which is a statement, clear in expression and moderate in tone, of the points on which the German reformers agreed with and differed from the Roman church and also on which they differed from the Zwinglians and the Anabaptists. It touches on practically all the points regarded as important to Christian belief in that period.

The Reformed (Calvinistic) churches produced over 30 creeds. Most of these were either local or were superseded by later creeds. No one has the universal authority among the Reformed churches that the Augsburg Confession has among the Lutherans. The First Helvetic Confession (1536) was the earliest reformed creed of national authority, but was superseded by the Second Helvetic Confession (1566). These represent the Zwinglian theology of the Swiss reformers. The Gallican Confession (1559) is based on a first draft written by Calvin, and was the creed of the French churches. Netherland Calvinism produced the Belgic Confession (1561), the Canons of the Synod of Dort (1619), against the Arminians, whose *Remonstrance* is in the form of a brief creed (1610). Calvinism in Germany issued the Tetrapolitan Confession (1530) and the Heidelberg Catechism (1563). These creeds are authorities in the Dutch and German Reformed churches.

England has produced two important creeds. For the *Thirty-nine Articles* of the Church of England see ARTICLES, THE THIRTY-NINE. They were originally 42 and are supposed to have been chiefly composed by Cranmer. In 1571 they were revised and approved by Convocation and Parliament. The Lambeth Articles, 1595, and the Irish Articles, 1615, became of great importance as affecting essentially the contents of the next great creed, the Westminster Confession of Faith. This was the product of the great Puritan agitation of the seventeenth century. It was produced by the Westminster Assembly (q.v.), was completed in the third year of the Assembly's sessions (1646), and laid before Parliament in the same year. It was approved by the General Assembly of the Church of

Scotland in 1647, and again in 1690, taking the place of the Scottish Confession, a Calvinistic creed which had been the standard from 1560 to 1688.

The Confession of Faith is the latest of the great Protestant creeds, and the creed of the Presbyterian churches throughout the world. It is also one of the most elaborate of all creeds. It extends to 33 chapters, beginning with *Holy Scripture* and ending with *The Last Judgment*. The tone of the doctrinal chapters is that of the later and formal Calvinism which spread from Holland among the English Puritans. The ecclesiastical spirit is Puritan-Presbyterian. "God alone" is declared to be "Lord of the Conscience"; yet the "publishing of opinions contrary to the light of nature, or to the known principles of Christianity," is at the same time declared to be matter of censure by the church and of punishment by the civil magistrate. See COVENANTS.

The work of forming creeds did not, however, cease with Westminster. The great Methodist revival in the eighteenth century led to a revision of the Articles of the Church of England for the use of the newly arisen body; the Unitarian controversy in New England at the beginning of the nineteenth, to the formation of many more or less elaborate church and seminary creeds. The Congregationalists of America put forth a new creed in 1883, the Presbyterians of England one in 1900, and the Northern Presbyterian Church of the United States in the General Assembly of 1902 adopted the revision of certain articles of the Confession of Faith and a declarative statement of 16 articles, which was substantially a new creed. The best work on the subject is: Schaff, *Creeds of Christendom* (3 vols., New York, 1877–78), history and texts. Consult also: Winer, *Comparative View of the Doctrines and Confessions of the Various Communities of Christendom* (Edinburgh, 1873); Green, *The Christian Creed and the Creeds of Christendom* (London, 1898); Curtis, *History of Creeds and Confessions* (Edinburgh, 1911).

CREEK CHUB. The horned dace. See DACE.

CREEK FISH. See CHUB SUCKER.

CREEKS (so called from the numerous creeks running through their land), or MUSCOGEE, mŭs-kō′gē (Algonquin *maskoki*, creeks). An Indian confederacy, formerly holding the greater portions of Alabama and Georgia, and second in importance among the Gulf tribes only to the Cherokee. The ruling tribe was the Muscogee, whose language was the court language, besides which there were the Alabama, Hichitee, Koasati, and others of the same Muskhogean stock, with the Uchee and Natchez (q.v.), and a considerable incorporated band of Shawano. The Seminole of Florida were an offshoot from the Muscogee confederacy. They were agricultural, but warlike, living in villages of log houses, plastered on the outside with clay, and arranged in a rectangle about a central space reserved for public ceremonies, chief of which was the annual "busk," or green-corn dance. In the Colonial wars and during the Revolution they generally adhered to the English side. They made a treaty of peace with the United States in 1790, but in 1813, instigated by the English, again took up arms against the Americans, beginning hostilities by the terrible massacre of Fort Mims. They were completely crushed by General Jackson in a brief but bloody campaign, in three battles in which they lost respectively 200, 300, and 800 warriors killed. Utterly broken, the Creeks were compelled to sue for peace, which was granted only on submission to a peremptory "demand" for the surrender of more than half their ancient territory. Other cessions quickly followed, until in 1832 they sold all their remaining territory and agreed to remove beyond the Mississippi to their present habitat in Oklahoma. A few small groups, however, still reside in Alabama and other States. Like the other Southern tribes, they were divided in sentiment during the Civil War and suffered severely in that struggle. Under the name of the "Creek Nation" they formerly conducted an autonomous government, similar in form to that of the Cherokees (q.v.). In 1910 the Creeks proper numbered 6945. See MUSKHOGEAN STOCK.

CREEL′MAN, JAMES (1859–1915). An American editor and newspaper correspondent, born in Montreal, Canada. He was first associated with the New York *Herald* (1877) and eventually became editor of its London and Paris editions. During the war between China and Japan he was correspondent for the New York *World* in 1894, and in the Turco-Greek War for the New York *Journal* in 1897, and this paper he also represented at Santiago during the Spanish-American War, where his gallant conduct met with wide and well-deserved recognition. He was a voluntary aid on General Lawton's staff during the Philippine insurrection. From 1900 to 1906 he was a special and editorial writer on the New York *World*, and from 1906 to 1910 was associate editor of *Pearson's Magazine*. He was a member of the New York Board of Education (1911–12) and president of the Municipal Civil Service Commission (1911–13); and during the following year covered important political assignments for the *Evening Mail*. His publications include: *On the Great Highway: Wanderings and Adventures of a Special Correspondent* (1901); *Eagle Blood* (1902); *Why We Love Lincoln* (1908); *Diaz, Master of Mexico* (1911).

CREEP (from *creep*, AS. *crēopan*, Icel. *krjapa*, OHG. *chriochan*, Ger. *kriechen*, to creep). A miner's term for the depression which takes place in underground workings from the removal of beds of coal or ore. Masses of the coal seam, like huge pillars, are left by the miners for the support of the superincumbent strata; the pressure, however, of these beds is so great that in course of time the roof gradually sinks, or, as is more frequently the case, because of the roof consisting of hard rock, the softer shale pavement rises up, until the intervening spaces between the pillars, left by the removal of the coal, are filled up. A consequent depression takes place in the beds above, as also an alteration of the surface level. But this, being so gradual, is seldom noticed, except when it is made evident from the accumulation of surface water, or in districts where railways pass over the coal fields. The term is also used in geology to designate the movement of soil or rock outcroppings down a slope.

CREEP′ER. A name very generally applied to any bird, especially if of small size, which seeks its food by running or creeping about upon the trunks of trees. It is more properly applied to the members of the family Certhiidæ and especially of the genus *Certhia*. They have

CREEPERS

1. BANANA QUIT (Ccereba bahamensis).
2. NATAL COLLARED SUNBIRD (Anthothreptes collaris).
3. HAWAIIAN OŌ (Acrulocercus nobilis).
4. SLENDER-BILLED HONEYEATER (Acanthorhynchus tenulrostris).
5. AMERICAN BROWN CREEPER (Certhia familiaris americana).
6. PARSON BIRD (Prosthemadera novæ-zealandiæ).
7. ALPINE WALL-CREEPER (Tichodroma muraria).

a slender, arched, and pointed bill; a long, narrow, sharp-pointed tongue, jagged near its tip; the tail rather long, and the tips of the tail feathers firm and pointed, extending beyond the webs. The feet are rather slender; the hinder toe about as long as the other toes. Of this conformation of feet and tail great use is made in climbing trees, the stiff feathers of the tail being employed for support. Creepers display great agility in clambering, often back down, about the branches, and probe every cranny for hiding insects or insect eggs. They make their nests in crevices in trees, old woodpeckers' holes, etc. Although the family is large, it is doubtful if the genus contains more than one true species, the common streaked-brown creeper (*Certhia familiaris*), a bird found in all temperate parts of the Northern Hemisphere, wherever wood abounds. In the United States the word "creeper" is very generally used as a part of the name of several warblers, as the pine-creeping warbler (*Dendroica pinus*) and the black-and-white creeper (*Mniotilta varia*). In Jamaica the name is given to a small species (*Certhiola bahamensis*), otherwise known as "banana bird," because it frequents and nests in the banana trees. See HONEY CREEPER; TREE CREEPER.

CREEPING PLANTS. Plants whose stems run along the surface of the soil and root at intervals. See STEM; VEGETATIVE PROPAGATION.

CREESE, or **CREASE.** See KRIS.

CREFELD, krā'fĕlt. See KREFELD.

CREIGHTON, krā'ton, JAMES EDWIN (1861–1924). An American philosopher. He was born at Pictou, Nova Scotia; graduated from Dalhousie College at Halifax, N. S.; studied in Germany and received the degree of Ph.D. from Cornell University in 1892. He became connected with *The Philosophical Review* in its second year (1893), first as coeditor and subsequently as editor; he was also chosen the American editor of *Kant-Studien*. In 1895 he was appointed professor of logic and metaphysics in Cornell University, after having served in that institution as instructor and associate professor for six years. He helped to organize the American Philosophical Association and was its first president (1902–03). He published *An Introductory Logic* (1898) and some English translations of German philosophical and psychological works, and contributed frequently to philosophical journals. In 1900 he received the honorary degree of LL.D. from Queen's University, Canada.

CREIGHTON, krā'ton, MANDELL (1843–1901). An Anglican prelate and historian. He was born at Carlisle, Northumberland, graduated from Merton College, Oxford, in 1866, with the highest honors, and continued there as tutor until 1873. In 1870 he became deacon, in 1873 priest, and in 1875 assumed the college living at Embleton in his native shire. He was appointed rural dean of Alnwick in 1879, honorary canon of Newcastle in 1882, and professor of ecclesiastical history at Cambridge in 1884. In 1891 he became Bishop of Peterborough and remained there until 1897, when he was transferred to the see of London and was made a Privy Councilor. He represented Emmanuel College, Cambridge, at the celebration of the two hundred and fiftieth anniversary of Harvard University (1886) and in 1896 attended the coronation of Czar Nicholas II as delegate of the Church of England. Dr. Creighton will be remembered as one of the ablest bishops of the see of London. His stanch high-churchmanship, striking and piquant personality, and incessant activity combined to make him the most notable Anglican divine of the nineteenth century. His historical writings are of great importance. Among them are: *The Age of Elizabeth* (1876; 14th ed., 1899); *History of the Papacy during the Period of the Reformation* (4 vols., 1882–87); *Cardinal Wolsey* (1888); *History of the Papacy from the Great Schism to the Sack of Rome* (new ed., 6 vols., 1907); *Life of Simon De Montfort* (new ed., 1905); *Historical Essays and Reviews* (1902); *Historical Lectures and Addresses* (1903). Consult his wife's *Life and Letters of Mandell Creighton* (2 vols., London, 1903; new ed., 1913).

CREIGHTON UNIVERSITY. An institution for higher learning, founded under the auspices of the Roman Catholic church, in 1878, at Omaha, Neb. The University includes departments of law, medicine, dentistry, pharmacy, and the college. There is also a high-school preparatory department. The total enrollment in these several departments in 1914 was 1116, divided as follows: law, 173; medicine, 187; dentistry, 117; pharmacy, 153; college, 112; high school, 374. The faculty numbered 150. The productive funds of the university amount to about $2,750,000, and the annual income to about $210,000. The library contains about 50,000 volumes. The president in 1914 was Rev. E. A. Magevney, S.J.

CREIL, krā'y'. The capital of a canton in the Department of Oise, France, on the Oise, 32 miles north of Paris by rail (Map: France, N., H 3). The parish church dates from the twelfth century; a ruined twelfth-century church is situated on an island in the river; and there are remains of a royal castle where Charles V was kept during his madness. Hardware, copper, machinery, bricks, tiles, glass, nails, and pottery manufactures are its chief industries. The Northern Railway has large repair shops, and near by are extensive engineering works. Pop., 1901, 9125; 1911, 10,214.

CREIZENACH, krī'tse-näg, THEODOR ADOLF (1818–77). A German poet and literary historian. He was born in Mainz, the son of Michael Creizenach, a famous Hebrew scholar, studied at Giessen, Göttingen, and Heidelberg, and was one of the founders of the Jewish Reform Society in Frankfort-on-the-Main. He embraced Christianity in 1854 and in 1863 was appointed professor at the Frankfort Gymnasium. He was a versatile writer, his poems, *Dichtungen* (1839) and *Gedichte* (1851), being distinguished by simplicity and an elegiac character. His publication of the correspondence between Goethe and Marianne von Willemer (1878) is a valuable contribution to the literature on the great poet.

CRELINGER, krā'lĭng-ĕr, AUGUSTE (DÜRING) (1795–1865). A German actress, born in Berlin. She made her first appearance at the Court Theatre, Berlin, May 4, 1812, subsequently became one of the most famous actresses of her day, and frequently appeared as a star at the leading theatres of Germany as well as in St. Petersburg. Sappho, Lady Macbeth, Iphigenia, Phädra, and Adelheid in *Götz von Berlichingen* were some of her favorite rôles. She excelled also in comedy parts and was distinguished alike for her beauty, numerous histrionic accomplishments, and consummate

artistic training. Her maiden name was Düring. She was married in 1817 to an actor, Wilhelm Stich, after whose death in 1824 she became the wife of a Berlin banker, Otto Crelinger.

CRELL, NIKOLAUS. See KRELL, NIKOLAUS.

CRELLE, krĕl'le, AUGUST LEOPOLD (1780–1855). A self-educated German mathematician. He was born at Eichwerder, near Wriezen, and was an architect by profession, but is chiefly known as the founder of the *Journal für reine und angewandte Mathematik* (Berlin, 1826). This journal gave expression to many of the greatest mathematical developments of the nineteenth century. Abel's proof of the impossibility of solving the general equation of the fifth degree by algebraic methods appeared in the first volume. Steiner, "the greatest geometrician since the time of Euclid," was a leading contributor, and Möbius intrusted to it the publication of his most important researches. Crelle wrote quite extensively on algebra, trigonometry, the theory of numbers, the theory of functions, and various subjects of mathematical physics. His chief works are: *Versuch einer allgemeinen Theorie der analytischen Facultäten* (1825); *Encyklopädische Darstellung der Theorie der Zahlen* (1843); *Sammlung mathematischer Bemerkungen* (1820–22); *Elemente der Geometrie und ebenen und sphärischen Trigonometrie* (1826–27). He was also editor of the *Journal der Baukunst.*

CREMA, krā'mȧ. An episcopal city in the Province of Cremona, north Italy, situated on the right bank of the Serio, 25 miles southeast of Milan (Map: Italy, D 2). The cathedral has a Romanesque façade, and the church of Santa Maria delle Grazie has interesting frescoes. The circular church of Santa Maria della Croce, 1 mile from the city, built in 1490, has an octagonal interior adorned with paintings by Campi. Crema also has a ruined castle and a technical school. The chief products of the district are wine, fruit, flax, hemp, rice, and cheese; lace, silk, and linen goods are manufactured here, which are famous throughout Europe. Crema was founded by the Lombards in the sixth century and suffered much during the wars of the Guelphs and Ghibellines. It was besieged, taken, and destroyed by Frederick Barbarossa in 1159–60. Pop. (commune), 1881, 9111; 1901, 9755; 1911, 11,411.

CREMA'TION OF THE DEAD (Lat. *crematio,* from *cremare* to burn; connected with Goth. *haúri,* coal, Icel. *hyrr,* fire). The process of disposing of the bodies of the dead by reducing them to ashes. Three methods of disposing of the bodies of the human dead have prevailed since the earliest times: simple exposure; burial in the earth, in caves, or in artificial tombs; and cremation. Among the factors which have determined which of these methods should be adopted by a nation or race have been physical conditions, such as the character of the soil and climate and the abundance or scarcity of fuel; sanitary considerations; and religious beliefs. Only the most uncivilized tribes have practiced simple exposure, depending on the elements and the wild beasts to dispose of the bodies of their dead. Such was the practice of the early Colchians, who, we are told, hung dead bodies on the limbs of trees while the Syrians abandoned their dead to wild animals.

Disposal of the Dead among the Ancients and among Uncivilized Tribes. Of the two methods employed by civilized nations, cremation and burial, the former is the one originally prevalent among the Indo-European races. The graves of north Europe throughout the Bronze age contain, not skeletons, but only urns for the reception of funeral ashes. The Egyptians, on the other hand, embalmed their dead; the Jews laid them away in sepulchres; and the ancient as well as the modern Chinese buried them in the earth. The Chinese, influenced by religious doctrine, now, as of old, insist on properly placed graves in their own land, and for this reason corpses are sent home from abroad. They do not have cemeteries specially set apart for the burial of the dead, but may bury them anywhere, and the frequent occurrence of these hallowed spots, which may not be desecrated, has proved a serious obstacle to railway projects. The dry, hot climate of Egypt made the embalming process possible, and the scarcity of fuel made it less expensive than burning. The same natural cause, lack of fuel, may have led to the practice of burial among the Jews and other tribes. Among the ancient Persians the bodies of the dead were exposed to the elements, as is the practice of the modern Parsis, or followers of Zoroaster. It is, however, probable that in some instances, especially in the case of kings, burial with a coating of wax was allowed. The ancient Greeks practiced both cremation and burial, the former being introduced by the Phrygians, and burial by the Egyptians. In Greece only suicides, unteethed infants, and persons struck by lightning were denied the right to be burned. Burial was forbidden within the walls of Athens. Among the Romans cremation was the general practice during the latter days of the Republic and through four centuries of the Empire. Many of the early American Indians burned their dead and disposed of their ashes in various ways. Recent excavations in Guerrero, Mexico, showed that the immense population which once inhabited this region incinerated their dead before burying them. The body was placed on a large slab in the bottom of a deep grave. It was then covered with a glowing mass of coals and embers, on top of which was placed another slab, elaborately carved. Two plain slabs were placed above, and after the body was consumed the grave was filled with earth.

Cremation was once common in England and was but slowly supplanted by inhumation. The same is true of the Gallic and Germanic races. It is said that Charlemagne, in his zeal for Christian burial, punished the act of cremation with the death penalty. Cremation is still practiced in India and among some other Oriental nations. In Japan the Shinto sect practices burial, and the Monto sect cremation.

While natural causes undoubtedly had a great influence in determining the method of disposal, especially in very early times, religious belief in the resurrection of the physical man has usually been the chief factor which has caused the spread of the custom of interment rather than the more sanitary method of disposal by fire. The Egyptians, Jews, Mohammedans, and Christians all believe more or less fully in the physical resurrection of the body; and the question arises, whether cremation does not impair the prospect of a future life. With the spread of Christianity burial was substituted for cremation, both in the heart of the Roman Empire and among the converted pagans on its outskirts.

The Roman Catholic church remains actively opposed to cremation. Decrees of Roman Congregations from 1884 to 1892 prohibit burning the bodies of the dead. In 1300 Boniface VIII condemned analogous practices. Some of the reasons why the Roman Catholic church is rigidly opposed to cremation (though her decision relates not to doctrine but to discipline) are that burial conserves an old tradition, that the rituals of cremationists savor of irreligion, and that it is still an unproved thesis that cremation benefits the race more than burial. Its precise position has been defined by one of its clergy as follows: 1. The church is opposed to cremation. 2. If a dying person declares his resolve to have his body cremated, priests will not give him the sacrament nor bury him with Catholic rites. 3. But if the body is to be cremated against the will of the deceased, it may be brought to the church for mass or blessing, or blessed at the home where the deceased died. After the cremation the ashes without any religious service may be deposited in consecrated ground. The priest, however, may not accompany the body to the crematory for any rites, nor even for social or civil reasons. Consult addresses of the late James R. Chadwick, former president of the Cremation Society, Boston.

Many Protestant clergymen are actively in favor of this method of disposing of the dead.

Arguments for and against Cremation. Within the last few decades the conviction has spread that a more rapid and sanitary method of disposal must be substituted for burial, especially in the great centres of population. To find enough land for burial purposes is becoming a more and more difficult matter. If 4000 corpses are crowded into an acre, and a mortality rate of 15 per 1000 be assumed, then nearly four acres per 1,000,000 population are required annually to bury the dead. A similar computation of population, death rate, and space required for burial will show that, unless the custom is changed, much of the available space in the vicinity of all large cities will eventually be required for burial purposes.

The sanitary objections to burial are of still greater importance than the economic difficulties. In 1900 Sir Henry Thompson, in an address before the Cremation Society of England, advocated that while cremation remained optional for ordinary cases, it should be made obligatory when death is due to such transmissible diseases as smallpox, diphtheria, scarlet fever, typhoid fever, and tuberculosis. In cases of epidemics and after battles, when there are large numbers of bodies to be disposed of at once, cremation seems especially advisable.

An objection to cremation, in the minds of some, is that trace of the dead is obliterated from the sight of the living. But the condition and ultimate fate of graveyards, especially in the heart of great cities, is a proof that in many cases such memorials are but transitory. In continental Europe an average of 25 years is allowed for the occupancy of a grave, after which, in most cases, the ownership reverts to the municipality and the grave may be opened again. See CEMETERY.

Aside from the sentimental objection to cremation already mentioned, the chief argument against cremation is the medicolegal one, that with the burning of the body possible traces of crime are obliterated. Frederick L. Hoffman, in a paper on "Cremation as a Life Insurance Problem" (*Sanitarian* for January, 1901), calls attention to this phase of the subject and points out that 64 of the 528 persons cremated at St. Louis, Mo., in 1895–99 died from accidents, violence, or suicide. In view of the number of murders, by poison or otherwise, that are committed to obtain insurance money, it is recommended that very special precautions be taken to ascertain the exact cause of death before issuing a permit for cremation. To meet this difficulty, the Cremation Society of England investigates the conditions of death in the case of every body for whose incineration application is made. It has also secured the services of a distinguished pathologist to make autopsies when necessary.

History of the Modern Cremation Movement. In Great Britain the revival of the practice of cremation was discussed as early as 1658, when Sir Thomas Browne published his *Hydriotaphia, or Urn Burial.* During the early part of the nineteenth century, Dr. Lord, health officer for Hemel Hempstead, continued to agitate the subject, but no practical results were achieved. In 1874 Sir Henry Thompson organized the Cremation Society of London, whose object is to introduce some rapid process of disposal which cannot offend the living and shall render the remains absolutely innocuous. A crematory was erected at Woking, near London, and here the first incineration took place in 1885. The first municipally owned crematory was opened for use at Hull in 1901. The *British Medical Journal* of June 14, 1913, states that the yearly numbers of cremations has doubled since 1904, but the numbers are still insignificant.

In France, after much agitation, a law was passed in 1887, legalizing the practice. Soon after the city of Paris erected a crematory, where cremation is compulsory for certain classes, including all unclaimed hospital dead, the remains from dissecting tables, and dead bodies from streets and sewers. Other crematories have been erected.

In Italy the subject was continually agitated by scientific societies after 1852, and finally the incineration of human dead was made legal by a provision to that effect in the National Sanitary Code. The process has rapidly grown in favor, and there are crematories in most of the larger cities.

In Germany the subject was discussed at scientific meetings almost as early as in Italy, but greater legal difficulties were encountered, and at first little was accomplished. At present Germany leads in the movement. Six crematories were built in 1913, making about 40 in the Empire, at which it is estimated that over 10,000 cremations were performed in 1913.

In the other countries of Europe cremation seems to be gaining ground. There were two crematories in Norway in 1912, where 143 were incinerated. The first crematory in the Netherlands was built in 1913, near Amsterdam. The same year a crematory was built in Cairo, Egypt.

The first place in the United States where the subject of cremation was systematically agitated was in New York, in 1873, but it was not until 1881 that a crematory was built for the use of its population. In the meantime a few cremations were made in private furnaces at Washington, Pa., and Salt Lake City. During the last decade of the nineteenth century the movement grew rapidly, and at the close of the cen-

tury 24 crematories were in operation, at which 13,281 bodies had been reduced to ashes. The latest statistics available are for the year 1911, when the total number of cremations (including those in one Canadian city) had risen to 62,465. These were distributed among 38 crematories at the following places: Boston, Cambridge, and Springfield, Mass.; New York City, Buffalo, Troy, and Waterville, N. Y.; Chicago; Cincinnati and Cleveland, Ohio; San Francisco, Los Angeles, Pasadena, Sacramento, and Oakland, Cal.; Milwaukee, Wis.; Davenport, Iowa; Minneapolis and St. Paul, Minn.; Indianapolis and Fort Wayne, Ind.; Denver, Colo.; Baltimore, Md.; Philadelphia, Lancaster, and Pittsburgh, Pa.; Portland, Oreg.; Detroit, Mich.; St. Louis, Mo.; Seattle and Tacoma, Wash.; Washington, D. C.; Montreal, Canada. It appears that the growth of cremation is most rapid on the Pacific coast, and it is stated that in Oakland and Pasadena the number of incinerations has equaled 50 per cent of the number of deaths. Philadelphia operates the first municipally owned crematory in the United States; here the remains of unclaimed dead and those who die in the pest house are incinerated. In 1913 a contract was let by the national government for the erection of a crematory in the canal zone. The same year a national organization was formed, and the First National Cremation Convention met at Detroit. Hugo Erichsen, M.D., was made president.

Method of Cremation. In the earlier furnaces body and coffin were burned separately, but in the latest furnaces the remains are incinerated in the casket, without handling, as received. A chapel is connected with the crematorium, where services may be held if desired. The casket is then lowered into the incinerating room, and, after metal handles and name plate are removed, introduced into the retort. The heat is so intense that after a few hours only the ashes of the bones remain, all else, including the structure of the casket, having disappeared in light ash or gaseous products. Screws and nails are removed by a magnet, and about four pounds of pure ash remain. This is placed in a metallic receptacle, labeled, and sealed.

Bibliography. A chapter on cremation, treating the subject from the sanitary and economic standpoint, is contained in Baker, *Municipal Engineering and Sanitation* (New York, 1901). Cobb, *Quarter Century of Cremation in North America* (Boston, 1901), includes a complete history and statistics of the movement in the United States, also a bibliography. Consult H. Erichsen, *Cremation of the Dead* (Detroit, 1887); A. G. Cobb, *Earth-Burial and Cremation* (New York, 1892). Freeman, *Crematoria in Great Britain and Abroad* (London, 1906), contains descriptions with diagrams and illustrations of some of the principal crematoria in the world. An introductory chapter contains an historical sketch. The *Sunny Side*, an undertaker's trade publication, contains a department devoted to cremation news and propaganda.

CREMER, krā'mĕr, August Hermann (1834–1903). A German Protestant theologian. He was born at Unna, Westphalia, Oct. 18, 1834; studied at Halle and Tübingen, and since 1870 has been professor of systematic theology at Greifswald. Two of his publications have been translated, *Biblisch-theologisches Wörterbuch der neutestamentlichen Gräzität* (1866–67; 9th ed., 1902; Eng. trans., 1872, 3d ed., 1886), and *Ueber den Zustand nach dem Tode* (1883; 6th ed., 1901; Eng. trans., 1885); *Des Wesen des Christentums* (1901; Eng. trans., as *Reply to Harnack on "The Essence of Christianity,"* 1903).

CREMER, Jacobus Jan (1827–80). A Dutch novelist, born at Arnheim. Especially noteworthy are his rural tales in dialect, *Betuwsche Novellen* (1856). He wrote also the novels: *De Lelie van's Gravenhage* (1851); *Daniel Sils* (1856); *Anna Rooze* (1867); *Dokter Helmond en zijn vrouw* (1870). For Cremer's biography, consult J. ten Brink, *Geschiedenis der Noord-Nederlandesche Letteren* (1887–89).

CRE'MER, Sir William Randal (1838–1908). An English advocate of international peace, born at Fareham. He was prominent in English trade-unions in 1860–70. In 1885, as a Liberal, he entered the House of Commons, to which he was reëlected in 1886, 1892, 1900, and 1906. To further the cause of universal peace he founded (1887) the Inter-Parliamentary Conferences which have met since 1888 at frequent intervals. He visited the United States repeatedly in the interest of an Anglo-American treaty of arbitration, and in support of the International Arbitration League, of which he was secretary for 37 years, he journeyed through all Europe. He also edited the *Arbitrator*, a monthly devoted to the cause of peace. The Nobel peace prize, which was awarded to him in 1903, he gave as an endowment to the International Arbitration League. He was knighted in 1907.

CRÉMIEUX, krā'myĕ', Isaac Moïse (called Adolf) (1796–1880). A French statesman and philanthropist, born at Nîmes. He studied law, and was admitted to the bar at Aix in 1817. About 1830 he went to Paris, where he soon became famous, particularly in the defense of the political prisoners. He became in 1842 a deputy from Chinon and served till 1848. Under the Republic of 1848 he was elected as deputy to the Constituent Assembly and the Legislative Assembly, and was one of the first seven named by the Chamber on February 24 to form the provisional government, in which he acted as Minister of Justice. On the night of Louis Napoleon's coup d'état Crémieux was arrested and thrown into prison. He was soon released, and voluntarily retired into private life until November, 1869, when he was elected a deputy to the Corps Législatif. On Sept. 4, 1870, he was proclaimed a member of the Government of National Defense, and the following day he was made Minister of Justice. He rendered the famous decree which expelled from their seats the infamous magistrates composing the "mixed commissions" under the Empire. Another decree bearing his name, the Decree Crémieux, naturalized in mass 30,000 of his coreligionists in Algeria. In 1871 he subscribed 100,000 francs towards the payment of the war indemnity for the liberation of the French territory from the Germans. In 1875 he was elected life senator. He was one of the founders of the Alliance Israélite Universelle (q.v.) and its president from 1863 to 1866 and from 1868 to 1880. Consult Jacquot, *Les contemporains* (Paris, 1867), and Blanc, *Histoire de dix ans* (Brussels, 1846).

CREM'NITZ. See Kremnitz.

CREMONA, krā-mō'nā. The capital of the province of the same name in Lombardy, north Italy, situated 48 miles southeast of Milan, in a fertile plain on the left bank of the Po (Map: Italy, E 2). It has broad but irregular streets

and attractive public squares, and a bridge 3100 feet long over the Po; it is formed into an oval by old walls that surround it, and a partly covered canal passes through it. The twelfth-century Romanesque Lombard cathedral has a rich main façade of red and white marble and many mural paintings by masters of the Cremona school. Adjacent is an octagonal baptistery, also of the twelfth century. From the Torrazzo (397 feet), the highest clock tower in north Italy, is a view of the entire course of the Po through Lombardy. Others of its 44 (formerly 87) churches are the richly decorated sixteenth-century San Pietro al Po; the fourteenth-century Sant' Agostino e Giacomo in Braida, with paintings by Perugino and others; the sixteenth-century Santa Margherita, built and decorated by Giulio Campi; Sant' Agata, with four large fine frescoes; and in a suburb San Sigismondo, with frescoes and paintings by Cremonese masters. Also noteworthy are the restored thirteenth-century city hall and the thirteenth-century Palazzo de' Gonfalonieri, and the Palazzo Reale, with natural-history and other collections. A memorial tablet marks the house where Antonio Stradivarius (q.v.) made his violins. Cremonese violin makers who preceded him were the two Amati and Guarneri. Cremona was also famous for its painters, Boccaccio Boccaccino, the founder of the Cremona school; Melone, Bembo, the three Campis, and Sofonisba d' Angussola, whose five sisters also practiced the art. Cremona has a seminary, a lyceum, a gymnasium, a school of industrial art, a school for voice culture, a technical school, two theatres, a library of 100,000 volumes, and a chamber of commerce. The town has an active trade by rail and water, markets grain, flax, cheese, etc., and manufactures silk, cotton, and wool fabrics, machinery, and earthenware, and is thoroughly modern. Cremona was colonized by the Romans in 218 B.C., and grew to be an important commercial centre. It was destroyed in 70 A.D. by Vespasian, who afterward helped rebuild it, but it was again laid waste by the Lombards in 605. It became important in the tenth century and in the fourteenth century came into the possession of Milan. Pop. (commune), 1881, 31,788; 1901, 37,693; 1911, 40,436. Consult: Holder-Egger, "Die Annales Cremonenses," *Neues Archiv der Gesellschaft für ältere deutsche Geschichtskunde*, vol. xx (Hanover, 1900); Robaloth, *Cremona e sua provincia* (Milan, 1859); *Guida di Cremona* (Cremona, 1904).

CREMONA, Luigi (1830–1903). An Italian mathematician, born in Pavia. He participated in the struggle for independence against Austria in 1848–49, later studied at the University of Pavia, obtained a mathematical professorship in Bologna, and in 1873 became professor of higher mathematics in the University of Rome and director of the engineering school of the institution. In 1879 he became senator of the Kingdom of Italy, and was for a short time in 1898 Deputy Minister. His contributions to the study of projective geometry and of graphical statics are important. He introduced these subjects into the curricula of Italian technical schools. His works include: *Introduzione ad una teoria geometrica delle curve piane* (1862); *Le figure reciproche nella statica grafica* (3d ed., 1879); *Elementi di geometria projettiva* (1873); *Elementi di calcolo grafico* (1874). He was a contributor after 1856, and for many years joint editor, of the *Annali di matematica pura ed applicata*. Vol. i of an important edition of Cremona's *Works* was published in 1914 under the title *Opere matematiche, pubblicate sotto gli auspici della R. Accademia dei Lincei* (Milan).

CREMORNE (kre-môrn′) **GARDENS.** A famous resort in London, closed in 1877.

CRENEL′, or **CRENELLE′** (OF. *crenel*, notch, embrasure, from ML. *crenellus*, dim. of Lat. *crena*, notch). Any embrasure or opening in the walls of a fortified place; especially the spaces between merlons (q.v.) on a battlemented parapet, from which missiles could be discharged. Hence it is sometimes used to designate a battlement. "Crenellated" is used of a building supplied with crenels. See Battlement.

CRE′NIC ACID (from Gk. *κρήνη, krēnē*, fountain), $C_{12}H_{21}O_8$. One of the constituents of vegetable mold, produced wherever leaves and other plant matter are decaying, especially in peat bogs and marshes. Berzelius extracted a mixture of crenic and apocrenic acids from the water of Porla (Sweden). Crenic acid is a pale-yellow amorphous substance of sour taste and somewhat astringent aftertaste. Its salts are soluble in water, in which they are gradually transformed, in part, into salts of apocrenic acid.

CRE′ODON′TA (Neo-Lat., nom. pl. of Gk. *κρέας, kreas*, flesh + *ὀδούς, odous*, tooth). A suborder of extinct mammals, ancestral to the true carnivores, and hence sometimes called Carnivora primigenia, and found fossil in the Lower Tertiary rocks. The creodonts comprise primitive or synthetic types of animals that vary in size from that of a weasel to that of a grizzly bear, and that combine the characters of the true carnivorous families in such manner as to render determination of the taxonomic rank of any particular species a matter of some difficulty. The members of the suborder present resemblances to the bears, civets, and dogs among the true carnivores; the genus *Patriofelis* seems prophetic of the Pinnipedia, or seals, and *Mesonyx* resembles the carnivorous marsupials of Australia. The more primitive forms show characters possessed also by the Insectivora, Tillodontia, and Condylarthra. Creodont remains are found in the Lower Tertiary of Patagonia, and these are of interest because they resemble the carnivorous marsupials of Australia and New Zealand much more closely than do the North American creodonts. The range of the suborder in both North America and Europe is from the base of the Eocene into the Lower Miocene. During Eocene time the creodonts played that important rôle among land animals which subsequently, during later Eocene and Miocene time, was assumed by the true carnivores. Among the more interesting and important genera are *Arctocyon, Hyænodon, Mesonyx, Oxyæna, Patriofelis, Stylolophus.*

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du cretace superieur et du tertiaire de Patagonie," *Anal. d. Museo Nacional de Buenos Aires* (Buenos Aires, 1906); Matthew, "Osteology of Sinopa," *Proceedings United States National Museum* (Washington, 1906); Osborn, "New Carnivorous Mammals from the Fayûm Oligocene, Egypt," *Bulletin American Museum Natural History* (New York, 1909). See MESONYX; OXYÆNA; HYÆNODON; PATRIOFELIS; MAMMALIA; TRIISODON.

CRE'OLE (Fr. *créole*, Sp. *criollo;* probably a negro corruption of Sp. **criadillo, criado,* servant, from *criar,* to create, rear). A name properly used in the southern United States and in Latin America to designate the pure-blooded descendants of original French, Spanish, or Portuguese stock. By English writers it has sometimes been incorrectly supposed to mean a mestizo or mulatto; but it cannot properly be applied to any person of mixed race, non-Latin stock, or European birth, neither is it used in speaking of the Canadian French.

CREOLE CASE, THE. An incident in American history which caused some friction between the governments of the United States and Great Britain and was the occasion of an animated debate between the proslavery and antislavery elements in Congress. In 1841, 19 of the 135 slaves on board the American brig *Creole* revolted, while being transported coastwise between Hampton Roads and New Orleans, and securing control, after killing the captain and wounding several others, directed the vessel to Nassau, New Providence, where all those who had not been directly concerned in the revolt were immediately liberated by the British authorities, the others being held for trial, on a charge of murder, in the local courts. Daniel Webster, who was then Secretary of State, demanded the return of the slaves, on the ground that they were legally property, and were on American soil and under the jurisdiction of the United States so long as they were under the American flag, even when on board a ship. They were never returned, however, by the British government. The incident caused J. R. Giddings (q.v.) to offer a series of resolutions in the House of Representatives, on March 21, 1842, declaring that slavery could exist only by positive law of the separate States; that these States had delegated no control over slavery to the Federal government, which alone had jurisdiction on the high seas, and, therefore, that slaves on the high seas became free, and the coastwise slave trade was unconstitutional. The House passed a resolution of censure, and Giddings immediately resigned, but was triumphantly reëlected. His resolutions expressed the basis of one phase of the constitutional antislavery agitation. They are given in full in Giddings's *History of the Rebellion* (New York, 1864). The Statute of March 2, 1807, regulating the coastwise slave trade, is in 2 U. S. Statutes at Large, 426. See SLAVERY.

CREOLE STATE. Louisiana. See STATES, POPULAR NAMES OF.

CRE'OLIN (origin uncertain). An unofficial dark-brown, sirupy liquid, of tarry odor, derived from coal tar. It is soluble in alcohol and forms a milky fluid (an emulsion) with water. Different specimens vary considerably in composition and strength, and the careless use of the substance may cause poisoning. It is a good antiseptic, particularly against organisms that bear no spores, and is a powerful deodorizer. In operative surgery it has the disadvantage that the milky character of the solution makes it difficult to see instruments placed in it. Its chief use is in gynæcological affections. It has been given (in small doses) internally for gastric fermentation, dysentery, and typhoid fever.

CRE'ON (Lat., from Gk. *Κρέων, Kreōn*). In Greek legend, the son of Menœceus, and brother of Jocasta, wife of Laïus, King of Thebes. After the death of Laïus he assumed the government and offered the crown and Jocasta to the man who should free the city from the Sphinx (q.v.). Œdipus (q.v.) accomplished the task and thus unconsciously became the husband of his own mother. After Œdipus' fall Creon once more assumed the rule as guardian of the sons of Œdipus, Eteocles and Polynices (q.v.). After the death of the brothers Creon again became King, and forbade the burial of Polynices and the Argives. Antigone (q.v.), however, defied Creon and buried her brother's body, whereupon Creon sentenced her to be buried alive. Creon's son Hæmon, the betrothed of Antigone, killed himself on her body. This is substantially the story as it appears in the plays of Sophocles. Other versions told how Creon sacrificed a son from the walls of Thebes in order to avert the fall of the city, and how later he gave his daughter Megara to Heracles, who succeeded him on the throne of Thebes.

CRE'OSOTE, or **CRE'ASOTE** (Gk. *κρέας, kreas,* flesh + *σωτήρ, sōtēr,* preserver, from *σώζειν, sōzein,* to save). An oily liquid produced in the destructive distillation of wood, particularly that of the beech (*Fagus sylvatica* Linné, natural order Cupuliferæ). The wood tar obtained at first is subjected to fractional distillation, and the fractions heavier than water are dissolved in caustic potash; the resulting solution is exposed to the air and heated, the resinous matter produced is separated out, and the creosote is set free in the solution by neutralizing with dilute sulphuric acid. To obtain creosote in a state of purity, the process just described of dissolving in potash and liberating with sulphuric acid is repeated several times; as a final step in the purification, the creosote is dried and rectified by distillation. Commercial creosote is liable to contain more or less carbolic acid, whose presence, however, is not very easy to detect; if drops of a sample of creosote do not readily sink in water and do not remain transparent after contact with water for some time, the sample should be considered as suspicious. Pure creosote is almost colorless when freshly obtained, but gradually assumes a darker color if exposed to the action of light. It has a penetrating, smoky odor and a burning taste and is slightly heavier than water, in which it is soluble only to a very limited extent. It is completely soluble in alkalies and mixes readily with alcohol, ether, chloroform, and glacial acetic acid. It is composed mainly of *guaiacol* and *cresol* and has a high refractive power. Creosote acts as an antiseptic and has been used in the preservation of meat—whence its name. At present it is largely used in the treatment of tuberculosis with mixed infection. For this purpose it may be administered in the form of an emulsion with cod-liver oil and other substances; or else a mixture of creosote with alcohol and chloroform may be inhaled by the patient, moderate doses of pure creosote being perfectly harmless and causing no disagreeable symptoms whatever. Creosote was first prepared by Rei-

chenbach in 1832, and Bouchard and Pimbert were the first to apply it to the treatment of tuberculosis. It is also used in bronchitis with profuse expectoration containing the *streptococcus* bacillus, and in fermentative dyspepsia, diarrhœa, and dysentery. The so-called *creosote oil* used for the preservation of timber is derived by the fractional distillation of coal tar, constituting the fraction that distills over between 230° and 270° C., 446° and 518° F. It is composed mainly of phenol (carbolic acid), cresol, naphthalene, and anthracene.

The "creosote plant" (*Larrœa mexicana*) produces a substance similar to Indian gum lac and having a strong creosote-like odor; hence the name of the plant.

CREOSOTE BUSH. See ZYGOPHYLLACEÆ.

CREOSOTE OIL. See COAL TAR.

CREOSOTOL, krē′ō-sōt-ōl′ (from *creosote* + *-ol*), or CARBONATE OF CREOSOTE. A pale-yellow sirupy liquid similar to creosote, but having less odor and taste. It is used in tuberculosis and bronchitis and is better tolerated by the stomach.

CRÉQUI, krā′kē′, CHARLES, MARQUIS DE (1578–1638). A French soldier. He was a prominent officer under Henry IV, in 1622 was appointed a marshal of France by Louis XIII, and fought with great bravery against Spaniards and Huguenots. He died in the siege of Crema. His military ability was highly praised by Saint-Simon and Voltaire. Consult Chorier, *Histoire du Maréchal de Créquy de Blanchefort* (Grenoble, 1683).

CRE′RAR, JOHN (1827–89). An American philanthropist, born in New York City. He was a merchant in New York and from 1862 in Chicago, where he became head of the firm of Crerar, Adams & Co., and an incorporator and one of the directors of the Pullman Palace Car Company. He contributed $2,500,000 as an endowment fund for a library in Chicago now known by his name, $100,000 for a statue of Abraham Lincoln, and bequeathed $1,000,000 to charitable and religious organizations.

CRE′SAP'S WAR. See DUNMORE'S WAR.

CRESCENDO, krĕ-shĕn′dō *or* krĕ-sĕn′dō (It., increasing, pres. part. of *crescere*, from Lat. *crescere*, to grow). In music, a gradual increase of the volume of sound, or change from *piano* to *forte* and *fortissimo*. It is marked thus, or with the abbreviation *cresc.* The even swell of an organ produces a perfect crescendo.

CRES′CENT (from Lat. *crescens*, pres. part. of *crescere*, to grow). 1. A representation of the half-moon with the horns turned upward, called a "crescent," is often used as an emblem of progress and success. It is generally spoken of as "the arms" of the Turkish Empire, but is more properly the emblem of the Empire and people. The crescent and star occur in the horoscope of Osman, the founder of the Turkish Empire. The crescent was also a Byzantine emblem, however, and at the present day is frequently to be seen on churches in Russia, generally surmounted with the cross, marking the Byzantine origin of the Russian church.

2. A Turkish musical instrument introduced into the German military bands at the time of the Turkish wars and now in general use in military bands. It consists of a staff surmounted by a cap and supporting several crescent-shaped brass plates upon each of which little bells are hung. The instrument is played by being jingled in time with the music.

3. In heraldry the crescent is used both as a bearing, or charge, and as a difference, or mark of cadency. In the latter case it designates the second son and those that descend from him. See CADENCY.

CRESCENT, ORDER OF THE. A Turkish order of knighthood. It was founded by Selim II in 1799 after the battle of Abukir, to be conferred on Christians for service to the Turkish state. Nelson was the first man to receive the honor. The order became extinct after half a century. An Order of the Crescent was founded by St. Louis of France in 1269, and twice reëstablished by the house of Anjou, reigning in Sicily and Naples. This is also extinct. The crescent and the star in white upon a red background constitute the Turkish flag. It is supposed that the appearance of the crescent in the horoscope of the great Othman led to the acceptance of it as the national symbol.

CRESCENT CITY. A name applied to New Orleans because of its situation on a bend of the Mississippi River.

CRESCENTIIS, krĕs-sĕn′shī-ĭs, PETRUS DE, or **CRESCENZI,** krā-shĕn′tsē, PIETRO (c.1230–c.1310). An Italian agricultural writer, the founder of modern agronomics in Europe. He was born in Bologna, but later sojourned in various cities of Italy, where he frequently acted in the capacity of judge lateral to the podestâs. Upon his return to Bologna after an absence of 30 years, during which he made valuable observations on agriculture, he published his famous work, entitled *Ruralium Commodorum Libri XII* (1471). This work has been frequently reprinted and has been translated into Italian, German, and French. His *Scriptores rei rusticæ* (1735) is famous also. The genus *Crescentia* was named by Linnæus in honor of the famous author, who was probably the first since the days of the Romans to point out the high value of agricultural science.

CRESCENTINI, krā′shĕn-tē′nē, GIROLAMO (1766–1846). An Italian singer, born near Urbino, Italy. He studied with Gibelli at Bologna, made his début at Rome in 1783, and subsequently sang at Leghorn, Padua, Venice, Turin, London, Milan, and Naples. Napoleon, who first heard him sing in 1805, decorated him with the Iron Crown and was his patron from 1806 to 1812. He left Paris on account of vocal disorders, later (1816) becoming professor of singing at Naples. He published in French and Italian a treatise on vocalization.

CRESCENTIUS, krĕs-sĕn′shī-ŭs, JOHN (?–998). Leader (Patricius in 985) of the national party in Rome against the authority of the Emperor in the last quarter of the tenth century. About 991, probably, Crescentius was all-powerful in Rome. With a short intermission, when Otho III visited the city in 996, his rule lasted until 998, when he was beheaded by Otho. In 997 he had driven the Pope, Gregory V, from the city and appointed an antipope. Crescentius was long remembered as the champion of Roman liberty. Consult Gregorovius, *Rome in the Middle Ages*, vol. iii (London, 1895).

CRESCENZI, krā-shĕn-tsē, PIETRO. See CRESCENTIIS, PETRUS DE.

CRESCIMBENI, krā′shēm-bā′nē, GIOVANNI MARIO (1663–1728). An Italian critic and poet, born at Macerata, and one of the 14 poets associated with Christine of Sweden in founding the Academy of *Arcadia*, of which he was the first president (1690). As Arcadia expanded, dur-

ing the 38 years of his presidency, to embrace almost the entire literary set of Italy, Crescimbeni became the high priest of good taste, which was reflected in the pompous ceremonials of the Arcadian branches, the shallow dillettantism of literary production, idealistic sensualism in morals, and arrogant preceptualism in æsthetics. The vast but inaccurate and scattered erudition of Crescimbeni is collected in his *Istoria della volgar poesia* (best ed., Venice, 1730–31, 6 vols.). Though inferior to the best standards of scholarship even in its own time, this work is still of use. Its critical criterion was that of Arcadia: accuracy of imitation, not nobility of substance.

CRES'CO. A town and the county seat of Howard Co., Iowa, about 150 miles (direct) northeast of Des Moines, on the Chicago, Milwaukee, and St. Paul Railroad (Map: Iowa, E 1). It maintains a hospital, has extensive dairying and live-stock interests, and manufactures machinery, cupolas, telephone condensers, electrical supplies, steel corn cribs, lightning rods, furniture, stump pullers, tow, flour, and brick and tile. A "Farmers' Alliance" store is successfully operated here, and there is also a hospital. The city is governed by a mayor and council and owns its water works. Pop., 1890, 2018; 1900, 2806; 1910, 2658.

CRES'ILAS (Lat., from Gk. Κρησίλας, *Krêsilas*). A Greek artist of the Attic school, born at Cydonia in Crete, who worked in the latter part of the fifth century B.C. He made a statue of Pericles, of the base of which fragments with the artist's signature have been found on the Acropolis of Athens. This is the earliest Greek portrait statue which has been surely identified. From this work seem to be derived the busts of Pericles in the British Museum, the Vatican, and Munich. He also made a statue of a wounded Amazon, which is probably represented by the Capitoline type. (See AMAZONS.) Other statues have been claimed as copies of his works, as the Munich Diomedes, and the Athena of Velletri. Consult Furtwängler, *Masterpieces of Greek Sculpture*, trans. by Sellers (New York, 1895), and E. A. Gardner, *A Handbook of Greek Sculpture* (London, 1911).

CRESPIN, krâ-spăn', JEAN (c.1520–72). A French Protestant author. He was born in Arras, studied law in Louvain and Paris, became advocate in Parliament, 1540, fled on account of his religious opinions to Strassburg in 1545, removed to Geneva in 1548, and carried on the printer's trade there until his death in 1572. His fame rests upon his *Livre des martyrs* (1554), with its continuations or recastings under different names: *Recueil* (1554); *Histoire* (1570); new edition of the whole as *Histoire des martyrs* (3 vols., 1886–89). It was translated into Latin and has been the basis of many similar Protestant martyrologies.

CRESS (AS. *cresse, cærss*, OHG. *cresso, cressa*, Ger. *Kresse;* probably from OHG. *chresan*, MHG. *kresen*, to creep). A name given to many plants, of which the foliage has a pungent, mustard-like taste, and is used as a salad. It is sometimes more strictly confined to the genus *Lepidium*, of the family Cruciferæ. The common cress, or garden cress (*Lepidium sativum*), is an annual, a native of the East, frequently cultivated in European and American gardens. It is powerfully antiscorbutic. Virginian cress (*Lepidium virginicum*) resembles the garden cress in its properties and is eaten as a salad, and used as a diaphoretic medicine in North America and the West Indies. *Lepidium piscidium*, a native of the South Sea Islands, is one of the plants used by sailors for prevention or cure of scurvy. The name "winter cress" is given to species of the genus *Barbarea*, also cruciferous biennial or perennial plants. The common winter cress (*Barbarea vulgaris*) is plentiful in moist pastures and hedge banks throughout Europe and North America. It is occasionally cultivated as a winter salad; in Sweden it is used as a boiled vegetable. Its pungency is combined with some degree of bitterness. Very similar to this, and also occasionally cultivated, is the early winter cress, or American cress (*Barbarea præcox*), a native of Great Britain, the continent of Europe, and North America. The common bitter cress, or cuckoo-flower (*Cardamine pratensis*), is also known by the name of lady's-smock. *Cardamine amara* and *Cardamine hirsuta* are cultivated to a considerable extent in Europe and are also found in America. Watercress (*Nasturtium officinale*) is a perennial aquatic plant, much used in the United States and Europe as a cold-weather salad. It is a native of almost all parts of the world. The leaves have a pungent, bitterish taste, with a little saltness. The plant is of easy cultivation and grows best in clear, shallow, running water, with a bottom of sand or gravel. Mud is injurious both to its growth and to the flavor of its leaves. For Indian cress, or nasturtium, see TROPÆOLUM.

CRES'SET (OF. *cresset*, Fr. *creuset*, from ODutch *kruysel*, hanging lamp, dim. of *kruyse*, cup, Icel. *krūs*, Ger. *Krause*, Eng. *cruse*). A name given to a great light kindled upon a beacon or watchtower, and also to a lamp or torch, or to a light fixed on a pole. The name owes its origin to the former custom of surmounting beacons by a cross.

CRESSID, or **CRESEIDE,** TESTAMENT OF, and COMPLAINT OF CRESSEIDE. Poems by Robert Henryson, wrongly included in the earlier editions of Chaucer.

CRES'SIDA, or **CRES'SID.** The lover of Troilus in the *Troilus and Cressida* (q.v.) of Chaucer, Shakespeare, Dekker and Chettle, and Dryden, and a type of infidelity. The name is probably a mediæval invention representing Briseis, the daughter of Calchas, the Trojan seer.

CRES'SON. A borough and pleasure resort in Cambria Co., Pa., 75 miles east of Pittsburgh, on the Pennsylvania Railroad (Map: Pennsylvania, D 6). It is situated at an elevation of over 2000 feet and is noted for the beauty of its scenery. Mineral springs add to its attractions as a resort. It has an academy and hotel, lumber, coal, and coke yards, and a brewery. Pop., 1910, 1470.

CRESSON, ELLIOTT (1796–1854). A Quaker merchant and philanthropist of Philadelphia, Pa., who devoted much attention to the emancipation of the negroes from slavery. He was president for some time of the Colonization Society (q.v.), and subsequently as its agent labored to establish the colony at Bassa Cove, on the Grain Coast, Africa.

CRESS'WELL, SIR CRESSWELL (1794–1863). An English jurist. He was born at Newcastle, graduated at Emmanuel College, Cambridge, in 1814, and in 1819 was called to the bar. In 1834 he was created King's counsel, in 1842 a puisne judge of the common pleas court, and in 1858 first judge of the newly created probate and divorce court. He was largely employed as an

advocate in important navigation and mercantile cases. Consult E. Manson, *Builders of our Law* (London, 1904).

CRES'SY. See CRÉCY.

CREST (OF. *creste*, Fr. *crête*, Sp., Portug., It. *cresta*, crest, from Lat. *crista*, comb, tuft; connected with Lat. *crinis*, hair). Though popularly regarded as the most important feature in heraldic emblems, the crest, in the eyes of heralds, is an external adjunct to the shield, without which the bearing is complete, and which may consequently be altered without materially affecting its significance. Occupying the highest place on the helmet, it is the member of the bearing by which the knight was commonly known in battle. From this circumstance it is to the crest that the term *cognizance* (from *cognosco*, to know) is properly given. Its claim to a classical origin is probably better than that of any other portion of coat armor. The helmet, as represented on ancient statues and gems, was frequently adorned with a crest. Sometimes it was of horsehair; at other times a lion or other animal, erect or couchant, was placed on the helmet.

The first crest to be met with in the monuments of English chivalry is that on the great seal of Richard Cœur de Lion. Crests came into general use about the time of Henry III, and were used as marks of distinction by commanders in the holy wars, as they had formerly been by the Roman centurions. For lightness they were often made of stuffed leather, gilt, silvered, or painted—a circumstance which explains their greater size then than in later times, when they were made either of wood or metal. The earliest example of the wreath on which the crest is now invariably placed is that on the monument of Sir John Harsick. It consisted of two pieces of silk, of the colors of the armorial bearings of the wearer, twisted together by the lady who had chosen him for her knight. It is now represented as consisting of two stripes of gold or silver lace, twisted into a circular cord. Its tinctures are always those of the principal metal and color of the arms. It is a rule in delineating the wreath, which is shown edgewise above the shield, that the first coil shall be of metal, and the second of color. Civic, triumphal, and other crowns were used as wreaths; and this practice is supposed to have given rise to the use of coronets.

Consult Fairbairn, *Book of Crests of the Families of Great Britain and Ireland* (Edinburgh, 1892); and for foreign crests, consult Reitstap, *Armorial général* (Gouda, 1884–87). See also HERALDRY and the authorities there referred to.

CREST, or CRESTING. In architecture, an ornamental finishing in stone, tiles, or metal, running along the top of a wall or the ridge of a roof or surmounting a gable. *Crest tiles*, or, as they are corruptly called, cress tiles, or crease tiles, are frequently in the form either of small battlements or Tudor flowers. See COPING.

CREST'ED. A term in heraldry. When a cock or other bird has its comb of a different tincture from its body, it is said to be crested of such a tincture, naming the tincture.

CRESTED DOG'S-TAIL GRASS. See DOG'S TAIL GRASS.

CREST'LINE. A village in Crawford Co., Ohio, 76 miles southwest of Cleveland, on the Cleveland, Cincinnati, Chicago, and St. Louis, and the Pennsylvania railroads (Map: Ohio, E 4). It is chiefly industrial in its interests, having plow, stove and furnace, pump, and buggy factories, a car manufactory, a woodworking establishment, etc. The water works are owned and operated by the village. Pop., 1910, 3807.

CRES'TON. A city and the county seat of Union Co., Iowa, 55 miles (direct) southwest of Des Moines; on the Chicago, Burlington, and Quincy Railroad (Map: Iowa, C 3). It has a public library and Elks, Moose, and Eagle homes. There are extensive machine shops, car works, planing mills, and a cold-storage plant. Creston was settled in 1868 and incorporated the following year. It is governed at present under a charter of 1870, revised in 1890, which provides for a mayor, chosen biennially, and a city council, elected by wards. Pop., 1890, 7200; 1900, 7752; 1910, 6924.

CRET, PAUL PHILIPPE (1876–). A Franco-American architect, born at Lyons, France. He was educated at the Ecole des Beaux-Arts, Lyons, and the Ecole des Beaux-Arts, Paris; in 1903 was an architect of the French government; and became in the same year professor of design at the University of Pennsylvania. He received the Paris prize in 1896, the Rougevin prize in 1901, grand medal of the Ecole des Beaux-Arts of Paris in 1901, and the gold medal of the Salon des Champs Elysées of Paris in 1903. He was architect of the Pan-American Union building at Washington and of the Valley Forge memorial arch.

CRETACEOUS (krê-tā'shŭs) **SYSTEM,** or CHALK FORMATION (Lat. *cretaceus*, chalky, from *creta*, chalk). A term applied to a series of strata underlying the Tertiary and resting on the Jura-Trias, the name being derived from the chalk beds which form such a prominent member of the Cretaceous in England and France, although such chalk beds are rare in the United States, occurring only in Texas and Arkansas. There exists at times an unconformity between the Upper Cretaceous and the Eocene, or lower member of the Tertiary, especially in the United States. The classification of the Cretaceous presents many difficulties, owing to the variable section which it exhibits in different areas; but European and American geologists are agreed on a division into an upper and a lower member, while for divisions of lesser size local names are employed.

The Lower Cretaceous, designated by some geologists as the Comanchean system, is represented along the Atlantic coast by the Potomac beds; in the northern Gulf States by the Tuscaloosa stage; in Texas and the western Gulf borders by (*a*) Trinity, (*b*) Fredericksburg, and (*c*) Washita stages. The Upper Cretaceous in the Rocky Mountain region has the following subdivisions: (*a*) Dakota stage, (*b*) Colorado series, (*c*) Montana series, (*d*) Laramie series; while in the Atlantic border States it is divided into (*a*) Matawan, (*b*) Monmouth, (*c*) Rancocas, and (*d*) Manasquan stages.

The Cretaceous rocks of North America form a belt of increasing width, extending southward along the Atlantic coast from New York, through New Jersey, Maryland, North Carolina, Georgia, and Florida; then around the northern and western shores of the Mexican Gulf, up the Mississippi valley to the mouth of the Ohio, and from Texas northward to the foothills of the Rocky Mountains. They occur also in Nebraska, Kansas, and Iowa. The greatest development of the Cretaceous system is in Wyo-

ming, Utah, Colorado, and west of the Sierra Nevadas in California. In some portions of these last-named regions it is found at heights of 10,000 and 12,000 feet. It occurs also in Arctic America, near the mouth of the Mackenzie River. The American Cretaceous beds consist of greensand—called also "marl," and much used in New Jersey and elsewhere for fertilizing land—sands of other kinds, clays, shell deposits, and, on the Gulf of Mexico, especially in Texas, limestone or chalk. In New Jersey the formation is 400 or 500 feet thick; in Alabama, 2000 feet; in Texas, over 1000 feet, represented by sands, clays, marls, and chalk; in the upper Missouri basin, more than 4000 feet; and east of the Wasatch, more than 9000 feet.

The rocks of the Cretaceous contain an abundance of both animal and plant remains, for this was a closing period of an era in which reptiles predominated, and, curiously enough, but few or none of the Cretaceous species have continued into the Tertiary. The plants found in the Cretaceous represent angiosperms, which were not found before this era, both dicotyledons and palms, the former including species of the oak, willow, poplar, beech, maple, fig, tulip, sassafras, eucalyptus, and sequoia. Many palms and cycads are found in the Cretaceous of North America. The appearance of the dicotyledons in this formation is rather sudden. The animal remains found include both the smallest and largest forms. There are foraminifera, sponges (which were very common in the chalk), echinoids, many mollusks, especially spirally coiled ammonites, and oysters. The fishes show a continuation of the placoids and ganoids of the former era; but teleosts, or true bony fishes, made their first appearance. There was also an extraordinary abundance of reptiles, including enaliosaurs, dinosaurs, pterosaurs, and crocodiles. Some of the pterosaurs from the Kansas rock measured from 20 to 25 feet in expanse of wing. The sea saurians were from 10 to 50 feet long. Cope describes the elasmosaurus as a snakelike form 40 feet long, with an arrow-shaped head on a swanlike neck that rose 20 feet out of the water. Consequently it could swim many feet below the surface and yet have its head extended into the air for breath. The American rocks supply 40 species of sea serpents. More curious still were the birds with teeth, found in New Jersey and Kansas. (See ICHTHYORNIS.) The mammalian remains were mostly those of lower orders, such as marsupials and monotremes.

The geographical developments in North America during the Cretaceous were great. In the closing stages the sea withdrew from the coastal plains of the Atlantic and Gulf of Mexico. The Appalachians were subjected to renewed uplift after having been planed down by erosion. The interior continental sea was shallowed, and finally obliterated by the uplifting of the land, so that the eastern and western portion of the United States were joined into one continent. This uplift became emphasized towards the end of the Cretaceous, when the Rocky Mountains were formed. Violent volcanic eruptions accompanied this uplift, and the lava flows of the Yellowstone and of many other sections of the west of the United States date from this time.

The economic products include most of the coal and lignite deposits of the Western States. As a coal-making period the Cretaceous ranks second only to the Carboniferous period. Petroleum is found in the Cretaceous strata of Wyoming. Many of the gold and silver bearing fissure veins of the Rockies were formed in the Cretaceous, while other products are fire clays, chalk, greensand, and iron ores.

In Europe the Cretaceous rocks assume great importance. According to Geikie, they may be grouped into two fairly distinct areas, of which the northern includes Great Britain, the lowlands of central Europe, with portions of Silesia, Bohemia, and northern France; while the southern embraces the central and southern part of France, the Alps, and the Mediterranean basin. The northern area is characterized by shallow-water deposits—sandstones, conglomerates, and marls—more or less glauconitic, and passing into a loosely textured limestone or chalk. In the southern basin the typical rocks are massive, compact limestones, which indicate conditions of deeper water and freer communication with the open sea. The entire series of rocks is usually grouped by geologists as follows: Lower Cretaceous—(*a*) Neocomian, (*b*) Urgonian, (*c*) Aptian; Upper Cretaceous—(*a*) Gault or Albian, (*b*) Cenomanian, (*c*) Turonian, (*d*) Senonian, (*e*) Danian. The dividing line between the Upper and Lower Cretaceous is regarded by the French geologists as occurring at the top of the Albian. The most conspicuous member of the Cretaceous is the white chalk (Upper Cretaceous) which forms the remarkable cliffs of southeastern England and northwestern France.

Bibliography. Consult: Dana, *Manual of Geology* (4th ed., New York, 1896); Geikie, *Text-Book of Geology* (London, 1903); White, "Correlation Papers, Cretaceous," *United States Geological Survey, Bulletin 82* (Washington, 1891); Chamberlin and Salisbury, *Geology*, vol. iii (New York, 1907).

CRETE (Lat. *Creta*, Gk. Κρήτη, *Krētē*, NGk. Κρίτι, *Kriti*, Turk. *Kirit*), or CANDIA. An island in the Mediterranean, situated south of Greece, considered the most southerly part of Europe. It lies between lat. 34° 57′ and 35° 41′ N. and between long. 23° 30′ and 26° 20′ E. (Map: Greece, F 6). It is oblong in shape, having a length of about 160 miles, and varying from 6 to 35 miles in width, with an area of 3327 square miles. Its mountainous surface bears some resemblance to that of Greece. The western part of the island is the more elevated, and contains the massive White, or Madaras, Range, rising at Hagios Theodoros to a height of 8104 feet. The central mass of Ida, or Psiloriti, reaches in Stavros 7103 feet. The eastern part is lower, but there are several peaks between 5000 and 7000 feet high. The northern coast is well indented and abounds in good harbors, that of Suda Bay on the northwest coast being one of the best in the Levant. The southern coast is mainly unbroken and inaccessible. There are several rivers, but they run dry during the summer season. There are numerous springs throughout the island. The climate of Crete is one of the most salubrious in Europe. In spite of its mountainous surface, Crete has a soil of remarkable fertility, producing most of the southern fruits and grains. The thick forests which formerly covered the mountains have almost entirely disappeared, but there are still found some trees, such as the cypress, the chestnut, and the olive, cultivated mostly in the lowlands.

The chief products are olive oil, grapes,

oranges, lemons, and other southern fruits. The vine of Crete, which enjoyed such fame in the Middle Ages, has greatly deteriorated. One of the chief manufactured products exported is soap, which is made of olive oil. The commerce is chiefly with Greece, Austria-Hungary, the United Kingdom, Turkey, and Italy. In 1911 imports were valued at 21,359,000 drachmas, and exports at 15,631,000. The chief exports were: olive oil, 5,571,000 drachmas; raisins, 2,395,000; carobs, 1,811,000; southern fruits, 1,516,000; wine, 1,436,000; and soap, 1,138,000 (drachma = 19.3 cents). The principal ports are Canea, Retimo, and Candia. The Bank of Crete was founded in 1899, with a capital of 5,000,000 drachmas, and obtained the privilege of issuing notes for 30 years.

Crete was formerly a Turkish dependency. The inhabitants, in large part Christian, frequently rose against the Turkish authorities, who were supported by a strong Mohammedan minority. A long series of outbreaks culminated in a general rebellion in 1897, which led to the interference of Greece. Thereupon the four Great Powers—Russia, France, Italy, and the United Kingdom—intervened and established an autonomous Cretan government under the suzerainty of the Porte. A constitution, which came into force in 1899, vested the supreme authority in Prince George of Greece as High Commissioner of the Powers. A representative legislative assembly was established, and representatives at Rome of the four Powers were given control of the island's foreign affairs. The constitution as modified in 1907 curtailed the powers of the High Commissioner; under it the Assembly was composed of 65 members elected for three years. In 1906 the Powers gave to the King of the Hellenes the right of naming the High Commissioner in case of vacancy; Prince George resigned, and was succeeded (early in 1907) by Alexander Zaimis, a former Greek premier. In October, 1908, the Assembly declared the union of Crete with Greece, and, in the absence of the High Commissioner, chose a committee of six to govern the island in the name of the Hellenic King. In the following year the Powers decided that a high commissioner be not appointed nor the *status quo* changed. On Oct. 14, 1912, the Prime Minister of Greece declared formally in the Greek Chamber the annexation of Crete.

Revenue is derived chiefly from customs, excise, and monopolies; expenditure is mostly for public works and security, instruction, and finance. In 1910 revenue and expenditure amounted to 6,465,760 and 7,308,632 drachmas, respectively; in 1911, 6,518,594 and 6,792,829. The public debt in 1912 was 4,615,709 drachmas.

Primary instruction is nominally compulsory, but the school enrollment shows only about one pupil for 10 inhabitants. There are a few institutions for secondary education.

Under the Venetians the population of Crete was estimated at about 250,000. A decrease followed the Turkish conquest, but by 1821 the number had risen to an estimated 260,000. Another great decrease resulted from the War of 1821–30, so that an estimate of 1836 placed the population at only 130,000. The census of 1881 showed 279,165 inhabitants (about 205,000 Christians and 73,000 Mohammedans; census of June 17, 1900, 310,056 (269,719 Christians, 33,496 Mohammedans); census of June 17, 1911, 344,001 (307,812 Christians, 27,852 Mohammedans, 487 Jews, and 7850 foreigners). The Christians are almost entirely of the Orthodox Greek faith. It is to be noted that the Mohammedans have rapidly decreased; they, as well as the Christians, are of Greek origin and speak Greek. Of the foreigners about two-thirds were Greeks and about one-sixth Turks. Canea, the capital, had, in 1911, 24,399 inhabitants; Candia (Iraklion), 25,185; Retimo (Rethymnon), 9086.

History. Archæological discoveries tend to show that the island was settled at a very early period by Phœnicians and Egyptians, and that it undoubtedly was a stepping-stone for those who brought the culture of the valley of the Nile to the mainland of Greece. These discoveries have shown also that the civilization known sometimes as "Minoan," sometimes as "Ægean," extended back many millennia before Christ; by 2500 or 2000 B.C. Crete was the dominant power in the Ægean worlds. Traces of this Cretan civilization extend from Canaan to Sicily. Thus the Greek stories about Minos (q.v.), once regarded as wholly mythical, have been in many ways remarkably confirmed.

One of the earliest historical notices of the island is that embodied in the *Odyssey* (xix, 172–179). Here it is spoken of as well populated by various peoples—pure Cretans, Achæans, Dorians, and others. The main element in the population was Greek, but whether Dorian or some other type is uncertain. When the *Odyssey* was composed, Cnosus, Minos's capital, situated in the northern part, was the greatest of the 90 cities of Crete. By the side of Cnosus, the city republics of Gortyna in the south and Cydonia in the northwest rose to great prominence. See ARCHÆOLOGY, I, *The Pre-Mycenæan or Minoan Period*, and II, *Mycenæan Period;* CANDIA, MEGALOKASTRON; CNOSUS; GORTYNA; GOURNIA; MINOS; PHÆSTUS. For brief summaries of the more important works bearing on the recent discoveries in Crete, see, in addition to the bibliography under ARCHÆOLOGY, Shear, "The Discoveries in Crete," in *The Classical Weekly* vol. ii, pp. 242–244 (1909), and id., "Crete and Cretan Archæology," in *The Classical Weekly*, vol. vii, pp. 82–85 (1914). Consult also ARCHÆOLOGY and CRETE in *The New International Year Book*, the volumes for 1908–13.

As allies of Mithridates the Great and, later, the Cilician pirates, the inhabitants of Crete came into conflict with Rome, and after a desperate resistance of two years were finally subdued by Metellus, in 66 B.C. On the division of the Empire the island fell to the Byzantine rulers, who held it till the year 823, when it was conquered by an army of Saracens from Andalusia. In 963 the Byzantines drove out the Saracens and reëstablished Christianity in the country. Upon the establishment of the Latin Empire of the East, in 1204, Crete was given to Boniface of Montferrat, who sold it to the Venetians. These retained their power till 1669, when the Turks, after a blockade lasting 21 years, took the fortress of Candia. The last vestiges of Venetian authority disappeared in 1715, and Crete remained a part of the Ottoman Empire, in spite of various attempts at revolt, in 1770 and in 1821–24. When Greece became independent in 1830, Crete, through the influence of the Allied Powers—England, Russia, and France—was ceded to Egypt; under Mustafa Pasha (1832–52) the island flourished. In 1840 Crete passed again under Turkish control.

The hostility prevailing between the Christian and the Mussulman inhabitants led to repeated revolts and civil wars throughout the nineteenth century. An insurrection lasting from 1866 to 1868 extorted from the Porte the promise of reforms in the government; the pledge remained unredeemed, however, till 1878, when the Sultan, spurred on by the Congress of Berlin, issued a pact or charter, and appointed a Christian Governor-General of the island. This was offset by a Mussulman military governor. In 1889 the Christians rose in arms, but the revolt was suppressed, the pact was abrogated, and the island held under military rule till 1894, when the intervention of the Powers led to the reappointment of a Christian governor.

In 1896 a fresh uprising took place. The Sultan gave his consent to the calling of a national assembly, but the Christian insurgents refused to lay down their arms, in expectation of assistance from Greece. In February, 1897, a Greek force landed in Crete and attacked the Turkish troops. But Greece, which had counted on European sympathy in its struggle with Turkey, found itself alone. Austria, England, France, Germany, Italy, and Russia declared that Crete should be granted complete autonomy, but that annexation to Greece was impossible. Italy, France, Russia, and England then established a peaceful blockade of the island and demanded that Greece recall its troops. The refusal of Greece plunged it into war with Turkey, the outcome of which destroyed all hopes of annexation. From 1897 to near the end of 1898 Crete was the scene of continuous violence. At length the Ottoman forces were withdrawn from the island, and in December, 1898, Prince George of Greece was created High Commissioner of Crete for the Powers for three years. A national assembly met and formed a constitution providing for the creation of a legislature and guaranteeing freedom of religion to all inhabitants. Although order was restored, popular sentiment continued to be increasingly in favor of annexation to Greece, and in 1904 the High Commissioner attempted to gain the consent of the Powers to such a step, but without success. There were revolts against the High Commissioner's arbitrary policy in 1904 and 1905; in the latter year a revolutionary assembly proclaimed the union of the island with Greece, and this was followed by a similar proclamation on the part of the regular Chamber. The Powers intervened, and after some desultory fighting the insurgents laid down their arms in November, 1905.

In 1906 Prince George resigned the High Commissionership of Crete and returned to Athens, but the designation of his successor was accorded by the protecting Powers to King George of Greece as a satisfaction to Greek national sentiment. This arrangement lasted six years, but by no means satisfied any of the parties directly interested. The overwhelming majority of Greeks in the Cretan Assembly persisted in treating their island as an integral part of the Greek Kingdom, while the government at Athens, out of deference to the four protecting Powers, was obliged to respect Crete as a shadowy vassal of Turkey. The six years were marked by almost constant political unrest on the island. A renewed proclamation of union with Greece in 1908, the exclusion of Mohammedan deputies who refused to take an oath of allegiance to King George in 1910, and the election of delegates to represent Crete in the National Assembly which revised the constitution of the Greek Kingdom in 1912, provoked in each case repeated intervention of the Powers.

It was a Cretan leader, Eleutherios Venezelos (q.v.), who in 1910 became Premier of Greece and organized the Balkan League that prepared to wage war against Turkey. A popular uprising of Cretans in March, 1912, put an end to the government that had been forced upon the island by the protecting Powers, and erected in its stead a provisional government, the reception of whose delegates at Athens in October, 1912, was one of the excuses for the outbreak of the Balkan War (q.v.). In that war the Cretans fought shoulder to shoulder with their fellow Greeks of the Greek Kingdom, and by the Treaty of London (May 31, 1913) Turkey renounced all sovereignty over the island. The union of Crete with Greece was formally recognized by the other Balkan states by the Treaty of Bucharest (Aug. 10, 1913).

Consult: Pashley, *Travels in Crete* (Cambridge, 1837); Spratt, *Travels and Researches in Crete* (London, 1865); Stillman, *The Cretan Insurrection of 1866–68* (New York, 1874); Mitchell, *The Greek, the Cretan, and the Turk* (London, 1897); Freese, *Short Popular History of Crete* (ib., 1897); Howes, *Crete the Forerunner of Greece* (ib., 1907); Nevor-Batteje, *Camping in Crete* (ib., 1914). See also ARCHÆOLOGY.

CRETE. A city in Saline Co., Neb., 20 miles southwest of Lincoln, on the Chicago, Burlington, and Quincy and the Missouri Pacific railroads, and on the Blue River (Map: Nebraska, H 4). It has a public library and is the seat of Doane College (Congregational), established in 1872, which has a well-equipped observatory. The principal industries comprise flour mills, a creamery, and a voting-booth factory. Settled in 1867, Crete was incorporated as a village in 1871 and is at present governed under a revised charter of 1886. The council is made up of the mayor and representatives from the city wards. The city owns and operates its water works and electric-light plant. Pop., 1900, 2199; 1910, 2404.

CRÉTIN, krā-tăn′, JOSEPH (1800–57). An American ecclesiastic, first Roman Catholic Bishop of St. Paul, Minn. He was born in Lyons, France, studied there, was ordained a priest, and in 1838 volunteered to assist Bishop Loras, of Dubuque, Iowa, as a worker in the American missions. Vicar-general of Dubuque until 1851, and pastor of the cathedral church of St. Raphael for much of the time, he in that year received episcopal consecration as pioneer Bishop of St. Paul, and entered upon his work with a clergy of nine. He soon established a school, a seminary, a hospital, and an asylum; restored the mission among the Winnebagoes at Long Prairie; founded new missions among the Ojibways; and began a cathedral. In three years he had increased the number of churches from 1 to 29, and to these had added 35 stations.

CRÉTINEAU-JOLY, krā′tē′nō′ zhō′lē′, JACQUES (1803–75). A French author. He was born at Fontenay-le-Comte, Vendée. Of his verse *Les chants romains* (1826) are best known. He wrote for the newspapers and

made special historical studies, particularly of the war of the Vendée. His principal work is *L'Histoire religieuse, politique et littéraire de la Compagnie de Jésus* (6 vols., 1844–46), written from unedited and authentic documents and practically an official history. Consult Maynard's biography (Paris, 1875).

CRE'TINISM (Fr. *crétinisme*, from *crétin*, idiot; possibly from OF. *christien*, *chrestien*, Fr. *chrétien*, an innocent; or from Lat. *creta*, chalk, suggested by the chalky pallor of cretins; or, more probably, from Rhæto-Romanic *cret*, dwarf; *cretin*, diminutive). A term applied in a general sense to idiocy or defective mental development, depending upon local causes and associated with bodily deformity or arrested growth. Endemic cretinism is found associated with goitre (q.v.) in the lower Alpine valleys, not only of Switzerland and Italy, but of the Pyrenees, Syria, India, and China. Families moving into goitrous districts are apt to develop goitre in the first generation, cretinism in the second and succeeding generations. In Europe it is rarely met with at a higher elevation than 3000 feet, and haunts chiefly the valleys surrounded by high and steep walls of rock, which exclude the light and limit the free circulation of air. Cretins are either imbeciles with intelligence or idiots; their bodies are dwarfed, with curvature of the spine, pendulous belly, distorted legs, small wide-apart eyes, large mouth, with protruding lower lip, sparse harsh hair, dry skin, low forehead, and irregularly large or small skull.

Cretinism is believed to be due to lime in the drinking water of the districts in which these people live; its immediate cause, however, has been proved to be dependent upon disease of the thyroid gland. Treatment of adult cretins with thyroid gland, administered by the mouth, has resulted in some improvement. Treatment of infant cretins with doses of the gland has resulted in a cure; but the thyroid must be taken as food for life, otherwise the patient relapses into an imbecile and the physical changes return. Sporadic cretinism, or infantile myxœdema, is related both to endemic cretinism and myxœdema (q.v.). Atrophy of the thyroid gland, due to traumatism, infectious disease, alcoholism, or emotional shock in the parents, results in deficient thyroid secretion; but changes in the pituitary body and the thymus gland have also been observed. The physical and mental changes are like those of endemic cretinism. The skin is coarse and thick, the nostrils broad and flattened. Development is exceedingly slow; the teeth appear late, the child is helpless. In this form of cretinism, a cure, if treatment is begun early, is generally brought about by the continuous administration of thyroid extract, which may be considered a specific in this disease. The improvement wrought in a child within a few months is remarkable. See GOITRE; THYROID GLAND; MYXŒDEMA.

CRETONNE, krē-tŏn′ (so named after its manufacturer). Originally a white cloth of French manufacture. The name is now applied to a printed cotton fabric introduced about 1860 and used for curtains or for covering furniture. Chintz (q.v.), so much employed for the same purpose in former years, is a comparatively thin printed cloth highly glazed. Cretonne, however, is generally thick and strong, and with a twilled, crape, basket, wave, or other figure produced on the loom. When a pattern is printed on this uneven surface, it has a rich, soft appearance. A cretonne is rarely calendered or glazed. The thick weft threads of inferior qualities are commonly formed of waste cotton, and the patterns upon these, though often bright and showy, are, as a rule, printed in more or less fugitive colors. Some cretonnes are printed on both sides with different patterns.

CREÜSA, krē-ū′sȧ (Lat., from Gk. Κρέουσα, *Kreousa*). 1. The wife of Jason and daughter of King Creon of Corinth. She was burned to death with her father by the magical poisoned diadem and robe given to her as bridal gifts by Medea. Consult the *Medea* of Euripides. 2. The daughter of Priam and Hecuba and wife of Æneas. She disappeared during the flight from Troy, and when Æneas returned to the burning city to search for her she reappeared, announcing her adoption as a nymph by Cybele, and prophesying his coming good fortune in Italy. Consult Vergil, *Æneid,* ii, 730–794.

CREUSE, krēz (Fr., hollow). A central department of France, watered by the river Creuse (Map: France, S., F 3). Area, 2164 square miles. Pop., 1896, 279,366; 1901, 277,831; 1911, 266,188. The streams, with the exception of the Creuse, are insignificant. The climate is cold, moist, and variable, and the soil poor except in the infrequent valleys. The products are rye, wheat, buckwheat, oats, and potatoes; but the raising of cattle forms the chief branch of rural industry. Large quantities of chestnuts and fruit are grown. Coal is mined at Ahun and Bourganeuf, while iron, lead, tin, and antimony are found at various places. Carpets, dyestuffs, lumber, shoes, hats, and porcelain are manufactured. The people of Creuse annually migrate in large numbers to find work in various parts of France, making local labor scarce and high-priced. Capital, Guéret.

CREUSE. A river of France, rising in the mountains on the southern border of the Department of Creuse, flowing in a generally north-northwest direction through that department, then in a northerly and westerly direction through Indre, then on the borders of the departments of Vienne and Indre-et-Loire, and falling into the Vienne, a tributary of the Loire, about 12 miles north of Châtellerault, after a course of 150 miles.

CREUTZ, kroits, GUSTAF PHILIP, COUNT (1731–85). A Swedish politician and poet, born in Finland. In 1763 he was sent as Minister to Madrid, and in 1766 as Minister to Paris, where in 1783 he concluded with Benjamin Franklin a commercial treaty between Sweden and the United States. He is chiefly known for the idyl *Atis och Camella* (*Atys and Camilla,* 1761), which, with 10 other poems, appeared edited by Gyllenborg (1795); a new edition (1862).

CREUZER, kroi′tsĕr, GEORG FRIEDRICH (1771–1858). A German philologist. He was born at Marburg and studied there and at Jena. In 1802 he was appointed a professor at Marburg and in 1804 obtained the chair of philology and ancient history at Heidelberg, which he occupied, with great credit, for 44 years. In 1848 he retired to private life. He died at Heidelberg, Feb. 15, 1858. His first and probably his greatest work was *Symbolik und Mythologie der alten Völker, besonders der Griechen* (1810–12).

This treatise, which asserted the symbolical character of ancient mythologies, excited a lively controversy, in which Gottfried Hermann and J. H. Voss appeared as the opponents of Creuzer. His next work in importance was a complete edition of the works of Plotinus (3 vols., Oxford, 1835). With G. H. Moser, Creuzer edited several works of Cicero—*De Natura Deorum* (1818); *De Legibus* (1824); *De Re Publica* (1826); and *De Divinatione* (1828). Between 1837 and 1848 he published a partial collection of his writings in 10 vols. (*Deutsche Schriften*, Leipzig and Darmstadt), the last of which contains his autobiography under the title *Aus dem Leben eines alten Professors*. This was supplemented by his *Paralipomena der Lebenskizze eines alten Professors* (Frankfort, 1858). He was also a prolific writer of essays on archæological topics. Consult Stark, *Friedrich Creuzer, sein Bildungsgang und seine bleibende Bedeutung* (Heidelberg, 1875), and Sandys, *A History of Classical Scholarship*, vol. iii (Cambridge, 1908).

CREUZNACH, kroits'näg. See KREUZNACH.

CREVAL'LÉ (from Sp. *caballa*, horse mackerel, from *caballo*, horse, from Lat. *caballus*, horse), or CAVALLY. A name in Florida and the West Indies for various edible mackerel-like sea fish of the genus *Caranx* (family Carangidæ), especially the large horse crevallé, or jack (*Carangus hippos*), which is found on both coasts of the warm parts of America and also in the East Indies. It is olivaceous above; sides and below golden; opercle marked with a large black blotch; canines of the lower jaw very prominent. It frequently exceeds 15 pounds in weight and is common in Florida, where it is regarded as a fine food fish. A closely related species (*Carangus caballus*) of the Pacific coast of Mexico is called "cocinero," or "cocinero dorado." See JUREL; Plate of HORSE MACKEREL.

CREVASSE, krâ-vâs'. See GLACIER.

CREVAUX, krâ'vō', JULES NICOLAS (1847–82). A French explorer, born at Lorquin, Lorraine. He made four extensive tours through South America. On the first of these (1877) he visited the interior of Guiana and crossed to the Tumuchumac Mountains, the first European to perform that feat. In the following year he visited the valley of the Río Oyapok and, after exploring the Amazon region, returned to Paris. On his next tour, undertaken for the purpose of exploring the left affluents of the Orinoco, he traveled from Bogotá, along the upper Río Negro to the Río Guaviare, which he reached Oct. 20, 1880. In 1882 he journeyed through the valley of the Paraná, explored the Tapajos and several other rivers, and discovered numerous remains of Inca civilization. While endeavoring to ascend the Pilcomayo, in order to visit certain Indian tribes, he was attacked by the Tobas and killed with 19 of his companions; two Bolivians of his escort alone escaped to relate the details of the catastrophe. An account of his explorations has since appeared under the title *Voyages dans l'Amérique du Sud* (1883). A work published by the Geographical Society of Paris, and entitled *Fleuves de l'Amérique du Sud* (1883), is also based upon his researches.

CRÈVECŒUR, krĕv'kĕr', JEAN HECTOR SAINT JOHN DE (1731–1813). A French agriculturist, traveler, and author. He was born at Caen and was educated in England. He came to America in 1754, bought an estate near New York, and married the daughter of an American merchant. He suffered much from the Revolutionary War, and in 1780 was imprisoned three months in New York on suspicion of being a spy. He was sent to England as a prisoner, was exchanged, reached France in 1782, and introduced there the culture of the American potato. On his return to New York (November, 1783) as French Consul, he found his wife dead, his house burned; his children, too, had disappeared, but were finally found in the care of a kindly merchant. He had previously published *Letters of an American Farmer* (1782), which he translated into French and published in Paris. They gave such glowing accounts of the climate and fertility of America that 500 families are said to have left France for the Ohio valley on the strength of his statements. He wrote also a volume on *Potato Culture* (in French), and *A Journey in Upper Pennsylvania and in New York State* (2 vols., in French, 1801). In his most important work, the *Letters*, Crèvecœur, though a man of much cultivation, writes as a simple-hearted American farmer. Internal evidence in his writings tends to indicate that he was a Quaker, and the likelihood that he was such is strengthened by his refusal to take any part in the military controversies of the Revolution. His idyllic descriptions of life in the New World, with its approximation to Rousseau's state of nature, transformed crudity into an idealistic mirage that fascinated the philosopher. The *Letters* were translated into German and Dutch, and their idealized treatment of American rural life may perhaps be traced in Campbell, Southey, Coleridge, and Byron—possibly in Chateaubriand. After holding his consulship for 10 years Crèvecœur returned to France, dying at Sarcelles. Consult Tyler, *Literary History of the Revolution* (New York, 1897).

CREVILLENTE, krā'vē-lyān'tā. A town of Spain, in the Province of Alicante, about 20 miles west-southwest of the city of that name (Map: Spain, E 3). It is picturesquely situated at the foot of the hills some 10 miles from the boundary of Murcia, and has a pretentious town hall and a castle, formerly the possession of the Count of Altamira. Weaving and agriculture are the principal industries. Crevillente is supposed to have been founded by the Romans. Under the Goths it formed part of the Kingdom of Todmir; it passed into the hands of the Moors, by whom it was held until 1263, when it was taken by Jaime el Conquistador. Pop., 1900, 10,726; 1910, 10,452.

CREW (older form also *crue*, apocopated from *accrue*, OF. *acrewe*, *acreue*, increment, from *acreistre*, Fr. *accroître*, to increase, from Lat. *accrescere*, to increase, from *ad* to + *crescere*, to grow). A term used to designate the body of men employed to man a ship, boat, gun, etc. The crew of a full-rigged sailing ship is divided into five parts—forecastlemen, foretopmen, maintopmen, mizzentopmen, and afterguard; these are called the *parts of the ship*, and they are again subdivided into port and starboard *watches*, and each watch is again separated into *first* and *second parts port* (or *starboard*). Modern men-of-war without sail power usually have the crew divided according to the arrangement of the battery. It is customary to have as many gun divisions as the arrangement of the battery demands. In ad-

dition to these there are the powder division, engineer's division, and marines.

CREW, HENRY (1859–). An American physicist, born at Richmond, Ohio. He graduated at Princeton in 1882, was fellow in physics at Johns Hopkins University in 1884–87, and instructor in physics at Haverford College in 1888–91. In 1891–92 he was astronomer of Lick Observatory, and in 1892 was appointed professor of physics at Northwestern University (Evanston, Ill.). He was president of the American Physical Society in 1909–10. In 1912 he became president of the Illinois Academy of Science. He also became assistant editor of the *Astrophysical Journal* and published *Elements of Physics* (1899; 3d ed. rev., 1909); *Principles of Mechanics* (1908); *General Physics* (1908; 1911).

CREWE, krōō. A town of Cheshire, England, about 34 miles southeast of Liverpool (Map: England, D 3). It is a central station of several railways and owes its importance to the establishment in 1843 of the immense workshops of the London and Northwestern Railway, which employ more than 7000 men. Crewe was incorporated in 1877. Its affairs are administered by a mayor, a municipal council of 21, and a board of aldermen of seven members. (See GREAT BRITAIN, *Local Government.*) In order not to interfere with its immense passenger traffic, many miles of railway have been tunneled under the city to transport freight. It is also a mail-distributing centre. Its supply of gas and water is provided by the London and Northwestern Railway. It has a modern system of sewerage connected with a sewage farm. Two hospitals, a technical school and school of art, a library, public baths, and a large general market are maintained by the corporation. Among its chief industries are the manufacture of locomotives, railway cars, clothing, and fustian. Pop. (municipal borough), 1891, 32,774; 1901, 42,074; 1911, 44,970.

CREWE, ROBERT OFFLEY ASHBURTON CREWE-MILNES, MARQUIS OF (1858–). A British statesman, educated at Trinity College, Cambridge. He was assistant private secretary to the Secretary for Foreign Affairs in 1883–84, Lord in Waiting to the Queen in 1886, and Lord Lieutenant of Ireland in 1892–95. In 1905–08 he was Lord President of the Council, in 1908 Lord Privy Seal, and in 1908–10 Secretary of State for the Colonies. He became Secretary of State for India in 1910, again Lord Privy Seal in 1912, and also His Majesty's Lieutenant for the County of London in the same year. He received the Oxford D.C.L. in 1912. Besides several articles on Ireland, he is author of a volume of *Stray Verses* (1889–90; 2d ed., 1893).

CREYTON, krā'ton, PAUL. A pseudonym of J. T. Trowbridge.

CRIB. See FOUNDATION.

CRIB'BAGE (from *crib*, rack, Ger. *Krippe*, OHG. *krippa*, also *chripfa;* connected with MHG. *krëbe*, basket, which is probably related to Lat. *corbis*, basket). A game of cards, which can be played by two, three, or four persons, but is mostly played by two with a pack of 52 cards. When four persons are engaged, they take sides. The value of the cards is: face cards 10, ace one, and the rest as marked. The number of cards dealt is usually five or six. The points are scored on a board, and 61 constitutes game. The players cut for deal; the player who loses the deal takes three points, as a makeweight for the adversary's advantage. Five (or six) cards in alternate succession are then dealt, the rest of the pack being placed face downward on the table. The players gather up their cards, inspect them, and select two to place them on the table face down. These cards are called "the crib" and become the property of the dealer. The nondealer then cuts the remainder of the pack, and the dealer turns up the top card. The play then begins, the player announcing the value of each card as he plays it: thus, suppose it is a king, he calls 10—the next player says, e.g., 8; then another card is played by the first player, and so on until the whole amount reaches 31, or as near it, without exceeding it, as can be accomplished. The details of counting the points made in play are too intricate to exemplify in a general description. After the play of the hand is completed, each player counts all the fifteens he can by any combination make out of the cards he holds in conjunction with the "turn up" card. Then the dealer takes up the four cards thrown out for the "crib" by the two players as already mentioned, and counts them in the same way in conjunction with the turn up or start card. Each player is entitled, in addition to the points made in play or in crib, to count "pairs," "pairs royal," "double pairs royal," and for the knave ("his nobs") as well as to count sequences—three or more cards following in successive numbers—and flushes, when all the cards in crib are of the same suit. Consult: Cady, *Cribbage* (New York, 1897); "Aquarius," *Piquet and Cribbage* (London, 1883); *Foster's Complete Hoyle* (New York, 1909).

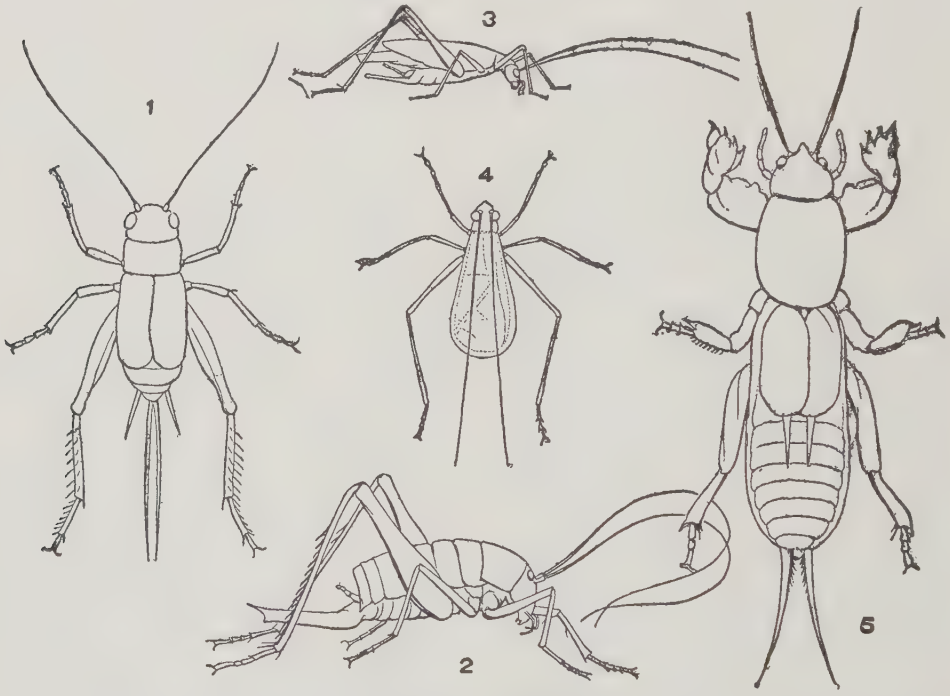
CRIB'BING, or **CRIB BITING.** A bad habit, met with especially in the lighter breeds of horses and those spending a considerable amount of time in the stable. The act consists in the animal seizing with his teeth the manger, rack, or any other such object, and then arching the neck, giving a grunt, and apparently swallowing air, and is technically called "wind sucking." Cribbing springs often from idle play; may be first indulged in during grooming, especially if the operation is conducted in the stall, and the animal be needlessly teased or tickled; is occasionally learned, apparently, by imitation from a neighbor; and in the first instance is frequently a symptom of some form of indigestion. Its indulgence may be suspected where the anterior edge of the front teeth is worn off, and will soon be proved by turning the animal loose where he can find suitable objects to lay hold of. It usually interferes with thriving and condition and leads to attacks of indigestion. It can be prevented only by the use of a muzzle or throat strap, by covering the mangers and other stable fittings with iron, or by using box stalls without any manger or projecting wood.

CRICHTON, krī'ton, JAMES (1560–82), called THE ADMIRABLE CRICHTON. A Scotchman famous for his versatility and his universal accomplishments. He was the son of Robert Crichton, of Eliock, Dumfriesshire, who was joint Lord Advocate of Scotland from 1562 to 1573 and from 1573 to 1581. On his mother's side he claimed descent from the old Scottish kings. He was educated at St. Andrews University. Before he reached his twentieth year

he had, it seems, "run through the whole circle of the sciences," mastered 10 different languages, and perfected himself in every knightly accomplishment. In Paris, Rome, Venice, Padua, and Mantua he achieved the most extraordinary victories in disputation on all branches of human knowledge and excited universal amazement and applause. The beauty of his person and the elegance of his manners also made him a great favorite; while, as if to leave no excellence unattained, he vanquished a famous swordsman in a duel at Mantua (1582). The Duke of Mantua appointed him preceptor to his son, Vincenzo di Gonzaga, a dissolute and profligate youth. On July 3, 1582, according to Douglas Crichton, in his *Admirable Crichton: the Real Character*, Crichton was attacked in the streets of Mantua by six masked men. He pushed them so hard that their leader pulled off his mask and disclosed the features of Vincenzo. With an excess of loyalty Crichton threw himself upon his knees and begged the young prince's pardon, at the same time presenting him with his sword, which the heartless youth plunged into the body of his tutor. What degree of truth there may be in the eulogies of his biographers it is impossible to determine, but he is known to have associated himself with the Venetian publisher Aldus Manutius, who is the authority for many otherwise unauthenticated biographical details. W. H. Ainsworth wrote a romance founded on the story of Crichton in 1837. Consult: P. F. Tytler, *The Life of James Crichton* (London, 1819; rev. ed., 1823); Douglas Crichton, *The Admirable Crichton: the Real Character* (ib., 1909); Whibley, *Essays in Biography* (ib., 1913).

CRICHTON-BROWNE, Harold W. A. F. (1866–). A British soldier and explorer, educated at Magdalene College, Cambridge. He became a lieutenant in the British army in 1884. He was a member of Joseph Thomson's exploring expedition to the Atlas Mountains, reached the top of Tizi Likumpt (15,000 feet) in 1888, and after the recall of Thomson had sole charge of the expedition. In 1890 he received a commission in the Bechuanaland Border Police. In 1892 he was taken prisoner by a Matabele impi, and in 1900–02 he served in South Africa. He was promoted lieutenant colonel in 1911. A fellow of the Royal Geographical Society, his writings on exploration include: *In the Heart of the Atlas; Two African Cities; Across the Veldt to Buluwayo.*

CRICK'ET (OF. *crequet*, Fr. *criquet;* ultimately imitative in origin). Any of the saltatorial insects of the orthopterous family Gryllidæ, distinguished from the Locustidæ by the cylindrical spear-shaped ovipositor of the female. The family contains three very distinct groups: (1) mole crickets (q.v.), with fore legs developed for burrowing; (2) tree crickets (q.v.); (3) true crickets, including the common field and house crickets. Most of them in all parts of the world are black or of some dull color and are mainly nocturnal. They are herbivorous, and the American black field crickets are most abundant in neglected fields, or where layers of old straw, etc., give them warmth and hiding. They dig holes in the ground and sit there during the day, chirping, as if with contented enjoyment, and going abroad at night; but any disturbance near them will produce instant quiet. Their eggs are laid in the loose soil, chiefly in the autumn, and hatch in the spring, few adults surviving the winters



REPRESENTATIVE CRICKETS.

1. Common black cricket (*Gryllus neglectus*). 2. A wingless cricket (*Ceutophilus maculatus*). 3. A tree cricket, the small green or "snowy" cricket (*Œcanthus niveus*), female. 4. Same; male. 5. A mole cricket (*Gryllotalpa borealis*).

of cold climates. The commonest species in the northeastern United States (*Gryllus neglectus*) occasionally comes into houses; but the house cricket proper is a European one (*Gryllus domesticus*) which habitually domesticates itself, and is especially fond of the crevices about old-fashioned fireplaces, where its merry chirping has woven itself into the romance and poetry of all Western nations, as a sound suggestive of domestic cheer. This species is now acclimatized in Canada and some of the Northeastern States. The wingless crickets are represented in the United States by a species (*Ceutophilus maculatus*) common in New England.

The chirping of these insects, which begins in midsummer, is produced by rubbing a filelike ridge of one wing over a scraping surface of the other. Only the males have these organs, and it is generally agreed that the sounds serve either to call or excite the mute females. A certain Sicilian species is said to make a noise audible a mile away. The apparatus and the musical characteristics of the sound have been exhaustively studied by S. H. Scudder, who says that the notes of the black field cricket are pitched at E natural, two octaves above middle C. The songs of other sorts of crickets vary from this, each in its own way. To this same group belong some curious forms of the tropics in which "the front of the head is produced into a leaflike projection." Another group are of very diminutive size and resemble minute roaches; one genus (*Myrmecophila*) dwells altogether in the nests of ants, both in Europe and in North America. Several species have been described. Other Gryllids are among the insects inhabiting caves. Consult Howard and Marlatt, "Principal Household Insects of the United States," in *United States Department of Agriculture, Division of Entomology, Bulletin 4*, N. S. (Washington, 1896). See CAVE ANIMALS and SYMBIOSIS, and compare LOCUST; KATYDID; MOLE CRICKET; TREE CRICKET.

CRICKET (probably from OF. *criquet*, stick used as a marker in the game of bowls). The national game of England is played wherever Englishmen have colonized, and in many of Great Britain's possessions, notably in the West Indies, it has become popular with the natives. In America it is played in certain portions of the United States and in the larger cities of Canada. The rules which govern the game all over the world are those made by the Marylebone Cricket Club of London and from time to time are regulated at meetings of this club. This has always been the custom since the club was founded, about the year 1744. Philadelphia, which is the home of cricket in America, has more clubs than any other place in the United States or Canada, and the four larger clubs—Germantown, Belmont, Merion, and Philadelphia—compete annually for the Halifax cup. Two other cups are also competed for by some 15 minor clubs and second elevens from the principal clubs. Cricket in Philadelphia is controlled by the Associated Cricket Clubs of Philadelphia, in an organization composed of three delegates from each of the four large clubs. This organization publishes a periodical, the *American Cricketer*, founded in 1877. The Metropolitan District Cricket League, and the New York Cricket Association, which has assumed more importance of late years, regulate the matches within 20 miles of the city hall in New York. The other organizations in the United States are the California Cricket Association, the Northwestern Cricket Association, with headquarters in Chicago, and the Massachusetts Cricket Association. International matches are played annually between the United States and Canada, and on several occasions teams from Philadelphia have visited England. In 1912 the Philadelphia Cricket Club made an excellent showing abroad by winning five matches and drawing one out of nine played. Almost annually, in recent years, either an English, Australian, or Irish eleven has visited Philadelphia, New York, and Toronto. The Intercollegiate Cricket League is composed of teams representing the University of Pennsylvania, Harvard, and Haverford.

The game is played between two teams of 11 men each, on a level grass field, but the exigencies of climate in Australia and the Pacific slope of California sometimes necessitate a cement-based, matted stretch. In the centre of the field a wicket is pitched; i.e., three stumps of wood about 1½ inches in diameter and 27 inches high are placed in a line so that with the space between them they cover 8 inches; on the top of these are two light wooden bails. Twenty-two yards in a direct line from and opposite these, three similar bail-topped stumps are erected. A line from each wicket or set of stumps 8 feet, 8 inches in length, with the stumps in the centre, is drawn. This is the bowling crease, beyond which the bowler must not pass when delivering the ball. In front of the stumps, 4 feet from them and parallel with them, another white line is drawn, called the popping crease, within which is the batsman's domain. The bat used must not be longer than 38 inches or wider than 4¼ inches. The ball is 3 inches in diameter and weighs about 5½ ounces. An umpire is appointed by each team, and, before starting a match, they settle what shall be considered boundaries and other conditions of play. Then the captains toss for the right to select which team shall go to the bat first. The team which so elects sends two men in, one to each wicket; the other team sends a bowler to one end and disperses the other 10 men about the field in such positions as the captain's knowledge of the kind of bowler and the kind of batter indicates to him as likely to be most efficacious. The umpire then calls "play," and the bowler bowls, not throws, the ball from the end opposite the batter. If it is a ball which the batsman can reach, he either blocks it or hits it to some part of the field; if he thinks he can run to the opposite wicket and the other batsman change places with him before the ball is returned and either wicket thrown down with it, he runs; and a "run" is scored each time the batsmen cross each other. The bowler bowls four, five, or six balls (four in a three days' match) from one end; and then the ball is handed over to a second bowler, who bowls an equal number of balls from the opposite end. The batsman may be put out in any of the following ways: if he fails to defend his wicket and the bowled ball knocks off the bails ("bowled"); a fielder catches a batted ball before it touches the ground ("caught"); should the batsman fail to have his bat or any part of his person within the popping crease before his wicket is thrown down with the ball ("run out"); if he steps out of his ground to play a ball, misses it, and the

wicket keeper throws his wicket down with it before he can step back ("stumped"); if, when a straight ball has been bowled to him, which in the judgment of the umpire would have hit his wicket had he not prevented it by interposing any part of his body except his hand ("leg before wicket"); if in playing at the ball he knocks down his own wicket ("hit wicket"); or if he willfully obstructs the fielders. When a batsman is put out, another takes his place, and the game proceeds until the tenth man is out. Then, there being no more batsmen to come, the eleventh man's innings comes to an end, he being "not out." The total number of runs made off the bats, with a few penalties added which it is not necessary to detail here, make up that side's score. Then the other side goes in to bat. Each eleven has normally two innings taken alternately, the total score of each side determining the result of the match.

Lillywhite, *Cricketers' Annual*, and Wisden, *Cricket Almanack*, are the standard authorities on the rules for the current years. Consult: Murdoch, *Cricket* (London, 1893); Lyttelton, *Outdoor Games: Cricket and Golf* (ib., 1901); Prince Ranjitsinhji, *The Jubilee Book of Cricket* (Edinburgh, 1897); Read, *Annals of Cricket* (London, 1897); Spalding's *Cricket Guide* (issued annually); Warner, *Cricket in Many Climes* (Philadelphia, 1901), and *Cricket Across the Seas* (New York, 1903).

CRICKET FROG. A small frog (*Acris gryllus;* northern specimens are variety *crepitans*), abundant throughout the warmer parts of the United States, east of the plains, and noted for its rattling cricket-like cries in spring. (See Colored Plate with TOAD.) It is about an inch long, brownish, with a blackish triangular patch (apex backward) between the eyes, the borders of which are light-colored, continued as a dorsal band to the rear end of the body; throat in spring yellow, and legs barred; but all these colors change with surroundings, as the species possesses the power of metachrosis in a high degree. "The note of this species," says Cope, "may be exactly imitated by striking two marbles together, first slowly, then faster and faster, for a succession of about 20 or 30 beats. The noise cannot be heard at a very great distance. . . . It keeps on the high grass in and around marshy places, seldom if ever ascending trees or bushes. When pursued, it leaps with prodigious agility and hides under water." Their eggs are deposited in April, in little masses attached to the blades of coarse grass. A short time afterward all the great numbers which make the marshes so noisy in April and May die off, so that until the eggs hatch and the young "peepers" develop late in August, the species is practically extinct. Consult Abbott, "Notes on the Habits of the Savannah Cricket Frog," in *American Naturalist* (Philadelphia, 1882), and Dickerson, *The Frog Book* (New York, 1906).

CRICKET ON THE HEARTH (Das Heimchen am Herde). An opera by Goldmark (q.v.), first produced in Vienna, March 21, 1896; in the United States, Nov. 7, 1912 (Philadelphia).

CRICKET ON THE HEARTH, THE. A Christmas tale by Charles Dickens (1845).

CRIEFF, krēf. A police burgh and health resort in Perthshire, Scotland, on the Earn, 17 miles west of Perth (Map: Scotland, E 3). It is beautifully situated at the foot of the Grampians, near the entrance to the Highlands. It has a public library and a mechanics' institute. Its healthful climate makes it a summer retreat for invalids, who resort to its hydropathic establishments. There are numerous handsome countryseats in the vicinity. The greatest Scotch cattle market was held here till 1770, when it was removed to Falkirk. Its industries include the manufacture of leather, linen, cotton, and woolen goods. Pop., 1901, 5208; 1911, 5571.

CRILE, GEORGE W. (1864–). An American surgeon, born at Chili, Ohio. He graduated from Ohio Northern University (A.B., 1884) and Wooster (M.D., 1887), and studied also in Vienna, London, and Paris. He was lecturer on the principles and practice of surgery at Wooster from 1893 to 1900, when he became professor of clinical surgery at Western Reserve University. In 1913 he was granted an honorary fellowship in the Royal College of Surgeons. His book, *On the Blood Pressure in Surgery* (1903), is especially important. (See BLOOD PRESSURE.) He published, besides: *Surgical Shock* (1897); *Surgery of the Respiratory System* (1900); *Certain Problems Relating to Surgical Operations* (1901); *Hemorrhage and Transfusion* (1909); *Surgical Anemia and Resuscitation* (1914).

CRILLON, krē'yōn', LOUIS BALBIS (or DES BALBES) DE BERTON DE (1543–1615). A celebrated French general, surnamed "L'homme sans peur," and "Le brave." He was born at Murs, in Provence, and was trained for war under François de Lorraine, Duke of Guise, then the model of military chivalry. In 1558 he gave proof of his valor at the siege of Calais and soon afterward at the capture of Guines. He fought against the Huguenots and distinguished himself at the battles of Dreux, Jarnac, and Moncontour. He was at the battle of Lepanto, in 1571, and, though wounded, was appointed to carry the news of the victory to the Pope and the French King. He disapproved strongly of the massacre of St. Bartholomew, but in 1573 he took part in the siege of La Rochelle. He accompanied Henry of Anjou to Poland, and after the latter's accession as Henry III continued faithful to him in his struggle with the Catholic League. Henry IV found in him a sincere friend and adviser, and called him "Le Brave des Braves." After the peace with Savoy Crillon retired to Avignon. Consult Montrond, *Histoire du brave Crillon* (Lille, 5th ed., 1874).

CRIME (OF., Fr. *crime*, It. *crimine*, from Lat. *crimen*, accusation, from *cernere*, Gk. κρίνειν, *krinein*, to decide). In law, an offense against the peace, order, and dignity of the state. *Crime* has been more specifically defined as "disobedience to a command or prohibition made with reference to a matter affecting public peace, order, or good government to which a sanction is attached by way of compensation for the injury which the act or omission may have caused to an individual."

The same wrongful act, e.g., assault and battery, may subject the wrongdoer to a criminal prosecution by the state and to a civil action in tort by the injured individual. Such an act is at once a breach of the public peace and an invasion of the injured person's rights. In England and in each of the States of the United States certain offenses are crimes at common law, while others are made so by statute. Criminal offenses against the United States, however, are all of statutory origin. The common-law classification of crimes was into *treason* (q.v.),

felony (q.v.), and *misdemeanor* (q.v.); treason being separated from other high crimes because of its character, its mode of trial, and its punishment, and the chief distinction between a felony and a misdemeanor being that the former occasioned the forfeiture of lands and goods, while the latter did not. The statutory definitions of the various classes of crimes now usually includes treason under the head of felony and makes the distinction between felonies and misdemeanors turn upon the disgraceful or infamous character of the punishment prescribed for the crime, a felony being usually punishable by loss of life or by imprisonment in a State prison for a year at least and by the deprivation of civil rights, while a misdemeanor is punished by fine or by imprisonment in a workhouse or by both.

In order that an act shall amount to a crime, it must be committed with a criminal intent. It is not a crime to take the life of a human being if this is done pursuant to a legal command, as in the case of a sheriff inflicting capital punishment upon a duly convicted and sentenced criminal, nor if it is the result of accident. In neither case does the person causing the other's death intend to commit a wrongful or forbidden act. But criminal intent is not necessarily synonymous with actual intent to become a criminal. A general criminal intent exists when the actor has an intellectual apprehension of the nature of the act which the law pronounces criminal and voluntarily assents to its commission. In most crimes no other intent is required. At times, however, the law requires a specific intent, as in the case of the transfer of one's property with intent to defraud his creditors or sending poison to another with intent to injure him. Here something more than knowingly and voluntarily disposing of the property or sending the poison is necessary to the commission of the crime, viz., the disposition or the sending with the specific intent to defraud or to injure. Insanity (q.v.) relieves its victim from criminal liability when it renders him incapable of forming a criminal intention. Voluntary drunkenness, even when causing temporary insanity, does not so relieve its victim, although it may be taken into account in crimes requiring a specific intent on the part of the actor, in determining whether he did the particular act with the specific intent. Infancy also relieves from criminal liability when the infant is incapable of forming a criminal intent. (See AGE.) Analogous to insanity and infancy, as an excuse for an act otherwise criminal, is coercion or duress (q.v.) when of such a character as to destroy the voluntary nature of the act. See ACCESSORY; PRINCIPAL; PUNISHMENT; also CRIMINAL LAW; CRIMINOLOGY, and the authorities there referred to.

CRIME AND PUNISHMENT. A novel by Dostoyevsky, published in 1866. It is a study in abnormal psychology.

CRIME'A (Russ. *Krim, Krym*, Lat. *Chersonesus Taurica*). A peninsula in the south of Russia, forming part of the government of Taurida, and comprising the districts of Perekop, Eupatoria, Simferopol, Yalta, and Feodosia (Map: Russia, D 5). It is united to the mainland by the very narrow isthmus of Perekop, between the Black Sea and the Sea of Azov, and separated from the peninsula of Taman, on the east, by the narrow Kertch Strait. The Crimea is thus almost surrounded by water—on three sides by the Black Sea and on the fourth by the Sea of Azov. A trench 70 feet wide and 25 feet deep across the isthmus of Perekop cuts it off from the mainland. The Crimea is quadrilateral in shape; but a long, narrow peninsula juts out on the east, which increases the extreme length of the territory from east to west to nearly 200 miles, the breadth being 110 miles. The area is about 9800 square miles. The peninsula is peopled by about 855,000 inhabitants, mostly Turkish-speaking Tatars. Greeks, Russians, Germans, and Jews make up the other constituents of the population. The coast is indented, particularly on the side bordering on the Sea of Azov. It has good harbors and is the seat of a thriving fishing industry throughout its extent. Northern Crimea is a continuation of the southern Russian steppes. The Salgir River divides the peninsula into two distinct regions. Southern Crimea is well watered and fertile. Along the side facing the southeast there is a highland region, the Yaila Mountains, forming the watershed. These mountains rise to a height of over 5000 feet, their most interesting peak being the Tchatir Dagh (Tent Mountain), the *Mons Trapezus* of the ancients. The streams rise in the southeast coast highlands, and while a few very short ones flow towards the east and southeast, most of the drainage goes into the Bay of Kalamita, the Gulf of Perekop, and the Sivash or Putrid Sea, which is a portion of the Sea of Azov almost cut off from it by the tonguelike peninsula of Arabat. The northwest section of the Crimea has but little fluvial drainage. The southern district of the peninsula rises with steep slopes from the sea, while spurs and secondary chains extend northward. These are richly wooded, but the beautiful intermediate valleys gradually sink into the uniform and desolate steppe which forms the northern and much greater part of the peninsula. The southern district of the Crimea is well cultivated, and is a favorite resort for Russian society. Many noblemen maintain in it their countryseats, parks and gardens surpassed by none in Europe. The famous Imperial countryseat of Livadia is situated near the southern extremity of the peninsula. Tatar villages, mosques, and Greek convents are to be seen in most picturesque situations among the woods and rocks, with many ruins of ancient fortresses.

The southeast highland region produces a rich and varied flora. On the northern slopes and valleys grow hardy fruit and various forest trees; in the central mountain region are forests of oak, beech, elm, and other deciduous trees of central Europe; while on the higher southern slope the pine occurs, and at lower altitudes the vegetation is Mediterranean in character, and the vine and the olive flourish. Grain of various kinds is produced abundantly, and silk, wax, and honey. Fruit culture is being rapidly developed in the Crimea, under the favorable climatic and soil conditions found in the peninsula. The Yalta district and parts of the Simferopol and Feodosia districts have a heavy yearly output, among which almonds, apricots, medlars, peaches, pomegranates, and quinces grow in profusion. Some small rodents, hares, and foxes are the chief mammals; reptiles and insects are not numerous. Much attention is bestowed upon horses, oxen, and sheep, in which no small part of the wealth of

the country consists. The climate of the Crimea varies considerably for such a slight extent in latitude. The northern part has cold winters and hot summers, while in the southern part the winters are warm and the heat of the summer is tempered by proximity to the sea and the shelter afforded by the mountainous barrier emerging northward.

The chief industry of the Crimea is agriculture. The raising of cereals is carried on mostly by the Russians and the colonists, chiefly Germans, while the Tatars and Greeks are engaged primarily in gardening. Owing to the scarcity of labor and the prevalence of large holdings, agriculture in the Crimea is based on modern lines. Cereals are raised, fruit abounds, and wine of an excellent quality is produced. Tobacco plantations are numerous. The southeastern littoral enjoys a mild and healthful climate and is rich in flowers, shrubs, and flowering trees; here the olive, the pomegranate, and the fig flourish, and the hills are overgrown with fir and pine, beech, oak, and elm. On the open steppes beyond the Yailadagh the grass is parched by midsummer droughts and bitten by winter frosts. Saline lakes yield quantities of salt; porphyry, limestone, and ironstone exist. The rearing of live stock (which includes camels) is extensively carried on. Beekeeping, sericulture, and fishing are important industries. The manufactures include flour, leather, wool, soap, preserved fruits and vegetables, metals, and ships. In the country districts the bulk of the inhabitants are Tatars; height, 1.644 meters; cephalic index, 80. Cleanliness and morality are proverbial among them. Other elements of the population are Russians, Greeks, Armenians, Germans, Karaite Jews, and Albanians. The two principal cities of the Crimea are Sebastopol, a great fortress and naval station, and Simferopol, the capital of the government of Taurida. An interesting town is Bakhchisaray, celebrated as the ancient capital of the Tatar khans.

History. To the ancients the Crimea was known as *Chersonesus Taurica*, from the Tauri, a mountain tribe of the south, who are supposed to have been the remnants of a Cimmerian people driven out by the Scythians in the seventh century B.C. (See CHERSONESUS; CIMMERII.) In the sixth century B.C. the Greeks of Miletus founded flourishing colonies at Nymphæum, Theodosia, and Panticapæum (the present Kertch, q.v.). About 500 B.C. these cities, together with several other towns, united to form the Kingdom of Bosporus, which existed till the fifth century A.D. and embraced, at the period of its greatest extent, the entire peninsula and the eastern coast of the Sea of Azov. The Chersonesus stood in close commercial and social relations with the Greeks of Europe and especially with the Athenians, who imported from the country great quantities of grain and hides as well as many slaves. In 114 B.C. Parisades, the ruler of Bosporus, hard pressed by the Scythians, acknowledged himself the vassal of Mithridates (q.v.) of Pontus. Pharnaces (q.v.), son of Mithridates, who had sided with the Romans against his father, received as a reward from Pompey the Kingdom of Bosporus. (See BOSPORUS, KINGDOM OF.) Subsequently, under the nominal suzerainty of the Romans and later of the Byzantines, the Kingdom of Bosporus prospered, till about the end, probably, of the fourth century, when it fell before the Huns. The country, with the exception of the southern coast land, which was held by the Byzantines, was henceforth devastated by a succession of barbarian invasions. About the middle of the seventh century the Khazars, a fierce tribe from the region of the Volga, took possession of the peninsula and established a powerful kingdom there, chiefly remarkable for the fact that the ruler, the entire nobility, and large numbers of the people became zealous adherents of the Jewish faith. In the thirteenth century the country was conquered by the Mongols, and it constituted till about 1430 a part of the Khanate of Kiptchak (q.v.). At the same time the Genoese founded a number of trading colonies on the south coast, which was known as Gothia. Among these were Caffa (Kaffa), on the site of Theodosia, which became a great emporium of the commerce between Europe and Asia. (See KAFFA.) After forming a part of the independent Khanate of Krim for about 45 years, the Crimea was conquered in 1475 by the Turks and was ruled by a khan under the suzerainty of the Sultan. In 1571 the Khan raided Moscow and sacked the town. Russian aggressions on the Crimea began in 1735, and in the following year an army under General Münnich laid the country waste. By the Treaty of Kutchuk-Kainardji, in 1774, the Porte was forced to recognize the independence of the Khan. In 1783 the country was incorporated with Russia. In 1854–56 the Crimea was the scene of conflict between the Russian armies and the allied forces of England, France, Sardinia, and Turkey. (See CRIMEAN WAR.) Consult: *Antiquités du Bosphore Cimmérien* (St. Petersburg, 1854; reprinted at Paris, 1892); Telfer, *The Crimea and Transcaucasia* (2d ed., London, 1877); Wood, *The Crimea in 1854 and 1894* (ib., 1895); Beaulieu, *The Empire of Tsars and the Russians* (New York, 1893); Minns, *Scythians and Greeks* (Cambridge, 1907).

CRIME'AN WAR. The name given to the War of 1854–56 between Russia on the one hand, and Turkey with her allies, France, England, and Sardinia, on the other. Its cause was the struggle between Russia and Turkey, which broke out in 1853, over the assertion by Russia of a protectorate over the Greek Christians in the Turkish dominions. Coupled with this was a dispute between Russia and France over the guardianship of the holy places in Palestine. The real ground, however, for the attitude assumed by France and Great Britain was resistance to the aggressive policy of the Russian Emperor, Nicholas I. The latter believed that the other Powers of Europe were not in a position to interfere, and saw an opportunity to continue the Russian advance which had Constantinople for its objective. Accordingly, in the spring of 1853 he submitted to the Porte, through Prince Menshikoff, an ultimatum in regard to the Greek Christians and other matters. England and France prepared to sustain the Sultan against Russia and stationed their fleets in Besika Bay. In July the Russian forces advanced into the Danubian principalities. The Vienna Note, prepared by Austria and signed by the neutral Powers as a basis of settlement, was so modified by Turkey as to be unacceptable to Russia, and on Oct. 4, 1853, Turkey declared war. The English and French fleets thereupon passed through the Dardanelles. Though the Turks were at first victorious upon land, the Russian admiral, Nakhimoff, won an important

naval victory at Sinope, November 30; on March 12, 1854, France and Great Britain concluded an alliance with Turkey, and two weeks later they declared war against Russia. Prussia and Austria remained neutral. The allied Western Powers determined to assist the Sultan by a naval expedition against Kronstadt, in the Baltic, and by a combined attack with land forces in the south. The Baltic expedition proved a complete failure, achieving nothing beyond the capture of Bomarsund on August 16.

Early in the summer 20,000 English troops, under Lord Raglan, and 50,000 French soldiers, under Marshal Saint-Arnaud, assembled at Varna, on the Black Sea. Against the advice of the Turks, who wished to drive Russia out of the Caucasus, Saint-Arnaud and Raglan decided upon the siege of Sebastopol, Russia's stronghold and depot in the Crimea. The war was thus narrowed down to a limited sphere and was fought in a long siege and a series of stubborn engagements. The first of these occurred at the river Alma, on Sept. 20, 1854, six days after the landing of the Allies. Saint-Arnaud died on September 29, and was succeeded by General Canrobert. At the beginning of October the Allies began the regular siege of Sebastopol, the defense of which was directed by Todleben. On October 25 the Russians attacked the British at Balaklava (q.v.). The engagement was marked by bad generalship on the British side and by the gallant but ill-advised charge of the Light Brigade. The Russians followed this up with an unsuccessful attack at Inkermann on November 5. The severe winter caused the suspension of active operations, and the English and Turks endured terrible hardships because of the inadequate commissary arrangements. Indeed, had it not been for the energy and patriotism of Florence Nightingale (q.v.), the famous nurse, the British forces would have succumbed in huge numbers. As it was, the mortality from disease in this war was frightfully above the average. During the winter an international conference attempted to adjust matters, but without avail. Austria entered into an alliance with France and Great Britain; but as Prussia could not be drawn into action unfavorable to Russia, Austria refrained from entering into hostilities. Sardinia, on the other hand, joined the Allies in January, 1855, and sent 10,000 men of her new army, under General La Marmora, to the Crimea. (See CAVOUR and ITALY.) The Russians resumed activities in February, assailing the Turkish positions at Eupatoria, but without result. After the death of the Emperor Nicholas and the accession of Alexander II, in March, 1855, Prince Michael Gortchakoff succeeded Prince Menshikoff in command of the Russian forces.

Operations were renewed with great vigor in the spring, the Allies having 174,000 men in the field and the Russians about 150,000. General Pélissier succeeded Canrobert in command in May, and General Simpson succeeded Lord Raglan, upon the latter's death in June. A Russian army, advancing to the relief of Sebastopol, was defeated at the Tchernaya on August 16. From the 19th of August to the 8th of September a terrible bombardment of the besieged city was kept up and was followed on the latter day by a general assault, in which the French took the Malakoff Tower and the British took the Little Redan. Gortchakoff now blew up the southern fortifications, evacuated the city, and retired into the hills. All the parties were ready for peace, which was signed at Paris, where a congress of the Powers had been in session, on March 30, 1856. The integrity of the Ottoman Empire was guaranteed by the Powers, which also renounced all right of intervention in Ottoman affairs; reforms were promised by the Sultan; Russia renounced her protectorate over the Danubian principalities, and ceded a strip of Bessarabia to Moldavia; the navigation of the Danube was declared free to all nations under the supervision of a commission of members from the bordering states; the Black Sea was neutralized. The Congress united in the Declaration of Paris (q.v.), which laid down certain principles of international law. Consult: Hamley, *The War in the Crimea* (London, 1891), the best short treatment in English. The standard work is Kinglake, *The Invasion of the Crimea* (9 vols., ib., 1863–87); also Russell, *The War in the Crimea, 1854–56* (ib., 1855–56); Marx, *The Eastern Question, 1853–56*, trans. by E. M. and E. Aveling (ib., 1897); Lodomir, *La guerre de 1853–56* (Paris, 1857); Kovalevski, *Der Krieg Russlands mit der Türkei in den Jahren 1853–54* (Leipzig, 1869); Rein, *Die Teilnahme Sardiniens am Krimkrieg und die öffentliche Meinung in Italien* (ib., 1910).

CRIME DE SYLVESTRE BONNARD, krĕm de sĕl'vĕs'tr' bô'när', LE. A graceful romance by Anatole France (1881). The hero, M. Bonnard, is an old member of the Institute, whose "crime" consists in releasing a young girl from a boarding school in which she was unhappy and bringing about a happy marriage for her.

CRIMINAL CONVERSATION (usually, in law, abbreviated to CRIM. CON.). The technical term for adultery with another man's wife. It is no defense to an action by the husband, in such a case, that the wife freely assented to the defendant's solicitation, for the husband does not sue for a wrong done to her, but to himself. The gist of the action is the shame which has been inflicted upon him, and the hazard to which he is subject of maintaining spurious issue. It is therefore quite distinct from the wrong of enticing the wife away from the husband, although, like seduction (q.v.), it is looked upon as a personal injury to the husband. He may condone the wife's offense, and thus lose his right to secure a divorce, without affecting his right to damages against the paramour. It has been judicially declared that the law will not hold a party remediless for an injury of this kind because, through the exercise of Christian virtue, the influence of family interest, or for any other reason, he forgives an erring wife and trusts in her reformation and promise of future good conduct. He may forgive the wife without forgiving the author of the wrong done him. See ADULTERY, and consult the authorities there referred to.

CRIMINAL LAW. That branch of public law which defines and prescribes the penalties for crime or public wrongs, i.e., wrongs or injuries by individuals against the state or sovereign as distinguished from injuries by individuals against others, which are dealt with by the private law of wrongs, or torts. All civilized systems of law now agree in drawing this distinction between public and private wrongs. There is no doubt, however, that the law of crime had its origin in the law of tort, and that in primitive society the consequence of the various acts now recognized as crimes

was to give rise exclusively to an obligation to the injured person or his representative which might be satisfied by the payment of money. Under the early Anglo-Saxon law, which corresponded substantially in this particular with other ancient systems of law, "a sum was placed on the life of every free man according to his rank, and a corresponding sum on every wound that could be inflicted on his person, for nearly every injury which could be done to his civil rights, honor, or peace; the sum being aggravated according to adventitious circumstances." (Kemble, *Anglo-Saxons*, vol. i, p. 177.) (See BLOOD MONEY; WERGILD; ETC.) The earliest recognition in ancient law of distinct wrongs against the state appears in the isolated acts, legislative in character, by which the state avenged itself for wrongs done in the same manner that private individuals were permitted under sanction of law to avenge or requite themselves for private wrong.

From these occasional legislative acts by which the state avenged itself upon the criminal for the wrong which his criminal act inflicted upon its peace and security, it was a natural transition to a system by which this particular function was delegated to a permanent commission, still legislative rather than judicial in character, whose duty it was to investigate and punish wrongful acts, usually of violence, which, though inflicted on an individual, threatened the peace and public order of the community, and finally to the more modern system under which a permanent tribunal wholly judicial in character defines and applies the law relating to crime. The history of the *Curia Regis*, or King's Court, which was at once the legislative, administrative, and judicial body under the Norman kings, shows these successive stages of development in our own criminal jurisprudence. The Court of King's Bench, which was the criminal branch of the King's Court, was organized in the reign of Edward I (1274–90). It follows, from the character of all public wrongs, that the first essential of a crime is some act which, because of its effect upon the community, is deemed an offense to the state. This may happen either: (*a*) because the act is directly an injury to the state; or (*b*) because the act is a direct interference with the performance of some duty, as of protecting the life, property, safety, and morals of citizens, which, upon grounds of public policy, the state has assumed.

Crimes may be conveniently classified as follows: (*a*) offenses against government; (*b*) offenses against public peace and health; (*c*) offenses against religion and morality; (*d*) offenses against personal liberty and security; (*e*) offenses against the dwelling house; (*f*) offenses against property; (*g*) maritime offenses. At common law also crimes were classified as felonies and misdemeanors, and the distinction has been preserved to some extent by the modern law and the various criminal codes. See CRIME; FELONY; MISDEMEANOR.

Criminal Procedure. The first step towards placing one charged with crime upon his trial is his arrest. (See ARREST.) After the arrest the prisoner must be brought for examination before the magistrate, who may hold him for the action of the grand jury, or, if an indictment has already been found, may hold him for trial before a petit jury. Pending trial, the prisoner is committed to jail, unless admitted to bail. See BAIL.

The method of finally accusing one with the commission of a crime is by indictment by the grand jury, which may either precede or follow the arrest. (See JURY; GRAND JURY.) The indictment is the final pleading corresponding to the declaration or complaint in a civil action, which sets out all of the essential elements of the crime and all facts necessary to give the court jurisdiction to try the prisoner for the offense charged. (See INDICTMENT.) Upon the trial the indictment must be read to the accused, and he is then given opportunity to plead to it. The prisoner may demur to the indictment on the ground that it is in law insufficient in force or substance. (See DEMURRER.) He may plead in abatement, setting up any facts showing want of jurisdiction in the court or other reason why he should not be placed upon his trial, or he may plead a former conviction or acquittal. See AUTREFOIS ACQUIT; JEOPARDY.

If the prisoner is unsuccessful upon his demurrer or the pleas already referred to, he must *plead to the merits* by a plea of either guilty or not guilty. A plea of guilty in effect admits the charge and is equivalent to a conviction after trial. A plea of not guilty puts in issue the indictment and places the prisoner upon his trial before a jury. (See JURY; PLEADING; TRIAL.) Upon verdict of the jury of not guilty the prisoner must be discharged. If the jury fails to agree upon a verdict, the prisoner may again be placed upon trial before a new jury, or if the verdict be guilty, he must be sentenced by the court to undergo whatever penalty the law provides for the crime. (See PUNISHMENT.) After conviction, but before sentence, the prisoner or his counsel may move to arrest the judgment because of some material error in the proceedings appearing on the record, or he may move to set aside the verdict because not supported by the evidence, or because of newly discovered evidence. Upon denial of this motion the prisoner must be sentenced, the sentence being the judgment of the court fixing and directing the punishment of the prisoner according to law.

The English common law of crime has been adopted in most of the States of the United States, with some statutory modification and addition. In a few States the criminal law has been codified, and in these jurisdictions it is entirely statutory. The law of procedure, while substantially changed by statute in all of the States in matter of form, varies in no important particular from the substance of the procedure at common law which has here been outlined.

As the several States upon the formation of the Federal Union retained their jurisdiction over crime, the Federal government has no common-law jurisdiction over crime, nor can it have any statutory jurisdiction over crime except over such crimes as in some way interfere with the power delegated to it in the Constitution by the several States, including such as arise in territory subject to its exclusive jurisdiction.

Bibliography. Blackstone, *Commentaries on the Laws of England;* Bishop, *New Criminal Law* (Boston, 1900); Robinson, *Elements of American Jurisprudence* (ib., 1900); also the *Encyclopædia of the Laws of England* (London, 1897); Archbold, *Pleading, Evidence, and Practice in Criminal Cases* (2d ed., ib., 1900); Harris, *Principles of Criminal Law* (8th ed., ib., 1899); Pollock and Maitland, *History of English Law* (2d ed., Boston, 1899); Stephen, *History of*

the Criminal Law of England (London, 1883); id., *General View of the Criminal Law of England* (New York, 1890); Phillips, *Comparative Criminal Jurisprudence* (Calcutta, 1889); Clarke and Marshall, *Treatise on the Law of Crimes* (St. Paul, 1905). Consult also authorities under JURISPRUDENCE; CRIMINOLOGY; PENOLOGY; CONSTITUTIONAL LAW.

For a discussion of the elements of a crime, of the place where a crime is punishable, and other matters affecting the liability, trial, defense, and punishment of crime, see such topics as ATTEMPT; JUSTIFICATION; JURISDICTION; JUDGMENT; PRINCIPAL; ETC.

For a discussion of particular offenses against a government, see TREASON; BRIBERY; EXTORTION; CHAMPERTY; MAINTENANCE; BARRATRY; EMBRACERY; CONTEMPT; PERJURY; RESCUE; PRISON BREACH; AFFRAY.

For offenses against public peace and health, see AFFRAY; RIOT; FORCIBLE ENTRY; LIBEL; SLANDER; ENGROSSING; FORESTALLING.

For crimes against religion and morality, see BLASPHEMY; ADULTERY; BIGAMY; SEDUCTION; ABDUCTION; ABORTION; FORNICATION.

For offenses against the person, see ASSAULT; BATTERY; MAYHEM; HOMICIDE; MANSLAUGHTER; MURDER; FALSE IMPRISONMENT; RAPE; ROBBERY.

For offenses against the dwelling house, see ARSON; BURGLARY.

For offenses against property, see LARCENY; EMBEZZLEMENT; FALSE PRETENSES; MALICIOUS MISCHIEF; RECEIVING STOLEN GOODS; FORGERY; COUNTERFEITING.

For maritime offenses, see PIRACY; BARRATRY.

CRIMINAL NEGLIGENCE. See NEGLIGENCE.

CRIM'INOL'OGY (from Lat. *crimen*, crime + Gk. λογία, *logia*, account, from λέγειν, *legein*, to say). The science which treats of the nature and causes of crime. As a separate study it is of comparatively recent growth, and the credit for its foundation as an independent branch of knowledge is usually given to Cesare Lombroso, an Italian professor in the University of Turin, who in 1876 published a remarkable book entitled *L'Uomo delinquente* ('Criminal Man'). Since its appearance quite a number of eminent scientists—physicians, jurists, economists, and sociologists—have taken up the study of crime and criminals. There is, however, such a difference of opinion concerning the fundamental causes or factors of crime that criminologists are divided into several groups. These groups may be classified under two large divisions, their difference turning upon the emphasis laid upon the individual causes of crime, on the one hand, or upon its social causes, on the other hand. The criminal, one party asserts, is born, not made; he is a criminal by nature, and the circumstances of education or environment have little or nothing to do with his law-breaking career. The opposing party maintains that social organization, education, environment—causes lying outside the individual—really determine whether or not he will become a criminal. As a rule, those who adhere to the former point of view conceive the study of crime as a part of anthropology, a part of the study of man; while those who believe that social conditions furnish the causes and explanation of crime consider this study a part of sociology. Thus the two terms usually applied to criminology, "criminal anthropology" and "criminal sociology," each indicate a prejudice in favor of one or the other of the tendencies characterized above.

The subject of criminology is a complicated and difficult one. It is only within the present generation that the possibility has arisen of conducting the study of criminal problems on anything approaching an exact and scientific basis. Before the introduction of a system of criminal statistics it was impossible to ascertain whether crime was increasing or decreasing, what transformation it was passing through in consequence of the social, political, and economic changes constantly taking place in all highly organized societies, and what was the effect of punishment on the criminal population. Statistics, moreover, even when carefully collected, often mislead. Suppose, e.g., that the number of convictions for crimes and misdemeanors has increased in Belgium from 22,359 in 1870 to 40,372 in 1890; this does not necessarily mean that crime has increased, for the total population may have increased more rapidly than the number of offenses, and in such an event criminality has really diminished. The larger number of convictions in 1890 may, perhaps, be due to an increase in the number of punishable offenses because of the enactment of severer laws; certain acts legally permissible in 1870 may have become misdemeanors in 1890. Another possible explanation of a merely apparent increase in criminality is offered by the fact that perhaps the police have become more efficient or more vigilant, and that therefore many offenders who escaped in 1870 are now brought before the courts and condemned. These three possible explanations are sufficient to show how careful we must be in the employment of criminal statistics. Particularly when we go beyond the statistics of a single nation and attempt to compare two or more nations with a view to their relative criminality, we must be even more cautious. In no two countries is the criminal law the same, and an act which is perfectly harmless when committed in one country is considered in another as a contravention of the law. Each country has also a nomenclature of crime and methods of criminal procedure peculiar to itself. In each country the police are organized on a different principle and act on a different code of rules. Great differences of opinion exist also among different nations as to the gravity of certain offenses. Whenever it shall be possible to collect criminal statistics in the several nations according to a uniform system, then criminology will have the necessary inductive basis for fruitful comparisons between nations.

The narrow legal definition of crime as a violation of the law is scarcely of any value for philosophical purposes; and a scientific definition which shall include all acts which at any time have been called crimes, but include none other —which shall, moreover, specify their common characteristics—remains yet to be found. It seems highly probable that the study of primitive religious ideas and primitive social organization will throw considerable light upon the problem of discovering the essential nature of crime. It should be noted, meanwhile, that originally the question whether a certain act was criminal or not, and, if criminal, how the perpetrator should be punished, was answered by the offended party—individual, family, or clan—and not by the political organization of the whole people (the state). That the state should determine these matters and reserve to

itself the right to judge and to punish is a result of quite recent evolution. Even to-day the state is far from being the only coercive institution; duels, and, in a measure, lynching, are survivals of the previous status.

The question whether crime is increasing has been very widely discussed, pro and con. The statistics for England seem to indicate a slight decrease in the ratio of criminals to the general population, and the same thing holds true of the German Empire. In neither country do the more serious forms of crime show a tendency to decrease, and in Germany the number convicted for second and additional offenses—the recidivists, or true criminal class—is steadily on the increase. From 1882 to 1901 first offenders diminished from 736 per 100,000 persons of punishable age to 664. Those convicted for second or other offenses increased from 93 per 100,000 to 135. In the United States there are no statistics that give conclusive evidence as to the relative changes in volume of criminality, but it is the opinion of most statisticians that crime is increasing more rapidly than the general population.

Causes of Crime. The factors responsible for crime may conveniently be divided into three great categories—cosmic, social, and individual. The cosmic factors of crime are climate and the variations of temperature; the social factors are the political, economic, and moral conditions in the midst of which man lives as a member of society; the individual factors are those attributes inherent in the individual, such as descent, sex, age, bodily and mental characteristics. It is often extremely difficult to disentangle these factors; many of them, indeed, are indirectly at work where they appear to be absent. Heredity, e.g., seems to belong clearly to the individual factors; but if we trace an inherited characteristic back through a long line of ancestors, it may finally be found to have its origin in the circumstances of environment or education.

Cosmic Factors. How profoundly the physical structure, and likewise the mental life of man, is affected by his natural surroundings, by climate, seasons, soil, the configuration of the earth's surface and the nature of its products, is illustrated by the low type of life exhibited by the primitive inhabitants of inhospitable, barren countries. Concerning the influence of climate on crime, statisticians have concluded that crimes against the person, as assault and homicide, are relatively more numerous in warm climates, while crimes against property are more frequent in colder regions. The statistics of homicide in Europe show that the warmer countries, Italy and Spain, head the list in the proportion of murders to the population, while England, Scotland, and Holland stand at the bottom of the list. Prof. Enrico Ferri, after a thorough examination of French judicial statistics for a series of years, concludes that a maximum of crimes against the person is reached in the hot months, while crimes against property come to a climax in the winter. Aschaffenburg, by a study of the criminal statistics for the German Empire for the period 1883–92, established similar conclusions. Crimes against the person reach their maximum in July and August, being more than twice as numerous in those months as in December and January. Crimes against property are more uniformly distributed: they are, however, nearly 33 per cent more frequent in December, when at their maximum, than in May and September. Crimes against the person are unduly high in the south and west of the United States; but here we have to consider not merely climate, but also race conflicts, pioneer conditions, and uncertain legal control.

Social Factors. Concerning the social factors of crime, it must be observed that the action of society upon the individual is so complex that it will here be impossible to discuss, even briefly, all these factors.

Considering, first, the conjugal condition of criminals, it appears that there is a higher ratio of criminality among the unmarried and divorced than among the married. A partial explanation of this fact may lie in the circumstance that married men and women, being subject to the restraining influences of home life, are much less apt to yield to those antisocial tendencies which manifest themselves in crime.

Considering, secondly, occupation, prison statistics show that the higher the character of a man's daily pursuits the greater the unlikelihood of his falling into crime. According to the census *Report on Prisoners and Juvenile Delinquents in 1904*, of male prisoners committed in the year 1904, 50.1 per cent were laborers and servants, 23.7 per cent were from manufacturing and mechanical industry; 17.2 per cent from agriculture. French official statistics summarizing the results of over 50 years indicate the following number of indictments for every 100,000 members of each class: agriculture, 8; liberal professions and proprietors, 9; industry, 14; commerce, 18; domestic service, 29; vagabonds and without trade or regular occupation, 405.

Thirdly, and closely related to occupation, is the influence of rural or city life on crime. In Germany, in cities of 20,000 and over, the delinquents average 134.2 per 100,000 adults; in the smaller towns and the country the average is 96.6. In France the cities, having less than one-third of the population, furnish about one-half the criminals. Nearly the same proportions hold for Italy; and the disproportionate share of the cities in criminality has been observed in the United States, although trustworthy statistics are lacking. The city is the refuge and hiding place of questionable characters; it intensifies the struggle for existence, and by the sharp contrast it offers between rich and poor, between luxury and penury, excites envy and class hatred.

A fourth point of great importance is the influence of poverty. If poverty in itself were a decisive factor, we should expect poor countries to produce the most criminals; but poor countries like Ireland, Spain, and Hungary show a smaller ratio of theft in the population than rich England. It is rather where great poverty exists side by side with great wealth that temptation is greatest and crime most frequent, especially crimes against property. Swift and unexpected industrial and commercial changes and hard times put character to unusual strains and increase the number of lawbreakers. Von Mayr, on the basis of statistics for a part of Bavaria for the period 1835–61, concluded that every half groschen added to the price of grain called forth one additional theft per 100,000 inhabitants. Aschaffenburg has compared the number of thefts per 100,000 of population in the

German Empire, 1880–1909, with fluctuations in the price of bread, and has established a remarkably close correlation. Inventions and progress in industrial processes often make it more difficult for men to support existence in their accustomed ways. There can be no doubt, moreover, that the keen struggle for existence imposed upon the poor classes disorganizes the family and destroys many of the beneficent influences of home life. It may reasonably be maintained, on the other hand, that excessive wealth, with the idleness that it frequently begets in the possessor, is quite as apt as destitution to lead to viciousness and crime. A wealthy criminal has, of course, more numerous and efficient means for escaping detection and punishment than a poor offender.

Among the other factors of crime which may properly be classed as "social" are: the influence of social theories which tend to engender contempt for human life and the institution of private property; the absence of a widespread, deep-seated religious spirit which restrains men from yielding to evil impulses; the corruption of partisan politics which permits the worst elements of the population to become the official guardians of the public peace and prosperity; lynching and public exhibitions of cruelty which debase human character; detailed accounts of crimes in the daily press; the influence of association and suggestion by which gangs of shiftless men or boys form centres of criminal life under the leadership of unscrupulous chiefs; social disturbances like war, crises, revolutions, and exposures, which disturb the even tenor of social progress and relax the social bond.

Individual Factors. Finally, the individual factors of crime should be briefly considered. They have been carefully studied by a score of scientists, beginning with Lombroso, the founder of criminology, who was disposed at first to overlook all but the individual factors. *Sex.*—In all civilized nations women are less addicted to crime than men, and girls less than boys. Among most European peoples between five and six males are tried for offenses against the law to every one female. Women are less inclined to acts of violence than men on account of their physical weakness, but when women do become criminals their crimes are frequently characterized by a cruelty and relentlessness not found in male offenders. The crimes of women are mostly infanticide, abortion, poisoning, domestic theft. They are addicted equally with men to the perpetration of parricide, and more frequently convicted than men of parricide. Women are also more hardened criminals than men, probably because a woman may regain her rank in society only with the greatest difficulty. *Age.*—In proportion to the population crime is, as we should expect, at its lowest level from infancy till the age of 16. From that age it goes on steadily increasing in volume till it reaches a maximum between 30 and 40. Females do not enter upon a criminal career so early as males, and the criminal age is earlier in coming to a close for women than in the case of men. *Education.*—The question whether education reduces or increases criminality is far from being conclusively answered. Those states which have the best systems of education have also the most criminals in their jails and prisons. But, as a rule, the proportion of our prison population unable to read or write is considerably higher than in the free population. M. Henri Joly, an eminent French criminologist, maintains that most frequently passions and vices which have nothing to do with instruction are the veritable motives of crime. It seems reasonably certain, however, that the lack of instruction in manual and trade processes and the absence of personal, moral, and spiritual influences account for much of the tendency to crime. *Drunkenness.*—All authorities agree that intemperance is a serious cause of crime. It weakens the will, leads to evil associations, dulls the conscience. Statistical information concerning this point is usually nonofficial and of little scientific value. German statistics for 1902 show that, of 97,376 persons convicted of aggravated assault, 34,652 had committed their offenses on Sundays or holidays, the days of heaviest drinking. *Heredity.*—Individual degeneracy, which Dr. Ferri has shown to be closely connected with crime, is frequently passed on from generation to generation. The diagrammatic history of eight families given by Dr. Strahan in his book on *Marriage and Disease* illustrates the degenerate tendencies transmitted from father to children throughout several generations. Similarly, Dugdale, in his book on the Jukes, has traced the posterity of a criminal and found that the great majority of his descendants possessed vicious or criminal instincts. Lombroso advanced the hypothesis that the criminal is essentially atavistic—a type harking back to remote progenitors and characterized by the psychology of the savage rather than that of the civilized man. Later study led him to admit pathologic qualities not essentially atavistic, and, above all, epilepsy, as an additional cause of criminality. Evidence of atavism is found by Lombroso and his school in anatomical and psychological peculiarities that appear with greater frequency among criminals than in the noncriminal population. The characteristics enumerated by Lombroso as indicative in certain combinations of the criminal type include height and weight above the average; asymmetry of the skull, brain, and face; brain lighter in weight than the normal; light hair; scant beard; retreating forehead; projecting eyebrows and ears; long arms; insensibility to physical pain; pointed skull; heavy lower jaw; defective lungs; tendency to diseases of the heart and of the sexual organs; etc. Criminal anthropologists, however, are far from agreeing upon these anomalies, and often reach conclusions divergent from and sometimes contradictory to those of Lombroso. The weight of opinion among criminologists of the present day is that while criminality is somewhat more common among atavistic types than in the general population, only a small fraction of present-day criminality is attributable to such types. The hereditary criminal exists, but criminality produced by social and economic causes is far more common and of far greater significance. For bibliography, see MacDonald, *Hearing on the Bill to Establish a Laboratory for the Study of the Criminal, Pauper, and Defective Classes* (Washington, 1902). Wigmore, *A Preliminary Bibliography of Modern Criminal Law and Criminology* (Chicago, 1909). Consult also Morrison, *Crime and its Causes* (London, 1891); Rylands, *Crime: Its Causes and Remedy* (ib., 1899); MacDonald, *Criminology* (New York, 1893); Joly, *Le crime, étude sociale* (Paris, 1894); Marsh, *Crime and the Criminal* (London, 1899); Drähms, *The Criminal: His Personnel and Environment* (New York, 1900); Forel and Ma-

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CRIMMITSCHAU, krĭm'mĭt-shou. A town of the Kingdom of Saxony, on the Pleisse, about 39 miles south of Leipzig (Map: Germany, E 3). It has extensive cotton and woolen mills and machine works, and manufactures yarn, wool, dyestuffs, chronometers, and metal ware. Pop., 1900, 22,840; 1905, 23,420; 1910, 28,818.

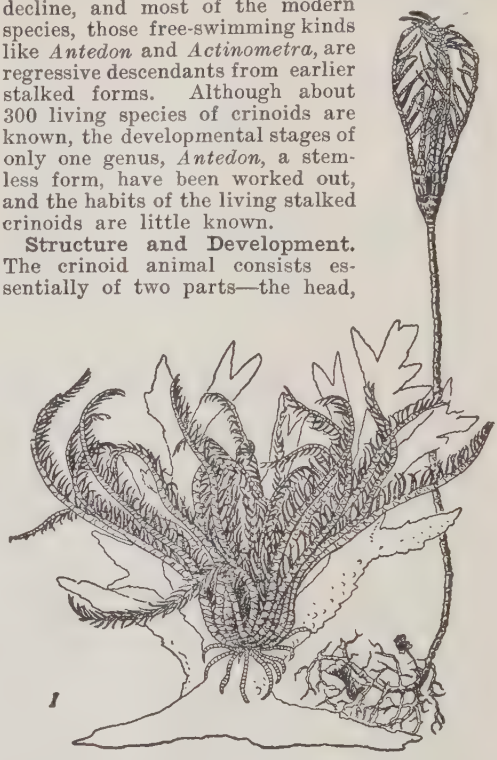
CRIMP (from Dutch *krimpen*, OHG. *chrimpfan, krīmfan*, to bend together, from *chrampfa*, Ger. *Krampe*, Eng. *cramp*). The name given to an agent for supplying ships with seamen. They are usually in league with the most disreputable class of lodging-house and saloon keepers and with prostitutes in the endeavor to fleece the sailors as rapidly as possible. The latter can then be forced aboard ship. There are numerous laws for the protection of seamen against the extortion of crimps and their dealings with masters of vessels who need crews, but these laws are unable to reach a very large proportion of cases; and some of the laws, while not greatly injuring the crimp, seriously affect the interests of a sailor who is not in need of legal protection and those of the honest lodging-house keeper.

CRIMSON. See RED.

CRINED, krĭnd (from archaic Eng. *crine*, from Fr. *crin*, Lat. *crinis*, hair). A term in heraldry. When the hair of a man or an animal differs in tincture from the rest of the charge, the object is said to be *crined* of such a metal or color.

CRINGLES (Ger. *Kringel*, Icel. *kringla*, circlet, dim. of *kringr*, pulley, *kring*, round). Short pieces of rope, with each end spliced into the boltrope of a sail, commonly confining an iron or brass ring or thimble. Smaller ropes are passed through them to aid in managing the sails. See KNOTTING AND SPLICING.

CRINOI'DEA (Neo-Lat. nom. pl., from Gk. κρινοειδής, *krinoeidēs*, like a lily, from κρίνον, *krinon*, lily + εἶδος, *eidos*, form). A class of pelmatozoan echinoderms related to the Cystoidea and characterized by the regular pentameral arrangement of the polygonal plates of the body wall, that form a usually stalked calyx, and by the presence of five generally well-developed flexible arms. The graceful flowerlike appearance of the stalked crinoids has given them the names of "sea lilies" for the living species, and "stone lilies" for the fossil varieties. The group is of great interest both to the zoölogist and paleontologist, but the complex modifications of the plates of the calyx, and the usually imperfect conditions of preservation, make their study a matter of considerable difficulty. At the present time the group is on the decline, and most of the modern species, those free-swimming kinds like *Antedon* and *Actinometra*, are regressive descendants from earlier stalked forms. Although about 300 living species of crinoids are known, the developmental stages of only one genus, *Antedon*, a stemless form, have been worked out, and the habits of the living stalked crinoids are little known.



EXISTING CRINOIDS.

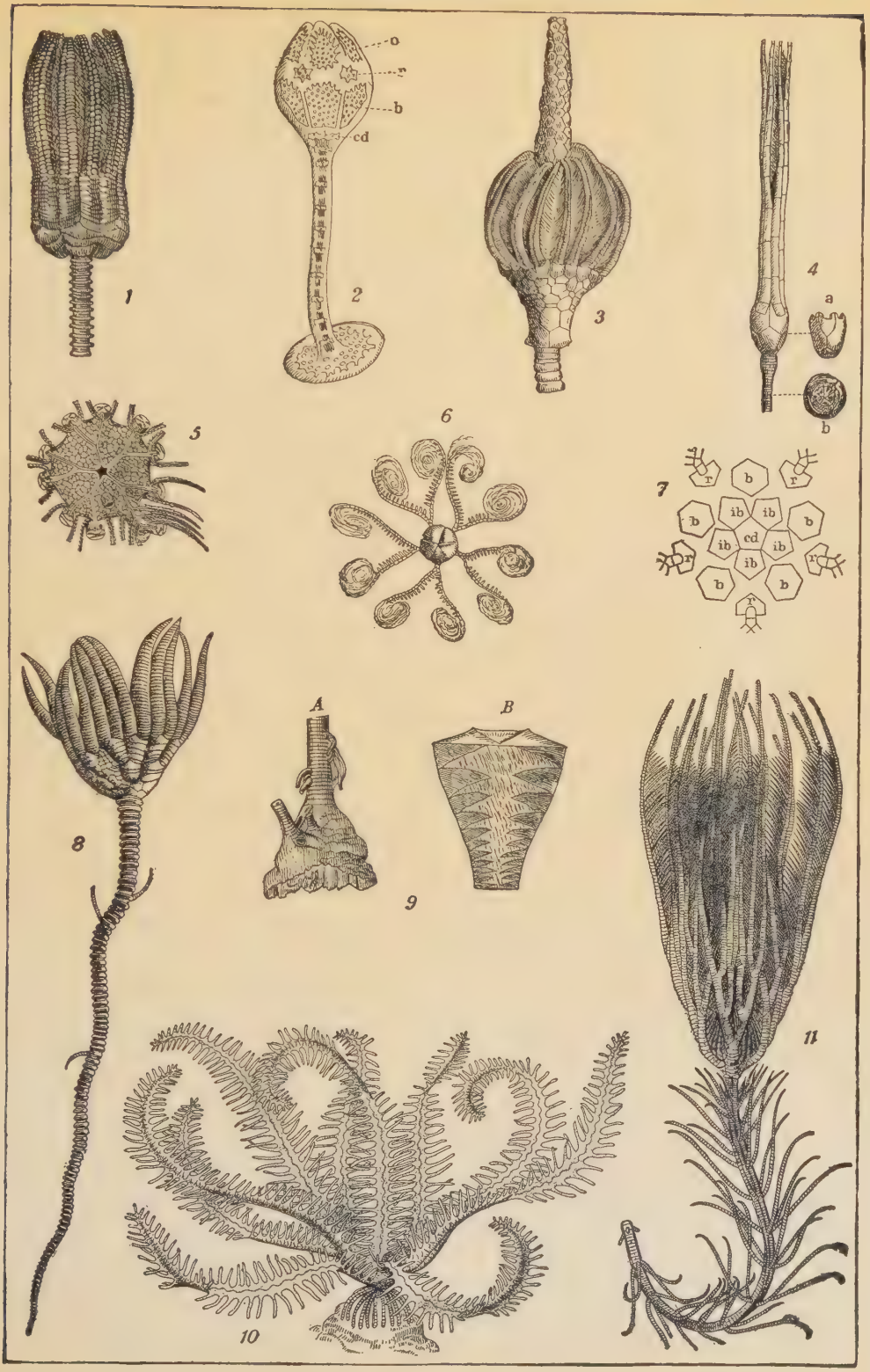
Representative species from the Atlantic: *1. Actinometra pulchella; 2. Rhizocrinus lofotensis.* (After A. Agassiz.)

Structure and Development. The crinoid animal consists essentially of two parts—the head, or calyx, and the stem, or column. The calyx bears 5 or 10 generally forked pinnulated arms attached to its sides, has upon its upper ventral surface a central mouth and an eccentric or lateral anal opening, and is itself supported by the column attached to its lower or dorsal surface. The calyx is a spherical or cup-shaped box made up of polygonal stony plates that are arranged in more or less regular horizontal series, and in vertical series according to the plan of pentamerous bilateral symmetry so prominent in the higher Pelmatozoa. The calyx contains the body cavity, in which are the vital organs, consisting of the simply coiled alimentary canal and the central portions of the nervous, generative, and water-vascular systems.

EXPLANATION OF PLATE.

1. An encrinite (Encrinus), fossil in the Trias. 2. Larva of a feather star (see Figs. 10 and 7). 3. *Batocrinus pyriformis*, fossil in the Subcarboniferous of Iowa. 4. *Pisocrinus flagellifer*, fossil in the Silurian of Gotland; *a*, posterior view of a perfect calyx; *b*, calyx seen from one side. 5. Type of calyx with a coriaceous skin in which calcareous plates are imbedded. 6. A free-swimming crinoid (*Saccocoma pectinata*), fossil in the Upper Jurassic lithographic slates of Bavaria. 7. Diagram of arrangement of principal pieces in the calyx of a crinoid: *b*, basals; *ib*, infrabasals; *r*, radials; *cd*, centrodorsal (compare Fig. 2, where the letters are the same, plus *o*, orals). 8. *Woodocrinus macrodactylus* from the Carboniferous of Yorkshire, England. 9. Apiocrinus. *B*, longitudinal section through the uppermost stem joints of *Apiocrinus parkinsoni* (Oölitic), showing empty spaces between them; *A*, restoration of the base of another species (*Apiocrinus roissyanus*, Upper Jura). 10. A feather star (*Antedon rosacea*), now living on European coasts; Fig. 2 is the larva of this, showing developing plates (see Fig. 7) of the calyx. 11. An existing deep-sea "stone lily" (*Metacrinus interruptus*).

CRINOIDS



For description, see article CRINOIDEA.

Prolongations of these latter systems extend into the arms. These are outgrowths of certain vertical rows of the calyx plates, termed the "radials," and are capable of free movement. In many of the earlier, more primitive crinoids, like *Pisocrinus*, the arms are simple; in the more specialized forms, *Pentacrinus*, they are quite complex and fork frequently. In all crinoids the arms bear pinnules and are provided with cilia. The feathery branches of the arms screen food from the water, while the ciliated grooves transport the food to the mouth through the food grooves, which are continued over the ventral surface from the bases of the arms to the mouth opening.

The ventral surface of the calyx in modern genera is usually covered by a tough skin, but in the Paleozoic forms it was often covered by a superficial "vault" or "tegmen" of calcareous plates. The mouth is then underneath the tegmen or ventral covering and communicates with the food grooves of the arms through closed stony tubes. In these genera the plates of the vault are often so arranged as to form an elevated "proboscis" (*Batocrinus*), at the summit of which is the anal opening, which is thus placed above the ends of the arms. The crinoid stem is attached to the base of the calyx, and consists of calcareous plates loosely jointed together to allow of a considerable degree of flexibility. Increase in the length of the stem is accomplished by the growth of new columnar plates between the base of the calyx and the top of the column. In form the columnar plates are discoid and of circular or pentagonal outline, and all are pierced by a central cavity through which passes the neurovascular canal of the column. Most crinoid stems are furnished at their lower ends with rootlike branches that serve to anchor the animal in muddy or sandy bottoms; others, *Apiocrinus*, have a disklike expansion that is cemented to rocky surfaces, and one genus (*Scyphiocrinus*) was fixed in the mud by large spherical bulbs, described as *Camarocrinus*, and until recently considered as floats of crinoids. Several genera, especially in later geologic and modern times, have columns supplied with lateral branches, called "cirri," which are similar in construction to the stem itself. The pentacrinids have the longest stems known, some of the fossil forms from the Upper Lias rocks of Württemberg having been found with stems ranging from 15 feet to the extraordinary length of 50 feet. Many of the crinoids with stems seem to have been fixed in their early stages only and detached in maturity. Some forms of crinoids, such as *Agassizocrinus* of the Carboniferous, *Uintacrinus* of the Cretaceous, and *Antedon* of recent seas, have no stem and are free-swimming animals, using their arms for locomotive purposes. *Uintacrinus* is the most remarkable of these, for, with a body only 2 or 3 inches in diameter, it has delicate feathery tentacles nearly 6 feet long, that served both as swimming organs and as food screens. Living *Antedon*, without a stem, has a whorl of cirri at the base of the calyx, and by means of these it anchors itself to the bottom. In other stemmed forms, as *Woodocrinus* from the Carboniferous, the base of the stem appears never to have been attached, as it ends in a simple point.

The development of Crinoidea is known for only one genus, *Antedon*, the feather star, and this cannot be considered as typical of the class as a whole, as it presents a case of regressive development. *Antedon* appears from the egg as an elliptical free-swimming larva that is crossed by four transverse ridges, has a posterior bundle of bristles and a lateral mouth, and resembles in many respects an annelid larva. This larva increases in size, and inside of it develops an animal with the form of a cystoid, with a head of loosely jointed perforated plates, a column, and a basal columnar plate. For a time this stalked larva is attached, and it resembles a primitive crinoid, but soon the stem is absorbed, and the animal assumes the form of the adult free-swimming *Antedon*. Almost nothing is known of the ontogeny of the host of fossil crinoids.

Habits and Distribution. The modern Comatulidæ, like *Antedon*, *Actinometra*, etc., have a very wide distribution, and are usually found in waters less than 150 fathoms in depth, although one species of the *Antedon* has been dredged from the great depth of 2900 fathoms. The habits of *Antedon* are best known. It is a gregarious animal, and Verrill has obtained 10,000 individuals in a single trawl in the north Atlantic. It lives mostly in the upper layers of the water, but when exposed to the direct rays of the sun, it curls up its arms and sinks. When clinging by its cirri to a coral or rocky point and disturbed, it releases itself immediately and swims away by graceful movements of the arms, or crawls on its arms like a spider over the bottom. Sudden changes of temperature stun it; it sinks to the bottom and soon dies. When these animals find themselves in uncomfortable surroundings, as when taken in the dredge and placed in aquaria, they drop off their arms, which break at specially fused joints, called "syzygies," but the arms are restored through regeneration if the crinoid survives. The stalked crinoids are also gregarious animals, but they are more restricted in their distribution and inhabit deeper waters. The majority of fossil stalked crinoids are found in rocks that were undoubtedly comparatively shallow-water deposits, and because the calcareous plates of the calyx, and to a lesser degree those of the stem, fall readily apart after the death of the animal, perfect specimens are quite rare finds. The food of crinoids has been ascertained to consist of minute crustaceans, diatoms, spores of algæ, foraminifera, and radiolarians.

Fossil Crinoids. About 175 genera and 2000 species of fossil crinoids are known. They appear first as very simple forms in Ordovician rocks, and they increase rapidly, becoming important elements of the faunas in the Silurian, Devonian, and Carboniferous periods. In some regions they were exceedingly abundant, for their fossil remains form great beds of limestone known as "crinoidal" or "encrinal limestone," which are found in formations of various ages. In the Silurian system alone, about 400 species, distributed among 70 genera, have been obtained from mostly three localities: the island of Gotland, the Wenlock of England, and the Niagara group of North America. Some of the more characteristic genera are *Pisocrinus*, *Crotalocrinus*, *Calceocrinus*, *Callicrinus*, and *Eucalyptocrinus*. In the Devonian system some localities have yielded good material. The Lower Carboniferous rocks of the upper Mississippi valley are the most renowned sources of fossil crinoids. The shaly limestone beds at Burlington, Iowa, and Crawfordsville, Ind., have furnished hosts of finely preserved specimens, which are to be seen in geological collections all over the world.

The Mesozoic rocks of Europe, especially the Liassic and Jurassic, have furnished some fine examples of *Encrinus, Apiocrinus,* and the pentacrinids, but the rocks of this era in America hold only rare occurrences of members of this class. The only find of note—and that was one of great importance—was that of *Uintacrinus* in the Cretaceous chalk of western Kansas. The Tertiary rocks seem to be poor in fossil remains of this group.

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CRIN'OLINE (Fr., from Lat. *crinis,* hair + *linum,* flax). A name originally given by French dressmakers to a fabric made of horsehair, capable of great stiffness, and employed to distend women's attire; it is also applied in a general way to those structures of steel wire or hoops by means of which women some years ago were able to wear skirts of extraordinary size at the bottom. The first device for producing an expansion of the dress skirt is the *fardingale,* introduced by Queen Elizabeth. Walpole, in his fancy descriptions of her, speaks of her "enormous ruff and vaster fardingale." The upper part of the body was incased in a cuirass of whalebone, which was united at the waist with the equally stiff fardingale of the same material, descending to the feet, without a single fold, in the form of a great bell. In the end of the reign of James I this fashion gradually declined, and, as a result of the Puritan feeling in the time of Charles I and Cromwell, it quite disappeared. It is next heard of in 1711 as "that startling novelty the hoop petticoat," which differed from the fardingale in being gathered in at the waist. About the year 1796 hoops were discarded in private life, but were still the mode at court, where they flourished until the time of George IV, when they were abolished by royal command.

The next development of this fashion, about the middle of the nineteenth century, began with crinoline in its original and proper sense, first in the form of the "bustle" in the upper part of the skirt, then the whole petticoat. The hoops were sometimes made with a circumference of four and even five yards. At last, after indignation and ridicule had for years assailed the monstrosity in vain, and when people had ceased speaking about it, the inflation began, about 1866, without any apparent cause, to collapse; and, rushing to the opposite extreme, ladies might be seen walking about as slim as if merely wrapped in a morning gown. At the close of the nineteenth century the name "crinoline" was applied to a cotton gauze stiffened with a dressing of glue and sold by the yard for use by milliners and dressmakers.

CRI'NUM (Neo-Lat., from Gk. *κρίνον, krinon,* lily). A genus of bulbous-rooted plants of the family Amaryllidaceæ, having long tubular flowers. It contains about 80 species, natives of different tropical and subtropical countries, generally with umbels of large and beautiful flowers, some of them among the most admired ornaments of our hothouses. *Crinum amabile,* an Indian species, is much esteemed. The plants are mostly cultivated in greenhouses, although *Crinum longifolium* is semihardy and, with slight protection, will endure the winters as far north as Washington. Numerous hybrids have been produced, some of them of exceeding beauty and possessing exquisite perfume. *Crinum americanum* is a native of Florida.

CRIP'PLE CREEK. A town and the county seat of Teller Co., Colo., about 20 miles (direct) west-southwest of Colorado Springs; on the Midland Terminal and the Florence and Cripple Creek railroads (Map: Colorado, D 3). It was founded in 1890 as a mining town, developed rapidly after 1893, and was nearly destroyed by fire in 1896. The district in which it is situated is a complete network of gold-bearing veins, and mining gave rise to the subsequent founding of Victor, Altman, Goldfield, and other near-by towns. The mining district covers an area of about 6 miles, of which only about one-tenth has been developed. The total gold output of this region up to 1914 was more than $300,000,000. The mines have attracted the attention of metallurgists, owing to the peculiar nature of the ores, which has necessitated new methods of treatment. The completion of the Roosevelt Drainage Tunnel in November, 1910, at a cost of $750,000, solved the problem of unwatering the mines and made deep mining possible. Cripple Creek, at an elevation of 9800 feet, is known also for its scenery and healthful climate. Pop., 1900, 10,147; 1910, 6206; though the whole district contains about 20,000.

CRIP'PLEGATE. An ancient London gate, probably dating from the restoration of the walls by King Alfred in 886. It is said to have taken its name from the lame beggars who congregated there, in 1010 A.D., to touch the body of Edmund the Martyr as it was passing

through. It was twice rebuilt, and was pulled down in 1760. The name was also applied to the district round it.

CRISA, or CRISSA. See DELPHI.

CRIS'FIELD. A city in Somerset Co., Md., about 100 miles (direct) south-southeast of Baltimore, with which it is connected by a steamship line, on the New York, Philadelphia, and Norfolk Railroad, and on Chesapeake Bay (Map: Maryland, O 9). Oyster and crab packing is the leading industry. Crisfield was incorporated as a city in 1910. It contains a marine hospital. Pop., 1910, 3468.

CRI'SIS (Lat., from Gk. *κρίσις, krisis*, decision, from *κρίνειν, krinein*, Lat. *cernere*, to decide). A name used by the older physicians to denote the rapid or sudden determination of an acute disease in the direction of convalescence or of death. It is opposed in signification to "lysis" (*luo*, I relax), which denotes the gradual subsidence of the symptoms and improvement in condition in most chronic and in some acute diseases. The doctrine of crises was closely bound up with that of a *materies morbi*, or material of disease, in the blood, which was presumed to be undergoing changes, during the whole course of the malady, tending to an evacuation of some kind from the system in the form of a critical discharge (*apostasis*, or *abscess*), which, when observed, was supposed to contain the matter of disease in a state of *coction* and to be the direct cause of the sudden relief of the patient. Thus, according to the character and seat of the critical discharge, it was common to speak of a crisis by sweating, by diarrhœa, by expectoration, by urine, by parotid swellings, etc.; and no crisis was considered regular that was not attended by some symptom of this kind. Another curious doctrine associated with that of crises was the belief in certain days as ruling the beneficent or injurious, the complete or incomplete, character of a crisis. The seventh, fourteenth, and twentieth (according to some, the twenty-first) days of the disease were regarded as eminently critical; less so, but still favorably critical, were the third, fifth, eleventh, and seventeenth; the fourth day was the *indicator* of a complete crisis on the seventh; the sixth day was the *tyrant*, notorious for unfavorable crises; the second, eighth, tenth, thirteenth, and the rest were noncritical. Physicians now use the term in diseases which run a certain course, such as typhoid fever and pneumonia, and then chiefly in relation to the temperature. A fever is said to fall by crisis when it reaches the normal in a few hours; by lysis, when it takes three or four days gradually to disappear.

CRISIS. A series of patriotic writings, 14 in number, published by Thomas Paine at Philadelphia during the Revolution. They appeared at intervals from 1775 to 1783.

CRISIS, ECONOMIC. A term employed by economic writers somewhat loosely to designate either the acute phase or the whole course of the disturbances in economic life which have characterized the last century and which have recurred with such frequency as to make them appear inevitable results of the modern industrial order. The phenomena involved are so complex that they must be described rather than defined.

The salient fact in the economic history of recent times is the "business cycle," or the alternation of prosperity and depression, of good times and bad. A period of prosperity with expanding business, great activity in production and commerce, is followed by a period in which some enterprises, then others, find costs advancing so rapidly as to encroach upon profits. Contraction of operations follows, with decline in demand for materials and labor, and with resulting embarrassment for the industries supplying material, and declining demand for products intended for general consumption. Thus the distress extends in widening circles until it affects eventually the whole business system. The process of readjustment may be gradual, or it may be greatly accelerated by the failure of a great banking house, an event likely to drag down other banking and mercantile firms. Such an event results in widespread uncertainty and suspicion; creditors demand the payment of claims; debtors, even though solvent, find the banks unwilling to provide means of payment. Panic rules, and for a time the whole mercantile structure threatens to collapse. From such a shock business recovers but slowly, its activity is reduced to the lowest ebb, and some time elapses before the restoration of confidence takes place. This period of depression is much more prolonged than the acuter phase which precedes it. After a time business revives and begins to expand. Prices rise, and activity becomes greater. A wave of prosperity again appears which seems to carry everything before it until it, in turn, is checked suddenly, and a new crisis is at hand. Lord Overstone, in an oft-quoted passage, describes these successive phases as follows: "State of quiescence, improvement, growing confidence, prosperity, excitement, overtrading, convulsions, pressure, stagnation, distress ending again in quiescence."

This related sequence of phenomena is now generally known as a business cycle. The term "crisis" is often employed to cover the whole part of the cycle in which hard times prevail. It is, however, more properly applied to the point in the process when contraction proceeds rapidly and liquidation becomes fairly general. The long period of stagnation that usually follows is properly denominated by the term "depression." The term "panic" is often used interchangeably with "crisis," but it is more properly restricted to an acute phase, not always appearing in crises, when the consciousness of impending disaster is widespread, and leads to more or less unreasoning acts calculated to aggravate the conditions dreaded.

Crises are designated as financial, commercial, and industrial. These qualifying phrases mark the places in the economic organism where the disturbance is felt. In a purely financial crisis the stock market is the storm centre, the disturbance affecting but slightly commercial or productive enterprises. A commercial crisis is of wider area and embraces the trading classes, while an industrial crisis extends its baneful influence to producers in all lines of agriculture, manufactures, and the like. These expressions do not designate so much different classes of crises as crises of different degrees of intensity, inasmuch as an industrial disturbance will always imply disturbance in trade and the money market, while trade upheavals imply commotion in the money market, though a financial panic does not necessarily imply the others.

While crisis and depression are usually associated, this is not always the case. Panic and

crises may occur, and after a brief interval affairs may prosper as before. This is particularly true of the purely financial crises, which are not deep-rooted enough to affect wider areas. The crisis in its larger sense, however, is invariably followed by hard times. It should be observed, moreover, that crises may be local or general, and while they have many points in common, it is particularly the latter with which we have to deal.

General crises affecting the economic situation of an entire country, and extending themselves to other countries which have trade relations with the former, are peculiarly a mark of the modern organization of business. A century ago bad harvests or other calamities might cause local distress, or speculation such as was exhibited in the days of the South Sea Bubble and the Mississippi Scheme might cause a panic, but such occurrences did not show the pertinacity and wide-reaching effects which characterize the modern industrial disturbances. That such crises are inevitable consequences of modern methods of doing business and inseparable from the economic activities of our times, seems to be well established by their frequent recurrence and by their greater severity in the most advanced nations.

Crises more or less pronounced occurred in England in the years 1815, 1825–26, 1836–37, 1847, 1857, 1866, 1873, 1890, 1900, and 1907, while in the United States like disturbances were felt in 1814, 1818–19, 1837, 1857, 1873, 1884, 1889, 1903–04, and 1907. The periodicity of these occurrences is marked, and certain writers have gone so far as to establish a normal interval of 10 or 12 years between crises. The facts as far as we know them do not warrant us in fixing any absolute rule, though the history of these crises reveals many common features.

It will further be observed that the dates given for Great Britain and our own country coincide in several instances, and if space permitted us to draw upon the history of Belgium, Holland, France, and Germany, further coincidences would be obvious. Certain crises, notably that of 1873, were felt quite generally. The actual crash did not occur in the same month, or even in the same year, in all the countries involved, but it is a frequent occurrence that local circumstances may hasten or postpone an event for which the general conditions are preparing.

The concrete manifestations of a crisis can best be studied in an historical instance, and none is better adapted for this purpose than the crisis of 1873 in the United States. With the close of the Civil War an extraordinary activity in all lines of enterprise was manifested. The public lands had been thrown open to settlement, and large tracts had been granted to the Pacific railroads. This, together with the return of the army to the pursuits of peace, and an enormous increase in immigration, was the condition for an era of speculative development in the Western States. The impulse which had been given to manufactures, not only by the highly protective duties which marked the war tariffs, but also by the depreciation of the currency, which acted as a check upon foreign competition, caused a similar activity in the manufacturing States of the East. Business prospered; prices and profits were high. The census of 1870 showed in every branch of industry a great advance over that of 1860, and the greater part of this advance was in the latter half of the decade. Nowhere was this confidence in the future shown more than in railroad building and in the iron industry. In 1867 there were 2249 miles of railway constructed; in 1869, 4615; in 1871, 7379. A like expansion of railways had marked the approach of the panic of 1857. In like manner, the outlay for constructing railways rose from $271,310,000 in 1864–68 to $841,260,000 in 1869–73. The consumption of pig iron, which had been 1,416,000 tons in 1868, rose to 2,910,000 tons in 1873. High prices ruled. The maximum prices in the period following 1860 were, it is true, attained in 1866, but if they fell in the years 1867 and 1868 it was only to rise again to a point nearly equal to that of 1866 in 1871 and 1872. The activity in the commercial centres is reflected in the rise of clearings in the New York Clearing House from $28,000,000,000 in 1868 to $35,000,000,000 in 1873. The foreign trade of the United States showed a like activity, the aggregate of exports and imports rising from $639,000,000 in the fiscal year 1868 to $1,165,000,000 in 1873. But even more significant of the expansion of activity in the United States was the fact of increased importations from abroad. In 1870 the imports exceeded the exports by $43,000,000, but in 1872 this excess had become $182,000,000 and in 1873 $120,000,000.

The crisis of 1873 is usually dated from the failure of Jay Cooke & Co., September 18. The Stock Exchange of New York was closed on the 20th and was not reopened until the end of the month. Clearing House loan certificates were issued in large quantities. There had been certain premonitory symptoms of the approaching collapse. Railroad building reached its highest point in 1871, pig iron its highest price in September, 1872. The crisis lasted a few months only, the last Clearing House loan certificates being redeemed Jan. 14, 1874. But there followed a long period of depression, which reached its lowest point three years later. The activities which had marked the previous era were not entirely stopped, enterprises begun had to be finished to save what was already invested, the daily needs of the people must be met, but all enterprise was timid and cautious. The buoyancy of the previous years was gone, and new enterprises were not undertaken. Railroad construction fell off, and in 1875 reached a minimum of 1711 miles, while in the period 1874–78 the outlay for construction was only $357,000,000. Prices fell until 1879, to rise thereafter until 1882. The consumption of pig iron declined until it reached 1,900,000 tons in 1876. Clearings in New York City fell off from $35,000,000,000 in 1873 to $23,000,000,000 in 1874, and reached their lowest point since 1863 at $22,000,000,000 in 1876. In foreign trade the excess of imports disappeared in 1875.

Every crisis, panic, and depression is marked by analogous characteristics. Whatever data are appropriate to show expanding conditions and an inflated condition of business at any particular time and place will exhibit a similar showing. In the United States, particularly since 1840, railroad construction has been a favorite index of conditions, but before the crisis of 1837 similar activity was shown in canal construction. Before the panic of 1825, in England, there were large investments in

manufacturing establishments, while the panic of 1893 was preceded by reckless investments in foreign countries.

As the year 1873 marks the outbreak of the crisis, so the year 1876 serves to mark the lowest point in the subsequent depression. The whole story of the crisis, its antecedents and results, is succinctly told in the statistics of business failures, as reported by R. G. Dun & Co., as follows:

YEAR	Number	Liabilities
1869	2,799	$75,054,054
1870	3,546	88,242,000
1871	2,915	85,252,000
1872	4,069	121,056,000
1873	5,183	228,499,900
1874	5,830	155,239,000
1875	7,740	201,000,000
1876	9,092	191,117,786
1880	4,735	65,752,000
1882	6,738	101,547,564
1883	9,184	172,874,172
1884	10,968	226,343,427
1885	10,637	124,220,321

A period of depression cuts down the existing stock of goods, and the retrenchment of production, coupled with the constant increase of population, creates a void in the market. To fill this there is a renewed activity; as prices begin to rise, existing plants find it difficult to meet the demand. Plants are remodeled and extended. Preparation for future production on a large scale takes place. Large investments of fixed capital are made in buildings, machinery, and the like, and those branches of industry which chiefly serve the purposes of construction, such as the iron industry, make extraordinary advances. Mills and railroads are built to supply an anticipated demand. This is usually overdone, and the facilities of production increase more rapidly than the effective demand for products. Credit is unduly expanded, and it is natural that the money markets feel the first shock when the inevitable readjustment takes place.

While the phenomena of a crisis and its attendant consequences are generally recognized, the widest variety of opinion exists as to the causes of such economic disturbances. Writers are prone to lay stress upon local or temporary conditions, and to generalize from them. In truth, the phenomena of a crisis are so complex, and the conditions which may aggravate it so numerous, that it is not surprising to see the latter considered as primary causes. Thus, speculation, the currency, the tariff, bad harvests, have all been made responsible for crises. These are frequently concomitant forces impelling a crisis, but crises are so numerous that there must be some deeper underlying cause. It is in the countries that are economically farthest advanced that the successive phases of the business cycle are most clearly marked. Where production is organized on a small scale, and is chiefly dependent on a local market, similar fluctuations do not appear. Students of crises are agreed that an important circumstance in connection with them is the extent to which credit is employed in industry. In a period of prosperity prices rise, and with them, profits. On the basis of high profits credit is expanded to meet the need for new equipment, etc., and the expansion of credit gives further impetus to the rise in prices. Within the expanding structure of industry and commerce certain stresses appear. The full employment of labor raises wages and reduces the efficiency of labor; the great demand for loans produces a rise in the rate of loan interest. In the period of good times the vigilance of managers is relaxed, and many small wastes accumulate. The existing volume of currency becomes inadequate to effect the exchange of the increasing volume of products at high prices, bank reserves decline, and bank loans are curtailed. The gains of prosperity are not uniformly distributed; some prices are kept from rising by public regulation or custom, others by circumstances peculiar to each. These industries, however, feel the effect of advancing costs and advancing interest rates. They are the first to show signs of weakness. In the end the various stresses become so great that the structure collapses.

Certain features of crises are clearly traceable to local conditions. In recent years the United States alone of the great nations has suffered from panics in time of crisis. This fact is ascribable to the want of an elastic and centrally controlled currency system. With the adoption of an improved system of banking (see BANK, BANKING) it is believed that this distressing feature of the panic will be eliminated.

Whether it will be possible to reduce the frequency and severity of crises through legislative measures is still a disputed point. It has been proposed to manipulate the funds devoted to public improvements in such a way as to create employment and demand for materials in time of crisis and depression. It has also been proposed, by Prof. Irving Fisher, so to regulate the money supply that general prices will remain practically stationary. Many believe that a more thoroughgoing publicity in matters pertaining to industry and finance will reduce the extent of ill-advised investment, and hence check the development of stresses in the industrial structure. At one time it was believed that trusts and similar forms of organization would make for stability in prices and hence prevent the recurrence of crises. Hence it was proposed to give state support to the consolidation movement, instead of attempting to check it, as now. But recent crises in the United States and Germany indicate that trusts and cartels have not perceptibly reduced their severity. Most observers of the phenomena of crises have little faith in any proposed method of checking them by law, so long as enterprise is so completely dominated by motives of private profit as at present.

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CRISP, CHARLES FREDERIC (1845–96). An American jurist and politician. He was born in Sheffield, England, but came to the United States when a child. He served in the Confed-

erate army from 1861 to 1864, when he was made a prisoner. He was admitted to the bar in 1866, and served as Solicitor-General of Georgia from 1872 to 1877, and as judge of the Superior Court from 1877 to 1882. From this time until his death he was a Democratic member of Congress and from 1891 until 1895 was Speaker of the House.

CRISPI, krĕ′spē, FRANCESCO (1819–1901). An Italian statesman, born at Ribera, in Sicily, Oct. 4, 1819. He studied law at Palermo and was admitted to the bar there and in 1846 at Naples. He took an active part in the Sicilian uprising of 1848 and after its disastrous issue engaged in journalism in Piedmont. In 1860 he aided Garibaldi in his expedition for the deliverance of the Two Sicilies. He became the first representative of Palermo in the Italian Parliament, began immediately to play a prominent rôle, and, after having been the leader of the radical Left, became an exponent of monarchical constitutionalism. In 1876 he was elected President of the Chamber of Deputies. To promote the interests of his country, he visited the European courts in the following year and soon after was made Minister of the Interior. Denounced by his opponents on a charge of bigamy, he was obliged to resign in 1878 and, although acquitted, did not take office again until 1887, in the cabinet of Depretis, after whose death, in the same year, he became head of the cabinet and Minister of Foreign Affairs. He was an earnest advocate of the Triple Alliance (q.v.) between Germany, Italy, and Austria, and in his endeavor to strengthen it visited Bismarck at Friedrichsruhe in 1887 and accompanied King Humbert to Berlin in 1889, conferring also with Caprivi at Milan in the following year. His policy was approved by an overwhelming majority of the electors in 1890, but his ministry was overthrown on a matter of financial policy in February, 1891. He now resumed his law practice in Rome, and in the Chamber of Deputies led the Opposition against his successor in office, the Marquis di Rudini. In 1893 he resumed the office of Premier, and held it till the defeat of the Italians in Abyssinia in 1896, when he was again succeeded by Rudini (q.v.). In March, 1898, he resigned his seat in the Lower Chamber as a result of the charges brought against him in connection with extensive swindles perpetrated on the Banca d' Italia. Save for a few articles which he published in favor of the Triple Alliance, he took no further active interest in affairs, and he died on Aug. 11, 1901, at Naples. Crispi was the greatest statesman that southern Italy gave to the united kingdom. In his lifetime he was much misunderstood and maligned. Distrusted by the Conservatives as a Radical and Republican, he incurred the hostility of the Republicans by his famous dictum in his letter to Mazzini, March 18, 1865, "Monarchy unites us, while a republic would separate us." From that time he was a firm supporter of the monarchy, but never a friend of the court. Consult: Stillman, *Francesco Crispi, Insurgent, Exile, Revolutionist, and Statesman* (London, 1899); T. Palamenghi Crispi, *Francesco Crispi, questioni internazionali* (Milan, 1913); also the translation of his memoirs into English by Agnetti (London, 1912).

CRIS′PIN. A saint and martyr of the third century, who was descended from a noble Roman family. With his brother Crispinianus, he fled during a persecution of the Christians from Rome to Gaul, where he worked as a shoemaker in Soissons and distinguished himself by his exertions for the spread of Christianity as well as by his works of charity. According to the legend, his benevolence was so great that he even stole leather to make shoes for the poor! From this, charities done at the expense of others have been called Crispinades. In the year 285 or 286 he and his brother suffered a cruel martyrdom. Both brothers are commemorated on the 25th of October. Crispin is the universally recognized patron saint of shoemakers. Consult: Butler, *Lives of the Saints*, for October 25; *The Accurate History of Crispin and Crispinianus, the Royal Shoemakers* (Dublin, 1816); *Saint Crispin and the Gentle Craft* (London, 1868).

CRISPIN. 1. The old name for shoemakers, applied to them from the fact that St. Crispin was their patron saint. 2. A conventional character in French comedy.

CRISPINO E LA COMARE, krē-spē′nō ā lä kō-mä′rā (It. The Cobbler and the Fairy). An opera by Ricci, first produced in Venice, Feb. 28, 1850; in the United States, 1861 (New York).

CRISS CROSS ROW. See CHRIST CROSS ROW.

CRISTINOS, krĕ-stē′nōs (Sp., adherents of Christina). A political party in Spain during the regency of Queen María Christina, mother of Isabella II. They were opposed to the Carlists and upheld the Pragmatic Sanction of Ferdinand VII (q.v.), by which the crown of Spain was made inheritable in the female line. They were also known as Isabelinos.

CRISTÓBAL DE LA LAGUNA. See LAGUNA.

CRISTOFORI, krĕ-stō′fō-rē, BARTOLOMMEO (1655–1731). An Italian harpsichord maker, and the inventor of the hammer action used in the modern pianoforte. He was born in Padua. After manufacturing instruments in that city until about 1687 he was persuaded by Prince Ferdinand, son of the Grand Duke Cosimo III, to remove to Florence. An authentic grand pianoforte made by the inventor in 1720 is said still to be preserved in Florence. See PIANOFORTE.

CRISTOFORO COLOMBO. An opera by Franchetti (q.v.) first produced in Genoa, Oct. 6, 1892; in America, Nov. 20, 1913 (Philadelphia).

CRISTUS, PETRUS (?–1473). A Flemish painter of the fifteenth century. He was born at Baerle, date unknown, and may have been a pupil of Jan van Eyck, who in any case influenced him strongly. As regards perspective and the treatment of landscape, Cristus is a step in advance of Van Eyck; in all else he is greatly inferior. His work is recognizable by the masklike appearance of the faces. His works include the portrait of Edward Grimstone (1446), now in possession of the Earl of Verulam; a Madonna in the Städel Institute, Frankfort; "St. Eligius," in the Oppenheim collection at Cologne. Two paintings in the Metropolitan Museum, New York, "A Virgin and Child" and "The Deposition from the Cross," formerly attributed to Jan van Eyck, are now assigned to Cristus.

CRITCHETT, R. D. See CARTON, R. C.

CRITIAS, krĭsh′ĭ-as (Lat., from Gk. Κριτίας, *Kritias*) (?–403 B.C.). An Athenian orator and

poet, the pupil both of Socrates and of Gorgias of Leontini. He was a leader in the oligarchical party at Athens and was exiled after the downfall of the Four Hundred in 411 B.C. After the subjugation of Athens by the Spartans he returned, and in 404 became head of the Committee of Thirty, known as the Thirty Tyrants, and was notorious for his cruelty. In 403 he was killed in battle, in the general revolt led against the Tyrants by Thrasybulus (q.v.). His activity was varied in the fields of oratory, tragic and elegiac poetry, and historical prose. Fragments of his elegies are in Bergk, *Poetæ Lyrici Græci*, vol. ii (Leipzig, 1900); of his historical work, in Müller, *Fragmenta Historicorum Græcorum*, vol. ii (Paris, 1868–83).

CRIT'IC, THE. A three-act farce by Richard Brinsley Sheridan in imitation of Buckingham's *Rehearsal*, produced at Covent Garden in 1779.

CRITICAL POINT. Experience shows that there is for every gas a certain temperature above which it cannot be liquefied, no matter how great the pressure exerted upon it. Thus, above 31.1° C. (87.98° F.) it is impossible to liquefy carbonic-acid gas; water cannot exist in the liquid state above 374° C. (705° F.), etc. Such temperatures are termed the critical points or critical temperatures of substances. The vapor pressure of a liquid at its critical temperature is termed the "critical pressure," and the specific volume of the substance at the critical temperature and under the critical pressure is termed the "critical volume."

The following table gives the critical temperatures and pressures for some of the more common substances (the critical pressures in terms of pounds per square inch may be obtained approximately by multiplying the pressures given in the table by 15):

SUBSTANCE	Critical temperature (centigrade)	Critical pressure (in atmospheres)	By whom and when determined
Acetic acid	+327.11°	57.11	Young (1910)
Acetone	+232.8	52.2	Sajotschewski (1878)
Acetylene	+ 35.5	61.6	Cardoso (1910)
Alcohol	+243.1	62.96	Young (1910)
Ammonia gas	+130.0	115.0	Dewar (1884)
Amyl acetate	+326.18	....	Brown (1906)
Amyl alcohol	+348.0	....	Guldberg (1882)
Argon	−117.4	52.9	Ramsay and Travers (1901)
Benzene	+288.5	47.89	Young (1910)
Bromine	+302.2	....	Nadejdin (1885)
Carbolic acid	+419.2	....	Radice (1899)
Carbon dioxide	+ 31.10	73.00	Dorsman (1908)
Carbon disulphide	+273.05	72.87	Battelli (1890)
Carbon monoxide	−139.5	35.5	Olszewsky (1887)
Carbon tetrachloride	+283.15	44.98	Young (1910)
Chlorine	+146.0	93.5	Knietsch (1890)
Chloroform	+260.0	54.9	Sajotschewski (1878)
Cyanogen	+128.1	59.6	Cardoso (1910)
Ethane	+ 32.1	49.05	Cardoso (1910)
Ether	+193.8	35.61	Young (1910)
Ethyl acetate	+150.1	38.00	Young (1910)
Ethylene	+ 9.5	50.7	Cardoso (1910)
Fluobenzene	+286.55	44.62	Young (1910)
Helium	−268.?	2.5?	Kamerlingh-Onnes
Hydrobromic-acid gas	+ 91.3	....	Estreicher (1896)
Hydrochloric-acid gas	+ 51.0	81.5	Dorsman (1908)
Hydrogen	−240.8	14.2?	Olszewski (1906)
Hydroiodic acid	+150.7	....	Estreicher (1896)
Iodine	+512.?	....	Radice (1899)
Iron	+3700.?	....	Kreichgauer (1907)
Laughing gas	+ 36.5	71.90	Cardoso (1910)
Marsh gas	− 81.8	54.9	Olszewski (1885)
Mercury	+1077.?	456.?	Happel (1904)
Methyl chloride	+143.2	65.85	Baume (1908)
Naphthalene	+468.2	39.2	Guye and Mallet (1901)
Neon	−205.?	29.0	Ramsay and Travers (1901) and Kamerlingh-Onnes (1909)
Niton	+104.5	62.4?	Rüdorf (1909)
Nitrogen	−146.0	33.0	Wroblewski (1885)
Oxygen	−118.8	50.8	Olszewski (1885)
Pentane	+197.2	33.04	Young (1910)
Pyridine	+344.2?	....	Radice (1899)
Sulphur dioxide	+157.0	78.25	Cardoso (1910)
Sulphureted hydrogen	+100.4	89.35	Cardoso (1910)
Toluene	+320.6	41.6	Altschul (1893)
Turpentine oil	+376.0?	....	Guldberg (1882)
Water	+374.0	217.5	Holborn and Baumann (1910)
Wood alcohol	+240.0	78.50	Young (1910)
Xylene	+245.6	35.8	Altschul (1893)

CRIT'ICAL ANGLE. See LIGHT.

CRITICAL PHILOSOPHY, or **CRITICISM.** The name applied to Kant's philosophy, because it was not willing to accept all dicta that seemed to have the support of reason (see DOGMATISM), but sought critically to investigate the conditions of the possibility of knowledge and rejected all so-called knowledge that did not conform to these conditions. See KANT.

The critical temperature of a liquid is usually determined by introducing the liquid into a strong-walled glass tube about 3 or 4 millimeters in internal diameter. The tube is sealed at one end and drawn out to a thin capillary at the other end. It is at first filled with the liquid completely, then about one-third of the liquid is allowed to boil away, and the capillary end is sealed off without allowing the air to enter. The two-thirds-full tube is now placed

in an appropriate bath, and the temperature is gradually raised. As the critical point is approached, the liquid meniscus is seen to become fainter and fainter; and when the critical temperature is reached, the meniscus disappears altogether. For a short time the tube looks as if filled with a cloud of bluish smoke in up and down commotion; then this too disappears, and the contents of the tube are perfectly homogeneous: all is vapor. If the temperature is now allowed to fall, a similar phenomenon occurs as the critical point is reached from above, the meniscus reappears, and the contents of the tube are again divided into two layers, liquid and vapor. In this manner, if the liquid is only pure enough, the critical temperature can be determined within a tenth of a degree. A convenient modification of the method has been recommended by Knietsch, according to whom the glass tube as described may be replaced by a thin glass capillary—which requires, of course, less liquid for a determination and is easier to manipulate.

A simple method for determining the critical pressure was devised in 1893 by Altschul in Ostwald's laboratory. A strong-walled capillary tube of glass is filled, half with the liquid under consideration and half with mercury. The upper end is sealed; the lower (mercury) end is firmly connected with a narrow copper tube filled with paraffin oil and leading to a small pump which is likewise filled with oil. The pump is also connected with a spring gauge indicating pressures within a tenth of an atmosphere. Now the extreme upper end of the glass tube is heated *above* the critical temperature of the liquid, so that the liquid within the tube becomes divided into two portions—an upper which is completely gasified, and a cooler lower one which remains liquid. But, as a general rule, there is no meniscus between the two portions. If, however, the pressure is now gradually raised, a moment arrives at which the meniscus appears at a certain point in the tube, viz., at the point where the temperature is equal to the critical temperature of the liquid. For at that temperature and under the critical pressure liquid and vapor are in equilibrium and therefore normally separated by a meniscus. The critical pressure sought is thus the pressure at which a meniscus appears in the fluid.

The critical temperature, as well as the critical pressure, of *mixtures* is usually intermediate between those of the components, and according to Pawlewski's rule each component contributes its property in proportion to its percentage amount in the mixture. This rule, however, is only a rough approximation to the truth. A similarly crude empirical rule is that of Guldberg, according to which the critical temperature of a single liquid (on the absolute scale, i.e., in centigrade degrees *plus* 273) may be calculated by multiplying the temperature of the boiling point (again on the absolute scale) under normal atmospheric pressure by 1.55. For instance, the boiling point of ether is 35° C., or 35 + 273 = 308° absolute. 308 × 1.55 = 477.4; 477 − 273 = 204°, and this should, according to Guldberg's rule, be approximately the critical centigrade temperature of ether. As a matter of fact, that temperature is only about 194° C., or 10° lower. In some cases the agreement between Guldberg's rule and experiment is somewhat better, in other cases it is even worse.

As to the critical volume, the experimental determination is extremely difficult, and critical volumes are usually *calculated* on the basis of a reliable empirical rule found by Cailletet and Mathias and generally referred to under their names. It must be remembered that when a liquid is ordinarily heated it expands as the temperature rises, i.e., its density continuously diminishes; at the same time the density of its vapor continuously increases; with rising temperature, therefore, the densities of liquid and vapor tend to equalize, and finally at the critical point the densities become exactly equal. This is why all difference between liquid and vapor, and with it the separating meniscus, disappear. Cailletet and Mathias discovered that if the *arithmetical means* of the densities of liquid and vapor are plotted against the temperatures, the result is a straight line which at the critical temperature passes through the point indicating the critical density of the substance (and hence reveals also the critical volume). If, therefore, a few points are determined on this line at temperatures considerably below the critical point, where experimentation is still sufficiently convenient, the prolongation of the line to the critical temperature gives the desired density and volume, and the determination may be considered as quite reliable.

If two substances whose critical temperatures are respectively θ_1 and θ_2 are at two different temperatures T_1 and T_2 (all on the absolute scale), such that $\frac{T_1}{\theta_1} = \frac{T_2}{\theta_2}$, they are said to be at the same "reduced temperatures." Similarly, substances are said to be under the same "reduced pressures" when the pressures under which they are placed are equal fractions of their critical pressure π_1 and π_2. Finally, they are said to have the same "reduced volumes" when their specific volumes are equal fractions of their critical volumes ϕ_1 and ϕ_2. When at the same reduced temperature and under the same reduced pressure, substances are also said to be in *corresponding states*. A number of interesting theorems are connected with these "corresponding states." It can be shown, e.g., that when substances are at the same reduced temperatures and pressures their reduced volumes, too, are the same. Altogether the theory of corresponding states forms an important chapter of modern physical chemistry, even though many exceptions to it have been observed and not yet accounted for.

The critical point of substances can be taken advantage of for passing from the gaseous to the liquid state of aggregation and conversely in a "continuous" way, i.e., without having to deal, at any moment during the process, with a mass consisting partly of liquid, partly of vapor, and hence having two different specific volumes. Thus, remembering that the critical temperature of carbonic acid is 31.1° C. and its critical pressure 73 atmospheres, let it be required to transform continuously a given amount of the gas into liquid. To accomplish this we may first heat the gas, say, to 35° C., raise the pressure, say, to 80 atmospheres, and then, keeping the pressure unchanged, let the temperature fall, say, to 20° C.; we shall then find the substance entirely liquid; for a sudden liquefaction of the entire mass (without separation into a layer of liquid and one of

vapor) will have taken place when, during the process of cooling, the temperature of 31.1° is reached. At no moment will liquid have existed simultaneously with gas. Similarly, if it should be required to transform continuously a given amount of liquid carbonic acid into gas, we might proceed as follows: lower the temperature, say, to 20° C., raise the pressure, say, to 80 atmospheres, and then allow the temperature to rise, say, to 35° C.; we should then find the substance entirely gaseous, without, however, the mass having at any moment during the process consisted partly of liquid, partly of gas. Continuous changes like those just described were at one time expected to break down the barrier between the gaseous and the liquid states of aggregation, and to permit of extending to liquids the simple gas laws. For, at least at the critical point, liquids and their vapors are identical in physicochemical properties and must therefore be governed by the same laws. But the hope has not yet come true.

Consult Van der Waals, *Die Continuität des gasförmigen und flüssigen Zustandes* (2 vols., 2d ed., Leipzig, 1899–1900). Simpler accounts of the subject may be found in the works on physical chemistry recommended in the article CHEMISTRY (q.v.). See also GASES, GENERAL PROPERTIES OF: HEAT.

CRIT'ICISM (Fr. *criticisme*, from Lat. *criticus*, Gk. *κριτικός, kritikos*, critic, from *κρίνειν, krinein*, to judge). Criticism, as the art of judgment, whether favorable or adverse, is applicable in all fields of human accomplishment, and all inventions, all institutions, all life, are, broadly speaking, within its scope. It is, however, with literature and with art that criticism has most significantly busied itself, with the result that the term has come to mean the interpretative study of these greatest expressions of man's nature. The *Poetics* of Aristotle has for centuries been regarded as the first important work of criticism, and many of the rules there laid down have maintained their value to this day. Aristotle's manner of approach was the scientific method of induction, and his understanding of the fundamental laws of human nature, his perception of those traits, emotions, and desires which, transcending any one age, belong to the men of all ages, underlaid and formed the firm basis of his criticism. Briefly summarized, Aristotle's chief doctrines were that all art and literature should have as function the pleasure-giving representation or "imitation" of what was universal—appertaining to all human nature, and not particularly or insignificantly individual; and that great art was measured by the high and lasting pleasure it afforded to society. To study the impressive works that have stood the test of time—the Bible, Homer, Vergil, Dante, Shakespeare, Milton, and lesser but well-loved poets—in the light of Aristotle's illuminating laws, is to discover how striking in its essence is the similarity in the greatest art; the sameness of man's soul, its passions and aspirations, remaining the keynote of art as it is of life.

The technical side of criticism—questions of metrical and dramatic construction and minor points of style—was approached by Aristotle, and the systematic nature of the *Poetics* is probably the chief reason for the reaction that has now and again set in against what is sometimes termed purely academic criticism. Yet it is just because Aristotle appreciated and showed that all art must have laws that the student will find him so useful; more so even than Plato, whose lightning flashes of interpretation must be ranked with the highest creative critical literature. The critical writers after Aristotle are so numerous—Greek, Byzantine, Latin—and for the most part so occupied with the linguistic phase of composition, that one is glad to pass by almost all their rhetorical treatises until there looms up in the third century the figure of Longinus, whose refreshing enthusiasm for the beauty of letters places him above the mechanical student of rules. Notable among his Latin predecessors were Cicero, Horace, and Quintilian, whose observations on style have been of permanent service. From the time of Quintilian to Dante there is no great name in criticism; nor is this to be wondered at when one reflects that the mediæval attitude towards literature was, on the whole, that of distrust and disapprobation. Dante's poetry has so overshadowed his critical treatises that there are probably many lovers of the *Divine Comedy* who have no conception of the interest of the master's reflections on poetic form and beauty, nor any knowledge of his limitations of the subject matter of great poetry to love, war, and virtue, or moral philosophy. Of more service than Dante's treatises were the writings of the poets and critics of the Italian Renaissance. Through them the classical tradition was passed on to England and to the rest of Europe; in art and literature, as in science and in politics, the Italy of the Renaissance was the great rejuvenator and originator in the realm of the intellect.

In more modern times the names of Corneille, Boileau, Voltaire, Diderot, Hugo, and Sainte-Beuve in France, of Kant, Schiller, and Lessing in Germany, of Sidney, Pope, Addison, Dryden, Wordsworth, and Shelley in England, represent differing views and opinions. Boileau's *Art poétique*, reminiscent of Horace's *Ars Poetica*, and Pope's *Essay on Criticism* have their distinct value as volumes of often authoritative formal instruction, furnishing useful analyses of the different kinds of verse compositions. Of far more worth is Sir Philip Sidney's *Defense of Poesie* (an essay richly reminiscent of the Italian Renaissance), wherein he quaintly reminds us that "though the poet cometh to you with words set in delightful proportion," yet "it is not rhyming and versing that maketh a poet." Lessing's great achievement was to disperse the fog that Corneille had raised around the dramatic principles of Aristotle, and by clarifying the classic doctrines, to make possible their application to all art under modern conditions. And here, without going into any details concerning any present-day doctrines, even though they be so interesting as the evolutionary theories with which we readily connect the name of M. Brunetière, it may be well to suggest the wider paths open to criticism through modern conditions. The Greek and Roman critics had only their own work to study. We of to-day have the dramas, the epics, the novels of many nations and ages. The study of comparative literature, now possible, opens up opportunities for tracing those influences which affected the literatures of all Europe, and affords the student the chance of building up from varying yet interrelated sources a standard of criticism. The differences due to national character and individual genius

will teach him the limitations of hard and fast formal rules, while his faith in the fundamental canons of great art can only be made firmer by such comparative study. He will learn that criticism is of use as a method of judgment for the reader, rather than an inspiring guide to the poet, whose highest achievements are never the result of the rules whose vitality they attest. The critic who disregards the universal message of great art and, maintaining that there is no disputing concerning taste, claims for his personal opinion as much value as can attach to any judgment, rejects for his impressionistic mess of pottage the birthright of many ages of culture. The subjective element of criticism is not, however, precluded by the positive laws revealed through the inductive method applied to works of art. As Lowell pointed out in his essay on *Don Quixote*, a book is great in proportion to what can be gotten from it, and many an artist has builded better than he knew. The individual critic can be so keen and yet true in his interpretations and so inspiring in his expression as to make his criticism itself creative literature. The qualities which are necessary to the ideal critic are, therefore, not alone knowledge of human nature and of the characteristics of the literature which has endured; he must himself have true power of intuition, sympathy combined with impartiality in judgment, a rational appreciation of the relative importance of form and content, the sense of beauty which will enable him to judge style, and the capacity for making others see what he sees. Method and technique are always valuable, and Americans have much reason to be grateful to Child and Ticknor and Longfellow for their contribution to America's scholarship, for criticism is to be thought of, first of all, not as a formidable and narrowing system, but indeed as a broad viewpoint, occupying the same relation to literature that literature holds to life; and as law is the condition of true liberty in life, so criticism is the bar to anarchy in literature. "We do not possess what we do not understand," said Goethe. The true critic, like the rhapsodist of old, can be the connecting link between the artist and the public, leading his readers to understand the beauty of a work and so to possess it. The technical beauty may well be a matter of formal development, but the emotional beauty and appeal rest on the basis of the essential oneness of human nature, whether in the days of Athens, of Rome, of London, or of New York.

Criticism thus understood is freed from the charges to which certain critics have exposed it. It is not, on the side of form, a narrowing method of petty rules, but a rational study of fitting construction and adequate expression; on the side of content, its most lasting dicta are opposed to the contention of those who, like Ruskin, would make art a handmaiden of morality. It does not restrict genius, because genius precedes it, and genius connotes the sense of form and beauty, and can but be aided by reference to the simple laws of formal beauty. As the art of judgment concerning the fairest flowering of the human spirit, criticism has one of the highest of judicial functions; as the art of interpretation, admitting individual intuition and inspiring teaching, it has a creative function of wide and lofty worth.

Consult the following representative works: S. H. Butcher, *The Poetics of Aristotle* (London, 1898); H. L. Havel and Andrew Lang, *Longinus on the Sublime* (ib., 1890); Horace, *Ars Poetica* (translations are easily accessible); Sir Philip Sidney, *Apologie for Poetrie* (c.1581, and published subsequently as *The Defense of Poesie;* easily accessible in recent editions). English critical thought in the sixteenth and seventeenth centuries is well represented, with scholarly commentary, in G. G. Smith, *Elizabethan Critical Essays* (2 vols., Oxford, 1904); P. H. Frye, *Dryden and the Critical Canons of the Seventeenth Century* (University of Nebraska, 1907); and *Critical Essays of the Seventeenth Century* (3 vols., Oxford, 1908–09), ed. J. E. Spingarn. Consult too: Boileau, *L'Art poétique* (1674, easily accessible in recent editions and in translation); Alexander Pope, *Essay on Criticism* (1711); Shelley, *Defense of Poetry* (published in 1840, easily accessible in recent editions); Coleridge, *Literary Criticism* (Oxford, 1908); Matthew Arnold, *Essays in Criticism* (1st series, 1865; 2d series, 1868), and passim; Walter Pater's works, passim. See also the critical writings of Goethe and Lessing, and of Sainte-Beuve, Taine, Brunetière, and Anatole France. The works cited may be supplemented by the following: J. E. Spingarn, *Literary Criticism in the Renaissance* (New York and London, 1899); C. M. Gayley and F. N. Scott, *Introduction to the Methods and Materials of Literary Criticism* (2 vols., Boston, 1899); G. E. Woodberry, *A New Defence of Poetry* (New York, 1900); George Saintsbury, *History of Criticism* (3 vols., London, 1902–04); Théry, *Histoire des opinions littéraires* (Paris, 1849); Bourgoin, *Les maîtres de la critique au XVIIe siècle* (Paris, 1889); P. Hamelius, *Die Kritik in der englischen Litteratur* (Berlin, 1897).

CRITICISM, BIBLICAL. See EXEGESIS.

CRITICISM, TEXTUAL. See TEXTUAL CRITICISM.

CRITIQUE DE L'ÉCOLE DES FEMMES, krē'tēk' de lā'kōl' dā fâm (Fr., criticism of the School for Wives). An amusing comedy by Molière, produced June 1, 1663, written in defense of his earlier comedy, *L'Ecole des femmes*, which had been attacked by Le Visé, editor of *Le Mercure galant*, in the third series of his *Nouvelles nouvelles*. It consists of a discussion of the merits of the former piece, chiefly carried on between a hypercritical marquis and an amiable chevalier.

CRITIQUE OF PURE REASON, krĭ-tēk' (Ger. *Kritik der reinen Vernunft*). A philosophical work by Immanuel Kant (1781), the basis of modern German philosophy.

CRITIUS. A Greek sculptor. See HARMODIUS AND ARISTOGITON.

CRI'TO (Lat., from Gk. Κρίτων, *Kritōn*). A wealthy friend and disciple of Socrates. He arranged for his master's escape from prison, but Socrates refused to take advantage of the plan. Plato's dialogue representing the last conversation between Socrates and Crito bears the latter's name.

CRIT'OLA'US (Lat., from Gk. Κριτόλαος, *Kritolaos*). A Greek philosopher, born at Phaselis, in Lycia, in the second century B.C. He succeeded Ariston of Ceos as the head of the Peripatetic school at Athens and acquired a high reputation as a philosopher and orator. About 155 B.C. he went to Rome, and, with Carneades and Diogenes, obtained a remission of the fine of 500 talents which the Romans had

imposed upon Athens for the destruction of Oropus. See CARNEADES.

CRIT'TENDEN, GEORGE BIBB (1812–80). An American soldier, the son of J. J. Crittenden (q.v.). He was born at Russellville, Ky., graduated at the United States Military Academy in 1832, served with distinction in the Mexican War and was promoted to be lieutenant colonel (1856). He resigned and joined the Confederate army in 1861, was appointed major general, and was placed in command of southeastern Kentucky and a part of Tennessee. For his defeat at Mill Spring (1862), however, he was censured. He subsequently served as a volunteer, and from 1867 to 1871 was State Librarian of Kentucky.

CRITTENDEN, JOHN JORDAN (1787–1863). An American statesman, born near Versailles, Ky. He graduated at William and Mary College in 1807, served in the War of 1812, was a United States Senator from 1817 to 1819, United States District Attorney from 1827 to 1829, and a United States Senator again from 1835 to 1841. In 1841 he was appointed Attorney-General by President Harrison, but resigned when Tyler became President, and was again in the Senate from 1842 to 1848, after which he was Governor of Kentucky from 1848 to 1850. He was again Attorney-General under President Fillmore and in 1855 was a fourth time sent to the Senate. Although a Southerner, Crittenden consistently devoted his energy and eloquence to the preservation of the Union, and he exerted every effort, first, to avert the impending Civil War, and later to assist the Administration in its prosecution. In the Senate (1860–61) he urged unsuccessfully his famous compromise. (See CRITTENDEN COMPROMISE.) Retiring from the Senate in 1861, he served one term in the House, and in that body also strove for the supremacy of the Constitution. Consult *The Life of John J. Crittenden,* by his daughter, Mrs. Chapman Coleman (2 vols., Philadelphia, 1871).

CRITTENDEN, THOMAS LEONIDAS (1815–93). An American soldier, the son of John Jordan Crittenden, born in Russellville, Ky. He was a private in the Kentucky Volunteers in 1836, studied law, and in 1842 became commonwealth's attorney. During the Mexican War he served as lieutenant colonel under both General Taylor and General Scott and, when the former became President, was appointed United States Consul at Liverpool. He entered the Federal army at the beginning of the Civil War, became a brigadier general of volunteers in October, 1861, and for his services at Shiloh, where he commanded a division, was raised to the rank of major general (July 17, 1862). He afterward commanded a division under General Buell and took an important part in the battles of Murfreesboro and Chickamauga, but resigned from the service in December, 1864. He entered the regular army as colonel of the Thirty-second Infantry in 1866, was brevetted brigadier general in 1867, and served on the frontier until his retirement in 1881.

CRITTENDEN COMPROMISE. In American history, a measure proposed in Congress in 1860 by Senator J. J. Crittenden (q.v.) as a means of preventing the secession of the Southern States, through the adoption of certain constitutional amendments. These amendments were five in number, and provided: (1) that the right to property in slaves was to be recognized, and that slavery was to be permitted and protected in all the common territory south of 36° 30′ and prohibited north of that line, while the land remained in its territorial status; (2) that Congress was not to have power to abolish slavery in the places under its exclusive jurisdiction which lay within a State where slavery existed; (3) that Congress was to have no power to abolish slavery in the District of Columbia so long as it existed in either Maryland or Virginia, and then only after the owners of the slaves had been compensated; (4) that Congress was to have no power to prohibit or hinder the transportation of slaves from one State to another, or to a Territory where slavery was legal; (5) that Congress might provide that in cases where escaped slaves were rescued, or their arrest prevented by mobs, the owners should be compensated by the United States, which in turn might recover damages from the county in which the illegal act occurred. All of these amendments were to be permanent and "unamendable." The compromise was defeated in a committee of the Senate and failed of consideration in the House.

CRITTENTON, CHARLES NELSON (1833–1909). An American philanthropist, born in Adams, Jefferson Co., N. Y. He went into the drug business in New York City in 1861; but after 1882, when his five-year-old daughter Florence died, he devoted his time and wealth to the establishment of Florence Crittenton Homes for homeless and unfortunate girls and their infant children. In 1895 the National Florence Crittenton Mission was incorporated to carry on this work. Of these mission homes more than 70 were organized in Mr. Crittenton's lifetime in all the larger cities of the United States and in Marseilles, Tokio, Shanghai, the city of Mexico, etc. The drug-manufacturing company which bore his name was one of the first profit-sharing concerns in the United States. He was an active member of the Prohibition party.

CRITTENTON MISSION. See FLORENCE CRITTENTON MISSION; CRITTENTON, C. N.

CRIVELLI, krē-vĕl'lē, CARLO (c.1430–c.1495). A Venetian painter of the early Renaissance. He was born in Venice, probably the son of Jacopo Crivelli, a painter, and studied with Antonio and Bartolommeo da Murano, and was later influenced by the schools of Padua and Ferrara. Of his life in Venice nothing is recorded except that he was convicted of adultery in 1457, and this was probably the cause of his leaving Venice, never to return. In 1468 he began his work in the Marches, where he practiced the remainder of his life, residing after 1473 in Ascoli. In 1490 he was named "Miles," and shortly before his death "Eques Laureatus" by Ferdinand II of Capua, as the signatures of his later paintings proudly record. Among his early works are a "Madonna" in the Verona Museum, and a "Pietá with Saints" in the Berlin Gallery, which show the influence of Negroponte and Squarcione. After he left Venice in 1457, his works, owing to Mantegna's influence, increased in earnestness and pathos and improved in color and technique, as is shown in the altarpiece in five compartments with predella in the cathedral of Ascoli (1473) and "St. George on Horseback" in the Gardner collection, Boston. In the so-called "Demidoff Altarpiece" (1476), in 13 compartments (National Gallery, London), he has fully developed an individual style, and between 1480 and 1490

he reached the height of his power. At this time he painted the "Madonna" in the Vatican Gallery, the triptych "Madonna" in the Brera, the "Pieta" in the Boston Art Museum, the same subject in the Johnson collection, Philadelphia, the "Madonna with St. Peter and six Saints" in the Berlin Gallery, and "The Annunciation" in the National Gallery. Such works combine grace, charm, and elaborate idyllic accessories with intense pathos and fervid religious feeling. They are characterized by wonderful strength of line and a metallic lustre of color. Both in technique and sentiment Crivelli was a conservative and stood apart from the general development of Venetian painting. He painted only in tempera and maintained the early scheme of division of his altars into separate panels. He excelled in the treatment of such isolated figures, which, although stiff and archaic, are in expression calm and deep as the sea. After 1490 his work shows less originality and intensity but more perfect technique and increasing, almost riotous, ornamentation. "The Coronation of the Virgin" (1493) and the "Madonna della Candeletta," both in the Brera, are good examples of his latest style. Consult Berenson, *Venetian Painters of the Renaissance* (New York, 1909), and Rushforth, *Carlo Crivelli* (London, 1900).

CROAK'ER. See DRUM; GRUNT; QUEENFISH.

CROAKER AND CO. The pseudonym adopted by Joseph Rodman Drake and Fitz-Greene Halleck in the *Croaker Pieces*, in the New York *Evening Post* (1819).

CROATAN, krō'tăn'. An island off the coast of North Carolina, south of Roanoke Island, at the time of the first English attempt at colonization, about 1585. By the shifting of the sands it is now probably a part of Hatteras or Ocracoke Island. A colony of 117 persons who were landed by Sir Walter Raleigh upon Roanoke Island in 1587, and of whose ultimate fate nothing definite was ever afterward learned, is supposed to have taken refuge with friendly Indians upon Croatan Island and to have eventually become absorbed into that tribe. Recently new interest has been given to the story through the claim of descent from these colonists, asserted by a considerable body of mixed-blood stock in Robeson County, in the southern part of the State. Although their claim has probably no sound historical basis, they have been officially recognized by the State as a separate people under the name of "Croatan Indians." According to the census of 1910 they numbered 5865.

CROATIA (krō-ā'shĭ-ȧ) **AND SLAVONIA** (Slav. *Hrvatska i Slavoniya*, Hung. *Horvát-Slavonország*, from Croat. *Hrvat*, OChurch Slav. *Khrŭvatinŭ*, Slov. *Khrvat*, Pol. *Karwat*, Russ. *Khrovate*, Croat. and OChurch Slav. *Slovieninŭ*, Russ. *Slavyaninŭ*, MGk. *'Εσκλαβηνός*, *Esklabēnos*, a Slav, whence Ger. *Sklave*, Eng. *slave*). A kingdom of Austria-Hungary, constituting one of the lands of the Hungarian crown (Map: Hungary, D 4). It is separated by the Drave and the Danube from Hungary proper on the northeast, by the Save from Servia and Bosnia on the south, has Dalmatia and the Adriatic on the southwest, and Styria, Carniola, and Istria on the west. Croatia constitutes the southwest portion; Slavonia, the northeastern part. Its area is 16,425 square miles.

A large part of the surface consists of mountain chains ranging in height from about 2000 to 4000 feet, principally spurs of the Julian and Styrian Alps. In Croatia are the Agram highlands, the Croatian Karst (see KARST), with an elevation of about 500 feet, the two ranges of Great and Little Kapella, the former reaching a height of about 500 feet, and the Velebit Range, whose highest summit is about 5750 feet. On the borders of Carniola are the Uskok Mountains. The beautiful mountain region on the northwest is called "Croatian Switzerland." The interior along the Save consists of an extensive and fruitful valley. The eastern part contains fertile, well-cultivated valleys, while the western part is covered with forests. There are several small rivers flowing into the Save and Drave, and a number of lakes on the coast. The Kulpa River, a tributary of the Save rising in Carniola and flowing across Croatia, is generally considered the northern boundary of the Balkan Peninsula.

The climate is not uniform throughout the kingdom. Along the coast of Croatia the summers are dry and the winters long with considerable precipitation, but the annual range of temperature is less than in Slavonia. In this western portion the winters are very raw, and the land is subject to the bora, a cold, fierce northeastern wind, which renders navigation dangerous and brings heavy snows to the highlands. In the interior the continental type of climate prevails, with winter temperatures frequently below zero and excessive summer heat. In parts of Slavonia the climate is very insalubrious on account of numerous swamps. The soil is fairly fertile, and the range of vegetation very wide. About 32 per cent of the productive area is arable land, 23 per cent is in meadows and pastures, 38 per cent is under forests, and 1 per cent is covered with vineyards. The common European cereals are raised extensively, especially wheat and corn. The yield of potatoes is considerable. Fruits are grown in abundance, notably apples, plums, nuts, and grapes in the southern part of the country. Agram in Croatia is the capital and railroad centre. A number of railroads under government control cross the kingdom, and over 2000 miles of highways have been constructed.

The mineral production of Croatia and Slavonia is unimportant. Some coal, iron, marble, copper, and sulphur figure in the exports. There are but few modern industrial establishments, the bulk of the manufactures originating in the domestic industry of the peasant families. There are some silk mills, glass and sugar mills, a few shipbuilding, milling, paper, and leather establishments in the coast districts, and a number of distilleries and breweries. The plum brandy of Slavonia is famous under the name of "Sliwowitz." There is a considerable transit trade, largely carried on through the ports of Fiume, Zengg, and Porto Ré. The chief articles of export are grain, fruits, wine, lumber, flour, horses, and swine. The crownland had, in 1911, 11,997 miles of public roads and 1329 miles of railway. Of the railway, 541 miles were owned by the state, and 536 were also operated by the state though privately owned. Agram (Zágráb) is the principal railway centre. There is water transportation on the Danube, Save, Drave, and Una.

Croatia and Slavonia, a titular kingdom, is autonomous in its internal affairs. Its executive head, or governor, is the Ban, responsible to the Provincial Diet and to the Hungarian Pre-

mier, who appoints him with the approval of the King (the sovereign of Austria-Hungary). There are three ministries—Interior, Public Instruction and Worship, and Justice. The Diet, or National Assembly, is a single chamber of 88 elected deputies and certain privileged members, as the heads of the nobility and high ecclesiastics and officials. The privileged members, who must not exceed in number half the deputies, usually sympathize with Hungarian policy. The crownland is represented by three members in the Upper House and 40 in the Lower House of the Hungarian Parliament and is entitled to a minister in the Hungarian cabinet, who countersigns all important acts affecting it. In 1908 the revenue of the autonomous government was 25,619,000 kronen, and the expenditure 24,710,000 kronen. The crownland is divided into eight counties and four municipal towns.

The facilities for both elementary and secondary education are improving. In 1910, 52.6 per cent of the population over six years of age could read and write, as compared with 44.4 per cent in 1900. Agram (q.v.), the capital, has a university. The population in 1890 was 2,201,927; in 1900, 2,416,304 (9.7 per cent increase); in 1910 (census of December 31), 2,621,954 (8.5 per cent increase). The last census returned by language 62.5 per cent of the people as Croats, 24.6 per cent Serbs, 5.1 per cent Germans, and 4.1 per cent Hungarians. The percentage of Roman Catholics in 1910 was 71.6, and Greek Orthodox 24.9. Agram had 79,038 inhabitants; Eszék (Esseg, Osjek), 31,388; Zimony (Semlin), 17,131; Károlyváros (Karlstadt, Karlovac), 16,112; Varasd (Warasdin), 13,398. Average birth rate, 1906–10, 40.4; 1911, 36.8; death rate, 25.0 and 25.1; illegitimacy, 7.3 and 7.9 (for Hungary proper, 9.7 and 9.5).

History. Croatia and Slavonia were included in the Roman Province of Pannonia. The Croats are a southern Slavic people, speaking a language which differs but slightly from that of their neighbors the Serbs. They came down in the seventh century from the Carpathians. In the ninth century the Croats adopted Latin Christianity, while the Serbs received Christianity from Constantinople. About the year 910 Croatia asserted its political independence of the Byzantine emperors and under its own king extended its power over Bosnia and Dalmatia. A great part of Croatia was annexed to Hungary towards the close of the eleventh century, and in 1102 Koloman of Hungary had himself crowned King of Croatia and Dalmatia. The country was involved in the dynastic struggles and wars for self-preservation which were the lot of Hungary for centuries. In the great democratic and nationalistic uprising throughout Europe in 1848 Croatia played a prominent rôle. By stirring up the race prejudice of the Croats against the Hungarians the reactionary Austrian government was enabled to subdue the great Hungarian rebellion in that year, Jellachich, Ban of Croatia, acting as the ready tool of Austria and the Hapsburg dynasty. After the revolution Croatia was ruled by the Hapsburgs in a purely despotic fashion for 10 years. It was then incorporated again in Hungary by a compromise treaty which gave the Croats representation in the Hungarian Diet. Hungary, however, annexed Fiume outright, and the Croats, far from satisfied with the compromise, have never ceased to demand complete autonomy. The occupation and subsequent annexation of Bosnia and Herzegovina by Austria-Hungary, with their large Croatian population, has given additional fervor to this desire, and it has been made a constant issue, throughout the last 40 years, by a succession of riots. The more serious of these occurred in 1883 and 1903. The recent Balkan War (q.v.) fanned the flame still further, and the Croats, aroused by the success of their neighbors, the Servians, took occasion to renew their demands with unusual vehemence. Consult: Matkovitch, *Kroatien und Slavonien nach seinen physischen und geistigen Verhältnissen* (Agram, 1873); Krauss, *Die vereinigten Königreiche Kroatien und Slavonien* (Vienna, 1889); Lukšić, *Führer durch Ungarn, durch Croatien und Slawonien* (Vienna, 1902). See AUSTRIA-HUNGARY.

CROCE, krō'chā, BENEDETTO (1866–). An Italian philosopher and critic. He was born at Pescasseroli (Avezzano), but early made Naples his residence. His contributions to literary history are of the first importance, both for bulk and for rigorous method coupled with enormous erudition. Typical of his specialization on Spanish influences in Italy and on the writers and general intellectual history of Naples, are *Studi letterari del seicento* (Bari, 1910), *I teatri di Napoli* (Naples, 1890), and the critical editions in his monumental series. *I scrittori d'Italia* (Bari, 1911), which, now continued by F. Nicolini, will reach 600 volumes. At the same time he stimulated a great revival of philosophical studies in Italy, collaborating with G. Gentile on the Bari series of *Classici della filosofia moderna* (24 vols.), to which he contributed important works on Vico and Hegel. A world-wide influence has been exerted by Croce's *Filosofia dello spirito*, a work in three parts: *Estetica* (new ed., Bari, 1908), *Logica* (1909), *Etica* (1909), available in English translations by Ainslie (*Æsthetik*, London, 1909, *Ethics*, 1913; consult Ainslie in the *North American Review*, vol. 198 (1913), "Introduction to Croce's Philosophy of the Practical"). The *Estetica* is of the three most influential and, in spite of the animated criticism aroused by it, remains a classic. Proceeding from the criticism of Vico, whom he calls the "discoverer of the science of æsthetics," Croce sets himself against the Aristotelian and classic schools of æsthetics as well as against Lessing, Kant, Hegel, and other moderns. The cardinal point in his theory is the entire distinction of logic from *intuition*, logic dealing with the apprehension of *relationships*, of *universals*, intuition with the apprehension of the *particular*, the *individual*. The act of intuition is the act of *expression:* all expression is "art," and all art is expression. The creative act in art is the act of expression in the mind of the artist: the material execution of the work of art is posterior to this creative act, of which it is only a copy. Croce thus excludes from æsthetics the idea of "beauty" as it is commonly understood; questions of artistic "technique" become irrelevant to æsthetic criticism; while his insistence on the intuitive nature of art destroys the critical value of rhetorical categories, and the terminology of literary genres and artistic classification becomes devoid of sense, since each production is a work *sui generis*, representing a moment, a mental state, that has intrinsically nothing to do with any other mental state. The function of criticism becomes primarily interpretative, its object being to reconstruct the mental

state in its causal and final elements. The æsthetic judgment is possible only with reference to the intention of the artist and the extent to which that purpose has been realized.

Croce's methods are applied extensively, especially to Italian literature of the nineteenth century, in his journal *La Critica* (Bari, 1902–). Selected essays are given in *Problemi di estetica* (Bari, 1910) and the *Brevario di estetica* (Bari, 1913). A comprehensive application of the theory to grammar appears in Trabalza's *Storia della grammatica italiana* (Milan, 1908), and its influence appears in Germany in Karl Vossler's studies on the *Divine Comedy* of Dante. Croce's chief American interpreter is Spingarn, *The New Criticism* (New York, 1909). As an ethical teacher, Croce represents and leads in Italy the revolt against the attempt to treat the spirit in a materialistic or naturalistic manner, and therefore he is to be classed with Bergson and Eucken (qq.v.), in spite of the fact that he represents none of their anti-intellectual tendencies. The honorary senatorship of the kingdom was conferred on Croce in 1909, and he was chosen secretary of the Società Napolitana di Storia Patria and awarded an honorary doctorate by the University of Freiburg.

CROCE, Giulio Cesare della (1550–1609). An Italian story-teller, born at Persiceto, near Bologna. He wrote a number of romances and plays and created the world-famous types of Bertoldo, Bertoldino, and Cacasenno in the often translated *Astuzie di Bertoldo* and the *Simplicità di Bertoldino* (1620). Consult biography and bibliography by Guerrini (Bologna, 1879).

CROCHET, krō-shā′ (Fr. *crochet*, hook, dim. of *croc*, hook, from Icel. *krōkr*, hook, perhaps from Gael. *crocan*, Welsh *crwg*, hook, and connected with Lat. *crux*, cross). A form of fancy-work where threads of linen, cotton, worsted, or silk are looped with hooks called crochet needles to form various decorative and useful articles. Endless varieties of patterns may be formed, and lightness and elegance attained, by twisting the thread one or more times in taking up the loop, while openwork is formed by passing one or more loops.

CROCID′OLITE (from Gk. *κροκίς, krokis*, nap on cloth; connected with *κροκή, krokē*, thread, from *κρέκειν, krekein*, to weave + *λίθος, lithos*, stone). A sodium iron silicate of the amphibole group that occurs in fibrous or asbestos-like filaments, and also sometimes massive or earthy. It has a silky lustre and is indigo blue to green in color. The best specimens are found in Griqualand, in the Orange River country, South Africa. This mineral frequently contains a siliceous base, such as ferruginous quartz, which imparts to it a golden yellow to yellowish-brown color, often handsomely mottled with the blue or green of the original mineral. This, when cut *en cabochon*, with a high summit and the longer diameter of the oval at right angles to the direction of the fibres of which the mineral is made up, yields the cat's-eye ray, in consequence of which the mineral is popularly known as *tiger-eye*, and has some value as a gem stone, being used when polished for umbrella handles, charms, etc. In the United States specimens are found in North Carolina, Pennsylvania, and Rhode Island, but these are of no value for ornamental purposes.

CROCK′ER, Francis Bacon (1861–1921). An American electrical engineer. He was born in New York City, received from Columbia University the E.M. in 1882 and the Ph.D. in 1894, and at Columbia was instructor in electrical engineering (1889–92), adjunct professor (1892–93), and professor thereafter. In 1892–95 he was president of the New York Electrical Society and in 1897–98 of the American Institute of Electrical Engineers. He published *The Practical Management of Dynamos and Motors* (1892), revised under the title *Management of Electrical Machinery* (7th ed., 1907); *Electric Lighting* (2 vols., 1896–1901; 8th ed., 1908); *Electric Motors* (1910). In 1914 he received an honorary M.S. from Columbia.

CROCK′ERY. See Pottery.

CROCK′ET (from OF. *croquet*, variant of *crochet*, hook). An ornamental knob or leaf projecting boldly from a plane surface, or from the edge of a coping or gable, or from the hip or arris of a spire or pinnacle, or from the bell of a capital; usually in the form of a single heavy stem ending in leafage or flower. This ornament is probably derived originally from the corner volutes of the Corinthian type of capital with the acanthus leaves curled up under them. This form persists through all Romanesque styles and was developed by the Gothic architects into an independent ornament.

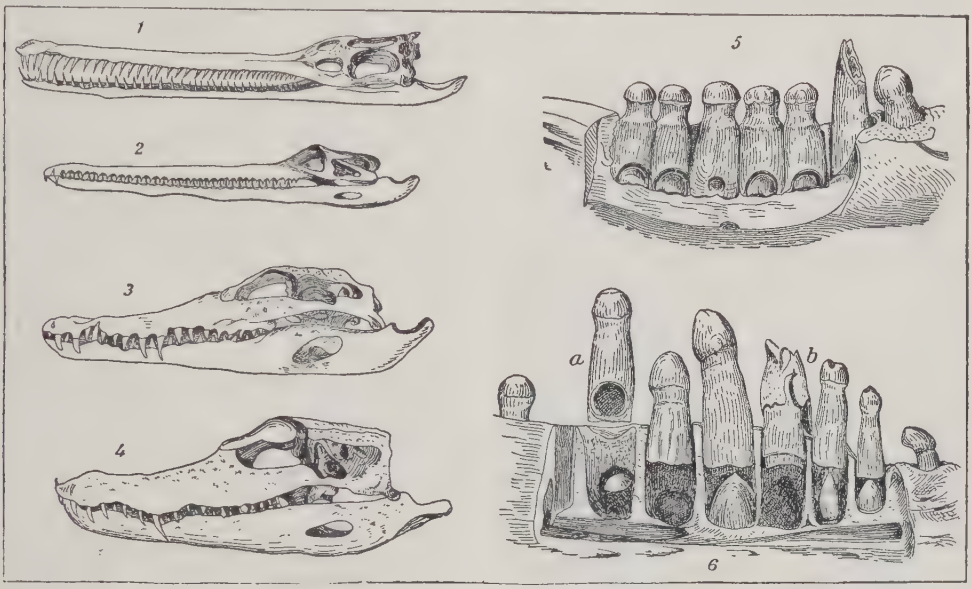
CROCK′ETT. A city and the county seat of Houston Co., Tex., 113 miles north of Houston, on the International and Great Northern Railroad (Map: Texas, E 4). It has a fine courthouse and the Mary Allen Seminary. Fruit, cotton, stock, and corn growing, lumbering, and the manufacture of cottonseed oil are the principal industries. The water works are owned by the city. Pop., 1900, 2612; 1910, 3947.

CROCKETT, David (1786–1836). An American pioneer and politician, born in Greene Co., Tenn. He was a typical backwoodsman, unlettered but shrewd, and skillful as a hunter. He served under Jackson in the war against the Creek Indians, was elected to the Tennessee Legislature in 1821 and 1823, and in 1826, 1828, and 1832 was elected to Congress, where his oddities of dress attracted considerable attention. At the close of his third term he enlisted with the Texan forces, then in arms against Mexico, and in 1836 was one of the six survivors of the 140 defenders of the Alamo (q.v.), where, on March 6, the entire garrison was killed by Santa Anna's troops. Crockett was massacred by order of Santa Anna at his surrender. Crockett's well-known maxim was, "Be sure you are right, then go ahead." He very probably dictated or authorized *A Narrative of the Life of David Crockett* (1834); *A Tour to the North and Down East* (1835). He has been credited, probably erroneously, with *Exploits and Adventures in Texas* (1836); and *Sketches and Eccentricities* (1847), all of which are characterized by crude wit. The best popular biography is that by E. S. Ellis (Philadelphia, 1884).

CROCKETT, Samuel Rutherford (1860–1914). A Scottish novelist. He was born at Duchrae, Galloway; graduated at Edinburgh University in 1879. His first publication, *Dulce Cor*, a book of poems, appeared in 1886. He was Free Church minister at Penicuik until the close of 1894, when he resigned to devote himself to writing. He wrote, notably: *The Stickit Minister* (1893); *The Raiders* (1894); *Bog-Myrtle and Peat* (1895); *The Grey Man* (1896); *The Standard Bearer* (1898); *Joan of the Sword*

Hand (1900); *The Banner of Blue* (1902); *Red Cape Tales* (1904); *Maid Margaret* (1905); *The Bloom of the Heather* (1908); *The White Plumes of Navarre* (1909); *Love in a Pernicketty Town* (1911); *Anne of the Barricades* (1912); *Patsy* (1913); *Sandy* (1914).

CROC'ODILE (Lat. *crocodilus*, Gk. κροκόδειλος, *krokodeilos*). An aquatic lacertiform carnivorous reptile, comparatively gigantic in size (several feet in length), representing the extensive subclass Crocodilia, regarded as the most highly organized of reptiles; more strictly one of the type genus *Crocodilus*, of the family Crocodilidæ, typical of the order Eustachia. Crocodilians differ from lizards in many points of structure, and prominently in the horny plates within the thick skin which form a



SKULLS AND TEETH OF CROCODILIANS.

1. *Teleosaurus* (extinct). 2. Gavial. 3. Nile crocodile. 4. American alligator. 5. Back part of the series of teeth of the lower jaw of an alligator, with the inner wall of the alveolar groove cut away, showing the absence of partitions and the germs of the successional teeth. 6. Middle part of the same series, showing the partitions, forming here distinct sockets from which the teeth are raised to show germs of successional teeth and dentiparous cavities; *a*, a tooth turned around to show the effect (a hole) of the new germ on its base; *b*, shell of an old tooth and two successors.

dorsal armor, and the firm setting of the strong teeth into alveoli, the fourth tooth often being much enlarged as a seizer. The skull has greater solidity, and the internal anatomy generally is much advanced. The heart has four distinct chambers, preventing an admixture of arterial and venous blood, and the organs of sense are well developed. Their limbs are of much more use to them in walking than are those of either turtles or newts, yet their real home is in the water, where they swim by means of twisting strokes of their compressed tails, which are also powerful weapons, and of aid in gaining food, since animals standing at the edge of a piece of water deep enough to permit a crocodile to swim close to the shore unobserved are frequently swept into the stream by a blow of the tail, then seized and drowned.

All crocodilians are oviparous. The eggs are about the size of those of a goose and are buried in the sand or mud to be hatched by the heat of the sun alone. The females of some, if not all, of the species guard them and take care of their young; yet the eggs and very young are preyed on by civets, a monitor lizard, and many other enemies. In warm countries crocodiles bury themselves in mud in times of drought, and in cold countries during winter. They feed on fish, birds, and mammals, and human beings are sometimes their victims. The necessity of taking small pieces of food, induced by their rigidly articulated jaws and unelastic throat, compels them to sink all their large prey and keep it until it is sufficiently macerated to be torn into small pieces.

All the species have a voice, described as a loud short bark or croak, heard at night or when the reptile is angry. The age to which they live is unknown, but they arrive at reproductive maturity when about 10 years old and seem to continue to grow for a century or more. Captives, and those often alarmed, show an ability to learn from experience.

"The recent geographical distribution of the various kinds of Crocodilia loses its mystery," says Gadow, "when we recollect that during the Tertiary period alligators, crocodiles, and long-snouted gavials existed in Europe. The solitary species of alligator in China is the last living reminder of their former Periarctic distribution. The group, taken as a whole, is otherwise now intertropical, crocodiles alone inhabiting the Paleotropical region, together with long-snouted forms in the Oriental subregion, while alligators and caymans, with a few crocodiles, live in America."

The order Eustachia contains the crocodilians, ancient and modern. Two other (extinct) orders are recognized by Gadow (1902), both small and peculiar groups known only in late Mesozoic rocks. The genus *Ætosaurus* represents the order Pseudosuchia, and *Belodon* the order Parasuchia. These and other Mesozoic crocodiles were marine and seem to have been descended from some terrestrial dinosaurian stock. "So

far as modern reptiles are concerned, only the *Chelonia* and *Sphenodon* are related to the Crocodilia, while monitors and other lizards resemble them only superficially."

The crocodilians (Eustachia) fall into seven families: 1. Teleosauridæ, fossil in the Lias and Oölite of Europe; marine, and of the general appearance of gavials, with very long and slender snouts (see Fig. 1). 2. Metriorhynchidæ, fossil in the Upper Oölite of Europe; marine. 3. Macrorhynchidæ, fossil in fresh-water deposits of Wealden, etc., of Europe. 4. Gavialidæ, the gavials (see GAVIAL), fossil and recent. 5. Atopsauridæ, fossil in the Upper Oölite of France; diminutive alligator-like reptiles, only about a foot long. 6. Goniopholidæ, large fossil crocodiles of the late Mesozoic. 7. Crocodilidæ, true crocodiles and alligators.

Of the crocodiles proper (which are characterized by their narrow, elongated heads and much-webbed feet), the best and longest known is the celebrated *Crocodilus vulgaris* of the Nile, which was revered, protected, and when dead embalmed, by certain sects of the ancient Egyptians. Crocodile worship, according to Flinders-Petrie, was indigenous, and one of the oldest worships of Egypt. It was most prevalent in Fayum, "the Lake of the Crocodile," whose marshy shores were especially favorable to that reptile, and which was the seat of the crocodile god Sebek. Up the Nile other places were devoted to this primitive worship, while at neighboring towns, such as Denderak, Apollinopolis, and Heracleopolis, it was detested. In the very earliest times the crocodile was regarded as a minister of vengeance, but not divine. Nowadays these animals are so much hunted that few remain in the lower Nile, but in its upper waters and in other African rivers crocodiles are still dangerously plentiful. The reptiles also abound in Madagascar; but the "common" one on the West Coast, from Senegal to the Congo, is *Crocodilus cataphractus*. Two species inhabit the fresh waters and estuaries of India (see MUGGER)—one ranging to Ceylon, and eastward to China, the Malay Islands, and Australia. A local species also inhabits northern Australia and Queensland. There are three crocodiles in North and South America and the West Indies. One (*Crocodilus americanus*) ranges as far north as Florida.

The eggs of crocodiles are prized by some people as food, the musk glands are taken for perfume, and the skin and fat are articles of considerable commercial value.

Consult Gadow, *Amphibia and Reptiles* (London and New York, 1902); and authorities on Egypt, Central Africa, India, Ceylon, and Australasia. See ALLIGATOR.

Fossil Forms. Fossil ancestors of the crocodilians are known from rocks as old as those of the Triassic, and they are found throughout the later rocks of Jurassic, Cretaceous, and Tertiary time. The more primitive forms, comprising the totally extinct suborder Parasuchia, are represented by *Belodon*, from the upper Keuper of Württemberg and the Triassic sandstones of North America; *Stagonolepis* of the Triassic of Scotland, and *Parasuchus* from the Gondwana series of central India. These three have long, narrow snouts, produced by the elongation of the premaxillary bones, and in the structure of their skulls they present some points of resemblance to the primitive dinosaurs and to the rhynchocephalians. The Mesosuchia of Jurassic age, mostly reptiles of small size, have both long and short snouted forms, that differ from the Eusuchia in respect of the form of the palate, Eustachian tubes, and vertebræ. The principal genera are *Pelagosaurus, Metriorhynchus, Theriosuchus, Notosuchus, Teleosaurus, Stenosaurus*, from the *Jurassic* of Europe, and *Notochampsa* from South Africa. The Eusuchia, also with both broad and long snouted species, range from the Upper Jurassic through the Cretaceous and Tertiary, and comprise all the recent species, in which the Eustachian tubes are inclosed by bone and the vertebral centra are procœlous. Direct ancestors of the Malayan genus *Tomistoma* are found in the Miocene beds of the eastern Mediterranean region of south Europe. During the Eocene typical gavials lived in the seas of England, but they migrated southward during subsequent Tertiary time, and their remains are found fossilized in the Pliocene deposits of the Siwalik Hills of India. The largest-known crocodile was probably the genus *Rhamphosuchus*, from the Pliocene of the Siwalik Hills, India, with a length of over 50 feet.

Bibliography. Parker, "On the Structure and Development of the Skull in the Crocodile," *Zoölogical Society of London Transactions* (London, 1885); Tornier, "Die Crocodile," *Beiheft zum Archiv für Naturgeschichte* (Berlin, 1901). For fossil forms, consult: Dollo, "Première note sur les Crocodiliens de Bernissart," *Bulletin du Musée royal d'histoire naturelle de Belgique*, vol. ii (Brussels, 1883); Woodward, *Outlines of Vertebrate Paleontology for Students of Zoölogy* (Cambridge, 1898); Huxley, "On Stagonolepis and the Evolution of the Crocodilia," *Quarterly Journal of the Geological Society of London*, vol. xxxi (London, 1875); Woodward, "The History of Fossil Crocodiles," *Proceedings of the Geologists' Association*, vol. ix (ib., 1886); Gadow, "Amphibia and Reptiles," *Cambridge Natural History*, vol. viii (New York, 1902); Ditmars, *Reptiles of the World* (ib., 1910). See also ALLIGATOR; GAVIAL; NOTOSUCHUS; PELAGOSAURUS; TELEOSAURUS; THERIOSUCHUS.

CROCODILE BIRD. A plover (*Pluvianus ægyptius*) of the Nile valley, placed among the coursers (suborder *Cursorii*). It is remarkable for its association with the crocodile and now is usually identified with the *trochilus*, or "leech-eater" of Herodotus, whose account of it, long regarded as fabulous, is quoted by Stejneger as follows: "As the crocodile lives chiefly on the river, it has the inside of its mouth constantly covered with leeches; hence it happens that, while all other birds and beasts avoid it, with the trochilus it lives at peace, since it owes much to that bird, for the crocodile, when he leaves the water and comes out upon the land, is in the habit of lying with his mouth wide open, facing the western breeze; at such times the trochilus goes into his mouth and devours the leeches. This benefits the crocodile, who is pleased and takes care not to hurt the trochilus." Modern writers wholly denied this, but it is now known to be mainly true; i.e., these birds do run about the bodies of crocodiles asleep or basking on the sand, in search of the insects or crustaceans clinging to their hides; and may at favorable moments pick parasites and particles of food from their lips, teeth, and gums. This has been actually seen by such good observers as Alfred Brehm and others and has also been asserted of a related bird, the Egyptian lapwing. A very complete account of the evidence of this

fact, and for identifying this species with the bird of the Herodotus tradition, will be found in Newton's *Dictionary of Birds* (London, 1894), article "Plover." The colors of this species are lavender and cream, strikingly marked with black on the crown and on the sides of the head, the black stripes joining and passing broadly along the back and also extending down the sides of the breast. Consult Whymper, *Egyptian Birds* (London, 1909). See Plate of PLOVERS.

CROCODILE RIVER. See LIMPOPO.

CROCODILE TEARS. Hypocritical, forced expressions of grief. This use of the term has sprung from the fiction of travelers that crocodiles shed tears over their prey. The conceit of *crocodiles' tears* (the animals have large lachrymal glands) was common in the sixteenth century. See Spenser's *Faerie Queene*, i, 14–18.

CRO'COITE (from Gk. κροκόεις, *krokoeis*, saffron-colored, from κρόκος, *krokos*, saffron). A lead chromate. It crystallizes in the monoclinic system, has an adamantine to vitreous lustre, and occurs in various shades from a bright hyacinth red to orange yellow. It is found in crystals in quartz veins or in intersecting gneiss or granite and is commonly associated with gold pyrite and other metallic ores. Crocoite occurs in the Urals, Hungary, Brazil, Tasmania, and with wulfenite in Maricopa Co., Ariz.

CRO'CUS (Lat., from Gk. κρόκος, *krokos*, saffron). A genus of the family Iridaceæ. The species, about 70 in number, have much general similarity and are natives chiefly of the south of Europe and of the East. They set seed, but since the seed pods are underground and are frequently overlooked, and since production of flowers from seed-sown plants is slow, they are chiefly propagated by their corms. Saffron prepared from the stamens of *Crocus sativus* is used medicinally and for dyeing; for the latter purpose, however, aniline colors are replacing it. Some of the species are much cultivated in gardens for the beauty of their flowers, particularly those which, as *Crocus vernus* and *Crocus imperati* and the Dutch hybrids of *Crocus mœsiacus*, flower very early in the spring. The saffron crocus and some other species flower in autumn. The flowers of some species are fragrant. It is necessary frequently to take up crocus roots and plant anew, on account of the manner in which the corms multiply—the new forming in some species above the old, thus, in time, raising the corm to or even above the surface of the ground. When planted in lawns the bulbs must be replaced every two or three years, because they soon become smothered by the grass. The autumn flowering species are seldom cultivated in the United States. See Colored Plate with IRIS. For illustration of *Crocus sativus* see article SAFFRON.

CROCUS OF ANTIMONY, or CROCUS METALLORUM. The bright-red antimony oxysulphide that is found native as *kermesite*.

CROCUS OF MARS, or **CROCUS MARTIS.** A polishing substance consisting of finely powdered ferric oxides.

CROES, JOHN JAMES ROBERTSON (1834–1906). An American civil engineer, born at Richmond, Va. After graduating in 1853 from the College of St. James (Md.) he served as engineer of the first high masonry dam in the United States at Boyd's Corners, N. Y. (1865–70), as topographical engineer of the New York Park Department (1872–78), and as chief engineer of the Suburban Rapid Transit Railroad, New York (1885–91). He made several reports on water supply for New York and other cities. In 1903–05 he was consulting engineer of the New York State Health Department. He was treasurer in 1877–87 and president in 1901 of the American Society of Civil Engineers. Besides contributing to other magazines he was editorial writer for the *Sanitary Engineer* (1880–90).

CRŒ'SUS (Gk. Κροῖσος, *Kroisos*). A Lydian king of the Mermnadæ line. The son of Alyattes, whom he succeeded, he flourished in the sixth century B.C. He came to the throne about the age of 35 (560 B.C.), and found the wrangling Æolians, Dorians, and Ionians an easy prey, but he did not press his advantage as conqueror beyond the exaction of tribute. Save Lycia and Cilicia, all Asia Minor west of the Halys fell before him. His ability in practical affairs soon made his wealth a proverb. His capital, Sardis, became the brilliant centre of arts and letters, and Crœsus was a munificent patron. Herodotus asserts (i, 29 ff.) that Solon visited his court, and that, when asked by Crœsus whether the possessor of so great riches might not be deemed the happiest of men, he replied in effect that no man can be called happy who is yet alive; to be called happy he must have a fortunate death. When the long peace of the kingdom was evidently about to be disturbed by the encroaching Persians under Cyrus the Great (q.v.), Crœsus formed a league with the Lacedæmonians, and sought the aid also of Nabonidos of Babylon. He tried to propitiate the gods by bestowing rich gifts upon Apollo's shrine, and, encouraged by the oracle's deliverance that he "would destroy a great empire," he determined to take the offensive. With his Lydian forces only, he joined battle with the enemy, but achieved no advantage—a failure which he attributed to the inadequate support of his mercenaries. Returning to Sardis, he called upon the Lacedæmonians for their promised aid and invited the assistance of the Egyptian King, Amasis, meaning to renew the contest early in the next year. Cyrus, however, forced immediate action. Crœsus, almost totally unprepared, was defeated at Thymbra and, after a short siege of Sardis, surrendered his capital. After a reign of 14 years he gave up his crown to the Persian. The oracle spoke truth—he destroyed a great empire, but it was his own. Herodotus further relates that, as the Lydian awaited the fire which, by command of Cyrus, was to consume him, he remembered his conversation with the Athenian philosopher and called out "Solon, Solon, Solon!" Desiring to know the reason of the exclamation, Cyrus heard the story and straightway commanded that the victim be spared. But the fire was by this time blazing vigorously. However, through Apollo's intercession merciful rain fell, and Crœsus was saved from the flames now raging about him. Recently, however, on the basis of a newly discovered poem of Bacchylides (q.v.), iii, 22 ff., it has been held that Crœsus had sought to escape capture by burning himself with his treasures, but that he was unable to effect his purpose. Consult How and Wells, *A Commentary on Herodotus*, vol. i, pp. 99–100 (Oxford, 1912); Jebb, Bacchylides (London, 1905). Crœsus, given a residence near Ecbatana, was taken into his

conqueror's favor and later into that of Cambyses. To both monarchs he is said to have rendered valuable service as a counselor, and both he survived. His end is not known.

CROF'FUT, WILLIAM AUGUSTUS (1836–1915). An American journalist and author, born at Redding, Conn. During the Civil War he was first a soldier and then a correspondent in the field for the New York *Tribune*. Afterward he became editorially connected with various journals and was executive officer of the United States Geological Survey, whose publications he edited for some time. He is the author of *The War History of Connecticut* (1867); *A Helping Hand for American Homes* (1868); *A Midsummer Lark* (1882); *The Vanderbilts* (1886); *Folks Next Door* (1892; 3d ed., 1904); *The Prophecy and Other Poems* (1893); a volume of poems, *Bourbon Ballads* (1880); the opening ode for the World's Columbian Exhibition (1893); *Deseret*, the libretto for the opera by Dudley Buck.

CROFT (AS., small field). A piece of inclosed land, usually connected with a humble kind of dwelling, whose inhabitant, the renter of the land, is called a "crofter." This method of letting small pieces of land, either for tillage or for pasture, is known as "the crofting system." This kind of petty farming was formerly common in Scotland, more particularly in the Highlands. See CROFTER.

CROFT, krôft, SIR HERBERT (1751–1816). An English writer. He was educated at University College, Oxford, took orders, and was appointed to the living of Prittlewell, in Essex, which he retained till his death, passing, however, much of his time abroad. He wrote extensively, but is mainly remembered by his "Life" of the poet Young, which he contributed to Johnson's *Lives of the Poets* (1779–81). He succeeded capitally in imitating Johnson's style. A novel in letter form called *Love and Madness* (1780) became notorious on account of the insertion of certain letters of Chatterton obtained under false pretense.

CROFT, or **CROFTS,** WILLIAM (1678–1727). An English musician. He was born at Nether Eatington, Warwickshire, and studied music in the choir of the Chapel Royal, then under the direction of Dr. John Blow. He was organist of St. Anne's, Westminster, from 1700 to 1711. In 1707 he was also appointed organist at the Chapel Royal, and it was in this capacity that he produced the beautiful anthems which have perpetuated his fame. In 1724 he published his *Musica Sacra* (2 vols.), containing a collection of 30 anthems and a burial service. According to the preface of the composer, this was the first attempt made in England to print the score of a sacred composition from engravings on plates. Among the best anthems of Dr. Croft are the following: *I will Give Thanks* (1704), for the thanksgiving after the battle of Blenheim; *The Soul of the Righteous* (1714), for Queen Anne's funeral; *The Lord is a Sun and Shield* (1714), for the coronation of George I; *O Give Thanks* (1715), for the suppression of the rebellion.

CROFT'ANGRY, CHRYSTAL. The imaginary editor of Scott's *Chronicles of the Canongate*. He is said to have been intended for Scott's father.

CROFT'ER. A term designating a class of small tenants of the Scottish Highlands and islands who hold arable land in severalty and usually certain rights of pasture in common. The crofter is for the most part a descendant of the lowest class under the early clan system; and the rights of common pasturage are traceable to the communal proprietorship of the clan. After the breaking up of the clans the legal status of the crofter became that of a tenant at will; by custom, however, he was usually accorded a certain fixity of tenure.

During the first half of the eighteenth century the chieftain of the clan, while losing his political leadership, came to be regarded as the proprietor of the soil. In some districts the chieftains who had been at war with the royal power were displaced, and the land granted to supporters of the king. In either case the followers of the chieftain became tenants, owing rent for their land instead of personal services and dues, as formerly. Nevertheless, their economic position was fairly satisfactory, especially in the islands. But with the expansion of the woolen industry it became profitable for the landlord to turn his estate into sheep runs; accordingly wholesale evictions of the crofters took place in many of the Highland districts. Moreover, natural increase of population had necessitated a reduction in the size of the individual holdings; so that at the end of the eighteenth century the whole class of crofters had been reduced to a condition of abject poverty. In the early part of the nineteenth century emigration of the crofters to America and the British colonies was officially encouraged; workhouses were established, and extensive measures for relief in time of famine were undertaken; but no permanent improvement was thus secured. In 1883 a parliamentary commission was appointed to investigate the conditions of life of the crofters. As a result of the investigation, the Crofters' Act of 1886 was passed. By this act the crofter is granted permanence of tenure, so long as he does not violate the specified conditions of his tenure; rents are fixed by a commission; compensation is allowed for improvements which the tenant may make, and the tenant has a right to demand the assistance of the landlord in making other permanent improvements. In order to remedy the evil effects of the excessive subdivision of holdings, the crofter is empowered to call upon the landlord to rent him additional land when the original holding is deemed by the commission to be insufficient.

Since the passage of this act the position of the crofter has materially improved. Rents have been lowered; and the crofter, assured that improvements which he may make will not have the effect of raising his rent and will not be taken from him through eviction, has advanced appreciably in methods of agriculture and in industry. See SCOTLAND, *Agriculture*.

Consult: Dalriad, *The Crofter in History* (Edinburgh, 1888); Guernier, *Les crofters écossais* (Paris, 1897); *Crofter Colonization: Eleventh Report of His Majesty's Commission* (London, 1901); "Crofters Past and Present," in *Blackwood's Magazine* (Edinburgh, 1906); *Crofters' Holdings, Scotland, Act* (London, 1907).

CROFTON, FRANCIS BLAKE (1841–1911). A Canadian author. He was born at Crossboyne, County Mayo, Ireland, and was educated at the Royal School, Dungannon, and at Trinity College, Dublin, where he graduated in 1863. He came to Canada and in 1864–65 was pro-

fessor of classics in Bishop's College, Lennoxville, Province of Quebec. For several years afterward he lived in New York City, where he was a contributor to various periodicals. In 1882 he was appointed librarian to the Nova Scotia Legislature, retiring from that position in 1906. He was an ardent advocate of Imperial federation. He published several humorous books, including *The Bewildered Querists and Other Nonsense* (1875), *The Major's Big Talk Stories* (1881), *The Hairbreadth Escapes of Major Mendax* (1889); also biographical and political studies, as *Haliburton, the Man, the Writer* (1889), *For Closer Union* (1897), *The Imperialism of Haliburton* (1898); *Sombre Tints* (poems), and *Is Suicide Sin?* In 1897 he became a vice president of the International Library Conference, London, England, and in 1901 a vice president of the Canadian Society of Authors.

CROFTS, krôfts, ERNEST (1847–1911). An English painter, born at Leeds. He studied under A. B. Clay in London, and with E. J. Hunten in Düsseldorf, where he lived for many years. Among his works are: "Cromwell at Marston Moor" (1877); "Napoleon and the Old Guard at Waterloo" (1895); "Funeral of Charles I" (1907, Bristol Museum). They are distinguished for accuracy and truth of detail, but are deficient in action and often merely theatrical in effect. However, Crofts stands among the first of the few English battle painters. He was elected to the Royal Academy in 1896 and named keeper in 1898.

CROGHAN, krō′gan, GEORGE (1791–1849). An American soldier, born near Louisville, Ky. He graduated at William and Mary College in 1810, entered the army in 1812, distinguished himself under General Harrison at Fort Meigs, and on Aug. 1–2, 1813, defended Fort Stephenson (on the present site of Fremont, Ohio) against the attack of a greatly superior force of British and Indians, for which he received the thanks of Congress and a gold medal. In 1814 he was promoted to be lieutenant colonel, but resigned in 1817 and was appointed postmaster at New Orleans in 1824. He became inspector general with the rank of colonel in 1825, joined General Taylor's forces in Mexico in 1846, and took part in the battle of Monterey.

CROISET, krwä′zā′, MARIE JOSEPH ALFRED (1845–). A French classical philologist, born in Paris. He was appointed professor of Greek at the Faculté des Lettres in 1885 and became a member of the Academy of Inscriptions in the following year. He is the editor of various Greek authors and wrote: *De Personis apud Aristophanem* (1873); *Xénophon, son caratère et son talent* (1873); *La poésie de Pindare et les lois du lyrisme grec* (1880); and, in conjunction with Maurice Croiset, *Histoire de la littérature grecque* (5 vols., 1887–99; new ed., 1913), an admirable work. An excellent abridgment of the last-named work, entitled *Manuel d'histoire de la littérature grecque*, appeared in 1901 (Paris; new ed., 1913). With J. Petitjean he wrote *Grammaire grecque* (3d ed., Paris, 1896).

CROISET, MAURICE (1846–). A French classical philologist, brother of the preceding, born in Paris. He became professor of the Greek language and literature at Montpellier in 1876, and professor of the Greek language and literature at the Collège de France in 1893. He is the author of *De Publicæ Eloquentiæ Principiis apud Græcos in Homericis Carminibus* (1874); *Des idées morales dans l'éloquence politique de Démosthène* (1874); *Essai sur la vie et sur les œuvres de Lucien* (1882); *Aristophanes and the Political Parties at Athens* (Eng. trans. by James Loeb, London, 1909), and, in conjunction with Alfred Croiset, *Histoire de la littérature grecque*, 5 vols., and *Manuel d'histoire de la littérature grecque.*

CROIX, krwä, CARLOS FRANCISCO DE, MARQUÉS DE CROIX (1699–1786). A Spanish general and administrator. He was born at Lille, French Flanders, and after serving in the Spanish army was appointed commandant at Ceuta, whence he was transferred in the same capacity to Puerto de Santa María. He afterward became captain general of Galicia and was Viceroy of New Spain (Mexico) from 1766 to 1771. He was distinguished by strict integrity and high administrative ability. During the last 15 years of his life he was Viceroy and captain general of Valencia.

CROIX, CHARLES DE. See CLERFAYT.

CROIX, TEODORO DE, CABALLERO DE CROIX (c.1730–91). A Spanish soldier. He was born at Lille, French Flanders, and was a brother of the Viceroy of New Spain (Mexico). In 1777 he was appointed Governor of the newly established district known as the "Interior Provinces" of the country and of Sonora, and served in this capacity until 1784. During his brief term as Viceroy of Peru (1784–90) he did much to ameliorate the condition of the Indians and enacted several laws for their protection. He died soon after his return to Madrid.

CROIZETTE, krwä′zĕt′, SOPHIE (1848–1901). A French actress. She was born in St. Petersburg. After two years at the Conservatory she obtained the first prize for comedy. In 1869 she appeared at the Théâtre Français as Queen Anne in *Un verre d'eau* and four years afterward was made a "sociétaire." Mademoiselle Croizette rarely appeared in classic rôles. Her best work was in the *Sphinx* (Octave Feuillet), *L'Etrangère* (Dumas fils), *Fourchambault* (Emile Augier), and *La princesse de Bagdad* (Dumas fils), her last and greatest creation. She married and retired from the stage in 1885.

CRO′KER, B. M. (?–1920). An English novelist. She was a daughter of William Sheppard, rector of Kilgefin, Roscommon, Ireland; was educated in England; married John Croker, of the Royal Munster Fusiliers, and traveled extensively in India and other parts of the East. Mrs. Croker wrote some good Irish peasant stories, as *Terence* (1899), and excels in depicting Anglo-Indian life, particularly the fashionable feminine world. The scenes of *Jason and Other Stories* (1899), comedy running into farce, are laid in India, Australia, and England. Her novels are commonly translated into French and German. Besides those above may be cited: *Proper Pride* (1882); *Pretty Miss Neville* (1883); *Village Tales and Jungle Tragedies* (1894); *In the Kingdom of Kerry* (1896); *Beyond the Pale* (1897); *A State Secret* (1901); *Angel* (1901); *Johanna* (1903); *Nine Days' Wonder* (1905); *Old Cantonment* (1905); *Serpent's Tooth* (1913).

CROKER, JOHN WILSON (1780–1857). An English writer and politician. He was born at Galway, Ireland. Educated at Trinity College, Dublin, he entered Lincoln's Inn as a student in 1800 and two years later was called to the Irish bar. In 1804 he published *Familiar Epistles,* a

clever satire in verse on the Irish stage, and *An Intercepted Letter from Canton*, a satire in prose on Dublin society. Both ran through several editions. In 1808 he issued a treatise on the *State of Ireland, Past and Present*—a pamphlet on Catholic emancipation—which brought him to the notice of politicians, and in the same year he was elected member of Parliament for Downpatrick. A warm defense in Parliament, in 1809, of the Duke of York, charged with corrupt administration, helped Croker in the same year to the office of Secretary to the Admiralty, a post which he held for more than 20 years. He was one of the founders of the *Quarterly Review* and contributed many violent party articles to its pages, as well as a large number of personal and abusive reviews, one of the most famous being on Keats's *Endymion*. As Rigby he was caricatured by Disraeli in *Coningsby*. In Parliament he steadily opposed the Reform Bill in all its stages, and after its enactment he refused to enter Parliament again. He took an active part in the establishment of the Athenæum Club and rendered good service to literature by his annotated edition of Boswell's *Johnson* (1831), famous for Macaulay's savage review of it, and by his publication of the *Suffolk Papers* (1823) and Lord Hervey's *Memoirs of the Court of George II* (1848). His *Stories from the History of England for Children* (1817) supplied Scott with the idea of *Tales of a Grandfather*. He also continued for a time to write verse. His *Battle of Talavera* (1809) pleased Wellington and was praised by Scott. Consult Jennings, *Diaries and Correspondence of Croker* (London, 1884).

CROKER, Richard (1843–1922). An American politician, well known as a leader of Tammany Hall in New York City. He was born at Black Rock, Ireland, but when two years of age was taken by his parents to America, and for a short time attended the public schools in New York City. He was then for seven years employed as a machinist, became prominent in the New York volunteer fire department, and took an active interest in local politics, and about 1865 identified himself with the Tammany Hall organization. From 1868 to 1870 he served as an alderman; was reëlected in 1872, but was forced out of office by Tweed, and acted for several months, on Mayor Havemeyer's appointment, as city marshal, his special duty being the collection of arrears in taxes. He was elected city coroner in 1873 and again in 1876, was appointed fire commissioner in 1883, and was reappointed to that position by Mayor Abram S. Hewitt in 1887. In 1886, on the death of John Kelly (q.v.), he became chairman of the finance committee of that organization and its recognized leader. From April, 1889, to February, 1890, he was city chamberlain. He conducted the successful mayoralty campaigns of Hugh Grant, Thomas F. Gilroy, and Robert A. Van Wyck in 1889, 1893, and 1897 respectively, and during the presidential campaign of 1900 supported W. J. Bryan. In 1902, soon after the election of Seth Low to the mayoralty, he resigned as leader of Tammany Hall, and the following year went to England, and later to Ireland. In 1907 he won the Derby with his race horse Orby. Consult Lewis, *Richard Croker* (New York, 1901).

CROKER, Thomas Crofton (1798–1854). An Irish author and antiquarian. He was born in Cork, Jan. 15, 1798. He early devoted himself to the collection of legends and songs of the Irish peasantry; and in 1824 he published his *Researches in the South of Ireland*, characterized by a happy blending of humor and sentiment with archæological learning. The work was followed by the *Fairy Legends and Traditions of the South of Ireland* (1825), trans. into German by Grimm (1826); *Legends of the Lakes* (1829); *Popular Songs of Ireland* (1839). Croker also edited *Memoirs of Joseph Holt, General of the Irish Rebels*, wrote two novels, and contributed to the magazines. He devoted much time to archæology, being member of many antiquarian societies. Through the influence of John Wilson Croker, a friend but no relative, he obtained at the age of 20 a clerkship in the Admiralty, a position which he held till 1850. He died Aug. 8, 1854. Consult "Life," by his son, prefixed to *Fairy Legends* (London, 1859), and "Memoir of T. C. Croker" in the introduction of his *Walk from London to Fulham* (ib., 1860). *The Popular Songs* were edited by Morley (ib., 1886). Other works that deserve to be mentioned are: *Adventures of Barney Mahoney* (2d ed., 1832); *Historical Songs of Ireland* (1841), relating especially to the revolutionary struggle between James II and William III; *The Keen of the South of Ireland* (1844), which illustrates Irish political and domestic history, manners, music, and superstitions; *Narratives Illustrative of the Contests in Ireland in 1641 and 1690* (1841); and *Britannia's Pastorals* (with W. Browne, 1852).

CROLL, krōl, James (1821–90). A Scottish geologist. He was born at Whitefield, Perthshire, and received only the usual brief schooling of a peasant's son. He studied philosophy and physical science and published a treatise on the *Physical Cause of the Change of Climate during the Glacial Period* (1864). He was appointed an officer of the geological survey of Scotland and in that post (1867–81) prosecuted researches which resulted in works including the treatise on *Climate and Time in their Geological Relations* (1875), in which he ascribed climatic changes during geological epochs to secular variations in the eccentricity of the earth's orbit, and *Climate and Cosmology* (1885), containing a discussion of the origin of the sun's heat and the probable development of the nebulæ and stars. Though considerable difference of opinion exists as to the real value of these views in relation to the establishment of a sound geological theory, there is general recognition of the value of his works as stimulating and directing inquiry. In his later life he returned to the field of philosophical speculation and published *The Philosophic Basis of Evolution* (1890), in which he discusses the fundamental principles underlying the doctrine of evolution. Consult *Autobiographical Sketch of James Croll, with Memoir of his Life and Work*, by J. C. Irons (London, 1896).

CRO'LY, David Goodman (1829–89). An American journalist, born in New York and educated at the New York University. He was associated with the *Evening Post* and the New York *Herald* (1854–58) and then became city editor and subsequently managing editor of the New York *World*. In 1872 he predicted the panic of 1873 and the failures of Jay Cooke & Co. and the Northern Pacific Railroad. From 1872 to 1878 he was editor of the *Daily Graphic*.

He married "Jennie June" (see CROLY, JANE CUNNINGHAM). His published works include *Seymour and Blair: Their Lives and Services*, with an appendix containing a *History of Reconstruction* (1868), and a *Primer of Positivism* (1876).

CROLY, GEORGE (1780–1860). An Irish author and clergyman. He was born in Dublin and was educated at Trinity College there. In 1810 he was ordained a priest of the English church, and in 1845 became rector of St. Stephen's, Walbrook, London. His first work was a poem, entitled *Paris in 1815*, which appeared in 1817. From this time up to within a short period from his death he wrote almost incessantly as dramatic critic of the *New Times*, as a contributor to *Blackwood's* and the *Literary Gazette*, and as the author of numerous satires, romances, and biographies. Among his works are: *The Angel of the World* (1820); *Tales of St. Bernard* (1829); the novel *Marston* (1846); and the poem *The Modern Orlando* (1846). He was an imitator of the grandiose style of Byron and Moore, yet *Salathiel* (1829), his chief publication, contains many effective scenes and is still good reading. It was reprinted in New York in 1901 as *Tarry Thou till I Come*.

CROLY, JANE CUNNINGHAM (1831–1901). An American author and journalist, better known as JENNIE JUNE. She was born in England, came to the United States when a girl, and at an early age became a contributor to newspapers and magazines. She called the first congresses of women in the United States in 1856 and 1869, organized Sorosis in 1868, founded the New York Woman's Press Club in 1889, and in 1892 became professor of journalism and literature in the Rutgers Women's College. She was married to David G. Croly in 1856. Her works include: *For Better or Worse* (1875); *Jennie Juneiana: Talks on Women's Topics* (1864); *Cookery-Book for Young Housekeepers* (1866); *Knitting and Crochet* (1885); *Thrown on her Own Resources* (1891); *History of the Woman's-Club Movement in America* (1898 and 1900). She was the editor of *Demorest's Magazine* from 1860 to 1887, and later was editor of the *Cycle* (which she founded) and the *Home-Maker*. Consult *Memories of Jane Cunningham Croly, "Jennie June"* (New York, 1904).

CRO-MAGNON, krō'mâ'nyôn'. A type of mankind supposed to have inhabited southwestern Europe at the end of the Magdalenian epoch, at the close of the Pleistocene. They were marked by the most dolichocephalic of crania, elongated at the back (index, 63–74.8), with low face and orbits, but by good stature. In 1858 workmen unearthed, in the cave called "Cro-Magnon," near Les Eyzies, in the Department of Dordogne, France, imperfect skeletons of three men, two women, and a child. A peasant found a human bone in a rabbit hole, and at the Cave of Aurignac the remains of 17 persons were recovered. At Laugerie Basse, in the Vézère valley, another discovery was made. In the Cave of Baumes Chaudes, in Lozère, 35 crania were collected, all of this long, low-faced type. To this type, wherever found, the name of Cro-Magnon is given. Consult: Mortillet, *Le préhistorique* (Paris, 1882); Deniker, *Races of Man* (London, 1900); Ripley, *The Races of Europe* (New York, 1899); and, for critical observations, Sergi, *The Mediterranean Race* (London, 1901); Obermaier, *Der Mensch der Vorzeit* (1912); Keith, *Ancient Types of Man* (1912). See MAN.

CROMARTY FIRTH, krŏm'ĕr-tĭ fĕrth (from Gael. *crom*, OIr. *cromb*, Welsh *crwm*, Bret. *crum*, crooked + OIr. *art*. Gall. *artos*, stone, and *firth*, *frith*, from Icel. *fjörþr*, ford; ultimately connected with Lat. *portus*, port, Skt. *par*, to cross). A landlocked inlet of the North Sea, on the northeast coast of Scotland, just northwest of the Moray Firth, 18 miles long, 3 to 5 miles broad, and 5 to 35 fathoms deep (Map: Scotland, D 2). The entrance is between the North and South Soutars, two high wooded headlands, and is 1½ miles across, with 12 to 30 fathoms of water, and with the Three Kings Reef about half a mile off land. Near the firth are the towns of Dingwall, Invergordon, and Cromarty. In the red sandstone, near the entrance, Hugh Miller discovered the fossil fishes *Pterichthys*, *Osteolepis*, etc.

CROMARTYSHIRE. See ROSS AND CROMARTY.

CROM'DALE (from Gael. *crom*, crooked + Eng. *dale*). A village in Inverness-shire, Scotland, on the east bank of the Spey. It was the scene of a battle fought May 1, 1690, between the Scottish Jacobites and 800 of William III's troops, in which the latter were victorious. The event is celebrated in a song entitled "The Haughs of Cromdale."

CROME, JOHN (1768–1821). An eminent English landscape painter and etcher, founder of the Norwich school. He is usually called "Old Crome," to distinguish him from his son of the same name. Born on Dec. 22, 1768, he passed his youth in humble circumstances, acquiring his taste for painting during an apprenticeship to a sign painter. Together with Robert Ladbrook, a printer's apprentice, he rented a garret and started upon his career as a painter. The two artists spent their leisure time sketching in the field, endeavoring to reproduce nature exactly. Crome's pictures thus became "exact views" of the places he loved. His technique is reminiscent of the Dutch masters, whom he studied in the houses of the Norfolk gentry, in his capacity as a drawing teacher, and in a visit to Paris. Hobbema, in especial, was his favorite master; but the foundation of Crome's art was a genuine English realism, and his pictures combine great breadth with delicacy of color and lightness of brushwork, and although they are occasionally marred by overattention to detail, they always contain a true feeling for light and air. He painted trees with great force and individuality. His "Oak at Poringlam," in the National Gallery, and the "Willow" are highest masterpieces of their kind. His works are mostly in private possession, especially among the gentry of Norfolk. The National Gallery contains three good examples, "Household Heath" and "Chapel Fields, Norwich," besides the one already mentioned. In the Metropolitan Museum of Art, New York, are two good examples, "Hautbois Common" and "The Old Oak." His favorite subjects were taken from the scenery about his native home, but he was capable of adapting himself to the livelier tones of French landscape, as is indicated in his "Fishmarket at Boulogne" and his "Boulevard des Italiens, Paris," both in Keswich Hall near Norwich. Although he followed etching as a pastime only, he was an excellent etcher, working with great care and detail, though sometimes not

achieving tone and atmosphere. His etchings were published after his death, in 1834, under the title of *Norfolk Picturesque Scenery* and again in 1838 and 1850. Crome seldom exhibited in London, but he displayed at different times no less than 288 pictures in the Norwich Society of Artists. This society he himself founded in 1803, becoming its president in 1808. He died, April 22, 1821, at Norwich, where nearly all of his life had been passed. Consult his biography by Turner (Norwich, 1838), Wodderspoon (ib., 1858), and Hardie, in the *Connoisseur* (London, 1904); also Van Dyck, *Old English Masters* (New York, 1902); Dickes, *The Norwich School of Painting* (London, 1905); Binyon, *J. Crome and J. S. Cotman* (ib., 1906); Theobald, *John Crome's Etchings* (ib., 1906).

CROME, John Berney (1794–1842). An English landscape painter, son and pupil of John Crome, usually called "Young Crome." He was born in Norwich and was appointed president of the Norwich Society of Artists in 1819. He painted usually coast and river scenes of England, France, Holland, and Italy, and his best pictures are so like those of his father that his "Yarmouth Water Frolic" (1821) was long considered Old Crome's masterpiece. Towards the end of his life his art degenerated, and he produced little besides potboilers, including many moonlight effects. Consult W. F. Dickes, *The Norwich School of Painting* (London, 1905).

CRO'MER. A seaport and watering place on the north coast of Norfolk, England, 21 miles north of Norwich (Map: England, H 4). It stands on the top of one of the highest cliffs on the coast. Nearly all the old town, called "Shipden," with one of the churches, was swept away by the sea about the year 1500. As the sea is encroaching on the land, vessels have to load and unload on the open beach. In 1825 some cliffs 200 feet high fell into the sea. Seamen call Cromer Bay the Devil's Throat, from its dangers to navigation. There is an excellent golf course in the neighborhood. Pop., 1901, 3781; 1911, 4073.

CROMER, Evelyn Baring, first Earl (1841–1917). An English diplomatist and administrator, born at Cromer Hall, Norfolk, and educated at Woolwich Academy. After a brilliant career in the Royal Artillery, he was private secretary to the Earl of Northbrook, Governor-General of India, from 1872 to 1876; was Commissioner on the Egyptian public debt from 1877 to 1879; was Controller General of Egyptian finances from 1879 to 1880; was Finance Minister of India from 1880 to 1883, when he became Consul General and Agent in Egypt. He was created first Baron Cromer in 1892, Viscount in 1898, and Earl in 1901. He became virtually British Viceroy of Egypt, and his efficient administration won for him the appellation of "Maker of Modern Egypt." He rescued it from bankruptcy, replaced corrupt administrators by honest officials, reduced taxes, reformed the army, increased trade, and greatly extended railway, postal, and telegraph facilities. He resigned in 1907 and returned to England, where in 1911 he was active in securing Unionist votes for the passage of the Parliament Bill, so as to prevent the creation of new peers. He wrote *Modern Egypt* (1908) and *Ancient and Modern Imperialism* (1910).

CROMER, Martin (1512–89). A Polish historian and geographer, born at Biecz, near Cracow, and educated at the academy in that city. He was secretary to the eldest son of King Sigismund I and was intrusted with diplomatic missions to Pope Paul V and to the emperors Charles V and Ferdinand I. In 1578 he was appointed Bishop of Ermeland. His history of Poland, from its beginning to the year 1506, *De Origine et Rebus Gestis Polonorum* (1555; frequently reprinted), is a valuable source of information on this subject. Another important work is the geographical and statistical publication *Polonia* (in Latin, 1586; Ger. trans., 1741).

CROMLECH, krŏm'lĕk. See Dolmen.

CROMP'TON. A town in Lancashire, England, 3 miles northeast of Oldham, and 11 miles northeast of Manchester. It has important cotton manufactures and collieries. Pop., 1901, 13,427; 1911, 14,750.

CROMPTON, Samuel (1753–1827). An English inventor, whose spinning mule revolutionized the cotton-weaving industry. In his youth he was largely occupied with weaving at home, and it was the dissatisfaction caused by the machine he used that led to the perfection of his invention in 1779. Unable to bear the expense of taking out a patent, he exploited his machine by private arrangement with manufacturers, some of whom later denied their obligations to him, so that for his valuable invention he received less than £70. In 1812, after much labor, he secured from the House of Commons a grant of £5000, the only official recognition bestowed upon him. Consult French, *Life and Times of Crompton* (London, 1860).

CROMPTON'S SPINNER. See Spinning.

CROM'WELL. A dramatic work by Victor Hugo (1827). It was not intended for the stage. The preface to its first edition has since become famous as containing the breviary of French dramatic "Romanticism."

CROMWELL, Bartlett Jefferson (1840–). An American naval officer, born near Springplace, Ga. He attended the Naval Academy (1857–60). During the Civil War he served in the South Atlantic blockading and Eastern Gulf squadrons, and rose to the rank of lieutenant commander. He was promoted commander in 1874, and as such was intrusted with the navigation of the flagship *Ticonderoga* during Admiral Schufeldt's voyage around the world in 1879–81. He thereafter successively became captain in 1889, commodore in 1898, and rear admiral in 1899. After the liberation of Cuba from Spain Cromwell was ordered to take charge of the naval station at Havana. In 1901 he was appointed to the command of the United States fleet in South American waters. In addition to his service at sea, Cromwell was inspector of ordnance at the Philadelphia navy yard (1874–78), at the Portsmouth navy yard (1882–84), and captain of the Norfolk navy yard (1891–94). He retired in 1902.

CROMWELL, Henry (1628–74). The fourth son of Oliver Cromwell. At the age of 16 he served as a soldier in the Parliamentary army. In the Barebones Parliament he was one of the six Irish members. In 1655 he went to Ireland as a major general, and was appointed Lord Lieutenant in 1657. His rule was popular, and his moderation to Royalists received the approval of Charles II, who at the Restoration confirmed his Irish estates under the Act of Settlement. His latter years were passed as

a farmer on his estate, Spenway Abbey, in Cambridgeshire. He died March 23, 1674. His great-grandson, the last representative of the house of Cromwell, died in 1821.

CROMWELL, Oliver (1599–1658). Lord Protector of England. He was born at Huntingdon, April 25, 1599, and was the only surviving son and heir of Robert Cromwell and Elizabeth, daughter of William Steward, whose family, tradition notwithstanding, has no connection with the royal house of Stuart. The Cromwell family sprang from Katherine, who was the sister of Thomas Cromwell, the Hammer of the Monks, and who married Morgan Williams, a Welsh brewer of means. Their son Richard took the surname Cromwell and, profiting by his uncle's influence, rose to wealth and honor in the service of Henry VIII, retaining his sovereign's favor even after his uncle's fall in 1540. The family continued to be prominent from that time and was noted for its lavish entertainment of royalty, but, owing to the extravagance of Oliver's uncle of the same name, the fortunes of the family had been squandered, and in 1627 the family seat at Hinchinbrook was sold to Sir Sidney Montague. Oliver's father was the second son of Henry, the Golden Knight, and the grandson of Richard (Williams) Cromwell, and he therefore represents a younger branch of the family, whose income was never large.

Little is known of Cromwell's early life. He was educated at the free school of Huntingdon under Dr. Thomas Beard, an austere Puritan. In 1616 he entered Sidney Sussex College at Cambridge, a stronghold of Puritanism, but soon withdrew, probably owing to his father's death, in 1617. There is no foundation for the reports by royalist biographers of wildness and profligacy in his early years, though he was boisterous and only moderately successful at his studies. He probably studied law for a short time at Lincoln's Inn. In 1620 he married Elizabeth Bourchier, daughter of a London merchant, and she seems to have brought him a considerable dowry. The few glimpses that we have of his life before the beginning of his active public career, which may be said to date from the meeting of the Long Parliament in 1640, leave no doubt as to which side he would espouse in the approaching struggle. For some years he was in the throes of a religious conflict, from which he emerged in a triumphant conversion. Throughout the rest of his life he was deeply religious, an ardent though tolerant Puritan. The earliest letter from his pen which has come down to us (1636) is a solicitation for a subscription to maintain a lectureship, by which means the Puritans supported preachers, owing to the neglect of this function by the established clergy. He was elected to the Parliament of 1628, where his only recorded speech is directed against the opponents of Puritanism. He watched the career of Gustavus Adolphus with eager sympathy, and it is thought that his own early military successes were in part a result of his careful study of Gustavus Adolphus' campaigns. He took less interest in purely political matters, but we know of three instances where he championed the poorer inhabitants of his districts whose rights of pasturage were threatened. He was fined £10 in 1630 for having neglected to be knighted, but we have no record of his having resisted the forced loan or the payment of ship money. Yet there can be no doubt that he was dissatisfied with Charles's arbitrary rule, and there is a tradition which corresponds well with circumstances, that he once intended to emigrate to New England. If this is true, it was probably between 1631 and 1636, and it may have been prevented by a legacy which fell to him in the latter year. He was elected to the Short Parliament in 1640 and to the Long Parliament in the same year.

Cromwell played a subordinate part in the deliberations of the Long Parliament. He had no share in the impeachment of Strafford. He was rather more interested in the constitutional reforms, but most of all in ecclesiastical matters, and joined Sir Henry Vane and Hampden in demanding the abolition of the episcopacy, "root and branch." On the outbreak of the Irish insurrection of 1641 it was he who proposed that Parliament should assume control of the militia. When the Civil War broke out in 1642, he was very active in securing the authority of Parliament in the eastern counties and commanded a troop of horse in the battle of Edgehill, Oct. 23, 1642. In 1643 the war everywhere went against Parliament except in the Eastern Association, where Cromwell not only kept the Royalists at bay, but even gained ground. His one troop had grown to 10, and afterward grew to 14, forming two regiments of the best-drilled cavalry in England. For his services in the Eastern Association Parliament made him lieutenant general of the army of the Eastern Association (1644), and appointed him a member of the committee of both kingdoms. In the battle of Marston Moor, July 2, 1644, he commanded the Parliamentary horse, whose final charge decided the fortunes of the day. Hitherto the Parliamentarians had been inferior in cavalry, whose military importance was greater in those days than now. It was due to Cromwell that this inferiority was overcome. It is at about this time that the division of the Puritans into two parties clearly appears. The Presbyterians, who were largely in the majority in Parliament, were alarmed at the growth of religious sects in the army, and they were anxious for an accommodation with Charles in order to be free to suppress Independency. The army, on the other hand, had become the stronghold of Independency and desired religious toleration and a vigorous prosecution of the war. Cromwell was the spokesman of the party of toleration. He impeached Manchester for half-heartedness in the prosecution of the campaign and found support with the Commons, but not with the Lords. He then disinterestedly proposed the reorganization of the army under new leaders, and on the adoption of the New Model (q.v.), and the Self-Denying Ordinance (q.v.), assumed that his military career was over. On the contrary, he was appointed lieutenant general in command of the cavalry, and by a charge of the Parliamentary horse decided the day at Naseby, the last battle of the First Civil War, June 14, 1645. The distrust between the Presbyterian Parliament and the Independent army became an open breach when the Parliament not only proposed to disband the army without paying the arrears due to the men, but made overtures to Charles which seemed to the army a surrender of what they had been fighting for. Cromwell, now the recognized leader of the army, hesitated, as was his wont, and tried to mediate between the two parties,

but in the end threw in his lot with the army. It was he who ordered the abduction of the King from Holmby. In the Second Civil War, a consequence of this rupture, in which the King played off one party against the other, Cromwell defeated the Scots under Hamilton, who were over twice his number, in a remarkable three days' battle near Preston, Aug. 17–19, 1648. The army now clamored for the life of the King, whose duplicity had caused the renewal of the war. For a time Cromwell held back, but when his mind was once made up no legal technicality could stop him. "I tell you we will cut off his head with his crown upon it," he cried roughly, in answer to an argument denying the jurisdiction of the High Court of Justice. He had nothing to do with Pride's Purge, being absent at the time, but he accepted the result of it, and was foremost in all the events leading up to the King's execution (Jan. 30, 1649).

On the abolition of the monarchy the position of the Commonwealth was extremely perilous. It was torn asunder by partisan strife, and it was without a friend in Europe. Scotland, alienated by the execution of the King and hostile to the dominant Independent and Military party, proclaimed Charles II King, not only of Scotland, but of England and Ireland as well. Ireland demanded immediate attention, for the Second Civil War had its counterpart there, and a coalition of the various parties had all but driven the Parliamentary forces out of the island. Cromwell accepted the command of the forces destined for its reconquest on March 30, 1649, and landed at Dublin, August 15, with three regiments. At Drogheda, "being in the heat of action," he ordered the famous massacre of the garrison of 2800 men, which had refused to capitulate (September). This was in accordance with the strict rules of war of the time, though it had not been put into practice in England. Cromwell explained that it was a just punishment for the outrages of 1641, which he looked upon as entirely wanton and without provocation. The immediate military effect of the massacre was advantageous, since for a time town after town surrendered with little resistance, but its unfortunate political effect lasts until the present day. At Wexford there was another massacre, though not by Cromwell's order. In May, 1650, the resistance was so nearly broken that Cromwell left the completion of the conquest to his successors, Ireton and Ludlow, and hastened back to confront the danger from the side of Scotland. He swept away with impatience Fairfax's legal objection that the Scots had a right to choose their own King, for he saw clearly that England must either coerce the Scots or be coerced by them. He defeated one Scottish army at Dunbar, Sept. 3, 1650, and another, commanded by Charles II in person, exactly one year later at Worcester. While he had to be on his guard from this time forth against plots and uprisings, Worcester marks the end of armed resistance to the Republic. He brought Scotland and Ireland (or the Protestant part of Ireland) into legislative union with England, the first union of the three kingdoms, and gave them free trade and a better administration of justice, but the taxes to support the English garrisons were heavy. In addition, Ireland groaned under the attempt to transplant her Catholic population, or, as the plan was afterward modified, her Catholic landowners, to the wilds of Connaught in order to make way for English settlers. Cromwell's treatment of Ireland was pitifully harsh, but it was caused principally by his complete ignorance of Irish affairs, though his ignorance was not greater than that of his countrymen.

The problem which now confronted the leaders of the Commonwealth was the substitution of a permanent constitutional government in the place of the provisional Rump. The withdrawal of the Cavalier party on the outbreak of the Civil War, and the expulsion of the Presbyterian members in the Pride's Purge, had left only 60 or 70 members in habitual attendance in Parliament, whose power depended solely upon the support of the victorious army. Not only had they made themselves very unpopular by their harsh measures, but they refused to give way to a newly elected and more truly representative Parliament which the army desired, unless they were made members of the new Parliament without election, and clothed with power to exclude undesirable new members, especially those of Royalist sympathies. In the course of the prolonged dispute they were guilty of what Cromwell considered a breach of good faith, whereupon he angrily expelled them on April 20, 1653, to the great satisfaction of the English nation. But with them went the last vestige of civil authority in the land, and England was left face to face with the army—a state of affairs which, in view of the well-known English detestation of military rule, could not long endure. Under the influence of Harrison and the extreme Puritans he called on the various Congregational churches to nominate members for a Parliament, which resulted in the Nominated or Barebones Parliament (q.v.) of 149 members (of whom four represented Scotland and six Ireland). This Parliament soon showed such a readiness to adopt radical and impossible measures, and was so torn asunder by party strife, that when the Moderates rose, early on the morning of Dec. 12, 1653, and voted its dissolution, Cromwell was greatly relieved, though he had no previous knowledge of the conspiracy. The officers thereupon adopted a written constitution, called the *Instrument of Government* (q.v.), which is of great interest from the point of view of constitutional history, under which Cromwell, on December 16, assumed the title of Protector. An elected Parliament of one House was provided for, whose powers were defined by the Instrument. The first Parliament which met under its provisions, on Sept. 3, 1654, is of great importance to a correct understanding of the Protector's treatment of his parliaments. He invited a revision of the Instrument, but in the debates on it the Parliament showed signs of making itself perpetual, of taking away liberty of conscience, and of reducing both the army and the Protector to its exclusive control, thus breaking down the balance of power between the Protector and Parliament which the Instrument had sought to establish. Cromwell interfered by force and excluded from the House all who refused to sign an agreement not to alter the Instrument in these "four fundamentals." This incident is crucial in the appreciation of Cromwell's parliamentary difficulty. The leaders of the popular party failed to understand that government by consent of

OLIVER CROMWELL

FROM AN ENGRAVING BY JAMES CALDWELL AFTER A PAINTING BY ROBERT WALKER

the people meant the return of the Stuarts and that the sole salvation of the Commonwealth lay in a strong executive backed by the army. Furthermore, his demands were moderate, for, says Mr. Gardiner, "his *four fundamentals* have been accepted by the nation and are at this day as firmly rooted in its conscience as parliamentary supremacy itself." Cromwell dissolved the Parliament without coming to an agreement with it and without receiving the necessary supplies. In the year following, Penruddock's rising drove the Protector to acts as illegal as any of which Charles I had been guilty. He divided England into 10 military districts, over which he placed major generals, with extensive police powers backed by military force, the estates of Royalists being taxed by his own arbitrary power to support the scheme. It was a success as a police measure, but the nation groaned when Cromwell used this method to enforce a stricter standard of Puritan morality than the people were ready to accept. The foreign wars made new supplies necessary, and in 1656 the Protector called his last Parliament, from which his council first excluded 100 undesirable members. Upon the discovery of a plot against the Protector's life, Parliament drew up a new constitution called the *Humble Petition and Advice*, providing for an Upper House and offering Cromwell the title of King. Cromwell hesitated for some weeks, but, finding the title unpopular with the army, he at last declined it. The *Petition and Advice* was then passed with the title Protector substituted for that of King, and was adopted in place of the *Instrument of Government*. Upon the second session of the Parliament in January, 1658, it was found that the promotion of Cromwell's supporters to the Upper House had given the Republicans a majority in the Lower House. They not only insisted upon revising the constitution anew, but were forming conspiracies of a dangerous sort, whereupon Cromwell dissolved them, February 4. He had failed to transform the military into a civil state.

The vigor with which Cromwell conducted England's foreign affairs has been much admired. He had little to do with the Dutch War, which he disliked as a war against a Protestant power. This he brought to a successful conclusion, April 5, 1654. The two leading nations of Europe were at war and bidding for his alliance. He was at first inclined to favor Spain, partly from his sympathy for the French Huguenots and partly because France supported Henrietta Maria and the Stuart cause. Spain, however, had prohibited English ships from sailing in West Indian waters, even though bound for an English colony. In December, 1654, Cromwell sent out a badly equipped expedition under Penn and Venables, which suffered a disastrous repulse in an attack against Santo Domingo, but seized Jamaica, whose importance was little appreciated at that time. This attack naturally precipitated a war with Spain in Europe in which Blake, having previously brought the Bey of Tunis to terms (April 4, 1655), destroyed one Spanish treasure fleet at sea (Sept. 8, 1656) and sank another in the harbor of Cadiz (April 20, 1657). Two treaties were signed with France—the first on Oct. 24, 1655, providing for the expulsion of the Stuarts from French territory; the second on March 23, 1657, providing for a joint attack upon the Spanish Netherlands, in which the English greatly distinguished themselves before Dunkirk, in the battle of the Dunes, June, 1658, and secured Mardick and Dunkirk as their share of the spoils. But while Cromwell succeeded by force of arms in making England universally feared, he was very ignorant of European politics and his aims were faulty. He was completely under the illusion that the Catholic powers were on the point of combining to crush Protestantism, and he was constantly negotiating with Charles X of Sweden, whom he erroneously regarded as a second Gustavus Adolphus, to form a counter Protestant league, not knowing that it was impossible to reconcile, for religious purposes, either Sweden and Holland on the one hand, or France and Spain on the other. Moreover, in allying with France against Spain he did much to prepare the way for Louis XIV and the period of French aggression in Europe. Nor should it be forgotten that his foreign enterprises greatly increased the burdens of a heavy taxation which alienated the people of England from his rule. He died on Sept. 3, 1658.

In 1899 Parliament erected a statue to Cromwell in Westminster, facing Whitehall. The debates which the erection of this tardy memorial to the great Puritan leader occasioned in Parliament show how vital to many Englishmen are, even yet, the principles for which their forefathers struggled in the period of the Great Civil War.

Bibliography. The chief source of information in forming an estimate of Cromwell's character will always be his own words, first collected by Carlyle, *Letters and Speeches of Oliver Cromwell* (London, 1845). The speeches are to be found in Stainer, *Speeches of Oliver Cromwell, 1644–58* (ib., 1901). His parliamentary career is to be followed in *Parliamentary History*, vols. ix-xxi (ib., 1760–62), together with the numerous memoirs, of which those of Whitelock and Ludlow deserve special mention. The *Calendars of State Papers, Domestic Series*, together with the great collections of Rushworth, Clarendon, Somers, and Carte, are rich mines of material, while the *Thurloe State Papers* (ib., 1742) contain the greater part of the diplomatic correspondence. Gardiner, *Constitutional Documents of the Puritan Revolution* (ib., 1899), is invaluable. Of the older writers, Guizot and Ranke are still useful, but they are largely superseded by the great works of Gardiner, *History of England, 1603–42* (10 vols., London and New York, 1883–84); *The Great Civil War* (ib., 1893); and the *History of the Commonwealth and Protectorate* (ib., 1894–1901). Gardiner has summarized the results of his researches in *Cromwell's Place in History* (ib., 1897) and *Oliver Cromwell* (London, 1901). Hardly inferior to Gardiner's work is Firth, *Oliver Cromwell and the Rule of the Puritans in England* (London and New York, 1900). The biographies by Harrison (London, 1888) and Morley (New York, 1900) are brilliant, but hardly of equal value. The *Oliver Cromwell* of Theodore Roosevelt (ib., 1900) is brief and readable. Gardiner and Mullinger, *Introduction to the Study of English History*, part ii (London, 1894), contains an account of the literature of the period, both contemporary and modern. Later works include: Marshall, *Story of Oliver Cromwell* (New York, 1908); Rhodes, "A New Estimate of Cromwell," in his *Historical Essays* (ib., 1909); Firth, *The Last*

Years of the Protectorate (London, 1909); Wilkinson, "A Narrative of the Circumstances Concerning the Head of Oliver Cromwell," in the *Archæological Journal*, vol. lxviii (ib., 1911); Larned, *A Study of Greatness in Men* (Boston, 1911); Johnstone, *Oliver Cromwell* (London, 1912); Marshall, *Through Great Britain and Ireland with Cromwell* (New York, 1912).

CROMWELL, Richard (1626–1712). Lord Protector of England. The third and eldest surviving son of Oliver Cromwell; he was born at Huntingdon, Oct. 4, 1626. When Oliver became Protector, he wished to train his son as his successor. Richard entered Parliament, was appointed one of the Committee of Trade, and became Chancellor of Oxford. But, of an amiable temperament, he was more addicted to pleasure and sport than statecraft, and after his father's death, in 1658, retained the protectorship for not quite nine months, until his willing demission in May, 1659. He lived in retirement on the Continent during 20 years and returned to England in 1680. Richard was of a peaceful, bucolic temperament that little fitted him to play his part in stirring times. He died at Cheshunt, July 12, 1712. Consult Guizot, *History of England under Richard Cromwell* (London, 1856).

CROMWELL, Thomas, Earl of Essex (c.1485–1540). An English statesman and Henry VIII's prime agent in effecting the Reformation. He was born at Putney, near London, where his father, a man of peculiarly evil character, engaged in the varied pursuits of blacksmith, brewer, innkeeper, fuller, and shearer of cloth. After a meagre education he went to Antwerp as a clerk in a factory and successfully devoted his spare time to learning languages. He spent some time in Italy as a soldier and trader. He returned to England in 1513 and, while following the paternal vocations, developed into a money lender, a lawyer, and an influential citizen. He received a trusted appointment from Cardinal Wolsey and under his patronage entered Parliament, where his able speeches attracted attention. He successfully defended his master against the bill of impeachment; and Henry VIII, appreciating his talent, made him his private secretary. He received a succession of honors, which, after knighthood in 1531, included the Chancellorship of the Exchequer (1533), Mastership of the Rolls and Vicar-ship-General of Ecclesiastical Affairs (1535), the office of Lord Privy Seal (1536), and that of Lord Chamberlain (1539), and culminated in his creation as Earl of Essex in 1540. For seven years, by subservience to the King, he held supreme sway in the royal councils and controlled all the administrative departments. He carried out faithfully the monarch's schemes to establish the Reformation. His methods in suppressing the monasteries earned him the designation of *malleus monachorum*, the 'Hammer of the Monks.' He was very unpopular, and after promoting the marriage of Henry with Anne of Cleves, the King's aversion to the Queen was extended to the instigator of the union. Henry assented to a bill of attainder for treason on a long list of offenses, and, after a piteous entreaty for mercy, Cromwell was beheaded on July 28, 1540. Froude praises his character. Dixon calls him "the worst enemy the Church of England ever had." Consult: Drayton, *Historie of the Life and Death of the Lord Cromwell* (London, 1609); Hook, *Lives of the Archbishops of Canterbury*, vol. vi (ib., 1868); Froude, *History of England* (ib., 1881–82); Merriman, *Life and Letters of Thomas Cromwell* (Oxford, 1902); *Van Dyke, Renascence Portraits* (New York, 1905); Dixon, *History of the Church of England*, vol. i (London, 1884–1902); Gairdner, *The English Church in the Sixteenth Century* (ib., 1902).

CROMWELL, The Life and Death of Thomas, Lord. A play of unknown authorship, once attributed to Shakespeare, and entered at Stationers' Hall in 1602. It was founded on the tragic fate of the Earl of Essex. See Cromwell, Thomas.

CRONACA, krō'nä-kä, It. See Pollaiuolo, Simone del.

CRONEGK, krō'nĕk, Johann Friedrich, Baron von (1731–58). A promising young German dramatist of the pre-Lessing period. He was born at Ansbach (in the principality of that name), was educated at Leipzig, where he came under Gellert's influence, and at Halle, and in 1754 received the title of *Hofrat*. His best-known work is his tragedy *Codrus* (1757), in rhymed Alexandrines—a somewhat rhetorical but sonorous imitation of the French classic manner—which was awarded the prize offered by the Berlin bookseller Nicolai for the best German tragedy. His ode *Der Krieg* (1756) was praised by Lessing. He was among the first to direct German scholarship towards the study of Spanish literature. Consult the biography by Gensel (Leipzig, 1894).

CRONENBERG, krō'nen-bĕrk. See Kronenberg.

CRONHOLM, krōn'hōlm, Abraham Peter (1809–79). A Swedish historian. He was born at Landskrona, was educated at Lund, and in 1849 became professor of history in that city. His works, which are based upon a careful personal study of the archives of Stockholm, Copenhagen, Berlin, Dresden, Vienna, and of other leading European cities, include the following: *Fornnordiska Minnen* (1833–35); *Katholska Ligan och Huguenotterna* (1839); *Skånes politiska historia* (1847–51); *Sveriges historia under Gustaf II Adolphs regering* (1857–72).

CRONJE, krōn'ye, Pietrus Arnoldus (1835–1911). A Boer soldier. In the campaign of 1881 against England he distinguished himself at Doornkop and at Majuba Hill, where he was second in command. In 1896 he captured the raiders led by Dr. Jameson into the Transvaal. At the outbreak of the war against England in 1899 he was stationed with 6000 troops on the western frontier. At Modder River (November 28) he fought an indecisive battle with Lord Methuen, who was marching with his division to the relief of Kimberley, in which he inflicted terrible loss on the enemy, and at Magersfontein (December 11) he won a brilliant victory over the same general. Immediately upon the beginning of Lord Roberts's invasion of the Orange Free State, in 1900, he sent a portion of his army to the north, and with the remainder sought to oppose the English advance on Pretoria. At last surrounded, he intrenched himself at Paardeberg and, under a scathing artillery fire, sustained that position until the failure of food and ammunition compelled him to surrender, with some 4000 troops and six guns, on February 27, the anniversary of Majuba Hill. He was thereupon sent as a prisoner of war to St. Helena. He was one of the most sagacious of the Boer leaders and was a member of the Executive Council of the Transvaal. In 1905

he was forced by poverty to appear in the United States in a mimic war.

CRON'OS. See SATURN.

CRONSTADT, krŏn'stȧt. See KRONSTADT.

CROOK, krụk. A coal-mining town in Durham, England, 4½ miles northwest of Bishop Auckland. Pop., 1901, 11,470; 1911, 12,308.

CROOK (ME. *croke, crok,* Icel. *krōkr,* hook). In musical instruments, such as the French horn or trumpet, a circular tube, which fits into the end of the instrument next the mouthpiece, for the purpose of lengthening the tube of the instrument and thus altering the pitch to suit the key of the music. These crooks save the player the great inconvenience of carrying as many instruments as there are keys in which he is to play.

CROOK, GEORGE (1828–90). An American soldier, born near Dayton, Ohio. He graduated at West Point in 1852 and spent the next nine years in California. He became colonel of the Thirty-eighth Ohio Volunteers and captain of the Fourth Infantry in the Federal army in 1861, served throughout the Civil War, and in March, 1865, was brevetted brigadier general and major general for services during the war. In March and April, 1865, he was in command of the cavalry of the Army of the Potomac. In 1866, as lieutenant colonel in the regular army, he was sent to Idaho, where he remained until 1872, in almost constant warfare with the Indians there. He subdued the tribes in Arizona in 1872 and in 1875–77 completely crushed the power of those in the Northwest, after Custer's defeat at their hands. He protected the Apaches (1882) from the encroachments of the Mormons and others on their lands, and defeated the Chiricahuas in 1883. Obtaining sole charge of all the tribes, he encouraged them in their industries and made them self-supporting communities. He was promoted to the rank of brigadier general in 1873 and to that of major general in 1888. From this year until his death he was in command of the Department of the Missouri.

CROOK, ISAAC (1833–). An American clergyman and educator, born at Crossenville, Perry Co., Ohio. In 1859 he graduated from Ohio Wesleyan University, and, having been ordained (1864) to the Methodist Episcopal ministry, he held pastorates in Ohio, Illinois, Michigan, Minnesota, and Kentucky. He was president of the University of the Pacific in 1891–92 and of Ohio University in 1896–98, and chancellor of Nebraska Wesleyan University in 1892–96. After serving for four years as pastor at Ironton, Ohio, he was presiding elder of the Chillicothe District from 1902 to 1908. He is author of *Character Sketch of Hon. C. C. White, of Crete, Nebraska* (1896); *Jonathan Edwards* (1903); *Earnest Expectation* (1905); *John Knox, the Reformer* (1906); *The Great Five* (1907).

CROOKBILL. See WRYBILL.

CROOKED ISLANDS. A group of the Bahamas, consisting of Crooked Island, Acklin Island, Fortune Key, and Castle Island. The largest, Crooked Island, contains 76 square miles (Map: West Indies, D 2). In common with some others of the group, it is valuable chiefly for its salt. Pop., 1911, Acklin Island 1733, Crooked Island 1541. Chief town, Pitt's Town.

CROOKED LAKE. See KEUKA LAKE.

CROOKES, krụks, SIR WILLIAM (1832–1919). An English physicist and chemist, born in London, June 17, 1832. He studied at the Royal College of Chemistry, where he later assisted Hofmann. In 1854 he became superintendent of the meteorological department of the Radcliffe Observatory, Oxford, and in 1855 professor of chemistry at the Chester Training College. After 1859 he was editor and proprietor of the *Chemical News,* which he had founded, and after 1864 he also edited the *Quarterly Journal of Science.* He was foreign secretary of the Royal Society in 1908–12, at various times was president of the Chemical Society, the British Association, and the Institute of Electrical Engineers, and was chosen corresponding member of numerous continental societies. In 1897 he was knighted; in 1907, with Edouard Buchner, he was awarded the Nobel prize for chemistry; and in 1910 the Order of Merit was conferred upon him. He is an authority of the first rank on sanitary questions, especially the disposal of the sewage of towns, and his method of producing extreme vacua rendered incandescent electric lighting a practical possibility. His original researches in chemistry and physics led to the discovery of the metal thallium in 1861. Subsequently he devoted several years to an elaborate investigation on the atomic weight of that element. Among his other discoveries may be mentioned the sodium amalgamation process for separating gold and silver from their ores (1865), and especially his new method for the spectroscopic investigation of substances—one of the numerous and brilliant results of his prolonged studies of "radiant matter." He also devised the radiometer (q.v.) and later the otheoscope, a greatly improved form of the radiometer. Among his publications may be mentioned: *A Practical Handbook of Dyeing and Calico Printing* (2d ed., 1883); an English translation of Wagner's *Chemical Technology* (2d ed., 1894); *Select Methods of Chemical Analysis* (4th ed., 1905); *Diamonds* (1909); papers on spectroscopy and psychic research. His original views on the genesis of the elements may, with the development of knowledge, form an important contribution to chemical philosophy.

CROOKES TUBE. A sealed vessel of glass from which the air has been exhausted and a high vacuum obtained, through which a current from an induction coil or other source of high-potential electricity is passed. A Crookes tube differs from a Geissler tube (q.v.) in the higher degree of its exhaustion and in several important particulars which will appear in the description of its operation given below. The name is derived from Sir William Crookes (q.v.), who was able by his improvements in the Sprengel pump (see AIR PUMP) to obtain vacuum tubes of greater efficiency than those of previous investigators. Crookes was not the inventor of the highly exhausted tube, as Hittorf, of Münster (1869), had performed a number of experiments with tubes having a comparatively high vacuum; but it remained for the English investigator to push the experiments still further and to formulate hypotheses and theories.

A Crookes tube contains two or more electrodes known as the cathodes and anodes. These are formed by platinum wires which pass through the glass walls of the tube and terminate in metallic plates of the material and shape desired for the experiment. The exhaustion is effected by connecting the tube to a mercurial

air pump and then sealing it when the proper point is reached. The terminals are then connected with an induction coil, or other source of high potential, which is set in operation. The important peculiarity of such a vacuum tube noticed by Professor Hittorf consists of a fluorescence (q.v.) or golden-green glow produced on the glass opposite the cathode. There is not the brilliancy of glow that is found throughout the tube as in the Geissler tube, and the rays which produce the fluorescence issue from the surface of the cathode in straight lines normal or perpendicular to that surface, not being bent to follow the shape of the tube, as would be seen in tubes of a less degree of exhaustion. These cathode rays have many other interesting properties. They may be deflected by a magnet, and they cause a number of substances, such as diamonds and rubies, on which they impinge, to become brilliantly phosphorescent; their energy is sufficient to heat to a high temperature a surface on which they fall and can also be exhibited in causing a small wheel with mica vanes, mounted within the tube, to revolve as a result of the impact. Crookes used cathodes of plane, convex, and concave surface, from which the rays would be emitted in beams either parallel, diverging, or converging. After studying these rays and their properties he concluded that the discharge from the cathode represented a new form of matter which he considered as existing in an ultragaseous or radiant state. The most important use of the Crookes tube is for the production of Röntgen rays, or X-rays (q.v.), which are the rays passing out from the tube opposite the cathode. To produce these rays a tube must be employed where the vacuum is adapted to the work in hand, and there are self-regulating tubes on the market in which this property is obtained. In 1913 a tube susceptible of more exact regulation and power, as well as requiring less time of exposure, was devised by W. D. Coolidge, in which the cathode is formed of a tungsten filament maintained at a high temperature through the passage of current from a storage battery. These tubes have a very high vacuum and give a pure electric discharge. The absence of fluorescence is a notable feature. See ELECTRICITY for an account of the passage of a current through rarefied gases.

CROOKES VACUUM. See MATTER, *Theories of Matter*.

CROOKS, GEORGE RICHARD (1822–97). An American Methodist theologian. He was born in Philadelphia and graduated in 1840 from Dickinson College, where he later taught for several years. Between 1848 and 1880 he held pastorates in Philadelphia, Wilmington (Del.), New York City, and Brooklyn (N. Y.); thereafter until his death he was professor of historical theology at Drew Theological Seminary. Professor Crooks, one of the most influential and distinguished Methodist theologians of his time, was instrumental in inducing his church to sanction seminaries as a training for its ministry. He edited the *Methodist* from 1860 to 1875 and published an edition of Butler's *Analogy* (1852); *The Life and Letters of Rev. Dr. John McClintock* (1876); *Sermons* (1885) and *Life* (1890) of Bishop Matthew Simpson; and *The Story of the Christian Church* (1897).

CROOKS, WILLIAM (1852–1921). An English labor leader. He was born in a London poorhouse, was apprenticed to a cooper when he was 14, and became active in the labor-union movement. He was a member of the London County Council after 1892, mayor of Poplar in 1901, was elected to Parliament from Woolwich in 1903, and was reëlected in 1906 and 1910.

CROOKSTON, krŭks'ton. A city and the county seat of Polk Co., Minn., 230 miles west by north of Duluth, on the Red Lake River, which affords abundant water power, and on the Great Northern and the Northern Pacific railroads (Map: Minnesota, A 3). Among noteworthy features are the Government Land Office, Carnegie library, Federal building, courthouse, St. Joseph's Academy, Bethesda Hospital, and the Northwestern School of Agriculture. The city derives a considerable trade from a tributary agricultural country and manufactures lumber, farm machinery, gas engines, castings, sashes and doors, leather goods, furniture, wagons, biscuits, etc. Crookston was incorporated in 1879. The government is administered by a mayor and a council. Pop., 1900, 5359; 1910, 7559.

CROOKSVILLE. A town in Perry Co., Ohio, 64 miles by rail southeast of Columbus, on the Zanesville and Western and the Cleveland, Akron, and Cincinnati railroads (Map: Ohio, F 6). It has large deposits of potter's clay, and there are a number of pottery plants, a crate factory, brickworks, and coal mines. Oil is also produced in considerable quantities. Pop., 1900, 835; 1910, 3028.

CROP'PIES. A derisive nickname given by the Protestant Irish to their Catholic opponents in the time of the English Revolution of 1688. The name was applied to the Irish rebels of 1798 because of their sympathy with the French Revolutionists. The Roundheads were so called in 1642. A factional Irish song called "Croppies Lie Down!" was a favorite with Orangemen.

CROP'SEY, JASPER FRANCIS (1823–1900). An American landscape painter, born at Rossville, N. Y. At first he studied architecture, but he abandoned it to study art and in 1847 visited Italy. He spent seven years in London and exhibited at the Royal Academy. His "Autumn on the Hudson" and "Richmond Hill" were praised by John Ruskin. Cropsey belonged to the so-called Hudson River school (q.v.) and painted mostly views of the White Mountains or the Hudson and English landscapes of similar type. His earlier works were in great demand; they are good in color and show much skill and feeling, of which scarcely a trace remains in his later pictures. Other pictures by him are: "Niagara Falls" (Brooklyn Museum); "Landscape" (Metropolitan Museum, New York); "Lake George," "View near Rome," and "Sunset, Lake George" (New York Public Library); "The Sibyl's Temple"; "High Tom, Rockland Lake." Consult Isham, *History of American Painting* (New York, 1905).

CROQUEMITAINE, krōk'mē'tān' (Fr., from *croquer*, to crunch). A French monster or bogy invoked by nurses to frighten unruly children. In L'Epine's *Légende de Croquemitaine*, Mitaine, a goddaughter of Charlemagne, searches for the castle of Croquemitaine, near Saragossa.

CROQUET. See ROQUE.

CRORE. See LAC.

CROSBY, krōz'bĭ, ALPHEUS (1810–74). An American educator and author. He was born at Sandwich, N. H., graduated at Dartmouth in 1827, and studied theology at Andover from 1831 to 1832. He became professor of Latin and Greek at Dartmouth in 1833 and of Greek

only in 1837. From 1857 to 1865 he was principal of the Salem (Mass.) Normal School. He published an edition of the *Anabasis; The Second Advent* (1850); *First Lessons in Geometry* (1851); *A Compendious Grammar of the Greek Language* (1871); *Greek Tables* (rev. ed., 1871); *Greek Lessons* (rev. ed., 1872).

CROSBY, ERNEST HOWARD (1856–1907). An American reformer and author, born in New York City. He was educated at New York University and the Columbia Law School. While a member of the State Assembly (1887–89), he introduced three high-license bills, all vetoed by the Governor. From 1889 to 1894 he was judge of the Court of the First Instance at Alexandria, Egypt. He became an exponent of the theories of Count Tolstoy, whom he visited before his return to America; his relations with the great Russian later ripened into intimate friendship, and he devoted himself in America largely to promulgating Tolstoy's ideas of universal peace. His book, *Plain Talk in Psalm and Parable* (1899), was widely commended by such writers as Björnson, Kropotkin, and Zangwill. He is also author of *Captain Jinks, Hero* (1902); *Swords and Plowshares* (1902); *Tolstoy and his Message* (1903; 2d ed., 1904); *Tolstoy as a Schoolmaster* (1904); *Garrison, the Non-Resistant* (1905); *Broad-Cast* (1905); *Labor and Neighbor* (1908).

CROSBY, FANNY (MRS. FRANCES JANE VAN ALSTYNE) (1820–1915). An American hymn writer, born at South East, Putnam Co., N. Y. She lost her eyesight when an infant six weeks old. After attending the Institution for the Blind, in New York City, for nine years, she became instructor in Greek and Roman history and in various other branches at that institution, until her marriage to Alexander Van Alstyne in 1858. Some of her several thousand hymns are contained in Moody and Sankey's *Gospel Hymns* and in Mr. Sankey's *Sacred Songs and Solos.* Among her best-known verses are: "Safe in the Arms of Jesus"; "Pass Me Not, O Gentle Saviour"; "Jesus is Calling"; and "I am Thine, O Lord." Her songs include the well-known "There's Music in the Air" and "Hazel Dell." Her secular poems have been published under the titles *The Blind Girl and Other Poems* (1844) and *Bells at Evening and Other Poems* (1898). Consult her *Memories of Eighty Years* (1906).

CROSBY, HOWARD (1826–91). An American Presbyterian clergyman, born in New York City. He graduated at New York University in 1844, was professor of Greek there in 1851–59, and subsequently held the same chair in Rutgers College. He was ordained in 1861 and became pastor of the First Presbyterian Church in New Brunswick, N. J. From 1863 to 1891 he was pastor of the Fourth Avenue Presbyterian Church, New York, and from 1870 to 1881 was chancellor of his alma mater. He was moderator of the General Assembly of 1873. He was instrumental in organizing, and for several years was president of, the Society for the Prevention of Crime and was prominent in his activity against the illegal liquor traffic, but distinguished between temperance and total abstinence. He was a member of the American Committee which revised the New Testament. Besides sermons and addresses, he published: *The Lands of the Moslem* (1851); *Notes on the New Testament* (1863); *Social Hints for Young Christians* (1866); *Jesus: His Life and Works* (1870); *Thoughts on the Pentateuch* (1873); and commentaries on Nehemiah, Joshua, etc.

CROSBY, JOHN SCHUYLER (1839–1914). An American soldier. He was born in Albany Co., N. Y., was educated at New York University, was appointed second lieutenant of the First Artillery in 1861, served throughout the Civil War, and, after being three times brevetted, acted for a time as adjutant general on the staff of General Canby. Subsequently he served as aid, with rank of lieutenant colonel, under Sheridan and Custer against the Indians, and resigned from the army in 1871. He was United States Consul at Florence, Italy, from 1876 to 1882; was Governor of Montana Territory from 1882 to 1884; and from 1884 to 1886, when he resigned, was First Assistant Postmaster-General. In 1889 he served as school commissioner of the city of New York.

CROSBY, PEIRCE (1823–99). An American naval officer. He was born near Chester, Pa., entered the navy in 1838, and in 1861 served in Chesapeake Bay. He participated in the capture of New Orleans and the bombardment of Vicksburg, and in 1863–64 was employed chiefly in blockade duty. In 1864 he was placed in command of the *Metacomet* and participated in the attack on Mobile. He was promoted to be captain in 1868, commanded the South Atlantic squadron, was made rear admiral in 1882, and in 1883 was retired.

CROSBY HALL. A mediæval Gothic dwelling house in London on Bishopsgate Street, built in 1466 by Sir John Crosby. It is the scene of a part of Shakespeare's *Richard III.* Richard of Gloucester lived here for a time, and Sir Thomas More, who purchased the house, wrote his *Utopia* in it. Some of the original chambers still remain. The hall, after having been used for a variety of purposes, is now an eating house.

CRO'SIER (ME. *croser, crocer,* from *cros, crosse, croce,* cross, from Latin *crux,* cross). The pastoral staff of a bishop. Throughout antiquity a hooked or curved staff had been an emblem of civil and particularly of religious authority. The crosier is sometimes regarded as derived from the staff of the Roman augurs. It was adopted by early Christian bishops as a symbol of authority. It took two forms—that of the *tau* (T) with a short transverse top piece, giving the shape of a small *crux commissa,* in which the cross appears as a symbol of the authority by which the bishop ruled; and that of the curved end or volute, imitating the shepherd's crook, emblem of the office of the bishop to keep the Lord's sheep. The tau form seems the earlier, judging from extant monuments, for no records of the crook form exist as early as the Carlovingian period. The tau often ends in the head of a lion, emblem of episcopal power; the crook often impales a serpent or a dragon, symbol of the triumph over evil. Abbots were often

CROSIER.

privileged to carry the crosier, as a symbol of their pastoral office, as early as the fifth century, and long before the other episcopal insignia of mitre and cross were allowed to them. Some of them still retain the *pannisellum* (a small silk veil hanging to the staff), which has long disappeared from those of bishops. Consult: Barraud and Martin, *Le bâton pastoral* (Paris, 1856); Lind, *Ueber den Krummstab* (Vienna, 1863). See COSTUME, ECCLESIASTICAL.

CROSLAND, THOMAS W(ILLIAMS) H(ODGSON). A British editor and author. He became known as a contributor to the *Leeds Mercury* supplement, *Yorkshire Weekly Post, Black and White, Saturday Review, The Gentlewoman, Public Opinion,* and the *Evening Standard.* From 1899 to 1902 he was assistant editor of the *Outlook* (London). In 1905 he became editor of the *English Review,* in 1911 editor of the *Penny Illustrated Paper,* and later assistant editor and director of the *Academy.* His writings include: *The Unspeakable Scot* (1902); *Lovely Woman* (1903); *The Lord of Creation* (1904); *The Enemy* (1904); *The Wild Irishman* (1905); *The Suburbans* (1905); *Red Rose,* verse (1905); *The Country Life* (1906); *The Beautiful Teetotaller* (1907); *English Songs and Ballads* (1907); *Sonnets* (1912); *Taffy Was a Welshman* (1913).

CROS'MAN, HENRIETTA (1870–). An American actress, born at Wheeling, W. Va., Sept. 2, 1870. She made her début in 1889 in *The White Slave* and later was successively under the management of Daly and the Frohmans. In 1897 she was married to Maurice Campbell. In the following year she became a star. Her greatest successes have been her production of George C. Hazleton's *Mistress Nell,* Oct. 9, 1900, in New York, where it ran for over 100 performances, and her Rosalind in *As You Like It* (Feb. 27, 1902), which ran for eight weeks at the Theatre Republic, New York. After this she appeared in many popular successes, including *The Sword of the King* (1902); *Sweet Kitty Bellairs* (1903); *All-of-a-Sudden Peggy* (1906–07); *Sham* (1909); *Anti-Matrimony* (1910); *The Real Thing* (1911).

CROSS (AS. *crūc,* OHG. *crūci, chrūci, chrūze,* Ger. *Kreuz,* Prov. *cros, crotz,* OF. *crois, croix, croiz, cruiz,* Fr. *croix,* It. *croce,* cross, from Lat. *crux,* cross). The cross was a common instrument of capital punishment among the ancients; and the death on the cross was deemed so dishonorable that only slaves and malefactors of the lowest class were subjected to it by the Romans. It was customary to proclaim the name and offense of the person crucified, or to affix to the cross a tablet (*album*) on which name and offense were inscribed. Malefactors were sometimes fastened on a simple upright stake, and so left to die, or they were impaled upon it, and to this upright stake the Latin name *crux* was originally and more strictly applicable; but very generally a crosspiece (*patibulum*) was added to the stake, to which the arms of the criminal were tied, or to which his hands were nailed. The person crucified often lived for days. When the crosspiece was fastened at right angles below the summit of the upright stake, the cross was called *crux immissa* (the Latin cross); the Greek cross, where the crosspiece was set so low as to form four equal or nearly equal arms, is a variant of this form; when the crosspiece was fastened at right angles across the top of the upright stake, the cross was *crux commissa* (also called "cross of St. Anthony"); and when it was formed of two beams crossing one another obliquely, it was *crux decussata* (also called "cross of St. Andrew"). The cross was erected outside the gates of towns, but in places of frequent resort.

It appears that the cross was in use as an emblem, having certain religious and mystic meanings attached to it, long before the Christian era. The Spanish conquerors were astonished to find it an object of religious veneration among the natives of America. But the death of Christ by crucifixion led Christians to regard it with peculiar feelings of veneration and to adopt it as a symbol with express reference to the central fact of their religion. It was seen everywhere in Christian countries, in the home as well as in the church, where it formed an invariable ornament of the altar. The Iconoclastic party contended against the worship of the cross, but the Church, while defining the sense in which worship might be offered to it, condemned their views. Though the word *latreia,* 'adoration,' is used of the veneration paid to the cross, it is explained as only relative, and referred back to the person of the Crucified. This species of veneration, which is sometimes misunderstood on account of the restricted use of the word "worship" in modern English, is solemnly paid in the Roman Catholic church to pieces of the true cross (considered the most sacred of all relics) whenever exposed, and to other crosses, especially on Good Friday. The cross on the high altar, which has been wrapped in a violet covering throughout Passiontide, is unveiled during the singing of the anthem "Behold the wood of the Cross, on which the Saviour of the world hung." It is then laid on the altar steps, and the celebrant and other sacred ministers approach with genuflections and kiss it. After this a smaller cross is offered to the congregation, kneeling at the altar rails, to be kissed. (Consult Cardinal Wiseman, *Lectures on the Offices and Ceremonies of Holy Week,* London, 1839.) The earliest account of the solemn veneration of the cross occurs in the *Peregrinatio Sanctæ Silviæ ad Loca Sancta,* recently discovered by Gamurrini and published in Rome, 1887–88, which describes a pilgrimage to Jerusalem during the episcopate of St. Cyril, probably in the year 384 or 385. The sign of the cross has been made in Christian worship, since the second century at least, as an act of homage to God in remembrance of the Redemption, and of blessing to the person or object over which the sign is made. It is differently made in the Roman Catholic and Eastern churches, and has been disused among most Protestants, as a ceremony of human invention tending to superstition. A cross was in the Middle Ages prefixed to most inscriptions and documents as a sort of consecration, and placed before signatures for the same reason; the latter practice is still retained by Roman Catholic bishops. At the time of the Reformation the use of the cross was discontinued in the Anglican church, but later a reaction in its favor set in. At the present time it is often seen upon the altar of the churches of the Anglican communion and is also frequently carried before the procession of choir and clergy. The Lutheran churches have retained the cross behind the altar, and they occasionally use the sign of the cross in liturgy. This is the authoritative practice in the Anglican

churches at baptism and in the anointing of the monarch at the coronation.

The forms given to crosses in art are endless; but the two leading types are the Latin cross, or *crux immissa*, supposed to be that on which Christ suffered, and the Greek cross, both of which are subject to many fantastic variations. The Greek cross forms the well-known cross of St. George, which, adopted from the legends of that hero, was the national ensign of the English previous to the union with Scotland. (See UNION JACK.) The cross of St. Andrew, according to the legend, was the form of cross on which St. Andrew, the national saint of Scotland, suffered martyrdom. As the Scottish ensign, it is now blended with the cross of St. George in the Union Jack. The Maltese cross, with its eight forked ends, was a form used by the Knights of Malta. It is similar to the crosslet form where small crosses are formed at the ends.

Sanctuary, Boundary, or Monumental Crosses, as they are called, consist of an upright flat pillar, or obelisk, covered with sculptured devices and set in a socket level with the ground. Occasionally they appear to have marked boundaries, but more frequently were monuments over the graves of heroes, kings, bishops, etc. In some instances they probably marked the verge of a sanctuary. The older of these crosses are said to be Scandinavian or Danish, and such are known as *runic crosses*, being inscribed with runes. We are told that the island of Iona at one time possessed 360 crosses, but all are now destroyed or dispersed, except one, called St. Martin's Cross, standing in the grounds of the cathedral. It is a column of compact mica schist, 14 feet high, 18 inches broad, and 6 inches thick, and is fixed in a pedestal formed out of a massive block of red granite, about 3 feet high. In connection with certain ancient religious houses in Ireland, there were some very fine crosses of this kind, the most gigantic and impressive which still exists being that of St. Luke's in the County of Louth. The prominence of such crosses extended to the East, where the Gothic and other tribes of the Caucasus, Georgia, and Armenia also used them prominently in church sculpture and in cemeteries.

Memorial Crosses are those which were erected in memory of some beloved object, or in commemoration of some event of local importance. In England there are some superb crosses of this kind; they are popularly called *Norman crosses*. This species of cross resembled a Gothic turret set on the ground or on a base of a few steps, and was erected by Edward I (1290) in memory of his queen, Eleanor, being placed on the spots where the body rested in its funeral progress to Westminster. Of the 15, three remain—at Geddington, Northampton, and Waltham.

Town or Market Crosses were erected as stands to preach from, or in commemoration of events regarding which it was deemed proper to evoke pious feelings. As these structures were incorporated with or surmounted by a crucifix, the term *cross* was so indelibly associated with them that it survived the religious character of the fabrics. The earliest examples of this kind consisted, probably, of tall crucifixes of wood, such as are still seen by the wayside in some continental countries. Afterward stone shafts would be substituted; and according to the increase of market revenues, or progress of taste, these town crosses assumed that imposing character which they latterly possessed. Of the larger ornamental crosses of this kind, there are some striking specimens in England, such as that at Cheddar in Somersetshire, and that at Malmesbury in Wiltshire; both are open-vaulted structures, with a commodious space beneath, as a refuge for poor market folks during rain, and surmounted with a kind of Gothic turret. At Chichester, Bristol, and Winchester the market crosses, while similar in form, are of a higher architectural quality. Adjoining St. Paul's in London, stood Paul's Cross, a structure which we read of as early as 1259, in the reign of Henry III. It was essentially a town preaching cross and is associated with some interesting occurrences in history. Before this cross the unfortunate Jane Shore, the mistress of Edward IV from 1470 to 1483, was forced to do penance in the reign of Richard III. Here Dr. Shawe, in his infamous sermon, attempted to bastardize the children of Edward and eulogized Richard. In front of this cross sat Cardinal Wolsey to hear fulminations against Luther; and about 10 years later, by order of Henry VIII, preachers here delivered sermons in favor of the Reformation. At this cross Queen Elizabeth attended to hear a thanksgiving sermon for the defeat of the Spanish Armada. Here sermons continued to be delivered until 1643, when, with other so-called relics of popery, it was demolished by order of Parliament. Whatever was the original form of Paul's Cross, it was in later times a plain, pulpit-like fabric of wood, covered with lead.

The Scottish town crosses, while simple, had some distinguishing features. The more simple kind consisted of a shaft of stone, generally octangular in shape, and 12 or more feet in height. At the top was an ornamental capital, which bore a dial and vane, or the figure of a unicorn. The shaft sprang from the top of a graduated flight of circular or octangular steps. A specimen of this species of cross is seen in the market place of Melrose. The grander market cross consisted of a tall stone shaft, such as just described, but instead of having steps it sprang from the centre of an imposing substructure. This structure was circular, hexagonal, or octagonal, and from 10 to 16 feet high. The top formed a platform, which was surrounded with an ornamental stone parapet and was reached by a stair inside. The sides of the building were decorated with pilasters and bore various heraldic and other devices. Such were the crosses of Edinburgh, and such is the renovated cross of Aberdeen, the sides of which, however, are open. Losing their religious character, the Scottish market crosses were employed for royal and civic proclamations, and as places where certain judicial writs were executed. The general removal of these ancient and interesting structures has often been a matter of lamentation.

In the history of the cross as a Christian symbol, it is evident that it was used at first as a symbol of triumph, not of suffering. In the sarcophagi and mosaics from the fourth to the ninth century it often stands alone on the sacred rock from which flow the Four Rivers of Paradise. It is sometimes surmounted by the Constantinian monogram of Christ, the Labarum, and thus became the standard of victorious Christianity. It was inscribed within

the circle around the head of Christ, thus forming the cruciform nimbus (q.v.). As an emblem of Christ, it preceded the crucifix, and it was not until the tenth and eleventh centuries that the figure of Christ had quite generally replaced on the cross the ornamentation which had previously been its usual decoration. Even when the monumental crucifixes had come into general use in central and southern Europe, the northern nations (e.g., Great Britain and Scandinavia) continued for centuries the use of the mere cross. The form of the cross given to the majority of churches in the later Middle Ages is more connected with the specific crucifixion than the mere cross, as is shown by the bend sometimes given in some church ground plans, imitated from the twist of the body on the cross. Consult: Stockbauer, *Kunstgeschichte des Kreuzes* (Schaffhausen, 1870); Fulda, *Das Kreuz und die Kreuzigung* (Breslau, 1878); Dobbert, *Zur Entstehungsgeschichte des Kreuzes* (1880); Bunsen, *Das Symbol des Kreuzes bei allen Nationen* (Berlin, 1876); Alger, *History of the Cross* (Boston, 1858); Mortillet, *Le signe de la croix avant le christianisme* (Paris, 1866); Zöckler, *Das Kreuz Christi* (Gütersloh, 1875); Forrer and Muller, *Kreuz und Kreuzigung Christi in ihrer Kunstentwickelung* (Strassburg, 1893). See also the bibliographies of CRUCIFIX and JESUS CHRIST IN ART.

CROSS. In heraldry (q.v.), one of the charges known as "ordinaries."

CROSS, CONGREGATION OF THE HOLY. See HOLY CROSS, CONGREGATION OF THE.

CROSS, INVENTION OR FINDING OF THE. The name of the Church festival commemorative of the finding of the cross upon which Christ died by the Empress Helena, the mother of Constantine, in the year 326. As related by Socrates (*Ecclesiastical History*, I, xvii), who wrote about 439, the story is this: In Christ's sepulchre she found three crosses, along with Pilate's tablet, and on the advice of Macarius, Bishop of Jerusalem, determined which was Christ's cross by taking the three to a sick woman, who touched the first two without avail, but was restored as soon as she had touched the third—so that was accepted as Christ's. Similar is the story in Sozomen (*Ecclesiastical History*, II, i), who wrote a little later. From this time on for many centuries there was no question of the fact. Doubt has been cast upon it by the consideration that Eusebius, who wrote in the fourth century, and who was particularly explicit regarding everything relative to the Constantine family in his account of Helena's visit to the Holy Land (*Life of Constantine*, III, lii), says nothing of her discovery of the crosses, nor when speaking of the erection of the church over the Holy Sepulchre (ib., III, xxviii et seq.). It is also noteworthy that the Bordeaux Pilgrim, the author of the *Itinerarium Burdegalense*, writing in 333, says nothing in his description of the holy places of any cross being discovered in the Holy Sepulchre (*Itinerary from Bordeaux to Jerusalem*, Palestine Pilgrim's Text Society's Eng. trans., London, 1877, p. 24). Still Cyril of Jerusalem, writing in the Holy City in 347–348, uses this language: "He was truly crucified for our sins. For if thou wouldest deny it, the place refutes thee visibly, this blessed Golgotha, in which we are now assembled for the sake of Him who was crucified, and the whole world has since been filled with pieces of the wood of the cross" (*Catechetical Lectures*, IV, 10). And he alludes to the finding of the cross when writing to Constantius, the son of Constantine (*Ep. ad Const.*, c. 3); though the authenticity of this letter has been questioned, but not disproved. That Helena found three crosses and that she and many others believed that one of them was the cross of Christ may be accepted, though we have no confirmatory proof of its authenticity.

The festival of the Invention of the Cross may date from the visit of Helena, but unless it was at first local, the earliest certain mention of it is in the eighth century. In the Latin church the day is May 3. In the Greek church there is a festival of the Exaltation of the Cross on September 14. Consult, in favor of the story: J. H. Newman, *Essay on Ecclesiastical Miracles;* and as against it: W. C. Prime, *A History of the Invention, Preservation, and Disappearance of the Wood Known as the True Cross* (New York, 1877); E. Nestle, *De Sancta Cruce, Ein Beitrag zur christlichen Legendengeschichte* (Berlin, 1889); Staley, *The Liturgical Year* (London, 1907).

CROSS, JUDGMENT OF. See ORDEAL.

CROSS, ORDER OF THE HOLY. See HOLY CROSS, ORDER OF.

CROSS, SOUTHERN. See CRUX.

CROSS, VICTORIA. See VICTORIA CROSS.

CROSS, CHARLES ROBERT (1848–1921). An American physicist, born at Troy, N. Y. He graduated in 1870 at the Massachusetts Institute of Technology and was instructor there in 1870–77. In 1877 he was appointed professor of physics and director of the Rogers laboratory. He established at the institute in 1882 the first American course in electrical engineering. His publications include: *Course in Elementary Physics* (1873); *Lecture Notes on Mechanics and Optics* (1884); *Notes on Mechanics* (1908; 2d ed., 1911).

CROSS, MARY ANN, or MARIAN. See ELIOT, GEORGE.

CROSS, MRS. GEORGE FREDERICK. See CAMBRIDGE, ADA.

CROSS, RICHARD ASSHETON, first VISCOUNT CROSS (1823–1914). An English politician. He was born at Red Scar, Lancashire, graduated at Trinity College, Cambridge, in 1846, and in 1849 was called to the bar. He sat in Parliament as a Conservative, for Preston from 1857 to 1862, for Southwest Lancashire from 1868 to 1885, and for the Newton Division, Southwest Lancashire, from 1885 to 1886. From 1874 to 1880 and in 1885–86 he was Home Secretary, and from 1886, when he was made Viscount, to 1892 Secretary of State for India. In 1887 he headed a commission on the working of the Education Acts, which brought in reports diametrically opposed to each other. He published *The Acts Relating to the Settlement and Removal of the Poor* (1853) and *The General and Quarter Sessions of the Peace* (1858).

CROSS, (CHARLES) WHITMAN (1854–). An American geologist, born at Amherst, Mass. He was educated at Amherst College and the University of Leipzig. In the United States Geological Survey he was assistant geologist in 1880–88, geologist after 1888, and chief of the section on petrology in 1903–06. In 1911 he became treasurer of the National Academy of Sciences. He is author, with three others, of the important *Quantitative Classification of Igneous Rocks* (1903), a new system with new nomenclature (see PETROGRAPHY). He also pre-

pared a number of Geological Survey bulletins and in 1902 published *The Development of Systematic Petrography in the Nineteenth Century.*

CROSS, WILBUR LUCIUS (1862–). An American educator and author, born at Mansfield, Conn. He graduated in 1885 at Yale University, and from 1894 to 1897 was instructor in English in the Sheffield Scientific School. In 1897 he was appointed an assistant professor in English and in 1902 professor. In addition to magazine contributions on Ibsen, the novel, and editions (with notes and essays) of *Macbeth* (1900), the *Works of Laurence Sterne* (1904), and Defoe's *Robinson Crusoe* (1911), his publications include an excellent handbook, *The Development of the English Novel* (1899), and *Life and Times of Laurence Sterne* (1909). He contributed to the first edition of the NEW INTERNATIONAL ENCYCLOPÆDIA. Under his editorship the *Yale Review* at once took a high place among contemporary periodicals.

CROSS'BILL'. A bird of the genus *Loxia,* large finches with a singular bill, the mandibles —which are rather long, thick at the base, and much curved—crossing each other at the points when the bill is closed. These mandibles are capable not merely of vertical but of lateral motion, and muscles of extraordinary power are provided for moving them; so that the crossbills readily obtain their principal food—the seeds of firs and pines—by tearing off the scales of the cones. They bring the points of the mandibles together (which they can do so as to pick up a very small seed) and insert them into the cone, when the act of allowing the points to slip past one another exerts a powerful lateral movement, opening the scale; and the tongue, which terminates in a singular movable scoop, formed of a bone articulated to the os hyoides, or ordinary bone of the tongue, is inserted to detach the seed.

BEAK OF THE CROSSBILL.
Side view, shut and open, and top view.

The power of the bill is such that wood may be torn to pieces, and crossbills in confinement seem to take a mischievous pleasure in destroying the cage. An apple is cut to pieces almost in an instant, in order that its seeds may be reached, and flocks of these birds sometimes do great mischief in orchards. Three or four species are known, two of which are found in America, although only one, the common red crossbill (*Loxia curvirostra*), is numerous, and even this in most years is scarcely to be seen in the United States. It is a native of Europe, Asia, and North America, dwelling chiefly in evergreen forests and extending as far north as they do, not dreading the coldest climates. The American bird is regarded as a subspecies, and a second subspecies is found from the southern Rocky Mountain region to central Mexico. The white-winged crossbill (*Loxia leucoptera*) is the other American species, but is not so common as the preceding. Both species are red in the males and olive brown in the females, the former species with blackish wings and the latter having wings crossed by two conspicuous white bars. They go about in small, chattering flocks and are resident in the most northern parts of the United States and in Canada. They breed in the late winter or early spring, sometimes during very severe weather.

CROSS BILL. In chancery or equity, a bill, or petition, filed by the defendant in an equity proceeding against the plaintiff or against other defendants, or both, in the same suit, either to obtain a discovery of facts in aid of the defense, or to bring the matters in dispute more completely before the court than could be done by a mere answer to the original bill. The cross bill must not introduce new parties nor new matter not embraced in the original suit, and is considered as an auxiliary suit in the nature of a defense to the original bill, the two proceeding together as one cause. However, the persons made defendants in it must answer, plead, or demur to it, or the relief demanded will be granted by default. Cross bills are used in the equity practice of the United States and many of the State courts and in the English chancery courts. See BILL; DISCOVERY, BILL OF; EQUITY; also PLEADING; and consult the authorities there referred to.

CROSSBOW. See ARBALEST; ARCHERY.

CROSS BREEDING. See BREEDING.

CROSS BREEDING IN MAN. Intercrossing in animals, as among plants, may, within due limits, be beneficial. These limits are confined to the same variety, race, or stock. If individuals of widely different races or breeds intermix, the result is degeneracy and sterility, the outcome of such unions being of the same nature as hybrids between different though allied species. As Darwin states: "After plants have been propagated by self-fertilization for several generations, a single cross with a fresh stock restores their pristine vigor; and we have a strictly analogous result with our domestic animals." This will apply to man also. When the French aristocracy was, as the result of the Revolution, broken up and forced to intermarry with the *bourgeoisie,* the result was an increase in the population and additional vigor in the race. An old family in its decline may be rejuvenated and restored by intermarriage with a more vigorous, even if a coarser, stock or strain. The population of our cities is maintained by the constant influx of fresh blood from the rural districts.

The mixture of the European races, now so marked, has been going on from early prehistoric (Neolithic) times. The French population is highly composite. The Anglo-Saxon race is equally or still more so, and the American people so in a still more marked degree; the intermixture being the result of emigration from the countries of northern and central Europe. It is not only that the old mixes with new stock, but the latter comes from regions differing in soil, climate, etc. Intermarriages between the stocks or breeds or strains of the white race are happy in their effects, resulting in increased vigor and fertility; and so with the stocks of the yellow, brown, or black races. The same law prevails throughout the animal world; everywhere Nature abhors too close inbreeding.

Interracial Marriage. Miscegenation, or "métissage," is marriage between individuals of widely different races, i.e., a high and a low race or variety. Its effects are bad physically and morally, since the product, like mules or hybrids between species, is inferior to the higher though superior to the lower race; the result is that, when general, the higher race is pulled down, or

tends to degeneracy, while the lower is in a degree elevated. Hybrids, or half-castes, are notoriously inferior to either pure race, though so partly from social causes. The results, so apparent in human history, show that crosses are injurious between races too far removed in physical characters and constitution, or where living under remote climatic conditions. While marriages between black or other backward races and white races are markedly evil in their effects, unions between those nearer allied, such as those between the white race and the Japanese or the Polynesian or Malayan or North American Indian, also tend to result in sterility; on the other hand, crosses between the yellow and brown races, and the brown and black, are apparently fertile, and the results not harmful.

In-and-in Breeding. The deleterious effects of self-fertilization, or of marriage between blood relatives, are recognized both by Darwin and by Wallace. Darwin found that certain plants which had been naturally cross-fertilized for many or all previous generations suffered to an extreme degree from a single act of self-fertilization. "Nothing of the kind," he adds, "has been observed in our domestic animals; but then one must remember that the closest possible interbreeding with such animals—that is, between brothers and sisters—cannot be considered as nearly so close a union as that between the pollen and ovules of the same flower."

Consanguineous Marriages. The bearings of the previous statements on this important subject are obvious. Yet the matter is involved in doubt, authorities differing. The popular notion is that marriages between first cousins result in disease, idiocy, insanity, sterility, etc. That the results are not, however, always deleterious is a matter of frequent observation. Darwin refers to his son's (G. H. Darwin) attempt to discover by a statistical investigation whether the marriages of first cousins are at all injurious, "although this is a degree of relationship which would not be objected to in our domestic animals." It appears from these and other researches that "the evidence as to any evil thus caused is conflicting, but on the whole points to its being very small." He concludes "that with mankind the marriages of nearly related persons, some of whose parents or ancestors had lived under very different conditions, would be much less injurious than that of persons who had always lived in the same place and followed the same habits of life. Nor can I see reason to doubt that the widely different habits of life of men and women in civilized nations, especially among the upper classes, would tend to counterbalance any evil from marriages between healthy and somewhat closely related persons."

Finally, to sum up the results thus far obtained, it appears, as concluded by Wallace, that a slight amount of crossing, attended by slight changes of the conditions of life, is beneficial; while extreme changes and crosses between individuals too far removed in structure or constitution are injurious. For the literature, consult many of the volumes under Evolution.

CROSS-BUN. A small cake specially prepared for Good Friday and in many English towns cried about the streets on Good-Friday morning as "hot cross-buns." Good-Friday buns were appropriately marked with the cross; hence the name. The origin of the practice is obscure. Most probably it is a relic of some heathen observance, to which the early Church gave a Christian significance.

CROSSCUT. A horizontal, or nearly horizontal passageway driven between two levels, drifts, or underground workings in a mine. In coal mining crosscuts are often driven in the coal for ventilation, whereas in metal mines they are usually driven across the formation, at right angles to the strike, to prospect for or connect parallel veins.

CROSSE, Andrew (1784–1855). An English physicist. He was born at Fyne Court, in the Quantock Hills, Somersetshire, and was educated at Bristol and Brasenose College, Oxford. He early devoted himself to the study of electricity and in 1807 he commenced experiments with the view of forming artificial crystals. These discoveries and investigations in electricity were described at the meeting of the British Association for the Advancement of Science, at Bristol, in 1836. A few months later, while experimenting with some highly caustic solution, out of contact with atmospheric air, there appeared, as if gradually growing from specks between the poles of the voltaic circuit, certain animals of the genus *Acarus*. Crosse never affirmed that he had developed animal life out of inorganic elements, but simply that under physical conditions he could make *Acari* appear, and not otherwise. This discovery aroused such violent criticism that Crosse retired from the world and for some time neglected his researches; but later he published papers on *Mode of Extracting Metals from their Ores; On the Perforation of Non-conducting Substances by the Mechanical Action of the Electric Fluid;* and *On the Apparent Mechanical Action Accompanying Electric Transfer*.

CROSS-EXAMINATION. The examination of a witness on behalf of the party against whose interest he has been called and against whom he has given testimony. The object is to test the correctness of the testimony given, to disclose any prejudice, lack of intelligence, weakness of memory, or untruthfulness that may exist, and to break in any proper way the force of the direct examination. Greater latitude is allowed to counsel in cross-examination of an adverse witness than in adducing direct testimony for his own client. Thus, "leading questions"—i.e., those which in their form suggest or indicate the answer desired—are allowed in cross but not in direct examination. In the United States generally it is held that cross-examination should be limited to inquire into matters drawn out on the direct examination, and if counsel asks questions as to new matter he thereby makes the witness his own and cannot thereafter impeach his credibility.

Counsel are required to confine the questions on cross-examination to material and relevant matters, but the determination of the question whether the facts sought to be shown are material and relevant rests in the discretion of the court, and, when occasion seems to demand it, this discretion is liberally exercised, especially in cases of cross-examination of expert witnesses, where it is necessary to show the standing and ability of the expert. Previous mistakes in collateral matters not connected with the cause in issue have been allowed to be shown on this point.

The right to cross-examination should be exercised immediately after the examination in chief; but it is in the discretion of the court,

upon good reason shown, to allow the privilege at a later stage of the trial. Consult Wellman, *Art of Cross-Examination* (New York, 1904). See EVIDENCE; EXAMINATION; TESTIMONY; and authorities there cited.

CROSS-FERTILIZATION, IN PLANTS. See POLLINATION.

CROSS-FOX. A valuable variety of the American red fox, marked by a dark line along the back, crossed by one upon the withers, whence the name. See FOX.

CROSS KEYS. A post village in Rockingham Co., Va., about 20 miles northeast of Staunton. Here, on June 8, 1862, during the Civil War, an indecisive engagement occurred between 18,000 Federals, under General Frémont, and a part of Jackson's retreating army, numbering about 8000, under General Ewell, the latter withdrawing during the night to effect a junction with Jackson. Each side lost about 500. The engagement was a strategic success for the Confederates, in that it checked the pursuit by Frémont and prevented his joining with General Shields for a combined attack.

CROSS'LEY, SIR FRANCIS (1817–72). An English philanthropist, born at Halifax, Yorkshire. He succeeded to the proprietorship of the Dean Clough carpet mills and accumulated a vast fortune. His many benefactions included the gift to Halifax of 21 almshouses in 1855 and an endowed public park, and to the London Missionary Society of £20,000. He was created a baronet in 1863 and published a lecture, *Canada and the United States*, in 1856.

CROSSOPTERYGII, krŏs-sŏp'tĕr-ĭj'ĭ-ī (Neo-Lat. nom. pl., from Gk. *κροσσοί, krossoi*, fringe + *πτερύγιον, pterygion*, dim. of *πτέρυξ, pteryx*, wing). An order of ganoid fishes, numerous in former ages, but surviving only in the ganoid-like genera *Polypterus* (see BICHIR) and *Calamoichthys*. They are described as "Teleostomi, in which the pectoral fin consists of a rounded basal lobe, supported by endoskeletal structures and fringed by dermal rays. There are no branchiostegal rays. The vertebral column is well ossified, and the caudal fin is diphycercal. The pelvic fins are abdominal. A spiral valve and a conus arteriosus are present, and the optic nerves form a chiasma."

CROSS RIVER. See CALABAR.

CROSS STONE. See MACLE.

CROSSWELL, krŏz'wĕl, EDWIN (1797–1871). An American journalist and leader in Democratic politics as a member of the Albany Regency (q.v.). He was born at Catskill, N. Y., began his journalistic career on the Catskill *Recorder*, a journal established by his father, and in 1824 became editor of the Albany *Argus*, which he made the official organ of his party in the State. He was also State printer from 1824 to 1840 and from 1844 to 1847. In 1854 he gave up journalism and went into business in New York City. Crosswell was the great antagonist of Thurlow Weed and exerted powerful influence by his editorial utterances in both State and national politics.

CROSWELL, HARRY (1778–1858). An American journalist and clergyman, born at West Hartford, Conn. In 1802 he became editor of the *Balance*, a Federalist newspaper, at Hudson, N. Y., and later of the *Wasp*. In the latter he charged Jefferson with paying Callender to defame Washington. He was sued for libel and defended by Alexander Hamilton, whose plea in this case Kent called "the greatest forensic effort Hamilton ever made." In 1814 Croswell took orders and in 1815 became rector of Trinity Church, New Haven, Conn. He was the author of *The Young Churchman's Guide; Manual of Family Prayers* (1857); *Guide to the Holy Sacrament* (1867).

CROT'ALA'RIA (Neo-Lat. nom. pl., from Gk. *κρόταλον, krotalon*, rattle). A genus of plants of the family Leguminosæ, deriving its name from the inflated pods in which the seeds rattle when ripe. The species, about 250 in number, are annual, perennial, and shrubby plants, natives of the temperate and tropical parts of the world. (See Plate of CRANBERRY.) Many of them have long, straight, slender stems and branches, and some of these yield valuable fibre, particularly the Sunn (q.v.), or Sunn hemp of India, *Crotalaria juncea*, an annual species, the fibre of which is now an important article of commerce. Jubbulpore hemp, also an important fibre, and regarded as stronger than Sunn, is the produce of *Crotalaria tenuifolia*, usually considered a variety of *Crotalaria juncea*, a perennial species about 9 feet high, a native of the south of India, which, when growing in abundant space, throws out many branches, but, when sown thick, grows with little branching. *Crotalaria burhia*, which naturally grows in very arid places, is also cultivated in Sinde for its fibre. There are a dozen species native of the United States, one of which, *Crotalaria sagittalis*, and perhaps others, are reputed to be injurious to horses, causing what is termed "crotalism," a disease something like loco (q.v.).

CROTAL'IDÆ (Neo-Lat. nom. pl., from Gk. *κρόταλον, krotalon*, rattle). A family of venomous serpents, the pit vipers, viper-like in form, but distinctively characterized by the presence of a deep pit on each side of the face between the nostril and the eye. It includes the American rattlesnakes, moccasins, and copperheads and some Asiatic species. See RATTLESNAKE.

CROT'ALISM. See CROTALARIA.

CROTAPH'YTUS. See COLLARED LIZARD.

CROTCH, WILLIAM (1775–1847). A distinguished English composer, born at Norwich. He was quite as precocious as Mozart. When little more than three years old he could play "God Save the King" almost throughout with chords, and could detect in a moment what note was struck and in what key music was composed. When only 22, Crotch was appointed professor of music in Oxford University, and the degree of doctor of music was conferred upon him. In 1822 he obtained the principalship of the Royal Academy of Music. He composed much for the organ and piano, as well as many glees. Among several oratorios which he wrote, two, *Palestine* (1812) and *The Captivity of Judah* (1834), are especially noteworthy. He died at Taunton, England.

CROTCH'ET. A musical term used in England to denote the quarter note ( ). In France the *crochet* denotes the eighth note ( ). The semiminima of the older notation (see MENSURABLE MUSIC) was called in Italy *crocheta* and was written as an open note with one hook (). When later on the larger values of notes were abandoned and all notes of lesser value were written black, the French applied the old name to the *shape*, the English to the *value*, of the note.

CROTHERS, krŭth'ĕrz, SAMUEL MCCHORD (1857–). An American clergyman and essayist, born at Oswego, Ill. He graduated from Princeton in 1874 and from the Union Theological Seminary. After holding several charges in the West, he entered the Unitarian ministry, and was settled in Brattleboro, Vt. He was called in 1894 to the First Parish of Cambridge, Mass., where he became also one of the preachers to Harvard University. His essays are of the familiar type, humorous, shrewd, and discreetly communicative, yet proceeding from a ripe and cultured mind, stored with literary lore, and of a scholarly type. They are happiest, perhaps, in dealing with the intellectual weaknesses and frailties of the time and are often pleased to treat with refreshing irony European conditions, which, from the American standpoint, do not fail in humorous appeal. His works include: *The Gentle Reader* (1903); *The Pardoner's Wallet* (1905); *The Endless Life* (1905); *By the Christmas Fire* (1908); *Among Friends* (1910); *Humanly Speaking* (1912); *Three Lords of Destiny* (1913).

CRO'TON (Neo-Lat., from Gk. *κροτών*, or *κρότων*, *krotōn*, tick, shrub bearing the castor berry, which was thought to resemble a tick). A genus of plants of the family Euphorbiaceæ. The species, about 700 in number, are mostly tropical or subtropical trees or shrubs, a few herbaceous. Some of them possess in a very high degree the acrid properties so characteristic of the family to which they belong. Among these the most important is the purging croton (*Croton tiglium*), a small tree, a native of India and the more easterly tropical parts of Asia. The leaves are extremely acrid; the wood in a fresh state is a drastic, and in a dried state a more mild purgative; and the seeds (*croton seeds*, or *tilly seeds*) are an extremely powerful drastic purgative, formerly much employed in Europe, but latterly disused on account of violence and uncertainty of action, although still valuable as yielding croton oil (q.v.). They are oval, or oval oblong, about the size of field beans. The oil is obtained mostly by expression, and partly by treating the cake with alcohol. Very different properties are found in the species which yield cascarilla (q.v.) and copalche (q.v.) barks, to which a great resemblance exists in the barks of a number of species, natives chiefly of South America. Other species are still more aromatic, and some delightfully fragrant, containing in great abundance a thickish balsamic sap. The sap of *Croton gratissimus* is much employed as a perfume and cosmetic at the Cape of Good Hope; that of *Croton origanifolius* is used in the West Indies as a substitute for balsam of copaiva; that of *Croton flavens*, also West Indian, furnishes *eau de Mantes* by distillation; and the balsamic sap of some South American species is dried and used as incense. *Croton aromaticus*, which grows abundantly in Ceylon, is an important lac tree. The plants cultivated by florists in hothouses as crotons belong to the genus *Codiæum*. See Plate of CYPRESS.

CROTO'NA, or **CROTON** (Lat., from Gk. *Κρότων*, *Krotōn*). A Greek colony in south Italy, on the east coast of Bruttium, founded probably about 710 B.C. by Achæans. Situated near a good harbor and in a fertile territory, Crotona rapidly became wealthy and was famous for its Olympian victors, especially the great athlete Milo (q.v.). About 530 B.C. the city became the home of Pythagoras (q.v.). But soon after the destruction of Sybaris (510 B.C.) a reaction set in, and the Pythagoreans were expelled. The power of Crotona sank rapidly during the fifth and the fourth centuries B.C. It was captured by Dionysius the Elder of Syracuse, and later by Agathocles, and in the war between Pyrrhus and the Romans was plundered and nearly destroyed. It recovered somewhat, but suffered severely in the Second Punic War, when it was for three years the winter quarters of Hannibal. Though made the seat of a Roman colony in 194 B.C., it was never after a place of importance. The modern name is Cotrone (q.v.). Pop. (commune), about 9000.

CRO'TON AQUEDUCT. See AQUEDUCT for descriptions of both the old and the new Croton Aqueduct. See Plate of DAMS.

CROTON BUG. See COCKROACH.

CROTON EL'EUTE'RIA. See CASCARILLA.

CROTON OIL. The fixed oil obtained by expressing the seeds of the *Croton tiglium*, cultivated in India and the Philippine Islands. It is a viscid liquid, varying in color from a pale yellow to a reddish brown or deep sherry. It is insoluble in water and but sparingly soluble in alcohol, ether, carbon disulphide, and many other organic solvents. It has an acrid taste and an unpleasant fatty odor. It contains *tiglic acid*, $C_5H_8O_2$, *crotonol*, $C_{15}H_{24}O_4$, and the glycerides of several fatty acids. Croton oil is a powerful irritant. When rubbed upon the skin, it produces rubefaction and pustular eruption. It is now rarely used in medicine, being prescribed for the purpose of stimulating the skin in alopecia, and internally to relieve very obstinate constipation.

CROTON RIVER. A river of New York, about 60 miles long, and formed by the confluence of three branches, the East, the Middle, and the West, which rise in the southern part of Dutchess County, flow in a southerly direction, and unite near the southern boundary of that county, whence the main stream follows a southwesterly course through Westchester County, and empties into the Hudson River at Croton Point, 30 miles north of New York. Its principal tributaries are the Titicus, Cross, Kisco, and Muscoot rivers. Its catchment area is about 33 miles north and south by 11 miles east and west, lying almost entirely in New York, and involving about 360 square miles above the new Croton dam. Within this area are about 30 lakes and ponds, many of which are utilized as natural storage basins. For many years New York City (i.e., the present Borough of Manhattan) was dependent chiefly upon this source for its water supply. For an account of the city's enlarged water-supply system, see AQUEDUCT.

CROUCH, FREDERICK NICHOLLS (1808–96). An Anglo-American musician, born in London. He came of a musical family and was himself remarkably precocious. He studied at the Royal Academy of Music and with Bochsa, and when only nine years old was a 'cellist in the Royal Coburg Theatre. Subsequently he was in the orchestras of Queen Adelaide and at Drury Lane Theatre, after which he became a teacher and singer in Plymouth. In 1849 he came to the United States, acting in various capacities as musical director, teacher, and chorister in New York, Boston, Philadelphia, Washington, and

Baltimore. He died in Portland, Me. His compositions were almost exclusively songs and comprise "Kathleen Mavourneen," "The Soldier's Grave," "The Emigrant's Lament." He also wrote two operas, *Sir Roger de Coverley* and *The Fifth of November*.

CROUP (Scotch *croupe, crope*, to croak, make a harsh noise). Since the discovery of the cause of diphtheria, it has been found that there are two forms of disease formerly known as croup: (1) spasmodic, or false croup, and (2) membranous croup, which is diphtheria of the larynx. False croup is caused in feeble or ill-fed children, or in those who have a catarrhal tendency, by exposure to cold and wet, digestive disturbances, or, in some cases, the grippe (q.v.). The child has a running from the nose and a cough; he awakens coughing hoarsely, with noisy and labored breathing or gasping, with every appearance of suffocation, the face becoming red or purplish, and tears starting from the eyes. The attack lasts from a half hour to five or six hours, and then relief comes in a loose cough, abatement of the fever, and free perspiration. The attack may be repeated on succeeding nights. No membrane is coughed up. The treatment consists of inhalation of warm moist air from a teakettle placed under a sheet thrown over the child's bed; frequent draughts of warm milk; and a dose of a half teaspoonful of syrup of ipecac, repeated every 15 minutes till vomiting occurs.

Membranous croup is caused by the bacillus of diphtheria (q.v.), and is very dangerously contagious as well as largely fatal. The symptoms are much the same as in false croup, except that they are steadily progressive; the child is generally drowsy for a few hours before the difficulty in breathing and the cough begin, and after a time becomes exceedingly restless, the lips and face become blue, pieces of membrane are coughed up, coma and possibly convulsions follow, and death occurs unless relief is obtained. Relief from suffocation may be obtained in desperate cases by the use of the tracheotomy tube. This is a metal or hard rubber tube inserted into the windpipe below the larynx by a surgeon, through an incision in the neck. More generally relief is afforded by the use of the intubation tube invented by Dr. Joseph O'Dwyer, of New York, which is passed down the throat and between the vocal cords. These procedures do not, however, check the disease, for which antitoxin (q.v.) is the only effective remedy. See DIPHTHERIA.

CROUTH. See CROWD.

CROW (AS. *crawe*, OHG. *chrawa, chraja*, Ger. *krahe*, crow, from AS. *crawan*, OHG. *chrajan*, Ger. *krahen*, to crow; probably onomatopoetic in origin). A bird of the genus *Corvus*, the type of the family Corvidæ. The crows are a widely distributed group of birds, found in nearly all parts of the world, but especially in the Northern Hemisphere. The largest species of the genus is the raven; the rook and the jackdaw of England also belong to it. Crows are always more or less black, frequently wholly so, but differ from each other not only in color, but especially in size and in the amount of space at the base of the bill, which is bare of feathers. All are smaller than the raven, but most of them are more than 15 inches in length. They are omnivorous, eating almost anything edible, and some species live largely on fish. All are intelligent to a high degree, and many stories are current regarding their avoiding danger and communicating with each other. They are easily domesticated. Most of the species are more or less gregarious, at least at certain seasons of the year, and frequently resort in incredible numbers to certain favorite places of woodland to roost at night.

Three species of crow occur in the United States, besides the two ravens. The common crow (*Corvus brachyrhynchos*, or *americanus*) is generally distributed over North America, but is most abundant in the East and is apparently wanting from certain parts of the Rocky Mountain region, where ravens are common. Although it formerly had a bad reputation as a corn thief, and is known to be guilty not only of stealing corn, but even of stealing eggs and killing birds (including poultry), it is now recognized as a really beneficial bird and a true friend of the farmer, because of the vast number of injurious insects which it destroys. It was primitively confined mainly to the Eastern coast belt, but has steadily progressed westward with the advance of civilization, as the raven has correspondingly disappeared.

The fish crow (*Corvus ossifragus*) frequents the coast and the southern rivers of the United States. (See FISH-CROW.) The "jabbering" crow (*Corvus jamaicensis*) of the Blue Mountains of Jamaica is remarkable for the resemblance of its voice to human speech, which some of the other species of this genus may be taught to imitate. The small, glossy crow of India and Ceylon (*Corvus splendens*) frequents the towns, feeding on offal, and boldly entering rooms through open windows to snatch some morsel from the dinner table; these birds, called "hooded crows" in English India, are a nuisance by their boldness and thievish ways about camps and villages.

CROW (translation of the Hidatsa name of the tribe *absaroka*, hawk). A warlike nomadic tribe of Siouan stock, formerly roaming over the upper Yellowstone region of Wyoming and Montana and now gathered upon a reservation in the southeastern part of the latter State to the number of about 1750. They were formerly almost constantly at war with all their neighbors, particularly the Sioux, but have uniformly remained at peace with the whites, frequently furnishing a contingent of scouts against the hostile tribes.

In language the Crow are most closely related to the Hidatsa, with whom they also share certain cultural features, notably a clan system with maternal descent, which is, however, combined in both tribes with social usages dependent on the father's clan. The Crow had a series of ungraded military societies, and still engage in the ceremonial planting of a sacred tobacco plant under the auspices of esoteric organizations.

Consult: Curtis, *The North American Indian*, vol. iv (Cambridge, 1909); Lowie, *Social Life of the Crow Indians* (New York, 1912); id., *Societies of the Crow, Hidatsa and Mandan Indians* (ib., 1913).

CROW'BERRY, or CRAKE'BERRY (so called from its black color) (*Empetrum nigrum*). A small procumbent shrub, of the family Empetraceæ, a native of northern latitudes, abundant in moors and highlands. The family consists of a few heathlike shrubs. The berries of the crowberry are nearly black, surround the branches in crowded clusters, and each contains six to nine bony seeds and a watery,

acidulous juice, which is sometimes thought to be refreshing; but they are generally little esteemed. A fermented or vinous liquor is prepared from them in some northern countries. They are a favorite food of game. A second species, *Empetrum rubrum*, of southern South America, differs little from the northern plant, except in having red berries.

CROW BLACKBIRD. See GRACKLE.

CROWD (AS. *croda*, *gecrod*, throng; of unknown origin), or MOB. In the popular sense, an aggregation of individuals, regardless of their character or the purposes which brought them together. The psychological signification of a crowd is different. The aggregation becomes a crowd only "when the sentiments and ideas of all the persons in the gathering take one and the same direction, and their conscious personality vanishes." A half dozen individuals gathered together may become a crowd more easily than hundreds assembled accidentally.

The most distinctive characteristic of a crowd is that the individuals composing it do not think and act as each one would think and act independently. Back of the avowed causes of our acts are unconscious motives or forces that defy investigation, and these are the mainsprings of crowd activity. They are the common characteristics of the race, and it is in these points that people are more alike than in the acquired characteristics which result from education. It is owing to the fact that these forces which are requisite for crowd or mob activity are the primitive ones, that crowds are incapable of rising above very mediocre intellectual attainments. This also explains why the crowd descends in the scale of civilization below the average individuals composing it. If this were not true, it would be impossible to explain the conduct of otherwise respectable persons at lynchings and the degrading forms of torture imposed by them.

The causes which determine the appearance of the characteristics of the crowd are: (1) a sentiment of invincible power; (2) suggestion; and (3) contagion. Through the mere force of numbers, and also through the irresponsibility of the individual of the crowd, a feeling of invincible power takes possession of him. Nothing is permitted to stand between him and the realization of his aims. On this account the soldier in battle, acting under a common impulse, is braver and stronger than he would be otherwise. By means of suggestion contagion in the crowd is produced; the individuals are more or less in a hypnotic state; and the individual will and personality disappear in a common purpose or aim.

Crowds are not premeditative; they are impulsive and mobile. Aroused one minute to acts of generosity and heroism, they may descend the next to acts of extreme violence and torture. They are credulous, believing things wholly incomprehensible to those outside of crowd influence.

Much difference of opinion prevails concerning the rôle which mob action is to play in the civilization of the future. Gustave Le Bon, *The Crowd* (Eng. trans., London, 1900), asserts that "while all our ancient beliefs are tottering and disappearing, while the old pillars of society are giving way one by one, the power of the crowd is the only thing that nothing menaces, and of which the prestige is on the increase. The age we are about to enter will in truth be the era of crowds." Professor Baldwin, *Social and Ethical Interpretations* (New York, 1897), differs widely from this point of view, claiming that "the attempt to build a fruitful conception of society upon the actions of the crowd under the influence of these imitative suggestions, seems to be crude and unphilosophical in the extreme." Consult Lee, *Crowds: A Moving Picture of Democracy* (New York, 1913). See SOCIOLOGY; SOCIAL PSYCHOLOGY.

CROWD, kroud, *dial.* krōōd, **CROUTH,** or, Welsh, **CRWTH,** krōōth (from Welsh *crwth*, Gael. *cruit*, OIr. *crot*, violin; ultimately identical with Welsh *crwth*, bulge, on account of the rounded shape of the instrument). A musical bow instrument, of Welsh or Irish origin, and probably the oldest European instrument of that class. It is mentioned as a *chrotta* by Venantius Fortunatus in 609, and from then till the beginning of the nineteenth century, when it was still in use in Ireland, Wales, and Brittany, it seems to have preserved its form. But on the Continent the instrument underwent radical changes. Originally its body was square and was prolonged by two parallel arms, connected at the end by a crossbar. From this bar a narrow finger board extended to the middle of the sound box. The strings—originally three, later six in number—were stretched from the top of the parallel arms to the bottom of the sound box and were supported by a bridge placed between two sound holes. For illustration, see MUSICAL INSTRUMENTS. Consult F. W. Galpin, *Old English Instruments of Music* (London, 1911).

CROW DUCK, or SEA CROW. A coot.

CROWE, CATHERINE STEVENS (c.1800–76). An English author. She was born at Borough Green, Kent, and lived chiefly in Edinburgh. Her principal work, entitled *The Night Side of Nature* (1848; new ed., 1904), has perhaps never been surpassed for weirdness of conception. In her novels, among which are *Adventures of Susan Hopley* (1841), *Lilly Dawson* (1847), and *Linny Lockwood* (1854), she showed much skill and ingenuity in the development of the plot.

CROWE, EYRE (1824–1910). An English painter, born in London. He was a pupil of William Darley and later of Paul Delaroche in Paris. He traveled in the United States as amanuensis to Thackeray in 1852 and remained until 1857. In 1876 he was elected an associate of the Royal Academy. His painting is somewhat dry and hard and his color poor, but he treats his subjects with great care and feeling. His pictures include "Goldsmith's Mourners" (1863); "Nelson Leaving England" (1888); "The Brigs of Ayr" (1894); "The Gipsy's Rest" (1897); "James II at the Battle of La Hogue" (1898); "Napoleon's Abdication" (1902). He published *With Thackeray in America* (1893).

CROWE, SIR JOSEPH ARCHER (1825–96). An English journalist. He was born in London and began his journalistic career as foreign editor of the *Daily News*. During the Crimean War he was the correspondent of the *Illustrated London News*, and he acted in the same capacity for the *Times* during the Indian Mutiny. While in India he was also director of the Art School at Bombay from 1857 to 1859. He was Consul General at Leipzig in 1860–72 and at Düsseldorf in 1872–80. In the latter year he became commercial attaché in Berlin, and two years later attaché in Paris; and was secretary and protocolist to the Danubian Conference, London (1883), and British Plenipotentiary to the Sa-

moan Conference, Berlin (1889). He wrote, with G. B. Cavalcaselle, *The Early Flemish Painters* (1857) and *History of Painting in Italy* (5 vols., 1864–71).

CROWELL, krō′el, EDWARD PAYSON (1830–1911). An American scholar and educator, born at Essex, Mass. He graduated at Amherst College in 1853, at Andover Theological Seminary in 1858, and in 1859 was licensed to preach by the Congregational church. From 1858 to 1864 he was instructor in German and professor of Latin at Amherst. In 1864 he was appointed to the chair of Latin languages and literature and in 1880–94 was dean. His publications include editions of Latin classics, such as those of the *De Senectute* and *De Amicitia* of Cicero (1871), the *De Officiis* of Cicero (1873), the *Andria* and *Adelphæ of Terence* (1874), and the *De Oratore* of Cicero (1879). He also translated and edited Bender's *Grundriss der römischen Litteraturgeschichte* (1876) under the title, *A Brief History of Roman Literature* (1880), jointly with H. B. Richardson prepared a useful volume of *Selections from Latin Poets,* with notes (1882), and wrote *A Clue to the Prose Writings of the Silver Age* (1897).

CROWELL, JOHN FRANKLIN (1857–). An American economist, born in York, Pa., and educated at Yale, Columbia, and Berlin universities. He was principal of Schuylkill Seminary, Fredericksburg, Pa., for several years; president of Trinity College, N. C. (1887–94); head of the department of economics and sociology at Smith College (1895–97); and in 1900–04 an expert of the United States Industrial Commission and also expert on internal commerce for the Bureau of Statistics in the Treasury Department. In 1906 he became editor of the *Wall Street Journal,* New York City, and in 1910–11 was president of the American Civic Alliance. His publications include: *The Logical Process of Social Development* (1898); *Internal Commerce of the United States* (1902); *Report to War Department on Deepening the Mississippi River* (1903); *Trunk Line Differentials* (1904); *Competition, Fair and Unfair* (1913).

CROWFIELD, krō′fēld, CHRISTOPHER. A name which Mrs. Harriet Beecher Stowe sometimes used as a pseudonym.

CROW'FOOT. See RANUNCULUS.

CROWFOOT FAMILY. See RANUNCULACEÆ.

CROW GARLIC. See ALLIUM.

CROWLEY, krō′lĭ. A city and the county seat of Acadia Parish, La., 135 miles west by north of New Orleans, on the Louisiana Western, the New Orleans, Texas, and Mexico, and the Opelousas, Gulf, and North Western railroads (Map: Louisiana, C 3). Its principal industries are the cultivation of rice and rice milling. A rice-growing experiment station has been established here under State and Federal control. Petroleum in large quantities is produced in the vicinity. Settled about 1887, Crowley was incorporated two years later and grew rapidly. The government is administered by a mayor, elected biennially, and a council. The city contains an Odd Fellows Home and owns and operates its water works, electric-light plant, and sewerage system. Pop., 1890, 420; 1900, 4214; 1910, 5099.

CROWN (MDutch *krune, krone,* Icel. *krūna,* Ger. *Krone,* OHG. *corōne, corōna,* OF. *corone,* Fr. *couronne,* from Lat. *corona,* crown, Gk. *κορώνη, korōnē,* curved end of a bow; connected with Gael. *cruinn,* Welsh *crwn,* round, Lat. *curvus,* curved). The crown, as we understand it to-day, resembles in some degree the fillets, wreaths, and garlands which were worn among the Greeks as an emblem of office (in the case of the archons), as a distinction for the victors in the public games, or for citizens who had rendered exceptional service to their country. The Romans used them chiefly as rewards for valor. The most highly prized was the *corona obsidionalis,* made of grass or wild flowers, bestowed by a beleaguered garrison on the general who rescued them. Next came the *corona civica,* of oak leaves and acorns, as a reward to any soldier who had saved the life of a Roman citizen in battle; a place next to the senators was reserved for the wearer at public spectacles, and the whole assembly rose at his entrance. The *corona muralis,* a golden ring surmounted with turrets or battlements, was bestowed on the man who first scaled the wall of a besieged city; and the *corona triumphalis,* of three kinds, upon a general who obtained a triumph. There were other crowns not honorary, but emblematical, and regulated not by law, as were the former ones, but by custom. Of these the most important were the *corona sacerdotalis,* worn by priests and others engaged in sacrifice; *corona funebris,* or *sepulchralis,* with which the dead were crowned; *corona convivialis,* worn on festive occasions by banqueters; *corona nuptialis,* or bridal wreath; and *corona natalitia,* a chaplet suspended over the door of a house in which a child was born.

As the emblem of sovereignty in modern Europe, the crown was borrowed rather from the diadem than from the above-mentioned crowns. The Roman emperors are represented as wearing either the diadem, the laurel crown (a simple emblem of glory), or the radiating crown, probably of Eastern origin, which symbolized among the Romans the deification of the emperors. From the time of Constantine the Great (306–337) the diadem was the established emblem of Imperial power; but it was supplanted under Justinian (527–565) by the crown, called *stemma,* a slight elaboration upon the golden fillet; and this in turn was replaced by still more elaborate crowns, until the crown with arches became the accepted form. The ordinary type of the Imperial crown of the Middle Ages, as assumed in imitation of the Greek emperors by Charles the Bald (840–877), is found in an illuminated manuscript at Munich representing the Emperor Henry II (1002–24) crowned by Christ. The crown actually used at the coronation of many subsequent emperors, and now preserved in the Imperial treasury in Vienna, is a round cap surrounded by eight small shields with semicircular tops alternately adorned with precious stones and with pictures. It is surmounted by a small cross resting on an arch inscribed "Chonradus Dei gratia Romanorum imperator augustus" (Conrad II, 1024–39). The present Austrian Imperial crown is of the style adopted by the Emperor Maximilian II in 1570. It is cleft in the centre so as partly to resemble a mitre; the golden circlet is jeweled and adorned with fleurs-de-lis and surmounted by a cap, above which rises a single arch surmounted by a cross. The new German Imperial crown resembles the old crown of Charlemagne and consists of eight shields ornamented with precious stones; the larger shields show a cross made of precious stones, the smaller the Imperial

eagle set with diamonds; above it rise four arches surmounted by a cross. The royal crown of Great Britain is a circle of gold enriched with precious stones and pearls and heightened by four crosses patée and four fleurs-de-lis alternately; from these rise four arches which close under a mound ensigned with a cross patée. See TIARA; CORONET.

So entirely was the crown regarded as the symbol of sovereignty that the word came to be used as synonymous with the monarchy, the state, and matters under the control of the executive authority. Thus we speak of crown lawyers, crown lands, etc., the term having no connection with the sovereign personally.

CROWN and **HALF CROWN** (so called from the crown which generally appears on the reverse). English silver coins since 1551, before which date they were made of gold. The crown, which is the five-shilling piece, is worth approximately $1.20 in United States currency.

CROWN, ORATION ON THE. See DE CORONA.

CROWN DEBTS. In English law, all debts due to the crown, which are on record, or evidenced by a bond or other specialty, and also those due from accountants to the crown on account of moneys received for the use and benefit of the crown. Formerly the lands of the debtor were subject to a lien for the amount due, even in the hands of an innocent purchaser for value without notice of the lien, if they were conveyed after the debt became due. At present the lien is not binding on a *bona fide* purchaser or mortgagee for value, unless a writ of execution has been issued and registered before the execution of the mortgage or conveyance.

Simple contract debts have no such lien; but the crown has in all cases preference over private creditors in the distribution of the estates of bankrupts and deceased persons. See ADMINISTRATION; DEBT; PREROGATIVE; EXCHEQUER. Consult Prideaux, *Law of Judgments and Crown Debts, as they Affect Real Property* (4th ed., London, 1854).

CROWNE, JOHN (c.1640–c.1703). An English dramatist. He began his literary career with *Pandion and Amphigenia* (1665), interesting as one of the very few English heroic romances in imitation of Scudéry. His contemporary reputation as dramatist was gained by *The Destruction of Jerusalem,* in two parts (produced in 1677). His comedy *Sir Courtly Nice* (produced in 1685) held the stage through the eighteenth century. His numerous other plays have only slight interest. Consult *Dramatic Works* (4 vols., Edinburgh, 1873).

CROWN GALL. A very destructive disease that attacks nearly all kinds of fruit trees, grapes, almonds, walnuts, blackberries, raspberries, poplars, and chestnuts, frequently killing them. It exists in two forms—crown gall proper, which is described below, and hairy root, characterized by numerous thin fibrous roots. The exact relation between the two forms has not been positively determined. The point of attack is at the crown of the roots where the roots and stem join, the galls formed on young trees being half an inch or more in diameter. When young, they have the color of the young roots, but later they are considerably darker. They increase with the age of the tree, becoming as large as a man's fist or even larger. When small, they are soft masses of irregular fibres, and when older they exhibit concentric rings in cross section. On account of the deep wounds and the attack made upon the vitality of its host the tree is frequently killed, and whole orchards are reported in which every tree has succumbed to this cause. The disease is widely distributed, being known in Europe, in many parts of the United States, and recently reported from New Zealand. The more common cause of crown gall is the bacterium, *Bacterium tumifaciens.* This organism has been repeatedly isolated from galls on many kinds of plants and galls produced by the inoculation of sound plants. Annual inspection of the trees, cutting off all galls and coating the cut surfaces with a paste made of copper sulphate and lime, is the most efficient protection known.

A crown gall of alfalfa that is rather common in parts of Europe and has been reported in this country is due to the fungus *Urophlyctis alfalfæ.*

CROWN GLASS. The method of blowing soda-lime glass in which the original balloon is flattened, crown-shaped. A steel rod tipped with molten glass is now attached opposite to the blowpipe, which latter is then removed. By rapidly revolving the rod on a horizontal axis opposite the large opening of the glass furnace, the mass of glass softens and spreads out into a disk, thick at the centre and thinning towards the edges. The limit of the diameter of these disks is about 4 feet. On cooling and annealing, small windowpanes may be cut from the disk, leaving the irregular centre or "bull's-eye." This type of glass is no longer made in quantity except for art work, where it retains its place on account of its peculiar brilliant surface.

CROWN IMPERIAL. See FRITILLARY.

CROWNINSHIELD, ARENT SCHUYLER (1843–1908). A United States naval officer, born at Seneca Falls, N. Y. He graduated at the United States Naval Academy in 1863, was a participant in both of the attacks on Fort Fisher (December, 1864, and January, 1865), and in 1868 attained the rank of lieutenant commander. His further promotions were to the rank of commander (1880) and captain (1894). He became chief of the Bureau of Navigation of the Navy Department in 1902, during the Spanish-American War was a member of the Board of Naval Strategy, and was retired in 1903. He immediately preceded Capt. C. D. Sigsbee in the command of the battleship *Maine.*

CROWNINSHIELD, FREDERIC (1845–1918). An American decorative painter and writer. He was born in Boston, graduated at Harvard College in 1866, and studied abroad 11 years; under Rowbotham in London, Couture in Italy, and Cabanel in Paris. From 1879 to 1885 he was an instructor in the Boston Art School, after which he removed to New York, where he was president of the Fine Arts Federation from 1900 to 1909. In 1911 he was appointed director of the American Academy in Rome. He devoted himself principally to mural decoration, excelling particularly in the difficult work of harmonizing color, planning arrangement, and designing borders and arabesques, and contributed very materially to the development of this branch of art in America. His stained-glass windows and landscapes also deserve mention. His writings include: *Mural Painting* (1887); *Pictoris Carmina* (1900); *A Painter's Moods* (1902); *Tales in Metre* (1903).

CROWNLANDS. The English sovereign was at one time not only the nominal owner,

as lord paramount, of all the lands in England, but was also in his royal capacity one of the great landowners in the kingdom. He was the lord of many manors, and in him were vested most of the wastes, forests, and common lands throughout the realm. The ancient demesne lands of the crown are now contracted within narrow limits, having been almost entirely granted away to subjects. King William III so impoverished the crown in this manner that an act was passed (1 Anne, c. 7, § 5), the effect of which and of subsequent statutes is that all grants or leases from the crown of royal manors, or other possessions connected with land, for a period exceeding 31 years, are void. At a much earlier period (1455, c. 41) a Scottish statute had rendered the consent of Parliament necessary to the alienation of the property of the crown; but neither it nor the subsequent statutes which were passed with a similar object succeeded in checking the practice. Since the beginning of the reign of George III the English sovereign surrenders during his life the hereditary revenues derived from the crownlands in exchange for a fixed civil list granted by Parliament. The control of crownlands is now vested in commissioners appointed for that purpose, called the commissioners of woods, forests, and land revenues. These restrictions do not apply to estates purchased by the sovereigns out of the privy purse, or coming to the sovereign, his heirs, or successors, by descent or otherwise, from persons not beings kings or queens of the realm; for, although there is no marked line drawn between the proprietary rights which the King has as King and those which he has in his private capacity, and there are no lands which belong to the nation or state as a personified body, yet a distinction is made between the lands of ancient demesne and those coming by modern title, by which the alienation of the former is restricted and that of the latter left free. Consult Cox, *Institutions of the English Government, etc.* (London, 1863), and Stephen, *New Commentaries on the Laws of England* (14th ed., London, 1903). See CIVIL LIST; DEMESNE; FEUDALISM.

In Austria the term "crownland" is applied to the various territorial divisions into which that country is divided.

CROWN POINT. A city and the county seat of Lake Co., Ind., 39 miles south-southeast of Chicago, Ill., on the Chicago and Erie, and the Pittsburgh, Cincinnati, Chicago, and St. Louis railroads (Map: Indiana, B 1). Among the noteworthy features are the county jail and almshouse, the juvenile home for delinquents, and the Carnegie library. It has grain elevators, machine shops, wagon works, and a shirt and overall factory. Pop., 1900, 2336; 1910, 2526.

CROWN POINT. A town in Essex Co., N. Y., on the west shore of Lake Champlain, on the Barge Canal, and on the Delaware and Hudson Railroad, 110 miles north by east of Albany (Map: New York, G 2). It contains the Hammond library and chapel, Congo Park, and a memorial lighthouse erected to the memory of Samuel de Champlain. The town manufactures building material and staves and has sash and door factories, grain elevators, spar mills, and a creamery. In the vicinity are deposits of graphite and iron. Pop., 1900, 2112; 1910, 1690. Crown Point was first visited by Champlain, who, on July 5, 1609, fought and defeated the Iroquois Indians here. In 1714 it became an important English trading station. About 1731 the French built upon the site Fort St. Frederic, which, in spite of hostile English expeditions directed against it in 1755 and 1756, they held until 1759, when it was partly destroyed after being abandoned by Montcalm and Dieskau, who returned to the defense of Quebec. Lord Jeffrey Amherst then took possession and during the winter of 1759–60 began the erection of Fortress Crown Point, the ruins of which still remain, and which, though never completed, ultimately cost fully $10,000,000. On May 11, 1775, Seth Warner, at the head of a company of "Green Mountain Boys," captured the fort, then garrisoned by only 12 men. In 1777, on the approach of General Burgoyne, it was temporarily abandoned by the Americans. The grounds containing the ruins of Forts St. Frederic and Crown Point were presented to New York State in 1910 for a public park and reservation.

CROWN SOLICITOR. The solicitor to the Treasury, who, in state prosecutions in England, acts as solicitor for the crown in preparing the prosecution. In Ireland there are crown solicitors attached to each circuit, whose duties correspond in some degree to those of the procurator fiscal and crown agent in Scotland. In England there are no analogous local officers, such prosecutions being conducted by solicitors representing the parish or by private parties.

CROW PHEASANT, fĕz'ant. See COUCAL.

CROW'QUILL, ALFRED. See FORRESTER, ALFRED HENRY.

CROW SHRIKE. See PIPING CROW.

CROW'S NEST. A perch for the lookout man of a vessel. It is placed on the foremast at as great a height above the deck as is found desirable; protection from the weather is afforded by a platform surrounded by canvas.

CROW STEP. See CORBIE STEPS.

CROWTHER, krou'THĒr, SAMUEL ADJAI (c.1810–91). The first native Bishop of Africa, born in the Yoruba country. He was captured in a slave raid when a lad and was several times sold; was rescued by a British man-of-war from a Portuguese slaver, and placed in the mission school at Bathurst, and was the first student enrolled in the Fourah Bay College, where he subsequently served as an assistant instructor. Ordained in 1843, he became a missionary at Akessa. In 1864 he was consecrated Bishop of the Niger country. Crowther accompanied both of the British Niger expeditions, a journal of which he published (1859; 1872). His other works include a dictionary and grammar (1852) of the Yoruba language, a primer (1860), and a grammar (1864) of Nupe, and a translation of part of the New Testament into the Yoruba. Consult *Good out of Evil* (London, 1852) and *The Slave Boy Who Became Bishop of the Niger* (1888), and a biography (New York, 1889) by Page.

CROY'DON (OEng. *Croidene*, from Fr. *craie*, It. *creta*, OHG. *krīda*, Ger. *Kreide*, chalk, from Lat. *creta*, chalk, AS., OHG. *dūn*, hill, Eng. *dune*, from Ir. *dun*, Gael. *dūnon*, Welsh *din*, hill, fort; connected with AS. *tūn*, Eng. *town*, OHG. *zūn*, Ger. *Zaun*, hedge). A parliamentary and municipal borough and market town of Surrey, England, 10½ miles south of London Bridge (Map: England, F 5). Its parish church of John the Baptist dates from the fourteenth or fifteenth century and has been rebuilt three times. It lies on the edge of the chalk and plastic clay,

near the Banstead Downs, at the source of the Wandle, and is an important railway centre. Among its public buildings are the former palace of the archbishops of Canterbury (now used as a girls' school), Whitgift's Hospital, a handsome Elizabethan structure with which is connected a grammar school, and the municipal buildings containing the law courts and central public library. Owing to its proximity to London, a healthful climate, and the absence of factories, Croydon is a favorite residence place of London business men. This accounts for its great progress in municipal improvements and ownership of public utilities, libraries, water supply, artisans' dwellings and lodging houses, parks and recreation grounds, hospitals, baths, electric lighting, and street railways. It is governed by a mayor, 12 aldermen, and 36 councilors. Its death rate in 1914 was a little over 10 per 1000, the smallest in England for a city of its size. Pop., 1851, 10,000; 1901, 133,895; 1911, 169,559. Consult Steinman, *History of Croydon* (London, 1836).

CROZAT, krō'zȧ'. A prominent French family of financiers and art collectors.—PIERRE (1661–1740) was treasurer to the King, and his various acquisitions included 19,000 original drawings, 2000 engravings, 400 paintings, 1382 intaglios and cameos, and a library of 20,000 volumes. Two series of engravings of the drawings and paintings in his and other collections were published in 1729–42 under the title of *Le cabinet de Crozat.* His nephews LOUIS FRANÇOIS (d. 1750), JOSEPH ANTOINE (d. 1750), and LOUIS ANTOINE (d. 1770), inherited the greater part of his collection, to which they added. After their deaths it was dispersed, and the treasures of Louis Antoine ultimately came into the possession of the Russian crown.

CROZET (krō'zȧ') **ISLANDS** (in honor of the second in command of the French expedition under Marion-Dufresne which discovered the islands in 1772). A volcanic group in the Indian Ocean, between Kerguelen and Prince Edward Islands (Map: World, O 26). The larger islands are Possession (15 miles long, 8 miles wide, fair anchorage at Navire Bay), East, Apostle, and Hog. The total area is about 200 square miles. They have no permanent population, but are visited by sea-lion hunters and war vessels. They were recently annexed by France. Consult Roth, *Crozet's Voyage to Tasmania* (London, 1891).

CROZIER, krō'zhēr, JOHN BEATTIE (1849–1921). An English writer on philosophy and history. He was born of Scottish parents, at Galt, Ontario, and was educated at the Galt Grammar School and at the University of Toronto. Graduating M.D. in 1872, he at once settled as physician in London. His *Religion of the Future* (1880) was followed by *Civilization and Progress* (1885). To aid him in carrying out his studies, he received in 1894 a civil-list pension of £50, which was doubled four years later. In 1897 appeared the first volume of *The History of Intellectual Development on the Lines of Modern Evolution.* Dr. Crozier has also published: *My Inner Life, Being a Chapter in Personal Evolution and Autobiography* (1898); *Lord Randolph Churchill: A Study of English Democracy* (1887); *Sociology as Applied to Practical Politics* (1911). In 1899 he received from the University of Toronto the degree of LL.D.

CROZIER, WILLIAM (1855–). A United States artillery officer and inventor of ordnance. He was born in Carrollton, Ohio, and on his graduation from West Point in 1876 was assigned to the Fourth Artillery, in which he served three years, taking part in campaigns against the Sioux and Bannock Indians while at Western posts. From 1879 to 1884 he was instructor in mathematics at West Point, and in 1881 won by competitive examination an assignment to the Ordnance Department. In 1898 he was major and inspector general of volunteers. With General Buffington he invented the Buffington-Crozier disappearing gun carriage (see illustration and description under ORDNANCE), which ranks high among modern military inventions, and which has been installed in all the important coast-defense works of the United States. He is also the inventor of a wire-wound cannon. In 1899 he was appointed by President McKinley one of the American delegates to The Hague Peace Conference. In the Peking relief expedition in 1900 he served under General Chaffee as chief ordnance officer, and in November, 1901, was appointed chief of ordnance, with rank of brigadier general, and reappointed in 1905, 1909, and 1913, the detail being for four years. In 1912–13 he was detailed as president of the Army War College, Washington, D. C. Many of the notes and pamphlets on the construction of ordnance published by the War Department are from his pen. He is of international reputation regarding all matters connected with his department of military science.

CRUCE, LEE (1863–). An American public official, born in Crittenden Co., Ky. He was educated at Marion Academy and Vanderbilt University. In 1891 he removed to Ardmore, then in Indian Territory, where he continued to practice law until 1901. From 1903 to 1910 he was president of the Ardmore National Bank. In the latter year he was elected Governor of Oklahoma on the Democratic ticket for the term 1911–15.

CRUCIAN, krōō'shan (Dutch *karuts,* Ger. *Karausche,* older *Karas, Karutze, Karutsch,* from Fr. *carassin,* It. *coracino,* crucian, from Lat. *coracinus,* Gk. κορακῖνος, *korakinos,* fish like a perch, from κόραξ, *korax,* raven; so called on account of its color). A species of carp (*Carassius vulgaris*), differing from the common German carp (*Cyprinus*) in the larger scales, in the absence of barbules at the mouth, and in the pharyngeal teeth. It may attain a large size and inhabits lakes, ponds, and slowly flowing rivers in northern Europe and Asia.

CRUCIBLE (ML. *crucibulum, crusibulum,* melting pot, from OF. *cruche,* Portug. *crugo,* crock, from OHG. *chruag,* Ger. *Krug,* AS. *crōg,* jar, or Ir. *crogan,* Gael. *crog,* Welsh *crochan,* pitcher; confused by popular etymology with Lat. *crux,* cross). A highly refractory vessel in which metals, glass, or other material requiring a high temperature may be fused, melted, or treated. Crucibles are made in all sizes, from that of a lady's thimble to one which will hold 400 pounds of molten zinc. The essentials in their construction are that they be made to endure extreme heat without fusing and sudden changes of temperature without breaking. A great variety of materials are used for making crucibles, as clay, porcelain, graphite, lime, aluminum, silver, and platinum. The most common form is the *Hessian crucible,* made of equal parts of fire clay and coarse sand. It will stand extreme heat, but not very sudden changes in temperature. This is the cheapest variety and is

adequate for all ordinary processes of assaying ores and refining metals or alloys. They come in nests, in sizes varying from 2 to 8 inches in diameter. *Porcelain crucibles* are largely used for special fusions in chemical analyses. *Coke crucibles* are of value in the fusion of certain metals. *Graphite crucibles* meet all temperature conditions, but are slowly acted on by metallic oxides or gases. They are largely used in making crucible steel and various alloys and in refineries for the melting of gold-silver bullion. *Lime crucibles* are absolutely infusible. *Aluminum crucibles* possess the advantage of not being readily acted on by the materials fused, even sodium having no effect on them. The *Berlin crucibles* are made of a composition of fire clay, black lead, powdered coke, and old crucibles. *Silver crucibles* are of use for special analyses. *Platinum crucibles* are of utmost importance in chemical laboratories on account of the infusibility and noncorrosive character of the metal. Compounds of lead, mercury, and other metals which will combine with platinum when heated cannot be treated in these crucibles.

CRUCIF'ERÆ (Neo-Lat. nom. pl., from Lat. *crux*, cross + *ferre*, to carry, bear), the mustard family. One of the most characteristic families of dicotyledons, including about 200 genera and 1800 species of very wide geographic distribution. It is a very well-marked and therefore easily distinguished family. There are four conspicuous characters by which it may be recognized: (1) the plants are more or less pungent, as the name "mustard family" would suggest; (2) there are four petals that spread in such a way as to form a Greek cross, from which the family name was taken; (3) there are six stamens, four of which are longer and stronger than the other two (*tetradynamous*); and (4) the fruit is the characteristic pod called a *silique*, which means that it is divided into two compartments by a false partition and that each half usually opens from below, leaving the seeds attached to the partition. The amount of variation in the family is indicated by the fact that 10 distinct tribes are recognized, the differences being based largely on the characters of the pods. Among the useful plants included in the family are mustard, raddish, turnip, cabbage, cauliflower, cress, etc. Some of the ornamental plants are sweet alyssum, wallflower, the various stocks, etc. The family also contains many common weeds, such as shepherd's purse, wild mustard, pepper grass, etc. Sulphur compounds are common in many, as may be recognized from the odor given off when cooking. The pungence and acridity of the Cruciferæ seem to depend on a volatile oil, or on different volatile oils of a very similar character, present in various degrees in different species, or in the same species under different circumstances, and in different parts of the same plant. This diversity is very well illustrated in the common turnip, in the different qualities of the root as to sweetness and acridity in different soils or seasons, and in the difference between the flesh and the rind. The seeds of the Cruciferæ contain a fixed oil, which is extracted from some (rape, colza, in Europe; *Camelina sativa* and *Erysimum perfoliatum* in Japan), to be used as a lamp oil and in the arts, and the oil cake of which is valuable for feeding cattle.

CRUCIFIX (Lat. *cruci fixus*, fastened to the cross, from *crux*, cross + *figere*, to fasten). A cross with the effigy of Christ affixed to it. It must be distinguished, as an instrument of devotion and liturgical use, from the pictorial or other representations of the scene of the Crucifixion (q.v.). The cross (q.v.), at first used for devotional and symbolic purposes in its simplest form, came first to be decorated with the symbolic sacrificial lamb (see CHRIST IN ART), with the addition sometimes of the medallion bust of Christ, as in the Vatican cross. Perhaps the earliest crucifixes were small devotional objects which contained portions of the supposed true cross, such as that of Mount Athos, or were pictorial crosses, like that of Queen Theodolinda at Monza (sixth century). During the Carlovingian age the crucifix came into somewhat more general use in the West, but, having been opposed in the East shortly after its introduction by the image-hating iconoclasts (eighth century), it obtained a foothold there, not as a plastic image, but in the form of a pictured Crucifixion. The manner in which the figure of Christ was represented on the crucifix is the same as that in pictures of the Crucifixion. During the Romanesque and Gothic periods there was an increasing number of large crucifixes, in some of which the figure was almost or wholly life-size. These were mainly of four classes—the stationary *altar crucifix*, that stood in the centre of the altar or at the entrance to the choir, sometimes with accompanying statues of the Virgin and St. John (e.g., at Wechselburg, Saxony, thirteenth century); the *road crucifix*, at crossroads, or to mark certain spots for devotion; the *station crucifix*, which often crowns a hall at the end of a line of devotional stations (q.v.) known as the Way of the Cross; the *processional crucifix*, usually smaller and of metal, carried in religious processions. All such crucifixes became very numerous from the thirteenth to the sixteenth century and were sometimes carved by the greatest sculptors, as in the case of Brunelleschi's crucifix in Santa Maria Novella and Donatello's in Santa Croce, Florence.

A curious compromise between a picture of the Crucifixion and a crucifix is a class of representations in which the figure of Christ is painted on a panel cut in the shape of a cross. A very early instance is in the cathedral of Spoleto. Others by the Berlinghieri, Margheritone, and other early painters (thirteenth century) exist at Lucca, Pisa, and Florence. The plastic crucifix was more popular in northern Europe than in Italy before the fifteenth century and was often executed in wood, while for smaller examples ivory and metals were most used. The realistic schools of North Italy, however, during the fifteenth and sixteenth centuries, especially the artists of Modena, gloried in realistic crucifixes of painted wood and terra cotta. The most impressive are the large station crucifixes, such as that of the Sacro Monte at Varallo. Consult: Stockbauer, *Kunstgeschichte des Kreuzes* (Schaffhausen, 1870); Lazar, *Die beiden Wurzeln der Kruzifix Darstellung* (Strassburg, 1912); Schönermark, *Der Kruzifixus in der bildenden Kunst* (ib., 1908). See also the bibliographies under CROSS and JESUS CHRIST IN ART.

CRUCIFIXION, THE. A favorite subject in Christian art since the sixth century, before which time effigies of Christ were unusual. The treatment of the subject may be divided into two periods: in the first, which lasts until about the twelfth century, Christ is represented adhering to the cross without signs of suffering, in-

stead of hanging upon it, the figure generally robed and wearing a royal crown—Christ living and triumphant. After the eighth century the two thieves, the centurion, the soldier with the sponge, the Virgin and St. John are usually introduced, together with symbolical figures. One of the earliest representations is the Cruxifixion carved on the wooden door of the Santa Sabina, Rome, dating from the sixth century. In the tenth century the subject is treated more realistically, and after the twelfth the Christ Triumphant is replaced by the humiliated, dead, or dying Christ; the sufferings are accentuated, the crown of thorns appears. The Magdalene and sometimes the other Marys are associated with the Virgin and St. John, and often many other figures are introduced. This treatment, rendered popular by the schools of Cimabue and Giotto, was followed by the great masters of the Renaissance, almost all of whom painted the Crucifixion. Among the most famous are those by the Italian masters: Antonello da Messina (Antwerp Gallery); Fra Angelico (San Marco, Florence); Perugino (Santa Maria dei Pazzi, Florence); Andrea Mantegna (Louvre); Luca Signorelli (Florence Academy); Guido Reni (Bologna Gallery and San Lorenzo in Lucino, Rome); and Tintoretto (Scuola di San Rocco, Santi Giovanni e Paolo, and San Cassiano, Venice). Other famous examples are by the German masters Lucas Cranach (Stadtkirche, Weimar), and Albrecht Dürer (Dresden Museum); by the Flemish masters Rubens (Antwerp Museum) and Van Dyck (cathedral of Malines); by Murillo (Hermitage, St. Petersburg). Consult the bibliography of JESUS CHRIST IN ART.

CRUDEN, krōō'den, ALEXANDER (1701–70). An English scholar, maker of a well-known Bible concordance. He was born at Aberdeen and educated at Marischal College in that city, with a view to the church, but, having exhibited decided symptoms of insanity, he was for some time placed in confinement. On his release he left Aberdeen and, after spending several years as a tutor in and about London, settled in London in 1732 as a bookseller. In 1735 he received the title of "bookseller to the Queen." In 1737 he published his *Complete Concordance of the Holy Scriptures of the Old and New Testaments*. Soon afterward he relapsed into insanity, and his friends were obliged to remove him to a private asylum, where he appears to have been harshly treated. On his recovery he published an account of his sufferings (1738). He then acted as a corrector for the press. Cruden now believed himself divinely commissioned to reform the manners of the world, styled himself Alexander the Corrector, and went about exhorting the people to refrain from Sabbath breaking and profanity. He also petitioned the King for the honor of knighthood, and Parliament to constitute him by act "the corrector of the people," hoping by such honors to influence the people more effectually. He was mentally unbalanced during the rest of his life, and died at Islington, London, Nov. 1, 1770. The second edition of his concordance appeared in 1761 and the third in 1769; since then it has been repeatedly reprinted in full, with his definitions, which make it a Bible dictionary, or in abridgment, and has been made the basis of other concordances. Perhaps the best edition of the complete work is by Alexander Chalmers (London, 1812; 10th ed., 1824), with his life. See CONCORDANCE.

CRUELTY (OF. *crualte, cruelte*, Fr. *cruauté*, from Lat. *crudelitas*, cruelty, from *crudelis*, cruel, *crudus*, raw). The intentional infliction of unnecessary pain. As a legal term, it is used chiefly in connection with divorce, with the treatment of children, and the treatment of animals.

As a ground for *divorce*, cruelty is not limited to physical violence, although formerly it was thought to be thus restricted. It is now held to include any unjustifiable conduct on the part of either husband or wife which so grievously wounds the feelings or destroys the peace of mind of the other as seriously to impair bodily health or endanger life, or which utterly destroys the legitimate ends and objects of matrimony. See DIVORCE.

While the common law does not permit a child to sue a parent in *tort* for injuries inflicted by cruel treatment, it does provide for the criminal punishment of parents guilty of such cruelty, and courts of equity have not hesitated to take children away from a parent who abuses their persons or corrupts their morals. Cruel treatment of animals by their owners is not a criminal offense at common law unless it is of such an aggravated kind as to amount to a nuisance. See CRUELTY TO ANIMALS; CRUELTY TO CHILDREN; HUSBAND AND WIFE; PARENT AND CHILD.

CRUELTY TO ANIMALS, PREVENTION OF. The earlier laws on this subject were not so much the outcome of humane principles as for the protection of animals considered as property. At the common law cruel treatment of animals by their owner was a criminal offense only when it was so aggravated as to be a nuisance. But the general tendency of the nineteenth century towards the organization of philanthropy was not slow to operate in this direction. England was the first country to organize (in 1824) a society for the purpose. Legislative enactments followed, and the Statute of 1849 provides a penalty not exceeding £5 (in addition to a further sum recoverable as damages by the owner) for any person who "shall cruelly beat, ill-treat, overdrive, abuse, or torture" a variety of domestic animals. The movement spread to Germany, France, and the United States. The first American society was chartered by the Legislature of New York in 1866, chiefly through the efforts of Henry Bergh, who was its president for 22 years. Cruelty to domestic animals is now punishable in most of the United States by fines ranging from $5 to $100, or imprisonment from 30 to 60 days, or both. The Ohio law, as amended in 1898, specifies cruelty by beating, mutilating, lack of good food and water, carrying in an inhuman manner, overwork, and crowded transportation. The New Hampshire Law of 1897 gives the officer making an arrest the right to seize the animal, notifying the owner, and to kill it if disabled, or to hold it as security for proper damages.

The Pennsylvania Society for the Prevention of Cruelty to Animals (founded 1867, incorporated 1868) is generally accepted as a model. It endeavors to prevent cruelty by moral suasion and well-considered advice rather than by coercion. It tries to educate where cruelty is due to ignorance and thus attempts to secure the use of proper harness and bits for horses and the abolition of the checkrein. A similar movement in England against the checkrein, excessive curbing, and the docking of horses' tails received great impetus from the hearty support of King

Edward VII, then Prince of Wales. The Pennsylvania society was the first to provide (1874) an ambulance for the removal of disabled animals and a derrick with chain pulley and sling for hoisting animals out of holes. In several States the weight of a load which may be drawn uphill is carefully regulated by the work of such societies; and homes are very generally established for stray dogs and cats, where the animals are painlessly put to death in case of need. Similar societies now exist in nearly every European country, in Algeria and South Africa, in Australia, and in Mexico, Brazil, and the Argentine Republic. See VIVISECTION; CRUELTY TO CHILDREN, PREVENTION OF; ORNITHOLOGICAL SOCIETIES.

CRUELTY TO CHILDREN, PREVENTION OF. Owing to the long survival of the Roman idea of parental power (see CRUELTY), and the comparatively late growth of a tendency towards social legislation, it was not until very recent times that organized effort in this direction became common. Curiously enough, the movement in the direction of organization, in the United States at least, did not take definite shape until eight years after that for the prevention of cruelty to animals. The New York Society for the Prevention of Cruelty to Children was organized in January, 1875, and within five years 10 other societies followed, from Boston to San Francisco. As the movement grew, some societies originally intended for the protection of animals added the care of children to their purpose. In other cases "humane societies" were organized to cover both purposes. The total number of societies in the United States in 1913 for the protection of children, or children and animals, was 354. They were brought into close relations by the Humane Association (q.v.), which has included societies for the protection of children since 1887. As in the case of animals, their work is twofold—the promotion of better legislation in their field and the diligent enforcement of existing laws. They also investigate cases of alleged cruelty or neglect and present to the courts such facts as they learn. The New York society exceptionally includes the investigation of cases of destitution. By the work of the agents whom it stations in all the magistrates' courts it has come to have a powerful advisory influence on the commitment of destitute, neglected, and wayward children in New York City, thus affecting the lives, on an average, of about 15,000 children. These societies in general are private corporations, supported by subscriptions, although in New York, Philadelphia, and a few other places, some aid has been given from public funds. In the State of Indiana since 1889 boards of children's guardians have been organized by law, which not only investigate cases of cruelty and neglect and secure the punishment of the offenders, but also undertake subsequent oversight of the children. The Colorado Humane Society was made by the Legislature of 1901 a "State bureau of child and animal protection," with an appropriation of $3000 per annum for two years; this, however, remains under private control, though three State officers are made ex officio members of its board of directors. Consult: Folks, *The Care of Destitute, Neglected, and Delinquent Children* (New York, 1902); Hart, *Preventive Treatment of Neglected Children* (ib., 1910); *Annual Reports* of the American Humane Association (1876–); *The National Humane Review* (Albany, 1913–). See DEPENDENT CHILDREN.

CRÜGER, krȳ'gĕr, JOHANNES (1598–1662). A German choral composer and musical author. He was born at Grossbresen, Province of Brandenburg, and was educated at the Jesuit College in Olmütz, under Hamburger at Ratisbon, and at the University of Wittenberg. He was cantor of the Nikolaikirche, Berlin, from 1622 until his death. As a composer of Lutheran chorals, he has never been excelled, and many of his melodies, such as *Nun danket alle Gott; Jesus, meine Zuversicht; Schmücke dich, o liebe Seele,* have survived to the present day. His sacred compositions were published under the title *Praxis Pietatis Melica, oder Kirchenmelodien über Luthers und anderer Gesänge,* for four voices and two instruments (45th ed., 1736).

CRUICKSHANK, krȳk'shănk, ERNEST ALEXANDER (1854–). A Canadian historical and military writer. He was born in Welland Co., Ontario, and was educated at Upper Canada College, early acquiring an extensive acquaintance with several modern languages. For a few years he was engaged in newspaper work in the United States, but he returned to Fort Erie, Ontario, became warden of Welland County (1886), police magistrate at Niagara Falls, Ontario (1903), and was in 1908 military archivist at Ottawa. In 1899–1904 he was lieutenant colonel commanding the Forty-fourth Regiment of militia, and afterward he was appointed a district officer commanding. In 1907 he was elected a fellow of the Royal Society of Canada. His principal publications are: *Battle of Lundy's Lane* (1889; 3d ed., 1894); *Battle of Queenston Heights* (1891); *Battlefields of the Niagara Peninsula* (1891); *A Century of Municipal History* (1892–93); *Battle of Fort George* (1896); *Documentary History of the Campaigns on the Niagara Frontier in 1812–14* (9 vols., 1896–1910).

CRUIKSHANK, krȳk'shănk, GEORGE (1792–1878). An English caricaturist, etcher, and painter. He was born in London, Sept. 27, 1792, the younger son of Isaac Cruikshank, himself a caricaturist. His early wish to follow the sea was opposed by his mother, who desired that his father should instruct him in art; but his father refused, and George, failing to secure entrance into the Royal Academy schools, was almost entirely self-taught. His apprentice work as caricaturist appeared in the monthly periodicals called, respectively, *The Scourge* and *The Meteor;* and about the same period he made the sketches referring to the trial of Queen Caroline. Indeed, a great deal of his work, which at that time reflected the political situations of the day, may be looked upon now as being fairly historical in its bearing. By his "Bank-Note not to be Imitated" (1818) he contributed largely to the abolishment of hanging for minor offenses. As early as 1823 he began the illustrations for Grimm's *Fairy Tales.* In 1835 he published the first number of the famous *Comic Almanac,* which flourished under various managements until 1853. In 1847 he made a series of woodcuts on "The Bottle," and his "Sunday in London," "The Gin Trap," and "The Gin Juggernaut," published at this time, had a wide circulation. It is said that the unfortunate life of a personal friend influenced him to exercise his gifts in a crusade against intemperance. A strong moral was enforced in these drawings. His best-known illustrations were those made

for Dickens's *Oliver Twist* and the *Sketches by Boz*, those for the Waverley novels, and for the *Memoirs of Grimaldi*. In 1833 he designed and etched 15 plates for illustration of *Don Quixote*. After 1830 he essayed to paint, and, though he had little skill in manipulating pigments, his efforts in that direction show his keen insight into human nature and his unique genius in portraying the grotesquely humorous. His "Cinderella," painted in 1854, is in the South Kensington Museum. In 1862 he painted for the National Temperance League "The Worship of Bacchus," which is now in the National Gallery. Rossetti wrote, in reference to this picture, that "the man who in his old age occupies himself for nearly three years in painting this homily upon canvas, to the most negative results in point of art, deserves respect." George Cruikshank died in London, Feb. 1, 1878, and was buried in St. Paul's Cathedral. Consult: Stephens, *A Memoir of George Cruikshank* (London, 1891); Bates, *George Cruikshank* (ib., 1878); Jerrold, *Life of George Cruikshank* (ib., 1897); *Cruikshank's Water-Colors* (ib., 1903); Cohn, *Bibliographical Catalogue of the Printed Works Illustrated by George Cruikshank* (New York, 1914); and a biography by W. H. Chesson (1912).

CRUIKSHANK, Isaac (c.1756–c.1811). An English caricaturist and water-color painter. He was born in Leith, the son of a painter, and, early left an orphan, followed his profession as an illustrator, water-color painter, and political caricaturist. He settled in London and married Miss Mary Macnaughten; excepting this, very little is known of his career. Two of his water colors, "A Child Lost" and "A Child Found," are in the South Kensington Museum. His political drawings were as well known as those of Gillray. His other designs include "The Rage; or 'Shepherds, I Have Lost my Waist,'" a skit on the exaggerated fashions of the times. His oldest son, Isaac Robert (1789–1856), born in London, was a miniature painter and caricaturist. He satirized the political and social customs of the time, but after 1825 seems to have taken more to illustrating. His most popular work was done for *Life in London* (1821), in collaboration with his brother George, the text being supplied by Pierce Egan. It was dramatized and achieved a notable success. Further work of Cruikshank's was 71 illustrations for Charles Molloy Westmacott's *English Spy* (1825); and illustrations for Crithannah's *Original Fables* (1834); Colburn's *Kalendar of Amusements* (1840); and *The Orphan*, a translation of Eugène Sue's *Mathilde*. While neither as gifted nor as imaginative as his celebrated brother George, Robert Cruikshank was a good draftsman and a clever artist. Consult biographies of George Cruikshank by Jerrold (1897) and W. H. Chesson (1912).

CRUIKSHANK, William Cumberland (1745–1800). A Scottish anatomist, author of a number of medical works, the most valuable of which is one on *Insensible Perspiration*, showing that carbonic acid is constantly given off by the skin. His work, *The Anatomy of the Absorbing Vessels of the Human Body* (1786; 2d ed., 1790), was translated into French, German, and Italian.

CRUISER (from *cruise*, from Dutch *kruisen*, to cruise, to cross, from *kruis*, OHG. *crūci*, Ger. *Kreuze*, AS. *crūc*, Eng. *cross*, from Lat. *crux*, cross). A war vessel built for cruising. The principal features of a cruiser are: (1) seaworthiness; (2) ability to keep at sea for long periods (this requires large capacity for coal and stores, and habitability); (3) speed; (4) offensive and defensive powers. Cruisers are of many kinds, but they may be divided into three general classes—*armored cruisers*, *protected cruisers*, and *unprotected cruisers*. The dividing line between the classes is not very distinct, as some cruisers partake of the character of two classes. *Armored cruisers* carry armor for the protection of the ship, or battery, which is applied vertically, or nearly so. *Protected cruisers* have no vertical armor, but the vitals are protected by a thick steel deck, which is nearly horizontal, placed about the level of the surface of the water, but having the edges of the deck near the ship's sides inclined downward, so as to meet the side several feet below water. This part of the deck (the slope) is thicker than the middle part, called the *flat*. *Unprotected cruisers* have no protective deck. Some of them have a watertight deck in the same region, but of insufficient thickness to admit of styling it a *protective* deck. Cruisers are frequently divided into first-class cruisers, second-class cruisers, etc. These distinctions are purely arbitrary and differ in the various navies. In the United States navy small cruisers are called "gunboats." This is a term properly applicable to craft so small as to approximate to large boats. In the British navy the terms "gunboat" and "gun vessel" are used almost as loosely. In addition to the regular cruisers a most important addition to the naval force in time of war is found in fast merchant steamers, which are frequently armed as *auxiliary cruisers* and used as ocean scouts or fleet scouts; in the former case they are bound on distant missions, in the latter they accompany the fleet. See Ships, Armored.

CRUITHNIGH, krụth'nī, or **CRUITHNIANS,** krụth'nī-*anz*. The name given by the Irish to invading tribes of Picts, from whom the kings of Ulster were supposed to have descended. The appellation was subsequently applied to some of the inhabitants of the counties of Antrim and Down. They were also called Dalaradians, and their country Dalaradia (q.v.). The name "Cruithnigh" is sometimes derived from the custom of painting and tattooing practiced by the people. The Irish called the Picts of Britain Cruithnigh, and it is probable that the Irish Cruithnigh were related to those of Britain, as a Pictish colony came from Scotland and settled in Dalaradia a century before the Christian era. Consult Skene, *Celtic Scotland* (3 vols., Edinburgh, 1876–80).

CRUIVE, krụv, or **ZAIRE,** zâr (probably from Gael, *crō*, sheep cote, hovel). A contrivance erected upon rivers in Scotland for the purpose of catching salmon. These weirs are of great antiquity and consist of a kind of hedge formed by stakes driven into the ground, the interstices being filled with brush, and the mode of capturing salmon being similar to those employed with bag and stake nets. See Net.

CRUM'MELL, Alexander (1818–98). A negro clergyman of the Protestant Episcopal church. He was born in New York of a slave father and free mother, was educated at the Oneida Institute, N. Y., and graduated from Queens' College, Cambridge, England. He held a professorship in the Liberian College, at Liberia, West Africa, and then returned to the United States, and was rector for 22 years of St. Luke's Church, Washington, D. C. He was

one of the first negro clergymen to enter the Episcopal church. His works comprise: *The Future of Africa* (1862); *The Greatness of Christ, and Other Sermons* (1882); *Africa and America* (1891).

CRUMMLES, krum'lz, VINCENT. The head of a theatrical family, in Dickens's *Nicholas Nickleby.*

CRUNCH'ER, JERRY. In Dickens's *Tale of Two Cities,* a general-utility man in Tellson's banking house by day and a "resurrection man" at night.

CRUPPI, krụ'pē', JEAN (1855–). A French public official, born at Toulouse, France. He was general advocate in the Court of Appeals at Paris, advocate at the Court of Cassation, and, being elected a deputy for Haute-Garonne, served as Vice President of the Chamber. Later he was Minister of Commerce, and, in 1911, Minister of Foreign Affairs in the Monis cabinet. He was made a chevalier of the Legion of Honor. His publications include: *Un avocat journaliste au XVIIIe siècle; La cour d'assises; Pour l'expansion économique de la France* (1910); *Femmes écrivains d'aujourd'hui* (1912).

CRUQUIUS, krōō'kī-ŭs. The Latinized name of a renowned Flemish scholar of the sixteenth century, Jacques de Crusque. He was professor at Bruges, and his studies in Horace have had a most important influence on our knowledge of that poet. In his commentary on Horace (Antwerp, 1578) Cruquius gives readings from the four valuable "Blandinian" manuscripts, since destroyed, one of which is very ancient, and also quotes the marginal notes of an early commentator, whose name is lost, but who is now cited as "Commentator Cruquianus." Consult Palmer, edition of Horace's *Satires,* xxix–xxxii (4th ed., London, 1891), and Endt, *Studien zum Commentator Cruquianus* (Leipzig, 1906).

CRUSADE (Fr. *croisade,* It. *crociata,* from ML. *cruciata,* crusade, from *cruciare,* to mark with the cross, from Lat. *crux,* cross). A war undertaken for a religious purpose; specifically one of the wars waged by the Christians for the recovery of the Holy Land. Towards the close of the eleventh century, when the Byzantine Empire was in great danger of being conquered by the Seljukian Turks, the Emperor Alexis Comnenus appealed for help. At the Council of Clermont, in November, 1095, Pope Urban II made his memorable speech, in which he exhorted his hearers to bear aid to the Eastern Empire and to reconquer Jerusalem. His fiery eloquence evoked an enthusiastic response; for he appealed to all the motives which were then influential—to the spirit of religious enthusiasm, to the love of fighting and adventure, and to the desire, in many, of bettering their fortunes. After the conclusion of Urban's speech many pressed forward to take the Crusader's vow and the cross, which was the symbol of this vow and gave its name to the movement. The agitation spread rapidly to all the countries of western Europe and embraced all ranks of society. The nobles made deliberate preparations for an expedition which was expected to last three years; but the common people, among whom Peter the Hermit (q.v.) and others had been busily preaching the Crusade, were too impatient, and many of them too poor, to wait. In the spring of 1096 thousands of men, women, and children started in different bands under the leadership of Walter the Penniless, Peter, and others. They marched from Cologne and the Rhineland, across Germany, through Hungary, along the Danube, and southward to Constantinople. Later bands were very disorderly; their course was marked by persecution of the Jews, robbery, and plunder, and many of them were slaughtered by the infuriated inhabitants of the countries through which they passed. Those who reached Constantinople were received graciously by the Emperor. Their disorderly conduct, however, soon caused him to transport them to Asia Minor, where almost all were slain by the Turks. The march of these disorderly bands is generally styled the Peasants' Crusade.

The First Crusade, 1096–99. In the summer and fall of 1096 the real armies, led by the nobles, began their march. Among the leaders were Godfrey of Bouillon, Bohemond, Prince of Tarentum, Robert of Normandy, Robert of Flanders, and Raymond, Count of Toulouse, who was the latest of all to start. They proceeded by different routes to Constantinople, where they were delayed by the Emperor, who was alarmed by their numbers and lack of discipline, but wished to make use of their strength. An agreement was finally made, by which almost all of the leaders were induced to become his vassals, but in the campaign which followed neither party kept its promises, and the long negotiations resulted only in a mutual feeling of antagonism, which proved disastrous to the Christian cause. All of the Crusaders met at the siege of Nicæa, in May, 1097, when the army may have numbered 100,000, besides the women and noncombatants. Six millions were said to have taken the cross, but undoubtedly the number was greatly exaggerated; many, besides, who had taken the vow had turned back or were dead. Nicæa was taken, the Sultan of Iconium was defeated at Dorylæum, and in a few months the Crusaders accomplished the arduous march to Antioch, which was captured after a siege lasting from Oct. 21, 1097, to June 2, 1098. In the meantime Baldwin, brother of Godfrey, had taken possession of Edessa for himself, and Bohemond now established himself as Prince of Antioch. The leaders became so intent on making conquests for their own profit that the advance to Jerusalem was delayed for months. Finally, on June 7, 1099, the remnants of the army, about 20,000 in number, reached Jerusalem. After a siege of five weeks the city was captured, by reckless daring, on July 15. The Crusaders vented their wrath in an indiscriminate massacre, in which neither youth nor age was spared, and men and women were slaughtered in the holy places. The leaders wrote home exultingly, "In Solomon's Porch and in his temple our men rode in the blood of the Saracens up to the knees of their horses." Godfrey was elected "Baron and Defender of the Holy Sepulchre," and after the battle of Ascalon, in which the Egyptian army was defeated with great slaughter, almost all of the Crusaders returned home, leaving Godfrey with a small band of followers to defend Jerusalem. Bohemond held Antioch with his Norman followers. Baldwin was in the distant Edessa. A large part of Asia Minor was restored to the Greek Emperor. The news of the victories gained by the Crusaders set into motion three great armies from France, Germany, and Italy (1101–02), but, owing to their own excesses and folly, they fell an easy prey to the Mussulmans in Asia Minor.

The Second Crusade, 1147–49. In 1144 Edessa was captured by the Mohammedans. The news

of its loss aroused great alarm in the West, and a new Crusade was initiated, in which special privileges were offered to all participants. Bernard of Clairvaux was the great preacher of this movement. Conrad III of Germany and Louis VII of France took the cross and led great armies to the relief of the Holy Land, Conrad and Frederick Barbarossa starting from Ratisbon, in April, 1147. The march was very disorderly, and when the Crusaders entered the Byzantine Empire they came to blows with the Greeks. After much trouble the Bosporus was crossed, and the army advanced into Asia Minor, led by Greek guides. The guides proved unsatisfactory, the troops were harassed by the Turks, and finally, threatened with famine and death, they retreated, closely pursued by the enemy, only a very few getting back to Nicæa. Louis had better fortune; his army was more orderly, and he was well received by the Greek Emperor, although, when the French King crossed to Asia Minor, the Emperor refused to furnish guides until Louis and his barons had taken the oath of homage. Near Nicæa they met the German fugitives, with whom they joined forces and marched along the coast. Conrad soon turned back and spent the winter in Constantinople, but Louis went on, and, after meeting with a terrible defeat, in which the loss was very great, he and his knights went by ships to Antioch, while the common people were left behind to be slaughtered. From Antioch Louis proceeded to Jerusalem, where he was joined by Conrad. Together they planned the renewal of hostilities on a grand scale, but their schemes miscarried, and the kings went home in disgust.

The Third Crusade, 1189–91. The capture of Jerusalem by Saladin, in 1187, caused Frederick Barbarossa, Philip Augustus of France, and Richard the Lion-Hearted of England to take the cross. Frederick was drowned soon after he reached Syria. Richard and Philip captured Acre after a long siege; but the two kings quarreled so bitterly that Philip went home soon after the capture. Richard, thwarted at every turn by Saladin (q.v.), was compelled to make a truce without accomplishing anything more.

The Fourth Crusade, 1201–04. Innocent III (q.v.) made every effort to bring about a new Crusade. A great number of Latin nobles and knights were induced to take the cross, and the enthusiasm of the people was unbounded. Among the leaders in this Crusade were Baldwin of Flanders, Boniface of Montferrat, Geoffroy de Villehardouin, Louis of Blois, and Simon de Montfort. Arrangements were made with Venice that the Republic should supply the vessels and provisions for the journey; but, when the Crusaders reached Venice, they could not raise the amount agreed upon for payment. After a long delay they made a new bargain with Venice by undertaking to capture for her the city of Zara, in Dalmatia. The common soldiers were kept in ignorance of the infamous plan until it was too late for effectual protest. Zara was sacked, and the army spent the winter there. In the meantime a new plot was hatched by which, under pretense of reinstating the rightful Byzantine Emperor, Isaac Angelus, the Crusade was diverted to Constantinople. Isaac Angelus was restored to his throne, but, as he was not able to fulfill the conditions to which he had been compelled to agree, the Crusaders turned against him. Constantinople was captured a second time and sacked (1204). Much of the city was burned, precious works of art were destroyed, and enormous quantities of booty were secured. The Crusaders and the Venetians divided their conquests, and the Latin Empire (q.v.) was established.

The last three Crusades effected little permanent good for the Christian cause. *The Fifth Crusade* took place in 1228–29. The German Emperor, Frederick II (q.v.), who had taken the vow, went to the Holy Land and, by a treaty with the Mohammedan powers, secured Jerusalem. In 1244 the Holy City fell into the hands of the Kharesmians. *The Sixth Crusade* (1248–54) was led by Louis IX of France (St. Louis). He invaded Egypt and, although at first successful, was soon defeated, captured, and compelled to pay an enormous ransom. He then went to the Holy Land, rebuilt some fortresses, but accomplished little of importance. In 1270 he started on the *Seventh Crusade*, but was induced to turn aside to Tunis, where he died. Edward Plantagenet associated himself with Louis IX in that Crusade. He abandoned the Holy Land in 1272, and this year is generally considered to mark the end of the Crusades.

In addition to the seven principal Crusades, there were countless other expeditions. In some of these large armies took part, as in the Crusade of 1101, of which mention has been made; the German Crusade of 1197; the Children's Crusade (q.v.) in 1212; and the Crusade of John of Brienne and Andrew II of Hungary in 1217–21, which achieved the conquest of Damietta, in Egypt, in 1219. The last is often called the Fifth Crusade, and in fact the first four Crusades are the only ones to which the same numbers are assigned by unanimous consent. In addition, almost every year, from 1100 to 1270, small bands of Crusaders went to the Holy Land, and after 1270 many attempts were made to reconquer Jerusalem. There were also Crusades in the West against the Moors in Spain and against the heathen Prussians. (See TEUTONIC KNIGHTS.) Besides these Crusades against pagans many Crusades were preached against the Albigenses (q.v.), the Hohenstaufen (q.v.), and other opponents of the popes, the name being used for all kinds of expeditions in which the Church was interested.

The Results of the Crusades. The Crusades were of very great importance in the history of Europe in that they accelerated many movements which without them would probably have advanced much more gradually. They contributed to the growth of the great Italian seaports by establishing closer commercial communications between Europe and the East; they enriched the Church and increased its powers, and they helped to develop the strength of the French monarchy by killing off large numbers of the turbulent nobility, or removing them to a more grateful field of activity in Asia and Africa. For Europe at large the most important results were these: 1. They checked the advance of the Mohammedans for a considerable period of time; for, by carrying the war into the enemy's country, they prevented his advance into Europe. It is true that too much stress may be laid on this fact, for the Crusades undoubtedly weakened the Byzantine Empire and made it an easier prey for the Turks in the fifteenth century; but in

the twelfth and thirteenth centuries the Crusading states in the East served as outposts to guard against the invasion of Europe. 2. The Crusades enriched Europe greatly by promoting the growth of commerce. In order to transfer the Crusading armies and to supply their various needs, large ships had to be built. These brought back to the West the products of the Orient. In Asia and Africa the Crusaders acquired new tastes and desires, which had to be gratified by a more extensive commerce—witness the remarkable growth in the use of sugar and spices in the twelfth century. Money, which previously had been hoarded, was put into circulation to equip the crusading hosts. All of these causes led to a remarkable growth in wealth and prosperity, which benefited especially the inhabitants of the cities in western Europe. This is regarded by many as the most important result of the Crusades. 3. The Crusades caused a broadening of the intellectual horizon and originated a tendency towards skepticism. "On its Oriental *Studienreisen* young Europe studied industriously and with great results." The constant contact for two centuries with the more advanced Byzantine and Arabic culture taught the Crusaders many lessons in civilization. The admiration which they learned to feel for heretics and Mohammedans dispelled many of their prejudices. Some Crusaders became Mohammedans, others became freethinkers. There was a rapid spread of heresies. "The roots of the Renaissance are to be found in the civilization of the Crusades." There have been three periods of great advance in the history of Europe—the Crusades, the Reformation, and the French Revolution; and of these three the Crusades were not the least important and influential.

Bibliography. The literature of the Crusades is very extensive, and only a few of the principal titles can be given. The most important collection of sources is the *Recueil des historiens des croisades*, of which 15 folio volumes have been published (Paris, 1841 et seq.). Consult also: Bongars, *Gesta Dei per Francos* (Hanover, 1611); the publications of the Société de l'Orient (Paris, 1878–84); Villehardouin and De Joinville, *Chronicles of the Crusades* ("Everyman's Library," 1908). Of general histories the best are: Wilken, *Geschichte der Kreuzzüge* (7 vols., Leipzig, 1807–32); Michaud, *L'Histoire des croisades* (Paris, 1825–29, many later editions), and also an English translation by Robson, *History of the Crusades* (London, 1881); Kugler, *Geschichte der Kreuzzüge* (Berlin, 1891); Archer and Kingsford, *The Crusades* (New York, 1895); Bréhier, *L'Eglise et l'Orient au Moyen Age* (Paris, 1907); Prutz, *Kulturgeschichte der Kreuzzüge* (Berlin, 1883); Von Sybel, *Geschichte des ersten Kreuzzuges* (Leipzig, 1900); Röhricht, *Geschichte des Königreichs Jerusalem* (Berlin, 1898). See ANTIOCH, PRINCIPALITY OF; DANDOLO; LATIN KINGDOM OF JERUSALEM.

CRUSADE, CHILDREN'S. See CHILDREN'S CRUSADE.

CRUSCA, krōō'skȧ, ACCADEMIA DELLA. See ACADEMY.

CRUSENSTOLPE, krōō'zen-stōl'pe, MAGNUS JAKOB VON (1795–1865). A Swedish publicist and author, born in Jönköping. He became editor of *Ställningar och förhållanden* in 1838 and for publishing therein certain expressions against the government was imprisoned from 1838 to 1841. He is best known for his historical fiction, such as *Morianen* ('The Moor,' 1840–44) and *Carl Johan och Svenskarne* ('Carl Johan and the Swedes,' 1845–46). Consult Ahnfelt, *Magnus Jakob C.* (2 vols., 1880–81).

CRUSHING MACHINERY. See GRINDING AND PULVERIZING MACHINERY.

CRUSIUS, krōō'zē-ụs, OTTO (1857–). A German classical scholar, born at Hanover. He became professor at the University of Heidelberg in 1898 and at Munich in 1903. His works include: *Zur griechischen Religionsgeschichte* (1886); *Untersuchungen zu Herondas* (1892); *etc.* He edited *Philologus; Herondas* (1901); *Fabeln des Babrius* (1897); and *Griechische Lyriker* (1897 et seq.). Since 1910 he has, with others, published several volumes of *Das Erbe der Alter: Schriften über Wesen und Wirkung der Antike* (Leipzig).

CRUSOE, krōō'sō, ROBINSON. See ROBINSON CRUSOE.

CRUSQUE, JACQUES DE. See Latinized form CRUQUIUS.

CRUSTA'CEA (Neo-Lat. nom. pl., from Lat. *crusta,* crust). A class of gill-bearing aquatic anthropods, differing from other Branchiata in having five pairs of appendages on the head, the first two of which are antennæ, and in having all of the limbs except the first pair of antennæ biramose.

Structure. The Crustacea derive their name from the hard armor which in most of them covers the whole body, forming a complex exoskeleton, calcareous and intermediate between shell and bone in the higher forms, while in the lower and smaller kinds it consists principally of chitin and corresponds more nearly in its nature with the integuments of insects. It is secreted by the epidermis on its outer side and serves not merely for protection, but also for the attachment of the muscles. Its color is dependent upon the absence or presence and amount of pigment, which is also a product of the epidermis and is formed during the growth of the skeleton. These pigment cells are often very ornamental, especially under the microscope, as their shape is beautifully and very irregularly stellate. Usually, however, the pigment is so abundant as to make the body wall opaque and the individual pigment cells are no longer visible. The mineral matter of the skeleton is chiefly carbonate of lime. The smallest crustaceans have little or none in the skeleton, but in all of the larger forms it is present in greater or less abundance. In the so-called "stone crabs" so much is present that the skeleton is really as hard as a rock. In all cases, however, where the skeleton covers a joint it is thin and free from mineral matter, thus permitting perfect freedom of movement. The bristles and hairs often found on the outside of the skeleton are of the same essential structure as it and have a central core of epidermis. In barnacles (q.v.), ostracods, water fleas (q.v.), and a few other crustaceans, there is, in addition to the external skeleton, and formed as an outgrowth of it, a true shell, whose only function is protection. This shell may consist of several pieces, as in barnacles, or be strictly bivalve, as in water fleas, and it may be wholly chitinous or very firmly calcified. Sometimes it is capable of inclosing the entire animal, but often it only seems to protect certain parts. It is usually hinged along the dorsal side of the animal, where it is attached to the skeleton and is supplied with muscles for closing it.

The crustacean body is composed of segments, some very distinct, while others coalesce or are consolidated, of which the thorax of a crab affords an excellent example. The first five rings are regarded as forming the head, the next eight the thorax, when that part of the body is separable from what follows.

Epidermis and Molting.—The crustaceous covering has beneath it a true skin and, like the epidermis, is cast off from time to time and supplied anew, as the growth of the animal requires more room for the internal parts. In this molting or casting of the shell the animal divests itself of its covering, not in separate parts, but in one piece, including the coverings of the limbs and even of the antennæ, although the membranes which connect the hard plates are split and torn. A period of apparent sickness precedes, and agitation accompanies the process; and the thick muscular parts of the limbs of crabs and lobsters become soft and flaccid, so as to be more easily extricated from their hard covering. The loss of a limb, which sometimes takes place in this process and is otherwise a frequent occurrence, is easily repaired, for a new one grows in its stead; but it is a curious circumstance that in order to this reproduction the limb must be broken off at a particular joint, the second from the body, thus leaving only a short stump; and when a limb is broken elsewhere, the animal itself exercises the remarkable power of throwing it off by this joint.

Locomotive and Other Organs.—The principal organ of locomotion in many Crustacea, as in the lobster, shrimp, etc., is the abdomen, terminating in fanlike appendages; by bending the abdomen suddenly down under the body, the animal darts backward in the water. The limbs, which are connected with the thoracic rings, are, in some, organs of swimming; those of others are used for walking at the bottom of the water or on dry ground. Some have "swimming feet" or pleopods attached to the abdomen, often very different from the thoracic legs. The legs of some are fitted for burrowing. The first pair of legs is not infrequently transformed into a pair of powerful pincers or "claws," the last joint but one being prolonged so as to oppose the last joint, which becomes attached as to the side of it; and these are used for seizing and tearing food. The first pair of appendages are organs of touch called "antennules"; following these are the antennæ, also sense organs; then come a pair of powerful jaws, the mandibles; and back of these are two pairs of accessory jaws, the maxillæ. The thoracic feet, which follow in regular order, are sometimes modified to function as jaws and are then called "maxillipeds." In some forms the mouth parts are greatly modified to form sucking instead of masticating organs. The digestive organs are very simple; there is a short but capacious gullet, a large stomach, and a straight and simple intestinal tube. A well-developed digestive gland called the "liver" is often present. The pyloric region of the stomach is sometimes furnished with a remarkable apparatus of hard tubercles or sharp teeth for grinding or tearing food. Many of the Crustacea feed on animal food and are very voracious; many, however, feed on vegetable food. The nervous system of crustaceans agrees generally with that of other anthropods and exhibits many gradations of concentration. The eyes are either simple (ocelli), aggregate (consisting of several ocelli under a common cornea), or compound; and the compound eyes are often elevated on stalks. Besides eyes some crustaceans have ciliated pits or cavities that seem to be sense organs, perhaps for smell or taste. Others have otocysts or positional organs, but it is doubtful whether any have the sense of hearing. In some Schizopoda there are also "accessory eyes" on the basal points of certain thoracic feet and in the middle line of the abdomen. The gills are variously placed, on the sides of the body, or on the thoracic limbs, on the abdominal legs, etc. The heart is always in the middle line of the body on the dorsal side, is of variable form, and distributes the blood by a number of trunks through the system; but the blood returns to venous sinuses, from which, and not from the heart, it is sent into the gills, and it is not until after its aëration in the gills that it comes to the heart again.

Reproduction and Ecology. The sexes are distinct in most Crustacea, and all are oviparous. The eggs are almost invariably hatched in water, even those of terrestrial forms, and a sort of incubation often takes place, as the eggs are carried about under the abdomen or thorax of the female, attached to the pleopods or other appendages. Except in a few cases the development takes place by metamorphosis, through a very remarkable series of larval stages. All the lower Crustacea hatch as minute, oval, unsegmented creatures with three pairs of appendages, and this larva is called a "nauplius." Although the higher Crustacea hatch as a more highly organized form called "zoea," and later pass through an intermediate larval form, the "megalops," all pass through a nauplius stage in the egg. See BARNACLE for illustration of nauplius, and see CRAB for illustrations of zoea and megalops.

More than 10,000 species of living Crustacea are known, of which the greater number are marine; some inhabit fresh waters, running or stagnant; comparatively few are terrestrial. Many exhibit a high degree of intelligence. The Crustacea constitute, in an economic sense, perhaps the most important group of invertebrates. The myriads of the smaller forms that drift about the ocean and the great lakes furnish the greater part of the fare of the important food fishes and are thus indirectly of value to mankind. In the economy of the ocean itself Crustacea are also of great importance, for they act as the natural scavengers of the sea.

Classification and Phylogeny. Classification of the Crustacea is based upon the number and manner of consolidation of the segments of the body and upon the number and character of the appendages. There are three large groups, (I) Trilobita, (II) Entomostraca, and (III) Malacostraca (qq.v.), which may be considered to constitute subclasses. The principal characters of these subclasses and their component orders, together with some notes of the geological history of the groups, are here briefly given.

I. TRILOBITA. This is an extinct group of Crustacea that lived during Paleozoic time only. No near relatives are known, though they exhibit some affinities with the Phyllopoda. The body consists of three regions—head, thorax, and abdomen—and it is further divided by a raised median dorsal ridge into three longitud-

inal lobes from which character the group derives its name. The thorax has a variable number (2 to 19) of segments that are so articulated as to enable the animal to coil itself more or less closely after the manner of an armadillo. The trilobites constitute a very primitive group of Crustacea, and, as their remains are found in the oldest sedimentary rocks, they were among the earliest inhabitants of the earth. They are of great importance to the geologist, as the various species are very characteristic of the particular layers of rock in which they occur, and for this reason they will be more fully described in an article under their own name.

II. Entomostraca. The members of this subclass present a great variety of form and habit of life, but they are alike in the variability of the degree of segmentation of the body. They are with few exceptions small, and all are aquatic. They are divided into four orders. 1. In the order *Phyllopoda* the segmentation is distinct, the anterior portion of the body is covered by a cephalic shield, and the thoracic appendages are leaflike, this latter character giving the group its name. In some phyllopods, as *Apus*, and the brine shrimps (*Branchipus* and *Artemia*), the body is elongated, well segmented, partly covered by a single dorsal shield and divided into three regions. In other genera, as *Daphnia* and *Estheria*, the body is not well segmented and is inclosed in a bivalve shell articulated by a hinge at the dorsal median line. The phyllopods are doubtfully represented in the Cambrian rocks. One genus, *Estheria*, has enjoyed a remarkably long life period, since it has existed from Devonian to recent times. During the Devonian and Carboniferous periods the Phyllopoda abounded in the brackish waters of the coastal swamps; in the rocks of the Tertiary era the members of this order are less common. A single doubtful representative of the suborder Cladocera, the genus *Lynceites*, has been found in the Carboniferous rocks. 2. *Ostracoda.*—In this order the animals are all small, mostly microscopic, and with the body inclosed in a hinged bivalve shell that can be tightly shut by a specially developed adductor muscle. These animals occur by myriads in the modern ocean, seas, and lakes, mostly swimming near the surface of the water, and they seem to have lived in equal abundance in the seas of past time, for their fossil shells are common in all the aqueous rocks from those of Cambrian to those of recent time. Their greatest expansion was in the Ordovician and Silurian, and again in the Carboniferous and Cretaceous periods. Examples are *Beyrichia*, *Leperditia*, and *Cypris*. 3. *Copepoda.*—These are all recent forms, with elongated well-segmented bodies in all except the degenerate parasitic members of the order. The limbs of the free-swimming species are biramous; those of the parasites are greatly reduced in size or entirely wanting. Examples: the water flea (*Cyclops*), the fish lice (*Lernæa*), and carp lice (*Argulus*). 4. *Cirripedia.*—In this order, the barnacles, we see perhaps the most aberrant of all crustaceans. Because of the usual sessile habit of life, the body of the animal has suffered so great modification that only the study of the developmental stages shows that the peculiar forms of the adult barnacles are acquired after passing through a series of larval stages exactly parallel to those of other Entomostraca. The body of the adult is attached by the head. It is inclosed in a leathery integument that develops articulated calcareous plates and is raised upon a peduncle as in the goose barnacle (*Lepas*); or it may be contained in a calcareous box made of a series of stony plates firmly joined to each other and to the foreign object that serves as a support, as in the acorn shell (*Balanus*). The earliest members of the order, *Turrilepas* and *Plumulites*, appeared in Cambrian and Ordovician time, and were ancestors of *Lepas*, while the oldest relative of *Balanus*, viz., *Palæocreusia*, occurs in the Lower Devonian rocks, and the genus *Balanus* itself has been found in the Mesozoic and Tertiary deposits. The Cirripedia afford the largest examples of Entomostraca in some of the goose barnacles that attain a length of 8 or 9 inches, and they furnish also the most degenerate forms in those Rhizocephala that live as parasites in the bodies of crabs. See Barnacle; Copepoda; Ostracoda; Phyllopoda; Entomostraca; and Plate of Barnacles.

III. Malacostraca (crabs, lobsters, etc.). The most commonly known, the largest, and the most highly organized Crustacea belong to this division. The body consists of a constant number of segments (20 or 21), distributed between the head (5), the thorax (8), and the abdomen (7). In most of the orders the head and thorax are fused to form a cephalothorax of 13 segments, and each segment bears a pair of appendages, all of which are usually well differentiated to perform special functions. The compound eyes are stalked in all orders except the Cumacea and Arthrostraca. 1. The order *Phyllocarida* was much more fully represented in Paleozoic times than it is now by such genera as *Ceratiocaris*, *Echinocaris*, *Pephricaris*, etc., in which the cephalothorax was covered by a hinged bivalve shell provided with an adductor muscle like that in the bivalve phyllopods and the ostracods. The order enjoyed a long life period, as it first appeared in the Upper Cambrian, and it lasted to the end of the Paleozoic. Through the Mesozoic and Tertiary eras the order could not have been very abundant, as no fossil remains referable to it have been found in the rocks of those ages, and the modern genera, three in number, show considerable modifications from their early ancestors. This group presents synthetic types which may have given rise on the one hand to the Phyllopoda, and on the other to the higher Crustacea represented by the Schizopoda and Decapoda. (See Phyllocarida.) 2. *Schizopoda.*—The animals of this order, the opossum shrimps (*Mysis*), resemble in their general form the shrimps and prawns among the decapods. They are, however, more loosely built, and the thoracic limbs, of which there are eight pairs, are biramous (whence the name), and all alike. These characters mark the group as of primitive rank. Its relation, as one of lower phylogenetic rank, to the Decapoda, is shown by the fact that certain decapods, such as the prawns, pass in their ontogeny, i.e., in their development from egg to adult, through a "mysis stage," in which schizopod characteristics are strongly marked. The fossil genera *Archæocaris*, *Crangopsis*, and *Pygocephalus* from the Carboniferous, and possibly also *Palæocaris* and *Gampsonyx*, the latter from the Permian, are the earliest ancestors of the Schizopoda. These all present very primitive characters and are separated from the

modern descendants by the interval of Mesozoic and Tertiary time, from which we have no traces of the group.

3. *Decapoda.*—The character upon which the order (shrimps, lobsters, and crabs) is based is the prominence of the five posterior pairs of thoracic limbs developed as walking feet; the three anterior pairs being adapted as maxillipedes or accessory mouth parts. The first pair of walking feet is usually provided with strong chelæ, or nipping claws. The cephalothorax is covered by a single firm carapace, which in many crabs is so shaped as to afford a most efficient protective covering for the entire animal, including the legs. The frontal portion of this carapace is produced into an anterior rostrum that is often of considerable length, and the lateral portions are extended downward to cover the gills, which are borne on the bases of the thoracic limbs. The order is divided into two suborders: the Macrura, with long-tailed bodies, as the shrimp, prawn (*Palæmon*), and lobster (*Homarus*); and the Brachyura, or crabs, with the abdomen reduced and closely applied to the under surface of the cephalothorax. A number of species allied to the hermit crab (*Pagurus*), often distinguished under the subordinal designation Anomura, are either Macrura or Brachyura which, through adaptation to their peculiar habits of life, in occupying the discarded shells of gastropods, have lost the regularity of their thoracic and abdominal segments. The compound eyes of all decapods are raised on stalks, which in many crabs are developed to extraordinary lengths. Some of the largest among Crustacea are found among the decapods. As a rule, the quick-swimming decapods (prawns) may be recognized by the lateral compression of the body, while the bottom crawlers have a more or less flattened form. The crabs are the most highly specialized forms of all Crustacea, and they exhibit many interesting and peculiar adaptations to habit of life. (See CRAB; LOBSTER; PRAWN; ETC.) The early ancestry of the decapods is not well known for those periods previous to Mesozoic time. Some doubtful Paleozoic forms that seem to be transitional between the schizopods and decapods are *Palæopalæmon*, from the Devonian of Ohio, and *Anthrapalæmon*, from the coal measures of Illinois, but during this era the order was greatly subordinated to other crustaceans like the trilobites and ostracods, and to the merostomates, represented by *Eurypterus*. In the Mesozoic of Europe the group attained a great development, and this continued through the early Tertiary period. Fossil decapod remains are peculiarly sparse in the American deposits of these periods. The Jurassic lithographic slates of Bavaria have afforded large numbers of finely preserved specimens of fossil decapods of many genera and species. Some of these, as *Eryon*, have modern representatives, as *Willemœsia*, still living in the abysmal depths of the ocean. Other genera, among them the prawn (*Penœus*), began in the Jurassic and Cretaceous periods and have survived without changes of greater than specific rank throughout the succeeding ages, and are now abundant in the Mediterranean Sea and the Atlantic and Indian oceans. The Macrura declined towards the end of Cretaceous time and gave way to the Brachyura, which attained great expansion during the Eocene or early Tertiary period. In fact, the crabs were the dominant types of invertebrate life in many parts of the Tertiary seas of Europe, and their fossil remains are now found in abundance in the rocks that are relics of those seas. The Eocene deposits of the London Clay of England, those of Bavaria and Hungary, and especially those of Vicenza, in northeastern Italy, have afforded the finest specimens, nearly all of which belong to modern families.

4. *Stomatopoda.*—This is a small order comprising nine marine genera, of which the best known is the mantis shrimp (*Squilla*). They have the body loosely built, elongated, and flattened, with an incomplete carapace that leaves the three posterior thoracic segments uncovered, and with a disproportionately large abdomen. The five anterior pairs of thoracic limbs function as maxillipedes, the second pair being much the largest and provided with a spiny terminal segment that folds back upon the penultimate segment, like a knife blade into its handle, to form a very efficient clasping organ. A powerful burrowing organ, developed by the union of the sixth pair of abdominal appendages with the terminal plate, or telson, enables the animal to bury itself in the sandy bottoms near shore. Fossil forms of this group are rare. The earliest, *Necroscylla*, from the coal measures of England, resembles *Squilla*. Another allied genus, *Sculda*, is found in fine preservation in the lithographic slates of the Bavarian Jurassic, and *Squilla* is found in the same horizon and in succeeding horizons of the Cretaceous and Tertiary.

5. *Cumacea.*—Another small order of prawn-like Crustacea, in which the compound eyes are sessile and sometimes fused together or are entirely absent. The carapace is further reduced than in the Stomatopoda, for it leaves the five posterior pairs of thoracic segments uncovered. Only two pairs of thoracic limbs function as maxillipedes, and six pairs are legs, of which two or three anterior pairs are biramous. This group is related to the Schizopoda and Isopoda; no fossil representatives of it are known.

6. *Arthrostraca.*—In this large order the fusion of the segments is still further reduced, only one or two of the anterior being united with the head to form a rudimentary cephalothorax. These fused segments bear maxillipedes, while the remaining free segments bear legs that end in claws or are built for swimming. The two suborders are quite different in outward appearances. The Amphipoda have the body laterally compressed and the legs adapted for swimming and jumping, as in the sand fleas (*Gammarus* and *Orchestia.*) The Isopoda have the body dorsoventrally flattened, the legs adapted for crawling, and the abdominal segments are fused to form a single terminal plate.

EXPLANATION OF PLATE OF CRUSTACEA, FOSSIL.

1. *Dromiopsis*, a round crab from the Upper Cretaceous of Denmark. 2. *Leperditia*, an ostracod; Silurian; island of Gotland. 3. *Æger*, a prawn; Jurassic lithographic limestones; Bavaria. 4. *Xanthopsis*, a cyclometopan crab; Eocene; Bavaria. 5. *Turrilepas*, a primitive cirriped, allied to the goose barnacle; Silurian; Dudley, England. 6. *Sculda pennata*, a stomatopod; Upper Jura of Bavaria; *A*, outline of the fossil; *B*, dorsal view of head; *C*, ventral view of entire body, showing thoracic and abdominal appendages. 7. *Ceratiocaris*, a phyllocarid; Ordovician; Lanarkshire, Scotland; showing the bivalve shell, some of the head appendages, and the segmented long abdomen with terminal spines. 8. *Palæocreusia*, a barnacle, allied to the acorn shell, imbedded in a fossil coral of Lower Devonian age; New York State. 9. *Pephricaris*, a phyllocarid with spinose carapace; Chemung; New York State. 10. *Eryon*, a macruran; lithographic limestones of Bavaria; *A*, ventral aspect; *B*, dorsal aspect.

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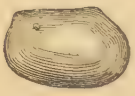

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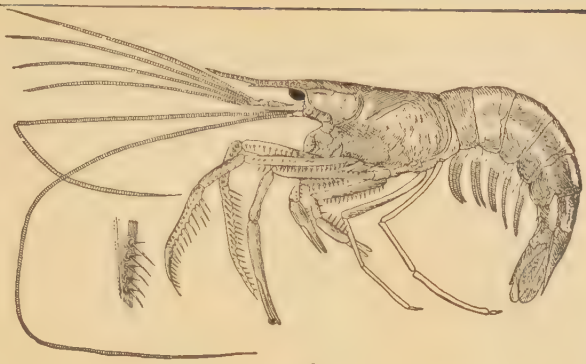

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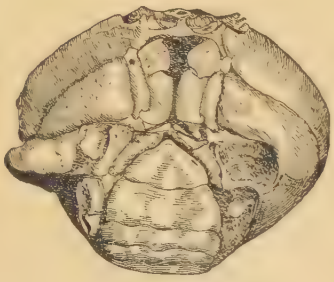

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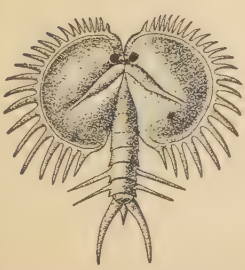

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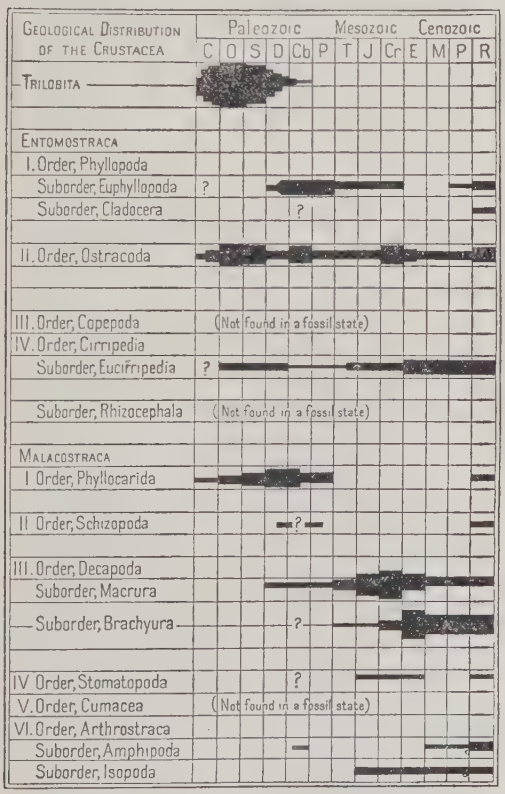
For description, see article CRUSTACEA.

The amphipods (see AMPHIPODA) are wholly aquatic, in both marine and fresh water, and are often also found living in the damp flotsam and jetsam of the beach between low and high tides. The isopods, while generally aquatic, afford some fine examples of adaptation to terrestrial conditions in the wood louse (*Oniscus*) and pill bug (*Armadillidium*), which are commonly found under the bark of dead trees and in other like situations. Paleontologically the amphipods are of little importance. The earliest indisputable ancestor is *Acanthotelson*, of the Carboniferous, and the genus *Gammarus* itself is found in the Tertiary rocks. The isopods are better known in a fossil state, and the ancestors seem to have been, as a rule, of larger size than the recent forms. *Arthrapleura* of the Carboniferous attained a length of about 20 inches. *Prœarcturus*, also a large form, from the Old Red Sandstone of the English Devonian, is the earliest isopod known. *Archæoniscus*, *Cyclosphæroma*, and *Eosphæroma* are other genera from the Mesozoic and Tertiary rocks that are closely allied to modern forms.

Geological Distribution. The accompanying table indicates in a rough way the larger classi-



HISTORICAL VIEW OF CRUSTACEA.

fication of the Crustacea and the distribution and expansion of the various subdivisions in past geologic times. It shows that certain types, especially the more primitive, played more important rôles in the early ages than they do at present, and that they have been superseded by the more specialized types. The letters at the heads of the vertical columns indicate the geological systems as follows: C, Cambrian; O, Ordovician; S, Silurian; D, Devonian; Cb. Carboniferous; P, Permian; T, Triassic; J, Jurassic; Cr, Cretaceous; E, Eocene; M, Miocene; Pl, Pliocene; R, Recent. An interrogation point indicates the doubtful presence of a member of the group, and the width of the black line indicates in a very imperfect way the relative amount of expansion of the group. The articles on the different orders and suborders should be consulted for further information.

Bibliography. The best general introduction to the study of the Crustacea is T. H. Huxley, *The Crayfish: An Introduction to the Study of Zoölogy*, in "International Scientific Series" (New York, 1884), and the most interesting and comprehensive account of the whole group is Calman's *The Life of Crustacea* (ib., 1911). Other works of a general nature on the morphology and classification are: J. S. Kingsley, "The Classification of the Arthropoda," in *American Naturalist*, vol. xxviii (Philadelphia, 1894); K. Groben, "The Genealogy and Classification of the Crustacea," in *Annals and Magazine of Natural History*, 6th series, vol. xi (London, 1893); T. R. R. Stebbing, *History of the Crustacea* (New York, 1893); R. Rathbun, "Natural History of the Economic Crustaceans," in *Bulletin United States Fish Commission* (Washington, 1889); H. Milne-Edwards, *Histoire naturelle des crustacés* (3 vols., Paris, 1834–40); H. Gerstaecker, "Gliederfüssler," in Bronn's *Klassen und Ordnungen des Thierreichs*, vol. v (Leipzig, 1866–94). Consult also: Cornish, *Crustaceans* (London, 1883); Rankin, *The Northrop Collection of Crustacea from the Bahamas* (Lancaster, Pa., 1898); id., "The Crustacea of the Bermuda Islands," in *Annals of New York Academy of Sciences*, vol. xii (New York, 1900); Sharpe, "Report on the Fresh-Water Cestracoda of the United States National Museum," in *Proceedings of the United States National Museum*, vol. xxvi (Washington, 1903); Paulmier, "Higher Crustacea of New York City," in *State Education Department* (Albany, 1905); Smith, "Crustacea," in *Cambridge Natural History*, vol. iv (London, 1909); Calman, "Crustacea," in Lancaster's *A Treatise on Zoölogy*, vol. vii (ib., 1909); Stappers, *Crustacés malacastraces* (Brussels, 1911). For description of the fossil forms, consult the various manuals of paleontology, such as those by Zittel-Eastman, Bernard, Nicholson, and Etheridge. A good synopsis of the class, dwelling more especially on the fossil forms, is to be found in Zittel-Eastman, *Text-Book of Paleontology* (New York and London, 1900), where are given very useful bibliographic lists of works on both recent and fossil forms.

CRUST OF THE EARTH. It was formerly believed by scientists that the interior of our globe is in a state of fusion due to excessive heat, and they accordingly gave the name "crust of the earth" to the external solid portion of the earth with which we are familiar. Modern investigation has tended to show that the interior of the earth may not be liquid, as this term is ordinarily understood, and the term "crust of the earth," suggesting, as it does, the liquidity of the earth's interior, has fallen somewhat into disfavor among scientists. The term "lithosphere," meaning "rock sphere," has been proposed as a substitute, but in popular usage it has not displaced the earlier term. The crust of the earth is composed of igneous and sedimentary rocks. The rocks occurring deepest below the surface, chiefly of the Archæan age,

are igneous. Resting on them, and forming the surface rocks for much of the globe, are sedimentary rocks, which have everywhere the same general geological succession, although varying widely in minor stratigraphy and structure. The basal igneous rocks, owing to erosion, are now exposed at the surface over considerable areas, and later igneous rocks are associated with the sediments which they have invaded by deep-seated or volcanic processes.

The rocks of the earth's crust are fractured and folded, the folding involving an actual plastic deformation or "flowage" of the rock mass. It is probable that fractures are confined to the outer portion of the earth's crust, while at a considerable depth, perhaps 10,000 meters or more, the pressure is so great that fractures cannot be developed, and the rock is deformed by flowage. For convenience in discussing its structure, Van Hise has accordingly proposed a division of the earth's crust into (1) a deep-seated zone of flowage, where rocks are deformed by flowage and where fractures cannot exist; (2) an upper zone of fracture, where the rocks are deformed by fracture alone; and (3) an intermediate zone of fracture and flowage. By surface erosion rocks which have been deformed in the zone of flowage may ultimately reach the surface of the earth, and hence it is that we have, side by side, the effects of deformation in all zones. Consult Van Hise, "Principles of North American Pre-Cambrian Geology," in *Sixteenth Annual Report United States Geological Survey*, part i (Washington, 1896). See GEOLOGY; METAMORPHIC ROCKS.

CRUVEILHIER, krụ'vâ'yâ', JEAN (1791–1874). A French anatomist. He was educated in the University of Paris and became professor of pathological anatomy at Montpellier in 1824 and at Paris in 1836. His publications include: *Essai sur l'anatomie pathologique en général* (1816); *Anatomie descriptive* (1834–36); *Anatomie pathologique du corps humain* (2 vols., 1828–42); *Anatomie du système nerveux de l'homme* (1845); *Traité d'anatomie pathologique générale* (5 vols., 1849–64); *Traité d'anatomie descriptive* (3 vols., 1833–38; 5th ed., 1872–79).

CRUVELLI, krụ-vĕl'lī, SOPHIE, COUNTESS VIGIER (1826–1907). A German singer. Her real name was Crüwell. She studied under Bordogni in Paris, made her début in Venice in 1847, and sang with increasing success in various Italian theatres and afterward in London and Paris. Endowed with a contralto voice of great strength and purity, she was one of the most popular vocalists of her time. On marrying Count Vigier, in 1856, she left the stage and thereafter lived at Nice.

CRUX (Lat. *crux*, a cross). A southern constellation, commonly known as the Southern Cross. It is situated near the Antarctic circle and therefore never visible in northern latitudes. It consists of four bright stars, to which fancy, aided by Christian associations, gives the cruciform shape. The two brilliant stars which mark the summit and foot of the Southern Cross have nearly the same right ascension. The constellation, therefore, is almost vertical when passing the meridian, and these two stars act as pointers to the Antarctic Pole.

CRUYS, krois, or **KRUYS,** CORNELIS (1657–1727). A Russian rear admiral of Norwegian extraction. He entered the service of Peter the Great in 1698 and rose to be a vice admiral and vice president of the Russian Admiralty Board. He served Peter faithfully in the wars with Sweden and Turkey, but was hampered by the jealousy of the native Russian officers, and in 1714, after an unsuccessful encounter with some Swedish vessels, he was arrested and tried by court-martial. Sentenced to death, he was reprieved by order of the Czar and exiled to Kazan, but later in the year was recalled and restored to his office. As chief assistant to Count Apraxin (q.v.), Cruys did much to build up the Russian navy. He promoted the building of dockyards, canals, and the drawing up of charts. At the time of his death, in 1727, he owned a large estate at Kexholm and the island of Birken in Finland. In memory of his work, the Russian men-of-war still fly a white flag with a blue cross (*kruis*). Consult "The Russian Fleet under Peter the Great," in *English Navy Records Society* (London, 1899), and Browning, *Peter the Great* (ib., 1898).

CRUZ, krōōs, JOSÉ MARÍA DE LA (1801–75). A Chilean general. He was born at Concepción and became a member of the Republican cadet class when 10 years old. In 1838 he became chief of staff in the Peruvian campaign, was twice appointed Minister of War, and in 1842 was elected Governor of Valparaiso. In 1851, defeated as the candidate of the Liberals for the presidency, he organized a revolution which terminated in the disastrous defeat of Loncomilla (Dec. 8, 1851), and was followed by his retirement from public life.

CRUZ, JUAN PANTOJA DE LA. See PANTOJA DE LA CRUZ, JUAN.

CRUZ, krōōth, SAN JUAN DE LA (1542–91). A great Spanish mystic, born at Fontiveros. His real name was Juan de Yepes y Alvarez, but upon entering the Order of the Carmelites (1563) he assumed that of de la Cruz ('of the Cross'). St. Theresa was then engaged in the reformation of the Order of Carmel, and San Juan became her ardent disciple. His efforts brought him into constant trouble, and into one imprisonment of seven months; and he was practically in exile at the time of his death. He was canonized in 1726. The many writings of Juan de la Cruz in prose and verse contain some passages of great beauty and others of untranslatable vagueness, but wonderfully harmonious. In his *Obras espirituales* Spanish mysticism finds its loftiest expression. Many of his poems have been translated into English by Arthur Symons. His best single works are *Noche oscura del alma* and *Subida del Monte Carmelo*. His works, published first at Barcelona in 1580, were translated into French by P. Maillard in 1694 and have frequently been reprinted. Consult M. Domínguez Berruete, *El misticismo de San Juan de la Cruz en sus poesías* (Madrid, 1894), and R. Encinas y López de Espinosa, *La poesía de San Juan de la Cruz* (Valencia, 1905).

CRUZADA, krōō-zā'dȧ *or* -zä'dȧ, BULL OF THE. This was one of many special dispensations from the rigors of Lenten abstinence and was originally granted for war against the Moors. Later it was practically forced upon the people for a money consideration and became a regular source of considerable revenue. It was promulgated by Pope Pius II, who reigned from 1458 to 1464. By a brief dated at Rome, Jan. 28, 1555, Pope Julius III conceded to His Catholic Majesty the sale of the Bull of the *Cruzada*. The Cortes

more than once complained of the Bull and claimed the prerogative of deciding for themselves whether the Bull should be published or not. They also claimed that if the Bull were to be sold, the purchase must be purely voluntary and not forced, as has been asserted, on the people by itinerant friars who kept congregations for days in church and refused absolution to all who did not buy. Those who sold the Bull were known as *bulderos*. The abuses practiced in the sale were frequently the subject of witty, satirical works. The sale by the King of Spain was also a stock subject for a quarrel between the King and the Pope. Pius IV withdrew the right, and Pius V renewed it.

CRUZ CANO Y OLMEDILLA, krōōth kä'nō ē ōl'mā-dēl'yȧ, Ramón Francisco de la (1731–94), commonly known as Don Ramón de la Cruz. The most important dramatist produced by Spain during the eighteenth century; also a poet. He essayed nearly every kind of drama—tragedy, tragi-comedy, comedy drama, comedy, farce, comic opera, and, last of all, the *sainete*, a short, witty piece, with little or no plot (since its length, of one act, forbade), that gives a faithful picture of some little scene in everyday life. This *genre* is the further development of the older *pasos* and *entremeses*, and in Cruz's hands forms the natural bridge between rigid classicism and elastic romanticism in things dramaturgic. In his early days Cruz attempted the classic drama along lines strictly classic and even carried his admiration thereof so far as to imitate in some cases, and to translate in others, certain French and Italian plays. But in the *sainete* he was himself, and a Spaniard, with no debts to foreign influences or models. The effect of this lesson in patriotism and independence was later felt even in serious drama, and thus prepared the way for the modern renaissance of the drama in Spain. Before the time of Cruz the *zarzuela* (a kind of Spanish comic opera) had been the pastime almost exclusively of the rich. Not the least of Cruz's achievements was its democratization as we now know it. During 30 years he kept the Madrid theatres supplied with his plays, at a time when long runs were unknown, and runs even of a week practically unheard of. His productivity caused one of his editors to call him the Lope de Vega of the eighteenth century. We know the titles of more than 500 of his plays, of which number nearly two-thirds are still inedited. Although Cruz realized the importance of what he was doing (as shown by his celebrated phrase, "Truth dictates and I write"), posterity long failed to recognize him as a master. Only in relatively recent years have we come to realize that his works are an inexhaustible source of information concerning Spanish life in his period, and that he is entitled to be called, as he has been, "the Goya of the theatre." Consult: Cruz y Cano, *Teatro* (10 vols., Madrid, 1786–91); *Colección de sainetes, etc.*, ed. of A. Durán (2 vols., ib., 1843); *Sainetes inéditos, etc.*, ed. of C. Cambronero (ib., 1900); *Sainetes desconocidos* (1st series, ib., 1906); Pérez Galdós, "Ramón de la Cruz y su época," in *Revista de España*, (1870–71); Cotarelo y Mori, *Ramón de la Cruz y sus obras* (ib., 1899); Pérez y González "Cuatro sainetes 'anónimos' de Don Ramón de la Cruz," in *Ilustración Española y Americana*, vol. lxxxiv (1907).

CRUZ E SILVA, Antonio Diniz da. See Diniz da Cruz e Silva, Antonio.

CRUZ Y GOYENECHE, krōōs ē gō'yȧ-nā'chȧ, Louis de la (1768–1828). A Chilean general. He was born at Concepción, where he held several municipal offices. His exploration of the Andes in 1806 resulted in the discovery of several important mountain passes, which are described in a report published in the Angelis collection at Buenos Aires in 1835. Four years after his famous Andean expedition, he became a member of the revolutionary junta of Concepción, but was captured during the ensuing campaign and imprisoned until 1817. He was afterward for a time acting President of Chile and upon the outbreak of the Peruvian campaign joined San Martín's army, (1820), advancing to the rank of grand marshal. Shortly before his death he was appointed Minister of Marine.

CRYING BIRD. See Courlan; Limpkin.

CRYOHYDRATES. See Freezing Point.

CRY'OLITE (Gk. *κρύος, kryos*, frost + *λίθος, lithos*, stone). A sodium and aluminium floride that crystallizes in the monoclinic system. It is found chiefly in west Greenland, near Arksuk, where it occurs as a large bed in a granite vein, and in El Paso Co., Colo. Cryolite is an important ore of aluminium (q.v.) and is used in the manufacture of alum, sodium hydrate (for making soap), sodium carbonate, and other salts. It is also employed in the making of an opaque white glass, sometimes called hot-cast porcelain, which is said to be prepared by fusing together 100 parts of silica, 35 parts of cryolite, and 15 parts of zinc oxide.

CRYOPH'ORUS (Neo-Lat., from Gk. *κρύος, kryos*, frost + *φέρειν, pherein*, to bear). An instrument consisting of a glass tube with a bulb at both ends, from which the air has been exhausted. A little water is present in one of the bulbs, and when the second bulb, containing only water vapor, is placed in a freezing mix-

CRYOPHORUS.

ture, the vapor condenses, thus producing a diminution of pressure, which causes more vapor to rise from the water in the first bulb. The result of this evaporation from the first bulb is the abstraction of much heat, and eventually the remaining water freezes.

CRYOSCOPY. See Molecules—Molecular Weights.

CRYPT, krĭpt (Lat. *crypta*, Gk. *κρύπτη, kryptē*, crypt, vault, from *κρύπτειν, kryptein*, to hide). In its ancient meaning, a subterranean chapel in the catacombs; hence, in more general usage, a chamber under a church, wholly or partly subterranean. The crypt was the logical enlargement of the confession (q.v.), which became a crypt when so expanded as to provide space for an altar. This expansion progressed, with the development of ecclesiastical architecture, until in many cases the crypt occupied the entire space under the choir and apse. It was reached from the church by a single or a double staircase, usually in the neighborhood of the high altar, in the nave or

side aisles. Although some crypts existed as early as the sixth century, it was not until the Carolingian period (ninth century) that such chambers attained to any size; but from that time until the thirteenth century they formed a very important part of church architecture, especially of the Romanesque style. In rare instances they extend under the entire body of the church, including nave and aisles, as in St. Eutrope at Saintes, the cathedral of Otranto, San Niccolò, Bari, and certain concentric churches of the Holy Sepulchre type, such as St. Bénigne at Dijon. Crypts were invariably and almost of necessity vaulted, usually with groin vaults carried on rows of columns or, in Romanesque and Gothic examples, on heavy round or clustered piers. In a number of important churches great height is secured for the crypt under the choir by raising the floor of the choir considerably above that of the nave, with picturesque effect. Sometimes the change of level is so great that the centre of the crypt opens widely upon the nave by one long central stairway, and two side staircases ascend to the choir. In such cases the crypt is apt to be a very monumental structure. Such are the crypts of San Zeno at Verona, of San Miniato at Florence, of the cathedral of Arezzo, of the abbey church of St. Denis, of the cathedral of Strassburg (the largest in Germany), and many others. Some German churches, having a choir at the west as well as east end, had crypts under both choirs, as in the cathedral of Bamberg. In England the finest crypt is that of Canterbury; next to it, that of Glasgow Cathedral. It is not always easy to draw a clear distinction between such crypts and the lower church or undercroft of two-storied edifices like St. Francis at Assisi, the Sainte-Chapelle (Paris), and the church of Schwarz-Rheindorf. Crypts are not only interesting in themselves, and from their great variety of plan and arrangement, but also because, on account of their protected subterranean situation, they have suffered less from vandalism than the more exposed structures aboveground and are often the only remaining part of a mediæval church. The age of cathedral building of the Mendicant orders, in the twelfth and thirteenth centuries, put an end to the building of crypts, because the cardinal idea of this era was to provide immense interiors on a single level for large congregations, instead of interiors divided by a raised choir into two sections.

CRYP'TO-CAL'VINISTS. A name given to Melanchthon and those who agreed with him in wishing to unite the Lutherans and Calvinists, and especially in his supposed leaning towards the Calvinistic view of the Lord's Supper as shown in the difference between the original and the altered Augsburg Confession (q.v.). The former said: "The body and blood of Christ are truly present in the Lord's Supper in the form of bread and wine and are there distributed and received by the communicants; therefore the opposite doctrine is rejected." In the latter the last clause is omitted. Luther did not approve the alteration, but tolerated Melanchthon's change of doctrine. Many, however, called him a Crypto-Calvinist. The truth seems to have been that he did not consider that either opinion was a sufficient bar to communion with Christ and therefore thought that both of them ought to be allowed. The controversy was becoming violent before his death, but afterward it broke out with great virulence, and continued with alternate success on each side for 50 years, during which time frequent attempts were made to suppress the Calvinistic opinions by imprisoning their leading advocates and at last, in 1611, by the execution of Chancellor Nicolas Crell. The term has also been applied to the Missouri Lutherans because of their acceptance of the doctrine of unconditional election. Consult Richard, *Philip Melanchthon* (New York, 1898).

CRYP'TOGAMS (from Gk. *κρυπτός, kryptos*, hidden + *γάμος, gamos*, marriage). A general term that includes all plants below the spermatophytes (seed plants), i.e., the pteridophytes (ferns and their allies), bryophytes (mosses and their allies), and thallophytes (algæ and fungi). The name means "hidden sex reproduction," and, in contrast with it, the spermatophytes are often called "phanerogams," which means "evident sex reproduction." The names are not appropriate, since the sex reproduction of cryptogams is "very evident" and that of phanerogams is very much "hidden." The mistake arose from regarding stamens and pistils as sex organs. The term "cryptogam," however, remains one of great convenience; but the term "phanerogam" is being replaced by the much more significant term "spermatophyte" (seed plant). The old distinction between cryptogams and phanerogams, that the former reproduce by spores and the latter by seeds, is a false one. Both groups produce spores, but the cryptogams do not produce seeds. Since the pteridophytes are distinct from the bryophytes and thallophytes in developing a vascular system, they are very frequently called "vascular cryptogams." For full account, see articles under the different group names.

CRYPTOG'RAPHY (Gk. *κρυπτός, kryptos*, secret + *γράφειν, graphein*, to write). The art of writing messages and documents in cipher, intended to be read only by those possessing the key. The use of secret methods of correspondence in important matters of state is of considerable antiquity. Plutarch and Gellius tell of a method employed by Spartan ephors in communicating with their generals abroad, which has received the name of *scytale*, from the staff used in deciphering it. A narrow strip of parchment was first wound spirally upon the staff, its edges just meeting, and the message was then written along the line of jointure. When it was unwound, the broken letters could afterward be read only by rolling the parchment upon a duplicate staff in possession of the general to whom it was sent. This is but one of a large number of mechanical devices for reading secret dispatches, such as papers pierced with holes, to be laid over the document, revealing only such words or letters as compose the secret message.

Cryptography, in its stricter sense of a cipher alphabet formed either by changing the value of the different letters or by substituting for them groups of letters, numbers, or arbitrary symbols, if not of Semitic origin, was at least already known to and used by the sacred writers, in its simplest form of using the alphabet in its inverted order. By the Jews this form is known by the name of Atbos, a word formed from A, the first letter of the Hebrew alphabet; T, the last letter; B, the second; and S, the last but one. An instance of its use occurs in Jeremiah

xiv, where the prophet, wishing to veil his meaning from all but the initiated, writes "Shehach" instead of "Babel," using the second and twelfth letters from the end of the alphabet instead of from the beginning. Julius Cæsar's "quarta elementorum littera," in which D takes the place of A and E of B, is only a variant of this simplest form of cipher. Suetonius states that a similar method was employed by Augustus. In mediæval and modern times many scholars have turned their attention to cryptography. Among them are John Trithemius, Abbot of Sponheim, in his *Poligraphia* (1500); Anastasius Kircher, and his pupil, Kaspar Schott, whose work, *De Magia Universali* (Würzburg, 1676), contains a cryptographic table that lies at the foundation of the modern cipher telegraph systems. It consists simply of the alphabet repeated 24 times in horizontal rows, each successive row dropping off one or more letters from the beginning and adding it at the end. Thus, in the second row B stands under A, C under B, etc. In the third C represents A, in the fourth D = A, etc. Thus correspondents have a choice of 24 alphabets, it being necessary only to agree between themselves upon the first or key letter. For diplomatic purposes this form is much too simple, since by the simple mechanical task of making at most 24 versions, any one could decipher dispatches made in this way. Accordingly various methods of complicating the cipher have been tried, one simple and effective way being that which is known in France as the method of Saint-Cyr. It consists in using alternately two or more of these 24 alphabets, the order in which they are to be used being determined by a key word previously agreed upon. Thus, if the key word is "Army," four alphabets are to be used, viz., those in the rows beginning respectively with A, R, M, and Y. Various other elaborations have been sometimes employed, such as arbitrarily changing the sequence of the letters of the alphabet, inserting at regular intervals letters or symbols that have no meaning ("nulls and insignificants," Bacon called them), or using groups of letters to represent separate letters. Of the last-named variety is the famous biliteral cipher of Bacon himself, consisting of various combinations of A and B, arranged in groups of five. Thus, *aabab, ababa, babba* = fly. So used, such a cipher would be but little more difficult to detect than any ordinary set of single symbols. But Bacon went a step further; for the *a*'s and the *b*'s of his groups he substituted two fonts of type, differing so slightly as to present little distinction to the untrained eye. These, called respectively the *a* font and the *b* font, can be used for setting up any ordinary page of printed matter when, by the proper admixture of the two fonts, each successive group of five letters on the page may be made to stand for a single letter in Bacon's biliteral system. The fact that Bacon took a deep interest in cryptograms is probably the origin of Ignatius Donnelly's theory that the Shakespearean plays contain a cipher which, if interpreted, would prove that Bacon wrote them. And recently a still bolder attempt has been made by a certain Mrs. Gallup to apply the biliteral cipher to the early Shakespeare folios, in which, as is generally known, more than one variety of type was used. The general principle involved in Bacon's method—that of representing the whole alphabet with groups and combinations of two symbols only—lies at the basis of many modern methods of signaling.

It is hardly too much to say that ingenuity and perseverance will solve any code based upon a regular mathematical principle. If the language of the document is known in advance, the relative frequency with which the letters of the alphabet normally occur in that language forms an important initial clue. Thus *e* is the letter of most frequent occurrence, not only in our own language, but in French and German as well. In English the next in order of frequency are *t, a, o, n, i, r, s, h, d, l, c, w, u, m,* etc. Single letters must be either *a, i,* or *o.* Words of two letters most likely to occur are *of, to, in, it, is, be, he, by, or,* etc. Double letters are most apt to be *ee, oo, ff, ll,* or *ss.* If there is doubt whether the cipher is in Latin, English, French, or German, the lack of double letters at the end of words suggests that it is Latin; if but few words end with double letters, it is probably French; if double letters are very numerous, it is German. Those who make a science of interpreting cipher documents receive no small assistance from a knowledge of the frequency with which certain symmetrical combinations of letters occur in the vocabulary of a language. Thus, the combination which may be represented for convenience by the formula *abab,* is comparatively rare in English: one may cite *papa, dodo;* in French, *tête, bébé.* The form *abeba* is found in *level;* Fr., *rêver.* In German, the formula *abba* gives only *Anna, Ebbe, Egge, Esse, Otto;* in French, the formula *abcdabc* gives only two words, *cherche* and *quelque.* An interesting example of the relative frequency of letters being used to solve a cryptogram will be found in Poe's tale, *The Gold Bug.*

Consult: John Baptist Porta, *De Furtivis Literarum Notis* (1563); Blaise de Vigenère, *Traité des chiffres* (1587); Thicknesse, *A treatise on the Art of Deciphering and of Writing in Cipher* (1772); and among more modern writers, J. L. Kluber, *Kryptographik* (Tübingen, 1809); Romani, *La cryptographie dévoilée* (1875); Fleissner, *Handbuch der Kryptographik* (Vienna, 1881); A. J. Butler's "Elizabethan Cipher-Books," in *Transactions of Bibliographical Society* (London, 1901).

CRYPTU'RI (Neo-Lat. nom. pl., from Gk. *κρυπτός, kryptos,* hidden + *οὐρά, oura,* tail). An order of birds, the tinamous, occupying a singular position and placed by Stejneger near the Apteryx and certain extinct forms. They are now included in the subclass Carinatæ, in the order Tinamiformes. They differ from all other Carinatæ (q.v.) in the character of the palate, which is like that of the ostrich. The order contains only a single family, of eight genera, which include nearly 70 forms, all confined to South America. See TINAMOU.

CRYS'TAL. See CRYSTALLOGRAPHY.

CRYSTAL CLASS and **CRYSTAL SYSTEM.** See CRYSTALLOGRAPHY.

CRYSTAL FALLS. A city and the county seat of Iron Co., Mich., about 210 miles (direct) north of Milwaukee, Wis., on the Chicago, Milwaukee, and St. Paul, and the Chicago and Northwestern railroads (Map: Michigan, A 2). The courthouse and high-school buildings are noteworthy. The city is of considerable importance commercially as the centre of a lumbering and iron-mining region. Crystal Falls

was chartered as a city in 1899 and owns its lighting and water plants. It is governed by a mayor and a unicameral council. Pop., 1910, 3775.

CRYSTAL GAZING. See CRYSTALLOMANCY.

CRYS'TALLIN. See GLOBULINS.

CRYS'TALLINE LENS (Fr. *cristallin*, Lat. *crystallinus*, Gk. κρυσαλλινός, *krystallinos*, from κρύσταλλος, *krystallos*, crystal, from κρυστάνειν, *krystanein*, to freeze, from κρύος, *kryos*, frost). A biconvex, transparent, solid body, situated immediately behind the pupil of the eye and imbedded in the vitreous humor. Through it the rays of light from any object must pass to reach the retina. The crystalline lens is more convex on its posterior than on the anterior surface, and its shape and consistency vary at different periods of life. In early youth it is nearly spherical and soft; as age advances, it becomes flattened and firm. In the adult human being it measures three-eighths of an inch transversely, and one-sixth of an inch in antero-posterior diameter. The lens is retained in position by a capsule of equal transparency, composed of tissue exactly similar to the elastic layer of the cornea. The lens has no vascular connection with its capsule, but is nourished by means of a very delicate layer of nucleated cells on its surface, which absorb nourishment from the capsule. Opacity of the lens is called "cataract" (q.v.). In rare instances the lens may be entirely absent. It may be dislocated either congenitally or from traumatism.

An increase in the refracting power of the eye for the purpose of near vision is called "accommodation." The mechanism of accommodation is as follows: The ciliary muscle contracts, drawing forward the choroid and ciliary processes and relaxing the zonula. The lens, which had been flattened by the tension of the zonula, assumes, through its own elasticity, a more spherical shape. The posterior surface of the lens alters but little in shape, being fixed rather firmly in place; but the anterior surface becomes more convex, and thus its refracting power is increased. The eye can see objects accurately at every distance between the "far point" (the most distant point of distinct vision for that eye) and the "near point." The near point is situated at that place at which the eye can begin to see clearly the fine print on a page held close to the eye and then moved slowly from it. Between the near point and the eye vision is indistinct, because the ciliary muscle cannot by any effort produce the amount of convexity of the lens requisite for so short a distance.

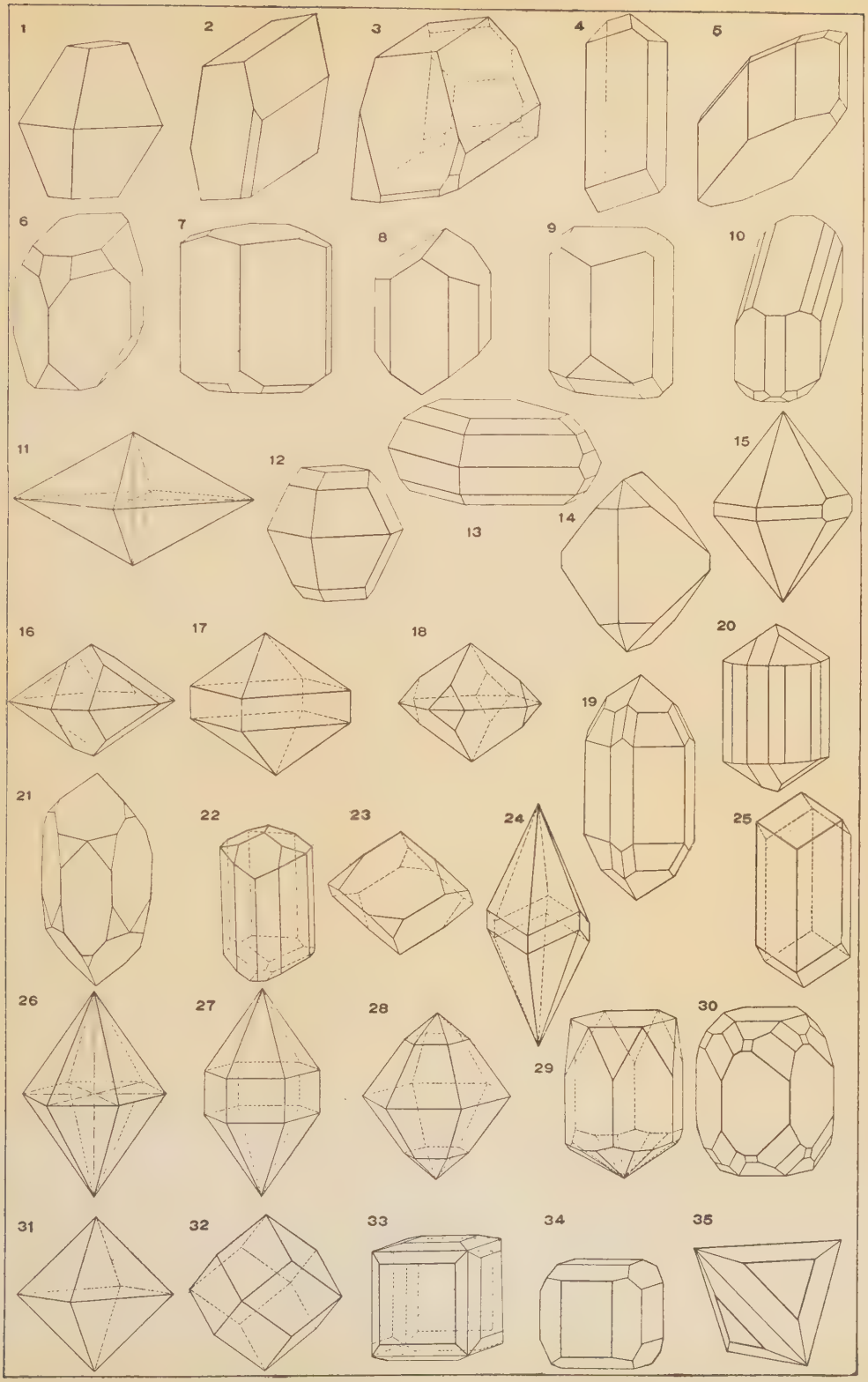
CRYSTALLINE ROCKS. A term used to include the igneous rocks (q.v.) and the metamorphic rocks (q.v.), both of which classes have a more crystalline texture than that of the sedimentary rocks.

CRYSTALLINE SCHISTS. See METAMORPHIC ROCKS.

CRYSTALLOGENY, krĭs'tal-loj'ĕ-nĭ. See CRYSTALLOGRAPHY.

CRYS'TALLOG'RAPHY (from Gk. κρύσταλλος, *krystallos*, crystal + γράφειν, *graphein*, to write). The science which treats of crystals. A crystal is a portion of inorganic matter which has a definite molecular structure and an outward form bounded by plane surfaces called "crystal faces." These crystal faces result from the regular arrangement of the particles of the substance which is undergoing solidification, every addition of matter to the crystal in the process of formation being piled upon the particles already solidified in much the same manner as cannon balls or oranges are built up into a pile. The reason which we assume for this is that every minute particle of a crystallizing substance, which we call a "crystal molecule," has certain lines of attractive force by which it gathers to itself other crystal molecules of the same substance in much the same way that a magnet attaches itself to a piece of iron or to another magnet. Crystal molecules of different substances have, in general, different lines of attraction, some of which are of different intensity; hence it follows that in most cases the solid formed by the piling together of the crystal molecules of a certain chemical compound has an outward shape which is characteristic of that compound. It is also assumed that the directions of attraction of the unit of crystal accretion, i.e., the crystal molecule, is dependent upon the structure of the chemical molecule of the substance crystallizing, being, it is supposed, made up of a number of chemical molecules grouped together. Hence only elementary chemical substances and definite chemical compounds form crystals. In order that the crystal molecules of a substance may come into sufficiently close proximity to admit of their being mutually attracted along their lines of crystallizing force, it is necessary that they should be crowded together by reason of the contraction of the space in which they are confined. This happens where a mass solidified by cooling, or when by evaporation the amount of a substance dissolved in a liquid, such as water, exceeds in quantity the amount which the solvent can retain in solution under the conditions obtaining. Either of these conditions results in the formation of crystals. A condition of formation more rarely met with is that in which crystals form directly from vapors, as in the case of iodine or chloride of ammonia. By far the best means of studying the formation of crystals is afforded by the evaporation of a solution of some soluble compound, such as salt or blue vitriol, until it is supersaturated, when crystals of the dissolved substance will be thrown down. If two substances, such as salt and borax, are dissolved in the same solution, the result of evaporation will be crystals of both substances, each set of molecules building themselves up in distinctive forms. Solutions show considerable inertness, and it is often necessary to start the process of crystallization by introducing some solid substance—best of all, a crystal of the substance—to form a nucleus for the growing crystal. The outward form—i.e., the solid bounded by plane faces—is only an expression of the regular grouping of molecules which takes place when a substance crystallizes, and consequently we may expect other evidences of this molecular arrangement. These evidences become apparent when we consider the physical properties, such as the transmission of light, heat, and electricity through crystals. A sphere cut from a quartz crystal, e.g., does not expand equally in all directions when heated, as does a sphere of an uncrystallized substance, such as glass or amber, neither does a piece of beryl transmit polarized light in the same way as does a piece of glass of the same shape. This latter property of crystals is of great use in the detection of imitation gems. In the case of the

CRYSTAL FORMS



1–5. TRICLINIC SYSTEM.
6–10. MONOCLINIC SYSTEM.
11–15. ORTHORHOMBIC SYSTEM.
16–20. TETRAGONAL SYSTEM.
21–25. TRIGONAL SYSTEM.
26–30. HEXAGONAL SYSTEM.
31–35. ISOMETRIC SYSTEM.

sphere of quartz we find that the action of heat pulls apart the molecules more in one direction than in all other directions, so that the sphere becomes an ellipsoid. Substances which, like glass, show no evidences of crystallization are said to be *amorphous*. A substance in which the molecules have responded to crystallization but in which crystal faces have not been developed is said to be crystalline. Crystalline masses are often the result of the close crowding of crystals to the exclusion of the development of crystal outlines.

Symmetry. Just as in the organic kingdoms we are familiar with unfailing regularity of repetition in parts of a flower or of an organism, as the opposite halves of a leaf or the arms of a starfish, so, as the result of the growth by regular accretions in crystals, we find a symmetrical recurrence of crystal faces corresponding to the lines of attraction of the crystal molecules. This is beautifully illustrated in the familiar snow crystals, which throughout their infinite variety of complex forms show a sixfold grouping; i.e., through the centre of every such crystal there passes an axis of sixfold symmetry. Similarly in a cubic crystal of salt there are axes of fourfold, threefold, and twofold symmetry, about which the crystal edges and angles are grouped in fours, threes, and twos respectively. A plane of symmetry is one which divides a crystal into equal halves, each of which is the reflected counterpart of the other—such a plane as would pass through the opposite edges of a cube. The point within a crystal in which the axes and planes of symmetry intersect is known as the centre of the crystal and is a centre of symmetry; i.e., every line through this point intersects the crystal in similar faces, edges, or solid angles. These elements of symmetry form the basis of the mathematical study of crystals, and from them 32 groups of crystals, divided into six systems, have been mathematically deduced. Any substance of which definite crystals are formed produces forms which show the symmetry of a distinct group, and it is impossible to find in nature a crystal whose symmetry would place it in more than one group. Beginning at the lowest degree of symmetry, the six crystallographic systems are:

The *triclinic system*, based on three inclined axes, corresponding to three nonrectangular and noninterchangeable lines of crystallizing force. Crystals referred to this system, which includes two groups, are symmetrical only to a point.

The *monoclinic system*, based on three noninterchangeable axes, two of which are at right angles and the third inclined to the plane of these. This system includes three groups, all crystals of which show one plane of symmetry.

The *orthorhombic system*, based on three noninterchangeable rectangular axes of twofold symmetry, the highest of the three groups under the system having three planes of symmetry.

The *hexagonal system*, based on three interchangeable axes in the same plane equally inclined to each other (i.e., 60° apart), and one axis at right angles to the other three and noninterchangeable with them. This system includes two subdivisions, (1) the *trigonal*, comprising seven groups, and (2) the *hexagonal*, made up of five groups. The characteristic feature of the system is that the noninterchangeable axis is always an axis of threefold symmetry (trigonal division) or of sixfold symmetry (hexagonal division).

The *tetragonal system*, based on three rectangular axes, two of which are interchangeable. Five of the seven groups under this system show fourfold symmetry with respect to the noninterchangeable axis.

The *isometric system*, based on three rectangular interchangeable axes, giving, in the normal group of the five included under the system, the highest symmetry possible.

Crystal Forms. From the fact that in five of the six systems enumerated above, at least one axis, or direction of crystallizing force, is different from the others, it follows that this difference may vary in degree between substances crystallizing in the same system; e.g., the fundamental six-sided pyramid of beryl is not as steep as the corresponding pyramid of apatite, although both crystallize in hexagonal forms. This characteristic relation constitutes a means of differentiation between substances crystallizing in the same system, so that with a knowledge of these relations, crystals of any substance, except those of the isometric system may be readily recognized from one another. This is done by measuring the angles between the faces of the crystal, these angles being always constant between the same kind of faces, provided the substance is pure and the temperature constant. Instruments for measuring the angles between crystal faces are known as *goniometers* and are of various forms, the more accurate of which depend on the reflection of a beam of light from the smooth surface of the crystal face.

Although the simple action of the crystallizing forces produces comparatively simple geometrical solids, like the cube of salt or the six-sided prism of quartz, we frequently find them acting in combination, the resultants producing secondary forms, as, e.g., when the resultant of three forces at right angles to the faces of a cube acting together produce faces which cut off the corners of the cube. The crystal in the latter instance would be made up of a combination of two crystal forms, the cube and the octahedron. In the same way a series of faces may be produced which bevel the edges between the cube and the octahedron, constituting a form of 24 planes. From this it will be readily seen that extremely complicated crystals are possible. The multiplication of crystal forms is, however, subject to the *law of rational indices*, which admits of the *usual* occurrence of such forms as will intercept the crystallographic axes in proportion to a series of low numbers and simple fractions. It is this law, tracing as it does a direct relation between the simplicity of the axial intercepts of a crystal form and the frequency of its occurrence in nature, which goes far towards proving the theory of regular molecular structure in crystals.

A very significant fact in relation to the connection between the molecular structure of crystals and their chemical molecules is that in many instances substances related chemically crystallize in similar forms of the same crystallographic system. This is known as isomorphism. (See MINERALOGY, *Mineral Chemistry.*) Among certain chemical compounds a reversal of the order of molecular grouping often takes place, resulting in the production of *twin crystals*, which are formed by the uniting of two or individual crystals in reversed

juxtaposition. The interrelation of twin crystals is always referable to some simple crystallographic axis or plane.

Divisions of Crystallography. The science of crystallography is divided into (1) morphological crystallography, which deals with the external forms of crystals and includes the mathematical relations of crystals; (2) crystallogeny, or chemical crystallography, which treats of the genesis or growth of crystals; and (3) physical crystallography, which discusses the physical properties of crystals, a very important branch of which in its relation to petrography is optical crystallography. Consult: Dana, *Text Book of Mineralogy*, parts i–iii (New York, 1902); Williams, *Elements of Crystallography* (ib., 1891); Groth, *Physikalische Krystallographie* (Leipzig, 1895); Moses, *Characters of Crystals* (New York, 1899); Phillips, *Mineralogy*, part i (ib., 1912). See MINERALOGY.

CRYS'TALLOIDS (Gk. *κρυσταλλοειδής, krystalloeidēs*, like crystal, from *κρύσταλλος, krystallos*, crystal + *εἶδος, eidos*, form). Crystals of reserve proteids in plants. They occur in small proteid granules (see ALEURONE), in the endosperm (the food-bearing tissue surrounding the embryo), and in the embryo of various seeds. Similar crystals are found free in the outer cells of potato tubers and in certain seaweeds. Crystalloids are angular in form, but their faces and angles are inconstant. They are insoluble in water, but absorb it and swell, as ordinary mineral crystals do not. They are insoluble in weak solutions, but dissolve in strong solutions of common salt. The proteid material composing crystalloids belongs to the group of globulins. See also COLLOIDS.

CRYS'TALLOMAN'CY (from Gk. *κρύσταλλος, krystallos*, crystal + *μαντεία, manteia*, divination). At one time a popular practice of divination, accomplished by means of transparent bodies. Commonly a transparent jewel would be employed, but a beryl was deemed most effective. The operator first muttered over it certain formulas of prayer and then gave it into the hands of a youth or virgin—none others were pure enough to discern its revelations—who read in it the information required. The desired facts were conveyed by means of written characters on the crystal, but sometimes the spirits invoked were supposed to appear in the crystal to answer the questions asked. This method of divination is still practiced by magicians. Consult Shorthouse, *John Inglesant* (London, 1881); Thomas, *Crystal Gazing: Its History and Practice* (New York, 1905).

CRYSTAL PALACE (so called because made of glass). An edifice erected in Hyde Park, London, for the World's Fair held in 1851. Designed by Sir Joseph Paxton, it was built of glass and iron, with floors of wood. Its length was 1608 feet, and its area 21 acres. It cost £1,450,000. Every department of art and science was represented, and the visitors numbered over 6,000,000. Its materials were removed in 1854, and the structure rebuilt at Sydenham, 8 miles from London. There the park and grounds cover nearly 200 acres, and a permanent fair is held. In 1853 a similar but smaller "crystal palace" was erected between Fortieth and Forty-second streets on Sixth Avenue, New York. It was used for exhibitions and grand concerts, but was destroyed by fire in 1858. The locality is now Bryant Park.

CSABA, chŏ'bŏ, or **BÉKÉS-CSABA,** bā'kāsh-chŏ'bŏ, a town of Hungary, in the County of Békés, 5 miles from the White Körös, with which it is connected by canal, and 105 miles east-southeast of Budapest (Map: Hungary, G 3). Its industries are principally agricultural—cattle raising, wine production, wheat and hemp growing. The women are noted for their skill in making linen and hemp fabrics. Csaba has the largest Protestant community of any town in Hungary, excepting Budapest. It is an important railway centre. Pop., 1890, 32,244, largely Slovaks; 1900, 37,547; 1910, 42,599. The Lutheran religion predominates.

CSÁNYI, chä'nyē, LÁSZLÓ (LADISLAUS) (1790–1849). An Hungarian statesman. He was born at Csány (County of Zala), and served in the campaigns of 1809–15. He early manifested an interest in local politics and became intimate with Francis Deák. In 1848 he was appointed commissioner plenipotentiary to various divisions of the revolutionary army, and subsequently received from Kossuth a portfolio in the ministry. After the surrender of the Hungarian army at Világos he refused to avail himself of the opportunity for flight; but as he had previously been one of the most active organizers of the revolution, so he now became a martyr to his convictions, and after a voluntary surrender to the Russians at Sarkad he was delivered by them to the Austrians, and executed on Oct. 10, 1849.

CSÁRDÁS, chär'däsh (Hung., from *csárda*, tavern). The national dance of Hungary. It consists of two movements, the first a slow *lassú* in *lied* form and in four-fourth or two-fourth time. It is mostly in the minor mode. The second movement, *friss* or *frischka*, is an exceedingly lively dance, also in four-fourth or two-fourth time. This is in the major mode and consists of 8 and 16 bar phrases, which are repeated. Towards the end the time is greatly accelerated, and the rhythm becomes more and more complex, so that the whole piece has a wild, tumultuous, and abrupt character. In both parts of the csárdás the accent comes on the weak beat. The alternation from the *lassú* to the *friss* is made at the will of the dancer, who motions to the players when the change is to be made. The figures of the csárdás vary greatly in different districts. The usual form opens with a stately promenade, which changes into a rapid whirling motion. The dancers then separate and carry on a sort of pantomime, the girl alternately approaching and retreating from her partner, who follows and finally seizes her. Again they whirl wildly around, then separate and go through much the same performance. The dance may be performed by any number of couples, but, as no two couples are ever dancing identically the same figures at the same time, the whole presents a varied and complex appearance. See MAGYAR MUSIC.

CSENGERY, chĕn'gĕ-rĭ, ANTON (1822–80). An Hungarian statesman and publicist. He was born at Grosswardein and early devoted himself to journalism. After editing the *Pesti Hirlap* for three years he was in 1848 appointed ministerial councilor and followed the Hungarian ministry to Debreczin. In 1849 he returned to Budapest and devoted himself to literary pursuits. In 1857 he founded the review entitled *Budapesti Szemle*, which he conducted for 12 years. He was an active promoter of agricultural

and trade societies and was one of the chief founders and afterward the director of the Hungarian Institute of Land Credits. In 1861 he was elected to the Diet, where he became, as the most intimate friend of Deák, a powerful leader of the Deák party. In addition to his excellent translation of Macaulay's *History of England* (latest ed., 1874), he was the author of several important and brilliantly written works in Hungarian, among which may be mentioned: *Historical Studies and Character Sketches* (2 vols., 1870); *History and Historians* (1874); *Memorial Address on Francis Deák* (1877). His collected works were published in Budapest in 1884.

CSIKY, chē'kē, GERGELY, or GREGOR (1842–91). An Hungarian dramatist, born at Pankota (Arad). After studying Catholic theology at Budapest and Vienna he became professor at the Priests' Seminary in Temesvár. After an activity here of several years he became a convert to Protestantism in 1878. Csiky is considered one of the greatest of modern Hungarian dramatists; he was equally effective in tragedy and comedy. He also wrote several successful novels, among them *Az Atlaszcsalád* ('The Atlas Family,' 1890), and translated into Hungarian the works of Sophocles, Euripides, and Plautus, as well as standard works of French and English dramatists. Among his numerous plays, most of which have been highly successful, may be mentioned: the comedies *A Jóslat* ('The Oracle'), *Mukányi,* and *Kaviar;* the tragedies *Janus, Spartacus, Nora,* and *Theodora;* and the popular drama *The Proletarians* (*A Proletárok*).

CSOKONAI, chō'kō-nō-ē, VITÉZ MIHÁLY (1773–1805). An Hungarian poet, born at Debreczin. He was appointed professor of poetry in the college at Debreczin in 1794, but resigned the post in 1795, in order to study law, and, with the exception of a brief connection with the gymnasium of Csurgo, he lived thenceforth in private, devoting himself wholly to literature. His acquirements, particularly in linguistics, were notable. In poetry he was to some extent influenced by Földi, but remained essentially independent. He was preëminently a lyrist, in both the narrower domain of the folk song and the larger realm of artistic poetry. His diction is simple and often naïve. Some pronounced defects of taste have met with the censure of the critics, but a distinguished place among modern Hungarian poets has been conceded to him. He wrote a most original mock-heroic poem called *Dorottya, or the Triumph of the Ladies at the Carnival* (1804), several comedies, and a number of odes which enjoyed considerable popularity principally because they opposed Napoleon and the French Revolution. A collective edition of his works was published by Toldy in 1846. Two specimen poems rendered into German may be found in Schwicker, *Geschichte der ungarischen Litteratur* (Leipzig, 1889). The city of Debreczin erected a statue of him in 1871. For his biography, consult the works of Szana (Pest, 1869) and Haraszti (ib., 1880).

CSOMA DE KÖRÖS, chō'mō de kē'rēsh, SÁNDOR (1784–1842). An Hungarian traveler and Tibetan scholar. He was born, April 4, 1784, at Körös, in Transylvania, and was educated first at the college of Nagy-Enyed, and subsequently at Göttingen, where he devoted himself especially to the study of Oriental languages. It was the dream of his life to discover the original home of his race, the Magyars, in Asia. In 1820 he set out on his pilgrimage for that purpose. He went to Egypt, then to Teheran, and, disguised as an Armenian, to Little Bokhara, and finally settled for four years (1827–30) at the Buddhist monastery of Kanam on the confines of Tibet and India, where he studied Tibetan. He found to his disappointment that the Tibetan language had little bearing on the Magyar problem, but it led him to Calcutta to study Sanskrit, as the literature of Tibet is largely translated from the Sanskrit. At Calcutta, where he became the object of general attention on the part of British scholars, he devoted himself to cataloguing the Tibetan books, upward of 1000 volumes, in the library of the Asiatic Society of Bengal. He prepared, likewise, a *Tibetan Grammar* (1834) and a *Dictionary* (1834) which is still a standard work, and he wrote a number of articles on Tibetan literature in the *Asiatic Researches.* Once more he set out on his old-time search to find the early home of the Magyars and bent his way towards the western confines of China, but while on this journey he died at Darjiling, northeastern India, April 11, 1842. Consult Th. Duka, *Life and Works of A. C. de Körös* (London, 1885).

CSONGRÁD, chōn'grād. A market town of Hungary, in the county of the same name, situated near the confluence of the Theiss and the Körös, 70 miles southeast of Budapest (Map: Hungary, G 3). The inhabitants are chiefly engaged in the raising of cattle, agriculture, the making of wine, and fishing. Pop., 1900, 22,619; 1910, 28,310, mostly Magyars.

CTENACODON, tē-năk'ō-dŏn. One of the rare primitive fossil mammals found in the Upper Jurassic rocks of Wyoming. It is known only by the lower jaws and a portion of the upper. The former has a length of about one-half inch and indicates an animal of the size of a mouse. The teeth are of the multituberculate type and consist of a prominent chisel-shaped incisor, four longitudinally compressed premolars, which are distinctly cutting teeth with serrated edges and grooved sides, and of which the fourth is much the largest, and two small molars with tubercles surrounding the central cavities on their crowns. This type of dentition indicates relationship to the Monotremata (*Ornithorhynchus* and *Echidna*), which, together with the fossil *Ctenacodon* and its allies, *Plagiaulax* and *Polymastodon* from the Eocene, and other Mesozoic and Tertiary genera, form the order Multituberculata of the subclass Prototheria. Consult: Cope, "The Tertiary Marsupialia," in *American Naturalist* (Philadelphia, 1884); Marsh, "American Jurassic Mammals," in *American Journal of Science,* vol. xxxiii, 31st series (New Haven, 1887); Osborn, "On the Structure and Classification of the Mesozoic Mammalia," in *Journal of the Academy of Natural Science,* Philadelphia, 2d series, vol. ix (1888); id., "Supplementary Note on the Above," in *Proceedings of the Academy of Natural Science* (ib., 1888).

CTENOID (tē'noid) **FISHES** (Gk. κτενοειδής, *ktenoeidēs,* comblike, from κτείς, *kteis,* comb + εἶδος, *eidos,* form). One of the four orders into which Agassiz classified fishes, the others being *cycloid, placoid,* and *ganoid.* The name refers to the scales, which bear teeth or sharp projections on the posterior or free margin. These teeth may be in one or more rows.

This classification has been abandoned, since evidently unrelated forms may show this character. Such ctenoid scales characterize the more recent fishes, as perch and flounders.

CTENOPHORA, tē-nŏf′ō-rȧ (Neo-Lat. nom. pl., from Gk. *κτείς, kteis,* comb + *φέρειν, pherein,* to bear, carry). A class of cœlenterates, composed of jellyfish, characterized by the absence of nettle cells and the near approach to bilateral symmetry. The ctenophorçs are distinguished by the presence of eight external rows of minute plates, made from fused cilia, beginning near the aboral pole and running down towards the mouth, which have given the name "comb jellies" to this group. The body is almost transparent and is oval, more or less elongated, rarely band-shaped, as in the girdle of Venus (q.v.). The gastrovascular system of canals is rather complicated and differs from that of other cœlenterates by opening at the aboral pole, with two small outlets; between these is a remarkable and complicated sense organ, which serves as an eye and a positional organ, which body is often prolonged on each side of the mouth as a flap or fold, by the movements of which the animals swim. The eight rows of so-called swimming plates are probably quite as much respiratory as locomotive. On each side of the body is a long tentacle, with branches on one side, capable of being greatly extended or completely retracted into a projecting sheath. In a few forms these tentacles are wanting. More than 100 species of ctenophores are known, all marine. The largest ones are only 3 or 4 inches in length, but the girdle of Venus is sometimes 5 feet broad. They are usually colorless, but are sometimes yellowish or brownish, and the movement of the swimming plates sometimes makes them strikingly iridescent. Many species are notably phosphorescent. Consult: L. Agassiz, *Contributions to the Natural History of the United States,* vol. iii, part ii (Boston, 1860); A. Agassiz, papers in *Memoirs of the Museum of Comparative Zoölogy* (Cambridge, Mass., 1875 et seq.); Mayer, "Ctenophores of Atlantic Coast of North America," in *Carnegie Institute Publication No. 162* (Washington, 1912). See Cœlenterata.

CTESIAS, tē′sĭ-ȧs (Lat., from Gk. *Κτησίας, Ktēsias*). A Greek physician and historian of the fifth century B.C., a native of Cnidus. In 415 he was captured by the Persians and on account of his knowledge of medicine was kept at the Persian court 17 years. In 398 he returned to his home, where he wrote a comprehensive work on Assyria and Persia (*Περσικά, Persika*), in 23 books, based on the knowledge he had gained by his residence and researches at the Persian capital. Of this only fragments remain, and an abridgment in Photius; the latter has likewise preserved an abridgment of another work by Ctesias on India. We also hear of a geographical treatise. The fragments are edited by C. Müller in an appendix to Dindorf, *Herodotus* (Paris, 1844); those of the *Persika* by J. Gilmore (1888). Consult Blum, *Herodotus und Ctesias* (Heidelberg, 1836), and Wachsmuth, *Einleitung in das Studium der alten Geschichte* (Leipzig, 1895).

CTESIBIUS, tē-sĭb′ĭ-ŭs (Lat., from Gk. *Κτησίβιος, Ktēsibios*). A Greek who was famous for his inventions in mechanics. He lived about 250 B.C. He was born at Alexandria. We owe to him and his pupil, Hero of Alexandria, the force pump, the water organ, and also the discovery of the elastic force of air and its application as a motive power. His work on hydraulic machines is lost. See Clepsydra; Pumps and Pumping, *Historical Sketch.*

CTESIPHON, tĕs′ĭ-fŏn (Lat., from Gk. *Κτησιφών, Ktēsiphōn*), now Tak-ti-Kesra (The Throne of Chosroes). A city on the eastern bank of the Tigris, the common winter residence of the Parthian kings, and finally the capital of the Parthian Kingdom (Map: Turkey in Asia, L 6). It fell into the hands of the Arabs in 637 A.D. and was later abandoned, its ruins being used to furnish material for the neighboring Bagdad. Its site is to-day marked by scanty remains, including, however, the façade and arched hall of the Parthian Palace. On the opposite bank are the ruins of Seleucia, and the two cities are together called by the Arabs El-Madain ('The Cities').

CTESIPHON. An Athenian orator of the fourth century B.C. See Æschines; Demosthenes.

CTETOLOGY. See Palæontology.

CUAUHTEMOC. See Guatemotzin.

CUAUTLA DE MORELOS, kwä-o͞ot′lȧ dā mō-rā′lōs, or **CUAUTLA MORELOS.** A city in the State of Morelos, Mexico, situated on the river Cuautla (Map: Mexico, K 8). It is the centre of a fertile sugar-growing district and has several sugar mills. Cuautla de Morelos was at one time the residence of the Governor of the state and is famous for its heroic resistance under José María Morelos y Pavón in 1812 against the attacks of a superior army of Royalists. It is well known as a health resort on account of its hot sulphur springs. Pop., 1900, 6269; 1910, 7000.

CUBA, kū′bȧ, *Sp. pron.* ko͞o′Bȧ (West Indian *Cubanacan*). An island republic of the West Indies, the largest of the Greater Antilles, situated between lat. 19° 40′ and 23° 13′ N. and long. 74° and 85° W., and lying south of the Florida peninsula, from which it is separated by Florida Straits, 110 miles wide, east of the Yucatan Peninsula, from which it is separated by the Yucatan Channel, 130 miles wide, and west of Haiti, from which it is separated by the Windward Passage, 50 miles wide (Map: West Indies, G 2 and special map). The island of Cuba lies in a slight northwest and southeasterly direction; it is long and narrow, somewhat resembling a crocodile in shape, having its greatest breadth of about 150 miles at the southeast, and a width of less than 30 miles in its narrowest part, near Havana. The average width is about 50 miles. The total length of Cuba is about 730 miles, and it has an area of 45,881 square miles, including its small islands and the Isle of Pines.

Topography. The coast of Cuba is exceedingly broken, being indented by numerous gulfs or bays, and has an extent of 2500 miles. The chief gulfs on the south coast, commencing at the west, are the following: Corrientes, Cortés, Matamanó, Cazones, Broa, and Guacanayabo. There are many fine harbors, with narrow, tortuous entrances opening within into broad expanses, as at Havana, Santiago de Cuba, Guantánamo, Nipe, and Cienfuegos. The north coast is in great part bordered by coral islands or reefs, which stretch from Nuevitas to Cárdenas, and render approach to this part of the coast extremely difficult and dangerous. On the south is the large Isle of Pines (Isla de Pinos), with many small islets associated with it, and,

FLORIDA
GULF OF MEXICO
MEXICO
CARIBBEAN SEA
Florida Bay
FLORIDA KEYS
STRAITS OF
Key West
DRY TORTUGAS
Ft. Jefferson
MARQUESAS KEYS
TROPIC OF CANCER
To Tampico
To Progreso
To Limon & Central America
Yucatan Channel
HAVANA
Regla
Guanabacoa
Marianao
Santiago de las Vegas
Bejucal
Artemisa
San Cristobal
PINAR DEL RIO
Nombre de Dios
Macurijes Bay
Vinales
Francisco
Los Palacios
Consolacion del Sur
Sierra de Los Organos
Mantua
Guadiana B.
Guanee
Cataliua
Remates
Grifa
C. San Antonio
Cortes B.
Corrientes B.
C. Corrientes
C. Frances
Pt. Lucrs
SAN FELIPE KEYS
INDIAN KEYS
Nueva Gerona
Sta. Fe
ISLE OF PINES
Frances Pt.
Sunigua B.
East Pt.
C. Pepe
Pt. Guanal
ISLAS DE MANGLES
HANBRE KEYS
LAGUNA KEYS
ARCHIPELAGO DE LOS CANARREOS
TRAVIESA KEY
TABLONES KEY
PASSAGE KEY
JARDINES BANK
Submarine Telegraph
Gulf of Mutamano
ZAPATA PENINSULA
MATANZAS
Cardenas
Jovellanos
Perico
Colon
Macagua
Union de Reyes
Palpite
Torriente
Perla
Gonzalo
Murga
Rodas
Palmira
Cienfuegos
Abreus
Aunas
Trinidad
Caibarien
Nicholas Channel
Old Bahama Channel
Florida Current
Gulf Stream
Ponce de Leon B.
C. Sable
Submarine Telegraph to Dry Tortugas
Key Largo
SALT KEY
LARGO KEY
TRABUCO KEY
CAYO LARGO
XAGUA BANK
PICKLE BANK
CAYMAN ISLANDS (Br.)
GRAND CAYMAN (Br.)
George Town
North Sd.
English Cem.
Bodden B.
Pt. West
Morro Light
Morro Castle
Cabana Castle
San Tiago Fort
Castillo de la Punta
Prison
Casa Blanca
Queen Battery
Victoria Hospital
Dos Hermanas Battery
Dos Reales Battery
San Carlos Battery
Principe Barracks
Irrisari Castle
Arsenal
Treasury
Custom House
Post Office
Ensenada de Marimelena
U.S.S. "Maine" Destroyed, Feb. 15, 1898
Belot
Cem.
Ferry
HAVANA HARBOR
REGLA
Ensenado de Tallapiedra
Atares Castle
Ensenada de Atares
Ensenada de Guasabacoa
Pta. Blanca
CAYO BLANCO
CAYO CRUZ
HAVANA
0 ¼ ½ 1 Mile
SCALE OF STATUTE MILES
0 10 20 40 60
SCALE OF KILOMETRES
0 50 100
Important towns are shown
Railways
1906

F 79° G 78 H 77 J 76 K 75 L
BAHAMA ISLANDS
ATLANTIC OCEAN
CARIBBEAN SEA
CUBA
JAMAICA
HAITI
ELEUTHERA ISLAND
CAT ISLAND
SAN SALVADOR OR WATLING I.
ANDROS
NEW PROVIDENCE I.
BERRY ISLANDS
GREAT EXUMA ISLAND
LONG ISLAND
CROOKED I.
ACKLIN I.
CAMAGUEY
ORIENTE
SIERRA MAESTRA
Nassau
Havana
Santiago de Cuba
Manzanillo
Guantanamo
Holguin
Camaguey
Port Antonio
Kingston
Montego Bay
Falmouth
Spanish Town
Port Royal
Cayos de las Doce Leguas
Jardines de la Reina
Jardines del Rey
Old Bahama Channel
Windward Channel
Crooked I. Passage
Mona Passage
Tropic of the Ocean
Tropic of Cancer
Gulf Stream
Great Bank of Buena Esperanza
Cochinos Bank
Columbus Bank
Submarine Telegraph to Jupiter
Submarine Telegraph to Mole St. Nicholas
Submarine Telegraph to Bermuda and Halifax
Submarine Telegraph to San Juan and South America
Submarine Telegraph to Ponce, Porto Rico
Ponce & Antigua
To Belize
Columbus Pt.
First Landing place by Columbus Oct. 12, 1492
Kingston Harbor
Port Royal Harbor
L. L. POATES ENGRG CO., N.Y.
F West 79° from G 78 Greenwich H 77 J 76 K 75° L

farther eastward, a group of many islets, known as the Jardines de la Reina.

The western province of Pinar del Río is hilly, and is traversed by a mountain range, Sierra de los Organos, 2500 feet high. The celebrated tobacco region, Vuelta Abajo, is on its south slope. The central provinces of Havana, Matanzas, Santa Clara, and Camaguey have an undulating surface, broken only here and there by hills, such as the group near Trinidad, on the south coast. The most elevated portion of the island is in the eastern Province of Santiago de Cuba, which consists in the main of an elevated plateau, 1000 to 2000 feet high, deeply scored by streams. Along the south coast of this province, stretching from Cape Cruz eastward, is the Sierra Maestra, the highest land of the island, its highest peak, Turquino, being 8320 feet in height. The south coast, except in the Province of Santiago, is low and marshy. In the provinces of Santa Clara and Matanzas is the great Zapata swamp, having an area of 600 square miles. Just west of the city of Matanzas is the beautiful Yumurí valley, the most attractive scenic feature of the island. The rivers are numerous, but short, and in general unfitted for navigation; the river Cauto, in the southeastern part, is about 150 miles in length, and is navigable for a distance of 50 miles to Cauto Embarcadero.

Climate. The climate of Cuba on the coast is extremely equable, but less so inland. The average temperatures for January vary from 72° F. at the north, to 75° F. at the south, and the July temperatures average about 82° F.; the coast temperatures seldom exceed 90° F. in summer, nor go below 65° F. in winter. In the mountain regions, however, the temperature often falls below 50° F. The rainfall is excessive in the northeastern section, reaching over 100 inches in some places; at Havana it is over 50 inches; the southern coast region has, however, much less rainfall. The chief rainy season is in summer, but rain falls throughout the year. The prevailing winds are the trades, from the northeast. Cuba lies within the path of the West Indian hurricanes, which are liable to occur during August, September, and October. The unhealthful conditions formerly prevalent were due to the absence of sanitary precautions. Yellow fever was an annual epidemic. The recommendation of sanitary measures by a commission of American scientists, in 1901, and the energetic administration of these measures, first by the United States military authorities and subsequently by the Cuban national government, have resulted in the practically complete extirpation of this disease. See HAVANA; YELLOW FEVER.

Flora. The vegetation of Cuba is tropical in its species and luxuriance, although, strangely enough, trees usually found only in colder climates are also found even in the Cuban lowlands. Thus, the pine grows side by side with the mahogany tree. Palms are plentiful, including the magnificent and useful royal palm. The majagua, granadillo, Cuban ebony, lignum vitæ, Cuban cedar, Cuban mahogany, the ácana, jiquí, cottonwood, logwood, rosewood, and the odd jagüey are all indigenous. The plants of greatest economic value are sugar cane and tobacco; coffee, cacao, and henequén are also cultivated. Among the economic fruit and vegetable products may be mentioned the banana, coconut, pineapple, orange, lemon, lime, fig, date, tamarind, mango, guava, zapote, pomegranate, custard apple, alligator pear, melon, bean, cassava, and sweet potato.

Fauna. The fauna of Cuba includes rabbits, the hutia (q.v.), and bats; the domestic hog, dog, and cat (which have run wild and become very numerous); over 200 species of birds, including scavenger buzzards and vultures, grouse, quail, snipe, and wild turkeys; alligators, chameleons, iguanas, small lizards, and tree toads. Few species of snakes are found, although some, like the majá, grow to large size (16 to 18 feet). The land crabs, which move over the country in countless numbers and grow in size up to 8 inches in diameter, are very annoying, as are also the flying cockroaches. Scorpions, centipedes, and tarantulas are plentiful. Insects are numerous in species and limitless in numbers; among these are ants, beautiful fireflies, and what has been described as the "worst pest on the island," the nigua, or jigger. Nearly 650 species of fish have been found in Cuban waters, among which are large sharks, the giant aguja (weighing sometimes 500 pounds), the snoring ronco, gallego, garfish, and the parego, or red snapper. The porpoise and manatee are also found in numbers in the coast waters. Over 1600 species of mollusks are found in Cuba.

Geology. Cuba was largely formed in late Tertiary times. The rocks composing it are mainly recent stratified deposits. There are irregular areas of granite, serpentine, and eruptive rocks near the middle of the island, surrounded by Tertiary beds extending over most of the island to the coast. The Sierra de los Organos is composed mainly of Triassic sandstones, and the Sierra Maestra of Cretaceous and Tertiary beds. The mineral resources consist of iron, asphalt, manganese, coal, and copper.

Mineral Resources. The mineral deposits of Cuba are confined chiefly to Oriente, and are exploited almost exclusively by American companies. The chief mineral, iron, was first worked on a large scale in 1884, and the output has since then grown at a steady rate, increasing from 23,977 tons in 1884 to over 600,000 tons annually at present, almost all of it going to the United States. The ore is of good quality and especially adapted for the manufacture of Bessemer steel. Another mineral product of importance is manganese, which is also found in Oriente and exported to the United States. Copper was mined in Cuba as early as the sixteenth century in the Sierra del Cobre, near Santiago de Cuba, Oriente; and prior to the discovery of copper in the United States the latter imported most of the copper for its domestic use from Cuba. Owing to unfavorable circumstances copper mining ceased in 1869, not to be resumed until after the Spanish-American War. In general, the mining industries of the island are little developed.

Agriculture. Owing to its climate and soil, Cuba is exceptionally well adapted for agriculture, but long years of political oppression and unfavorable labor conditions, combined somewhat with the indisposition for work inherent in the natives, retarded the agricultural development of the island. Prior to the last war with Spain the number of farms was estimated at over 90,000, valued at nearly $200,000,000. But the war, with the Spanish reconcentrado policy, caused a great destruction of farms and live stock. In 1905 it was estimated that about 16 per cent was under cultivation. Ownership on

the part of colored inhabitants is confined largely to the smaller farms.

Sugar.—Sugar was one of the earliest products of the island. Cane is supposed to have been introduced in 1523, but its cultivation for three centuries was insignificant. The annual output prior to the opening of the nineteenth century averaged about 28,000 tons, which was increased to 70,000 in 1817 and by the end of the first half of the century to about 300,000. During the latter half of the nineteenth century also the tendency was upward, although the industry was greatly handicapped by frequent internal disturbances and by the low price of sugar, brought about largely by the competition of beet sugar. In 1853 the output of the island was 322,000 tons; the average from 1850 to 1878 was about 470,000 tons, and in 1870 the output was 726,000. In 1881 the amount had fallen to 493,000 tons; but in 1894 there were produced 1,054,214 tons, or nearly 50 per cent of the world's output of cane sugar. Even in 1895, the first year of the Cuban war, the output exceeded 1,000,000 tons; but in the following year it fell to 225,221, with a further decrease in 1897 of 13,221 tons. Since the Spanish-American war the figures have rapidly grown, 335,668 tons in 1899, 1,132,482 tons in 1906, 1,459,630 tons in 1911, 1,896,000 tons in 1912, and in 1913 (i.e., the season of 1912–13), 2,285,000 tons. The cultivation of sugar requires a large outlay of capital. The successful *colonia*, or sugar estate, generally contains several thousands of acres, several miles of private railway for transporting the cane to the mills, numerous buildings and costly plants of machinery for the manufacture of the sugar, besides buildings for the housing of 1000 or more employees. The cane, which requires replanting but once in seven years, is chiefly grown on elevated land, no fertilizer being required. About one-half the cultivated land is given over to sugar. In 1912 the sugar export was valued at $102,033,516, most of which (valued at $94,264,287) went to the United States.

Tobacco.—Next to sugar, tobacco is the most important agricultural product of the island. The cultivation of that plant in Cuba dates from about 1580, when it was introduced into the Vuelta Abajo, which has since been famous for the quality of its tobacco. The Vuelta Abajo is generally regarded as that part of Cuba west of the meridian of Havana, and thus includes Pinar del Río Province and part of La Habana Province; sometimes the term is applied to a restricted area within Pinar del Río. The output of Pinar del Río is over 70 per cent of the entire crop of the island; La Habana yields less than 25 per cent, Santa Clara producing the bulk of the remainder. At the outbreak of the war for independence the normal annual output was over 62,000,000 pounds, but in 1896–97 the amount had dwindled to about 41,000,000 pounds; in 1904–05 it reached about 45,700,000 pounds, and in 1911 it was 37,019,640 pounds. In 1912, 23,684,944 pounds of leaf tobacco were exported, of which 16,769,318 pounds went to the United States. Tobacco covers about one-tenth of the cultivated area.

Other Agricultural Products.—Corn, or maize, is grown throughout the island and is used extensively for the feeding of domestic animals. Rice is also cultivated, but the harvest goes entirely to satisfy the domestic demand. Wheat, barley, and oats are little cultivated, and it is doubtful whether the output of wheat will ever meet the home demand. Sweet potatoes are raised almost everywhere and form a very important article of food. The natural conditions are exceedingly favorable for the cultivation of fruit. The banana is grown in enormous quantities and, besides being extensively exported to the United States, figures very prominently in the diet of the poorer classes. Coffee, once an important product, is now in a state of decline, and the output is barely sufficient for home consumption. Pineapples, oranges, coconuts, limes, lemons, and numerous other southern fruits grow in abundance; their cultivation and exportation have increased notably in recent years. The fruit interests are largely in the hands of foreign (chiefly American) companies.

The forests of Cuba are supposed to occupy about 50 per cent of the total area of the island. Besides the valuable mahogany and cedar woods which find their way to foreign markets, there are about 30 species of the palm, of which the royal palm is probably the most useful tree on the island, every part of it, from the leaves and fibre to the roots, being utilized by the natives. Of the forest area the state owns 1,250,000 acres.

The natural conditions for the raising of live stock are very favorable, and at one time this industry was in a high state of development. During the decades preceding the war for independence, however, the supply was far short of the natural demand, and most of the animals necessary for agricultural purposes and slaughtering had to be imported. In 1894 the live stock of the island numbered 584,725 horses, 2,485,766 cattle, 570,194 hogs, and 78,494 sheep, with a total value of over $101,000,000. The effect of the late war on the live stock of the island may be seen from the census figures of 1899, which give the number of horses at 88,000; cattle, 376,650; hogs, 358,868; and sheep, 9982. In January, 1902, there were 805,000 cattle, 137,000 horses, and 25,700 mules. In June, 1912, there were 2,829,553 cattle, 560,580 horses, 41,192 mules, and 2298 asses.

Manufactures. The manufacturing industries of Cuba are almost wholly confined to the production of sugar and of cigars and cigarettes —both industries closely connected with agriculture. In fact, the first is so intimately connected with the plantations that it is rather to be regarded as an adjunct of agriculture than a separate industry. In the case of tobacco products the line of demarcation is more distinct, and, while some of the large manufacturing companies have their own plantations, most of them prefer to buy the raw material of the planters. The centre of the cigar manufacturing is Havana, and most of the large firms are in the hands of foreigners.

Labor Conditions. One of the prominent retarding factors in the agricultural and industrial development of Cuba is the scarcity of labor. The liberation of slaves had a detrimental effect on the economic development of Cuba as well as the West Indies in general. With the supply of black labor cut off, the Chinese coolies became the chief factor in the Cuban labor market, but, owing to real or alleged inhuman treatment, the Chinese government prohibited further emigration to the island. Since then Spain and the Canary Islands have been drawn upon to some extent, but the supply falls short of the demand. The war still further depleted the ranks of labor, and accord-

ing to the census of 1899 only 299,197 persons were engaged in agriculture, fishing, and mining; 93,034 in manufacturing and mechanical pursuits. The 1907 census showed that of all wage earners 48.5 per cent were engaged in agriculture, mining, and fishing, 16.3 in manufacturing, and 17.7 in trade and transportation. To the sugar planter the problem of securing competent laborers is serious. In the tobacco industry the labor question does not offer such difficulties, owing to the fact that the work requires great skill, and white labor can be utilized to a large extent. In the mining industry the problem is also simplified, largely because of more favorable climatic conditions in the mountain districts.

Transportation. Existing transportation facilities are inadequate. The roads are mostly uncared for and during the rainy season become almost impassable. Much of even the *Camino Central*, the chief highway of the island running from Havana to Santiago de Cuba, is in poor condition. However, the impetus given to public improvements during the American occupation has been continued to some extent by the Cuban government, which is steadily improving the highways of the country. In the introduction of the railroad Cuba was 12 years in advance of Spain; the first railway in a Spanish country was the line from Havana to Güines, opened in 1837. A system was built up between the city of Pinar del Río in the west and the city of Santa Clara in the middle of the island, and short lines were constructed from several ports into the interior. In 1902 Santa Clara was connected with Santiago de Cuba, through communication being thus established nearly from one end of the island to the other. For the most part the railways are narrow gauge, with light rails and poor roadbeds. Havana is the centre of the railway system. Among the ports connected with the line running from Havana to Santiago de Cuba are Cienfuegos, Cárdenas, Caibarién, Nuevitas (connecting with Camagüey), and Manzanillo. All the railways are owned and operated by private companies. In 1913 the length of railway in operation, including the private lines owned by the great sugar estates, was upward of 2200 miles. At the end of 1910 there were 5848 miles of telegraph line, with 6184 miles of wire and 180 offices; post offices, 496.

Commerce. The commerce of Cuba, under the Spanish régime, notwithstanding the restrictions placed upon it, was, relatively speaking, extensive. By a system of heavy protection, which had grown out of the monopoly idea of the seventeenth century, most of the commerce was diverted into Spanish channels, although only a few of the demands of the island could be supplied by Spanish domestic products. But the adoption of a reciprocal treaty between the United States and Spain gave an impetus to commercial relations between the former country and Cuba. The exports of merchandise from the United States to Cuba rose from $12,224,888 in 1891 to $24,157,698 in 1893, while the imports of Cuban products into the United States increased during the same period from $61,714,395 to $78,706,506. With the expiration of this treaty in 1894 and the beginning of the war for independence in the following year, Cuban commerce began to decline, and the exports and imports in 1899 amounted to $49,700,000 and $75,300,000 respectively, as against $64,000,000 and $93,000,000 in 1892. Comparing the mean annual value of imports by countries for 1894–95 ($67,335,800) with that for the period of 1899–1900 ($64,965,800), we find that Spain's share fell off from about 44 to less than 16 per cent; that of the United States increased from about 33 to over 45 per cent, while that of the United Kingdom practically remained the same, over 15 per cent. The export trade of Cuba for 1900 was distributed as follows: United States and possessions, 68 per cent; United Kingdom and possessions, 12 per cent; Spain, 2 per cent; and Germany, 11 per cent. In 1903 the imports amounted to $67,000,000, and the exports to $78,000,000. The principal imports in that year were: foods and drinks, 36 per cent; textiles, 16 per cent; animals and animal products, 13 per cent; metals, machinery, and chemicals, 15 per cent. The principal exports were: sugar and its products, 54 per cent; tobacco and its products, 20 per cent; the remainder consisting of woods, fruits, minerals, and animals. Imports increased from about $77,000,000 in 1904 to $91,447,581 in the fiscal year 1909, and exports from about $89,000,000 to $124,711,069. In the fiscal year 1910 imports and exports were $103,675,581 and $150,909,020 respectively; in 1911, $108,097,782 and $129,178,865; in 1912, $120,229,317 and $146,787,295. Principal exports in the fiscal years 1911 and 1912: sugar, $85,168,933 and $102,033,516 (of which $85,081,624 and $94,264,287 to the United States); unmanufactured tobacco, $16,888,761 and $17,399,403 (of which $14,319,155 and $14,954,309 to the United States); manufactures of tobacco, $13,097,982 and $13,057,484; iron, gold, and copper ores, $3,874,172 and $3,910,305; fruits, $1,835,952 and $2,264,229. The growth of Cuba's trade with the United States after the reciprocity treaty of December, 1903, may be seen in the following figures: imports from and exports to the United States in 1903, $26,000,000 and $60,000,000; in 1904, $33,000,000 and $74,000,000; in 1905, $44,000,000 and $95,000,000; in 1909, $46,339,000 and $109,408,000; in 1910, $54,569 and $129,329,000; in 1911, $57,128,000 and $113,451,000; in 1912, $62,826,000 and $122,969,000. Second to the United States in commercial importance is the United Kingdom, imports from which in 1911 and 1912 amounted to $12,759,000 and $14,834,000; exports, $5,087,000 and $11,067,000.

Banks. Of all the banks founded in Cuba in the course of the last three decades of the past century, only two survived the Spanish-American War, viz., the Spanish Bank of the Island of Cuba and the Bank of Commerce. The former, though owned by private stockholders, was a semiofficial institution under the Spanish régime, being subject to certain official regulations, and its governor appointed by the Spanish government. It acted as fiscal agent of the government, collecting the internal revenue and floating the paper currency. The Bank of Commerce owes its uninterrupted, though by no means entirely prosperous, existence to its valuable railway and other properties, which have helped indirectly to swell its banking business and have yielded a revenue outside of that derived from its purely banking operations.

Finance. The history of the currency of Cuba does not differ much from the lamentable record made by nearly all of the Spanish-American countries as well as Spain. It is the story of desperate, but in the end of vain, attempts to make the fiat of government pass for commodi-

ties of intrinsic worth in the monetary transactions of the people. For a time such attempts succeeded, but in the end the government was compelled to refuse its own worthless currency. This is particularly true of the paper currency of the Spanish government, which was worth at the time of American occupation but seven cents on the dollar. Even before that event, when the Spanish government accepted 10 per cent of customs dues in that currency, the price rose only to 15 cents, varying between that value and 12 cents. The last issue of Spanish paper currency took place during the war for independence, when $20,000,000 of paper money was put in circulation through the Spanish Bank of the Island of Cuba upon the security of $6,330,000 (silver) deposited with the bank. In spite of having been made legal tender, the paper went at a discount from the start, and as soon as the government had shown by its illegal withdrawal of the silver fund from the bank that it did not mean to depart from its old-time methods, the paper was repudiated throughout the island, until, as stated above, the action of the government in accepting the paper in payment of 10 per cent of customs dues raised it to from 12 to 15 per cent of its par value.

The standard of money in Spanish Cuba was Spanish gold, a 25-peseta piece being the principal coin. In addition to that there was a large amount of silver currency. The principal silver coins in circulation were: the peso (dollar), medio peso (half dollar), peseta (quarter dollar), real (bit), medio real (half dime). Since silver was not exchangeable for gold at its face value, it tended, as is always the case, to drive the gold out of circulation. To counteract that tendency the government by a royal decree artificially inflated the value of the gold 25-peseta piece to $5.30, the real value being only about $4.80. In 1893 the French louis, a 20-franc piece (real value $3.86), was similarly and for the same reason inflated to $4.24.

Upon assuming temporary administration of the island, the government of the United States found itself in a predicament. The only rational course lay in reducing the coin to its face value and putting an end to all inflation and artificial substitutes for currency of intrinsic worth. On the other hand, the people had become accustomed to existing conditions; prices had adjusted themselves to the level of the inflated currency, and all contracts had been concluded on that basis. Nevertheless, by order of the President of the United States, which took effect Jan. 1, 1899, the United States gold dollar was declared the standard in which all customs, taxes, public and postal dues in Cuba should be paid, and foreign gold coins should be current at their real value. At the same time, since retail prices and wages have been usually fixed on the island on the basis of silver money, and in order to prevent a sudden rise of wages to the detriment of the planters who could not expect a corresponding rise in prices of their products in the foreign markets, the Spanish silver money was also declared legal tender. The old inconveniences of a fluctuating currency were done away with by giving the coins a fixed rate in exchange for gold as follows: peso, 60 cents; medio peso, 30; peseta, 12; real, 6; medio real, 3 cents. A fixed value was also given to the bronze and copper coins, which were made legal tender for sums not exceeding one dollar.

During the last 30 years of Spanish sovereignty in Cuba the budget of the island remained almost stationary, at from 26,000,000 to 30,000,000 pesos. Although the entire revenue was derived from the people of the island, only about 15 per cent of the expenditures was incurred for local needs, while about 85 per cent went to defray "sovereignty expenses," i.e., the expenses of the general government. The average annual budget for the period July, 1890, to June, 1895, was as follows:

REVENUE

Customs	$11,599,270
Internal revenue	5,882,205
Lotteries	2,919,945
Other sources	2,058,305
Total	$22,459,725

EXPENDITURE

Government	$3,634,439
Justice and instruction	902,449
Finance	664,911
Public works	880,685
Total civil administration	$6,082,484
Army and navy	$6,493,281
Service of the debt	10,334,421
Total	$22,910,186
Deficit	450,461

As compared with the foregoing average budget of the Spanish régime, the following budget for the fiscal year 1900–01 (during the American occupation) is of interest:

REVENUE

Customs	$15,945,666.42
Postal	367,950.28
Internal	658,535.92
Miscellaneous	182,736.96
Total	$17,154,889.58

EXPENDITURE

State and government	$1,756,689.53
Justice	871,152.52
Public instruction	734,335.78
Finance	2,363,863.61
Agriculture, industry, and commerce	223,588.56
Public works	1,735,231.38
Municipalities	8,226,748.39
Military department	1,732,885.04
Total	$17,644,494.81

The chief sources of revenue under Spanish rule were (1) taxes and excise duties, yielding less than one-fourth of the total; (2) import and export duties, which furnished about 55 per cent of the entire revenue; (3) stamp taxes, 6 per cent of the revenue; (4) lotteries, over 7 per cent; (5) state property—rent and sale of public lands and rent from docks—producing about 1½ per cent of the total revenue; (6) miscellaneous, over 5 per cent. Thus the great bulk of taxation fell upon the consumer, while the expenditures took little account of the needs of the people. As the above table shows, the army absorbed almost 30 per cent of the entire expenditure; nearly 50 per cent went to pay the debt incurred by the Spanish government, while only about one-fourth of the total went for civil administration, of which the greater part was absorbed by salaries of Spanish officers.

It will be observed that under the new régime the customs duties furnished over 90 per cent of the entire revenue of the island. On the other hand, on the side of expenditures a radical change may be noted. The expenses of the mili-

tary department decreased from nearly one-half of the total expenditure to less than 10 per cent. The service of the debt naturally disappeared from the budget because it was not the business of the United States to pay the debts incurred by the Spanish government, and the Cuban Convention, by repudiating that debt, relieved the people of a great burden. A detailed comparison of expenditures under the two régimes is impossible owing to the different method of classification; however, a comparison of the four leading items common to both budgets shows the following changes:

The expense for state and government decreased from $3,634,439 to $1,756,689.53, or 52 per cent, although the latter sum includes the cost of the census. The expense for justice and instruction, on the other hand, increased from $902,449 to $1,605,488.30, or 78 per cent. The finance department showed also an increased expenditure of 255 per cent, and that of public works increased from $880,685 to $1,735,231.38, or 99 per cent. An unusually large item, $8,226,748, almost one-half of the total budget, was formed by the supplementary grants to municipalities. These subsidies were occasioned by the poverty-stricken condition of the people, who were unable to raise the necessary local revenue, and the money was advanced largely to defray expenditures affecting the most vital interests of the people, such as instruction, sanitation, hospitals and asylums, public buildings, etc.

Such were the finances of Cuba during the period of American military occupation. The national budget for 1905–06 showed estimated revenue of $19,699,805 (of which $17,862,000, customs) and estimated expenditure of $19,138,104; for 1912–13 estimated revenue and expenditure were $37,940,000 and $33,974,147 respectively. Estimated receipts for the latter year were as follows: customs, $26,434,000; excise, $3,900,000; lottery, $3,700,000; direct taxes, $1,113,000; posts and telegraphs, $1,076,000; consular dues, $500,000; other, $1,217,000; total, $37,940,000. Estimated disbursements for 1912–13: administration, $10,117,394; public instruction, $4,782,653; sanitary service, $3,784,987; public debt, $3,710,500; public works, $3,704,625; finance, $3,329,504; justice, $2,038,220; executive, $1,000,540; foreign affairs, $717,224; agriculture, industry, and commerce, $488,400; total, $33,974,147. The public debt in 1911 was $62,083,100; charge, $2,464,585.

Government. The constitution of Cuba was adopted by the constitutional convention on Feb. 21, 1901. It provides for a republican form of government and in its main provisions differs but slightly from the Constitution of the United States. The President, who must be either a native Cuban or a naturalized citizen with at least 10 years' service in the Cuban army during the wars for independence, is chosen by an electoral college for a term of four years and is disqualified for more than two consecutive terms. He has the right of appointing and removing the members of his cabinet.

The legislative power is vested in the Congress, which consists of a Senate and a House of Representatives. The former is composed of four senators from each province, chosen by an electoral board composed of the provincial councilmen and electors, the latter being twice the number of the former and chosen by popular vote. Provision is made for the retirement of one-half of the senators every four years. The House of Representatives consists of one member for every 25,000 inhabitants, or for a fraction of more than 12,500. They are elected directly for four years, one-half retiring every two years. Congress meets twice annually (on the first Monday in April and November) and is endowed with extensive powers, controlling, besides the financial affairs and foreign relations of the republic, also the preparation of electoral laws for the provinces and municipalities. The approval of two-thirds of the members of both legislative bodies is necessary for a change in the constitution.

For administrative purposes the republic is divided into six provinces. The provincial governors and assemblies are elected directly for a period of four years. The provinces are independent in their internal administration, but the President has the right of interference in case of abuses of power on the part of the Governor or the Assembly. The municipalities are administered by mayors and assemblies elected directly by popular vote. The judges of the Supreme Court are appointed by the President with the approval of the Senate. The voting franchise is accorded to every male Cuban over 21 years of age, and not mentally incapacitated, convicted of crime, nor serving in the army or navy, to all Spanish male residents of like age who have been on the island since April 11, 1899, and to all male foreigners of like age who have resided in Cuba since Jan. 1, 1899. For foreigners who have arrived on the island after Jan. 1, 1899, a five years' residence is required for naturalization.

Education. Primary education, according to the provisions of the constitution, is free and compulsory, and the expenses are to be paid by the central government in case of inability on the part of a province or a municipality to maintain its primary schools. Secondary and advanced education is under the control of the state. During the Spanish régime education was controlled to a large extent by the church, and the provisions for primary education were very inadequate. According to the census of 1899 the proportion of illiteracy among the voting population was: Cubans, 59 per cent; Spaniards, 12 per cent. In 1894, just before the war for independence, there were about 900 public and about 700 private schools, with an enrollment of not more than 60,000. With the American occupation the school system was entirely reorganized, and the facilities for teaching as well as the enrollment increased with an extraordinary rapidity, so that in 1900 the number of public schools was 3550, with an enrollment of 172,000 and an average attendance of 123,000. In February, 1911, there were 3774 public schools, with an enrollment of 152,658 and an average attendance of 105,774; enrollment in private schools, 24,434. The 1907 census showed that 56.6 per cent of the people above 10 years could read (as compared with 43.3 per cent in 1899). Cuba has a university at Havana. The population is Roman Catholic. The island forms one archiepiscopal diocese.

Population. The population of Cuba in 1910 is stated at 2,220,278; the estimate of 1912 is 2,473,600. There have been various censuses, beginning with 1774, but the results of those prior to 1887 are regarded as untrustworthy. The census returns have been as follows: 1774, 173,620; 1792, 272,300; 1817, 572,363; 1827,

704,487; 1841, 1,007,624; 1861, 1,396,530; 1877, 1,509,291; 1887, 1,631,687; 1899, 1,572,797; 1907 (census of September 30), 2,048,980; November, 1919, 2,898,905. The decrease of 3.6 per cent shown in 1899 was due to the war. The increase shown in 1907 was 30.3 per cent; the increase was largest in Pinar del Río (41.1 per cent), next largest in Oriente (38.8), and smallest in Matanzas (13.5). The 1907 population was returned by race and sex as follows:

	Male	Female	Total
Native whites	608,597	615,942	1,224,539
Foreign whites	163,014	40,623	203,637
Negroes	133,655	140,617	274,272
Mixed	157,975	176,720	334,695
Yellow	11,641	196	11,837
Total	1,074,882	974,098	2,048,980

The percentage of whites was 69.75, negroes 13.28, mixed 16.40, and yellow 0.57. Among the white population males exceeded females by 115,046; while among the negroes females exceeded males by 6962, and among the mixed inhabitants by 18,745. Of the total population, 1,820,239 were born in Cuba, 185,393 in Spain, 11,217 in China, 7948 in Africa, and 6713 in the United States. The percentage of negroes was largest in Oriente (43.1) and smallest in Camagüey (18.3). The inhabitants dependent upon agriculture, fisheries, or mining were 48.1 per cent of the total; domestic and personal service, 22.8 per cent; manufacturing and mechanical pursuits, 14.9 per cent; trade and transportation, 12.8 per cent; professional service, 1.4 per cent. The larger cities were: Havana (capital of the republic), 297,159; Santiago de Cuba, 45,470; Matanzas, 36,009; Cienfuegos, 30,100; Camagüey, 29,616; Cárdenas, 24,280. There were 13 other towns having over 8000: Sancti-Spíritus (17 thousand), Santa Clara (17), Manzanillo (16), Guantánamo (15), Guanabacoa (14), Sagua la Grande (12), Pinar del Río (11), Trinidad (11), San Antonio de los Baños (9), Jovellanos (9), Marianao (9), Caibarién (8), Güines (8).

The area of the Republic of Cuba (i.e., the island of Cuba and the adjacent isles) is officially stated at 44,164 square miles (the provincial areas in the table below are approximations). By provinces the total population and the density per square mile were as follows in 1907:

PROVINCES	Square miles	Population 1907	Density
Pinar del Río	5,000	240,372	48.1
La Habana	2,772	538,010	194.1
Matanzas	3,700	239,812	64.8
Santa Clara	9,560	457,431	47.8
Camagüey	10,500	118,269	11.2
Oriente	12,468	455,086	36.5
Total	44,000	2,048,980	46.5

In 1904 immigrants numbered 28,467 (from Spain, 23,759); in 1905, 54,219 (47,902); in 1910, 32,606 (25,947); in 1911, 38,053 (32,104). In 1911 there were 12,846 marriages, 74,286 births, and 33,194 deaths.

History. The "Pearl (or Queen) of the Antilles," the "Ever-Faithful Isle," as the Spaniards used to term Cuba (from the attitude of the Cubans at the time of the Napoleonic overthrow of the Spanish Bourbons), was discovered by Columbus during his first voyage, on Oct. 28, 1492. He landed, it is supposed, on the north coast, near Nuevitas, by the river Máximo, and believed it to be a part of the mainland, until assured by the natives that it was an island; but in 1494, on his second trip, he reiterated his previous belief and called the land Juana, after Juan, the son of Ferdinand and Isabella. Subsequently he changed the name to Fernandina in honor of Ferdinand, and still later to Santiago, the name of the patron saint of Spain, and finally to Ave María, in recognition of the kind offices of the Virgin Mary; but the aboriginal name of Cuba clung to the island and was never supplanted. A peaceable race of Indians, calling themselves Cibon-eyes, were its inhabitants, living under nine *caciques*. In 1502 Columbus visited Cuba a third time, and in 1511 his son, Diego Columbus, fitted out a colonizing expedition of 300 men, under Diego Velásquez, who in 1514 founded Santiago and Trinidad, and also a place on the southern coast called San Cristóbal de la Habana, a name soon transferred to another settlement on the northern coast, and in 1519 to the present locality. The natives were so cruelly treated that by 1553 their race was almost extinct, notwithstanding the appeals of Las Casas, the Roman Catholic apostle to the Indians, to the home government in their behalf. This humane missionary having observed in Santo Domingo that the negroes seemed to possess a capacity for endurance superior to that of the Indians, in order to save the latter, went so far as to suggest that negroes should be imported to take their places in the mines and cane fields. The colonists were not slow to act upon this suggestion, and thus negro slavery gained a foothold in the Western world. The Indians of Cuba, however, did not escape extermination, while the negroes were subjected to cruelties that checked their natural increase and made it necessary to recruit their numbers by constant importations. In 1537 Diego Columbus relinquished to the crown his right to appoint a governor for the island, and Hernando de Soto was appointed, under the title of captain general. Havana was destroyed by the French in 1538 and again in 1554, and for a century and a half the people of the island were in almost continual fear of invasion by the French, Dutch, or English, or the pirates infesting the adjacent waters. Many laws were also made in Spain that were exceedingly disastrous to the prosperity of the island—e.g., a law prohibiting all foreigners, even Spaniards not native Castilians, from trading with or settling in the island. This led to smuggling, which was carried on largely, especially after the English captured Jamaica in 1655. Whatever importance and prosperity Cuba has attained seems to date from the Treaty of Paris, 1763, which ended the Seven Years' War during which the English had captured Havana. The island was restored to Spain, and for the rest of the century it enjoyed unusual prosperity. Las Casas, appointed captain general in 1790, was especially indefatigable in his efforts for the public good, removing many restrictions from commerce and promoting many useful public works. During the nineteenth century the island was ruled by a succession of captains general possessing almost absolute power, and, although

some of these in the face of grave racial and social difficulties did excellent work, the majority proved both tyrannical and inefficient, as the great number of rebellions throughout the century indicate. Among them were: a number from 1820 to 1830, a sympathetic reflection of the revolutions in South America; the Black Eagle revolt of 1830, to some extent a servile insurrection; the great Ten Years' War, from 1867 to 1877, which was suppressed with revolting cruelty; and, finally, the insurrection in 1895, which was to end with the independence of Cuba. In the meantime the United States made repeated efforts to purchase the island. The first of these was by John Quincy Adams in 1825. In 1848 President Polk authorized the American Minister at Madrid to offer $100,000,000, and in 1858 a proposal was made in the Senate to authorize an offer of $30,000,000, but this was finally withdrawn. In 1854 what is known as the "Ostend Manifesto" (q.v.), drawn up in the interest of the slaveholding South by Buchanan, Mason, and Soulé, United States ministers to Great Britain, France, and Spain respectively, claimed the right of this country to annex Cuba if Spain refused to sell. Various attempts were made to secure the independence of the island and the abolition of slavery. The insurrections of 1849–51, under Lopez (q.v.), and of 1854 failed to accomplish anything and were suppressed by the most cruel measures and, finally, under President Grant these efforts were renewed. The constant jeopardizing of American interests, killing of American citizens, and interference with American shipping, as is illustrated in the *Virginius* and *Black Warrior* affair, led to constant friction between the United States and Spain, and, though the rebellion of 1868–78 induced the Spanish government to promise the representation of Cuba in the Cortes by her own deputies, and a Liberal party was formed to secure the fulfillment of this pledge, to encourage white immigration, and to promote free trade, the general discontent remained. In 1895 came the final revolt. The insurgents, under Generals Gomez, Maceo, and Garcia, succeeded in keeping the field in spite of every effort to exterminate them; and became so bold as in February, 1896, to approach so near to Havana that the sound of their firing was heard within the capital. In the same month General Campos was recalled by the home government, and General Weyler, a soldier reputed to be savage in his measures, succeeded him. The revolutionists were able to maintain the semblance of a government, and their conduct, as well as that of Spain, aroused for them much sympathy throughout the United States. Before the close of 1897 General Weyler was recalled and superséded by General Blanco. In the United States the criticism of Spanish methods suddenly developed into widespread and outspoken hostility to Spain upon the mysterious destruction of the American warship *Maine* in the harbor of Havana on Feb. 15, 1898. Diplomatic relations became strained, and in April, 1898, owing to the apparent success of the insurrection and justified by that, President McKinley called the attention of Congress to the situation in such words that Congress, on April 19, declared that the people of Cuba were "and of right ought to be free and independent." War followed, and by the Treaty of Dec. 10, 1898, Spain relinquished all right and sovereignty over Cuba, and the United States took temporary possession of the island and assumed all the international obligations arising from such occupation. For three years thereafter the affairs of the island were administered exclusively by the War Department of the United States, and extensive public improvements were effected. In December, 1901, after the people had adopted a constitution, a president of the republic was elected, in the person of Estrada Palma. On May 20, 1902, the United States formally withdrew from the island, and Governor-General Wood was replaced by President Palma.

The conditions set for the withdrawal of the American occupation, as incorporated in the Cuban constitution and in the permanent treaty with the United States in 1903, were that the Cuban government should enter into no treaty with a foreign power tending to impair the independence of the republic or permitting a military or naval occupation of the island, and that no loans should be issued beyond the limit justified by the public revenue. The acts of the United States military government were recognized as valid, and the United States received the right to intervene for the discharge of its obligations under the Treaty of Paris. Provision was also made for the lease of coaling and naval stations to the United States. The question of the ownership of the Isle of Pines was reserved for future settlement. The first Congress of the Cuban republic met on May 5, 1902. In August a public loan of $35,000,000 was authorized for the purpose of facilitating the revival of the sugar-cane industry. With the Spanish market closed to Cuban sugar and the United States as the leading available market, a modification of the American tariff laws in so far as they affected Cuban sugar became a matter of vital necessity. A reciprocity treaty between the two countries was ratified by the United States Senate in March, 1903, but the House of Representatives did not enact the necessary legislation until November. A tariff reduction of 20 per cent on Cuban products was granted. In September, 1903, the United States obtained the lease of the naval stations at Bahía Honda, near Havana, and Guantanamo, not far from Santiago. In April, 1904, an extradition treaty was concluded with the United States. In the latter part of 1905 the American residents of the Isle of Pines set on foot a movement for the annexation of the island to the United States, but the agitation received its quietus from the American Secretary of State, who announced that the United States government recognized the sovereignty of Cuba over the Isle of Pines, a position affirmed in a formal treaty between the two governments, then under consideration by the United States Senate.

Party politics entered on an ominous course in 1905. At that time the two leading parties were the Liberals, formerly the National party, and the Moderates. The latter comprised the conservative elements, including the great commercial and industrial interests. The Liberal party, embracing probably a great majority of the nation, consisted of the more democratic elements, including the colored population which had supplied the bulk of the forces in the war against Spain. Up to the beginning of 1905 President Palma carried on his administration with Liberal support, but at that time he abruptly went over to the Moderate camp,

actuated probably by the widespread corruption and inefficiency that characterized the municipal governments under Liberal rule. The Liberal cabinet resigned and was replaced by one composed of Moderates, and there followed wholesale removals of Liberal municipal officers throughout the island. Both parties made active preparations for the presidential and congressional elections at the end of 1905, and there is no doubt that the Palma administration had extensive recourse to illegal methods. Thus the register of votes for the primary elections of September, 1905, contained 432,000 names, or "one-half larger than any possible number of voters." Intimidation was also practiced by the government. Convinced of the hopelessness of their cause, the Liberals remained away from the polls. President Palma was reëlected, and a unanimously Moderate Lower House was chosen.

There were trivial uprisings in August and December, 1905, but it was not till the third week of August, 1906, that the Liberal outbreak came. The insurrectionary movement was begun by Pino Guerra in the Province of Pinar del Río, the first notable incident occurring on August 20, about 20 miles from Havana, when Gen. Quentin Bandera, a noted veteran of the War of Independence, was captured by a government force and brutally murdered. The government attempted to check the insurrection by arresting some of the Liberal leaders, including Gen. José Gomez, the candidate of the Liberals for the presidency in 1905. On August 27 President Palma issued a proclamation of amnesty in the hope of bringing the Liberals to terms, but it failed signally. How great was the general discontent throughout the island was attested by the helpless condition to which the government was reduced almost at a blow. It had at its command only 3000 rural guards, and it proceeded to organize a machine-gun battery which proved effective in one engagement with Pino Guerra's troops. But as early as September 8 President Palma secretly appealed to the United States government for intervention, professing his inability to cope with the insurrection. In the following week he gave public acknowledgment of the desperate state of affairs by suspending the constitution in the provinces of Havana, Pinar del Río, and Santa Clara. On September 12 the United States cruiser *Des Moines* arrived at Havana. At the request of President Palma a detachment of marines was landed the following day for the protection of the presidential palace, but received orders from Washington to reëmbark. On September 14 the Congress bestowed on President Palma full powers to deal with the situation, and on the 16th the latter, after a conference with a number of insurrectionary leaders, proclaimed a cessation of hostilities in view of the expected arrival of Mr. Taft, United States Secretary of War, who had been ordered to Cuba by President Roosevelt in the rôle of a mediator and with the hope of obviating the necessity of intervention by the United States. Secretary Taft landed in Havana on September 19, and immediately proceeded to inform himself of the merits of the issues at stake by soliciting testimony from the adherents of both parties. The weakness of the Moderate cause, in fact as well as in law, was speedily made apparent. Havana, as well as other large cities, was at the mercy of the insurgents.

It was decided by Secretary Taft that peace might be reëstablished by declaring null the election of all candidates chosen in 1905 with the exception of President Palma, whose retention was necessary to maintain the continuity of constitutional government. But this possible solution was frustrated by the resignation, on September 28, of President Palma, who declared it incompatible with his dignity to remain in office under the specified conditions. A crisis was thus precipitated and intervention made inevitable. On September 29 Mr. Taft assumed the office of provisional Governor, and the dispatch of United States troops was hastened. The disarmament of the Cuban forces was at once begun and rapidly completed. For the next three years the United States occupied Cuba. In 1909, order having been restored, the republic was declared established for the second time, and the American troops left the island. For two years the new government under General Gomez prospered, but in 1911 the discontent of old veterans, who felt insufficiently rewarded for their services to the fatherland, led to trouble. American intervention was threatened, but the Cuban authorities quelled the incipient revolt, and order was restored. In 1912 the Conservative party under Menocal were victorious at the polls. The question of amnesty to those who opposed the government now became the foremost political issue, and it has not yet been settled. The new administration, however, has proven itself wide-awake to the necessity of economic and industrial progress in Cuba, and to further this has succeeded in floating a large loan in the United States in 1914. See SPAIN; UNITED STATES; SPANISH-AMERICAN WAR.

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CUBAN FEVER. See CALENTURE.

CUBAN LITERATURE. "In Cuba everybody versifies," said the eminent critic Menéndez y Pelayo. It is certainly true that in her compositions in verse Cuba has made her most important contribution to literature in the Spanish tongue. The earliest poem known to have been written on the island is the *Espejo de paciencia* (1608) of Silvestre de Balboa, a native of the Canaries, but neither the seventeenth nor the first half of the eighteenth century produced any Cuban poet of great merit. Mention may, however, be made of the names

of José Surí y Águila (1696–1762), who wrote some religious *loas;* Mariano José de Alva and Lorenzo Martínez de Avileira, authors of *glosas* and *coplas;* an unknown poetess of Havana, who indited a little poem on the English invasion of 1762; and the cleric Diego de Campos, who commemorated the same event in his *décimas.* To another cleric of the eighteenth century, Fray José Rodríguez (*Capacho*), who likewise wrote *décimas* on various subjects, has been attributed the earliest dramatic work composed in Cuba, *El príncipe jardinero y fingido Cloridano,* but the bibliophile Barrera ascribes the play to one Santiago de Pita. The University of Havana was established in 1721, and at an early date in the century the first printing press was set up. In 1790 the first newspaper, *El papel periódico,* made its appearance and had among its most active collaborators such men of force as the teacher of philosophy José Agustín Caballero, the physician Tomás Romay, and, above all, the poet Manuel de Zequeira. Quite a number of epigrams are due to the pen of Manuel del Socorro Rodríguez, a journalist who founded several papers elsewhere in Spanish America. The epic was attempted with little success by Count Colombini in his *Glorias de la Habana.* All thus far produced was rather verse than poetry; the first real poets of Cuba are Manuel de Zequeira (1760–1846) and Manuel Justo de Rubalcava (1769–1805). Zequeira, perhaps the most attractive Cuban poet anterior to Heredia, echoed in the colonies the note of patriotic fervor called forth in Spain by the stirring events of 1808; in the heroic strains of his *Batalla naval de Cortés,* of his *Dos de Mayo,* and his *Primer sitio de Zaragoza,* he is as much a Spaniard as Quintana and Gallego in their heroic odes (cf. his *Poesías,* New York, 1829). Rubalcava, who was bucolic in temperament, translated the *Eclogues* of Vergil and composed some original idyls and descriptive poems (cf. the *Poesías de M. J. Rubalcava,* Santiago de Cuba, 1848).

But towering above the countless poetasters of the time, the greatest of all the poets that Cuba has yet produced was José María de Heredia (1803–39). A patriotic poet, who was exiled from Cuba because of his opposition to Spanish government, Heredia is held in high esteem, not only for his political poems like the *Himno del desterrado,* but also for his descriptive poems like the *Niágara,* the *Teocalli de Cholula,* and the *Tempestad* (often called also the *Huracán*), pervaded by a melancholy sentiment and full of most noble imagery. Among Heredia's works are many translations and imitations of the poems of English, French, and Italian writers, such as Young, Campbell, the pseudo-Ossian, Lamartine, Delavigne, Millevoye, Arnault, Foscolo, and Pindemonte (cf. the edition of Heredia's poems and his translations and imitations of foreign dramas, published at New York, 1875; his prose *Lecciones de historia universal,* Toluca, 1831, and other prose works; and consult: Villemain, *Essai sur le génie de Pindare et sur la poésie lyrique,* Paris, 1859; J. Kennedy, *Modern Poets and Poetry of Spain,* London, 1852). Among the lesser lights must be counted Domingo del Monte, a Venezuelan, who, residing in Cuba, there composed pleasing romances, played the part of a generous patron of other poets, and strove energetically to have purity of idiom maintained in the Cuban use of the Castilian speech; Ignacio Valdés Machuca, who imitated Meléndez Valdés in his *Ocios poéticos* (1819) and also translated and imitated Jean-Jacques Rousseau; Manuel González del Valle, a teacher of philosophy and the author of a *Diccionario de las Musas* (1827), etc. A protégé of Del Monte's was the romantic spirit José Jacinto Milanés (1814–63), a man of superior powers, whose lyrics are now gently sentimental and again madly socialistic. Milanés is also deemed one of the best playwrights that the island has had so far. His pieces include *El Conde Alarcos, El poeta en la corte, Por el puente ó por el río,* and *A buena hambre no hay pan duro.* Pictures of manners in dialogue form are to be seen in his *Mirón cubano* (cf. the 1st ed. of his *Obras,* Havana, 1846; 2d ed., New York, 1865). Another true poet was Gabriel de la Concepción Valdés, best known by his pseudonym Plácido (1809–44). He was a mulatto and a foundling and had but slight training, yet few Cuban lyrics will live longer than his romance entitled *Xicotencal,* and his sonnets, *La muerte de Gessler, Fatalidad,* and *Plegaria* (cf. the editions of his verse, New York, 1856; and Havana, 1886). Of undisputed excellence is the work of the poetess Gertrudis Gómez de Avellaneda (1814–73). She was eminently successful as a lyric poet and as a dramatist, less so as a novelist (cf. an edition of her works, Madrid, 1869). Juan Valera says that as a lyric poet she has no rival of her sex in any literature, unless we go back to Sappho and Corinna, or perhaps to the Italian Renaissance and Vittoria Colonna; and in some respects he prefers the Cuban to the Italian.

Among the countless writers of verse that have arisen in Cuba later than Avellaneda, three are of particular merit: Joaquín Lorenzo Luaces (1826–67), the author of war songs (the *Caída de Missolonghi,* etc.), of odes (see especially the *Oración de Matatías* of biblical inspiration and the ode *A Cyrus Field,* on the laying of the Atlantic cable), and of one or another drama (cf. the *Poesías de J. L. Luaces,* Havana, 1857, and the *Noches literarias en casa de N. Azcárate,* Havana, 1866); Juan Clemente Zenea (1831–71), whose elegiac verse is full of a tender melancholy (cf. the complete edition of his *Poesías,* New York, 1872); and Rafael María de Mendive (1821–86), noted for his translation of the *Irish Melodies* of Thomas Moore, whose influence is also easily discernible in his original Cuban verse (cf. the *Poesías* of Mendive, Havana, 1883, and the *Melodías irlandesas,* New York, 1875). To the list of the nineteenth-century poets there may further be added the names of Ramón Vélez y Herrera (born 1808), Miguel Teúrbe de Tolón (1820–58), Francisco Orgáz (1815–73), Ramón de Palma y Romay (1812–60), Ramón Zambrana (1817–66), José Fornaris (1827–90), José Güell y Renté, etc.

As compared with her poets, it is clear that the prose writers of Cuba are distinctly inferior in importance. In the eighteenth century she has the historians Arrati and Urrutia; in the nineteenth, Valdéz, José Arrango y Castillo, etc. Among her legal writers have figured Conde, Ayala, Armas, Bermúdez, Cintra, etc., and among her moralists and writers on philosophical matters, Barea, Veranes, José Augustín Caballero, Félix Varela, José de la Luz Caballero, etc. In the fine arts Vermay and Perouani have earned some recognition, and in

music Villate has gained notice by his operatic compositions. A really good critical account of Cuban prose and poetry has yet to be written; more light on the subject may be expected from the publication of the *Biblioteca selecta hispano-cubana de prosistas* and the *Antología de poesía cubana*, which a commission of littérateurs has presented to the Spanish Academy. On Cuban lyric poets an excellent essay has been written by M. Menéndez y Pelayo and now appears as the preface to the second volume of the *Antología de poetas hispano-americanos* (Madrid, 1893), which contains very good selections from the works of the most important Cuban poets. Consult also: the *Parnaso cubano, Colección de poesías selectas de autores cubanos desde Zequeira*, etc., by A. López Prieto (Havana, 1881); the *Cuba poética, colección escogida de las composiciones en verso de los poetas cubanos desde Zequeira*, prepared by Fornaris and Luaces (2d ed., ib., 1861); Hills, *Bardos cubanos, antología de las mejores poesías líricas de Heredia, "Plácido," Avellaneda, Milanés, Mendive, Luaces, y Zenea*, with biographical notices of each of the poets and a comprehensive bibliography of their works and of Cuban poetry in general (Boston, 1901); Bachiller y Morales, *Apuntes para la historia de las letras y de la instrucción pública en la isla de Cuba* (Havana, 1859); Mitjans, *Estudio sobre el movimiento científico y literario de Cuba* (ib., 1890); Merchán, *Estudios críticos* (Bogotá, 1886); Calcagno, *Diccionario biográfico cubano* (New York, 1878); González del Valle, *La poesía lírica en Cuba* (new ed., Barcelona, 1900); A. del Valle, *Parnaso cubano* (ib., 1912); C. M. Trelles, *Bibliografía cubana del siglo XIX* (2d vol. appeared at Matanzas, 1912, and carries the account from 1826 to 1840).

CUBE (Lat. *cubus*, Gr. *κύβος, kybos*, cube), or REGULAR HEXAHEDRON. A regular solid with six square faces, each of which is parallel to the one opposite to it. It is a form of frequent occurrence in nature, especially among crystals. The cube, or third power, of a number is the product formed by taking the number three times as a factor, e.g., the cube of 4, or $4^3 = 4 \cdot 4 \cdot 4 = 64$. This use of the term arises from the circumstance that the solid contents of a cube may be expressed by the third power of the number which expresses the length of one of its edges. Thus, if the edge of a cube is 4 inches, its volume is $4 \cdot 4 \cdot 4 \cdot 1$ cubic inch, or 64 cubic inches. The cube root of a number is one of the three equal factors of the number; e.g., the cube root of 8 is 2, since $2 \cdot 2 \cdot 2 = 8$. The number of which the root is sought is called the power, and if it is a power of a commensurable (q.v.) number, it is called a perfect power. Roots of perfect powers are often readily obtained by factoring; e.g., to find the cube root of 216, $216 = 6 \cdot 6 \cdot 6$, therefore 6 is the cube root of 216. If the root is incommensurable, the binomial formula, logarithms, or the equation (q.v.) is available. Every number which satisfies the equation $x^3 = 1$, or $x^3 - 1 = 0$, is a cube root of 1. But $x^3 - 1 = 0$ is the same as $(x - 1)(x^2 + x + 1) = 0$, and equating each factor to 0 and solving, $x = 1, -\frac{1}{2} + \frac{1}{2}\sqrt{-3}, -\frac{1}{2} - \frac{1}{2}\sqrt{-3}$, the three cube roots of unity. (See COMPLEX NUMBER.) The three cube roots of 8 are

$$2, 2(-\tfrac{1}{2} + \tfrac{1}{2}\sqrt{-3}), \quad 2(-\tfrac{1}{2} - \tfrac{1}{2}\sqrt{-3}).$$

Thus any number has three cube roots—one real and two imaginary. In extensive calculations tables of roots and of logarithms are employed.

Duplication of the cube, or the Delian problem, according to tradition, originated with the oracle of Delos, who declared to the Athenians that a pestilence prevailing among them would cease if they doubled the altar of Apollo, i.e., replaced his cubical altar by another of twice its contents. The problem reduces to the solution of the continued proportion $a : x = x : y = y : 2a$, or to the solution of $x^3 = 2a^3$. This was effected geometrically by Hippocrates, Plato, Menæchmus, Archytas, and others, but not by elementary geometry. This is one of the three great problems whose appearance has been of wonderful significance in the development of mathematics. Consult Gow, *History of Greek Mathematics* (Cambridge, 1884), and Klein, *Vorträge über ausgewählte Fragen der Elementargeometrie* (Leipzig, 1895; Eng. trans., Boston, 1897).

CU'BEBS, or CUBEB PEP'PER (Fr. *cubebe*, from Ar. *kabāba*). The dried unripe berries of *Piper cubeba*, a species of climbing shrub of the family Piperaceæ, very closely allied to the true peppers. *Piper cubeba* is a native of Penang, Java, New Guinea, etc., and is said to be extensively cultivated in some parts of Java. Its spikes are solitary, opposite to the leaves, and usually produce about 50 berries, which are globular and, when dried, have much resemblance to black pepper, except in their lighter color and the stalk with which they are furnished. *Piper caninum*, a native of the Sunda and Molucca islands, is supposed also to yield part of the cubebs of commerce, and the berries of *Piper ribesioides* possess similar properties. Cubebs are less pungent and more pleasantly aromatic than black pepper; they are used in the East as a condiment, but in Europe chiefly for medicinal purposes. They act as a stimulant and are sometimes found useful in cases of indigestion; also in chronic catarrh and in many affections of the mucous membrane, particularly those of the urinogenital system. The chief constituents of cubebs are a volatile oil, resin, cubebic acid, cubebin, and wax. Cubebs are administered in many ways. For illustration, see Plate of CYPRESS, ETC.

CUBE ROOT. See CUBE; INVOLUTION.

CUBIC EQUATION. A rational integral equation of the third degree is called a cubic equation. It is called binary, ternary, or quaternary according as it is homogeneous of the third degree in two, three, or four unknowns. The general form of a cubic equation of one unknown is $ax^3 + bx^2 + cx + d = 0$. It is shown in algebra that this equation can be reduced to one of the form $x^3 + px + q = 0$. Every cubic equation of this form has three roots, of which one is real and the others real or imaginary. The roots will all be real when p is negative, and $-\frac{p^3}{27} > \frac{q^2}{4}$. This is known as the irreducible case in solving the equation. Only one root is real when p is positive, or when it is negative and $-\frac{p^3}{27} < \frac{q^2}{4}$. If p is negative and $-\frac{p^3}{27} = \frac{q^2}{4}$, two of the roots are equal. The cubic equation may be solved by the following formula, due to Tartaglia and Ferro, Italian mathematicians of

CUCKOOS

1. AMERICAN YELLOW-BILLED CUCKOO (Coccyzus americanus).
2. BLUEHEADED KOEL (Eudynamis cyanocephala).
3. COMMON EUROPEAN PARASITIC CUCKOO (Cuculus canorus).
4. ANI, or RAIN CROW (Crotophaga ani).
5. CRESTED CUCKOO (Lepidogrammus cummingi).
6. CHANNEL-BILL (Scythrops novæ-hollandiæ).
7. CHAPARRAL COCK, or ROAD RUNNER (Geococcyx californianus).

the sixteenth century, but known as Cardan's formula:

$$x = \sqrt[3]{-\frac{q}{2} + \sqrt{\left(\frac{q^2}{4} + \frac{p^3}{27}\right)}} + \sqrt[3]{-\frac{q}{2} - \sqrt{\left(\frac{q^2}{4} + \frac{p^3}{27}\right)}}$$

Besides Ferro, Tartaglia, and Cardan, there were Vieta, Euler, and various others who contributed to the early theory of cubic equations. In case the roots of a cubic equation are all real their values are more readily calculated by means of trigonometric formulas; e.g., assume $x = n \cos a$, and the equation $x^3 + px + q = 0$ may be expressed by $\cos^3 a + \frac{q}{n^2} \cos a + \frac{q}{n^3} = 0$. But it is shown in trigonometry that $\cos^3 a - \frac{3}{4} \cos a - \frac{\cos 3a}{4} = 0$: therefore, equating corresponding coefficients of $\cos a$, and solving the equations, $n = \sqrt{-\frac{4p}{3}}$ and $\cos 3a = -4q\left(-\frac{3}{4p}\right)^{\frac{3}{2}}$. Hence x may now be computed from $x = n \cdot \cos a$; $n \cdot \cos\left(\frac{2\pi}{3} + a\right)$; $n \cdot \cos\left(\frac{2\pi}{3} - a\right)$. For history and methods, consult Matthiessen, *Grundzüge der antiken und modernen Algebra der litteralen Gleichungen* (Leipzig, 1896). See also CARDAN, JEROME.

CUBIC'ULUM (Lat., bedroom, from *cubare*, to lie down). A term used to designate a small room or cell in a Roman house, containing a bed or couch, and opening off the court; also a recess or alcove, a box at the theatre or circus; and lastly, a final resting place or burial recess for one or more bodies in the early Christian catacombs. In England, and less commonly in the United States, the term is applied to the bed alcoves of a common sleeping room or dormitory in a lodging house, school, or other institution; often in the Anglicized form *cubicle*.

CU'BISTS. A group of post-Impressionist painters, who see and depict natural objects as if composed of innumerable cubes. They are best treated with painters of similar tendencies under POST-IMPRESSIONISM (q.v.).

CU'BIT (Lat. *cubitus*, elbow). A measure employed by the ancients, equal to the length of the arm from the elbow to the tip of the middle finger. The cubit of the Romans was about 17⅝ inches and that of the Hebrews 22 inches, but its length is now generally given as 18 English inches.

CU'BITT, SIR WILLIAM (1785–1861). An English civil engineer, born at Dilham, Norfolk. In 1800–04 he was apprenticed to a cabinetmaker at Stalham, and at Swanton was associated with a manufacturer of agricultural machines and devised self-regulating sails for windmills. In 1818 he began the manufacture of his invention known as the "treadmill," which was quickly introduced into the principal jails of Great Britain. From 1826 he was connected as engineer with important works in the improvement of canals and rivers and the construction of bridges and railways. He conducted the improvement of the Severn and the building of the Southeastern Railway. The water works of Berlin were also executed by him. In 1850–51 he was president of the Institution of Civil Engineers.

CUCKOO, kŭk'o͞o (Fr. *coucou*, Lat. *cuculus*, Gk. *κόκκυξ*, *kokkyx*, cuckoo, Skt. *kōkila*, cuckoo). A name given to many birds of the picarian family Cuculidæ, which contains about 175 species, mostly confined to the warmer regions of the globe, although some of them are summer visitors to cool climates. Only 35 of the known species live in the New World. The beak is slightly compressed and somewhat arched; the tail long, rounded, and usually of 10 feathers; the wings rather long; the tarsi short, with two toes directed forward and two backward, the outer hind toe capable of being brought half round to the front. The feet are thus adapted for grasping and moving about upon branches rather than for climbing.

Cuckoos of the Old World.—The name "cuckoo" is derived from the note of the male of the common European cuckoo (*Cuculus canorus*), which, although monotonous, is always heard with pleasure, being associated with all that is delightful in returning spring. A similar name is given to the bird in many languages. This common cuckoo is very widely diffused, as it is also found in India, Africa, and, in summer, even in Lapland and Kamchatka. It appears in Great Britain in April, and all except the young birds are believed to migrate southward again before the middle of August. The adult cuckoo is about a foot in length; ashy gray, barred beneath with black; the wings are black, and the tail is black, marked with white. It frequents both cultivated districts and moors. There is no pairing or continued attachment of the male and female; and the female, after having laid an egg on the ground, takes it in her mouth and deposits it, by means of her beak, in the nest of some other smaller bird, leaving the egg to be hatched and the young one to be fed by the proper owners of the nest. This egg is very small for so large a bird, not larger than a skylark's; and the number laid is uncertain. The young one, soon after hatching, acquires size and strength enough to eject from the nest any eggs or young birds—the true offspring of its foster parents—which may remain in it, and it seems restless and uneasy till this is accomplished. It works itself under them and then jerks them out by a motion of its rump. Other species of cuckoo, closely allied to the European cuckoo, inhabit Africa, Asia, and Australia, and have essentially the same habits, one, about the Mediterranean, victimizing pies alone, its eggs having a remarkable resemblance to those of the magpie. Equally parasitic are many Old-World tropical species of various other genera; yet some of them (see COUGAL) do not shirk parental responsibility, but incubate and rear their own offspring. This extraordinary practice of bird parasitism, in respect to its facts and probable origin and development, is thoroughly discussed by A. Newton, *Dictionary of Birds*, article "Cuckoo" (London, 1896), and Baker, *The Ibis* (ib., 1913).

The American cuckoos represent three different subfamilies—the anis, the road runners, and the tree cuckoos. The last compose the group Coccyzinæ and are characteristic of and confined to America. The best-known species are the black-billed cuckoo (*Coccyzus erythrophthalmus*) and the yellow-billed (*Coccyzus americanus*). Both species occur commonly in summer throughout the United States and eastern Canada, but pass the winter in Central and South America. The black-billed cuckoo does

not occur west of the Rocky Mountains. The two species are of about the same size, a foot long, and are olive brown above, white beneath, but are easily distinguished by the color of the bill and the amount of white on the tail.

YELLOW-BILLED CUCKOO.

Unlike the Old-World cuckoos, they are not parasites, but build their own nests and incubate their own eggs. The nests are flimsy structures of twigs, the eggs large and pale blue. Incubation begins when the first egg is laid, so that no two of the eggs or young are in just the same stage of development. The American cuckoos are insectivorous and are very useful birds. Their note or call is a series of accelerated "chucks," not exactly harsh, but far from musical. In the Middle, Western, and Southern States the yellowbill is known as "rain crow," because its note is supposed to predict rain—an idea prevalent in regard to these birds in other parts of the world. Consult Beal, *Food of Cuckoos* (Department of Agriculture, Washington, 1898). See Plate of CUCKOOS, and Colored Plate of EGGS OF SONG BIRDS.

CUCKOO AND THE NIGHTINGALE, THE. A poem attributed in the sixteenth century to Chaucer, but probably not composed by him. The subject is the discussion between a nightingale and a cuckoo on the comparative blessings of love.

CUCKOO BEE. A naked, somewhat wasp-like bee of the family Nomadidæ, all the many species of which are parasitic in the nests of other bees, after the manner of the European cuckoo. Each genus makes its home with some particular form or forms of wild bee; thus, our common *Nomada imbricata* is found in nests of *Andrena* and *Halictus; Stelis* lives on *Osmia*, etc. These inquilines have no means of collecting or carrying pollen and so have been forced to seek the hospitality of forms able to do so. The investigations of J. H. Emerton show that this forced association arouses no quarreling, but that there is frequently enough food for the larva of both the proper owner of the cell and of the guest, whose egg is laid in the same pollen mass. The term "cuckoo bee" is also applied to hymenopterous insects of the family Chrysididæ. See BEE; CUCKOO FLY.

CUCKOO FLOWER. See CRESS.

CUCKOO FLY. One of a family (Chrysididæ) of diminutive, beautiful, metallic-green wasps, in which the abdomen has only three, four, or five visible segments, and can be turned under the thorax and closely applied to it. This "fly" seeks out the nest of a solitary wasp or bee, and, when the rightful owner is absent collecting food, the cuckoo fly deposits an egg in each cell. These eggs are walled in by the bee, together with her own eggs. The cuckoo-fly larvæ hatch, eat the food stored up in the cell by the bee, and perchance even the rightful larvæ. The adult fly, when seen by the wasp, is fought desperately, and during such encounters it rolls itself up in a defensive ball. In Europe, where the Germans call them *Goldwespen*, one of the cuckoo flies is parasitic on the currant worm.

CUCKOO SPIT. See FROG SPITTLE.

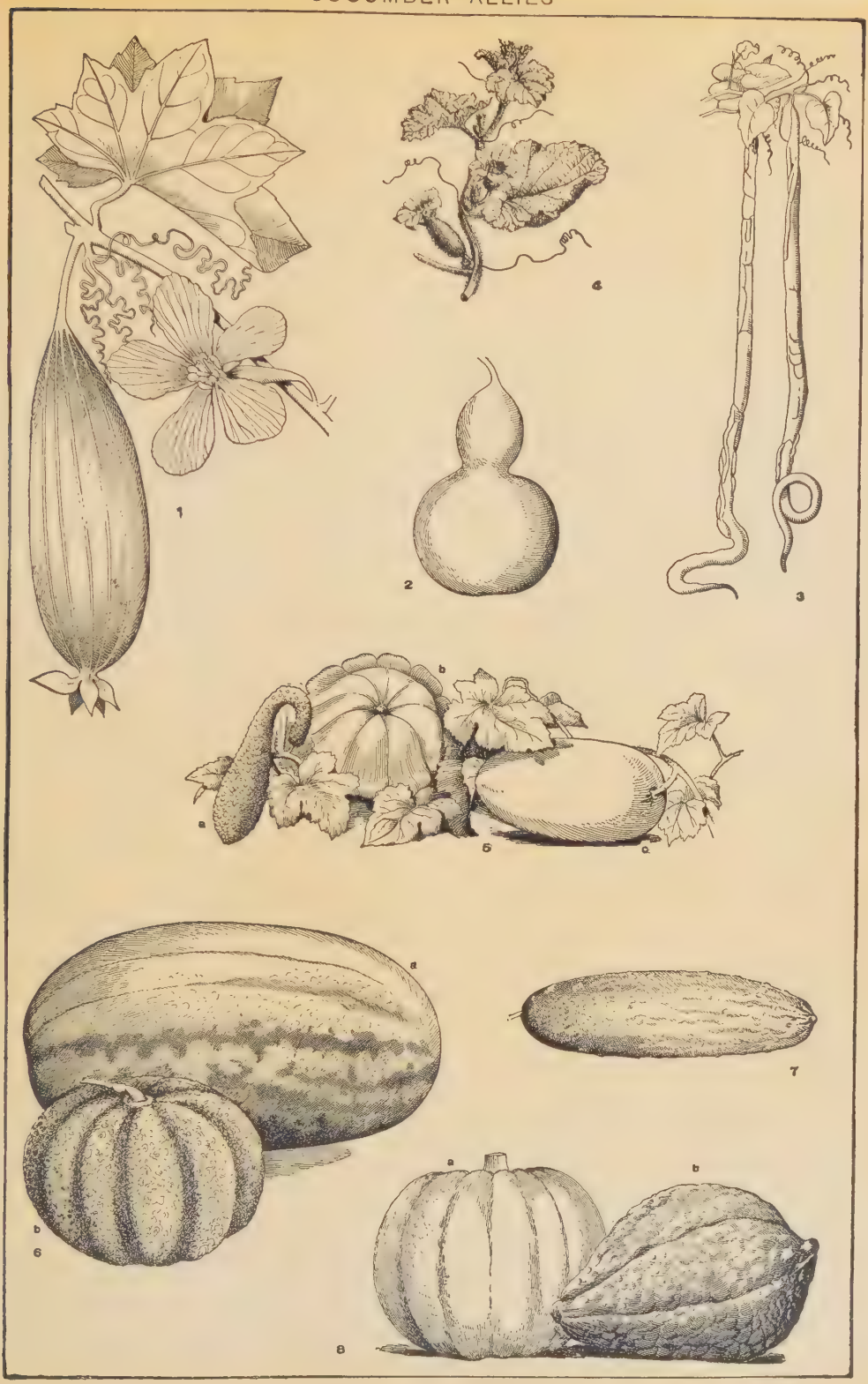
CUCU'JIDÆ (Neo-Lat. nom. pl., from *Cucujus*, of South American origin). A large family, chiefly tropical, of oblong, flattened beetles, most of which live under bark. See CORN INSECTS.

CU'CUMBER (OF. *cocombre*, Fr. *concombre*, from ML. *cucumer*, from Lat. *cucumis*, cucumber), *Cucumis sativus*. A common garden vegetable, native of Asia, and cultivated from the earliest times. The plant is vinelike and somewhat similar in appearance to the muskmelon. The oblong fruit (4 to 30 inches long) is eaten in the green state as a salad and is extensively used for pickling. The smaller sorts of pickling cucumbers are sometimes called "gherkins." The many varieties of cucumber in cultivation differ greatly in size and shape of the fruit. Cucumbers are very sensitive to frost. They are grown during the warm months in nearly all parts of the United States. The seeds are planted in hills 4 by 6 feet apart. The soil should be a fertile, warm loam, and the hills made rich with a few shovelfuls of well-rotted manure. The long English varieties extensively used for forcing in Europe are less used in America, the white-spine varieties being used more extensively for this purpose. To this genus belong other species valued for their edible fruit. *Cucumis anguria* is known as the West Indian gherkin. The snake cucumber (*Cucumis melo*, variety *flexuosus*) grows to a great length and is similar in quality to the common cucumber. *Cucumis serotinus* is cultivated in Turkey; *Cucumis macrocarpos* in Brazil; the conomon (*Cucumis conomum*) is much cultivated in Japan. The dudaim (*Cucumis dudaim*) is very generally cultivated in gardens in the East, for the fragrance of its fruit. The musk cucumber is *Cucumis moschata*.

CUCUMBER BEETLE. Of several beetles whose grubs attack cucumbers, the most important ones are described under MELON INSECTS (q.v.). A species of flea beetle found about cucumber vines is *Haltica cucumeris*, which is about the size of a small grain of wheat, black, with clay-colored antennæ and legs. The larvæ mine the seed leaves of the young plants, and both old and young feed upon the mature vine leaves and also upon other garden vegetables.

CUCUMBER DISEASES. The cucumber is subject to the attack of a number of fungi, only the more important of which can be mentioned. In the seed bed it is liable to the attack of *Phythium debaryanum*, the disease being called "damping off" (q.v.). In the field one of the worst pests is *Plasmopara cubensis*, producing mildew. It attacks the foliage, causing the leaves to turn yellow, to wilt, and die, the whole vine being involved. Spraying with some fungicide, as Bordeaux mixture or potassium sulphide, will prevent this disease if applied early and often. Care must be taken to spray the mixture upon the under sides of the leaves. In addition to cucumbers, this mildew occurs on muskmelons, squashes, and pumpkins. Another fungus, *Cladosporium cucumerinum*, attacks the fruit of the cucumber and melons, producing upon the young fruits small, sunken areas that later become black, rotten places. Often a sort of gummy exudation is associated

CUCUMBER ALLIES



1. LUFFA OR DISHRAG GOURD (Luffa ægyptiaca).
2. BOTTLE OR CALABASH GOURD (Lagenaria vulgaris).
3. SNAKE GOURD (Trichosanthes Anguina).
4. FLOWERS OF MUSK-MELON (Cucumis melo).
5. SUMMER SQUASH (Cucurbita); *a*, Crookneck; *b*, Custard or Patty-pan; *c*, Vegetable Marrow.
6. *a*, WATERMELON (Citrullus vulgaris); *b*, MUSK-MELON (Cucumis melo).
7. CUCUMBER (Cucumis sativus).
8. *a*, PUMPKIN (Cucurbita pepo); *b*, WINTER OR HUBBARD SQUASH (Cucurbita maxima).

with this disease. The treatment given above is recommended for this disease. In the greenhouse a serious trouble to cucumber forcing is the powdery mildew (*Erysiphe cichoracearum*). It may be known by the white, flourlike splashes on the leaves. The leaves become yellow, then brown, and dry up, killing the plant. The disease spreads with great rapidity, but may be kept under control as in the above cases. A disease known as the "wilt disease" is often of great destruction to cucumbers, melons, etc. It is caused by a kind of bacteria to which the name *Bacillus tracheiphilus* has been given. The organisms fill the water ducts of the plant, causing it suddenly to collapse. The leaf blades shrivel and dry up, and later the petioles and stem become flaccid, and the whole plant perishes. If a stem be cut across, a sticky, milk-white substance exudes. The disease is readily produced by inoculation and is largely spread through the agency of insects. A somewhat similar disease is caused by a species of *Fusarium*, a fungus. A disease due to *Mycosphærella citrullina* has recently become serious on cucumbers and other cucurbits grown under glass. It also attacks tomatoes.

CUCUMBER INSECTS. See MELON INSECTS.

CUCUMBER TREE. An American forest tree, *Magnolia acuminata*, growing in nearly all the States from New York to Arkansas and southward. The fruit, which looks like a cucumber, when macerated in spirit, makes a bitter tonic drink. The timber is light and useful for boat building. See MAGNOLIA.

CU'CURBITA'CEÆ (Neo-Lat. nom. pl., from Lat. *cucurbita*, gourd). A family of dicotyledonous plants (the gourd family), consisting chiefly of herbaceous plants, natives of the warmer parts of the world, having succulent stems which climb by means of lateral tendrils. The epigynous flowers are monœcious or diœcious and sympetalous. The calyx and corolla are five-parted and more or less coherent. The stamens exhibit a number of peculiarities, in some cases having both unilocular and bilocular anthers; in other cases the often tortuous anthers adhere, and sometimes the filaments are united. The fruit, called a "pepo," is peculiar, is more or less succulent, has a fleshy rind, and the seed-bearing placentæ either surround a central cavity or send prolongations into it. The seeds are flat and more or less imbedded in the pulp, which may be dry or juicy. The cotyledons are large and leaf like. This family contains 90 genera, with about 700 species, many of which produce edible fruits and are cultivated in temperate regions. To this family belong the cucumber, melon, gourd, pumpkin, squash, vegetable marrow, etc. (qq.v.). In some, important medicinal properties abound, as in bryony, colocynth, momordica, etc. (qq.v.). *Telfairia pedata*, a tropical African species, is cultivated for its seeds, which are used for food and from which oil is expressed.

CÚCUTA, kōō'kōō-tȧ. See SAN JOSÉ DE CÚCUTA.

CUDAHY, kud'ȧ-hĭ. A city in Milwaukee Co., Wis., 5 miles south of Milwaukee, on the Chicago and Northwestern Railroad and on Lake Michigan (Map: Wisconsin, F 6). The manufactures of the city include rubber goods, machinery, vinegar, and gloves, and there are foundries and a meat-packing establishment. Pop., 1900, 1366; 1910, 3691.

CUDBEAR, kŭd'bâr'. See ARCHIL.

CUDDALORE, kŭd'dȧ-lōr', or **KUDALUR,** kŭd'ȧ-lōōr'. The chief town in the southern division of South Arcot, Madras, British India, at the junction of the Pounaiyar and Gadelain rivers, 15 miles south of Pondicherry and 125 south of Madras by rail (Map: India, D 6). It has an ancient Siva temple and a ruined fort. The river, obstructed by a bar, admits only vessels of moderate size; but there is good anchorage 1½ miles off shore, and the port is the largest in South Arcot. The chief manufactures are cotton goods and carpets. There are a number of sugar refineries, oil presses, and paper mills, and an extensive export trade in cotton and grain. Cuddalore was the scene of exciting struggles between the French and the English from 1758 to 1795, when it was finally acquired by the latter. Pop., 1891, 47,400; 1901, 52,216; 1911, 56,574.

CUDDAPAH, kŭd'dȧ-pä'. See KADAPA.

CUDILLERO, kōō'dē-lyā'rō. A maritime town in the Province of Oviedo, Spain, 20 miles northwest of the city of Oviedo (Map: Spain, B 1). The harbor, protected by a jetty, has a lighthouse which marks its eastern point. It admits, however, only small craft. The port is engaged largely in fishing, and there are fish-curing establishments and manufactures of linen and chocolate; stock raising and agriculture also are carried on, and in the vicinity are mines of manganese. Pop. (commune), 1900, 10,160; 1910, 10,703.

ÇUDRAKA, shōō'drȧ-kȧ. The reputed author of the Sanskrit drama *Mricchakatika* (q.v.). See ŚŪDRAHA.

CUD'WORTH, RALPH (1617–88). An English theologian and philosopher. He was born at Aller, in Somersetshire, and admitted pensioner of Emmanuel College, Cambridge, in 1632, where he took his degree of M.A. and became a prominent tutor. In 1645 he was appointed master of Clare Hall and regius professor of Hebrew, in 1654 he was chosen master of Christ's College, in 1662 appointed to the rectory of Ashwell, and in 1678 installed prebendary of Gloucester. Cudworth's chief work, entitled *The True Intellectual System of the Universe* (1678), advocates a Platonizing doctrine of philosophy, especially emphasizing the necessity of a teleological view against the contention of the mechanists of the day, and defending the doctrine of innate ideas. From such views the remarkable group of which he was a leader obtained the name of the Cambridge Platonists (q.v.). His *Treatise Concerning Eternal and Immutable Morality*, which was posthumously published in 1731, champions the innate character of our moral ideas, which are held to cognize the objective reality of good and evil with the same immediateness and certainty which attend our geometrical knowledge. Selections from this treatise appear in Selby-Bigge's *British Moralists* (1897). Consult: Martineau, *Types of Ethical Theory*, vol. ii (Oxford, 1898); Lowrey, *The Philosophy of Ralph Cudworth* (New York, 1885); Birch, *Life*, in the edition of Cudworth's works (1743; reprinted 1820), and the preface to Mosheim's Latin translation of Cudworth's works (1733); Seth, *English Philosophers and Schools of Philosophy* (1912).

CUENCA, kwân'kȧ. The capital of the Province of Azuay, Ecuador, situated on the Río Matadero, 8640 feet above sea level, 190 miles south-southwest of Quito (Map: Ecuador, B 4).

It has straight streets and contains, among the chief buildings, the cathedral, the high school (formerly a Jesuit college), the prison, and the government building. It is the centre of a fertile grain, cotton, sugar, and cochineal producing region, and rich metal deposits are worked in the neighborhood. The most important manufactures are pottery, hats, and woolens, and a considerable trade in preserved fruits, cheese, and grain is carried on. It is the third most important city in Ecuador and has a population of about 30,000. Cuenca was founded in 1557, on the site of the old native village Tumibamba, and in 1786 was created an episcopal see. There are numerous interesting Aztec remains in the vicinity. The mountain of Tarqui on the south was chosen in 1742 for determining the meridian line of La Condamine, Bouguer, and Godin. At the base of the mountain occurred the battle of Tarqui in 1828 between the Colombian and Peruvian forces.

CUENCA. A city of Spain, the capital of the province of the same name and the seat of a bishopric, about midway between Valencia and Madrid (Map: Spain, D 2). It is picturesquely situated, at an elevation of about 3000 feet, on the river Júcar, at the confluence of the Huécar, and is poorly built, with narrow, crooked streets. The walls are in ruins, and the city, once celebrated for industry and art, but faintly suggests its former prosperity. A fine bridge spans the Júcar, and there are a college and several notable churches, the most pretentious of which is the Gothic cathedral, with the chapel of the Albornoces. The city has some manufacturing interests and a trade in lumber and wine. Pop., 1900, 10,505; 1910, 11,721.

Cuenca first appears in the history of the ninth century, under Saracen power. In 1177, after a long siege, it fell into Christian hands, though earlier in the century it had been captured, but retaken. It was granted the dignity of a municipality in 1257. The city was taken by the English in 1706 after bombardment, and in 1808 and 1810 was sacked and burned by the French—disasters which contributed materially to its decline. In 1874 Cuenca fell into the power of the Carlists, who ravaged the city, infuriated by its stubborn resistance.

CUERNAVACA, kwâr'nȧ-vä'kȧ. The capital of the State of Morelos, Mexico, magnificently situated in the valley of the Cuernavaca, 47 miles south of Mexico City, 5000 feet above sea level (Map: Mexico, J 8). It contains a church built by Cortés, an agricultural academy, a fine government building, a theatre (with a capacity for 2000 spectators), a hospital, and a literary institute. The city is the centre of a fertile district and has extensive sugar refineries and distilleries. Near by are the ruins of an Aztec temple, 400 feet high, composed of five terraces. Cuernavaca, at the advent of the Spaniards, was an old Indian village and became, after its capture, the favorite residence of Cortés, his palace being still extant. In 1863 Maximilian made it his residence. It bears many marks of his royal favor, especially in its public gardens. As a health resort it is frequented by those who cannot stand the excessive altitude of Mexico City. Pop., 1895, 8747; 1900, 9584; 1910, 12,776.

CUERO, kwā'rō. A town and the county seat of Dewitt Co., Tex., 105 miles by rail east-southeast of San Antonio, on the San Antonio and Aransas Pass and the Southern Pacific railroads, and on the Guadalupe River (Map: Texas, D 5). It is in a rich agricultural belt, producing corn, rice, truck, and cotton, carries on a large trade in turkeys and cattle, and has cotton gins and compresses, a cotton mill, cottonseed-oil mills, machine shops, turkey-dressing plants, and a creamery. The water works and sewerage system are owned by the town. Pop., 1900, 3422; 1910, 3109.

CUERVO, kwâr'vō, Rufino José (1844–1911). A Spanish-American humanist and philologian, born at Bogotá, Colombia, the son of Dr. Rufino Cuervo, a distinguished lawyer and statesman. Owing to various revolutionary disturbances Rufino José Cuervo was obliged to give up his professorship in Latin and help recoup the family fortunes. With his elder brother Angel he went into the brewing business about 1871. All during the darkest days the brothers held to their ideal of keeping the path as clear as possible for the studies of the younger one; and about 1882 they retired and went to Paris to spend the rest of their lives on the work Rufino José had planned. This work made of Cuervo the greatest Spanish grammarian and lexicographer of the nineteenth century, without dulling his delicate appreciation of literary values; so much so that Juan Valera, the most Attic stylist of them all, called him *el más profundo conocedor de la lengua castellana.* In addition to the work he (in collaboration with his brother) devoted to his father's career, *Vida de Rufino Cuervo y noticias de su época* (2 vols., Paris, 1892), he published five successively revised and enlarged editions of his *Apuntaciones críticas sobre el lenguaje bogotano* (5th ed., ib., 1907); repeated new editions, thoroughly revised and brought up to date, of the Bello-Cuervo *Gramática castellana;* and his *magnum opus,* the *Diccionario de construcción y régimen de la lengua castellana.* Although the work was completed, Cuervo's bad health after his brother's death prevented him from publishing more than the first two volumes: vol. i (Paris, 1885), letters A and B; vol. ii (ib., 1893), letters C, Ch, and D. The manuscript of the remainder was intrusted, by Cuervo's will, to the Colombian Academy for publication. Consult Fr. Pedro Fabo, *Rufino José Cuervo y la lengua castellana* (3 vols., Bogotá, 1912), and articles in the *Bulletin hispanique,* iii (1901) and xiii (1911) and the *Romanic Review,* iii (1912).

CUESTAS, kwā'stȧs, Juan Lindolfo (1837–1905). A South American politician and a president of Uruguay, born at Paisandú. In 1879 he became collector of customs, in 1880 Secretary of the Treasury, in 1884 Secretary of Justice, Worship, and Public Instruction, in 1886 Secretary of State, and in 1891 Senator for Paisandú. He was appointed President of the Senate in 1897; in 1898, after the assassination of President Borda, was placed in charge of the provisional government, and from 1899 to 1903 was President of the republic.

CUEVA, kwā'vȧ, Juan de la (c.1550–c.1609). A Spanish poet and dramatist, born in Seville. Despite his importance as one of the most influential of Lope de Vega's predecessors, modern scholarship has not yet succeeded in learning much about his life. He is supposed to have been a pupil of Mal Lara and to have spent five years in New Spain (i.e., Mexico) with his brother Claudio, an officer of the Inquisi-

tion. The date of this voyage is uncertain, as is also that of his visit to the Canary Islands. During many years he acknowledges himself as being in love with Felipa de la Paz, whom he celebrates as Felicia. He is also credited with a love affair with Brígida Lucía de Belmonte, whom he is supposed to have met in the home of Argote de Molina; but there seems to be little ground for this second tale. He lived in his native city until 1607, when he went to Cuenca. We do not know exactly the dates of his birth and death. The last certain date we have is 1609, the date of his signature to a new copy of his *Exemplar poético*, which he had written in 1606. He left a quantity of works (plays, poems, letters, epigrams, *romances*, etc.), but he is of interest and importance only as a dramatist and dramaturge. In these respects it is difficult to exaggerate his importance and influence. He expounded his dramaturgic theories in 1606 in the third epistle of his *Exemplar poético*, after he had long been putting them into practice. His fame rests secure on several important innovations: the introduction of the historical drama, the successful use of the old *romances*, the refusal to be bound by the rule of the three unities, the sketching of the main lines of the *comedia de capa y espada*, and the embellishment of the drama by the use of metrical forms thitherto unknown to the drama (unless they had been used, as Walberg conjectures, in the lost plays of Cuesta's master, Mal Lara). He believed, too, that he was the first to reduce the number of acts to four (not knowing that Micael de Carvajal had preceded him), and the first to use a national theme (unaware that Bartolomé Palau had written, c.1524, his *Santa Oria*). But even in these respects Cueva was the first to make a deliberate effort to reform the drama. Only two of his plays have been reprinted: *El Saco de Roma*, which demonstrated the dramaturgic possibilities of modern history, and *El Infamador*, which is a foretaste of the peculiar form that is later to be taken by the Spanish drama of manners, and gives us in the character of the libertine Leucino a first sketch of the type that was to become immortal under the name of Don Juan. Consult: E. de Ochoa, *Tesoro del teatro español*, vol. i (Paris, 1838), for the two plays; E. Walberg, *Juan de la Cueva et son "Exemplar poético"* (Lund, 1904); R. Menéndez Pidal, *L'Epopée castillane à travers la littérature espagnole* (Paris, 1910).

CUEVA, ENRÍQUEZ ARIAS DE SAAVEDRA, ĕn-rē'kāth ä'rē-ās dā sä-vā'drä, Baltazar de la (1626–86). A Spanish statesman. He was born in Madrid, and was the second son of the seventh Duke of Alburquerque and his third wife, Ana Enríquez. He was educated at the University of Salamanca and successively became Councilor of State, Councilor of the Indies, Ambassador to Germany, and Viceroy of Peru, Tierra Firma, and Chile, in which capacity he introduced many beneficent reforms and greatly improved the condition of the Indians. He married Teresa María Arias de Saavedra, seventh Countess of Castellar and Marchioness of Malagón, and by courtesy assumed her names and titles.

CUEVAS DE VERA, kwā'vās dā vā'rä. A town of Spain, in the Province of Almería, 42 miles northeast of Almería (Map: Spain, D 4). It is situated in a plain on the right bank of the Almanzora, 8 miles from its entrance into the Mediterranean, and is generally well built, with broad and regular streets. It has two spacious plazas, and among the principal edifices are an old Moorish castle and the parish church of the Incarnation, a handsome Doric structure, dating from 1758. A large number of persons are employed in the silver mines of the vicinity; agriculture and stock raising are also important industries. There are some manufactures, principally of pottery. Pop., 1890, 20,341; 1900, 20,603; 1910, 26,130.

CUFA, kōō'fä. A ruined city in the Turkish vilayet of Bagdad. It was founded by the Arab conquerors of Persia about a year after the decisive battle of Cadesia, in 637, and speedily became one of the most important centres of Moslem life. After the murder of Uthman, in 656, Ali made it his capital. Even when Muawiya had overthrown the son-in-law of the prophet in 661, established the Umayyad caliphate, and made Damascus the capital, Cufa continued to flourish. At the height of its prosperity it is said to have numbered from 150,000 to 200,000 inhabitants, for the most part of South Arabian stock. Cufa was the stronghold of various revolutionary movements. The schools of Cufa exercised the very greatest influence on the development of Arabian literature and theology. It possessed a famous school of grammarians. (See Arabic Language and Literature.) The peculiar script affected by its scholars spread far and wide and was for some time generally used by calligraphists in manuscripts of the Koran and inscriptions. (See Kufic Writing.) Owing to the unsuccessful political rivalry with Damascus and, after the establishment of the Abbasid caliphate, the growth of Bagdad, the city began to decline already towards the end of the eighth century. Consult: A. Müller, *Der Islam im Morgen- und Abendland* (1885); Wellhausen, *Das arabische Reich* (1902); C. Huart, *Histoire des Arabes* (1912–13).

CUFFE, William Ulick O'Connor. See Desart, fourth Earl of.

CUF'FEE, Paul (1759–1818). An American sea captain, half Indian, half negro, born near New Bedford, Mass. He was a member of the Society of Friends and used his wealth, acquired at sea, in the effort to encourage the colonization of his people in Sierra Leone. He carried out 38 colonists on his own ship in 1815 and died while waiting for permission from England to make further settlements in the colony.

CUF'FEY. A name formerly given to negroes in the West Indies and common among the maroons of Jamaica.

CU'FIC WRITING. See Kufic Writing.

CUI, kū'ē', César Antonovitch (1835–1918). A Russian composer and military engineer, born at Vilna. He studied at the gymnasium, where his father, a survivor of Napoleon's army of invasion, taught French. After studying music with Moniuszko (q.v.) for some six months at Vilna, he entered the School of Engineering and the Engineering Academy at St. Petersburg, becoming subsequently professor of fortification in several military academies, and gradually rising to the rank of lieutenant general. Among his pupils have been several grand dukes, the famous Skobeleff, and Nicholas II. During the Russo-Turkish War he was sent to examine the fortifications on the Danube. His report, *Tour Notes of an Engineering Officer from the Theatre of Military Operations in*

European Turkey, was translated into several languages and attracted considerable attention. Among his textbooks the best known are *A Short Manual of Field Fortification* (7th ed., 1894) and *A Short Historical Sketch of Permanent Fortification* (1889). His musical studies he continued with Balakireff (q.v.), making his début with a Scherzo in F major for orchestra (1859). His opera *The Prisoner of Caucasus* (1857–58) and the comic opera *The Mandarin's Son* were performed privately and exhibited no departures from established tradition. In 1864 he became musical critic of the St. Petersburg *Gazette*. He championed the theories of the Young Russian school, attacking the conservative attitude of the critics, rejudging established reputations, subjecting everything to a keen and searching analysis. He received the nickname "Musical Nihilist," and his opera *William Ratcliff* (1869), based on Heine's drama and embodying the new theories of "melodic recitative," met with severe criticism. *Angelo* (1876), based on Victor Hugo's drama, carried the theories even further and met with a similar fate. In 1883 he rewrote *The Prisoner of Caucasus*, adding a new act, and the work had considerable success. *Le Flibustier* (1894), words by Richepin, was successful at the Paris Opéra Comique, and *The Saracen* was favorably received in 1899. In the following year *Mamzelle Fifi* was written, in 1908 *Matteo Falconi*, and in 1909 *The Captain's Daughter*. His purely instrumental works include two *scherzi* and four *suites* for orchestra and a number of works for piano. But his talent shows to best advantage where inspiration is derived from words. His numerous songs, both to Russian and to French words, are veritable gems, while his pieces for chorus enjoy great vogue. He was never fond of orchestration and is far behind his Russian colleagues in that line, but for this shortcoming he makes amends through the sincerity and passion of his works. As a critic, in Russian periodicals and the French *Revue et Gazette Musicale*, Cui enjoys an enviable reputation. His *La musique en Russie* (Paris, 1880) is the only sketch of Russian music written with authority, even though it is at times marred by the author's æsthetic views. *The Russian Lied* (1896) is a detailed study of all important Russian song writers, with careful reference to both music and text. Consult Countess de Mercy-Argenteau, *César Cui* (Paris, 1888), and Pougin, *Essai historique sur la musique en Russie* (Turin, 1897).

CUIABÁ. See CUYABÁ.

CUIRASS, kwē-răs′ *or* kwē′- (Fr. *cuirasse*, from ML. *coratium*, breastplate, from Lat. *coriaceus*, leathern, from *corium*, leather). Originally a jerkin, or garment of leather for soldiers, so thick and strong as to be pistol proof and even musket proof. The name was afterward applied to a portion of armor made of metal, consisting of a backplate and a breastplate hooked or buckled together, with a piece joined to the back called a *culet*, or *garde de reins*, and still worn by some European regiments of cavalry. For illustration, see ARMOR.

CUIRASSIER, kwē′răs-sēr′ (Fr., from *cuirasse*, cuirass). In modern armies, the name given to certain soldiers of heavy cavalry. They are survivals of the troopers of the sixteenth and seventeenth centuries, who wore helmet and cuirass. There are four regiments of cuirassiers in the Russian army, and 12 regiments each in the German and French armies. (For illustration, see Plate of ARMOR.) The Russian cuirass is of iron, coated with copper, and weighs 30 pounds; the German is of white metal with a brass plate, and the French of steel with a brass plate, their respective weights being 13½ and 16 pounds. There are no cuirassiers in the British army, although the Life Guards and Royal Horse Guards wear dress cuirasses of steel, costing £3 6s. each, which are discarded on active service. In the time of Queen Mary there were heavy horsemen known as "cuirassiers," who wore body armor over buff coats. They carried swords and pistols, and their reins were strengthened with iron chains. The bodyguard of Napoleon III, Les Cent-Gardes, wore aluminum cuirasses. No cuirass is bullet proof against a direct shot. See CAVALRY, where an historical sketch of mounted troops is given.

CUISSART, kwē-särt′ (OF., from *cuisse*, thigh, from Lat. *coxa*, hip). A variety of ancient armor worn by troopers. Cuissarts consisted of small strips of iron plate laid horizontally over each other round the thigh and riveted together.

CUITLAHUATZIN, kwēt-lä-wät-sēn′, or **CITLAHUATZIN** (1470–1520). An Aztec prince, younger brother of Montezuma II. When the latter was seized by the Spaniards, Cuitlahuatzin, often mentioned as Quetlavaca, or Cuitlahuac, was also for some time in their hands, but was ultimately released. As the acknowledged leader of the Aztecs after the capture of Montezuma, he led the famous attacks upon the army of Cortés. He also directed the operations of the Aztecs during the retreat of the Spaniards to the coast. He was afterward elected to succeed Montezuma, but died of a pestilence after his installation and was succeeded by his cousin Guatemotzin, the last of the Aztec rulers.

CUJACIUS, kū-jā′sī-ŭs *or* kụ-yä′sĭ-ụs, properly **JACQUES DE CUJAS,** zhȧk *de* kụ′-zhäs′, or **CUJAUS,** kụ′zhȯs′ (1522–90). A French jurist of the sixteenth century, born at Toulouse. After studying law he was appointed teacher of the law at Cahors (1554) and in the following year gained the chair of law in the University of Bourges, after which he taught successively at Valence, again at Bourges, at Valence, at Paris, and at Bourges, at which last place he resided from 1577 till his death. He was one of the most eminent jurists of his day and is recognized as the founder of the historical school of jurisprudence. His learning was founded on the most diligent study of original manuscripts of the Roman laws. His treatment of these authorities and of the feudal system was classical and reconstructive, free from scholastic subtleties. He had in his library 500 manuscripts on Roman law and by his emendations contributed greatly to remove the obscurities of jurisprudence. A complete collection of his works was edited by Fabrot (10 vols.), at Paris (1658), and reprinted at Venice (1758–83), and at Prato (1834–43). Uhl has edited separately Cujacius' *Animadversiones et Observationes*. Consult: Spangenberg, *Cujacius und seine Zeitgenossen* (Leipzig, 1882); Berriat Saint-Prix, *Histoire du droit romain; Histoire de Cujas* (1821).

CULAMAN, kōō-lä′mán. See MANOBO.

CULASI, kōō-lä′sē, or **COLASI.** A town of

Panay, Philippines, in the Province of Antique, situated on the west coast, about 47 miles north of San José de Buenavista (Map: Philippine Islands, D 5). Rice, cacao, fruits, and pepper are cultivated. Pop., 1903, 10,966.

CUL'BERSON, CHARLES A. (1855–). An American legislator, born in Dadeville, Ala., but taken as an infant to Texas. He graduated from Virginia Military Institute in 1874 and in 1876–77 studied law under his father and at the University of Virginia. He returned to Texas to engage in the practice of law; in 1890–94 was Attorney-General of the State and was thereafter, until 1898, Governor. He was chosen United States Senator in January, 1899, and was reëlected in 1905 and again in 1911 for the term expiring 1917. In the Sixty-third Congress Culberson was chairman of the Judiciary Committee.

CUL'DEES (OIr. *céledé*, servant of God, from céle, servant + *Dé*, gen. sg. of *Dia*, God). Anchorite monks who came into Scotland from Ireland in the eighth and ninth centuries, and established themselves in many places, but who in the twelfth century had been absorbed by the regular orders, particularly that of St. Augustine. The list of books handed over by the Culdees of Loch Leven to the canons regular under Bishop Robert (c.1144) is the oldest Scottish library catalogue. Their monasteries, which, on the Columban model, were really villages, on St. Serf's Island, Loch Leven, at St. Andrews, Monymusk, Abernethy, and at Monifeith, near Dundee, are matters of record. Their abbots were often laymen. The mystery about their origin and fate gave rise to the idea that they were particularly holy and that they retained the primitive Christian faith. So claimed Hector Boece in his Latin history of Scotland (Paris, 1516), as many, especially ardent Presbyterians, have done since. But the facts were established by W. Reeves, *The Culdees of the British Isles* (Dublin, 1864), and W. F. Skene, *Celtic Scotland* (3 vols., Edinburgh, 1876–80). Consult also W. Beveridge, *Makers of the Scottish Church* (New York, 1908).

CULENBORG. See KUILENBURG.

CU'LEX (Lat., gnat). A short pastoral and mock-heroic poem of 414 hexameter lines. A sleeping goatherd is awakened by the sting of a gnat and kills the insect, but finds that it has saved his life by rousing him in time to escape an approaching serpent. The gnat's shade in the night reproaches him; whereupon the goatherd builds a tomb for the gnat and celebrates the usual funeral rites. Ancient writers state that Vergil wrote a *Culex*, with the plot described above. Modern scholars have usually refused to charge the extant poem against Vergil; but consult Mackail, "Virgil and Virgilianism," in *Lectures on Poetry* (London, 1911) and Elizabeth S. Jackson, "The Authorship of the Culex," in *The Classical Quarterly*, vol. v (1911).

CULEX. See MOSQUITO.

CULIACAN, kōō'lyä-kän'. The capital of the State of Sinaloa, Mexico, on the Culiacan River, 50 miles from the Pacific coast (Map: Mexico, E 5). It is situated in a broad valley and contains several plazas, those of Rosales and La Constitución being notable, an ancient cathedral, a seminary, and a mint. It is an episcopal see. The city has some manufactures, principally of textiles, and a large tobacco warehouse. It is fast becoming an important commercial centre. Culiacan was founded in 1599, with the name San Miguel. Pop., 1900, 10,380; 1910, 13,527.

CULICIDÆ, kû-lĭs'ĭ-dē (Neo-Lat. nom. pl., from Lat. *culex*, gnat). A family of nematocerous Diptera, the mosquitoes, with long slender wings, the veins and body bearing flattened scales. See MOSQUITO.

CULILAWAN (kōō'lē-lä'wän) **BARK.** The bark of a tree of the Moluccas, *Cinnamomum culilawan*, used like cinnamon (q.v.).

CU'LIN, STEWART (1858–). An American anthropologist, born in Philadelphia, a descendant of Johan van Culin, one of the earliest Swedish settlers on the Delaware. He was educated at a Friends' school and afterward at Nazareth Hall. Leaving this school at the age of 17, he engaged in business, but soon developed a deep interest in scientific matters and, through contact with Dr. Daniel G. Brinton, was led to take up original work in anthropology. In 1883 he was elected secretary of the Numismatic and Antiquarian Society of Philadelphia, and began a study of the Chinese in America, resulting in a series of papers on Chinese games. In 1889 he became secretary of the Archæological Association of the University of Pennsylvania and a curator in the Museum of Archæology; and in 1892 he was appointed director of the museum. In this capacity he represented the University of Pennsylvania at the Columbian Historical Exposition in Madrid, where he was at the same time secretary of the United States Commission. In 1888 he organized the Oriental Club in Philadelphia, of which he became secretary; in 1890 he was elected a fellow of the American Association for the Advancement of Science. He was president of the American Folklore Society in 1897 and was elected to the vice presidency of anthropology in the American Association in 1901. He is author of: *Chinese Games with Dice* (1889); *Chess and Playing Cards* (1896); *Korean Games* (1896); *American Indian Games* (1905).

CULION ISLANDS. See CALAMIANES.

CUL'LEN, PAUL (1803–78). Cardinal and Archbishop of Dublin. He was educated in Rome, where he became rector of the Irish College and, in 1848, of the Propaganda College. During the revolution of that year he saved the college property by appealing to Lewis Cass, Jr., the American Minister. He became Archbishop of Armagh and Primate of All Ireland in 1849, and Archbishop of Dublin in 1852. He had great executive ability and zeal in the restoration and erection of churches, reformatories, and hospitals. He assisted O'Connell, opposed the Fenians, forbade the clergy to take active part in politics, and advocated at the Vatican Council the definition of papal infallibility. He was the main supporter of the Catholic University at Dublin, but his quarrels with Dr. Newman, its head, wrecked the scheme. In 1866 he was made a cardinal, being the first Irishman to receive that dignity since the Reformation. In 1873 he was sued for libel by a parish priest, who received a farthing damages.

CULLEN, WILLIAM (1710–90). A celebrated Scottish physician, professor of medicine in the universities of Edinburgh and Glasgow. He was born at Hamilton, Scotland, his father being factor to the Duke of Hamilton. He acquired his medical education between 1727

and 1736 under great difficulties, but fortunately secured the aid of John Paisley, a surgeon apothecary, and Monro the Elder. In 1736 he began to practice his profession in his native town and was rapidly successful. One of his pupils was William Hunter (q.v.). In 1740 he received the degree of M.D. from Glasgow University. In 1744 he removed to Glasgow; in 1746 he began to lecture on the theory and practice of physic, on botany and the materia medica, and finally on chemistry, in Glasgow University. In botany Cullen seems to have lectured in Latin, but in the other departments he adopted the English language as the vehicle of expression—an innovation of great importance, which permitted him to adopt a more familiar style of lecturing than had hitherto been in use. One of his original hearers records that "in the physic class Dr. Cullen never read lectures, but only used notes; in the chemistry he sometimes read, but very seldom." In 1757 he became full professor of chemistry, continuing to teach clinical medicine in the Royal Infirmary. In 1760 he undertook also the lectures on materia medica. In 1766 Cullen was placed in the chair of institutes of medicine, vacant by the death of Dr. Whytt; and Black, the greatest chemical discoverer of the time, took Cullen's place as professor of chemistry. In 1773 Cullen was transferred to the chair of the practice of physic.

His most important works are the *First Lines of the Practice of Physic* (1777), in which he sets forth his system of nosology founded on his theories of nerve influence, and which was translated into many languages; *Synopsis Nosologiæ Methodicæ* (1785); *Institutions of Medicine* (1787); *A Treatise of the Materia Medica* (1789). His writings have been collected in two volumes by Dr. John Thomson (Edinburgh, 1827), by whom also a life was commenced, the first volume appearing in 1832. This biography was continued by his son, and finally completed in a second volume by Dr. Craigie in 1859.

CULLERA, kōō-lyā′rȧ. A fortified town of Spain, in the Province of Valencia, on the Júcar River, near its entrance into the Mediterranean, 23 miles south-southeast of Valencia (Map: Spain, E 3). Its streets are irregular but level, and among the noteworthy features are a ruined castle and the chapel of the Vírgen de Cullera. Fishing, agriculture, and stock raising are the principal industries. The city is the centre of a considerable trade in grain, rice, oranges, wine, etc. Cullera was of great military importance under the Moors, by whom it was strongly fortified, and successfully withstood attacks of the Christian armies in 1234 and 1235, though later it was taken by James I of Aragon. Pop., 1900, 11,957; 1910, 13,556.

CULLO′DEN, or Drummossie Moor. A Scottish battlefield in Inverness-shire, near the Moray Firth. The place was formerly a desolate table-land, but is now well cultivated. Here on April 16 (new style, 27), 1746, the Duke of Cumberland, with 12,000 royal troops, overwhelmed an army of 5000 Highlanders, under Prince Charles Edward, the Young Pretender, and extinguished the hopes of the house of Stuart of regaining the English crown. A monumental cairn marks the spot where the battle was fiercest and where many of the slain lie buried. At Culloden House, a mile to the north, the family seat of Duncan Forbes, the valuable historical collection of *Culloden Papers*, covering the years 1625–1748, was discovered in 1812. They were published in London in 1815. Consult William Augustus, Duke of Cumberland, *Authentic Account of the Battle of Culloden* (London, 1746).

CUL′LOM, Shelby Moore (1829–1914). An American politician, born in Wayne Co., Ky. He was admitted to the bar in 1855 and began the practice of the law at Springfield, Ill. Here he soon became a leader in politics, was several times elected to the Illinois Legislature, and was Speaker of the House in 1861 and again in 1873. He was a member of Congress for three terms after 1865 and was Governor of Illinois from 1876 to 1883. He then entered the United States Senate as a Republican, and served continuously until 1913. He was the author of the Interstate Commerce Law, and for many years was chairman of the Senate Committee on Interstate Commerce. In 1898 he was appointed one of the commissioners to establish the government of Hawaii. He wrote *Fifty Years of Public Service* (Chicago, 1911).

CUL′LUM, George Washington (1809–92). An American soldier and writer. He was born in New York, graduated in 1833 at West Point, and was instructor of engineering there from 1848 to 1855. He was made chief engineer of the Department of the Missouri in 1861, superintended engineering works on the Western rivers, and was chief engineer at the siege of Corinth. He was superintendent of the Military Academy from 1864 to 1866 and was brevetted major general in 1865. He retired from active service in 1874. He published: *Systems of Military Bridges* (1863); *Biographical Register of the Officers and Graduates of the United States Military Academy* (1868; 3d ed., 1891–1910); *Campaigns and Engineers of the War of 1812–15* (1879). On his death he left part of his fortune to be used for the erection of the Memorial Hall at West Point and for the continuance of his *Biographical Register.*

CULM. See Kulm.

CULM (ME. *culme, colm,* soot, smoke, or perhaps connected with Welsh *cwlm,* knot, the coal being found in knots in some places in Wales, OIr. *colmmene,* nerve, Bret. *koulm,* knot). A term used in the United States for the waste coal thrown out in anthracite mining. Owing to its fine size, much difficulty was experienced for some time in using it. At the present day it is either pressed into bricks or burned on special types of grate, often with forced draught. The name has a similar application in parts of Wales, but in some parts of England it is used in a general sense for anthracite. See Anthracite.

CULMANN, kụl′mȧn, Karl (1821–81). A German engineer, born at Bergzabern, Bavaria. He studied at the Artillery School of Metz and the Technical School of Karlsruhe and from 1841 to 1849 was active as an engineer in bridge construction. In 1855 he was appointed professor of engineering in the Polytechnic School of Zurich, of which he was director from 1872 to 1875. He was the originator of the method of graphical statics, by which the strength of structures is investigated through diagrams made to scale. In exposition of this he published *Graphische Statik* (1864–66; 2d ed., 1875). Among his further works is *Untersuchungen über die Schweizer Wildbäche von 1858 bis 1863* (1864), translated into Italian and French.

CULMBACH. See KULMBACH.

CULMBACH, kụlm'bäk, HANS VON. See KULMBACH, HANS VON.

CUL'MINA'TION (from ML. *culminare*, to culminate, from Lat. *culmen*, OLat. *columen*, height, from *collis*, hill, *celsus*, high). An astronomical term, signifying the passage of a star across the meridian. The star is then at the highest or lowest point of its course. The sun culminates at midday, or 12 o'clock, apparent solar time—which seldom agrees exactly with mean time as shown by a watch or clock. The full moon culminates at midnight. The time of culmination of a fixed star is always exactly midway between the times of its rising and setting; in the case of the sun, moon, and planets it is only approximately so.

CULP, JULIA (1881–). A distinguished Dutch contralto. She was born, Oct. 6, 1881, at Groningen, where she received her first musical instruction on the violin. Her progress was so rapid that she soon appeared in various cities of Holland as a violinist. When fourteen years of age it was discovered that she was gifted with an unusual voice. Thereupon she abandoned her career as a violinist and entered the conservatory at Amsterdam. After completing her course she went to Berlin, where she continued her vocal studies with Etelka Gerster. Her début as a vocalist took place at Magdeburg in 1901, in a concert with Busoni. The following year she was heard in Berlin and won instant recognition as one of the foremost lieder singers. Her fame spread rapidly all over Germany. Her tours of Austria, France, Italy, Belgium, Spain, and Russia were a series of brilliant triumphs, so that her place as the greatest of all lieder singers was established even before she made her first American tour in 1913. This was so successful that she visited America a second time in the following season, appearing in numerous recitals and with almost every symphony orchestra of importance. Aside from the extraordinary beauty of her voice, which she handles with supreme mastery, her preëminence as a lieder singer is due to her fine musicianship, dramatic intensity, soulful delivery, and unlimited versatility. It is due largely to her art that the genius of one of the greatest of song writers, Hugo Wolf, has found wider recognition.

CUL'PA. A term of the Roman law, signifying a fault or breach of a legal duty, but later restricted to denote carelessness or negligence. When damage has been done without right and willfully (*dolo*), the doer is always responsible. When damage is occasioned by a careless act or by failure to act as a careful person would act, the person chargeable with carelessness is not usually responsible unless he be under some special obligation to exercise care (*diligentia*). Such an obligation regularly exists only in contractual and quasi-contractual relations; and here the question what degree of carelessness creates liability depends upon the degree of care which the law requires. The standard, in most cases, is the care commonly exercised in similar matters by a good householder (*diligentia boni patris familiæ*). Exceptionally, in some cases, a person who is habitually somewhat careless is held to that degree of care only which he is accustomed to exercise in his own affairs (*diligentia quam in suis*). This is true when the advantage of the contractual relation is wholly on the other side, as in the deposit, or bailment, of goods for safe-keeping without remuneration, and also when the other party is chargeable with negligence if he enters into relations with a careless person, as in partnership. By reason, however, of the fiduciary character of these relations, the careless depositary or partner who has failed to exercise even that degree of care which he is wont to exercise in his own affairs is regarded as guilty of willful wrong (*dolus*). In contractual relations very gross carelessness (*culpa lata*) is also treated as willful wrong. Whether this is true outside of contractual relations—whether gross carelessness begets an action in tort—is disputed. Regularly, of course, at Roman law as at English law, an action in tort lies only when willful intent can be shown or presumed. Exceptionally, however, and by statutory rule (*lex Aquilia*), the person who has damaged another's property by a careless act is liable, although no contractual relation exists between the parties.

By the modern civil law, as administered on the continent of Europe, most of the rules of the Roman law relating to *culpa* still obtain. Modern legislators, however, have generally discarded the exceptional standard of the *diligentia quam in suis;* and the French civil code (art. 1383) and some of the codes based on the French, e.g., the Spanish civil code (art. 1089), lay down the broad rule that every person of sound mind who has reached the age of discretion is responsible for damage occasioned by his negligence, whether of act or of omission; but these provisions have not been interpreted as creating a general duty to act in the interest of strangers. For the English and American applications of the civil-law doctrine, see BAILMENT; NEGLIGENCE. Consult the authorities referred to under CIVIL LAW.

CUL'PEPER, JOHN. An early English emigrant to the Carolinas, leader of the "Culpeper Insurrection." In 1677 and 1678, with Zechariah Gilham (or Gillam) and others, he led a successful insurrection in the northern or Albemarle Colony of Carolina against Thomas Miller, royal collector of customs, who strictly enforced the unpopular customs regulations, and whose office Culpeper seized. He and his followers gained control of the government, but when he went to London to arrange a compromise with the home authorities he was arrested on a charge of treason. He was finally acquitted, however, on the ground that there had really been no authorized government in the Colony at that time to rebel against. In 1680 Culpeper laid out on paper the plan of the city of Charleston.

CULPEPER, or **COLEPEPER,** THOMAS (?–1719). A grantee (1673) and Colonial Governor of Virginia. In 1673 he received from Charles II for a period of 31 years a grant of the entire territory of Virginia. He was appointed Governor for life in 1675, but did not come to the Colony until 1680. In 1683, having administered the office chiefly for his own gain, being shrewd and unscrupulous to the last degree, he returned to England in spite of his orders, was tried and convicted of corruption, and was deprived of his commission. His daughter Catherine brought his great possessions in dower to Baron Fairfax and his descendants, who were related by marriage to George Washington. Consult Doyle, *English Colonies in America*, vol. i (1882).

CUL'PER. A local name in Africa for a fish

resembling a perch, but of uncertain position, ichthyologically, which inhabits the Zambezi valley. It burrows in the mud and thus survives droughts, and is exhumed both by animals and the native negroes for food, but is not thought palatable by the white colonists.

CULPRIT FAY, THE. The title of a poem by Joseph Rodman Drake (1816). Its subject is the love of a fairy for a mortal maiden and his expiation of the offense.

CUL'TIVA'TION. See TILLAGE.

CUL'TIVA'TOR (Fr. *cultivateur*, from ML. *cultivare*, to cultivate, from Lat. *cultura*, cultivation, from *colere*, to till). An agricultural implement extensively manufactured and used in the United States. The common name for it in Great Britain is "grubber." Certain forms are called "scarifiers." It is used for a number of purposes, such as preparing soil for planting, loosening soil between rows of plants, destroying weeds, etc. There are many forms, but usually the essential feature is a triangular or rectangular iron frame in which are fixed tines or teeth, somewhat like those of a harrow, but curved, and so placed as to enter the ground obliquely when the implement moves forward. Handles like those of a plow are provided for control of the implement, and the centre beam of the iron framework projects in front for the attachment of wheels and draft clevises. In some forms the implement is mounted on wheels and provided with a seat for the operator and various levers for the control of the implement. These are called *rider* cultivators, while the simpler forms are known as *walker* cultivators. The two forms are sometimes combined. One of the more modern forms of the rider cultivator is the disk cultivator, in which revolving sharp-edged disks take the place of teeth or tines. See also IMPLEMENTS, AGRICULTURAL; TILLAGE.

CUL'TURE (Lat. *cultura*, cultivation). When used by anthropologists and historians, the term signifies the complex of habits and customs peculiar to any group of people. Particular customs are designated as traits of culture. See ANTHROPOLOGY; CIVILIZATION; ETHNOLOGY.

CULTURKAMPF, kụl-tōōr'kämpf. See KULTURKAMPF.

CULTUS COD. A marine fish (*Ophiodon elongatus*) of the family Chiridæ, abundant from Lower California to Alaska, and one of the most important food fishes of the Pacific coast, where it is also known as "ling," "buffalo cod," and "blue cod." *Cultus*, in the Chinook jargon, means "common" or "ordinary," and was applied to distinguish this species from the true cod of that coast. It is codlike in form, dark brown above, variously spotted, and bluish green below, the flesh being also bluish; and reaches a length of 5 feet and a weight of 30 to 40 pounds, but much smaller specimens are usually brought to market. It lives about rocky places, sometimes in considerable depths, and spawns in summer; and it feeds upon fishes and crustacea and is excessively voracious, often being taken by seizing a fish upon the angler's hook. Its flesh is regarded as of superior quality.

CUL'VERIN (Fr. *couleuvrine*, ML. *colubrina*, culverine, from Lat. *coluber*, serpent). In early times, any small gun, the name being derived from the serpent-shaped handles cast on the piece. In the sixteenth century and later the name was used with reference to the heavier cannon, like the 18-pounder. Variations of the name were *culver* or *whole culver*, referring to the heavier guns, *demi-culverin* to the smaller.

CUL'VER'S PHYSIC, CULVER'S ROOT. See LEPTANDRA.

CUL'VERT (probably from Fr. *couloure*, drain, from *couler*, to flow, from Lat. *colare*, to filter, from *colum*, sieve; influenced in termination by analogy with *covert*). An artificial channel for carrying a small stream underneath a canal or the embankment of a roadway or railway. For very small streams vitrified clay pipe or cast-iron pipe is used for culverts. For streams of larger size stone box culverts are employed, consisting of two parallel masonry walls covered over with stone flagging and having a paved bottom. Where stone is scarce, box culverts are sometimes built of timber, and sometimes, instead of stone flagging, a roof of iron beams imbedded in a concrete slab is employed. Large culverts are usually built with parallel masonry side walls, supporting a stone or brick roof arch. With the increased use of concrete in railway engineering this material is increasingly used, both in the form of plain arches and various forms of reinforced concrete structures. A culvert, besides the passageway for the water, has wing walls at one or both ends to hold the embankment in place and protect it from the rush of the flowing water in times of freshet. A full technical description of culvert construction is given in Baker, *Treatise on Masonry Construction* (10th ed., New York, 1912); and also in *American Railway Engineering and Maintenance of Ways, Bulletin 105* (Chicago, 1908). The various railways have special formulas for the construction of culverts which are referred to with other appropriate matter in Merriman, *American Civil Engineers Pocket-Book* (2d ed., New York, 1913).

CULVERWEL, NATHANIEL. See CAMBRIDGE PLATONISTS.

CUMA'CEA. See CRUSTACEA.

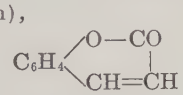
CU'MÆ (Lat., from Gk. Κύμη, *Kymē*). An ancient city on the coast of Campania, founded conjointly by colonists from Chalcis and Cymæ in Eubœa. According to Strabo, it was the earliest of all Greek settlements in either Italy or Sicily; it is probable that it was founded before the middle of the eighth century B.C., (ancient authorities give 1050 B.C.). It soon attained wealth and power, built several harbors or port towns of its own, including Dicæarchia (Pozzuoli) and Neapolis (Naples), and carried on an extensive trade with the interior. From the Chalcidian alphabet of Cumæ the Etruscan and the Italian alphabets seem to have been derived. Its property led to wars with the Etruscans and other Italian tribes, and in 524 B.C. a great land army was routed by the Cumæans. In 474 B.C. Cumæ, thanks to the aid of Hiero of Syracuse, broke the sea power of the Etruscans in a naval battle near the city. The victory seems to have left Cumæ dependent upon Syracuse. Its power now rapidly waned, and in 421 B.C. it was captured by the Samnites and became an Oscan community. About 340, along with Capua, it passed under the control of the Romans and from this period steadily adhered to the fortunes of Rome. In the Second Punic War Hannibal tried to capture it, but was repulsed by Sempronius Gracchus. Towards the close of the Republic it became the municipal capital of the district in which the Roman nobles had their villas

and seacoast residences. It continued to exist as a "quiet" place (Juvenal, iii, 2) down to the close of the Roman Empire, but reassumed a momentary importance during the wars of Belisarius and Narses. Its strong fortress, garrisoned by the Goths, was the last place in Italy that held out against the Byzantine army. The town was finally destroyed, as an abode of pirates, by the Neapolitans in 1205 A.D. Of the ancient fortifications considerable remains may still be traced, and both on the Acropolis and in the lower city there are fragments of architecture and scanty ruins. Underneath the Acropolis are a number of grottos and subterranean passages of unknown origin and purpose. One of these caverns was the seat of the oracle of the Cumæan Sibyl (q.v.). About the city lay cemeteries, showing Greek, Samnite, and Roman graves. Recent excavations here have led to the view that there was on the site of Cumæ a pre-Hellenic settlement. Consult: Beloch, *Campanien im Alterthum* (Breslau, 1890); Pellegrin, *Monumenti dei Lincei*, xiii (1903); Patroni, *Atti del congresso di scienze storiche*, v (1904).

CUMÆ'AN SIB'YL. The most famous of the ancient sibyls. She has been represented pictorially by several of the great masters. The most noted examples are paintings by Michelangelo in the Sistine Chapel, and by Raphael in the church of Santa Maria della Pace in Rome. See CUMÆ; SIBYL.

CUMANÁ, kōō-mȧ-nä'. A town in the State of Bermudez, Venezuela, situated on the Manzanares River, near its mouth, on the Gulf of Cariaco (Map: Venezuela, E 1). It has a college and is the seat of a United States consular agent. The town is an important commercial centre, its trade being promoted by an excellent roadstead and harbor, which are dominated by the fort of San Antonio on a hill overlooking the town. It exports cacao, sugar, coconuts, tobacco, pearls, and hides. Pop., 12,225; the suburbs of San Francisco, Guayquerias, and Serritos have an aggregate population which equals that of the mother town. Cumaná, possibly the oldest city in America, was founded by Jácomo Castellón, in 1523, under the name of Nueva Córdoba (not far from the settlement made in 1520 by Gonzalo de Ocampo, under the name of Nueva Toledo), and became in the following year capital of the newly erected Province of Nueva Andalucía. It has suffered considerably from earthquakes, notably in 1766 and 1853.

CU'MARIN, or **COUMARIN** (from *coumarou*, the Gallicized form of the native name of the Tonka bean),



The anhydride of cumaric (ortho-oxy-cinnamic) acid. It is a colorless, crystalline substance, melting at 67° C. and boiling at 201° C. It has an exceedingly agreeable odor. It is found in various plants, including the Tonka bean (the seeds of the *Dipteryx odorata* and *oppositifolia*); the woodruff (*Asperula odorata*); the melilot (*Melilotus officinalis*); a number of grasses, such as the sweet-scented vernal grass (*Anthoxanthum odoratum*); the faam or faham leaves (*Angrecum fragrans*), much prized among Asiatics for their vanilla-like scent; the Indian sarsaparilla (the root of *Hemidesmus indicus*), etc. Cumarin is soluble in hot water and in alcohol and ether. It may be obtained from Tonka beans by extracting with alcohol. It has also been prepared synthetically by heating salicylic aldehyde with sodium acetate and acetic anhydride. Tonka beans have been used to impart the odor of cumarin to snuff. Cumarin is also employed in perfumery and in preparing the beverage well known in Germany as *Maitrank* ('May drink'), which is made by adding a small quantity of pure cumarin to wine.

CUM'BERLAND. A peninsula of Baffin Land, forming the west coast of Davis Strait (Map: Canada, S 3). It cuts off the gulf known as Cumberland Sound.

CUMBERLAND (AS. *Cumbria*). The extreme northwest county of England (Map: England, D 2). It has 75 miles of coast and an area of 1520 square miles. A little more than half of the county is cultivated, the rest is covered by mountain and lake. The highest peaks of the Cumbrian Mountains (q.v.) are in the lake region, whence valleys radiate in all directions, gradually ending in a flat coastal belt. The chief rivers are the Eden and Derwent. Mineral wealth abounds, chiefly coal, iron, and lead. Dairy farming and domestic manufactures are carried on. The chief towns are Carlisle, the capital, Whitehaven, Brampton, Workington, Maryport, and Millom. Pop., 1901, 266,933; 1911, 265,780. Consult Ferguson, *History of Cumberland* (London, 1890), and Wilson (ed.), *The Victoria History of Cumberland* (Westminster, 1901).

CUMBERLAND. A city and the county seat of Allegany Co., Md., 152 miles by rail west-northwest of Washington, D. C., on the Chesapeake and Ohio Canal, and on the Pennsylvania, the Baltimore and Ohio, the Cumberland and Pennsylvania, and the Western Maryland railroads (Map: Maryland, C 2). It is in a remarkably picturesque locality on the Potomac River, some 650 feet above tide, on the outer edge of the Cumberland-George's Creek coal region, and ships vast quantities of semibituminous coal. There are extensive rolling mills for the manufacture of railroad materials, iron foundries, steel-shafting works, railroad shops, tanneries, brickworks, dyeing and cleaning works, flour mills, glassworks, distilleries, silk and tinplate mills, and cement works. Cumberland was laid out in 1785 on the site of Fort Cumberland, which was erected in the winter of 1754–55 at the outbreak of the French and Indian War. The town was incorporated in 1815, becoming a city in 1850. It adopted the commission form of government in 1909. A new half-million-dollar water-works system and the electric-light plant are owned by the city. Pop., 1900, 17,128; 1910, 21,839; 1920, 29,837. Consult Lowdermilk, *History of Cumberland* (Washington, 1878).

CUMBERLAND. A town in Providence Co., R. I., 6 miles (direct) north of Providence, on the Blackstone River, and on the New York, New Haven, and Hartford Railroad (Map: Rhode Island, C 2). Cumberland contains the only Cistercian Trappist Monastery in New England; Nine Men's Misery, a cairn under which are buried nine men who were killed in one of the early Indian wars; the Catholic Institute Association (nonsectarian); the Elder Ballou Meeting House, built about 1740; and the grave of William Blackstone, the first white settler in Rhode Island. It has granite quarries, some deposits of copper, gold, coal, and iron, and extensive manufactures of horseshoes, cotton,

silk, worsted goods, and women's clothes, etc. Cumberland was incorporated in 1747. The government is administered by a council, elected by the people; a police commission is appointed by the governor of the State. Pop., 1900, 8925; 1910, 10,107; 1920, 10,077.

CUMBERLAND, The. A Federal war vessel under the command of Lieut. George U. Morris, sunk by the Confederate ram *Merrimac* in Hampton Roads, March 8, 1862. She went down firing and with colors flying and carried with her a hundred of her crew.

CUMBERLAND, Duke of. See William Augustus, Duke of Cumberland, and Ernst August, King of Hanover.

CUMBERLAND, Earl of. See Clifford, George.

CUMBERLAND, Richard (1631–1718). An English moralist. He was born in London, educated at St. Paul's School and at Cambridge, where he became a friend of Pepys; appointed in 1658 to the rectory of Brampton, Northamptonshire, and in 1667 to the living of All Hallows, Stamford. In 1691 he was made Bishop of Peterborough. His work, *De Legibus Naturæ Disquisitio Philosophica* (1672), translated into English by John Maxwell in 1727 and into French (1744), was one of the first protests against the egoism of Hobbes's ethics. He maintained therein that "the common good of all" is the chief end and ultimate standard of morality, and he is thus one of the forerunners of the well-known English Utilitarians. Consult: Spaulding, *Richard Cumberland als Begründer der englischen Ethik* (Leipzig, 1894); Albee, "The Ethical System of Richard Cumberland," in the *Philosophical Review* (Boston, 1895); likewise id., *History of English Utilitarianism* (1902).

CUMBERLAND, Richard (1732–1811). An English dramatic writer and essayist, born in Cambridge. He was the great-grandson of the Bishop of Peterborough and was the grandson, on his mother's side, of Dr. Richard Bentley. He graduated at Trinity College, Cambridge, in 1750, and two years afterward was elected fellow. Having been appointed private secretary to the Earl of Halifax, he gave up his intention of entering the Church, and became Ulster Secretary during Halifax's term as Lord Lieutenant of Ireland. In 1775 he obtained a sinecure in the Board of Trade and retired to Tunbridge Wells, where he devoted himself to literature and wrote some 54 farces, tragedies, and comedies; pamphlets; essays; novels; and translations from the Greek poets. Many of his comedies were well received, but have not survived. They include *The Brothers* (1769) and *West Indian* (1770), his best play. Goldsmith describes Cumberland with gentle satire in *The Retaliation*, as "The Terence of England, the mender of hearts." His *Memoirs* appeared in 1807, but are considered untrustworthy. Consult George Paston's *Little Memoirs of the Eighteenth Century* (London, 1901).

CUMBERLAND AND TEVIOTDALE, tē'vĭ-ot-dāl, Duke of. English titles borne by the first cousin of Queen Victoria, George V of Hanover (q.v.), and perpetuated by his eldest son, Prince Ernest Augustus, born Sept. 21, 1845.

CUMBERLAND GAP. A pass through the Cumberland Mountains on the State line between Kentucky and Tennessee at the southwestern end of Virginia (Map: Kentucky, H 4). It is a notch about 500 feet deep and in some places so narrow as merely to allow room for a roadway. The road between Virginia and Kentucky laid out by Daniel Boone in 1769 passed through Cumberland Gap, and over this road journeyed most of the early emigrants to Kentucky. During the Civil War the Gap was of great strategic importance, constituting as it did a kind of passageway between central Kentucky and eastern and central Tennessee. It was occupied by the Confederate General Zollicoffer on Nov. 13, 1861, but on June 17, 1862, the Confederates withdrew on the approach of a superior Federal force under Gen. G. W. Morgan, who took possession on the following day and immediately began to strengthen the fortifications. Various minor skirmishes occurred in the vicinity, in the most important of which, that of August 7, the Confederates lost 125 men in killed and wounded, the Federals 68 in killed, wounded, and missing. On the night of September 17 Morgan secretly evacuated the place, destroyed the fortifications and the war material, and by a skillful retreat saved his command from capture at the hands of the superior Confederate forces in the vicinity. On October 22 General Bragg occupied the Gap. On Sept. 8, 1863, the place again passed into the hands of the Federals under General Shackelford, the Confederate General Frazer surrendering, without resistance, 2000 men and 14 pieces of artillery; and here on April 28, 1865, 900 Confederates surrendered and were paroled.

CUMBERLAND MOUNTAINS, or PLATEAU. The westernmost division of the southern Appalachian physiographic province. The belt of country occupied by the plateau extends through eastern Kentucky and Tennessee and northern Georgia and Alabama nearly to the Mississippi line. The highest (2500 feet) elevations are attained in Kentucky, the descent towards the south and west being gradual. In central Alabama the plateau merges into the Gulf coastal plain. The plateau has a general elevation of 1000 feet. It rises occasionally to 2000 feet (Map: Virginia, A 5). Its eastern edge is defined by a strong escarpment, while on the west the slope is abrupt in Tennessee but less so in Kentucky. The rocks at the surface of the region are of carboniferous age. They include sandstones, limestones, and slates, which inclose valuable deposits of coal. They are usually well timbered with ash, hickory, chestnut, and other hard woods, but the soil is not sufficiently fertile to support a large agricultural population. The slopes of the Cumberland Mountains are drained mostly into the Ohio River by the Cumberland and the Tennessee, the latter river crossing the southern portion of the range after flowing along the greater part of its eastern edge.

CUMBERLAND PRESBYTERIAN CHURCH. See Presbyterianism.

CUMBERLAND RIVER. A river of Kentucky and Tennessee, rising in the Cumberland plateau, in eastern Kentucky, near the Virginia line. It flows at first generally northwest and then southwest through southern Kentucky and enters Tennessee in long. 85° 30′ W. (Map: Kentucky, C 4). It then runs, in a very tortuous course, southwest, west, and then generally northwest, through northern Tennessee, reëntering Kentucky nearly at 88°. From this point it approximately parallels the Tennessee River, to its confluence with the Ohio River at Smithland, about 12 miles east of Paducah, Ky. The total length of the river is 688 miles, and its

basin area is about 18,000 square miles. It is navigable for steamboats to Nashville, 193 miles, and for vessels of three-feet draft 325 miles farther, to Burnside, Ky., which is commonly considered the head of navigation.

CUMBERLAND ROAD, The. A road 800 miles long, which extended from Cumberland, Md., to Vandalia, Ill., and which had an important part in opening up the West and Southwest to settlement from the East. It was begun about 1806, was constructed in sections, and was finished about 1840. It was to have been built by the Federal government out of funds derived from sales of public lands in the States to be traversed; but additional appropriations soon became necessary, and, largely owing to the influence of Henry Clay, the national government advanced the sum of $6,821,246 for this purpose between 1806 and 1838. For many years the road was under Federal control and was called the Great National Pike, but by 1856 the government had turned over to the various States through which it passed the portions included within each. For many years it was perhaps the chief avenue for Western emigration, and thousands of prospective settlers passed over it from the various Eastern States. Consult: Hulbert, *The Cumberland Road* (Cleveland, 1903); Sparks, *The Expansion of the American People* (Chicago, 1901); and an article "The Old National Pike," in vol. lix of *Harper's Monthly Magazine* (New York, 1879).

CUM'BRIA (Lat., the land of the Cymry, or Welsh). An ancient British principality, including Cumberland in England, and most of Scotland as far north as the Clyde. In Scotland, however, the boundaries were indefinite and depended upon the strength of the ruler. Cumbria had a mixed population of Britons, Goidels, and Picts, who, on account of common danger from the Saxons, united and took the name of Cymry. During the sixth century Cumbria ceased to be governed by one ruler and was united only in times of war. The country, however, was hilly and easily defended. Edmund conquered Cumbria in 946, with the help of the King of South Wales, and gave it to Malcolm of Scotland. William II of England annexed Cumbria early in his reign. In 1107 David I of Scotland became Prince of Cumbria, holding it from the English crown.

CUMBRIAN MOUNTAINS. A group of mountains, 37 by 35 miles in length and breadth, in the northwest of England, occupying part of Cumberland, Westmoreland, and Lancashire. This tract, embracing the English lake district, is of great picturesqueness and beauty and much frequented by tourists. There are 25 mountain tops upward of 1500 feet high, including Scafell Pike (3210 feet, the highest mountain in England), Scafell (3162), Helvellyn (3118), and Skiddaw (3054). The deep valleys between the mountains contain 14 lakes, 1 to 10 miles long. The largest of the lakes are Windermere, Ullswater, Coniston Lake, Bassenthwaite Lake, and Derwentwater. Many eminent persons have resided among the lakes, the beauty of which has inspired some of the finest writings of Wordsworth, Coleridge, Southey, Professor Wilson ("Christopher North"), De Quincey, Arnold, and Harriet Martineau. The heavy rainfall of the region is utilized by the conversion of one of the lakes, Thirlmere, into a reservoir for the water supply of Manchester, and some of the streams are used for producing electrical energy.

CUM'MING, Alfred (1802–73). An American official born in Augusta, Ga. In 1857 he was appointed by President Buchanan Governor of the Territory of Utah, whither he was sent with a protective force of 2500, under the command of Gen. A. S. Johnston, later famous in the Confederate service. He issued, on November 27, a proclamation which declared the Territory to be in a state of rebellion, a copy of which was forwarded to Salt Lake City. Brigham Young, the Mormon president, retaliated by announcing that the region was under martial law and forbidding the expedition to enter. A compromise was subsequently effected, and Governor Cumming assumed office on April 12, 1858. The troops were retained at Camp Floyd until Feb. 29, 1860. In 1861 Cumming was succeeded by Stephen S. Harding.

CUMMING, John (1807–81). A Scottish preacher and author, born in Aberdeenshire. He was educated at King's College, Aberdeen, and in 1833 was ordained to the Scotch Church, Crown Court, Covent Garden, London, where he officiated till 1879. He was very popular as a preacher and lecturer, but is remembered chiefly for his controversies with the Roman Catholic dignitaries and for his interpretation of the apocalyptic writings. The most important of his voluminous publications are: *Apocalyptic Sketches* (1849); *The Great Tribulation* (1859); *Destiny of the Nations* (1864); *Bee-Keeping* (1864); *The Seventh Vial* (1870).

CUM'MINGS, Amos Jay (1841–1902). An American editor and politician, born at Conkling, N. Y. A journeyman printer at 15, he set type in nearly every State of the Union. He was with William Walker in the last "invasion" of Nicaragua (1857), and during the Civil War served as sergeant major of the Twenty-sixth New Jersey Infantry and received the congressional medal of honor. Subsequently he became editor of the New York *Weekly Tribune* and in 1869 joined the staff of the *Sun*, of whose weekly and evening editions he was afterward editor. From 1887 he was a Democratic member of Congress from New York. He was the author of a series of letters, which attracted much attention, written from Florida and California to the *Sun*, over the signature "Ziska."

CUMMINGS, Joseph (1817–90). An American educator, born in Falmouth, Me. He was ordained a minister in the Methodist Episcopal church in 1846 and was president of Genesee College (later Genesee Wesleyan Seminary), Lima, N. Y. (1854–57); president of Wesleyan University, Middletown, Conn. (1857–75), and professor of mental philosophy and political economy there (1875–77), and president of Northwestern University from 1881 until his death. He edited *Butler's Analogy of Religion* in 1875.

CUMMINGS, Thomas Seir (1804–94). An American miniature painter and author, born at Bath, England. He came to New York early in life and studied there with Henry Inman. He painted miniatures in water color, and many of his sitters were well-known contemporaries of the artist. In 1826 he helped to found the National Academy of Design, was its treasurer for many years and one of its early vice presidents. He also wrote an account of its history, entitled *Historic Annals of the National Academy from its Foundation to 1865* (Philadelphia, 1865). His later life was spent in Connecticut, and Hackensack, N. J., where he died.

CUM'MINS, Albert Baird (1850–1926). An

American legislator, born at Carmichaels, Pa. He was educated at Waynesburg College, was admitted to the bar in Illinois in 1875, and from that year until 1878 practiced in Chicago. Removing to Des Moines, Iowa, he was in 1898 a member of the State House of Representatives, from 1902 to 1908 Republican Governor of the State, and after filling out the unexpired term in the United States Senate of Senator Allison, was reëlected in 1909 for the term expiring 1915. During his period of service in the Senate Senator Cummins came to be recognized as one of its most able and conspicuous members. While Governor of Iowa he had made a thorough study of matters relating to the regulation of railroad and other corporations, and to him was largely due the passage by the Senate of various important measures relating to trusts and railroads. Although not actively affiliated with the Progressive party in 1912, he was in favor of many of the principles advocated by the leaders of that party. After the Republican Convention in 1912 (in which he himself had been mentioned for the presidential nomination), Cummins denounced the action of the majority of the delegates in renominating President Taft and declared that he would not vote for the latter on account of the means used to assure his nomination.

CUM'MINS, GEORGE DAVID (1822–76). An American clergyman. He was born in Delaware, graduated at Dickinson College in 1841, and entered the Methodist ministry. In 1845 he took orders in the Episcopal church and was rector of several Episcopal churches in Virginia, Washington, and Chicago. He was chosen Assistant Bishop of Kentucky in 1866, but in 1873 resigned, after being criticized for taking communion with ministers outside the Protestant Episcopal church, and founded the Reformed Episcopal church (q.v.), of which he was the first bishop. Consult the *Memoir* by his wife (New York, 1878).

CUMMINS, MARIA SUSANNA (1827–66). An American novelist, born at Salem, Mass. After receiving a good education she began writing for contemporary magazines. In 1854 she scored an immense success with her story *The Lamplighter*—more than 100,000 copies in all being sold; a surprising sale for ante-bellum fiction. Her later books are negligible, and her reputation has not been maintained, although *The Lamplighter* is still read.

CUM'NOR HALL. 1. An old manor house, near Oxford, of which only a few ruins remain —the place where Amy Robsart was imprisoned, as mentioned in Scott's *Kenilworth*. 2. A ballad of that name by W. J. Meikle, supposed to have suggested to Scott the idea of *Kenilworth*.

CUMONT, kụ'mōn', FRANZ VALERY MARIE (1868–). A Belgian writer on Oriental religions. He was born at Alost, eastern Flanders, and studied at the universities of Ghent, Bonn, Berlin, Vienna, and Paris; from 1892 to 1910 he was professor in the University of Ghent, and from 1899 to 1912 curator of the Royal Museum at Brussels. In 1913 he was made an associate member of the French Academy of Inscriptions. His principal works are on the Eastern cults that took root in Rome about the beginning of the Christian era: they include *Textes et monuments relatifs aux mystères de Mithra* (1894–1901), partly translated by McCormack in 1903 as *The Mysteries of Mithras; Catalogus Codicum Astrologorum Græcorum* (1898 et seq.); *Studia Pontica* (1901–11, with Anderson); *Les religions orientales dans le paganisme romain* (1906; 2d ed., 1909; Eng. trans., 1911); *Recherches sur le manichéisme* (1908–12); *Astrology and Religion in Antiquity* (1912).

CUMULATIVE VOTING. A method of voting at elections for office and in representative assemblies, intended to obviate the inconveniences of the majority system by giving proportional weight to the minority vote. As commonly practiced, each voter is permitted to cast as many votes as there are candidates for a given office, and he may distribute his votes or give them all to one candidate, as he may choose. It has been advocated for many years, both in England and the United States, as an important measure of electoral reform, but has made headway slowly. The system has been employed to some extent in Illinois and Michigan and in parliamentary elections in England. Its constitutionality was established by a decision of the Supreme Court at Michigan in 1891. See ELECTION; ELECTORAL REFORM.

CU'MULUS. See CLOUD.

CUNA, kōō'nȧ. A linguistic stock of American Indians at one time occupying the Isthmus of Panama, in Colombia, from the Chagres River to the Atrato, in Colombia. They are also known as Darien or San Blas Indians, likewise Tules, etc. They are extremely jealous of the whites, and have lately withdrawn farther into the interior. They are of small stature, but athletic and of light complexion, some of them even approaching the blonde type. They formerly lived in villages of communal houses, cultivated corn and cotton, and worked gold obtained from the streams and mountains. The women were clothed, but the men usually went naked. They used poisoned arrows. They have never been entirely subdued and still retain their love for freedom and wild life. Rivet attaches the Cuna language to the Talamanca-Barbacoa group of his Chibchan stock. For recent literature on the Cunas, consult: Mrs. Bell, in *Smithsonian Report* for 1909; Pittier de Fabrega, in *National Geographical Magazine* for 1913; and several articles of an ethnological and linguistic nature by Dr. J. Dyneley Prince in the *American Anthropologist* for 1912 and 1913.

CUNARD', SIR SAMUEL (1787–1865). An English shipowner, born in Nova Scotia. He was the founder (1839) of the Cunard line of ocean steamers plying between England and America. He was a member of the Royal Geographical Society and was made a baronet in 1859.

CUNAX'A (Lat., from Gk. *Κούναξα, Kounaxa*). A place in Mesopotamia, on the eastern bank of the Euphrates, probably about 60 miles north of Babylon. It was the scene of the battle fought (401 B.C.) between Cyrus the Younger (q.v.) and his brother, Artaxerxes Mnemon, in which Cyrus was killed. See ANABASIS; XENOPHON.

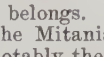
CUNDINAMARCA, kōōn'dē-nȧ-mär'kȧ. A department of the Republic of Colombia (Map: Colombia, C 3). Its area was estimated at over 79,691 square miles, but in 1909, in the new territorial division, it was reduced to 8046 square miles (*Statesman's Year Book*, 1913). This description applies to the old department, as the new boundaries are not defined. The western portion belongs to the Eastern Cordilleras, and the basin of the Magdalena, while the remainder forms a part of the Orinoco basin. Numerous rivers flow across it, the largest of which are the

Guahibos and the Guayabero. All the eastern streams are tributary to the Orinoco. The soil, with the exception of the mountain regions, is very fertile, but only a small portion is cultivated. The chief crops are corn, wheat, coffee, tobacco, cacao, and sugar. The chief exports are cinchona and tobacco. Bogotá, the capital of the State of Cundinamarca, is also the capital of Colombia. Cundinamarca derives its name from an old American goddess and before the conquest of the land by the Spaniards was one of the chief regions of native civilization, as is proved by numerous remains found in the state. The population of the new department in 1912 was 715,610.

CUNDURANGO, kŭn'dû-răn'gô (Quichua, eagle vine). A vine growing in northern South America. It contains a strong bitter principle and was at one time claimed to be valuable in the cure of cancer, as a remedy for which it was sold in the United States at enormous prices. Subsequently it was found to be worthless for the cure of that disease, although it is still claimed to be valuable as a blood purifier. It is not recognized in the American pharmacopœias, although it is still given in the German.

CUNE'IFORM INSCRIPTIONS. The term "cuneiform" (derived from Lat. *cuneus*, wedge, and *forma*, shape) appears to have been employed for the first time by Thomas Hyde (died 1703), and is now commonly used as a designation for the script most prevalent in western Asia before the adoption of some form of the alphabet (q.v.). It is generally held that this writing was invented by the Sumerians (q.v.). Whether they brought it with them into Babylonia, or developed it after their settlement in that country, cannot yet be determined. While the arguments formerly relied upon to prove a non-Babylonian origin have lost some of their force, new considerations have been urged that are not without cogency; but a decision is at present impossible. The earliest texts are more than 6000 years old, and the latest inscriptions come from the first century B.C. The script is composed of wedge-shaped characters consisting of combinations of the five elements:

which often become exceedingly complex. Many of them are polyphonous, so that one cuneiform group may represent a large number of entirely different combinations of sounds. As a rule, the writing is syllabic, each character representing, not a letter, but an entire syllable. There are also ideograms, standing for whole words, or serving as determinatives to indicate the class to which an object belongs. In some of the systems, however, as in the Mitanian, Arzawian, Chaldian, Susian, and notably the Persian, there is a tendency to simplify the script by assigning one value only to each sign, to use signs for single vowels, and to eliminate the majority of the ideograms.

Originally the cuneiform signs, like the Egyptian, Hittite, Cretan, Chinese, and Mexican, were pictographs. This was already suggested by Oppert in 1863, and the theory was accepted by Ménant, Sayce, Hommel, Hilprecht, and others. But before the discovery of early linear inscriptions no definite proof could be adduced. A new direction was given to the investigations as to the origin of the cuneiform characters by Delitzsch, who in 1896 propounded, with much learning and ingenuity, a peculiar view concerning a class of signs to which the Babylonians gave the name of *gunu*. These 11 signs he regarded as compounds of simpler forms and additional wedges prefixed, added, or inserted to heighten or intensify the meaning. In spite of the opposition of Jensen (*Deutsche Litteraturzeitung*, July 31, 1897) and Peiser (*Mitteilungen der Vorderasiatischen Gesellschaft*, 1897, pp. 316 ff.), this view won very general acceptance. Other scholars added 21 signs that seemed to them to be of the same nature as the *gunus*. An important contribution was made by Thureau-Dangin in 1898–99, who examined 563 signs, presented the linear forms then known, indicated the modifications of many signs, lucidly explained the change in the *ductus* of the script, and strengthened the conviction of its pictorial origin. Serious doubt was cast upon Delitzsch's theory by Ogden in 1911. She showed that in the case of the 11 *gunu* signs some were originally pictures of wholly dissimilar objects, some were pictures of different, though related, objects, and none revealed a heightening of the meaning through the additional wedges. Her conclusions in regard to the 21 signs supposed to be of the same character were equally subversive of the theory. Finally, Barton, in 1913, published a work on the origin of Babylonian writing in which he presented a collection of the actual pictographs, found in early inscriptions, traced their development, identified and registered in an index 288 different pictographs, indicated the signs formed by doubling, tripling, or quadrupling, noted 209 compounds of dissimilar signs, and furnished explanations of 619 out of a total of 719 characters. According to Barton, the signs are drawn from the human body and its parts, mammals, birds, insects, fishes, trees, stars and clouds, earth and water, buildings, boats, household furniture and utensils, fire, weapons, clothing, implements of worship, nets, traps, pottery, musical instruments, lines and circles. All the meanings of each sign, so far as known, have been considered by him. In a very large number of instances his identifications can be accepted without difficulty. Many may indeed be questioned, but the principle seems to have been established without peradventure. As characteristic examples, the following pictographs actually occurring in early inscriptions and some of their later modifications may be given: 1. archaic, by Gudea, later, 'star,' also meaning 'heaven,' 'god,' 'lord,' 'king,' etc.; 2. archaic, by Hammurapi, later, 'rising sun,' 'sun'; 3.  archaic, by Gudea, later, 'bird'; 4. archaic, by Manishtusu, later, 'fish'; 5. archaic, by Hammurapi, later, 'hand'; 6. archaic, later, 'foot,' 'go,' 'lead,' etc. In his *Grundzüge der sumerischen Grammatik* (Leipzig, 1914) Delitzsch recognizes fully the pictographic origin

of the cuneiform characters, but does not refer to the criticism of his *gunu* theory.

To the period of linear writing the peculiar arrangement of the signs goes back which is characteristic of the early inscriptions down to the time of Gudea. The surface on which the inscription was placed was divided into horizontal bands or strips, and each of these into squares or sections. So far as the long bands were concerned the text ran from the top down on the obverse and from the bottom up on the reverse. Within the squares of which they were composed the signs were arranged vertically, but within each band the text was read from the right to the left. This was later changed; the signs within each square fell into horizontal lines, the one at the top becoming the first on the left-hand side, so that the writing assumed a direction from left to right, while the bands became columns. Thureau-Dangin has suggested, as an explanation of this change, that the tablet was held in such a manner that it was possible to maintain in theory that the writing was vertical, though in reality the effect was to make it horizontal.

The transition from the linear to the cuneiform signs was no doubt influenced by the writing material and the implement used. As the Germanic runes, which were carved on wood, are angular in shape and avoid curves, while the Singhalese, which was written on palm leaves, has almost no straight lines, which would split the leaf, so the cuneiform received its shape from the soft clay that was substituted for stone and the stylus that took the place of the chisel. On the clay tablet the straight line was the easiest stroke, and the triangularly prismatic stylus formed the peculiar arrow-shaped head of the wedge. The clay bricks, after the writing was finished, were carefully baked or dried in the sun. A chisel was of course employed for longer inscriptions carved in the rock or on stone slabs and cylinders.

History of Decipherment. Although allusions are made to cuneiform texts by Herodotus, Diodorus, Strabo, Plutarch, Arrian, and the epistles ascribed to Themistocles, on the age of which consult Bentley, *Dissertation upon the Epistles of Phalaris* (1690), all remembrance of them seems later to have been lost. But European travelers were at length attracted by the signs on the mountain wall at Behistun. Josafat Barbaro, in 1472, noticed them; Pietro della Valle, in 1621, copied some of the signs; Carsten Niebuhr brought back to Europe and published the first complete and accurate copies in 1777. Upon these copies of the great trilingual inscription of Darius I in Persian, Susian, and Babylonian a number of scholars worked with varying success. The Persian was the first to be deciphered. Tychsen identified the wedge marking the division of words and four other signs; Münter found the true value of another sign and conjectured that an Achæmenian king was the writer; Grotefend read the name of Darius; Rask found the plural ending; Eugene Burnouf recovered all the signs of this cuneiform system; and Henry Rawlinson independently discovered the interpretation of the text he had himself copied afresh from the Behistun rock. Westergaard began the decipherment of the Susian text in 1844. Of the Babylonian text Löwenstern made out the sign for "king." But it was through the efforts of Rawlinson, Hincks, De Saulcy, and Oppert that the Semitic version yielded up its secret. The knowledge of modern Persian, and especially of Pahlavi (q.v.), was of much value in the deciphering of the ancient Persian text; and the similarity of the Babylonian version to well-known Semitic dialects assisted greatly in the deciphering of the third text. The fact that the same text is repeated word for word in the three languages was of great importance for the translation of the Susian, where no modern or hitherto known language gave any help. (On the recently found Aramaic version, see BEHISTUN.) The decipherment of the Chaldian and the peculiar form of the Assyrian found in Cappadocia is largely the work of Sayce; the Mitanian and Arzawian have been deciphered by Sayce, Jensen, Peiser, and Winckler chiefly; the Anzanian by Schei and Weissbach, and the Elamitish by Frank.

Sumerian. There are a number of distinct systems of cuneiform writing. Among these may be mentioned Sumerian, Akkadian (adopted for the Assyrian, the Lulubian, and the Gutian as well as in Egypt, Syria, and Asia Minor), Elamitish, Anzanian, Susian, Mitanian, Arzawian, Hittite, Chaldian, and Persian. The Sumerian was first written in linear form; but even after the introduction of the wedge-shaped characters the pictographic origin was for a long time quite apparent. The bulk of the signs consists of ideograms. The real pronunciation of many of these signs is doubtful. It is customary to transliterate the Sumerian signs with capital letters. Especially is this the rule when they occur in Akkadian texts, and the pronunciation or equivalent on the lips of the Semites is uncertain. While the syllabaries and bilingual texts were of great value, the discovery in recent years of numerous Sumerian texts not accompanied by a Semitic translation has greatly increased our knowledge both of the language itself and the Sumerian form of writing. The Sumerians failed to single out the individual consonantal sound which the Egyptians did; but they added to their ideograms phonetic syllable signs, thus preserving the vowel, so often lost to us in the Egyptian hieroglyphics. The numerical system, as in all cuneiform writing, consists of simple wedges, , for units, and angles, , for tens. After 60, which, like the first digit, is represented by the simple vertical wedge, the system becomes sexagesimal, differing in this respect from the Elamitish. Consult Delitzsch, *Grundzüge der sumerischen Grammatik* (1914) and *Sumerisches Glossar* (1914); and see SUMARIAN LANGUAGE.

Akkadian. Probably already before Sargon I of Agade the Semitic Akkadians had taken over from the Sumerians the art of writing. They had to adapt, however, the cuneiform system to the needs of their own language. The script became more distinctly syllabic. Sometimes the syllables were open, sometimes closed; sometimes a syllable was divided so as to consist of only a consonant and a vowel, as *par* or *pa-ar*. But there are not only ideograms taken over from the Sumerian, but also such created by the Semitic Akkadians. In reading, these ideograms were not pronounced according to their phonetic value, but the corresponding Semitic word was used. With the homophones, or different signs for the same sound, the polyphones, or signs with various values, and the ideograms, there are over

700 characters. To simplify the reading determinatives are used, as in Egyptian, by which the noun is shown to denote a class of objects, being a god, a man, an animal, a country, or the like. The clay tablets that form the largest part of the inscribed objects are of various sizes, some being as large as 9 by 6 inches, while others are little more than an inch square. The character of the writing also varies, so that the later Assyrian or Chaldæan letters are different from those of earlier times. Seals, cylinders, stone obelisks, statues of bulls and lions, and the walls of palaces were favorite places for texts to be inscribed. The writing is often exceedingly minute, some tablets having six lines to the inch, so that the complex characters must be read with the help of a magnifying glass. It is probable that the letters were cut with such assistance, as lenses of considerable power have been found among the ruins of Babylonian cities. From the Akkadians the Assyrians adopted the cuneiform writing, though there were slight differences in the pronunciation of some signs. The Lulubians and Gutians at an early time likewise adopted it. With the language itself it went to conquered Elam, to Asia Minor, where it is found in the so-called Cappadocian tablets as well as centuries later in the Boghaz-keui tablets, and to Egypt and Syria, as the Tell el-Amarna tablets and those found at Lachish, Gezer, Taanach, Megiddo, Zenjirli, and elsewhere show. Thus far, however, no tablet has been found in Syria on which Hebrew or Aramaic is written in cuneiform characters. The theory that a large part of the Old Testament was written originally in cuneiform letters, and possibly in the Babylonian language in earlier days and in Aramaic later, as the *lingua franca* of the time, presented recently by Naville, *Archæology of the Old Testament* (1912), can scarcely be regarded as plausible.

The ancient Akkadian scholars designated the cuneiform signs by names. A systematic presentation of these names was given by Brünnow in his *Classified List of All Simple and Compound Ideographs* (Leyden, 1887). Since then it has been briefly treated by Weber in 1907, and most fully by Viktor Christian, *Die Namen der assyrisch-babylonischen Keilschriftzeichen* (Leipzig, 1913).

Elamitish. In Elam, as in Babylonia, the cuneiform system developed from pictographs. But the combinations of lines and wedges are entirely different from those of the Sumerians or Akkadians. It is indeed a syllabic writing, with a few determinatives, and this has been regarded as indicating dependence upon Babylonia; but in view of the great age of Elamitish civilization, and the uncertainty as to the origin of the Sumerian, the question must be left open. It is significant that the numerical system and the signs used in it are decimal, and not sexagesimal as in Babylonia. The decipherment by Frank ("Zur Entzifferung der altelamischen Inschriften," in *Abhandlungen der Berliner Akademie*, 1912), with the aid of the bilingual inscriptions of Basha-shushinak, has shown that the language is substantially the same as that in the Anzanian inscriptions. The script seems to have disappeared after the middle of the third millennium B.C.

Anzanian. This system, used for the native language of the Hatamti or Anzanian tribes, is found in inscriptions of kings from the twelfth century to Achæmenian times. It shows already strong tendencies in the direction of the later Susian, and has sometimes been called Middle Susian, though Scheil, to whose investigations we owe our knowledge of it, prefers the term "Anzanian."

Susian. The third variety of the cuneiform inscriptions in Elam is very much simpler. Mordtmann suggested the name "Susian," which has now taken the place of many other names that have been proposed by scholars at different times. It is also termed the "language of the second form," in allusion to the fact that it is found in the second of the three versions of the Achæmenian inscriptions. This system contains 96 syllabic signs, which at times, however, show a distinct approach to alphabetic values. Like the other cuneiform systems, the Susian possesses ideograms and determinatives, having 16 of the former and 5 of the latter. It is noteworthy that each ideogram, excepting for *sunkik*, 'king,' which already has one determinative, is followed by the determinative , *id.*

The readings of the Susian characters are in general fairly clear, although there is still uncertainty about some words.

Mitanian. The Tell el-Amarna tablets acquaint us with the language and script of the Mitanians, a people living in Mesopotamia in the fourteenth century B.C. The language seems to be akin to the Hittite; the script is a development of the Akkadian.

Arzawian. The Tell el-Amarna tablets also contain a letter from the King of Egypt to the King of Arzawa, a country that is probably to be sought east of Cappadocia and north of Mesopotamia in the territory afterward occupied by the Chaldians around Lake Van. It is written in the language and cuneiform characters of Arzawa. The Arzawian language seems to be nearer the Hittite than the Mitanian; it is also found in another letter referring to the "sons of Lapaya."

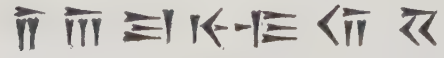
Hittite. Through the discoveries of Winckler it is now known that the Hittites themselves, in addition to their peculiar system of hieroglyphics, also had adapted for their use a system of cuneiform writing based on the Assyrian or Babylonian, and possibly upon the form that had been in vogue among the Babylonian and Assyrian colonies in Cappadocia. At Hatti, the modern Boghaz-keui, numerous tablets and fragments of tablets, evidently written in the native language, but in cuneiform script, were found along with those written in Babylonian. The character of this system is likely to resemble that of the Arzawian, but before publication of these important tablets, which is now eagerly expected, judgment upon all such points must be held in suspense.

Chaldian. The cuneiform inscriptions which are found in Armenia, chiefly in the neighborhood of Lake Van, are written in a language which is regarded by some scholars as related to the modern Georgian dialects. The inscriptions, which come from the ninth and eighth centuries B.C., were first noted by Saint-Martin in 1823, and studied by Schulz, who was murdered by the Kurds in 1829, before his researches were completed. Despite the erroneous view held by one of the early investigators that the language of these texts was Armenian, while another more naturally tried to read them as Assyrian, researches into them were at last suc-

cessful largely through the efforts of Sayce. The alphabet of the Chaldian cuneiform inscriptions is an obvious modification of the Assyrian characters. It is relatively extremely simple, since polyphones are discarded, and the number of signs is but 158, including 51 ideograms and 7 determinatives. The type of this script, like the Susian, forms a kind of transition between the Assyro-Babylonian and the Persian, since it has partly given up the syllabic system and often approximates the alphabetic form. Some of the determinatives, as those for god and man, and the numerical system, are borrowed from the Assyrian system of writing.

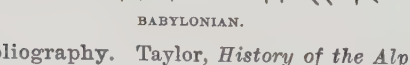
Persian. The most simple of all the cuneiform systems, and the one which, as stated above, gave the key to all the others, is the Persian. This is employed from the sixth to the fourth century B.C. in the tablets of the Achæmenians, Darius the Great, Xerxes, Artaxerxes I, II, and III, and Cyrus the Younger, together with a few seals of private persons. By far the most important text is that of Darius at Behistun, which is about 413 lines long. Other inscriptions, some of them of great value, are found at Persepolis, Susa, Naqs-i-Rustam, Elvand, Kirman, Hamadan, and Murghab. In addition, there are shorter tablets at Van, where the most important Armenian inscriptions exist, and at Suez. The trilingual inscription of Behistun was known to Diodorus Siculus (q.v.) in the first century B.C., who says that the deeds of Semiramis were carved there "in Syrian letters." The Persian cuneiform characters are almost entirely alphabetic, each sign standing either for a vowel or for a consonant plus a vowel. Traces of the earlier syllabic system may perhaps exist in the case of characters which, like some of those found in the Chaldian inscriptions, have different forms according to the following vowel, as , *ja*, but , *ji*. The Persian system possesses 36 letters, in addition to which there are four ideograms, for king, land, earth, and Ahura Mazda. Polyphones and homophones are altogether lacking, and the only possible trace of a determinative is in the oblique wedge, already mentioned as the first cuneiform character to be deciphered, which marks the end of a word. The Achæmenian kings probably derived the use of this system of writing from the Medes, as is suggested by Ed. Meyer (*Geschichte des Altertums*, 3d ed., 1913, i, 2, p. 337). But no Median cuneiform inscription has yet been found.

The difference in the three systems represented in the Behistun inscription may be illustrated by reproducing the name of Darius in Persian, *Dārayawaush*, Susian, *Tariyawaush*, and Babylonian, *Dāriyawush:*



PERSIAN.

SUSIAN.



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CUNENE. See KUNENE.

CUNEO, kōō'nâ-ō (dialectically called *Coni*). An episcopal city, the capital of the province of the same name in north Italy, 55 miles south of Turin, at the confluence of the Stura and the Gesso (Map: Italy, B 3). The town has a twelfth-century Franciscan church, now used as a military storehouse, a cathedral, and a city hall with a high tower. It markets grain, silk, and hemp of Nice in Lombardy, Switzerland, and Germany, and manufactures paper and fabrics of silk and wool. Cuneo has often been besieged since it came into possession of the house of Savoy in 1382. Pop. (commune), 1901, 26,879; 1911, 29,122. Consult Bertano, *Storia di Cuneo* (Cuneo, 1898).

CUNHA, kōō'nyà, TRISTÃO DA, or **D'ACUNHA** (c.1460–c.1540). A Portuguese navigator. In 1506 he was at the head of an expedition to Africa and the Indies in company with Affonso d'Albuquerque, to carry aid to the Viceroy of India, Francisco Almeida. Afterward he fought

in Madagascar, and he was distinguished for his conduct in the East. In 1514 he was made special ambassador to present to Pope Leo X the new possessions of Portugal. Upon his return he was made one of the special council of the crown. Da Cunha was the discoverer of three volcanic islands in the Atlantic, one of which bears his name.

CU'NIBERT, SAINT (c.590–663). In Latin, *Honobertus.* One of the earliest bishops of Cologne. He was consecrated in 623, was present at the synods of Rheims (625) and of Clichy (626), and soon took a place beside Pepin as one of the most influential men in the kingdom of the Franks. He educated Sigebert III and other Merovingian princes; was prominent in the revision of the Salic and Ripuarian laws, and in drawing up the Alemannian and Bavarian codes, and spread the power of the Church over Saxony, Westphalia, Frisia, and part of France. He died after forty years in the bishopric.

CUNLIFFE, JOHN WILLIAM (1865–). An American educator and literary critic. He was born in Bolton, Lancashire, and was educated at the University of London (Litt.D., 1892) and at Owens College, Manchester. He taught English literature at McGill University, Montreal, from 1899 to 1906, at Columbia University in 1906, and at the University of Wisconsin until 1912. He then became professor of English and associate director of the school of journalism, Columbia University. He wrote *The Influence of Seneca on Elizabethan Drama* (1907); edited Gascoigne's *Supposes and Jocasta* (1906), and a complete edition of Gascoigne (1907–10; in *Cambridge English Classics*), and "Eastward Hoe" in vol. ii of Gayley's *Representative English Comedies* (1913); and contributed to vols. iii and v of the *Cambridge History of English Literature* on "A Mirror for Magistrates," Gascoigne, and early tragedy.

CUN'NER. A small, brown labroid fish, common in summer about all the eastern shores of the United States, where it affords amusement to hosts of amateur anglers who fish for it from wharves and anchored boats. It is closely allied to the tautog, but less valuable, and is variously known as burgall, chogset, blue perch, sea perch, nipper, etc., and to ichthyologists as *Tautoglabrus adspersus.*

CUN'NINGHAM, SIR ALEXANDER (1814–93). An English soldier, archæologist, and author, born at Westminster, son of the poet, Allan Cunningham. He studied at Addiscombe, went to India in 1833 as second lieutenant of Bengal engineers, and in 1836 was appointed an aide-de-camp to Lord Auckland. From 1836 to 1846 he was in military and engineering service, in 1846–49 was field engineer in the Sikh wars, and in 1856, with rank of lieutenant colonel, was appointed chief engineer of Burma. In 1858 he was appointed to a similar post in the Northwest Provinces, and, as a major general, retired in 1861. He was from that time until 1865, and again in 1870–85, director general of the Indian Archæological Survey, editing its *Reports* (23 vols., 1871–86). He made extensive explorations, excavations, and drawings, gathered the most valuable collection of Indian coins yet made, and conducted important researches in the history of Buddhism as revealed by its architecture. In the Lahore Museum is the collection of Græco-Buddhist sculptures which he made and which was arranged by J. Lockwood Kipling. His publications include: *Essay on the Arian Order of Architecture* (1848); *Bhilsa Topes* (1854); *The Ancient Geography of India* part i, (1871); *Corpus Inscriptionum Indicarum,* vol. i (1877); *The Coins of Ancient India* (1891), and *The Coins of Mediæval India* (1894).

CUNNINGHAM, ALLAN (1784–1842). A Scottish poet and miscellaneous writer. He was born in the parish of Keir, Dumfriesshire. His father was for a time a neighbor of Burns, and Allan, as a boy, was present at the poet's funeral. At the age of 11 Cunningham was taken from school and apprenticed to his brother, who was a stone mason; but his spare time was given to song and the collection of traditions. In 1810 he contributed largely to R. H. Cromek's *Remains of Nithsdale and Galloway Song.* The ballads in this collection, though purporting to be ancient popular songs, were Cunningham's own compositions. Removing to London just before this publication, Cunningham became one of the best-known writers for the *London Magazine.* He subsequently obtained a situation in Chantrey's studio as foreman, or confidential manager, and this office he held till the sculptor's death. Among Cunningham's many works are: *Songs, Chiefly in the Rural Dialect of Scotland* (1813); *Songs of Scotland, Ancient and Modern* (1825); several romances, and a drama; *Traditional Tales of the English and Scottish Peasantry* (1822); *Lives of the Most Eminent British Painters, Sculptors, etc.* (1829–33); and an admirable life of Burns. Cunningham is the author of a fine sea song, "A Wet Sheet and a Flowing Sea." He died in London. Consult Hogg, *Life,* with selections from works (London, 1875).

CUNNINGHAM, JOHN (1819–92). A Scottish divine. He was born at Paisley and was educated at the universities of Glasgow and Edinburgh. He was pastor at Crieff for 41 years (1845–86). In 1886 he was moderator of the General Assembly of the Church of Scotland and became professor of divinity at St. Mary's College, St. Andrews. His *Church History of Scotland* (1859) is the best work on this subject. He also wrote: *A New Theory of Knowing and Known, with Some Speculations on the Borderland of Psychology and Physiology* (1874); *The Quakers from their Origin to the Present Time: An International History* (1868).

CUNNINGHAM, JOHN F. (1842–). An American Catholic divine, born in County Kerry, Ireland; educated at St. Benedict's College, Atchison, Kans., and at St. Francis Seminary, Milwaukee, Wis. He took an important part in the development of the Catholic church influence in Kansas, having been the first resident pastor of that church at Fort Scott (1865–68). He was transferred to Lawrence, Kans., in 1868; was pastor at Leavenworth in 1876–82, and rector of the cathedral there in 1882–98, when he was consecrated Bishop of Concordia, Kans.

CUNNINGHAM, PETER (1816–69). A British author, born in London, the son of the writer Allan Cunningham. He is best known by his *Hand-Book of London* (1849). He also edited a number of the English classics; wrote *Life of Drummond of Hawthornden* (1833), *Poems upon Several Occasions* (1841), *Life of Inigo Jones* (1848), *The Story of Nell Gwynne* (1852); and was a contributor to English periodicals.

CUNNINGHAM, RICHARD (1793–1835). A Scottish botanist, a brother of Allan Cunningham, the poet. He was born at Wimbledon. From 1808 to 1814 he worked on the *Hortus Kew-*

ensis at Kensington; from 1814 to 1832 he acted as assistant to the King's gardener at Kew, and in the latter year was made Colonial Botanist and superintendent of the gardens at Sydney, Australia. After spending nearly a year in New Zealand, he returned to Australia in 1834, and in the following year, while out with an exploring party on the banks of the Darling River, he was murdered by the natives. He wrote *Two Years in New South Wales* (London, 1827).

CUNNINGHAM, William (1805–61). A Scottish theologian. He was born at Hamilton, Lanarkshire, and was educated at Edinburgh University. In 1834 he was appointed pastor of Trinity College Church, Edinburgh, and in 1843 became professor of theology in, and in 1847 principal of, New College. He was a leader in the Free Church movement and in founding the Evangelical Alliance and was a controversialist of exceptional ability. He was moderator of the General Assembly of 1859. Among his principal works are the following: *Historical Theology* (1862); *The Reformers and the Theology of the Reformations* (1862); *Discussions on Church Principles* (1863). Consult Rainy and Mackenzie, *Life of Cunningham* (1871).

CUNNINGHAM COAL CLAIM. See Alaska, *History*.

CUNOBELINUS. See Cymbeline.

CUOCO, kōō-ō′kô, Vincenzo (1770–1823). An Italian historian, born near Naples. He practiced law for a time at Naples, but was banished for participation in the revolutionary movement of 1799, and until his return in 1806 lived chiefly at Milan, where he edited the *Giornale Italiano* and published his *Saggio storico sulla revoluzione di Napoli* (1800), a vivid narrative of the facts of 1799, viewed with a philosophical and historical criticism so sound as to make of Cuoco one of the greatest modern historians. From 1806 to 1816 he was director of the Treasury and a member of the Court of Cassation at Naples. The best edition of the *Saggio* is by Nicolini (Bari, 1913); best biography by Romano (Isernia, 1904). For Cuoco's philosophical ideas, where he was a follower of Vico, consult articles by Gentile in *Critica* (Bari, 1905, etc.).

CUP (AS. *cuppe*, Icel. *koppr*, OHG. *choph*, cup, from Lat. *cupa*, cask, OChurch Slav. *kupa*, cup, Gk. *κύπη, kypē*, hollow, Skt. *kupa*, well), Divination by. A mode of foretelling events practiced by the ancient Egyptians and still prevailing in some of the rural districts of England and Scotland. One of the Eastern methods consisted in throwing small pieces of gold or silver leaf into a cup of water, in which were placed also precious stones with certain characters engraved upon them. The infernal powers were then invoked, and returned answer either in an intelligible voice, by signs on the surface of the water, or by a representation in the cup of the person inquired about. By the modern method a person's fortune is foretold by the disposition of the sediment in his teacup after pouring out the last of the liquid. See Divination.

CUPAR, kōō′pēr, or **CUPAR FIFE.** A royal and municipal burgh, the county town of Fifeshire, Scotland, on the Eden, 32½ miles north of Edinburgh (Map: Scotland, E 3). It has several schools and a public library. The chief manufactures are linens, brick, leather, flour, building stone, printing, and earthenware. Coal is mined near by. A fortress of the Macduffs, thanes of Fife, once stood on a mound called the Castle Hill, at the east end of the town. Pop. (royal, parliamentary, and municipal burgh), 1901, 4511; 1911, 4380.

CU′PEL AND CU′PELLA′TION. See Assaying; Lead.

CU′PID (Lat. *cupido*, desire, from *cupere*, to desire). In classic mythology, the god of love; called in Greek Ἔρως, *Erōs*, and by writers in Latin *Amor*, love. Eros was worshiped at Thespiæ and Leuctra in Bœotia, and Parion on the Hellespont, as a very ancient god of productivity. He also appears in the poets from the time of Hesiod as a mighty god, the personification of the power of love, which unites the gods and produces all things. In this aspect he is called offspring of Chaos, or of Heaven and Earth; in fact any symbolical genealogy is assigned to him which pleased the fancy of a poet or a philosopher. The prevailing later conception, however, is that Eros is the son and inseparable companion of Aphrodite, though there is considerable confusion as to his father. In the earlier Greek art Eros is a winged youth, holding a flower or very commonly a lyre, or a burning torch, and sometimes a whip, as symbol of his power. The bow and arrows, which were his common attributes in Hellenistic and Roman times, seem to have been introduced in the fourth century B.C., when Praxiteles and Lysippus represented the god in famous statues. The statue of Eros stretching the bow, probably influenced by Lysippus, which is now in the Capitoline Museum at Rome, shows the passage to the type which afterward became universal—the chubby, mischievous boy. The later Alexandrian and Roman literature, with its frequent mention of the love gods, finds a reflection in the contemporary art. The artists of the time are exceedingly fond of genre scenes, in which the actors are Cupids, who appear hunting, driving chariots, making wine, selling their wares, or even playing like children. For such scenes cf. the famous "Cupid Frescoes" at Pompeii; consult Mau-Kelsey, *Pompeii: Its Life and Art*, pp. 331–338 (New York, 1902).

CUPID, The Letter of. A poem by Occleve, which was attributed to Chaucer in the edition of 1532, though bearing a date (1402) two years after the latter's death.

CUPID AND PSYCHE, sī′kē. 1. One of the tales narrated in the *Golden Ass* of Apuleius (q.v.). Psyche, a princess, by her beauty incurs the wrath of Venus, who sends Cupid to punish her; but he falls in love with his prospective victim and visits her, cloaked in invisibility. He commands her not to attempt to see him. Curiosity leads her to disobey, and the lovers are separated. The pity of Jupiter, however, finally unites them for eternity. 2. A graceful antique marble in the Capitoline Museum at Rome, a copy of a Greek original. Cupid, undraped, embraces Psyche, who is draped from the hips. The statue was found on the Aventine. See Psyche.

CUPID'S REVENGE. The title of an inferior comedy by Beaumont and Fletcher, showing strong resemblance to Sidney's *Arcadia*.

CU′POLA (It., dome, from Lat. *cupula, cupule*, little cup, cupola, dim. of Lat. *cupa*, cask). 1. A spherical vault or ceiling, so called from its resemblance to an inverted cup. The term may be used either of the interior or of the exterior structure, and is thus not to be sharply distinguished from the word "dome" (q.v.). It is, however, more commonly applied to the smaller forms of dome and to those which are

not conspicuous externally. When the outer roof differs materially in form from the inner dome, it is proper to call the latter a cupola, though not the former; as in the Baptistery at Florence or that at Ravenna. The minor domes of Turkish mosques, the domical vaults over the Mihrab at Córdova, over the side aisles or even over the nave and choir of St. Paul's at London, are cupolas; but the term is hardly applicable to great external domes or lofty domes like those of St. Peter's at Rome or of the Capitol at Washington. The inner vaults of these domes may, however, be called "cupolas." In popular language the term is often misapplied to a small lookout or lantern crowning a roof, without regard to its form. 2. A circular furnace used in iron founding. See FOUNDRY.

CUP'PING. The application of cups, from which the air has been exhausted, to the skin, with the object of causing congestion or excessive fullness of the cutaneous blood vessels; and if it should be thought desirable to withdraw some blood, the skin may be cut or scarified, and the exhausted cups applied over the incisions, to favor its flow. The two procedures are respectively called "dry" and "wet" cupping. Cups are made of glass, with round mouths, from 2 inches to 1 inch wide. The cup is held near the skin, and the flame of an alcohol lamp is thrust into it till part of the air is driven out by expansion. The flame is then withdrawn, and the cup is quickly inverted on the skin, to which it adheres on account of the partial vacuum formed on cooling. The "French cup" is provided with a rubber bulb connected with its interior. The bulb is grasped as the cup is applied, driving out the air, and when the cup is in position the bulb is allowed to expand and fill, thus exhausting part of the air in the cup. Wet cupping should be done under antiseptic precautions. A series of vacuum cups ingeniously devised to fit every part of the body, and provided with suction bulbs, have been invented in connection with the system of treatment advocated by Bier.

CUPRES'SUS. See CYPRESS.

CU'PRITE (from Lat. *cuprum*, copper). A red cuprous oxide that crystallizes in the isometric system and has an adamantine or submetallic lustre. It sometimes occurs in long thin needles (*chalcotrichite*), as well as in earthy varieties red, reddish brown, or black in color. Cuprite results from the oxidation of the sulphides of copper and is found associated with other copper minerals and with limonite. It occurs in Thuringia and Tuscany, in England, in Chile, Peru, and Bolivia; and with various copper ores in the Lake Superior region, Missouri, and Arizona. It is found occasionally as a furnace product. Cuprite is a useful ore of copper.

CU'PULE (Neo-Lat. *cupula*, dim. of Lat. *cupa*, cask). A word with at least two distinct applications among plants. Among seed plants it refers to a peculiar involucre of coalesced bracts, such as the acorn "cup," and the husk of beechnuts, hazelnuts, etc. Among liverworts (as *Marchantia*) it refers to a cuplike structure that appears on the plant body and contains the peculiar reproductive bodies called "gemmæ." See HEPATICÆ.

CU'PULIF'ERÆ (Neo-Lat. nom. pl., from *cupula*, cupule, little cup, cupola + Lat. *ferre*, to bear). An old name applied to the family in which the oak was the most conspicuous representative. This old family has now been divided into two: Betulaceæ (birch family), and Fagaceæ (beech family). To the former family hazelnuts, birches, and alders belong; while to the latter family beeches, chestnuts, and oaks belong. A conspicuous difference between the two families is that in the Betulaceæ both staminate and pistillate flowers are in catkins or catkin-like heads, while in the Fagaceæ this is true only of the staminate flowers. These two families, along with the willow family and walnut family, constitute the amentiferous groups—a name referring to the characteristic catkins or aments. In all of them the stamens and pistils are in separate flowers, so that the plants are either monœcious or diœcious. In none of them is there any corolla, except occasionally some minute petals in the walnuts. In all of them except the willows the fruit is a characteristic nut.

The Betulaceæ contain six genera with about 75 species; while the Fagaceæ contain five genera with about 375 species, the large majority of which belong to the genus *Quercus* (oak). In both families the leaves are alternate, simple, and straight-veined. The characteristic nuts of oaks, beeches, and chestnuts are well known. These two families contain some of our most important forest trees and are mostly natives of the Northern Hemisphere.

CURA, kōō'rȧ, or CIUDAD DE CURA, syōō-dȧd' dā kōō'rȧ. A city of Venezuela, formerly capital of the State of Mirada, situated near Lake Valencia, 1600 feet above sea level (Map: Venezuela, D 1). Owing to its position near the llanos of the Guárico, it has considerable trade as the centre of a cotton-growing, agricultural, and stock-raising region. Cura, founded in 1730, suffered considerably in the War of Independence. In 1900 it was visited by a destructive earthquake. Pop., about 12,000.

CURACÁNECAN, kōō'rȧ-kȧ-nā'kȧn. A minor linguistic stock of South American Indians in the lower Bolivian region. Rivet sees reason, however, to make it a dialect of the Otuquian or Otuké.

CURAÇAO, kōō'rȧ-sä'ō *or* kōō'rȧ-sō'. An island of the Dutch West Indies, lying in the southern part of the Caribbean Sea (Map: West Indies, E 4). It is situated about 41 miles north of Venezuela, in lat. 12° N. and long. 69° W., and covers an area of 212 square miles. Its surface is generally flat, except for the hills in the southwest, whose highest elevation is 1200 feet. Streams are few, and the rainfall light. Sugar, tobacco, corn, and fruits are raised, but a considerable part of the island is arid and uncultivable. The principal minerals worked are salt and phosphate. Curaçao liqueur takes its name from the island. The commerce of Curaçao is chiefly with the adjacent islands and the United States. The imports of the colony in 1911 were valued at 4,325,000 guilders: of the island for 1910 at 3,162,310 guilders (coal, dividivi, cigars and cigarettes, sugar, coffee, cheese, tobacco, rum, etc.). The exports of the colony in 1911 were 1,952,000 guilders and in 1900 1,716,886 guilders (Curaçao, 925,385; Bonaire, 164,363; Aruba, 542,260; St. Martin, 59,926; St. Eustatius, 13,823; Saba, 11,129). (Guilder = $.402.) The island of Curaçao, together with the adjacent Dutch islands of Bonaire, Aruba, a part of St. Martin, St. Eustatius, and Saba, form a separate colony (area, 436 square miles) officially called Curaçao, administered by a governor, assisted by a council of four members and a colonial council of eight members. The

smaller islands are administered by subordinate officials. The members of both councils, as well as the minor officials, are nominated by the sovereign. Pop. of the colony, Dec. 31, 1910, 54,469 (of the island of Curaçao, 32,585); 1900, 52,109 (30,636); Aruba, 9357, Bonaire, 6383. The capital of the colony of Curaçao is Willemstad, in Curaçao, a well-built town with a good harbor. Curaçao was occupied by the Spanish in 1527 and fell into the hands of the Dutch in 1634. It was ruled by the English for eight years (1807–15), then returned to the Dutch. There is a United States consul on the island.

CURAÇAO, kōō′rȧ-sō′ (so called from the peel of the Curaçao orange). A well-known and palatable liqueur, made from orange peel by digesting in sweetened spirits, with certain spices, as cinnamon, mace, or cloves. See LIQUEURS.

CURANA (kōō-rä′nȧ) **WOOD.** See PROTIUM.

CURARI, kōō-rä′rē (South American), CURARE, OURARI, URARI, WOORALI, or WOORARA. A celebrated poison used by some tribes of South American Indians for poisoning their arrows. Its active principle is *curarine* ($C_{18}H_{35}N$), a yellowish-brown, intensely bitter powder. It is by means of this poison that the small arrows shot from the blowpipe become so deadly. The nature and source of this poison remained long unknown, the Indians being very unwilling to reveal the secret, which seems, however, to have been at last obtained from them by Sir Robert Schomburgk, and it is now regarded as pretty certain that the principal ingredient is the juice of the *Strychnos toxifera*, a tree or shrub of the same genus with that which yields nux vomica. (See STRYCHNOS.) It has a climbing stem, thickly covered with long, spreading, reddish hairs, rough, ovate, pointed leaves, and large, round fruit. The poison, when introduced into the blood, acts on the end plates of the muscles, peripheral end organs of the motor nerves, causing complete paralysis without affecting consciousness, sensation, circulation, or respiration except indirectly. Convulsions are due to the asphyxia which results from paralysis of the muscles concerned in respiration. Death finally occurs from this respiratory paralysis. Curari is supposed to be the most powerful sedative known. Artificial respiration is the most efficacious means of preventing its effects. It has been proposed to employ it in the cure of lockjaw and hydrophobia, but it merely stops the convulsions and is itself very dangerous on account of the liability to paralysis of the respiratory muscles. It has been used with success in tetanus.

CURARINE. See ALKALOIDS.

CURAS'SOW (from *Curaçao*, an island in the Caribbean Sea) or properly CURAÇAO BIRD. A large gallinaceous bird of the genus *Crax* of the family Cracidæ, having a strong bill surrounded at the base with a skin—sometimes brightly colored—in which the nostrils are pierced, and the head adorned with a crest of feathers curled forward. They are natives of the forests of the warm parts of America. Their habits greatly resemble those of domestic poultry. They make large, clumsy nests in trees and lay white eggs. They are easily domesticated. The best-known species, the Curaçao bird (*Crax alector*), is about the size of a turkey; its plumage is almost entirely black. It is abundant in the forests of Guiana. Its flesh is very good eating. It is kept in poultry yards in South America, and was introduced into Holland at the close of the last century, where it seemed completely acclimated, but the stock has never become widespread. Consult Dixon, *The Dovecote and the Aviary* (London, 1853), and Sclater's illustrated papers in the *Transactions of the Zoölogical Society of London*, vol. ix (London, 1877). Cf. CHACHALACA; GUAN; and HOCCO; and see Plate of GROUSE, ETC.

CU'RATE (ML. *curatus*, from Lat. *cura*, cure, care). One who has the cure of souls. In this sense it is used in the phrase of the English prayer book, "all bishops and curates," and similarly in France the word *curé* denotes the parish priest. In England and America the word is applied, in Catholic and Church of England usage, to assistant clergymen. A few incumbents in England hold what are called "perpetual curacies" and are practically the same as vicarages. See VICAR.

CURAVECAN, kōō′rȧ-vā′kȧn. A minor linguistic stock of South American Indians, formerly resident in the forested region of eastern Bolivia. Rivet thinks it may belong to the Otuquian or Otuké stock and thus lose its independent character.

CURB (from OF. *courber, corber, curber*, Fr. *courber*, It. *curvare*, from Lat. *curvare*, to bend, from *curvus*, curved, OChurch Slav. *krivŭ*, Lith. *kreivas*, crooked). A bulging or thickening of the ligaments and other tissues of the back part of the hock of horses, following a sprain. Swelling appears on the inner and back part of the joint, generally causing lameness, which is most apparent in trotting and in slight cases usually wears off after the animal has been out for 10 minutes. It may be most readily detected by standing at one side and looking across the joint. Applications of cold, as intermittent or constant irrigation, or an ice poultice, must first be used to allay the irritation and inflammation. When the swelling has assumed defined boundaries, efforts should be directed towards effecting its absorption and reducing its dimensions by means of pressure, blisters of cantharides, and frictions with ointments of bin-iodine of mercury. All work should be suspended.

CURBINA, kōōr-bē′nȧ. See DRUM, OR DRUMFISH.

CURCI, kōōr′chē, CARLO MARIA (1809–91). An Italian priest and author, born in Naples. He was a Jesuit and founded in 1850 *Civiltà Cattolica*, a journal which stood for the rehabilitation of the temporal power of the Pope. But Curci later retracted these opinions and in 1877 published, in *Il moderno dissidio tra la chiesa e l'Italia* (1877), the reasons for his opposition to the policy of Pius IX. This forced him to leave the Society of Jesus, but afterward Leo XIII induced him to recant to some extent, and he continued more favorable to the policy of the Vatican until the publication of his books, *La nuova Italia* (1880), *Il Vaticano regio* (1883), and *Lo scandalo del Vaticano regio* (1884), which were immediately placed upon the Index. Towards the end of his life Curci retracted again and died in the communion of the Church. Consult his *Memorie* (Florence, 1891), extending to 1849.

CURCU'LION'IDÆ (Neo-Lat. nom. pl., from Lat. *curculio, gurgulio*, weevil). A large family of rhynchophorous beetles; snout beetles. See WEEVIL; PLUM INSECTS.

CUR'CUMA (It., Fr. *curcuma*, from Ar.

kurkum, saffron). A genus of plants of the family Zingiberaceæ, having the tube of the corolla gradually enlarged upward and the limb two-lipped, each lip three-parted. The species are stemless plants, with tuberous roots, natives of the East Indies. The dried roots of *Curcuma zedoaria* are the zedoary (q.v.) of the shops; the roots of *Curcuma longa* yield turmeric (q.v.); and *Curcuma angustifolia* yields a kind of arrowroot (q.v.). The same species often yields both arrowroot and turmeric—the former being obtained from the young roots, the latter from the old. *Curcuma amada* is called "mango ginger." Its root in its qualities resembles ginger. It is a native of Bengal.

CURD. See CHEESE.

CURÉ DE MEUDON, kụ'rā' *de* mē'dôN', LE (Fr., the curate of Meudon). The name frequently given to Rabelais, whose last charge was at Meudon.

CURE FOR A CUCKOLD. The title of a play by Webster and Rowley (1661), also attributed to Middleton and Rowley.

CUREL, kụ'rĕl', FRANÇOIS DE (1854–). A French dramatist, born at Metz. He studied engineering, but gave himself to the stage and, although he gained no great popularity, made his mark at the Théâtre Libre and the Théâtre Antoine with the critics by his boldness of theme and his originality, treating such serious topics as labor and capital, the genesis of religion, and the modern idolatry of science, and showing the influence of Ibsen. His plays include: *L'Envers d'une sainte* (1892); *L'Invitée* (1893); *Le repos du lion* (1897); *La nouvelle idole* (1899); *Fille sauvage* (1902); *Le coup d'aile* (1906). He wrote two novels, *L'Eté des fruits secs* (1885) and *Le sauvetage du grand duc* (1889).

CURES, kū'rēz (from Sabine *curis, quiris*, spear). A town of the Sabines, about 25 miles from Rome, near the Tiber, the birthplace of Titus Tatius (see ROMULUS), and of Numa (q.v.). The town was destroyed by the Lombards near the close of the sixth century. It stood not far from the modern Corresi.

CURETES, kū-rē'tēz (Lat., from Gk. Κουρῆτες, *Kourētes*). Cretan demigods who protected the infant Zeus from his father Cronus (see SATURN), by drowning his cries with the clanking of their brazen weapons. The Curetes were closely connected with the worship of Cybele (q.v.). (See CORYBANTES.) The priests of the Curetes, clad in armor, danced the Pyrrhic dance (q.v.). On the Corybantes and the Curetes both, consult an article by Kaibel in *Göttinger Nachrichten*, pp. 512–514 (1901), and Farnell, *The Cults of the Greek States*, vol. v (Oxford, 1909).

CURETON, kūr'ton, WILLIAM (1808–64). An English Syriac scholar. He was born at Westbury, became canon of Westminster and rector of St. Margaret's, London, in 1849. He died in London, June 17, 1864. His fame rests upon his Syriac studies, which include: *Corpus Ignatianum* (1849); *Four Gospels in Syriac* (1858); *Ancient Syriac Documents Relative to the Earliest Establishment of Christianity in Edessa and the Neighboring Countries* (1864).

CURETU, kōō-rā-tōō'. A tribe of Betoyan stock occupying the country on the Yapurá above the mouth of the Apaporis. They are a subtribe of the Yupua.

CUR'FEW (OF. *courfeu, corfeu*, from *cuevre-feu, coevrefeu, covrefeu, couvrefeu*, cover fire, from *covrir*, Fr. *couvrir*, to cover + *feu*, fire). In the Middle Ages, the ringing of a bell as a signal for the fires to be covered up for the night and consequently for the people to go to bed. The custom existed in many countries and was very necessary as a police measure, because the fires were built in the centre of the room and there were no chimneys; the wooden houses caught fire easily, and destructive conflagrations were frequent. Polydore Vergil attributes to William the Conqueror the introduction of the curfew bell into England, but the custom prevailed throughout Europe long before his time. There was so much opposition to the ordinance in England that Henry I modified it. The curfew is mentioned in English laws for more than a century afterward, but Blackstone says it refers to the time of night and not to the ordinance. In parts of the United States and England the curfew bell is now rung; in some towns of the former it is a police regulation to warn children off the streets.

CU'RIA (Lat., court). In Roman history, the name of a division of a tribe, dating traditionally from the constitution of Romulus. The tribes being three and the divisions in each tribe 10, there were 30 curiæ. From the *curiæ* plebeians were at first excluded; later, plebeians were admitted to them. The assembly of the *curiæ* was called *Comitia curiata*. The *curiæ* were at bottom, probably, territorial divisions, including groups of related families. They had political functions, discussed under COMITIA, and religious functions of various sorts. The meeting place of a curia was itself called "curia." Hence *curia* is also the name given to the Senate house in ancient Rome. Consult Botsford, *The Roman Assemblies* (New York, 1909).

CURIA MURIA (kōō'rĭ-ȧ mōō'rĭ-ȧ) **ISLANDS.** See KURIA MURIA ISLANDS.

CU'RIA RE'GIS (Lat.), or KING'S COURT. The ancient supreme court of judicature of England, known also as the *Aula Regia*, or Royal Hall (of Justice). It was instituted by William the Conqueror as the instrument of his judicial and administrative authority as supreme head of the state, and, exercising, as it did, a general and practically unlimited jurisdiction, it rapidly drew to itself all the important litigation of the kingdom. There had been no analogous tribunal under the Saxon kings, the popular county courts being in all ordinary cases supreme within their respective counties (shires), and a centralized administration of justice being foreign to the sentiments and traditions of the English people. Among the Normans, however, it was the duke or king, and not the people, from whom the stream of justice flowed, and the followers of the Conqueror could hardly be expected to subject their causes—their controversies over land titles, their exactions, their claims to tithes and preferments—to the judgment of the popular tribunals. It was in the County Court of the County of Kent, however, that a great case, involving the title to 25 manors, between the Archbishop of Canterbury and Odo, the Bishop of Bayeux and Earl of Kent, the half-brother of the King, was tried and adjudged in the tenth year of the Conqueror, and cases of this kind were not uncommon in the earlier years of William's reign.

But the older tribunals could not long com-

pete with the immediate jurisdiction of the King, at first administered by him in person, and then by the chief justiciar, an officer of almost royal authority and importance. All important causes, public and private, whether civil, criminal, or ecclesiastical, might be brought before the King's Court in the first instance, and judgments of the county courts and other local tribunals were subject to be appealed and brought before it for review. Its learning and disinterestedness contributed as much as its authority to invest it with the function of the principal court in the kingdom for the adjudication of private controversies, and the position of the justiciar, as the chief executive and military officer, as well as the highest judicial officer in the kingdom, added to the weight of its judgments.

The *Curia Regis* early became a peripatetic or circuit court, attending the King, or, in his absence from the realm, the justiciar, in his frequent progresses through the kingdom, and this, in the course of time, became a great abuse, amounting in many cases to a denial of justice. To remedy this, it was provided in *Magna Carta* (1215) that common pleas, i.e., causes between private parties, should not follow the court, but be heard in a fixed place. The establishment, thereupon, of a distinct Court of Common Pleas, in the reign of Henry III, to sit permanently at Westminster, was the beginning of the dissolution of the Curia Regis. A separate division of the court, known as the King's Court of the Exchequer, had previously been created for determining questions relating to the royal revenues. When in the same reign a Chancellor of the Exchequer was appointed as the permanent head of this department, it also became a separate and distinct tribunal. Finally, in the fifty-second year of Henry III (1268), a third court, thenceforth known as the Court of King's Bench, was created and took over the remaining jurisdiction of the Curia Regis. Thus, the latter, though never formally abolished, lost its importance and became obsolete, after 200 years of greatness. The last justiciar of the King's Court, Robert de Brus, became the first Chief Justice of the King's Bench in 1268, and with him the line of great justiciars became extinct. From that time to the reform of the judicial system of Great Britain in 1873–75, England lacked a single supreme court, but the model of the Curia Regis of the Norman kings was followed in the creation of the Supreme Court of Judicature, by which justice is administered in England to-day. See COURT; SUPREME COURT.

Consult: Thorpe, *The Ancient Laws and Institutes of England* (London, 1840); Stubbs, *Constitutional History of England* (Oxford, 1883); Stephens, *History of the Criminal Law* (London, 1883); *Essays in Anglo-Saxon Law* (Boston, 1876); Dugdale, *Origines Juridicales; or, Historical Memorials of the English Laws, etc.* (London, 1666); Inderwick, *The King's Peace, A Historical Sketch of English Law Courts* (ib., 1895); Pollock and Maitland, *History of English Law* (2d ed., Cambridge and Boston, 1899); Holdsworth, *History of English Law* (London, 1910); Jenks, *A Short History of English Law* (ib., 1912).

CURIA ROMANA. See ROMAN CATHOLIC.

CURIATII, kū'rī-ā'shī-ī. The name of three Alban brothers, the opponents and victims of the three Horatii (q.v.) in the famous contest by which Alba Longa became subject to Rome.

CURICANCHA, kōō'rē-kän'chȧ (Quichua, court of gold). A temple of the sun said to have been founded by Manco Capac, in Cuzco, Peru, and to have been first used as a palace by the early Incas.

CURICÓ, kōō'rē-kō'. The capital of the Province of Curicó, Chile (Map: Chile, C 10), situated, at an elevation of 748 feet above sea level, 114 miles south of Santiago. It is connected with Santiago by railroad and has considerable trade with Argentina through the Planchón Pass. Curicó was settled in 1743, though not on its present site. Pop., 1907, 17,573; 1910, 18,313. Pop. of the province, 1910, 108,120.

CURIE, kų'rē', MARIE SKLODOWSKA (1867–). A Polish-French physicist and chemist, the wife of Pierre Curie (q.v.). She was born in Warsaw, where her father was professor of physics in the University. She studied the physical sciences at Warsaw and later in Paris with Curie, whom she married in 1895. To the researches on radioactive substances and radioactivity which have made her name and that of her husband famous, she contributed at least an equal share. It was she who carried out the tedious and innumerable fractional crystallizations that finally yielded a minute sample of pure radium salt, enabling her to determine the precise atomic weight of radium. The honors and prizes for the discovery of the radioactive elements (see POLONIUM; RADIUM; RADIOACTIVITY) were awarded jointly to her and her husband, including part of the Nobel prize for physics in 1903. On her husband's death, in 1906, she succeeded him as professor of physics and director of the physical laboratory at the Sorbonne, where she continued her researches. Later she became professor also in the Ecole Normale Supérieure des jeunes filles at Sèvres. In 1910 she was awarded the Albert medal of the Royal Society of Arts (England), and in 1911 she received the Nobel prize for chemistry. She wrote *Recherches sur les propriétés magnétiques des aciers trempés* and *Recherches sur les substances radioactives* (Eng. trans., 2d ed., New York, 1904).

CURIE, PIERRE (1859–1906). A French physicist. He was born in Paris. He received his general education in Paris and early engaged in independent research, which resulted in a number of valuable contributions to physical science. In 1895 he was made professor of physics at the *Ecole municipale de chimie et de physique.* In 1896 he and his wife (see CURIE, MARIE SKLODOWSKA) began to study the Becquerel rays, which led them to the discovery of polonium (q.v.) and subsequently of radium (q.v.). In 1901 they received the La Case prize of the Academy of Science and two years afterward the Davy medal of the Royal Society of London, and part of the Nobel prize. In 1904 Curie was made professor of physics at the Sorbonne and in 1905 a member of the Institute of France. He was run over and instantly killed in Paris by a wagon, April, 1906. His memoirs were published mostly in the *Comptes rendus* of the French Academy. See RADIOACTIVITY.

CU'RIO (clipped from *curiosity*). A term still popularly used, though somewhat obsolete, to describe any kind of object of curiosity, especially such as would belong to cabinet (q.v.) collections, on account of antiquity, rarity, or intrinsic interest, in such domains as pottery,

porcelain, enamels, metal work, ivories, wood carvings, arms, clocks, fans, watches, snuff-boxes, musical instruments, and the like.

CURIO, GAIUS SCRIBONIUS. 1. A Roman statesman and orator, tribune of the people in 90 B.C. He served under Sulla in Greece against Archelaus (see ARCHELAUS, 4) and in Asia. He was consul in 76. As Governor of Macedonia, he defeated the Thracians and the European Dardanians, making his way even to the Danube; for this a triumph was granted to him. He was a friend of Cicero, but a bitter opponent of Cæsar, against whom he wrote a political pamphlet in dialogue form. As an orator, he was known for his brilliant style and his pure Latin. He died in 53. 2. Son of the preceding, best known in connection with the events leading to the outbreak of war between Cæsar and Pompeius. At first he supported Pompeius; later, he went over to Cæsar, persuaded, it was said, by a large bribe. When it was maintained that Cæsar, then in Gaul, in order to be free to stand for office in Rome, should follow the usual procedure and lay down his imperium before entering the city, Curio proposed that Pompeius should do the same, and recommended that, if either refused, he should be declared a public enemy. The proposal was carried, but the consuls nevertheless directed Pompeius to command all troops in Italy. Finding his opposition to this unsuccessful, Curio fled to Cæsar. He served with success in Sicily in the interest of Cæsar and then crossed to Africa and was defeated and slain there by King Juba.

CURIOSITIES OF LITERATURE. A work in six volumes by Isaac D'Israeli, which appeared, without indication of its authorship, at intervals from 1791 to 1824.

CURISCHES HAFF, kōō'rĭsh-ĕs häf. See KURISCHES HAFF.

CURITIBA, kōō'rē-tē'bȧ. The capital of the State of Paraná, Brazil (Map: Argentina, K 3), situated on the Iguazú River, in a fertile plain, 3200 feet above sea level. It is well built and has a high school and a street railway. Railroads run to the interior and to the coast, and the town exports corn, beef, fruit, tobacco, and Paraguay tea. There are gold mines in the vicinity. Curitiba was settled in 1654, and since 1831 has been the capital of the state. Pop., 1890, 22,694; 1912 (est.), 60,000.

CURLER, ARENDT VAN. See VAN CORLEAR.

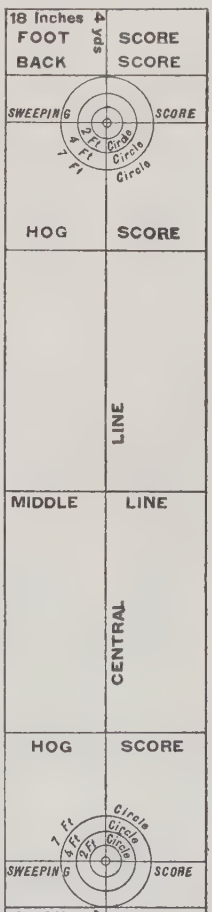
CUR'LEW (OF. *corlieu*, It. *chiurlo;* probably onomatopoetic in origin). A shore bird of the genus *Numenius*, and snipe family, characterized especially by its long, slender, downward-curving bill, and its liking for upland plains

BILL OF ESKIMO CURLEW.

rather than marshy places. In America are the Hudsonian or Jack curlew (*Numenius hudsonicus*), the Eskimo curlew, or doe-bird (*Numenius borealis*), and the long-billed curlew (*Numenius americanus*, or *longirostris*). The first two are found in summer in far Arctic regions and in winter as far south as Patagonia, so that during some part of the year they occur in most portions of the Western Hemisphere. The long-billed, whose beak is sometimes 8 inches long, belongs in the eastern and central United States, especially at the South, and on the Northwestern prairies. Its nest, like that of other curlews, is on the ground and slightly constructed, and the eggs are clay-colored, with various brown markings.

The common curlew of Great Britain (*Numenius arquatus*), the "whaup" of the Scotch, has an almost world-wide distribution in the Old World, migrating even to New Zealand. Its flesh and eggs are both eaten. Other Old World species are the whimbrel (*Numenius phœopus*) and the Otahiti curlew (*Numenius taitensis*) of the Pacific islands. Consult: Coues, *Birds of the Northwest* (Washington, 1874); Selous, *Bird Watching* (London, 1901); Bent, "The Hudsonian Curlew," *Educational Leaflet No. 62, National Association of Audubon Societies* (New York, 1913); Hornaday, *Our Vanishing Wild Life* (ib., 1913). See Plate of BUSTARDS.

CURL'ING (so called from the twisting motion of the curling stones). A game of Scottish origin. Associated with the parent body today, the Royal Curling Club of Scotland, are clubs in England, Ireland, Canada, Newfoundland, New Zealand, Nova Scotia, the United States, Russia, and Switzerland. The first club to be organized in the United States was the Orchard Lake Club, near Pontiac, Mich., in 1842. The Grand National Curling Club was organized in 1867.



There are two curling games—the rink play and "playing for points." The rink game is played on any piece of ice, upon which may be plotted out a rink 42 yards long (occasionally 32 yards) and 10 yards wide. There are four players on each side, each using two stones of circular shape, not heavier than 44 pounds nor lighter than 32 pounds (without handles), and not of greater circumference than 36 inches, nor of less height than one-eighth of the greatest diameter. Each player in turn takes his position on the crampet or iron foothold at one end of the rink and propels his stone as near to the tee, 38 yards off, as he can. The next man of the opposite side then projects one of his stones still nearer, if possible, and so the game proceeds until each has cast his two stones, after which the end, or "head," is counted. A stone is of no use unless it reaches the mark called the "hog score," and of no value if it passes out of the parish,

which is a 7-foot ring drawn round the tee. All the stones that stay within the parish are counted, and that side wins which has the greatest number of stones nearest the tee.

It is permitted during the game for one side to aim at its opponents' stones and to knock them out of the circle if possible. The sweeping of the ice, an important feature of the game, is under the direction of one player of each side called the "skip." The player's party may sweep the ice from the hog score next the player to the tee; but when snow is falling the ice may be swept from tee to tee. In the "point" game there are no sides; each player has two stones to throw, and other stones are placed round the tee for him to make his points by placing his ball, or displacing the other balls from the positions in which they have been placed. Originally the stones were simply rounded stones, taken from the channel of a river: but about the middle of the eighteenth century they were improved by chiseling, and later handles were introduced. Now each stone has usually two sides—one so curved that it runs as on a pivot and highly polished for use on dull ice, and the other less polished, but with a larger concave or hollow, to give it a better catch or hold on keen, clean ice. A set of matches is called a "bonspiel." There are international bonspiels between the United States and Canada, and interstate matches yearly at Montreal, Winnipeg, Ottawa, Hamilton, Toronto, St. Paul, Minneapolis, Duluth, Chicago, Buffalo, Hoboken, N. J., and several other cities. Numerous trophies are contested for, among which are the International trophy, the Quebec Challenge cup, the Grand Challenge cup of Manitoba, the Caledonian tankard, the Viceregal tankard, the Merrian trophy, and the Gordon-Mitchell and Smith medals. Consult: Ramsay, *An Account of the Game of Curling* (the earliest history of the game, Edinburgh, 1811); Taylor, *Curling, the Ancient Game* (ib., 1877); and the *Official Curling Guide* of "Spalding's Athletic Library" (New York, published annually).

CURLL, Edmund (1675–1747). An English bookseller, to whom Pope devoted some of the least complimentary lines of the *Dunciad*. He became known for his indecent publications, to describe which the term "Curlicism" was invented. Some of these dubious works got him into trouble, and one cost him an hour in the pillory. Besides his "Curlicisms," he published more than 150 standard works.

CURRACH, COURACH, kŭr′rȧ *or* kŭr′rȧk, or **COR′ACLE** (Gael., Ir. *curach,* Welsh *corwc,* boat). The name given in the British Islands to a canoe or boat made of a slender frame of wood covered with skins. Skiffs of this sort, as well as canoes hollowed out of the trunks of oaks, were in use among the Britons in the earliest times of which we have record. Julius Cæsar, who built some of them after the British model, tells us that the keel and gunwales were of light wood, and the sides of wicker covered with hides. A long voyage in the North Sea, made in a currach during the sixth century, by one of the companions of St. Columba, is commemorated by Adamnan, who died in 704. In 878 three Irish missionaries sailed in a currach from Ireland to Cornwall; the voyage occupied seven days, and the size of the currach is indicated by the remark that it was one of two skins and a half. An old life of St. Patrick speaks of a currach "of one skin, with neither helm nor oar." The currach of a larger size had a mast and sail. The currach still continues to be used on the Severn, and on many parts of the Irish coast, especially on the shores of Clare and Donegal. The last one known to have been used in Scotland is in the museum at Elgin. See Coracle.

CURRAGH OF KILDARE, kŭr′rȧg *or* kŭr′rȧ ŏŏ kĭl-dâr′, The. A famous race track and the seat of a military camp in County Kildare, Ireland. The plain is about 6 miles long and is the property of the crown, its administration being in the hands of a ranger. The camp was established after the Crimean War and has accommodation for over 12,000 men.

CUR′RAN, Charles Courtney (1861–). An American figure and landscape painter. He was born at Hartford, Ky., and studied in New York at the Art Students' League, and in Paris under Doucet, Lefèbvre, and Benjamin-Constant. He received the Hallgarten, Shaw, and Carnegie prizes in the National Academy, the Corcoran prize, Washington, and medals at the expositions of Paris (1900), Buffalo (1901), and St. Louis (1904). He was elected to the National Academy of Design in 1904. There are pictures by him at Vassar College, in the National Gallery, Washington ("Perfume of the Roses"), the Pennsylvania Academy ("The Breezy Day"), and in the museums of Columbus, Richmond, Ind., Toledo, and Buffalo. He has a wide range of subjects, but prefers to paint beautiful female nudes in idyllic surroundings. His color is delicate, his draftsmanship sure and minute. Among his more recent paintings are "Wild Asters on the Mountain Side," "Victoria," "Huckleberries and Ferns," "Mountain Laurel," all exhibited in 1912; and "June," "In the Garden," "The Lanterns," exhibited in 1913.

CURRAN, John Philpot (1750–1817). An Irish judge and orator. He was born at Newmarket, County Cork, July 24, 1750, and educated at Trinity College, Dublin, where he was more dissipated than studious. In 1773 he went to London and studied law assiduously at the Middle Temple. He was called to the Irish bar in 1775 and soon won success by his ability and social qualities. He was an expert cross-examiner and possessed a thorough acquaintance with every intricacy of the cunning native mind. In 1782 he became member for Kilbeggan in the Irish Parliament and supported a liberal policy. His sarcasm led him into several fortunately harmless duels. In 1788 he favored the formation of an Irish volunteer army corps and eloquently protested against the English policy which led to the rebellion of 1798. His fearless defense of the leaders at the State trials, and Robert Emmet's affection for his daughter, the heroine of Moore's pathetic poem, led to Curran's examination before the Privy Council (in 1803), but he was found guiltless of complicity. He bitterly opposed the Union, as the "annihilation of Ireland"; and its consummation, crowding on domestic trouble, seriously impaired his health. After the death of Pitt, Fox appointed him Master of the Rolls with a seat in the Privy Council. He held the office from 1806 to 1813 and retired on a pension. As a distinguished man among the brilliant men of the period, he spent the last three years of his life in London, where he died, Oct. 14, 1817. His memory is preserved by excellent examples of sparkling wit and repartee

found in various memoirs. Consult: Phillips, *Recollections of Curran and his Contemporaries* (London, 1850); Curran, *Life of Curran* (ib., 1819; New York, 1855); Stephens, *Memoir* (London, 1817); O'Regan, *Memoir* (ib., 1817); *Curran's Speeches*, with a *Life*, edited by Davis (Dublin, 1855).

CUR'RANT (Fr. *corinthe*, It. *corintho*, currant, from Lat. *Corinthus*, Gk. Κόρινθος, *Korinthos*, Corinth; so called as being originally exported from that city). A name used to designate some fruits of the genus *Vitis* as well as both the plant and fruit of the genus *Ribes*. Originally this term seems to have been applied to the small raisins which are now a common commercial article much used in cookery. In general the term "currant" is applied to both the plant and fruit of those species of the genus *Ribes* that have no thorns and bear their fruits in bunches or clusters like grapes. *Ribes rubrum* may be taken as a type. This group is found chiefly in the northern half of the north temperate zone. In Europe it is wild and occurs in England and on the Continent as far north as Kamchatka, although it is not found in the Mediterranean countries. In America it is found in Canada and both eastern and western United States. Having a northern origin, it has proved a most valuable plant in the Northwest, where few cultivated fruits thrive without protection. The currant is found in almost every fruit garden throughout the northern United States and Canada and is cultivated to a considerable extent commercially.

Ribes rubrum, from which our red and white varieties are derived, is the most important member of this group, both in America and Europe. (For illustration, see Plate of Cypress.) It grows best on a strong, moist loam, with a northern exposure or partial shade. For this reason it is often planted in orchards and on the north side of buildings. It is generally propagated by hardwood cuttings, 6 to 10 inches long, taken in the early fall. The plants are set about 4 feet apart in rows 6 feet apart. Frequent and shallow cultivation is given, and good results are often secured by mulching. Not much pruning is required. The old wood should be thinned out each year, none over three years old being allowed to remain. Red varieties are the ones chiefly grown for market. The white sorts are sweeter, but not so popular. Both white and red varieties are extensively used in the preparation of jellies and jams and for wine making. Black currants (*Ribes nigrum*) are little grown in the United States, but are extensively cultivated in Canada and in Europe, especially in Scotland. A kind of liquor (*liqueur de cassis*) is made in large quantities from them in France. The raw fruit has an unpleasant odor and flavor, which becomes agreeable only by scalding. It possesses medicinal properties and is used as a tonic and in throat troubles.

Ribes americanum, the Western representative of the black currant, possesses all its good qualities and is more ornamental. Another American species very generally met with in ornamental plantations, under the name of "flowering currant," or "golden currant," is *Ribes aureum*. It has been lately placed upon the market as a fruit plant under the name of "Crandall currant"; its fruit is of good quality, but it is a small bearer. The red-flowered currant (*Ribes sanguineum*), now so common as an ornamental bush in shrubberies and trained on walls, producing in April a profusion of deep-red flowers in large drooping racemes, is a native of northwestern America and was introduced into Great Britain in 1826. Its bluish-black, mucilaginous, insipid berries are not poisonous, as is popularly believed. Another currant, with beautiful red berries, larger than the largest English red currant, occurs on the Himalayas, at an elevation of 13,000 feet. The name "native currant," or "Australian currant," is given in Australia to the berries of different shrubs, particularly the white berries of *Leucopogon richei*, of the family Epacridaceæ. Other fruits bearing the same name are produced by species of Coprosma (family Rubiaceæ), but they are very inferior.

Currant Diseases.—Two diseases of the currant are well known in the United States, and they both occur in Europe and elsewhere. The anthracnose, caused by *Pseudopeziza ribis*, attacks the leaves, causing small black spots on the upper side, and later white areas on the under surface; the leaves turn yellow and fall from the bushes. The leaf spot, due to *Septoria ribis*, occurs as whitish spots with black centres, which spread over the leaf, causing it to fall prematurely, the whole bush being bare by late summer. The mildew, *Sphærotheca mors-uvæ*, also attacks currants. These diseases can be prevented by the proper use of any standard fungicide. A wilt due to *Dothiorella* sp. causes a sudden wilting and death of the canes. This disease is most common in the Hudson River region in New York.

CURRANT INSECTS. Currants are most injured by the caterpillar-like larvæ, called "currant worms," of two sawflies (q.v.). One, of foreign origin, is *Nematus ribesii*, and the other, a native, is *Pristiphora grossulariæ*. Both are fully described and treated of by Professor Riley in his *Ninth Report on the Insects of Missouri*, and hellebore is recommended as a remedy. These defoliate the plant. Its stem and roots are attacked by scale insects and by two borers of note. One is the caterpillar of a small wasplike ægeriid moth, or clearwing (*Scsia tipuliformis*); the other is a small, black, sparsely spotted, long-horned beetle (*Psenocerus supernotatus*). It lays its eggs on the currant stems early in June, where there are soon hatched tiny grubs that begin to bore into the stem until they reach and feed upon the pith. When full grown (before the close of the season), they are half an inch long, have brown heads, and whitish, pubescent bodies. When about to change to a chrysalis, this larva gnaws a tunnel to, but not quite through, the outer bark, and then pupates in this chamber and sleeps through the winter. As soon as it is revived by the spring it makes its final change, and the beetle gnaws its way out. The way to destroy these beetles is to prune and burn all dead twigs on the bushes early in spring. Compare Gooseberry. See Clearwing.

CURRANT WINE. A wine made of the juice of fresh red or white currants, to which sugar is added before it is set aside to ferment. Fermentation requires several weeks, and the wine is not fit for use for at least some months afterward. Black-currant wine is made in the same way from black currants.

CURREL'LEY, Charles Trick (1876–). A Canadian clergyman and archæologist. He

was born at Exeter, Ontario, was educated privately, and afterward at the Harbord Collegiate Institute, Toronto, and Toronto University. He entered the Methodist ministry in 1899, but went to London, England, in 1902 and was appointed to the staff of the Egyptian Exploration Fund. In 1903 he joined the British School of Archæology at Athens. In 1902–03, while excavating at Abydos, he discovered the tomb of Admes, "the Pharaoh that knew not Joseph," and also a stone which revealed the parentage of the founders of the eighteenth Egyptian dynasty. In 1903–04 he was in charge of explorations along the Fayoum and in the northern marshes, Egypt. In 1904–05 he led an exploring party to Sinai, and afterward engaged in excavations in Crete, Asia Minor, and Syria. He discovered the statue of Hathor; also the inscription and portrait of Cheops, for which the Khedive of Egypt conferred on him the Order of the Mejidieh. Later he was elected a fellow of the Royal Geographical Society. In 1907 he was appointed curator of the Museum of Archæology, Toronto University. He published *Sinai*, an account of his explorations.

CUR'RENCY (ML. *currentia*, current of a stream, from Lat. *currere*, to run). The circulating medium in which debts are paid and the business of the country transacted. This would seem to be also the definition of the term "money," and, indeed, among economic writers there is no hard and fast line to distinguish the use of the respective terms "currency" and "money." In general, however, the term "currency" applies more specifically to those attributes of money which are included under the designation "medium of exchange," as distinguished from those which attach to its function as a standard of value.

While, with few exceptions, the money of civilized states rests upon a metallic basis of gold and silver, the circulating medium is often exceedingly complex. Of this the statement of money in circulation in the United States furnishes an excellent illustration:

MONEY IN CIRCULATION IN THE UNITED STATES, OCT. 1, 1913

Gold coin	$ 610,735,030
Gold certificates	1,029,828,159
Standard silver dollars	73,284,490
Silver certificates	478,735,722
Subsidiary silver	157,787,867
Treasury notes of 1890	2,602,750
United States notes	339,826,454
National bank notes	709,677,098
Total	$3,402,477,570

The aggregate of these various forms of money constitutes the currency of the nation; but among them we can recognize one only, viz., gold coin, as possessing all the attributes of money. It is in the relation of these other forms to the standard money that the questions touching the currency arise. While a fuller discussion of these questions must be reserved for other articles, a brief survey can be had in examining the list here given. In it we recognize three types—token currency, government paper currency, and bank currency.

The subsidiary silver and minor coinage of the United States (the latter not given in the table) represent in the fullest sense token currency. The metallic value of the coins is in contemplation of the law less than their nominal value; their legal-tender quality is limited, as is also their amount, while the government undertakes the obligation to redeem them in standard money. The silver dollars approach token currency in the lack of correspondence between their metallic and nominal values and in the limitation of their quantity, but they depart from its principles in possessing full legal tender and in not being directly redeemable in gold.

Two forms of paper currency appear in the circulation of the United States—the certificates and the legal-tender notes. The certificates, whether gold or silver, represent in another form a definite quantity of money deposited in the United States Treasury. They are not themselves endowed with the legal-tender qualities of the money they represent, though receivable by the government as money. The United States notes convertible into gold on demand are secured not by an equivalent holding of gold by the Treasury, but by a "reserve" of $150,000,000, which is deemed sufficient to meet all ordinary demands for redemption. Experience has taught that all such obligations due on demand will not be presented simultaneously. The Treasury notes of 1890, popularly known as "Sherman notes," were issued in payment for silver bullion bought between 1890 and 1893. They are full legal tender and are redeemable in gold like the United States notes. They are gradually being retired in exchange for silver certificates based on silver dollars coined from the bullion purchased by the notes when first issued.

Banking currency is represented in our circulation by the national-bank notes. These are receivable at par by all national banks and by the government in payment of all dues except customs duties, and are payable for all debts owing by the United States except interest on the public debt and in redemption of United States or Treasury notes, for they rest, not on the credit of the issuing banks, but on government bonds, and their redemption is guaranteed by the government. Viewed in this light, they appear as a form of government paper currency. By Act of Dec. 23, 1913, provision is made for the gradual retirement of the bond-secured banking currency through the conversion of the 2 per cent bonds into 3 per cent bonds without the circulation privilege. A new form of currency, issued through the regional reserve banks, is authorized by the law. This currency is based upon commercial paper deposited with a Federal reserve agent, equal to the notes in face value. As additional security the regional reserve bank is required to hold a reserve of 40 per cent in gold against such notes. The notes are a prior claim on the assets of the bank and are further guaranteed by the government, which redeems them at par at the Treasury. The word "currency" is often used to include such credit instruments as checks and drafts and is usually then designated "deposit currency." Consult: Sumner, *A History of American Currency* (New York, 1878); Bullock, *Lectures on the Monetary History of the United States* (ib., 1900); Hepburn, *History of Coinage and Currency in the United States* (ib., 1903); Academy of Political Science, *The Reform of the Currency* (ib., 1911); Dodd, *History of Money in the British Empire and the United States* (London, 1911). See BANK, BANKING; COINAGE; GREENBACKS; TREASURY NOTE; MONEY.

CUR'RENT, ELECTRIC. See ELECTRICITY.

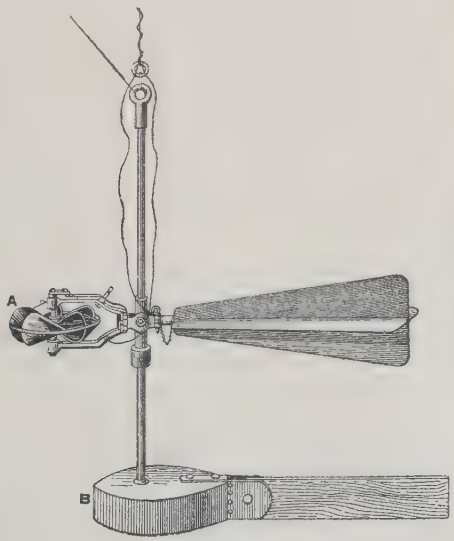
CURRENT METER. An instrument for measuring the velocity of flowing water, as in streams, canals, rivers, etc., consisting of a wheel revolving under the influence of the pressure of the flowing water in connection with an indicating or recording device. Such an apparatus was the float wheel of Borda and Dupuit for measuring velocities at the surface; the first real current meter for use beneath the surface was invented in the year 1790 by Woltmann, the German hydraulic engineer, and later improved by Darcy and others, until finally it reached the present form shown in the sketch.

The current meter used by the United States Geological Survey, which may vary more or less in its detail, consists essentially of a vertical metal rod, to the bottom of which is securely attached a heavy lead weight *B* with a tail which insures the apparatus being maintained in a vertical position and directed upstream. Above the weight and on the rod is the device *A*, consisting of a wheel with cup-shaped vanes and a four-bladed rudder to keep the wheel facing against the current.

The flow of water causes the wheel to revolve, and from the known relation between the number of revolutions and velocity, the velocity of the stream in feet per second may be determined.

By means of an electrical apparatus attached by wires to the spindle these revolutions are recorded as such upon an instrument which may be held either on shore or in the boat from which the work is being done.

To determine the relation between revolutions and the velocity in feet per second, it becomes necessary to rate the meter, and this should be



PRICE CURRENT METER.

done for each meter. This is done by passing the apparatus through a body of still water at uniform speeds varying from 0.2 foot per second to 10 feet per second, and noting the number of revolutions indicated on the dial corresponding to the different speeds. From these observations a rating table is platted, or a curve, to show the velocity of flow in feet per second corresponding to any number of revolutions. It is found, however, that this relation changes after use, so that it is absolutely essential to rerate the meter at definite periods if accurate results are desired. For this purpose the United States Geological Survey maintains stations at Washington, D. C., Denver, Colo., and Los Angeles, Cal., consisting of a track on which runs a car from which the meter is suspended.

The current meter is perhaps more extensively used and gives more precise results than any other apparatus for determining the velocity of flowing water in streams of average size and under normal conditions.

The object of all measurements of rivers is to determine the quantity of water flowing through a given section in a given time, but, as this depends upon the velocity, it is necessary to measure that. Where the quantity or discharge is small, the more accurate ways of measuring are by orifices or weirs, i.e., up to a discharge of 200 cubic feet per second, but beyond this, either floats or the current meter must be employed. Outside of the first cost the latter is always the more preferable.

The method applied by the current meter in determining the discharge of a stream, which depends upon the mean velocity, is as follows: To get the mean velocity of flow in any vertical, it is assumed that this is represented on the meter by the total number of indicated revolutions divided by the time, when the meter has been uniformly lowered from the surface to the bottom and raised again from the bottom to the surface. Several such readings being taken at various points in a plane at right angles to the axis of the stream, and a mean computed, will give the mean velocity at that section, whose area is computed from soundings. This mean velocity multiplied by the area of the section gives the discharge. By the direction meter invented by Ritchie and Haskell the observer is enabled to determine simultaneously on recording dials the direction and velocity of any current. In addition to the current meter may be mentioned those of Fteley and Ellis. The use of the current meter, as well as its construction, is fully discussed in the following references: Hoyt and Grover, *River Discharge* (2d ed., New York, 1912); Hoyt, "Use and Care of the Current Meter, as Practiced by the United States Geological Survey," *Transactions American Society of Civil Engineers*, vol. lxvi, p. 70. (ib., 1910); Murphy, *Hydrographic Manual United States Geological Survey* (Washington, 1904), and other Water-supply and Irrigation papers of United States Geological Survey.

CURRENT RIVER. A stream less than 250 miles in length, rising among the foothills on the east slope of the Ozark Mountains, in Texas Co., southern Missouri. It flows southeast, then south, crossing into Arkansas, where it joins the Black River in Randolph County (Map: Arkansas, E 1).

CURRENTS. See OCEAN CURRENTS; TIDES.

CURRIC'ULUM (Lat. *curriculum*, a running, a course, from *currere*, to run). The term applied to a course of study, or collectively to that of any type of educational institutions, as the college curriculum, the high-school curriculum, the common-school curriculum, etc. The historical basis of the modern educational curriculum is found in the Seven Liberal Arts of the Middle Ages, the development of which from Greek philosophical speculation and edu-

cational practices is traced under the title of ARTS, SEVEN LIBERAL. As long as the idea of the symbolical perfection of this organization of studies and of human knowledge prevailed, there was no modification of the form of the curriculum, though the content of these terms was modified from time to time. All lower education was included in the subject of the *trivium*, i.e., grammar, rhetoric, and dialectic, which represented so many approaches to the Latin language. This was based, it is true, on the work of the "singing" school, which furnished to the child the school arts (reading and writing), with a modicum of arithmetic. The curriculum of higher education included the subjects of the *quadrivium*, i.e., arithmetic, geometry (mathematics and geography), astronomy (natural sciences), and music (æsthetic, etc.). The elaboration of the curriculum under the influences of the early universities and of the Renaissance consisted chiefly in the addition of the subjects of medicine and law, both common and civil, and in the change in the content of the subjects of the quadrivium. These changes can be followed in the successive papal rules and university regulations which prescribed the books that should be read in the several subjects. From the time of the Renaissance to the close of the eighteenth century there was no modification in the organization of the educational curriculum and little in the content. From that time, however, the changes have been numerous and radical, and the old idea of the historical and logical perfection of the traditional curriculum has largely disappeared. In the United States, where conditions permitted these changes with less opposition than in the more conservative societies, very extensive changes have occurred, and an almost chaotic condition has ensued. These changes have consisted primarily in the addition of new subjects to each of the stages of the curriculum, due to the great development of knowledge, especially scientific, during the nineteenth century. The curriculum of the elementary school has expanded in content from the three fundamental school arts until it now embraces from 12 to 15 subjects in half that many spheres of intellectual interests, and in time, from three or four years to eight and nine; the secondary curriculum has undergone no expansion in time, perhaps a diminution, owing to the encroachment of both the lower and the higher curricula, but has added so great a number of subjects that it deals in a preliminary way with almost all those included within the curriculum of college and university. This multiplication of subjects, with no corresponding increase in time and with but little improvement in methods of teaching, has made the problem of the curriculum of the secondary school peculiarly difficult, and that part of our educational system is most in need of reform.

The problem of the curriculum in each of its stages is twofold—that of content and that of organization. This twofold problem is now and long has been the chief topic of educational discussions in the United States. It cannot be said that any solution has been offered, but a statement of the case will be found in the article PEDAGOGY. (See also ELECTIVE STUDIES.) The matter has received extended study by American educators and has formed the subject of two important reports by committees appointed by the National Education Association. The first of these, issued in 1892, is known as the *Report of the Committee of Ten* and relates chiefly to secondary education; the second, known as the *Report of the Committee of Fifteen*, relates chiefly to the elementary school and was issued in 1895. Consult, also: *Reports of the National Education Association* (Washington, 1865 et seq.); *Proceedings of the National Education Association;* Payne, *Public Elementary School Curriculum* (Boston, 1905); Henderson, *Textbook in the Principles of Education* (New York, 1910); Ruediger, *Principles of Education* (Boston, 1910); Cubberley, *Changing Conceptions of Education* (Boston, 1909).

CUR'RIE, JAMES (1756–1805). A Scottish physician. He was born at Kirkpatrick Fleming, Dumfriesshire, held a mercantile position at Cabin Point, Va., from 1771 to 1776, and graduated at Glasgow University in 1780. He settled in Liverpool, where he obtained a considerable practice as a physician, and published *Reports on the Effects of Water in Fever and Febrile Diseases* (1797; 4th ed., 1805). He is best known, perhaps, for his (the first) edition of Burns (1800; 7th ed., 1813), prefaced by a *Life* which was long the basis for studies of the poet. Consult the *Memoir* by his son, W. W. Currie (London, 1831).

CUR'RY, JABEZ LAMAR MONROE (1825–1903). An American lawyer, educator, and clergyman. He was born in Lincoln Co., Ga., but removed to Alabama in 1838, where he was admitted to the bar in 1845, having graduated at the Harvard Law School in this year. He served in the Alabama Legislature from 1847 to 1855 and in Congress from 1857 to 1861 and then became a member of the Confederate Congress. After the war he became a Baptist minister, was president of Howard College, Ala., from 1866 to 1868, and was professor of law at Richmond College from 1868 to 1881. From 1881 to 1885 he was general agent of the Peabody Educational Fund, from 1885 to 1888 was United States Minister to Spain, and subsequently was chairman of the educational committee of the John F. Slater Fund. His publications include: *Constitutional Government in Spain* (1889); *William Ewart Gladstone* (1891); *The Southern States of the American Union* (1894); *Difficulties, Complications, and Limitations Connected with the Education of the Negro* (1895); *Civil History of the Government of the Confederate States, with some Personal Reminiscences* (1901).

CURRY NORMAL AND INDUSTRIAL INSTITUTE. An institution for the training of colored youths, founded in 1889 at Urbana, Ohio, by E. W. B. Curry. The institute includes a Bible school and normal, literary, commercial, music, and industrial departments. The institute extension work is conducted through a race conference and a social settlement. Since the foundation of the institute over 2000 students have been assisted in obtaining an education. These students have been instructed chiefly along industrial lines. In 1912–13 there were 10 officers and instructors in the faculty. There is one combination building used for chapel, recitation rooms, trade schools, and dormitories. There are also cottages for boys' and teachers' dormitories. The real estate and equipment are valued at $50,000 and the annual income to about $7000. In 1913 the institute received a gift of $2000 from Martha Fouse, a former slave. This is to be used as the founda-

tion of an endowment. The institute depends for its support upon gifts from the general public. The library contains about 5000 volumes. The president from its foundation has been Dr. E. W. B. Curry.

CURRY POWDER and **CURRY PASTE** (Kanarese *kari, kadi,* Malayalam *kari,* curry). A compound condiment added to cooked dishes of meat and rice to render them piquant and appetizing. So generally is curry powder employed in East Indian cookery that it has been called the "salt of the Orient." The substances that commonly form the basis of these powders are turmeric, fenugreek, and sago. To these ginger, black and Cayenne pepper, coriander, caraway, and many other spices are added in varying quantities, or omitted, according to the locality. Such curry powders as contain the pulverized leaves of *Murraya kœnigia* (an East Indian tree of the natural order Rutaceæ) are used not only as aromatic stomachic stimulants, but as remedies for dyspepsia, diarrhœa, and even dysentery. The basis of many curry pastes is tamarind (q.v.).

CURSCHMANN, kụrsh'mȧn, HEINRICH (1846–). A German physician, born at Giessen. He studied at the university there, became a lecturer at the University of Berlin in 1875, and in 1876 was appointed head physician of the hospital connected with the city barracks of Berlin. In 1879 he obtained the post of director of the general hospital at Hamburg, and in 1888 was called to the chair of special pathology and therapy in the University of Leipzig. He became recognized as a prominent authority on hospital administration, and from 1886 to 1892 was an associate editor of the *Fortschritte der Medizin.* His publications include: *Entwicklung der Krankenpflege und des klinischen Unterrichts* (1889); *Klinische Abbildungen* (1894); *Hungersnöte im Mittelalter* (1900); *Typhoid Fever and Typhus Fever* (trans., by Alfred Stengel, 1901); *Die Aeltern Papsturkunden des Erzbistums Hamburg* (1909).

CURSCHMANN, KARL FRIEDRICH (1805–41). A German musician, born in Berlin. He studied law at first, then music under Hauptmann and Spohr at Kassel. He became known in Berlin as a singer, made tours in Germany, France, and Italy, and was an exceedingly popular song writer. His works consist of "Romeo," a scena and aria; "Abdul and Erinnieh," a one-act opera (1828); and his *Gesammelte Lieder,* comprising 92 selections, published in Berlin in 1871.

CURSE OF KEHAMA, kē-hä'mȧ, THE. A poem by Robert Southey (1810), relating to the adventures of an Indian rajah who is cursed with supernatural powers.

CURSE OF SCOTLAND, THE. In cards, a term applied to the nine of diamonds. Its origin is unknown. Among the many explanations offered are the following: 1. The nine of diamonds is the "pope" in the game of Pope Joan, and hence the symbol of Antichrist to the Reformers. 2. It is the chief card in comette, which game ruined many families in Scotland. 3. It goes back to the nine lozenges on the Dalrymple arms, the Earl of Stair having been responsible for the massacre of Glencoe. 4. Tradition says that the Duke of Cumberland, while drunk and gambling on the night before the battle of Culloden, wrote across the face of this card the order that no quarter was to be given on the morrow.

CUR'SIVE WRITING. See PALEOGRAPHY.

CURSOR, LUCIUS PAPIRIUS. See PAPIRIUS.

CUR'SOR MUN'DI (Lat., courier of the world, but intended to mean the course of the world, *cursus mundi*). A poem dating from the beginning of the fourteenth century, professing to be a history of the world from its creation to its destruction. It was based on the paraphrase of Genesis by Cædmon. It is among the works printed by the Early English Text Society.

CUR'TAIN. A term used in fortification. See BASTION; FORTIFICATION.

CURTAIN, THE. An old theatre in London at Shoreditch, called also the "Greene Curtain," mentioned in 1577 and probably established about that year. The name was probably given from its green curtain, used for the first time in this theatre.

CUR'TAL FRI'AR. A term used by Sir Walter Scott in *Ivanhoe* to denote an irregular clerk or "hedge priest," and applied by him to Friar Tuck of Copmanhurst. The phrase seems to denote a monk with his gown or frock shortened (curtailed) for convenience of moving about. Consult *Ivanhoe,* chap. xxxii, and "Robin Hood and the Curtall Friar," in Child's *Ballads,* v, 273.

CURTA'NA (Neo-Lat., from Lat. *curtus,* short). 1. The name given to the sword of Ogier the Dane. 2. The sword of Roland, the point of which had been broken off in trying it. 3. A pointless sword, also known as "the sword of Edward the Confessor," carried before English kings at coronation and symbolizing mercy.

CUR'TESY (OF. *curteisie, cortoisie,* Fr. *courtoisie,* courtesy, from OF. *curteis, cortois,* Fr. *courtois,* courteous, from ML. *cortis,* court, from Lat. *cors, cohors,* place inclosed; connected with Gk. χόρτος, *chortos,* garden, OIr. *gort,* sedge, Goth. *gards,* Icel. *garþr,* house, OHG. *gart,* circle, Ger. *Garten,* AS. *geard,* Eng. *yard*). In law, the life interest which the surviving husband has in the inheritable estate of the wife. The origin of the estate is involved in obscurity. Both in England and Scotland this customary right is regarded as a national peculiarity—in England, being known as the curtesy of England, and in Scotland as the curtesy of Scotland—whereas there is reason to believe that it had found a place, with all the peculiarities which now belong to it, in the *coutume* of Normandy, whence it was transferred to England (Barnage, vol. ii, p. 60; Stephen's *Commentary,* vol. i, p. 264; Fraser's *Domestic Relations,* vol. i, p. 635). The four circumstances which are requisite to make a tenancy by curtesy in England are lawful marriage, actual seisin of the wife, birth of living issue, and the wife's death. It is not necessary, however, that the child survive; it is enough that it was once in existence, although it may have died immediately after its birth. Not only must the estate of the wife be one of inheritance, i.e., a fee simple or a fee tail, in order that the husband shall be entitled to curtesy therein, but the child born must have been one capable of inheriting the estate in question. Thus, if the estate were entailed on male issue, and a daughter were born, the husband's inchoate estate of curtesy would not become vested, or "initiate," as the phrase was. As soon as the estate becomes vested in the husband by the birth of appropriate issue, he may alienate his life interest in it, subject of course to the wife's rights

therein during her life. If she die first, the estate, notwithstanding the conveyance, is defeated. Originally curtesy attached, as dower still does in most of the United States, to all estates of inheritance of which the wife was seised at any time during the marriage. But it is now generally, though not invariably, limited to such lands as she is seised of at her death; and she may therefore, in most States, by alienating the land during her lifetime or by last will and testament, defeat her husband's claims as tenant by the curtesy. See Blackstone, *Commentaries on the Laws of England;* Pollock and Maitland, *History of English Law* (Boston, 1899); Tiffany, *Law of Real Property.*

CUR'TILAGE (OF. *cortillage, curtillage, curtilage, courtillage,* from *courtil, cortil, curtil,* courtyard, from Lat. *cors, cohors,* inclosed place). The inclosed space of ground and buildings immediately surrounding or lying near a dwelling and used for its convenient occupation. The term is of feudal origin and originally meant a castle and outbuildings inclosed in a stone wall for defense. There is no exact limit to the area which may be included under the term, and it is a matter of proof in each case as to what is set apart for the use of any particular dwelling. The law has always given the curtilage greater protection than outside property, and this idea prevails to-day, as in most jurisdictions breaking and entering curtilage is burglary, and setting fire to any building in it constitutes arson. See ARSON; BURGLARY; REAL PROPERTY; and consult the authorities there referred to.

CUR'TIN, ANDREW GREGG (1815–94). An American politician, known as the "war Governor" of Pennsylvania. He was born in Bellefonte, Pa., studied law in Dickinson College, was admitted to the bar in 1839, and soon was recognized as a leading Republican in State politics. He was appointed Secretary of State for Pennsylvania in 1854 and from 1860 to 1866 served as Governor of the State. From 1869 to 1872 he was Minister to Russia; after his return he joined the Liberal Republican revolt, and later he served as a Democratic member of Congress from 1881 to 1887. During the Civil War he was always prompt in his response to President Lincoln's calls for troops, and by his minute care for the persons and families of the Pennsylvania soldiers won their esteem and became widely known as "the soldier's friend." Consult W. H. Egle, *Life and Times of Andrew Gregg Curtin* (Philadelphia, 1896).

CURTIN, JEREMIAH (1840–1906). An American linguist and translator, born in Milwaukee, Wis. He prepared for Harvard and by his own efforts graduated there in 1863, as an excellent linguist. In the following year he went to Russia, where he remained until 1870 as Secretary of Legation for the United States at St. Petersburg. While serving in this capacity he made a careful study of the languages of the Slavic group, and it was the knowledge thus acquired which enabled him to make his translations of works by Sienkiewicz, Zagoskin, and Alexei Tolstoy. From 1883 to 1891 he was connected with the Bureau of Ethnology of the Smithsonian Institution and after that time made independent researches in matters pertaining to the North American Indians. Curtin was familiar with more than 60 languages. Besides his translations, he also wrote: *Myths and Folktales of the Russian Western Slavs and Magyars* (1890); *Hero-Tales of Ireland* (1894); *Creation Myths of Primitive America* (1898); *Myths and Folklore of Ireland* (1906); *The Mongols* (1907); *The Mongols in Russia* (1908); *A Journey in Southern Russia* (1909); *Myths of the Modocs* (1912).

CUR'TIS, BENJAMIN ROBBINS (1809–74). A distinguished American jurist, born in Watertown, Mass. He graduated at Harvard in 1829, was admitted to the Massachusetts bar in 1832, and soon became one of the foremost lawyers of the State. In 1851 he was appointed by President Fillmore to the United States Supreme Court, and in 1857 he dissented, in a powerful argument, from the opinion of the majority in the Dred Scott decision (q.v.). In the same year he resigned and resumed his practice in Boston. During the celebrated impeachment trial of 1868 he was one of President Johnson's counsel. He published several valuable collections of law reports, including *Reports of Cases in the Circuit Courts of the United States* (2 vols., 1854); *Decisions of the Supreme Court of the United States* (22 vols.); and *Digest of the Opinions of the Supreme Court of the United States to 1854.* Consult *Memoirs and Writings of Benjamin R. Curtis* (Boston, 1880), the first volume of which is a memoir by his brother, George Ticknor Curtis (q.v.).

CURTIS, CARLTON CLARENCE (1864–). An American botanist, born at Syracuse, N. Y. He was educated at Syracuse and Columbia universities and also studied at the universities of Cambridge and Leipzig. In 1892–94 he was principal of the Fayette Union School (New York City), in 1894–96 instructor in natural science at the Brooklyn Polytechnic Institute, from 1898 to 1908 tutor in botany at Columbia, and thereafter associate professor. Besides his contributions to botanical journals, he is author of *Text-Book of General Botany* (1897) and *Nature and Development of Plants* (1907; 2d ed., 1910).

CURTIS, CHARLES (1860–). An American legislator, born in Topeka, Kans. His mother was a full-blooded member of the Kaw tribe of Indians. He was educated in the common schools, and after studying law was admitted to the bar in 1881. In 1884 and again in 1886 he was county attorney of Shawnee County. From 1893 to 1897 he served in Congress from the Fourth Kansas District and from 1897 to 1907 represented the First District of the State. He resigned from the House of Representatives in 1907 upon his election to the United States Senate to fill the unexpired term of J. R. Burton, resigned, and was the first Indian to hold such office. He was a candidate for reëlection in 1912, but a Democratic Legislature in 1913 brought about his defeat.

CURTIS, CYRUS HERMANN KOTZSCHMAR (1850–). An American publisher, born in Portland, Me. He was educated in the public schools and in 1876 removed to Philadelphia, where he became publisher of the *Tribune and Farmer.* He later established the *Ladies' Home Journal* and made it one of the most successful periodicals in the United States. The Curtis Publishing Company, of which he became head, published, in addition to the *Ladies' Home Journal,* the *Country Gentleman* and the *Saturday Evening Post,* the latter established by Benjamin Franklin in 1728. Under Mr. Curtis's management the *Saturday Evening Post*

attained a larger circulation than had hitherto been reached by any American periodical. In 1913 he took over the interest of A. S. Ochs in the Philadelphia *Public Ledger*.

CURTIS, Edward S. (1868–). An American author and photographer, born in Madison, Wis., and educated in the public schools of Minnesota. In 1891 he settled in Seattle as a professional photographer. He was official photographer for the Harriman Alaska expedition; and in 1907–11 published the *North American Indian*, edited by F. W. Hodge, with remarkably valuable photographs which he had taken in "field research under the patronage of J. Pierpont Morgan."

CURTIS, George Carroll (1872–). An American geographic sculptor, born at Abington, Mass. He was educated at Harvard University, where he was for a time an assistant in the geological department. Later he became assistant field geologist of the United States Geological Survey. He was the first to apply aërial perspective to topographical models; this he did in models of Boston and vicinity, and of the city of Washington as it existed and as it would appear if a proposed development were carried out. A member of the expedition to the West Indian eruptions, he was the first to visit the crater of La Soufrière and discovered the new summit of Mount Pelée. He also spent a year among the coral islands of the South Pacific and in 1910–11 made a special study of the Atlantic coast from Maine to Newfoundland. Besides his special geological and topographical articles, he is author and illustrator of *A Description of the Topographical Model of Metropolitan Boston* (1900).

CURTIS, George Ticknor (1812–94). An American jurist and writer on the constitutional history of the United States. He was born in Watertown, Mass., graduated at Harvard in 1832, was admitted to the bar in 1836, and began the practice of the law in Worcester, Mass. In the following year he removed to Boston, where he continued with short intermissions to practice law until 1862, and from this time until his death he practiced in New York City and before the United States Supreme Court in Washington, D. C. While in Boston he acted for many years as United States Commissioner, and in this capacity, though his sympathies were strongly against the institution of slavery and the rendition of the fugitive slaves, he ordered the return of the escaped slave, Thomas Sims (q.v.), to his master in accordance with the Fugitive Slave Law in 1852 and for so acting was denounced by the Abolitionists throughout the country. Among the cases in which he appeared as counsel are the Dred Scott case, the legal-tender cases, the Colt revolver suits, and the sewing-machine cases. He was popular as a public speaker and delivered many able addresses dealing for the most part with legal or political subjects. He will best be remembered as a writer, and especially as the author of the *Constitutional History of the United States from their Declaration of Independence to the Close of their Civil War* (2 vols., 1896), a part of which was first published in 1854 as *The History of the Origin, Formation, and Adoption of the Constitution of the United States;* and of the *Life of Daniel Webster* (2 vols., 1870), and the *Life of James Buchanan* (2 vols., 1883). He also published, besides numerous magazine articles: *Digest of the English and American Admiralty Decisions* (1839); *Rights and Duties of Merchant Seamen* (1841); *American Conveyancer* (1846); *Law of Patents* (1849); *Equity Precedents* (1850); *Commentaries on the Jurisprudence, Practice, and Peculiar Jurisdiction of the Courts of the United States* (1854–58); *Memoir of Benjamin R. Curtis* (1880); *International Arbitrations and Awards* (1885); *Creation or Evolution: A Philosophical Inquiry* (1887); and a novel entitled *John Charaxes: A Tale of the Civil War in America* (1889).

CURTIS, George William (1824–92). An American critic, essayist, and publicist, born in Providence, R. I., Feb. 24, 1824. After a few years at school he began life as a clerk in New York, joined the Brook Farm Community at West Roxbury, Mass., in 1842, went thence, after 18 months, to Concord, Mass., and afterward spent some years in Italy, Germany, and the Orient. Returning to America in 1850, he became well known through his books of travel and his editorship of *Putnam's Monthly*. In *Harper's Monthly* he published a series of papers called *The Editor's Easy Chair*, from 1853 onward, which increased his reputation. He was popular also as an antislavery orator and lecturer, was long the chief editor of *Harper's Weekly*, took an active part as Republican (till 1884) in politics, and after 1871 in the agitation for civil-service reform. He declined offers of diplomatic service abroad. Shortly before his death, which occurred at West New Brighton, S. I., Aug. 31, 1892, he became chancellor of the University of New York. He was the master of an attractive style, and his books of travel and light essays paved the way for the more important services rendered by his polished lectures and orations and by his single-hearted, patriotic labors in behalf of a pure civil service. His strictly literary reputation seems hardly so well assured as it did a few years since, but the man and orator are still remembered with pleasure and gratitude. His youthful years spent at Brook Farm are charmingly set forth in his letters exchanged with John S. Dwight, which have been published in a volume (1898). His most important publications are: *Nile Notes of a Howadji* (1851); *The Howadji in Syria* (1852); *Lotus Eating* (1852); *The Potiphar Papers* (1853), a satire on New York social life; *Prue and I* (1856), generally thought the best of his early books; *Trumps: A Novel* (1861); *Eulogy on Wendell Phillips* (1884); three series of essays from the "Easy Chair" (1892, 1893, 1894, etc.). He edited the *Correspondence* of Motley in 1889 (2 vols.). Charles Eliot Norton edited his *Orations and Addresses* in 1893–94 (3 vols.). Edward Cary wrote his biography for the *American Men of Letters Series* (Boston, 1894).

CURTIS, Henry (1866–). A British surgeon, educated at University College Hospital, London, and in Paris, Berlin, and Vienna. He had charge of the bacteriological department of University College Hospital in 1896–97 and was surgical registrar in 1898–1900. In 1900–03 he was surgeon to the Queen's Hospital for Children and assistant surgeon to the Royal Waterloo Hospital for Children and Women, and in 1904–06 he was resident surgeon of Bulawayo Hospital and director of the Pasteur Institute for Rhodesia. Later he became surgeon to the Metropolitan Hospital, senior assist-

ant surgeon to the Seamen's Hospital Society, and instructor in operative surgery at the London School of Clinical Medicine. In 1912–13 he was president of the Æsculapian Society. His clinical lectures on surgery and abscesses have been published.

CURTIS, JOHN GREEN (1844–). An American physiologist, born in New York City. He graduated from Harvard University in 1866 and received his medical training at the College of Physicians and Surgeons (Columbia University), New York. At Bellevue Hospital he was an assistant in 1869, house surgeon in 1870–76, attending surgeon in 1876–80. In the College of Physicians and Surgeons he was assistant and demonstrator in anatomy in 1870–75, adjunct lecturer in 1875–76, and adjunct professor of physiology in 1876–83; he became professor of physiology in 1883 and emeritus professor in 1909. Besides contributions to medical journals, he is author of *American Text-Book of Physiology* (1896).

CURTIS, OLIN ALFRED (1850–1918). An American theologian, born at Frankfort, Me., and educated at Lawrence College and Boston University, and at the universities of Leipzig, Erlangen, Marburg, and Edinburgh. He served as pastor of Methodist Episcopal churches in Janesville, Wis. (1880–83), Milwaukee (1883–86), and Chicago (1888–89), from 1889 to 1895 was professor of systematic theology at Boston University, and in 1896 accepted the corresponding chair at Drew Theological Seminary. Professor Curtis came to be recognized as perhaps the most distinguished Methodist theologian of his generation. Besides many theological papers, his publications include: *Elective Course of Lectures in Systematic Theology* (1901), and *The Christian Faith Personally Given in a System of Doctrine* (1905), a work of great importance.

CURTIS, SAMUEL RYAN (1807–66). An American soldier. He was born near Champlain, N. Y., but when very young removed to Ohio. In 1831 he graduated at West Point and in the following year resigned from the service to become a civil engineer. He afterward studied law, was admitted to the bar, and practiced from 1843 to 1845. In the Mexican War he served as a colonel of volunteers and from 1847 to 1848 was Governor of Saltillo. He was then successively an engineer and a lawyer in the West and for two terms and a part of the third was a member of Congress from Iowa (1857–61). He became a brigadier general of volunteers in 1861, commanded the southwestern district of Missouri from December, 1861, to February, 1862, and the Army of the Southwest from February to August, 1862, and on March 7–8, 1862, defeated the Confederate general Van Dorn in the battle of Pea Ridge (q.v.). Soon afterward he was raised to the rank of major general and subsequently commanded the departments of Missouri (1862–63), of Kansas (1864–65), and of the Northwest (1865), and in 1865, as United States Commissioner, negotiated treaties with several Indian tribes.

CURTIS, WILLIAM (1746–99). An English botanist, born at Alton, Hampshire. He studied botany, pharmaceutics, and entomology, established botanic gardens at Lambeth Marsh and at Brompton, and published a number of works on subjects of natural history. His writings include: *Flora Londinensis* (1777–87; the same work, edited by Graves and Hooker, was republished in 5 vols. in 1817–28); *British Grasses* (1790 and several later editions); and *Lectures on Botany* (3 vols., 1803–04; 2d ed., 1807). In 1781 he established, and for many years thereafter edited, the *Botanical Magazine.*

CURTIS, WILLIAM ELEROY (1850–1911). An American journalist, born in Akron, Ohio, and graduated at Western Reserve University in 1871. From 1873 to 1887 he was on the staff of the Chicago *Inter-Ocean,* and by securing interviews with the James brothers during their contest with Pinkerton's detectives, and in investigating the Ku-Klux Klan of the South, gained a national reputation. He was Washington correspondent of the Chicago *Record* in 1887–1901, when he became associated with the Chicago *Record-Herald.* He was a commissioner of the United States to the Central and South American republics in 1885, was the executive officer of the International American Conference of 1889–90, and was director of the Bureau of American Republics from 1890 to 1893. He wrote: *The Life of Zachariah Chandler* (1879); *Capitals of Spanish America* (1888); *The Land of the Nihilist* (1887); *The United States and Foreign Powers* (1892; 2d ed., 1899); *The Yankees of the East* (1896); *Between the Andes and the Ocean* (1900); *The True Thomas Jefferson* (1901); *Denmark, Sweden, and Norway* (1902); *The Turk and his Lost Provinces* (1902); *The True Abraham Lincoln* (1903); *To-Day in Syria and Palestine* (1904); *Modern India* (1905); *Egypt, Burma, and British Malaysia* (1905).

CURTISS, GLENN HAMMOND (1878–). An American aviator, born at Hammondsport, N. Y. He began life as a newsboy, but was early interested in mechanics. In 1906 at Ormond Beach, Fla., he established the world's record for the fastest mile ever traveled on a motor cycle, making a mile in 26⅖ seconds. From 1907 to 1909 he was the director of the Aërial Experiment Association of America. He won the *Scientific American* cup in an aëroplane competition at Hammondsport, N. Y. (1908), obtained the international cup in the aëroplane contest at Rheims (1909), and won a $10,000 prize offered by the New York *World* in a record-breaking flight from Albany to New York (1910). In 1913 he was awarded a medal by the Smithsonian Institution. Besides making a large number of flights in America and in Europe, Curtiss became actively engaged in the commercial side of aviation, being secretary and treasurer of the Curtiss Exhibition Company of New York and president of the Curtiss Aëroplane Company at Hammondsport, N. Y. With the exception of the Wright brothers, none other has done so much as he for aviation in America. He is part author of *The Curtiss Aviation Book* (1912). See AËROPLANE and AËRONAUTICS.

CURTISS, SAMUEL IVES (1844–1904). An American biblical scholar, born at Union, Conn. He was educated at Amherst College, at Union Theological Seminary, and at the universities of Leipzig and Berlin. From 1874 to 1878 he was pastor of the American Chapel at Leipzig, Germany, and then was professor of biblical literature and, after 1879, of Old Testament literature and interpretation at the Chicago Congregational Theological Seminary. In addition to several translations of important works from the German, especially by Delitzsch, his writings include: *A Plea for a More Thorough*

Study of the Semitic Languages in America (1879); *Moses and Ingersoll* (1881); "Ezekiel and his Times," in *The Bible as Literature* (1876), and *Primitive Semitic Religions To-Day* (1902), his special study.

CURTIUS, kụr'tsê-ụs, ERNST (1814–96). A distinguished German archæologist and historian, born at Lübeck. He studied at the universities of Bonn, Göttingen, and Berlin, traveled in Greece and Italy, and in 1844 was appointed a professor at Berlin and preceptor of the Crown Prince Frederick William, afterward Frederick III. From 1856 to 1863 he was professor of classical archæology and philology at Göttingen, whence he returned to Berlin as professor of ancient history. From 1853 Curtius was a member of the Royal Academy of Sciences, from 1871 to 1893 he was continuously secretary of the philologico-historical section of that institution. Under Imperial commission in 1874 he negotiated with the Greek government in regard to the German excavations at Olympia (q.v.), begun by him in the following year. With Schöne he edited the *Archäologische Zeitung,* to which he made many important contributions. He must be reckoned among the great scholars of modern Germany, a thinker of imperious influence alike in his academic instruction and in his published works. These latter include: *Peloponnesos* (2 vols., 1851–52), a study of the Greek peninsula with special reference to its mythology, history, and monuments of art; *Griechische Geschichte* (3 vols., 1857–67; 6th ed., 1889), in which he endeavored to present in popular form the results of expert research; *Attische Studien* (1863–64); *Die Stadtgeschichte von Athen* (1891); three volumes of collected lectures and addresses, entitled *Altertum und Gegenwart; Gesammelte Abhandlungen* (1894). Consult: Gurlitt, *Erinnerungen an Ernst Curtius* (Berlin, 1902); Grimm, "Ernst Curtius: Ein Brief an seine Freunde," in the *Deutsche Rundschau,* vol. lxxxviii (Berlin, 1896); and F. Curtius, *Ernst Curtius: Ein Lebensbild in Briefen* (Berlin, 1903); Sandys, *A History of Classical Scholarship,* vol. iii (Cambridge, 1908).

CURTIUS, GEORG (1820–85). An eminent German comparative philologist. He was the brother of Ernst Curtius and was born at Lübeck. He studied at the universities of Bonn and Berlin, in 1849 became professor extraordinarius, and in 1851 full professor of philology in Prague. In 1854 he was called to Kiel and in 1862 to Leipzig, where he remained. Curtius was the teacher of many of the most eminent comparative philologists of the present day. His most important works are his *Sprachvergleichung in ihrem Verhältniss zur klassischen Philologie* (1845); *Sprachvergleichende Beiträge zur griechischen und lateinischen Grammatik* (1846); *Griechische Schulgrammatik* (1852; over 20 eds. since); *Grundzüge der griechischen Etymologie* (5th ed., 1879); *Das Verbum der griechischen Sprache* (2d ed., 1877–80). In his *Studien zur griechischen und lateinischen Grammatik* (1868–78) he published not only his own studies, but those of his pupils and others. In 1878, with Lange, Lipsius, and Ribbeck, he founded the *Leipziger Studien zur klassischen Philologie.* Several of his works were translated into English and stimulated interest in Greek grammar and comparative philology. Consult Sandys, *A History of Classical Scholarship,* vol. iii (Cambridge, 1908), and Platner, *The Topography and Monuments of Ancient Rome* (2d ed., Boston, 1911).

CURTIUS, kûr'shĭ-ŭs, METTUS. In Roman legend, the leader of the Sabines who occupied the Capitoline Hill, in the battle with the Romans of the Palatine, during the reign of Romulus. To escape death he plunged with his horse into a morass, on ground afterward occupied by the Forum, from which he extricated himself with difficulty; the morass was thenceforth called *Lacus Curtius.* For the so-called Lacus Curtius in the Forum, consult Hülsen-Carter, *The Roman Forum* (Rome, 1906).

CURTIUS, QUINTUS (QUINTUS CURTIUS RUFUS). A Roman historian, commonly supposed to have flourished in the time of Claudius. He was the author of the interesting work *Historiæ Alexandri Magni,* in 10 books, of which the first two have been lost, and the rest are incomplete. Curtius had a very inaccurate knowledge of geography, chronology, military tactics, astronomy, and historic criticism; hence his work is far from being reliable as a whole. The style, though declamatory, is in general pure and elegant. Modern editions are by Vogel (Leipzig, 1884); Dosson (Paris, 1887); Hedicke (1908). There is a translation into English by Crosby (New York and London, 1858). Consult S. Dosson, *Etude sur Quinte-Curce, sa vie et ses œuvres* (1887). For a fresh presentation of the view that Curtius should be assigned to a much later date, consult Steele, *Proceedings of the American Philological Association,* vol. xliii, li–liv (1912), and the Introduction to the English edition by Heitland and Raven (Cambridge, 1889).

CURTIUS, kụr'tsê-ụs, THEODOR (1857–). A German chemist. He studied at several German universities and, after the publication of a series of original researches, became professor of chemistry at Kiel in 1889; in 1897 he went to Bonn, but on the death of Victor Meyer, in the same year, accepted the professorship of chemistry at Heidelberg. Curtius discovered new series of important compounds of nitrogen, including hydrazine and many of its derivatives, and the diazo derivatives of the fatty series of organic compounds.

CU'RULE CHAIR (trans. of Lat. *sella curulis,* from *sella,* seat, and *currus,* chariot, from *currere,* to run). The chair of state, equivalent to a throne, among the early Romans, used by the curule magistrates, dictators, consuls, prætors, and curule ædiles, on formal occasions. The chair was usually ornamented with ivory, gold, or other precious work. It had curved legs, but no back; it could be folded up as a camp stool is folded. The right to sit in the presence of others and to ride in a carriage in the city of Rome were precious privileges of certain magistrates. The ancients explained the adjective *curules,* applied to certain magistrates (see above), as given because they rode in a *currus,* 'chariot.'

CURULE MAGISTRATES. See CURULE CHAIR.

CURUMINACAN, kōō-rōō'mê-nä'kän. A minor linguistic stock of South American Indians, in the region of Lower Peru. Rivet thinks it may turn out to be a dialect of the Otuquian or Otuké.

CUR'VATURE. See CURVE.

CURVATURE OF FIELD OF A LENS. See LIGHT.

CURVATURE OF THE EARTH'S SURFACE. See CURVE.

CURVATURE OF THE SPINE. See POTT'S DISEASE; SPINE.

CURVE (OF. *courbe, corbe,* Fr. *courbe,* Sp., Portug., It. *curvo,* from Lat. *curvus,* curved, OChurch Slav. *krivŭ,* bent, Lith. *kreivas,* crooked). In common language, a line that constantly departs from a fixed direction. In analytic geometry, however, the word is commonly used to designate the locus of a point moving according to any definite law and hence to include the straight line. If the statement of the law according to which the point moves can be translated into an equation or equations between the coördinates (q.v.) of the moving point, these equations may be used to represent the curve—e.g., the circle is the locus of a point moving in a plane at a constant finite distance from a fixed point in that plane, and its equation is $x^2 + y^2 = r^2$. (See COÖRDINATES.) If the curve possesses the property of continuity (q.v.), it is precisely definable at every point, although it may contain singularities. The form of a curve corresponds to the nature of its equation; hence a curve may be designated as algebraic or transcendental according as its equation consists of algebraic or transcendental functions of the coördinates; e.g., the conic sections are algebraic curves, and the cycloid, the logarithmic spiral, and the catenary are transcendental curves. Algebraic curves are fundamentally grouped into orders and classes, according to Newton's classification. The order of a plane curve is determined by the number of points, real or imaginary, in which it intersects any line in its plane. Curves which cut such lines in two points are called curves of the second order; those which cut the lines in three points curves of the third order, and so on—e.g., the conic sections are all curves of the second order, and cubic curves are of the third order. The straight line is the only line of the first order. Similarly the order of an algebraic curve in space depends upon the number of points in which it cuts any plane. The class of an algebraic plane curve is determined by the number of tangents, real or imaginary, which can be drawn to it from any point in its plane. If two tangents are possible, it is a curve of the second class; if three are possible, a curve of the third class, and so on—e.g., the conic sections are curves of the second class; the cissoid (q.v.) is of the third class. Similarly the class of a space curve is given by the number of tangent planes which can be drawn containing any fixed line. The class of a plane curve depends directly upon its order when no singularities exist. If n is the order and c the class, $c = n(n-1)$. Thus, a conic with no singular points is of the second class, since $c = 2(2-1) = 2$; the cubic is of the sixth class, since $c = 3(3-1) = 6$. But singularities tend to diminish the class. Plücker gave six equations connecting the order, class, number of double points, number of double tangents, number of stationary points, and number of stationary tangents from which, if any three of these numbers are given, the other three may be obtained. The one directly connecting the order and class is $c = n^2 - n - 2d - 3p$, in which c is the class, n the order, d the number of double points, and p the number of stationary points. Thus, a cubic with one double point is a curve of the fourth class, since $c = 9 - 3 - 2 = 4$. By the aid of covariants (see FORMS), the class of a curve can be determined directly.

Singularities. 1. An algebraic curve whose equation is $y = f(x)$ is convex or concave downward, according as $\frac{d^2y}{dx^2}$ is positive or negative.

2. A point of inflection is one at which the tangent to the curve takes a limiting position—i.e., the point of contact of a stationary tangent, at which $\frac{d^2y}{dx^2} = 0$ or ∞. See CURVE OF SINES.

3. A multiple point is one at which more than one tangent exists—i.e., a point for which $\frac{dy}{dx}$ has more than one value. Two values determine a double point, three values a triple point, and so on. A multiple point is also called a node or crunode. Multiple points of the third order are divided into classes according to the relative number of cusps and crunodes involved.

4. When two branches of a curve have a common tangent at a point, but do not pass through the point, they are said to form a cusp, called also a spinode or stationary point. See CISSOID; CONCHOID.

5. An isolated point whose coördinates satisfy the equation of the curve is called a conjugate point or acnode. An acnode is a multiple point at which the tangents are imaginary. A node or conjugate point corresponds to a double tangent, and a cusp to a stationary tangent. See also CARDIOID; CARTESIANS; CASSINIAN OVAL; CATENARY; CAUSTIC; CYCLOID; ELLIPSE; FOLIUM; HODOGRAPH; LEMNISCATE; SPIRAL; WITCH.

Curvature. The curvature of a plane curve at any point is its tendency to depart from a tangent to the curve at that point. In the circle this deviation is constant, since the curve is perfectly symmetrical round its centre. The curvature of a circle varies, however, inversely as the radius—i.e., it diminishes at the same rate as the radius increases. The reciprocal of the radius is therefore taken as the measure of the curvature of a circle. A straight line may be considered a circle of infinite radius and as having no curvature, since $\frac{1}{\infty} = 0$. The constancy of curvature in the circle suggests an absolute measure of curvature at any point in any other curve, for whatever be the curvature at that point a circle can be found of the same curvature. The radius of this circle is called the radius of curvature for that point; and the circle itself is called the osculating circle. By means of this radius we may compare the curvatures at different points of the same curve or of different curves. In simple cases, as in the conic sections, the measure or radius of curvature may be determined geometrically, but it is usually necessary to employ the calculus. The expression for the radius of curvature at any point (x, y) of a curve is

$$\rho = \frac{\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}}{\frac{d^2y}{dx^2}}.$$

If the curve, instead of lying in a plane, twists in space, it is sometimes called a gauche curve or a curve of double curvature, and its curva-

ture at any point may be measured by the radius of its osculating sphere at that point. The centre of the osculating circle or sphere is called the centre of curvature. The curvature of surfaces is determined similarly to that of curves. Thus, the measure of the curvature of the earth, commonly taken as the deviation of the line of apparent level from the line of true level—i.e., from a line everywhere parallel to the surface of still water—is approximately 8 inches per mile.

Relations. The following are some of the more important relations which exist among certain groups of curves:

1. The evolute (q.v.) of a curve is the locus (q.v.) of its centre of curvature. Regarding the evolute as the principal curve, the original curve is called its involute. The normals to any curve are tangents to its evolute.

2. Two curves or surfaces are said to have contact when they touch at two or more consecutive points. A contact (q.v.) of the nth order exists between two curves $y_1 = \phi(x)$, $y_2 = \psi(x)$ at the point whose abscissa is a when $\phi(a) = \psi(a)$, $\phi'(a) = \psi(a)$, $\phi_n(a) = \psi_n(a)$. If n is even, the curves cross at the point. No curve which has contact of a lower order can pass between the given curves. Curves which have contact of the first order have a common tangent, and those having contact of the second order have a common radius of curvature at the point of contact.

3. The envelope of a curve is the locus of the ultimate intersections of the individual curves of the same species, obtained by constantly varying a parameter of the curve. That is, the envelope touches all of the intersecting curves thus obtained; e.g., if p is a variable parameter and $f = 0$ is the equation of the curve, then the result obtained by eliminating p between $f = 0$ and $\frac{df}{dp} = 0$ is the equation of the envelope.

Every curve may be an envelope, and some curves are evidently so by definition—e.g., evolutes and caustics (qq.v.).

4. The process of replacing each radius vector of a curve by its reciprocal is called inversion. The origin is called the centre of inversion and the resulting curve the inverse of the given one. See CIRCLE, *Inversion*.

5. The locus of the feet of the perpendiculars from the origin upon the tangents to a curve is called a pedal curve. The pedal of a pedal is called the second pedal, and so on. Reversing the order, the curves are envelopes and are called negative pedals. The pedal and reciprocal polar are inverse curves. (See CIRCLE.) In general, to find the inverse of a curve whose equation is given in rectangular coördinates, substitute for x and y the expressions $\frac{k^2x}{x^2+y^2}$ and $\frac{k^2y}{x^2+y^2}$ respectively.

6. A roulette is defined as the locus of a point rigidly connected with a curve which rolls upon a fixed line or curve. See CYCLOID.

Centres. A point such that every radius vector (see COÖRDINATES) drawn from it to a point on the curve is matched by another vector of the same length in the opposite direction is called the centre of a curve. See also CIRCLE and the paragraph on *Curvature* above.

When a plane figure moves in any manner in its own plane, the instantaneous centre of rotation is the intersection of two lines drawn through two points perpendicular to the directions in which the points are moving.

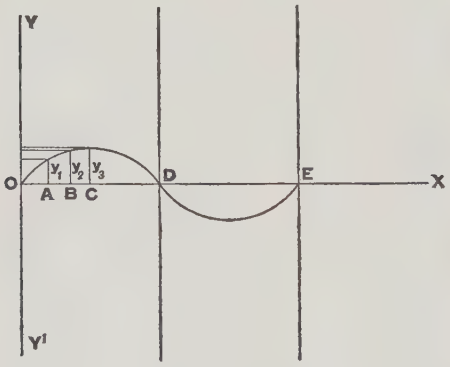
The number of kinds of curves that might be drawn is infinite. A large number are known by specific names and are objects of great interest on account of their beauty, their remarkable properties, or their relation to physical problems. Among those discussed under separate titles are the conic sections, cissoid, conchoid, lemniscate, cycloid, trochoid, witch, cardioid, cartesians, Cassinian ovals, caustic curve, tractrix, curve of pursuit, catenary, curves of circular functions (e.g., curves of sines), logarithmic curves, and spirals.

Though the history of curves is inseparable from that of geometry, it may roughly be divided into four periods: (1) the synthetical geometry of the Greeks, in which the conic sections (q.v.) play an important rôle; (2) the birth of analytic geometry, in which the synthetic geometry of Guldin, Desargues, Kepler, and Roberval merged into the coördinate geometry of Descartes and Fermat; (3) the period 1650 to 1800, characterized by the application of the calculus to geometry and including the names of Newton, Leibnitz, the Bernoullis, Clairaut, Maclaurin, Euler, and Lagrange; (4) the nineteenth century, the renaissance of pure geometry, characterized by the descriptive geometry of Monge, the modern synthetic geometry of Poncelet, Steiner, Von Staudt, Cremona, and Plücker. Descartes's contributions were confined to plane curves, but led to the discovery of many general properties. The scientific foundations of the theory of plane curves may be ascribed to Euler (1748) and Cramer (1750). Euler distinguished algebraic from transcendental curves, and Cramer founded the theory of singularities. Clairaut (1731) attacked the problem of double curvature; Monge introduced the use of differential equations. Möbius (1852) summed up the classification of the cubic curve; Zeuthen (1874) did the same for the quartics, and Bobillier (1827) first used trilinear coördinates (q.v.). In 1828 Plücker published the first volume of his *Analytisch-geometrische Entwickelungen*, which introduced abridged notation and marked a new era in analytic geometry. To him is due (1833) the general treatment of foci, a complete classification of cubics (1835), and his celebrated "six equations" 1842). Hesse (1844) gave a complete theory of inflections and introduced the so-called Hessian curve as the first instance of a covariant of a ternary form. To Chasles (q.v.) is due the method of characteristics developed by Halphen (1875) and Schubert (1879), and the general theory of correspondence (1864), completed by Cayley (1866) and Brill (1873). Cayley's influence was also very great. He advanced the work of Plücker, investigated bitangents and osculating conics, extended the properties of covariants and invariants, as well as Salmon's theory of reciprocal surfaces and the theory of double curvature. Mention should also be made of the labors of Jean-Claude Bouquet (1819–85) and Charles-Auguste-Albert Briot (1817–82), two of Cauchy's most eminent pupils, whose labors in the field of geometry and theory of functions are well known. Their *Leçons de géométrie analytique* (Paris, 1847) has been translated into English (Chicago, 1896) and forms an excellent introduction to the subject. Besides the works of those mentioned in connection with

the development of curves, consult, for theory: Salmon, *Treatise on the Higher Plane Curves* (Dublin, 1852); Study, *Vorlesungen über ausgewählte Gegenstände der Geometrie* (Leipzig, 1911); Clebsch, *Vorlesungen über Geometrie* (ib., vol. i, 1875–76; vol. ii, 1891); Staude, *Analytische Geometrie des Punktepaarer, des Kegelschnittes und der Fläche zweiter Ordnung* (ib., 1910); Runge, *Analytische Geometrie der Ebene* (ib., 1908); Hilbert, in the *Mathematische Annalen*, vol. xxxviii; Brill-Noether, in the *Jahresbericht des deutsch Math.-Verein.*, vol. iii; and for history, Merriman and Woodward, *Higher Mathematics*, chap. xi (New York, 1896); Brocard, *Notes de bibliographie des courbes géométriques* (Bar-le-Duc, 1897–99).

CURVE OF PURSUIT. The problem of the curve of pursuit first attracted attention in the following form: To find the path of a dog which takes the shortest course to reach his master, while the master is walking in a straight line. This problem, though stated in various forms, resolves itself mathematically into finding the curve traced by a point A whose movement is always directed towards a point B moving on a known curve. The curve seems to have been studied first by Pierre Bouguer (1732). The result is, in general, an algebraic curve; in particular cases, logarithmic. For a solution of the problem, consult Salmon, *Treatise on the Higher Plane Curves* (Dublin, 1852).

CURVE OF SINES. A curve whose ordinates are equal or proportional to the sines of a variable angle and whose abscissas are equal to the corresponding arcs of the unit circle. This curve is also called an harmonic curve, it being the curve in which a musical string vibrates when sounded.



CURVE OF SINES.

In the figure, OA represents the length of an arc whose sine is y_1, OB the length of an arc whose sine is y_2, and so on. The ordinate y_3 is the sine of 90°, and is the maximum ordinate of the curve. D, which corresponds to an angle of 180°, is a point of inflection, the radius of curvature being infinite. Similarly the curves of the other trigonometric functions (cosine, tangent, etc.) may be represented graphically.

CURVES, Anticlinal and Synclinal. See Anticline and Syncline.

CUR'WEN, John (1816–80). An English music reformer and writer. He was born at Heckmondwike, in Yorkshire, and was early influenced by the community music, in those days characteristic of every Yorkshire village. The influence of Handel, and his oratorios, more than any other single factor, had caused choral and philharmonic societies to spring up throughout the northern counties of England. In order to develop these and the numerous local band organizations, Curwen, then a dissenting minister, resigned his pastorate and, becoming interested in the "tonic sol-fa" system, invented by Miss S. A. Glover, spent his entire time in propagating it. In 1853 he had begun to found associations for spreading the theory and in 1862 established the Tonic Sol-Fa College. He was successful enough to start a publishing house in London, where he published the *Tonic Sol-Fa Reporter*. Nearly all of his many publications are for the system of his choice. He died at Heaton Mersey, near Manchester. Consult J. S. Curwen, *Memorials of John Curwen* (London, 1882).

CURWENSVILLE. A borough in Clearfield Co., Pa., 34 miles (direct) northwest of Altoona, on the New York Central and Hudson River, the Buffalo, Rochester, and Pittsburgh, and the Pennsylvania railroads, and on the Susquehanna River (Map: Pennsylvania, D 5). The chief industries are coal mining, tanning, and the manufacture of fire brick. Pop., 1900, 1937; 1910, 2549.

CURZOLA, kōōr-dzō'lä (Slav. *Korcula*, ancient *Corcyra Nigra*, so called from the sombre color of its pine forests). An island in the Adriatic, off the coast of the Austrian Crownland of Dalmatia, of which it forms administratively a part, and is situated in lat. 43° N. and long. 17° E. It is about 25 miles long, has an area of 107 square miles, and is hilly, the greatest altitude being 1880 feet. It is well wooded and produces grain, wine, and olives. The inhabitants are engaged chiefly in boatbuilding, seafaring, and fishing. There are several good harbors. Pop. of Curzola administrative district, Dec. 31, 1910, 29,908, almost entirely Roman Catholic. The principal towns are Curzola, the administrative seat, with 2157 inhabitants in 1910 (as a commune, 7144), and Blatta, with 6837 inhabitants (as a commune, 8862). The island came under Austrian rule in 1815.

CUR'ZON, George Nathaniel, Earl Curzon of Kedleston (1859–1925). An English statesman, born at Kedleston. He studied at Balliol College, Oxford, became assistant private secretary to the Marquis of Salisbury in 1885, and from 1886 to 1898 sat as a Conservative for the Southport division of southwest Lancashire. In 1891–92 he was Undersecretary of State for India and in 1895–98 Undersecretary of State for Foreign Affairs. He was appointed, in 1898, Viceroy and Governor-General of India. He gave himself up to the duties of his office with almost unprecedented devotion and energy, making the promotion of the material welfare of the people of India his special concern. Owing, however, to his masterful disposition, he did not escape criticism, and, in particular, the partition of Bengal in 1905 aroused violent resentment among the natives. In the same year he came into conflict with Lord Kitchener, commander in chief of the forces, over the latter's proposals looking to the restriction of the power of the civil government over the army, and when the home government supported Lord Kitchener, the Viceroy resigned, Aug. 12, 1905. He did not, however, retire from public life. In 1908 he became chancellor of

Oxford University and in the same year a peer of Ireland. In the latter capacity, in 1910, he was one of the most influential leaders of the Unionist party in their great struggle with the Liberals, and it was owing considerably to his influence that the House of Lords permitted the Parliament bill to become law. Curzon became known also as an advocate of universal military service and an active opponent of woman's suffrage. In 1895 he married Miss Leiter, of Chicago, who died in 1906. He published: *Russia in Central Asia* (1889); *Persia and the Persian Question* (1892); *Problems of the Far East* (1894). Consult Lipsett, *Lord Curzon in India, 1898–1905* (London, 1906).

CU'SA, Nikolas of, or Nikolaus Cusanus (1401–64). A Roman Catholic philosopher and theologian. He was born at Kues, on the Moselle, in the Diocese of Treves; educated at Deventer by the Brethren of the Common Life and at the University of Padua; became Archdeacon of Liége and attended the Council of Basel (1431–49), where he opposed the papal claims; but, altering his views, he entered the papal service and was made a cardinal in 1448; Bishop of Brixen in the Tirol, and papal legate for Germany in 1450. He died at Todi, Italy, Aug. 11, 1464. He was interested in promoting reform in the church. As a philosopher, he was one of the first to break with the ruling scholasticism. He taught that God cannot be apprehended by the intellect, but by intuition. As a mathematician and natural philosopher, he first taught the revolution of the earth about the sun and the plurality of worlds; as critic, he declared the so-called "Donation of Constantine" to be a forgery. His most important writings have been translated into German by F. A. Scharpff (Freiburg, 1862), who also published the first part of a biography (Mainz, 1842), and subsequently *Der Cardinal und Bischof Nikolaus von Cusa* (Tübingen, 1871). Consult also: Falkenburg, *Grundzüge der Philosophie des Nikolaus von Cusa* (Breslau, 1880); Schanz, *Cardinal Nikolaus von Cusa als Mathematiker* (Rottweil, 1872); id., *Die astronomischen Anschauungen des Nikolaus von Cusa und seine Zeit* (ib., 1873); Höffding, *History of Modern Philosophy,* vol. i (New York, 1900).

CU'SACK, Mary Frances (1820–99). An Irish nun, known as the Nun of Kenmare. She was born near Dublin, Ireland, and spent her youth in England, where she joined a Church of England sisterhood. She later became a Catholic and upon her return to Ireland took a deep interest in the Franciscan sisterhoods known as Poor Clares, organized for the purpose of providing poor and friendless girls with a useful education. From 1861 to 1884 she conducted the celebrated convent of Poor Clares, established by her at Kenmare. In 1884 Pope Leo XIII sanctioned the founding of the order known as Sisters of Peace. After the establishment of a house in Nottingham, England, in 1884, she founded a branch of the order at Jersey City, N. J. (1885). Among her works are: *A Student's Manual of Irish History* (1870); a biography of O'Connell (1872); *Woman's Work in Modern Society* (1874); *The Book of the Blessed Ones; The Trias Thaumaturga* (1877), lives of St. Patrick, St. Bridget, St. Columba; and several volumes on the shrine of the Virgin at Knock, County Mayo. Consult *The Nun of Kenmare: An Autobiography* (Boston, 1888).

CUSACK-SMITH, Sir Berry (1859–). An English legislator. He was born at Dublin and was educated at the Middle Temple. After acting for one year as Consul at Samoa and Deputy Commissioner for the western Pacific, he was in 1891 sent as Consul General to Valparaiso, whence he was again transferred in 1892 to the Tokelau Islands. As special judicial commissioner to Samoa, he acted, conjointly with the consuls of Germany and the United States, as receiver and custodian of the revenues of the islands and as President of the municipality of Apia. From June, 1900, to December, 1901, he was chargé d'affaires at Santiago, and was Consul General at Valparaiso in 1898–1905.

CUS'CUS. See Phalanger, and Plate of Phalangers.

CUSCUS. See Vetiver.

CUS'CUTA. See Dodder.

CUSH (Heb. *Kūsh*). The eldest son of Ham, according to the genealogical scheme given in the tenth chapter of Genesis. In the Bible he seems to be regarded as the eponymous ancestor of the Cushites, or people of the land of Cush, a country mentioned in a number of passages of the Old Testament. The Babylonian Nimrod is also said (Gen. x. 8) to have been a son of Cush. The "Land of Cush" is rendered "Æthiopia" in the Septuagint, in the Vulgate, and in most modern versions of the Bible, and until comparatively recent times the country has been generally identified with the ancient Ethiopia (i.e., Nubia), called by the Egyptians *Kôsh,* though some scholars have supposed that it also included a portion of Arabia. Some modern critics believe that in Gen. x Cush (v. 6) the brother of Mizraim (Egypt) and Cush (v. 8) the father of the Babylonian Nimrod are two different persons, and that the name of the second Cush represents *Kashshu,* an old name for Babylonia. They further maintain that the Arabian Cushites (Gen. x. 7) were also of a different stock, and that thus, under the same name, three different peoples are confused in the biblical account. Other scholars, however, adhering to the older view, believe that the dark Ethiopian race once extended across Arabia into, or even beyond, Babylonia.

CUSHAT, kŭsh'ăt (AS. *cūsceote,* ring dove, from *cucu,* quick + *sceotan,* to shoot; so called from the bird's swift flight), or Cushie-Doo (Scottish). A dove.

CUSHING, kŭsh'ĭng, Caleb (1800–79). An American statesman, the first American Minister Plenipotentiary to China. He was born at Salisbury, Mass., and was educated at Harvard, where he graduated when 17 years old. He practiced law at Newburyport and was elected to the State Legislature in 1825 and to the State Senate in 1826. From 1829 to 1831 he traveled in Europe. He was elected to Congress in 1835 and served four terms as a Whig, but afterward joined the Democratic party. President Tyler nominated him as Secretary of the Treasury, but the Senate rejected the nomination. Tyler then appointed him Minister to China, where new ports were to be opened according to the Treaty of Nanking. Here he made good use of his erudition and talents. When he arrived, Feb. 24, 1844, at Canton in the frigate *Brandywine,* he had already made the general outline of the treaty, which greatly

abridged the subsequent negotiations. The Peking government honored the United States by sending as High Treaty Commissioner Ki-Ying, a member of the Imperial family, who, on July 3, 1844, signed the convention, which contained 16 provisions not included either in the English Treaty at Nanking or in the treaty supplementary thereto. Among these was the right of Christian missionaries to follow the openings of commerce and to build dwelling houses, churches, and hospitals and to have cemeteries, while Chinese scholars acting as teachers or assistants were to be protected from injury. The purchase of books was legalized, and American citizens were forbidden to engage in the opium trade, or to use the flag of the United States to cover a violation of the laws of China. In short, this treaty, because of its fullness of detail and clear exhibition of the rights conceded by the Chinese government to foreigners dwelling within its borders, was the leading authority in settling disputes until 1860, when foreigners were admitted to Peking.

After his return to the United States Cushing advocated the Mexican War and furnished the necessary funds to equip a regiment of which he was made colonel. He subsequently rose to be brigadier general. In 1852 he became associate justice of the Supreme Court of Massachusetts and in 1853 entered the cabinet of President Pierce as Attorney-General, serving through the entire administration. He favored the Union cause during the Civil War. When the arbitration of the "Alabama Claims" was to be settled at Geneva in 1871, President Grant chose Mr. Cushing as one of the three men who were to be counsel for the United States. In 1873 he was nominated Chief Justice of the United States, but the nomination was withdrawn. From 1874 to 1877 he was Minister of the United States at the court of Spain. Mr. Cushing was a man of unusual erudition and of rare ability, imposing in person and forcible in argument. He was the author, among other works, of *The Practical Principles of Political Economy* (1826); *The Growth and Territorial Progress of the United States* (1839); *Reminiscences of Spain* (1833); *Historical Review of the Late Revolution in France* (1833); *The Treaty of Washington* (1873).

CUSHING, Frank Hamilton (1857–1900). An American ethnologist. He was born at Northeast, Pa., spent his boyhood on a farm in New York State, and at the age of 16 began excavations on the sites of Indian camps. He studied for a time at Cornell University in 1875 and in 1876 had charge of a part of the National Museum collection at the Centennial Exposition at Philadelphia. He went to New Mexico in 1879 as assistant ethnologist of the United States Bureau of Ethnology and remained for three years among the Zuñi Indians. He was adopted into the tribe, made a thorough study of the habits, folklore, language, and history of the Pueblo Indians of New Mexico and Arizona, and became the recognized authority in this branch of American ethnology. In 1896 he conducted the Pepper-Hearst expedition to the Gulf coast of Florida and published a *Report on the Ancient Key Dwellers of Florida.* Among his publications are: *Zuñi Fetiches* (1881); *The Relationship between Zuñi Sociologic and Mythic Systems* (1882); *The Nation of the Willows* (1882); *Adventures in Zuñi* (1883); *Studies of Ancient Pueblo Keramic Art, as Illustrative of Zuñi Culture Growth* (1884); *Zuñi Breadstuff* (1885). A volume entitled *Zuñi Folk-Tales* was published posthumously in 1902.

CUSHING, Harvey (Williams) (1869–). An American surgeon, born in Cleveland, Ohio. He was educated at Yale and Harvard universities, and in 1895 took up the practice of surgery. From 1902 to 1911 he was associate professor of surgery at Johns Hopkins University, and in the latter year he became professor of surgery at Harvard. With Dr. George W. Crile (q.v.) he made an important contribution to the study of blood pressure in surgery. (See Blood Pressure.) In 1913 he received an honorary fellowship from the Royal College of Surgeons. He is author of *Dr. Garth, the Kit-Kat Poet, 1661–1718* (1906) and *The Pituitary Body and its Disorders* (1912).

CUSHING, Luther Stearns (1803–56). An American lawyer and law reporter, best known as the author of a *Manual of Parliamentary Practice,* commonly known as *Cushing's Manual* (1845), a work which is still regarded as an authority. He was a native of Massachusetts and was judge of the Court of Common Pleas in Boston and reporter for the Supreme Court of the State. His publications include: *Treatise on Trustee Process* (1837); *Treatise on Remedial Law* (1837); *Reports of Controverted Election Cases in Massachusetts* (1852); *Introduction to the Study of Roman Civil Law* (1854); *Lex Parliamentaria Americana* (1856; 9th ed., 1874).

CUSHING, Thomas (1725–88). An American statesman, born in Boston. He was a graduate of Harvard, was Speaker in 1766–74 of the Massachusetts Assembly, and in 1774–75 was a member of the First and Second Continental Congresses. In England he had the groundless reputation before the outbreak of the war of being the great leader of the American revolutionary movement, and Dr. Johnson, in some of his pamphlets, accused him of aiming at an American crown. At home, however, he made himself unpopular by opposing the Declaration of Independence. From 1780 to 1788 he was Lieutenant Governor of Massachusetts. In 1788 he was a member of the convention which ratified the Federal Constitution for Massachusetts.

CUSHING, William (1732–1810). An American jurist, born at Scituate, Mass. He was appointed Chief Justice of the State Superior Court in 1777, became an associate justice of the United States Supreme Court in 1789, and in 1796 declined the Chief Justiceship, for which he had been nominated by Washington. He was a founder of the American Academy of Arts and Sciences.

CUSHING, William Barker (1842–74). An American naval officer, born in Delafield, Wis. He studied at the United States Naval Academy from 1857 to 1861, and at the outbreak of the Civil War entered the United States navy as a volunteer. In 1862 he was promoted to be lieutenant. He soon became known for his fearless and successful performance of perilous tasks assigned to him, the most notable of which was the destruction by torpedo of the Confederate ram *Albemarle,* on the night of Oct. 27, 1864, at her moorings in Plymouth Harbor, N. C. This exploit won him the thanks of Congress and the rank of lieutenant commander. He also led a land attack on Fort Fisher in 1865, and later he served in the Pacific and Asiatic

squadrons and was commissioned commander in 1872.

CUSHING, William Henry (1852–). A Canadian manufacturer and statesman. He was born near Kenilworth, Ontario, and was educated at the public schools. After working on a farm for some years he went west to Calgary in 1883 and engaged in business, later becoming the head of an important manufacturing concern and the owner of extensive timber limits in British Columbia and elsewhere. In 1905 he was elected Liberal member for Calgary in the Alberta Legislature; and in the same year, when the government of Alberta was organized with Alexander Cameron Rutherford as Premier, Cushing became Minister of Public Works, retaining that position until 1910. He was the first Canadian to make ownership of telephones a part of government policy.

CUSHMAN, Allerton Seward (1867–). An American chemist, born in Rome, Italy, and educated at the Worcester Polytechnic Institute, at Freiberg, and at Heidelberg, Harvard, and Johns Hopkins universities. He was associate professor of chemistry at Bryn Mawr College in 1900–01, associate director of the Office of Public Roads, United States Department of Agriculture, for eight years, and then (1910) founded and became director of the Institute of Industrial Research. He is author of *The Corrosion and Preservation of Iron and Steel* (1910), and of the following bulletins of the Department of Agriculture: *The Useful Properties of Clay* (1904); *The Decompositions of the Feldspars* (1907); *The Use of Feldspathic Rocks as Fertilizers* (1907); and also a bulletin of the Institute of Industrial Research, *The Preservation of the Exterior of Wooden Buildings* (1911).

CUSHMAN, kush'mân, Charlotte Saunders (1816–76). A celebrated American actress, best remembered perhaps for her acting of Meg Merrilies in Scott's *Guy Mannering*. She was born in Boston, July 23, 1816, of Puritan descent, and was the eldest of five children left poor with their mother by the early death of their father, a West India merchant. She had, however, a fine contralto voice, which she cultivated, and in 1835 she made her appearance as an opera singer in the *Marriage of Figaro*. Her prospects were bright, when shortly afterward in New Orleans her voice suddenly failed. She was greatly disheartened, but, at the request of a tragedian (Mr. Barton), she undertook her first dramatic part, Lady Macbeth, which became one of her greatest rôles. Long afterward Lawrence Barrett said of her: "To the last she was the greatest Lady Macbeth of her age." She played for a time in Albany and elsewhere, and then began at the Park Theatre, New York, an engagement which lasted for several years. She took a great variety of parts, both comedy and tragedy, among them Bianca, Helen McGregor, Queen Gertrude, Goneril, Nancy Sikes, her wonderful Meg Merrilies, and later, Queen Katharine, Cardinal Wolsey, Ophelia, Lady Teazle, and many others. In 1844, after a period of successful management in Philadelphia and a tour with Macready, whom she had supported before, she went to England. She met with great success; while there she and her sister Susan made their first appearance in *Romeo and Juliet*, which had, for that period, an exceptionally long run in London. She returned to America in 1849, but revisited Europe several times. In 1856 she went to Rome, where she had a home for some years. She was honored in the most cultivated society of Europe and America, not only as a great artist, but as a good woman. During the Civil War she showed her patriotic spirit by giving performances for the benefit of the Sanitary Commission, contributing in this way over $8000. In her later years she was known as a reader, with singular interpretative powers. Her last appearance on the New York stage, Nov. 7, 1874, was a memorable occasion. She played Lady Macbeth. When the curtain fell, a body of eminent citizens, with William Cullen Bryant as spokesman, came upon the stage and presented the actress with a laurel crown, inscribed *C. C.—Palmam qui meruit ferat.* Charlotte Cushman never married. She died in Boston, Feb. 18, 1876. In 1880 her grave in Mount Auburn was marked by an obelisk which in form is a copy of Cleopatra's Needle as it stood in Heliopolis. Consult: Stebbins, *Charlotte Cushman: Her Letters and Memories of her Life* (Boston, 1878); Clement, *Charlotte Cushman* (ib., 1882); Cook, *Hours with the Players* (London, 1881); W. T. Price, *A Life of Charlotte Cushman* (New York, 1894); H. A. Clapp's *Reminiscences of a Dramatic Critic* (Boston, 1902).

CUSHMAN, Robert (c.1580–1625). One of the founders of the colony at Plymouth, Mass. He was born in Kent and arranged the emigration of the Pilgrims to Holland, later following them to Leyden. He accompanied Deacon Carver upon his fruitless mission to London (1617), assisted Brewster in obtaining a patent from the King (1619), and, together with Carver, chartered the *Mayflower*. He emigrated to New England with his son Thomas in 1621 in the ship *Fortune* and, leaving him there in the care of Governor Bradford, returned to Europe three weeks later to act as the agent of the colonists in London. The celebrated sermon on "Sin and the Danger of Self-Love," delivered by him before his departure, is memorable as being the first published discourse delivered at Plymouth and is the oldest sermon extant delivered in America. It was printed in London in 1622 and in Boston in 1724 and 1780. The strip of territory on Cape Ann secured by him and Edward Winslow in 1623 afterward became the site of the first successful settlement established within the boundaries of the Massachusetts Bay Colony. Sixty facsimile copies of his famous sermon were published at Boston in 1870.

CUSINS, kŭz'ĭnz, Sir William George (1833–93). An English composer, born in London. He sang in the chapel royal at the age of 10. Soon afterward he was sent to study under Fétis in Brussels and upon his return obtained the King's scholarship at the Royal Academy of Music. At the age of 16 he was appointed organist to the Queen's private chapel, and in 1867 he succeeded Sterndale Bennett as conductor of the Philharmonic Society, which position he retained until 1883. In 1875 he became examining professor at Queen's College, and in 1876 joint examining professor of scholarships at the National Training School of Music. In recognition of his services in behalf of art, he was knighted in 1892. The few but highly meritorious compositions which he wrote include: *Royal Wedding Serenata* (1863); *Gideon*, an oratorio (Gloucester Festival, 1871); *Masonic Prayers Set to Music; Responses to the Commandments; Te Deum;* pianoforte con-

certo in A minor, a violin concerto, a symphony, two overtures, a septet for woodwind instruments, some chamber music, and several songs.

CUSK. A fish of the cod family (*Brosme brosme*), frequenting rocky ledges in the North Atlantic, especially off the shores of Scandinavia and Newfoundland. It has much the same habits and characteristics as the cod and is more extensively used in northern Europe than in America, where it has never found favor in market. See Plate of ROCKFISH, SUNFISH, ETC.

CUSP (from Lat. *cuspis*, point, spear). In architecture, the point formed by the meeting of two small arches, or foils, decorating the intrados of an arch. From its simplest form in late Romanesque buildings, it was developed by the Gothic builders into a highly ornate feature of the tracery in windows and on walls. In the earlier forms the cusp was always a solid triangular projection; in the more elaborate form it inclosed a triangular opening (open cusp). The cusp, closed or solid, appears also in Hispano-Moresque and Indo-Moslem architecture. For illustration, see ARCH.

CUSPARIA BARK. See ANGOSTURA BARK.

CUSSET, kŭs'sâ'. The capital of a canton in the Department of Allier, France, on the Sichon, 2 miles northeast of Vichy (Map: France, S., H 2). It is an ancient town, dating from a convent founded in 886, which was created an abbey in the thirteenth century. It has interesting fifteenth and sixteenth century houses, and the Grosse Tour, now a prison, is a relic of the mediæval fortifications built by Louis XI, now replaced by boulevards, which surrounded the town. It is noted for its cold mineral springs and has manufactures of linen, chalk, textiles, oil, paper, confections, and baskets. Pop., 1901, 6598; 1911, 6941. Consult Giraudet, *Topographie physique et medicale de Cusset.*

CUSSO. See KOOSSO.

CUST, LIONEL (1859–). An English author and art critic. He was born in London and was educated at Eton and Cambridge. In 1882 he entered the War Office and two years later was appointed assistant in the department of prints and drawings in the British Museum. He was director of the National Portrait Gallery from 1895 to 1909, when he became director of the National Gallery, and after 1901 he was also surveyor of the King's pictures and works of art. His publications include: *Index of Artists Represented in Department of Prints and Drawings in British Museum* (part i, 1893; part ii, 1896); *Albrecht Dürer, a Study of his Life and Art* (1897); *The Master "E. S." and the "Ars Moriendi"* (1898); *A History of Eton College* (1899); *Van Dyke's Chatsworth Sketch-Book* (1901); *Anthony Van Dyck* (1903); *Angelo Bastiani: A Story of Modern Venice* (1904); *The Bridgewater House Gallery* (1904); *The Royal Collection of Paintings, Buckingham Palace* (1905); *Eton College Portraits* (1909); *Anthony Van Dyck, a Further Study* (1911); *Notes on Pictures in the Royal Collections* (1911); *History of the Society of Dilettanti* (1898; 1914).

CUST, ROBERT NEEDHAM (1821–1909). An English Orientalist. He was born at Cockayne Hatley, Bedfordshire, was educated at Eton, and, entering the East Indian service, took honors in the College of Fort William, Calcutta, for skill in four Oriental languages. For many years he served with the military in various parts of India, took part in several battles, and was present at the taking of Lahore in 1846. He also took an active part in the pacification of the Punjab after the Sepoy Mutiny in 1858. After his return from the East he filled various local offices and became a member of several societies. He died on Oct. 28, 1909. Among his 60 works are: *Modern Languages of the East Indies* (1878); *Modern Languages of Africa* (1883); *Modern Languages of Oceania* (1887); *Modern Languages of the Caucasian Group* (1887); *Modern Languages of the Turki Branch of the Ural-Altaic Family* (1889); *Linguistic and Oriental Essays* (5), seven series (1880–1904); *Clouds on the Horizon* (1890); *Life Memoir* (1899).

CUSTANCE. See CONSTANCE.

CUS'TARD APPLE. A common name in the West Indies and other tropical countries for several fruits of the genus *Anona* of the family Anonaceæ. Some of the fruits of this genus are among the most delicious produced in tropical countries, as the cherimoyer (q.v.), and even the common custard apple (*Anona reticulata*) of the East and West Indies. The custard apple is a large, dark-brown, roundish fruit, sometimes from its size and appearance called "bullock's heart" in the West Indies; the tree is of considerable size. The custard-apple family is represented in the northern United States by the common papaw (*Asimina*, now *Uvaria, triloba*). There are two or three which are natives of western Africa. To the genus *Anona* also belong the sweetsop, the sour-sop, the pinana, or pinha, all of them tropical American fruits, and the alligator apple of the West Indies (*Anona palustris*), a fruit which in its present unimproved state is probably not worth cultivation. Quite recently plant breeders have been giving increased attention to this group of fruits, with the view of extending their commercial culture to semitropical sections of the United States and elsewhere. A number of species are now being grown to a small extent in southern Florida and California.

CUS'TER, GEORGE ARMSTRONG (1839–76). An American soldier, born in New Rumley, Harrison Co., Ohio. He graduated at West Point in 1861, was assigned as a second lieutenant to the Fifth United States Cavalry, and arrived at the front on the day of the first battle of Bull Run. He served successively as an aid on the staffs of Generals Phil Kearny, William F. Smith, and McClellan, was promoted to be a captain of volunteers, and served throughout the Peninsular campaign of 1862. In June, 1863, he was made a brigadier general of volunteers, and was placed in command of a brigade of Michigan volunteer cavalry, which under his leadership became one of the most efficient and best-trained bodies of cavalry in the Federal army. At the head of these troops he distinguished himself at the battle of Gettysburg. His brigade was then attached to Sheridan's cavalry corps, with which he served in the campaigns in Virginia in the spring and summer of 1864 and the subsequent operations in the Shenandoah valley. Placed in command of the Third Division of Sheridan's corps, he won a victory at Woodstock and distinguished himself at the second battle of Winchester (Cedar Creek). He was brevetted major general of volunteers on Oct. 19, 1864, for his services, defeated General Early at Waynesboro, and took

part in the battles of Five Forks, Dinwiddie Courthouse, and other engagements of Grant's last campaign. After several months' service in Texas during the winter of 1865–66, he applied for leave of absence, in order to accept the offer which had been made him to take command of the cavalry which Juarez was organizing to drive the Emperor Maximilian out of Mexico. His request being denied, he accepted the position of lieutenant colonel of the Seventh Cavalry. In 1867–68 he gained his first experience as an Indian fighter in Gen. W. S. Hancock's campaign against the Cheyennes, bringing the campaign to a successful conclusion by a decisive defeat of the Indians at Washita, Ind. Ter., in November, 1868. From 1871 to 1873 he was stationed with his regiment in Kentucky. In the spring of the latter year he was ordered to Dakota Territory to protect the surveyors of the Northern Pacific Railway while locating that line through the Indian country west of the Missouri River. The discovery of gold in the Black Hills led to an influx of white gold seekers into land belonging to the Sioux, and during the next three years Custer and his command saw considerable active service in the Black Hills country and along the valley of the Yellowstone. In the spring of 1876 General Sheridan planned a campaign against the Indians which he hoped would be decisive. Three expeditions were set under way, with the expectation that they would meet and act in conjunction against Sitting Bull and his force of about 6000 Indians, who were supposed to be encamped somewhere near the juncture of the Rosebud and the Yellowstone. General Crook, with 1000 troops, was to advance northward from Fort Laramie; General Terry, with a similar force, was to march westward; and General Gibbon, with 450 men, was to come down from the northwest. Custer and his regiment of 624 strong formed part of General Terry's force. On June 17 Crook, feeling his way along the Yellowstone, came upon Crazy Horse and some hundred of his braves on the Rosebud and engaged them in a sharp but indecisive struggle. Terry and Gibbon had meanwhile effected a junction on the Yellowstone, at the mouth of the Big Horn, without encountering Indians in any number. After their engagement with Crook on the Rosebud, Crazy Horse and Sitting Bull led their forces in a southwesterly direction, until they were directly south of Terry and Gibbon, where they set up their tepees on the west bank of the Little Big Horn. This new move of the Indians was discovered by scouts sent out by Terry, who immediately determined to march upon them. Terry, having no intimation of Crook's defeat, sent Custer with the Seventh Cavalry scouting up the Rosebud to locate the enemy. He himself went to the mouth of the Big Horn with steamboats to ferry Gibbon's men across the river and planned to rejoin Custer at the junction of the Big Horn and Little Big Horn. But on June 24, Custer's scouts informed him that the enemy was located on the west bank of the Little Big Horn. He supposed that there would not be serious opposition from one Indian village, and although he did not know the strength of the enemy, prepared to attack. In the hope of trapping the Indians by strategy, he formed his troops into three divisions. He kept with himself five companies, with which he planned to attack that part of the village that lay directly before him, dividing the remaining six companies between Major Reno and Captain Benteen, the latter being sent two miles to the southward, while Reno advanced midway between Benteen and Custer. Thus fatally divided, the Seventh Cavalry advanced to the attack of an enemy greatly outnumbering them. Benteen's advance took him far south of the village. Reno's rather spiritless attack led him against the south end of the village, where he was repulsed and driven back across the river to the shelter of a protecting bluff. Custer and his five companies dashed almost at the centre of the Indians, were driven back and surrounded, but fought on desperately until the entire command of 208 men were killed. The engagement lasted perhaps not more than twenty minutes. Reno lost 56 officers and men. Neither Sitting Bull nor Rain in the Face were in this battle. The bodies were found the next day, when Terry's troops relieved the reunited forces of Benteen and Reno, who had been holding their position on the bluffs with difficulty. Custer was one of the bravest, most daring, and dashing soldiers America has produced, but he undoubtedly allowed his impetuosity to get the better of his judgment. He was the author of *My Life on the Plains* (1874). Consult Whittaker, *Life of General George A. Custer* (New York, 1876); *Report of the Secretary of War and Accompanying Papers* (Washington, 1876). General Custer's wife, ELIZABETH BACON CUSTER, whom he married in 1864, accompanied him in many campaigns, and published the following books: *Boots and Saddles, or Life with General Custer in Dakota* (1885); *Tenting on the Plains* (1887); *Following the Guidon* (1891).

CUSTINE, kŭ'stēn', ADAM PHILIPPE, COUNT DE (1740–93). A French general, born at Metz. He served with distinction in the Seven Years' War. As colonel of the infantry regiment "Saintonge," and quartermaster-general of the French troops, he took part in the Revolutionary War and was present at the surrender of Yorktown. He was a member of the States-General in 1789. In 1792 he became commander of the Army of the Lower Rhine and conducted the brilliant campaigns against Speyer, Worms, and Mainz. In consequence of his failure, in the campaign of 1793, to relieve Mainz, after it was recaptured by the Allies, he was suspected of negotiations with the enemy and was accused of treason and executed. His soldiers idolized him, calling him "Général Moustache."

CUSTINE, ASTOLPHE LOUIS LÉONARD, MARQUIS DE (1790–1857). A French author, grandson of the preceding, born at Niederwiller, Lorraine. He wrote a play and several romances, but is most celebrated for his descriptions of travels in his *Mémoires et voyages* (1820). The most amusing of his books of travels is *La Russie en 1839* (1843). His correspondence with Varnhagen von Ense was published in 1870.

CUS'TIS, GEORGE WASHINGTON PARKE (1781–1857). An American author, the adopted son of George Washington. He was born at Mount Airy, Md., a grandson of Martha Washington, his father being her son by her first husband. Custis studied at Princeton and St. John's colleges, married Mary Lee Fitzhugh, and in 1802 went to reside on an estate of 1000 acres at Arlington, near Washington. His daughter, Mary Randolph Custis, married Robert E. Lee, the Confederate general. The grand estate was confiscated by the government and is now the

Arlington National Cemetery. Besides orations and plays, he left *Recollections of Washington* (1860).

CUS'TOM (OF. *costume*, Fr. *coutume*, It. *costuma*, ML. *custuma, costuma*, from Lat. *consuetudo*, habit, from *consuescere*, to grow accustomed, from *consuere*, to be accustomed, from *con-*, together + *suere*, to be accustomed; probably from *suus*, Gk. *ἑός, heos, ὅς, hos*, Skt. *sva*, Av. *hva*, one's own). One of the three great departments of social psychology (q.v.), coordinate with language and myth (qq.v.). It may be defined as "any norm of voluntary action which has been developed in a national or tribal community." (Wundt.) Like animal instinct (q.v.), it is the outgrowth of individual habits. But instinct is practically invariable; it expresses the habits of past generations in the form of mechanized, not of consciously motived, actions, whereas custom, however rigorous its prescriptions, may always be disobeyed or modified; the customary action has not lost its conscious antecedents. Hence we may say that "instinct is habitual conduct that has become mechanical; custom, habitual conduct that has become generic."

The origin of custom appears to have been twofold. In the great majority of cases in which we are able to trace a custom back towards its first beginnings we come upon religious or ceremonial ideas. In certain other cases custom seems to have originated in ancient rules of law, the meaning of which has been forgotten, while the usage which they enjoin still persists; although, when we consider that every action of importance in a primitive society, whatever its special significance, has a religious aspect, we shall probably not be wrong in referring these legal customs also to an ultimately religious source. As an illustration of legal custom we may cite the Greek and Roman marriage ceremony, in which it was an established tradition that the mothers of the contracting families should bring the bride and groom together—a clear indication of that law of mother right which the civilized societies of the ancient world had long outgrown. But the mother right is itself permeated through and through with primitive mythological conceptions, so that we are in this case thrown back with practical certainty upon a religious origin of the custom. As an instance of the transformation by custom of the purpose of a religious ceremonial, we may take the funeral feast. In primitive times the "funeral baked meats" were furnished forth as a sacrificial feast; the mourner seeks in part to obtain the favor of the gods for his dead and in part to offer worship to the dead man himself. Later the feast becomes a meal shared in all piety with the dead; the survivors symbolize their brotherhood with the departed by partaking of the meat which is to sustain him on his pilgrimage to the other world. Nowadays the cake and wine may be offered quite perfunctorily, or may bring so much of comfort to the mourners as springs from the conviction that they have dealt handsomely with the dead, or may serve as an excuse for ill-timed carousals. In any event it has completely lost its primary significance and has persisted only by virtue of that *vis inertiæ* which makes custom at large so valuable a mine of information to the anthropologist and social psychologist.

Consult: Wundt, *Ethics* (London, 1902); id., *Völkerpsychologie* (Leipzig, 1911); id., *Elemente der Völkerpsychologie* (ib., 1912); Tylor, *Primitive Culture* (London, 1903); id., *Early History of Mankind* (ib., 1878); id., *Anthropology* (New York, 1905). See ANTHROPOLOGY. For the legal aspect of custom, see the following article.

CUSTOM. In the legal sense, a usage which has obtained the force of law and which will, accordingly, be enforced by the courts. As is explained in the article on CUSTOMARY LAW, the greater part of the legal rules enforced by society are the expression of customs, and custom continues to be an important, though diminishing, source of law in civilized as well as in primitive society. Indeed, it is only in the progressive communities, where the constantly accelerating progress multiplies social needs faster than they can be supplied by the slow processes of custom, and where the political consciousness has kept pace with this progress, that conscious legal development by legislation and judicial action tends more and more to supplant the unconscious development of customary law. In the nonprogressive societies, which vastly outnumber the progressive, custom is still the principal, if not the only, source of law.

English and American law writers distinguish between *general* and *particular* customs, the former being of general observance and constituting the body of the common law, and the latter being restricted to the inhabitants of a particular district or the members of a certain calling. As an example of the former may be cited the right of the public to use the seashore, between high and low water mark, for landing and other lawful purposes; and, as an example of the latter, the right of persons engaged in the business of towing, on some parts of the river Thames, to go upon the banks of the river for that purpose, though the land is the private property of abutting proprietors. There is, in truth, and from the point of view of jurisprudence, no distinction between the two classes of customs, both depending alike upon immemorial usage, and both, when established, having equally the force of law. In practice, however, the common-law system has made a distinction between them for the purpose of establishing them, the courts taking "judicial notice" (q.v.) of general customs as a part of the common law which it is their business to interpret and declare, but requiring proof of the existence of local or other particular customs. But the line between the two classes is not very accurately drawn, the custom of the County of Kent, known as "gavelkind" (q.v.), whereby lands descend to all of the sons equally instead of to the eldest only, and the still more curious custom of "borough English" (q.v.), under which lands descend to the youngest son in preference to his elder brothers, and which is confined to no particular area, but affects isolated estates or manors in various parts of England, being recognized as parts of the common law, notwithstanding their limited occurrence. Doubtless these exceptional cases are to be explained by the great antiquity of the customs in question and their early recognition by the courts. Of a similar character is the *lex mercatoria*, or custom of merchants, which, though applying only to a limited class in the community, has also become incorporated in the common-law system and is noticed by the courts without special proof of its terms.

In order that a particular or local usage, alleged to be a custom, shall have the force of law, (1) the practice "must have been used so long that the memory of man runneth not to the contrary"—i.e., as the phrase is understood in England, from the accession of Richard I (1189); (2) it must have been continued without interruption; (3) it must have been peaceable and acquiesced in, not subject to contention and dispute; (4) it must be definite and certain; (5) it must be reasonable. The question of the reasonableness of a custom is often one of great difficulty. It has been decided that any usage relating to land which is destructive of the land itself, or which deprives the owner of the beneficial use of it, is unreasonable. Thus, a custom for all the inhabitants of a village to play games or walk for recreation on private property has been held to be reasonable, while a custom for all the inhabitants of a village to pasture cattle on private land is, in its turn, unreasonable. As usually stated, the rule is that a right in the nature of an *easement* may arise by custom, but not a right in the nature of a *profit*.

It is doubtful whether local or particular customs can arise generally in the United States. It has usually been assumed that the common-law rules above set forth are in force in this country, and a few States have so held. It has, on the other hand, been decided in New Jersey and Virginia that no rights in another's land can arise by custom, and the decisions have been put upon the ground that there is in the United States no possibility of a usage having the requisite antiquity (i.e., of dating from the reign of Richard I) to give it the standing of a custom enforceable at law.

The courts sometimes make a further technical distinction between local or particular *custom* and *usage*—the former being of compulsory legal effect, and the latter consisting of current practices, to which parties may or may not conform, and in accordance with which they are supposed to have regulated their conduct or agreements. Thus, in matters of contract, a usage affecting the trade or calling with which the contract has to do may be dealt with as an understood but unexpressed term of the agreement; and in matters of tort, as an allegation of negligence, the usage of the community (as, e.g., the so-called "rule of the road") may be called into play to determine the presence or absence of negligence. Consult: Blackstone, *Commentaries on the Laws of England;* Holland, *Elements of Jurisprudence* (9th ed., London, 1900); Holmes, *The Common Law* (Boston, 1881); Pollock and Maitland, *History of English Law* (2d ed., ib., 1899); Gale, *Treatise on the Law of Easements* (7th ed., London, 1899); Jones, *Treatise on the Construction or Interpretation of Commercial and Trade Contracts* (New York, 1886). See COMMON LAW; CONTRACT; EASEMENT; LAW; PROFIT.

CUSTOMARY FREEHOLD. In English law, a variety of copyhold tenure, sometimes called "privileged copyhold," which differs from the common form of that tenure in that it is not expressed to be "at the will of the lord." It is not a true freehold, however, the freehold title being actually vested in the lord of the manor. As the title indicates, this form of tenure owes its origin to the local custom of a manor or borough. It is of infrequent occurrence in England and has never existed in the United States. See COPYHOLD, and the authorities there referred to.

CUSTOMARY LAW. The body of customs recognized as binding in any social group or community and enforced by its authority. As, in the evolution of humanity, social habits or customs precede the definite organization of social groups, such an organization, when it arises, finds a body of customary observances ready to be transformed, and in process of being transformed, into positive law. This body of customs constitutes the entire legal system of primitive society, and the development and recognition of new customs and the modification of old customs are its principal, if not its only, means of expansion and change. Indeed, the primitive codes—as the Mosaic law of the Jews, the laws attributed to Lycurgus among the Greeks, the Twelve Tables of Rome, and the more recent barbaric codes (*leges barbarorum*) of the early Middle Ages—represent little more than a statement, in precise and definite form, of the body of custom which had already gained the force of law in the community. It is only when a community has reached the stage of political consciousness that it undertakes deliberately, by legislation or judicial methods, to effect changes in its laws; and even then custom, though relatively diminishing in importance, continues to be an important source of new law.

Customary law, then, is the foundation and basis of all existing legal systems. Of many, if not most, of those systems it constitutes by far the greater portion of the body of rules of which they are composed, and in all of them it forms an important increment of their growth. Even where the political and legal consciousness of a community has reached the stage of sweeping legal reform—as in the Eastern Empire under Justinian and in France under Napoleon Bonaparte—the resultant code of laws, however comprehensive, must be based upon, and must consist mainly of, the rules of the customary law which it is intended to supersede, and its most radical departures from that law are most swiftly corrected by the judicial organs of the community. Undoubtedly the most complete and widespread transformation which the customary law of mankind has ever undergone was the general reception throughout Europe of the civil-law system of Rome. (For the history of this process, see CIVIL LAW.) Only the common-law system of England, upon which that of the United States is based, was able to withstand that influence; and this is still, for the most part, consciously and avowedly a body of customary law. (See CODE; COMMON LAW.) Under the influence of the spirit of nationality, which has so powerfully affected the nations of Europe during the last quarter of the nineteenth century, there has recently developed a strong sentiment in favor of the revival of the local customary law, as against the more general law of foreign origin. This is particularly noticeable in the recent revision of the German codes.

Consult: Maine, *Ancient Law* (11th ed., London, 1887, or any other edition), and *Lectures on the Early History of Institutions* (6th ed., ib., 1893); Lee, *Historical Jurisprudence* (New York, 1900); Blackstone, *Commentaries on the Laws of England,* book i, pp. 63–84; Bryce, *Studies in History and Jurisprudence* (New

York, 1901); Holmes, *The Common Law* (Boston, 1881); Pollock and Maitland, *History of English Law* (2d ed., ib., 1899).

CUSTOMHOUSE. The office in a port of entry (seaport or lake port) where masters of ships are bound to enter and clear their vessels according to the statutes governing the subject, and where importers of merchandise must pay customs duties. In the United States the customhouse of each port is under the direction of a collector of the port, appointed by the President with the advice and consent of the Senate. He is responsible for its proper conduct, subject only to the direction of the Secretary of the Treasury, and it is his duty to carry out the United States statutes and tariff laws governing and restricting the importation of foreign goods. See CUSTOMS DUTIES.

CUSTOM OF THE COUNTRY, THE. The title of a play by Fletcher and Massinger (about 1628), in part taken from Cervantes. A play by Mrs. Centlivre, with the same title, was produced in 1715.

CUSTOMS DUTIES. Taxes levied upon merchandise which passes a frontier, generally upon goods imported. Such taxes are of very early origin, and in the long conflict between the English King and the Commons over the right of taxation it was claimed that these taxes were ancient customs over which Parliament had no jurisdiction. Hence the name which has since clung to this class of taxes. It appears that in their origin such taxes were largely in the nature of payments for privileges of trading at certain places and for use of the facilities of ports and markets, but that they soon passed beyond the stage of fees into that of imposts. The name "customs duties" was applied indifferently to the taxes levied at ports of entry or at ports of passage or upon goods brought into a city from surrounding parts of the same country. Such internal customs have almost disappeared in modern countries, though remnants of them are found in the "octroi" of Paris and other continental cities. Transit taxes, such as those levied upon the navigation of the Rhine, have also disappeared. Such restrictions upon the freedom of commercial intercourse would no more be tolerated in modern times than the tributes once paid to the Barbary pirates.

Taxes upon exports have become infrequent. They are no longer an element of consequence in the fiscal system of modern states, though a few remnants of them can be found. In South America such taxes are more common. Chile derives considerable revenue from its nitrate exports, and Brazil from its coffee exports. Quite striking, as a return to older forms of taxation supposed to be laid aside, was the imposition in 1901 of a tax of one shilling per ton upon all coal exported from Great Britain.

Customs duties are, therefore, generally synonymous with duties upon imports. Such duties may have no other object than to raise revenue. The most conspicuous case of such a purely fiscal tax is when the imported article is taxed to exactly the same extent as the home product, such a tax aiming to equalize the conditions of competition for the foreign and the home producer. Another distinctly fiscal tax is one imposed upon an article not produced in the home country, as the English duty upon tea. Taxes which weigh more heavily upon the foreign article than the home product, or which are levied upon imports where the same article is not taxed at home, may be purely fiscal in intent or may be designed as a protection for home industries. It is not the magnitude of the taxation which decides this point, but the effect upon the economic order. It is well understood that any taxation whatever influences consumption and production, but this influence may be deliberately planned or incidental. It is the deliberate planning which characterizes a protective tariff. Whether such a course is to be justified is not to be discussed here. (See FREE TRADE; TARIFF.) It is enough for our purpose to note that the injection into tariff legislation of ulterior economic motives complicates the machinery of customs duties in a high degree. Such a course does not eliminate the fiscal features of a tariff, as there are few states which can afford to handle their customs taxation in such a way as entirely to subordinate fiscal interests to economic policy.

The contrast between a purely revenue tariff and a protective tariff is illustrated most strikingly by comparing the United States and Great Britain. In the latter the general principle is freedom from taxation, duties being laid upon a few articles only, 27 in all. In the United States the general principle is taxation, and all articles not specifically taxed at rates named, or expressly exempt from taxation, are subject to a duty of 10 per cent if unmanufactured and of 15 per cent if manufactured in whole or in part. The articles subject to tax, by the tariff law of 1913, fall under 386 paragraphs, divided into schedules lettered from A to N. The following table indicates the nature of these schedules and the paragraphs under each. The free list embraces 271 paragraphs.

SCHEDULES	Paragraphs fixing rates
A. Chemicals, oils, and paints	70
B. Earths, earthenware, and glassware	41
C. Metals, and manufactures of	66
D. Wood, and manufactures of	9
E. Sugar, molasses, and manufactures of	4
F. Tobacco, and manufactures of	5
G. Agricultural products and provisions	51
H. Spirits, wines, and other beverages	13
I. Cotton manufactures	17
J. Flax, hemp, and jute, and manufactures of	19
K. Wool, and manufactures of	25
L. Silks and silk goods	9
M. Pulp, paper, and books	13
N. Sundries	54

Customs duties are specific and ad valorem—the former being reckoned by the quantity of the goods imported (weight, measure, or number), and the latter by the value. Theoretically, the ad valorem duties are the preferable, as they adjust the amount of the burden to the value of the article. But they offer great practical difficulties in ascertaining the value of the goods. As the statements of the importers, even when made under oath, are not accepted as final evidence as to the value of the goods, a complex machinery for the ascertainment of values is a necessary adjunct to all ad valorem taxes. Hence the preference for specific duties, which can be imposed readily according to the physical characteristics of the objects imported. Such specific duties fall unequally upon objects of high value and low value in the same class. Thus, if all textiles were taxed 15 cents a square yard, such a tax would be prohibitive on print

cloths, but insignificant upon silks. It is the plaint of the protectionist that specific duties protect only the lower grades of goods from foreign competition. The only method of mitigating this is to make a minute division into classes. The greater convenience of administration has produced a general sentiment in favor of specific duties, but nations which pursue an avowedly protectionist policy cannot yield to this sentiment as largely as those whose tariff is for revenue only. Specific duties can best be applied when the product is comparatively uniform in quality and value. In Great Britain, Germany, and Austria, only specific duties prevail, and the tariffs in France and Italy show very few ad valorem rates.

With these countries the United States stands in marked contrast. Here ad valorem rates are abundant, but the provisions of the act are so complex that a separation of rates into two classes only is not practicable, and it has become necessary to add a mixed class. This includes several cases: (1) when two articles are named in the same paragraph, one receiving an ad valorem and the other a specific tax; (2) where one article receives both forms of tax; (3) where an article is classed according to value and then receives a specific tax for each class. Other combinations also occur, as where an article is classed according to value and receives a different ad valorem rate in each class, or again when classed according to specific characteristics and taxed at different ad valorem rates, but these combinations are classed as ad valorem rates. Specific rates predominate in the schedules A, C, F, G, and H, but in the others ad valorem and mixed rates prevail.

Consult: United States Tariff Law of 1913; Annual Reports of Commerce and Navigation; Statistical Abstracts of the United Kingdom and of the principal foreign countries. See FREE TRADE; TARIFF; TAX.

CUSTOMS OF WAR. See WAR; HONORS OF WAR; SALUTES; LAWS AND USAGES OF WAR.

CUS'TOS RO'TULO'RUM (Lat., keeper of the rolls, or records). An office of great antiquity and dignity in England. It is usually held by the first civil officer of the county, as the Lord Lieutenant, though the actual custody of the records of the sessions of the peace and of the commission of the peace, constituting by eminence "the rolls" of the county, is vested by statute in the clerk of the peace. Formerly the office was filled by appointment of the Lord Chancellor, but it has for over 300 years been conferred by the crown. The Keeper of the Rolls is always one of the commission of the peace, though the title of the office points to ministerial rather than to judicial functions.

CUSTOZZA, kōō-stōd'zȧ. A village in the Province of Verona, North Italy, situated 11 miles southwest of Verona (Map: Italy, E 2). On July 25, 1848, and on June 24, 1866, the Italians were defeated here by the Austrians. (See ITALY, *History.*) In 1879 a monument was erected to the fallen. Consult Mathes von Bilabruck, *Taktische Studie über die Schlacht von Custozza im Jahre 1866* (Vienna, 1891).

CUSTRIN, kụ-strēn'. See KÜSTRIN.

CUTA'NEOUS SENSATIONS (Fr. *cutané,* Portug., It. *cutaneo,* from Lat. *cutis,* skin). The sensations aroused by stimulation of the skin and of the superficial mucous membrane. The skin has been credited, in one or another psychological system, with a large number of sensations: sensations of contact, pressure, impact, movement, resistance, weight, touch; hardness, roughness, wetness, and their opposites; warmth, heat, cold; pain, tickling, goose flesh, pricking, tingling, creeping. (See COMMON SENSATION.) When, however, the organ is explored, point for point, by mechanical, thermal, and electrical stimuli, it proves to be capable of four sensation qualities, and, as far as investigations have gone, of four only: pressure, warmth, cold, pain. The so-called sensations of dryness, weight, resistance, touch, smoothness, etc., have proved to be perceptions, made up of sensations from the skin and from the underlying tissues. Pricking, tingling, etc., are in all probability circulatory sensations, aroused by change of blood flow or blood supply; their organs and mode of excitation are imperfectly known. We shall return to heat and tickling below; we now take up the cutaneous qualities in order.

1. *Pressure.*—If a small point of cork or soft wood be set down firmly upon the skin surface, e.g., on the back of the hand, one of two things will happen: either it will arouse a dull, vague, diffuse pressure sensation, or it will arouse a sharp, distinct pressure, the kind of sensation that one might suppose to come from the inward pressure of a little hard seed lodged in the cutis. (Goldscheider.) If the point be now applied lightly, we get either no sensation at all, or (at the place where the seed pressure was before produced) a light, fine, rather ticklish pressure sensation. The seed pressure, which, however, probably involves subcutaneous in addition to the cutaneous organs, and the ticklish pressure come from the organs of the pressure sense, the "pressure spots" as they are called. The dull pressure with intensive stimulation is set up by the indirect affection of several pressure spots; the stimulus makes an indentation in the skin, and the dragging down of the tissue squeezes the pressure organs that lie about the point of application. The absence of sensation with light contact means that the experimenter has applied the stimulus at a point of the skin which has no pressure organ. We see then, from this simple experiment, that the skin is not uniformly sensitive to pressure; it may rather be compared to a mosaic of tiny blocks, some of which are sensitive, while the rest are insensitive, to mechanical stimulation.

A careful exploration of the cutaneous surface, undertaken with the object of mapping the pressure spots, has led to two definite results. (*a*) If the portion of the skin explored is hairy, the pressure spot lies always to windward of a hair shaft, immediately above a hair bulb. It follows that the nerve skein which enfolds the bulb is the terminal organ of pressure, and that the hairs are as truly sense apparatus in man as they are, e.g., in the cats. (*b*) If the region is hairless, pressure spots, arranged in lines and groups, can still be identified. The organs in this case are the corpuscles of Meissner.

2. *Warmth and Cold.*—If the blunt point of an ordinary lead pencil be drawn slowly over the back of the hand, it will give rise, from time to time, to little flashes of cold; over the rest of its course it will arouse nothing but pressure sensations. If the point be warmed, and drawn in the same way over the closed eyelid, it will give rise, from time to time, to little dots of warm sensation; at other points it excites nothing but pressure. There is, then, a mosaic of

temperature organs as there is a mosaic of pressure organs. Moreover, if a small square or circle of skin is accurately marked, and explored twice over, once with a cooled and once with a warmed point of metal, it will be found that the cold and warm organs do not coincide. A cold organ never gives a warm sensation; a warm organ never responds to stimulation by a cold sensation. While, therefore, we are justified, physically, in speaking of "degrees" of temperature, and in arranging "warms" and "colds" upon a single thermometric scale, we must recognize the fact that, psychologically regarded, warmth and cold are distinct things; there are two temperature senses, each with its own distribution and its peculiar terminal organs. The organs of cold are more numerous than those of warmth. They are to be found, perhaps, in the end bulbs of Krause, and the organs of warmth in the cylinders of Ruffini (von Frey). All these cutaneous organs are of extremely simple structure, consisting of little more than a skein or tangle of nerve fibrils, twined about a cluster of connective-tissue cells. All alike are readily fatigued; and all show differences of responsiveness or "attunement"—some answering a given stimulus with an intensive, others with a weak, sensation.

3. *Pain.*—If a small area of skin, say, upon the back of the hand, be shaved, moistened, stretched taut, and explored, point for point, by a fine horsehair or needle, sensations of pain—more closely distributed than any of the three preceding sensations—will be obtained. The pain sensations are the most delicate—the smallest, so to speak, of all the skin sensations. The pain quality is unmistakable; even a novice will have no difficulty, after the first few trials, in distinguishing it from the ticklish quality of fine pressures. Moreover, it can be elicited independently of the pressure sensations. Hence there can be no doubt that pain is a new, fourth sense, endowed with organs of its own.

These organs are, in all probability, the free nerve endings in the epidermis. The epidermis lies, like a layer of stiff leather, upon the elastic cutis. When, then, the skin is lightly touched, the resulting vibration passes *through* the epidermis to the underlying cutis; the epidermis, with its organs, is not stimulated at all. When, however, the skin is bruised, so that the epidermis is actually broken or crushed; or when the epidermis is itself explored, under experimental conditions that render it accessible to stimulation—then the pain quality is evoked. The mechanical character of cutis and epidermis thus enables us to explain the apparently paradoxical fact that the pain organs are placed more superficially than the organs of pressure, and yet that, under ordinary circumstances, it takes less stimulation to call out pressure than to excite pain.

4. *Heat.*—We have seen that warm spots give only sensations of warmth, and cold spots only sensations of cold. It is remarkable that, while the cold spots do not as a rule respond to warm stimuli—as, indeed, we should not expect them to do—they respond, by a distinct cold sensation, to heated stimuli of some 45° C. or over (von Frey's "paradoxical cold"). On the other hand, warm spots may mediate a faint sensation of warmth in response to stimuli that are slightly cooler than the skin ("paradoxical warmth"); a very cold stimulus does not affect them. If a piece of metal, heated above 45°, be laid upon a portion of the skin that is furnished with both cold and warm spots, the result of the combined excitations is not warmth, or cold, or pain, but what at first seems to be a new quality, that of heat. A good place for experimentation is the median line of the forehead, close up to the hair. Raise the temperature of the metal from 40° upward, by 1° steps. For the first few trials you get nothing but a mild warmth, from the warm spots. But as soon as you pass the critical temperature (the heat that, if the metal were a point, would evoke from a cold spot the paradoxical cold sensation), you get a distinct sense of heat. Thus psychophysically heat is a fusion, a mixture of the stimulus qualities warm and cold. To introspection it is apt to appear as a simple quality, but may, under repeated observation, yield to analysis.

5. *Tickling.*—The psychophysics of this sensation complex is also obscure. Tickling may be set up, at certain parts of the cutaneous surface, by light intermittent pressure or even by a single light touch. The resulting pressure sensations are (*a*) in some way diffused, so that the area of sensation presently becomes much larger than the area of original stimulation. Concomitant sensations of pressure (see COMMON SENSATION) may also be aroused in remote regions of the skin. It is possible (*b*) that the smooth muscle fibres at the roots of the hairs, the muscles that cause the hair to "stand on end" and whose contraction produces goose flesh, may contain sensory nerve endings which function in the tickling complex. (*c*) The occasional thrills of warmth which are characteristic of tickling are due, apparently, not to mechanical stimulation of the warm spots, but to a change of blood supply in the vessels of the cutis. Weak pressure or blowing upon the skin is known to increase the arterial blood pressure. (*d*) There is, in general, no reference to the stimulus, nor any definite visualization of the surface affected. (*e*) The movements of withdrawal have been ascribed to the unpleasantness of the intermittent stimulation; a flickering light, a beating tone, an interrupted pressure, are all disagreeable. While this statement may contain a part of the truth, it seems probable that the movements are referable, in part at least, to reflex connections between the sensory and motor nerves, akin to the connections which, on the purely sensory side, subserve concomitant sensation. Moreover, laughter is the direct motor response to tickling, and unpleasantness does not arise unless the stimulation be long continued. (*f*) For theories of the connection of laughter with tickling, see LAUGHTER.

For the sensitivity of the internal organs, including the alimentary canal, to pressure, pain, warmth, and cold, see ORGANIC SENSATIONS.

Bibliography. For a general account of experimental work upon the cutaneous "spots," consult: Wundt, *Physiologische Psychologie*, ii (Leipzig, 1910); Titchener, *Experimental Psychology* (New York, 1901); id., *Text-Book of Psychology* (ib., 1910); Sherrington, in Schäfer's *Text-Book of Physiology*, ii (Edinburgh, 1910).

See PAIN.

CUTCH, or **KACHH,** kŭch (Skt. *kaccha*, shore). A native state under the Presidency of Bombay, British India, occupying the peninsula south of Sindh, between the marshy tracts of the Rann, or Runn, of Cutch and the Gulf of Cutch. It covers an area of 7616 square miles, excluding the Rann of Cutch (Map: India, A 4).

Its soil is mostly sterile. The climate and meteorological conditions are extremely unfavorable for vegetation and rainfall is light. Its chief products are minerals and salt. The Rann is a morass of 9000 square miles in area. It is flooded during the monsoon by salt water, but by December 1 it is comparatively dry. Cutch has a feudal system of government, the ruling power being confined to the dynasty of Jharija Rajput, of which there are about 200 members. Pop., 1891, 558,415; 1901, 488,022; 1911, 513,529. About one-third of the inhabitants are Mohammedans, the rest Hindus of various castes. Chief town, Bhuj.

CUTCH, or **KACHH GUNDAVA,** gŭn-dä'vȧ. A region in Baluchistan, east of Khelat. The Hala Range of mountains extends along the western frontier. The area is a desert, with an annual rainfall of but 3 inches, but the soil under irrigation yields bountiful crops of grain and cotton. The hot summer winds from the interior are not easily endured.

CUTCH, GULF OF. An inlet on the north border of the Arabian Sea, lying between Cutch and the peninsula of Kathiawar, British India (Map: India, A 4). It is about 30 miles wide and 100 miles long and connects at its upper end with the Little Rann (or Runn) of Cutch, and through this with the great western Rann, the remarkable salt marshes lying to the east and north of Cutch.

CU'THA, or **KUTHA.** An ancient city in Babylonia, identified by Rawlinson, Rassam, and Delitzsch with the present Tell Ibrahim, 25 miles N. E. of Babylon. It was connected with Sippara (Abu Habba) by a canal. The city is mentioned already by Sargon and Manishtusu. Its famous Nergal temple was built by Dungi of Ur; the zikkurat, or temple tower, was dedicated to Nannar, the moon god. One of the creation stories (see CREATION) came into Asurbanipal's library from Cutha. It remained an important religious centre until the time of Nabunaid. Men from Cutha were carried away, probably by Asurbanipal after 648, to Samaria (2 Kings xvii. 24) where they continued to worship Nergal (vs. 30). Hence the Samaritans were often spoken of in later times as Cuthæans. In 1881 Hormuzd Rassam conducted for a few weeks excavations at Tell Ibrahim without noteworthy results. Consult Delitzsch, *Wo lag das Paradies* (Leipzig, 1881); Zehnpfund, *Babylonien in seinen wichtigsten Ruinenstätten* (Leipzig, 1910); Ed. Meyer, *Geschichte des Altertums*, 3d ed. (Berlin, 1913).

CUTHBERT, kŭth'bĕrt. A city and the county seat of Randolph Co., Ga., 118 miles southwest of Macon, on the Central of Georgia and the Georgia, Florida, and Alabama railroads (Map: Georgia, B 4). It is the seat of Andrew Female College (M. E. So.), opened in 1854, and of Bethel Military College (for men). Fruit growing and farming are the principal industries, and there are fertilizer factories, cotton-compress and grist mills, cotton-oil mill, and ginneries. The water works and electric-light plant are owned by the city. Pop., 1900, 2641; 1910, 3210.

CUTHBERT, SAINT (c.635–687). Bishop of Lindisfarne and one of the most popular saints in England in the Middle Ages. He was born about 635, probably of Northumbrian parents. In 651, moved by a vision of angels carrying to heaven the soul of St. Aidan, he entered the monastery of Melrose. Ten years later he was put at the head of this monastery and did noble missionary work in the surrounding country. He left it in 676 for an austerer hermit life, from which he was withdrawn in 684 to accept the Bishopric of Hexham, which he exchanged for that of Lindisfarne, holding the latter only two years and returning (687) to his solitary hut on Farne Island. Here he died, March 20, 687.

The influence of St. Cuthbert upon his contemporaries was great, but his fame became even greater after his death. His body remained at Lindisfarne till 875, when the monks, bearing it on their shoulders, fled from the fury of the Danes. After many wanderings through the south of Scotland and the north of England, they found a resting place at Chester-le-Street in 883. In 995 the remains were transferred to Ripon, and then to Durham, where, inclosed in a costly shrine and believed to work frequent miracles, they remained until the Reformation, when the shrine was defaced and the body buried under the pavement of the cathedral. The tomb was opened May 17, 1826, when a coffin ascertained to have been made in 1541 was found to inclose two others. The innermost case contained a skeleton, still entire, wrapped in five robes of embroidered silk, and also the head of King Oswald, killed in battle (642), which it was known had originally been buried with the saint. His life was twice written by the Venerable Bede and still earlier by a monk of Lindisfarne. Besides these lives, all of which have been printed more than once, and what is told of him in Bede's *Historia Ecclesiastica Gentis Anglorum*, are modern lives: Raine (Durham, 1828), Eyre (London, 1849; 3d ed., 1887), and Fryer (London, 1880).

CUTHBERT OF CANTERBURY (?–758). An English prelate. He was born in the Kingdom of Mercia, became Bishop of Hereford in 736, and Archbishop of Canterbury in 740. He died on Oct. 26, 758. An instructive letter was addressed to him by St. Boniface, in reply to one from him relating the doings of a council which determined upon closer relations between the English church and that of Rome. This letter has been printed more than once and will be found in the appendix to Hussey's edition of Bede, *Historia Ecclesiastica* (Oxford, 1846).

CUTHBERT'S BEADS, SAINT. See BEADS, SAINT CUTHBERT'S.

CU'TICLE. See SKIN.

CUTICLE (Lat. *cuticula*, dim. of *cutis*, skin). In plants, a hyaline film covering the surface of plants, and derived from the outer walls of the epidermal cells. The film consists of "cutin," which is a transparent, elastic substance, only slightly permeable to water. The process of formation of the cuticle is called "cutinization," or "cuticularization." The term "cuticle" is sometimes loosely used instead of "epidermis," and is not to be confused with the same term as used by zoölogists. See MORPHOLOGY IN PLANTS.

CU'TIN (in plants). See CUTICLE.

CU'TINIZA'TION (in plants). See CUTICLE.

CUT'LASS (Fr. *coutelas*, from OF. *coutel*, *cultel*, Fr. *coutean*, knife, from Lat. *cultellus*, dim. of *culter*, knife). A short curved sword formerly used in men-of-war as a side arm for the men. The blade was usually about 27 inches long, an inch wide, and had a bowl-shaped guard on the hilt. See SWORD.

CUTLASS FISH. A remarkable fish (*Trichiurus lepturus*), alone representing in this coun-

try a family (Trichiuridæ, the hairtails) of pelagic fishes allied to the sailfishes and better known elsewhere. Its body is long, bandlike, tapering into a hairlike tail, scaleless, and covered with a glistening white skin, so that its resemblance to a sword or to a silver scabbard justifies the European "scabbard fish," or the names "swordfish," prevalent along the Gulf coast, and "silverfish," heard in Florida. Its length may reach 2 or 3 feet, and it swims mostly at the surface, often leaping above it (whence another local name, "skipjack") in pursuit of its prey; and it is sought by anglers both for sport and food. In Jamaica, indeed, it

CUTLASS FISH: MOUTH OPEN AND SHUT.

forms the object of a commercial fishery; and another species is the highly esteemed frostfish (q.v.) of New Zealand.

CUT'LER, Elbridge Jefferson (1831–70). An American scholar and poet, born at Hollis-ton, Mass. He was professor of modern languages at Harvard from 1865 until his death. His works include *War Poems* (1867) and *Stella* (1868). In addition to his creative work, he wrote much criticism.

CUTLER, Manasseh (1742–1823). An American clergyman and botanist. He was born in Killingly, Conn., graduated at Yale in 1765, and in 1767 was admitted to the bar. He then studied theology, was licensed to preach in 1770, and from 1771 until his death was pastor of Hamlet Parish, Ipswich, now the town of Hamilton, Mass. During the latter part of the Revolutionary War he served as chaplain of a Massachusetts regiment. He subsequently studied medicine and botany and was the first to make a systematic study of the plants of New England, 350 species of which he classified in accordance with the Linnæan system. As the representative of a number of old Revolutionary soldiers, he contracted with Congress for 1,500,-000 acres of the public lands northwest of the Ohio, and in 1788 materially assisted the party of Connecticut farmers who, under the lead of Rufus Putnam (q.v.), founded Marietta, Ohio (q.v.). He is generally credited, moreover, with having made the first draft of the famous Ordinance of 1787. He himself went to Marietta in 1788, but soon returned to Massachusetts, and from 1801 to 1805 was a member of Congress. He was a frequent contributor on scientific subjects to the *Proceedings* of the American Academy, and wrote the chapter on trees and plants in Belknap's *History of New Hampshire.* Consult William P. and Julia P. Cutler, *The Life, Journals, and Correspondence of Manasseh Cutler* (Cincinnati, 1888).

CUTLER, Timothy (1683–1765). An American clergyman. He was born at Charlestown, Mass., graduated at Harvard in 1701, became president of Yale College in 1719, but was forced to resign (1722) on account of his prelatical tendencies. He went to England and was ordained a minister of the Church of England by the Bishop of Norwich (1723) and received the degree of D.D. from both Oxford and Cambridge; he returned to Boston, became rector of Christ Church (1723), and died there, August, 1765. Some of his letters appear in Nichols, *Illustrations of the Literary History of the Eighteenth Century* (London, 1817–58).

CUT'LERY (from *cutler,* AF. *coteller,* OF. *cotellier,* Fr. *coutelier,* from ML. *cultellarius,* knife maker, from Lat. *cultellus,* little knife). A term broadly applied to cutting instruments in general, but, as more commonly employed, its use is limited to such cutting utensils as pocket, pen, and table knives, razors, shears, and scissors. Shells and sharp-edged stones formed the rudest and most ancient cutting instruments. These were followed by bronze weapons and instruments which were used by the Romans as late as the beginning of the Christian era. In the remains of Pompeii, however, knives, shears, and lancets were found made of iron or steel as well as bronze. During the Middle Ages, when the chivalry of the period sought the best equipment, certain cities of Spain and Italy acquired a high reputation for the manufacture of cutting instruments, especially of swords. The knives used by the Anglo-Saxons resembled in appearance the modern razor blade. Forks were used only for serving, as the custom of eating with forks, which was introduced from Italy, was not known in England until the time of James I. Knives were not placed on the table until about the close of the fifteenth century, and each person carried a knife with him for use whenever the exigencies of dining required other instruments than his fingers. As early as the reign of Richard I Sheffield had gained a reputation for the excellence of its *whittles,* Chaucer referring to a Sheffield "thwytel," or whittle. In 1415 the cutlers of London obtained a charter from Henry V. In the seventeenth century, when England had acquired a reputation throughout Europe for the quality of its cutlery, Birmingham was regarded as the centre of the industry; but during the nineteenth century Sheffield regained its old preëminence.

In America, although some tools were manufactured in Pennsylvania as early as 1810, the first cutlery factory was at Worcester, Mass., and dates from 1829, when a pen and pocket knife factory was established there.

The manufacture of table cutlery in the United States began in 1832, when a factory was built at Saccarappa, Me. With the improvement of the quality and lowering of the price of American steel, the industry steadily developed. The annual product in 1909 of cutlery and edge tools, which includes also shears, axes, swords, joiner's tools other than saws, as reported by the Thirteenth United States Census of 1913, amounted in value to $22,884,914, produced by 281 establishments, with a maximum number of wage earners of 16,997, showing an increase in value from 1850, when the product was but $3,813,000 and the number of workers 4275, though there were 401 establishments. In 1913 the United States imported cutlery valued at $2,026,564 and distributed as follows: pen or pocket knives, $752,705; razors, and parts of, $391,303; scissors and shears, $604,029; all other cutlery, $278,527. America has excelled in the production of "medium" goods—i.e., goods of tasteful design and good quality at a moderate price, and has developed such specialties as the safety razor; but in the manufacture of other branches of cutlery it has not been so successful. Although it is claimed that an equally good quality is produced at home, still the United States

imports from England large quantities of the finest grades, especially pocket knives. In the very cheap grades, such as vegetable and other kitchen knives which retail in the United States for a few cents apiece, America cannot compete with Germany. Many English workmen, attracted by high prices and steady employment, came over from Sheffield to work in the Connecticut shops. As the industry early became established in that State, some of these afterward migrated to Walden, N. Y., where they built a coöperative factory, and since that time over 50 factories, many of them coöperative, have been established, a number of which have failed, while others have sold out, or have been reorganized as corporations. The piece system of paying the operative still prevails to a large extent in cutlery shops, though the work is done for the most part in large factories. All the early cutlery was hand-forged, and this practice is still general in England and in the United States for the manufacture of some of the best pocket and pen knives. In the latter country to-day, however, large quantities of pocket and pen knives and apparently all table knives and most carving and butcher knives are machine-forged. Machinery is used for driving the various grinding stones, emery and buffing wheels for finishing blades and handles. In some instances, also, the blades are placed in holders and manipulated by automatic machinery for the rough grinding. The evil effects from the grinding dust are now obviated, as far as possible, by wet grinding and by exhaust fans and ducts for removing the dust. The hand and machine processes for making different kinds and grades of cutlery vary greatly in detail. But a fair general idea of the industry may be gained by first describing the actual operations of an American pocket and pen knife factory where hand-forged goods are made, and then indicating in a more general way some points of difference in the manufacture of other kinds of cutlery.

Pocket and Pen Knives. Each knife, rough-speaking, consists of two parts, the blade and the handle, but each of these, from the manufacturer's standpoint, is composed of a number of parts. The blade consists of the blade proper, or cutting edge, and its supporting back, and of the tang, or the portion which joins the blade to the handle. The handle, in turn, includes (1) the horn, ivory, or other material which is grasped by the hand, and which portion alone is technically called the handle; (2) the scale, which is the brass or iron lining of the handle; and (3) the spring, which, besides its primary purpose of controlling the blade in opening and shutting, also closes the back of the lining.

The edge-tool steel from which pocket and pen knife blades are made is called "rod steel"; it is flat, of proper widths for the different sizes of blades, and of thickness one gauge greater than the finished blade. In the best goods the blades are forged and shaped by hand. In the case of cheap knives the blades are pressed into rough shape by machines, then further shaped or forged by trip hammers in much the same manner as that explained below in describing table knives. Comparatively little machinery is used on the blades in either case, except that the grindstones and finishing wheels are driven by mechanical power. The processes here described relate to high-grade goods.

Mooding is the name given to the rough shaping of the blade at the first heat, and the formation of the tang is called *tanging*. After these two processes are completed the metal is heated for the third time, the blade again worked by hammer, and the nail mark cut, which finishes the third or *smithing* process. All the forging is done by means of special hammers on special anvils. *Choiling* is filing the little nick just between the cutting edge and the tang. This removes a weak spot in the metal and serves as a guide in filing the blade flatwise. The blade is now shaped in the rough, but before it leaves the forge it must be hardened and tempered. *Hardening* is effected by bringing it to a red heat and dipping it in water up to the choil. The tang is left soft, so it may be readily filed, drilled, stamped with maker's name, and fitted in the handle. *Tempering* (q.v.) is often accomplished by bringing the blades to a purple heat on a thin copper plate, resting on the fire of the forge. The blades are set on their backs, thus keeping their edges furthest from the heat. The final work of the forger or smith is to straighten crooked blades, if any, by means of light hammer blows on the concave side of the blade.

Grinding is next in order. The grinder places the tang in a holder, which he grasps with one hand, while with the other hand, protected by a leather patch, he presses the blade against the rapidly revolving power-driven stone. *Racing irons*, consisting of small rods of Norway iron, are occasionally held against the face of the stone to restore the rough surface and preserve its cylindrical shape. *Material* is the name given to all the separate parts except the blade. The *material maker* presses out, or cuts out with dies, the steel springs and the brass or iron linings, and fastens the tips or bolsters to the outside of the lining, in case the material forming the handle proper does not cover the tip ends of the lining. *Cutler's work*, curiously enough, includes assembling, or putting together, the various parts of the knife, including drilling, filing, fitting, polishing, and buffing the handles. The material for handles embraces ivory, pearl, silver and gold, tortoise shell, buffalo and stag horn, celluloid, rubber, California redwood, cocoa wood, and ebony. *Polishing* the handles is accomplished by power-driven built-up wood wheels, covered first with leather, then with a mixture of glue and emery. *Buffing* is effected on wheels in which the leather, emery, and glue give place to cotton cloth, fastened on edge around a wheel or spindle. *Blade finishing* is done on emery wheels, much like the polishing wheels already described, except that the glue and emery are placed on very hard leather instead of on wood. *Glazing*, on these wheels, removes the dirt and gives a glazed finish. *Crocus finish* is a superior glaze, or polish, requiring special wheels.

Sharpening is done by hand, on flat stones. The edges of the blades are held at an angle of 45° with the stone, a point that might well be borne in mind by all who attempt to sharpen old knives. The common practice of holding the knives flat on the stone gives a thin, easily broken edge. Finally, the handles are again buffed and the whole knife wiped, packed, and boxed. The ordinary knife of fair quality has now gone through about 100 operations, while the finest goods receive 200 to 300. It may be added that the processes involved in machine-forged pocket and pen knives resemble those described for table knives in the next paragraph.

Table Cutlery, including ordinary and carv-

ing knives, and also forks, is an industry which by the use of machinery and factory organization and method has been brought to a high state of efficiency in America. The product was early standardized and adapted for large scale production as contrasted with England, where for many years manufacture was largely or wholly by hand. Knife blades and tangs are roughly shaped by rolling or by trip or drop hammers—an American innovation which, with its application to striking up the bolster or shoulder, increased the output of two men twentyfold—and are brought to a uniform shape and size by means of dies. The blades are hardened in oil, which is sometimes burned or blazed off. They are sometimes heated in a sand bath to secure the desired color and temper. The holes in the tang are punched and the blades are ground on large power-driven stones, 5 to 7 feet in diameter. Where machinery is used at every possible point, the blades are rough-ground by placing six or more in a brass frame, which is so manipulated as to give them both a side to side and vertical motion on the stone. The finish, however, is done by hand, on wheels similar in general character to those explained in describing pocket knives. The highest grades of steel table knives receive more hand work, but the cheaper ones have even less, and the handle, and in some cases the whole knife, is cast instead of wrought. The same is likewise true of forks, though steel forks, except for carving sets, are gradually decreasing in use with the cheapening and more general availability of plated ware. Wooden handles are generally in two pieces, united to the tang, but ivory, bone, horn, and various other materials are in one piece, with the tang inserted. The curved tines of forks are shaped by means of presses, or dies, and the tines are rough-cut in the same general manner. In some instances more or less forging, either by hand or machine, is employed. Silver-plated (see ELECTROPLATING) table knives and forks are plated on steel or on some softer malleable metal.

Scissors and **Shears** differ principally as to length, the dividing line in the trade being 6 inches, and the shorter instruments being classed as scissors. Some of the cheapest scissors are cast, but the best ones are hand-forged, though die forging with a heavy press is very much used, and a fly press is used to shear off the rim of superfluous metal so that the portion of the scissors is turned out ready for the grinder. English shears are of steel, but some of the best American shears, which are now largely exported, have their inner sides only of steel, "laid on" to shear blades of malleable iron, often cast in outside foundries.

Razors, at least those of good quality, are practically all hand-forged from razor steel, in much the same general way as pocketknives, but with greater care. There has been a recent tendency towards molding large quantities of razor blanks in a die or under a heavy stamp or hydraulic press. While this process presents difficulties, it was believed that eventually it would supplant the hand-made article. *Safety razors* of various types are provided with guards designed to make cutting the flesh impossible. The earliest safety razor is said to have been made by Michael Hunter, of Sheffield, England, about 1875. It was merely an ordinary razor with a guard. The later safety razors have detachable blades and adjustable guards. The cutting edge is generally shorter than in the ordinary razor, in some cases not much over an inch in length. The safety razor not only met a world-wide demand, but as hand forging and hand grinding were eliminated it soon became a commercial triumph. Consult: Lloyd, *The Cutlery Trades* (London, 1913), an excellent summary of the industry from its earliest days, giving a comparison of British and other methods; Landrin, *Die Kunst des Messerschmiedes* . . . (Weimar, 1836); Page, *La coutellerie depuis l'origine jusqu'à nos jours* (4 vols., Chatellerault, 1896–98).

CUT'LIPS. A curious sucker (*Lagochila lacera*) of the streams of the central Mississippi valley, distinguished at sight by its mouth, where the reduced lower lip is divided into two distinct, elongated lobes; the lower lip, further, is "entirely separated from the upper at the angles by a deep fissure," cloaked by the skin of the cheek. It is olive or brown above, silvery on the sides and belly, and the lower fins are faintly orange. Many names have been given this singular fish, such as harelip, or splitmouth, or rabbitmouth, sucker, and May sucker. See Plate of SUCKERS.

CUT'PURSE, MOLL. The sobriquet of Mary Frith, a notorious character, born in London about 1584, a thief and prostitute and famous in almost every form of crime. She dressed in male attire and is said to furnish the first recorded instance of the use of tobacco by a woman.

CUTTACK, kŭt-tŭk', or **KATAK** (Skt. *Kaṭaka*). The capital of the district of the same name in Bengal, British India, situated on the south bank of the Mahanadi, at its junction with the Katjuri, 220 miles southwest of Calcutta (Map: India, E 4). It contains the ruins of an old fort and many educational institutions, including Ravenshaw College. It is famous for its fine filigree work in gold and silver. Other products are oil, fibre, carpets, and cotton goods, made largely by convict labor. Pop., 1891, 47,186; 1901, 51,364; 1911, 52,528, largely Hindus.

CUT'TER. The name given to a portion of the equipment of boats on board of a man-of-war. They are double-banked and are fitted either for rowing or sailing. In sailing ships a nest of cutters of varying sizes used to be stowed amidships, one within the other, the launch being the bottom boat of all. At present the boats are either swung at the davits or in cradles resting on frames amidships, clear of the blast of the guns. Modern battleships carry very few cutters on account of lack of room. Instead they have steam launches, sailing launches, and motor launches, mostly of large capacity. (See BOAT.) The name "cutter" is also applied to a small vessel with a single mast, a mainsail, a forestaysail, and a jib set to the bowsprit end. Cutter yachts are sloop-rigged vessels, and the name is now generally applied to sloops of considerable draft and comparatively small beam.

A *revenue cutter* is a light, armed government vessel, commissioned for the prevention of smuggling and the enforcement of the customs regulations. (See REVENUE CUTTER SERVICE, UNITED STATES.) A small, light sleigh with a single seat for one or two persons, usually drawn by one horse, is also called a cutter.

CUT'TER, GEORGE WASHINGTON (1801–65). An American poet. He was born in Massachusetts and, after studying law, settled in Kentucky. He fought in the Mexican War and later

entered the political field, where he soon became known as a brilliant public speaker. His most celebrated poems are "The Song of Steam," "The Song of the Lightning," and "E Pluribus Unum." His works were published under the respective titles: *Buena Vista and Other Poems* (1848); *Song of Steam and Other Poems* (1857); *Poems, National and Patriotic* (1857).

CUT'THROAT' TROUT. The Rocky Mountain, or black-spotted, trout (*Salmo clarkii*, or *mykiss*). See TROUT.

CUT'TING. A detached portion of a plant inserted in soil, water, or other media for the purpose of propagation. This process is one of the oldest and most important forms of artificial reproduction. Plants in general lend themselves readily to the process, thus enabling the propagator to secure hundreds of offspring from a single individual. Cuttings are superior to seeds, because, with the exception of bud variations, plants so propagated come true to kind, i.e., varieties of cultivated plants which do not come true to sort by seeds can be perpetuated by cuttings. In the arts of budding and grafting the bud or scion is in reality a cutting inserted in another plant with which it unites and thereby develops much faster than on its own roots. Cuttings are made from such a variety of parts of plants—sometimes even from root, stem, and leaf of the same plant—that a corresponding number of styles of cuttings have been developed. They may be classified, according to the maturity of the part used, as:

Hard-wood cuttings	(1) Simple stem, (2) Single eye, (3) Heel, (4) Mallet, etc.
Soft-wood (herbaceous) cuttings	(1) Stem cuttings—slips, (2) Leaf cuttings, (3) Root, rootstalk, or rhizome, (4) Tubers, etc.

Some conception of the importance of this means of increasing plants can be gathered from the fact that, except for the production of new varieties, all commercial varieties of grapes, currants, and gooseberries are increased in this way, while among flowering and ornamental bedding plants millions are annually produced by one or another of these methods in the United States alone. Sugar cane, pineapples, and potatoes are extensively propagated by this process.

The parts used in making cuttings are numerous, but the methods resorted to are as varied as interesting. Some plants root readily from cuttings placed in the open ground; others require special treatment before they will "strike" root, while still others require most careful nursing in the greenhouse and even under a bell jar to induce them to take root. Special devices, carrying a variety of soils and capable of maintaining a given degree of heat and moisture, have been constructed in order to facilitate the work of propagating plants by this means. Consult Bailey, *The Nursery Book*, and article on "Cuttings," in *Cyclopedia of American Horticulture*.

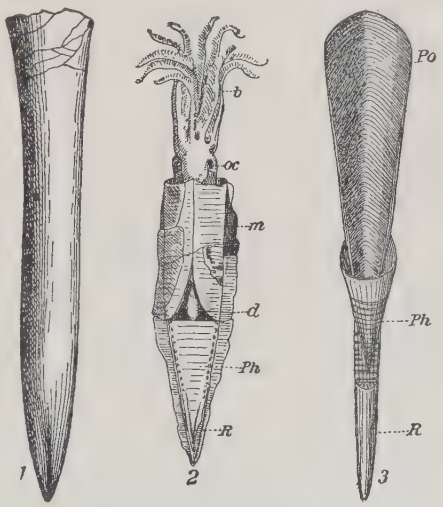
CUTTING, MARY STEWART (DOUBLEDAY) (1851–). An American writer of stories, born in New York City. In 1875 she was married to Charles Weed Cutting. While still a girl, her verses were published in *Lippincott's*, and after 1894 she was busied continuously in literary work, especially as a writer of short stories and serials. Her publications include: *Little Stories of Married Life* (1902; 2d ed., 1909); *Heart of Lynn* (1904); *Little Stories of Courtship* (1905); *More Stories of Married Life* (1906); *The Suburban Whirl* (1907); *The Wayfarers* (1908); *Just for Two* (1909); *The Unforeseen* (1910); *The Lovers of Sanna* (1912); *Refractory Husbands* (1913).

CUTTING R(OBERT) FULTON (1852–). An American financier and philanthropist, born in New York City. He graduated at Columbia in 1871 and was prominent in many municipal reforms, becoming president of the Association for Improving the Condition of the Poor in 1892 and president of the New York Trade School Association in 1899. Of his influence and wealth he contributed largely to political reform in New York City, especially to the Citizens' Union (founded in 1897) and the Bureau of Municipal Research. He published *The Church and Society* (1912), Kennedy lectures in the New York School of Philanthropy.

CUTTING, STARR WILLARD (1858–). An American educator and Germanic scholar, born in West Brattleboro, Vt. He graduated at Williams College in 1881, was principal of Deerfield Academy, Deerfield, Mass., for five years, studied at Leipzig, Geneva, and Johns Hopkins (Ph.D., 1892), and then taught in Chicago University, becoming head of the department of Germanic languages and literatures in 1906. Besides editions of school texts, he published: *Der Konjunktiv bei Hartmann von Aue* (1894); *The Modern German Relatives "Das" and "Was"* (1904); *Robert Wesselhoeft, Jena Burschenschafter, German Revolutionary, and American Citizen* (1911).

CUT'TLE, CAPTAIN. A rough-looking, good-hearted, retired merchant captain in Dickens's novel *Dombey and Son*. His favorite expression, "When found, make a note of," was adopted as the motto of *Notes and Queries*.

CUTTLEFISH (*cuttle*, AS. *cudele;* connected by popular etymology with *cuttle*, knife, on ac-



FOSSIL CUTTLEFISH (BELEMNITES).

1. A belemnite (*Pachyteuthis acutus*) from the Lower Lias, England. 2. A belemnite (*Belemnoteuthis antiqua*) from the Oxford Clay, England, partly restored: *b*, arms; *oc*, eyes; *m*, mouth; *d*, ink bag: *Ph*, phragmacone; *R*, guard. 3. Restoration of a belemnite's shell: *Po*, proöstracum; *Ph*, phragmacone; *R*, guard. See BELEMNITE.

count of the knifelike cuttle bone, + *fish*). A popular name of certain cephalopods, originally applied to a calamary (*Sepia officinalis*), but

now generally restricted, in the United States at least, to octopods. (See OCTOPODA.) The European cuttlefish (*Sepia*) furnishes cuttlefish bone and sepia, which are of commercial importance. The former is the calcareous "pen," or brace, which lies along the "back" of the creature beneath the skin; and the sepia is the substance in its "ink bag," by throwing out which it beclouds the water and eludes pursuit.

Fossil cuttlefish bones of *Sepia*, scarcely different from the modern species, are found in various Tertiary deposits. In the Triassic, Jurassic, and Cretaceous rocks are other forms of sepioid shells that are not calcified, but are thin, elongated, and horny, often containing fossilized ink bags and hardened ink, which may still be prepared and used for drawing. *Sepia* and its allies are supposed to have evolved from Belemnite-like forms through such intermediate stages as the genus *Belosepia* of the Tertiary. See CEPHALOPODA; SQUID; and Colored Plate of OCTOPODS AND DECAPODS in article DECAPODA.

CUTTS, EDWARD LEWES (1824–1901). An English clergyman. He graduated at Queens' College, Cambridge, and was ordained in 1848. He was curate successively of Ide Hill (Kent), Coggeshall (Essex), Kelvedon (Essex), and in 1859–65 of Billericay (Essex), and after 1871 was vicar of the church of the Holy Trinity, Haverstock Hill, London, N. W. He wrote on English archæology, especially ecclesiastical, and published a *Dictionary of the Church of England* (1887).

CUT'TYHUNK. The most southerly island in Buzzard's Bay, Mass., on which the first settlement of white men in any part of New England was made (Map: Massachusetts, F 5). Sailing from Falmouth, England, March 25, 1602, Bartholomew Gosnold, in the ship *Concord*, with "32 persons, whereof 8 were mariners and sailors, 12 proposing upon the discovery to return with the ship for England, the rest to remain there for population," made land off the coast of Maine on May 14. Coasting southwesterly, he discovered and named Cape Cod, and, coming "amongst many fair islands, all lying within a league or two, one of another, and the outermost not above 5 or 7 leagues from the main," landed on Cuttyhunk on the 25th of May. This they called Elizabeth's Isle, after the Queen, and here they built a fort. On account of disagreements the settlement was abandoned on June 18, and the colonists returned to England. Cuttyhunk later became the home of many pilots, when New Bedford had 400 whaling ships. The winter population is 50, and in summer, in the clubhouses and hotels, several hundred. The United States Life-Saving Station was established in 1889, and the house of the Massachusetts Humane Society in 1847. Consult *New England Magazine* (Boston, 1897).

CUT'TY STOOL (Scot. *cuttie*, short, dim. of *cut* + *stool*). A seat once used in the Scottish church for the exposure of offenders against chastity. The sinner was required to sit on the stool before the whole congregation during the entire service and, at its close, to stand up while severely reprimanded by the minister.

CUT'WORM'. The terrestrial caterpillar of certain noctuid moths, mainly of the genus *Agrotis*, which winter and pupate in the ground and are ready to attack early vegetation. Cutworms are night feeders and cut the plants off at the level of the ground, destroying far more than they can eat. They attack wheat, Indian corn, oats, and all the cereals, as well as garden vegetables. By day they hide under the surface of the soil, where each patch of withering vegetation marks their hiding places. In vegetable beds these spots should be dug over and the upturned worms killed; holes made with a hoe or rake handle furnish favorite hiding places by day and thus serve as traps to catch many a worm. Some kinds of cutworms ascend trees by night and cut off tender leaves and buds, descending and hiding in the early morning. A widely distributed example is *Agrotis saucia*, a pest of orchards in both Europe and America.

CUVIER, kụ'vyâ', FRÉDÉRIC (1773–1838). A French naturalist, born at Montbéliard. He was professor of zoölogy in the Jardin des Plantes, Paris, and keeper of the collection in comparative anatomy at that institution. His published works include *Sur les dents des mammifères comme caractères zoölogiques* (1825) and *Histoire naturelle des mammifères* (jointly with Geoffrey de Saint-Hilaire, 1819–29). He was a brother of Baron Georges Léopold de Cuvier.

CUVIER, GEORGES LÉOPOLD CHRÉTIEN FRÉDÉRIC DAGOBERT, BARON DE (1769–1832). A French naturalist, founder of the science of comparative anatomy, born at Montbéliard, then in the Duchy of Württemberg, to which place his father, formerly an officer in a Swiss mercenary regiment, had retired on a pension. He was educated at home in the strictest tenets of the French Protestant or Calvinistic faith, and at the age of 14 entered the Academy at Stuttgart, where he remained four years. His father intended him for the ministry, but he showed such a love for natural history that he was allowed to spend his time in pursuing such studies in that branch of science as the academy afforded, and supplemented them with reading almost every scientific book in the library. In 1788 he became tutor in the family of the Comte d'Héricy, a Protestant nobleman living near Caen, on the coast of Normandy. Here, during the stormy years of the Reign of Terror, he remained, quietly utilizing the rather unusual facilities the neighborhood offered for the study of marine animal life and fossil remains, thus laying the foundations of his future eminence. A chance acquaintance with the Abbé Tessier, a writer on agricultural subjects, who was struck with young Cuvier's remarkable knowledge of zoölogy, secured for him an introduction to Geoffroy Saint-Hilaire, who at once recognized in Cuvier a man of genius and urged him to move to Paris. Here, in 1795, he became, through the influence of Lacépède, Lamarck, and others, assistant to Mertrud, the professor of comparative anatomy at the Jardin des Plantes. He immediately took a high position among the scientists in Paris and was chosen one of the original members of the Institute upon its organization in 1795. In 1796 he was chosen professor of natural history at the central school of the Panthéon, and in 1800 he succeeded Daubenton in a similar position at the Collège de France. In 1802 he succeeded Mertrud at the Jardin des Plantes. In 1798 appeared his first separate work, *Tableau élémentaire de l'histoire naturelle des animaux*, in which he introduced tentatively his classification of animals upon which so much of his fame rests. Between 1800 and 1805 were published the five volumes of his *Leçons d'anatomie*, which brought together the hitherto disconnected knowledge of comparative anatomy and gave him the right to be con-

sidered the founder of that branch of science. In 1800 he published his first work on paleontology, *Mémoires sur les espèces d'éléphants vivants et fossiles.* At the opening of the nineteenth century, therefore, Cuvier may be said to have already attracted the attention of the scientific world to the three branches with which his name will always be connected.

Cuvier began his career as an administrator in 1802, when he was appointed an inspector of education under the Consulate and helped establish *lycées* at Marseilles, Bordeaux, and Nice. From 1808 to 1813, as a member of the council of the Imperial University under Napoleon, he spent considerable time in Italy, Holland, and Germany, organizing the academies in the districts recently annexed to the Empire. In 1814 Napoleon made him a Councilor of State, a position which he continued to hold under Louis XVIII. In 1819 he became president of the Committee of the Interior, and chancellor of the University of Paris. He was made a member of the Academy in 1818 and a grand officer of the Legion of Honor in 1826. In 1822 he was appointed grand master of the faculties of Protestant theology, in which position he had supervision of all the civil, political, and religious affairs of Protestant institutions and organizations. In 1831 Louis Philippe made him a peer of France, and in 1832, shortly before his death, was considering him for the office of Minister of the Interior.

With all his administrative duties, Cuvier still found time and opportunity to pursue his scientific investigations. His life work falls naturally into three divisions—paleontology, systematic zoölogy, and comparative anatomy. In each of these departments he achieved remarkable success and left a lasting impression, in spite of mistakes due largely to personal peculiarities derived from his Calvinistic training, such as his refusal to accept the theory of descent. By means of his knowledge of comparative anatomy, and his theory of the correlation of growth, Cuvier "reconstructed" a large number of extinct animals, proving that every geological epoch is represented by distinct animal forms, having a similarity well defined to animals in preceding or succeeding epochs. Nevertheless, he held to the Linnæan doctrine of the constancy of species, and looked upon the similarity of animal forms in successive epochs as a recurrence of types rather than a steady development of the same type. In comparative anatomy his work in special fields was as remarkable as it was valuable. His investigations of the comparative anatomy of fishes and of the osteology of mammals may be mentioned as two of his most valuable contributions to zoölogy. In systematic zoölogy his work was of great originality and importance, for to him is due the reclassification of the animal kingdom on a natural basis, in place of the artificial and arbitrary classification of Linnæus. Cuvier's system was based on the constancy and morphological resemblance of types rather than on outward similarities of structure. It remained the standard arrangement of animals until set aside by modern investigators. Cuvier's great work, *Le règne animal* (1816), became at once the standard reference book in natural history.

Among his works not noted above are: *Les reptiles douteux* (1807); *Recherches sur les ossements fossiles des quadrupèdes* (1812); *Mémoire pour servir à l'histoire et à l'anatomie des mollusques* (1816); *Description géologique des environs de Paris* (1822); *Histoire naturelle des poissons* (1828); *Discours sur les révolutions de la surface du globe et sur les changements qu'elles ont produits dans le règne animal* (1851). Consult: Lee, *Memoirs of Baron Cuvier* (New York, 1883; Fr. trans., Paris, 1833); Flourens, *Histoire des travaux de Georges Cuvier* (Paris, 1845); Ducrotay de Blainville, *Cuvier et Geoffroy Saint-Hilaire* (ib., 1890).

CUVILLIER-FLEURY, kü'vē'yā'-flē'rē', Alfred Auguste (1802–87). A French author, born in Paris. His love of letters brought him to the attention of the Duc d'Orléans, who made him tutor to his son, the Duc d'Aumale (1827). These duties ended, he became a political writer on the *Journal des Débats.* In 1866 he was made a member of the Academy. Among his works are: *Voyages et voyageurs* (1837–54); *Etudes historiques et littéraires* (1854); *Nouvelles études historiques et littéraires* (1855); *Dernières études historiques et littéraires* (1859); *Historiens, poètes et romanciers* (1863); *Etudes et portraits* (1865–68); *Posthumes et revenants* (1878). Consult the biography by the Duc d'Aumale, in *Le livre du centenaire des débats,* and Bertin's edition (1900) of his *Journal intime.*

CUXHA'VEN, *Ger. pron.* kụks-hä'fen. A German seaport and watering place on the North Sea, at the mouth of the Elbe, about 57 miles northwest of Hamburg (q.v.), to which it belongs (Map: Germany, C 2). It has a fine harbor, which has been much improved in recent years, and which is now the station of the Hamburg pilots. It is a free port, being outside the Zollverein, and the Hamburg-American Steamship Company have made it the point of arrival and departure of their mail service. It is fortified and has a handsome old castle of the fourteenth century. Pop., 1900, 6906; 1905, 11,145; 1910, 14,888. See Hamburg.

CUYABÁ, kōō'yà-bä'. An episcopal city of Brazil, the capital of the State of Matto Grasso, situated on the Cuyabá River (Map: Brazil, F 7). It has broad, well-paved streets and contains barracks, an arsenal, and a military hospital. The town was formerly famous for gold and diamond mines and is now an important commercial centre. It has a steamship service to Montevideo, a trip of over 2500 miles. Pop., 1890, for the city, 14,507; for the municipality, 1912 (est.), 20,000.

CUYAHOGA (kī'à-hō'gà) **FALLS.** A village in Summit Co., Ohio, 33 miles south by east of Cleveland, on the Baltimore and Ohio, and the Cleveland, Akron, and Columbus railroads, and on the Cuyahoga River (Map: Ohio, G 3). It contains a public library and has manufactories of paper bags, wire nails, sewer pipe, machine-shop products, rubber goods, and flour. The water works and electric-light plant are owned by the village. Pop., 1910, 4020; 1920, 10,200.

CUYLER, kī'lẽr, Theodore Ledyard (1822–1909). An American Presbyterian clergyman. He was born at Aurora, N. Y., Jan. 10, 1822; graduated at Princeton in 1841 and at Princeton Theological Seminary in 1846. After holding charges in New Jersey, he became pastor of the Market Street Reformed Dutch Church, New York, in 1853, and was pastor of the Lafayette Avenue Presbyterian Church, Brooklyn, from 1860 to 1890. His eightieth birthday was publicly celebrated in Brooklyn. He was prominent in temperance work. He was an influential

preacher and a prolific writer of books and articles. In 1902 he published his *Recollections of a Long Life.*

CUYO (kōō′yō) **ISLANDS.** A group of the Philippine Islands, Province of Paragua, in the northern waters of the Sulu, or Mindoro Sea (Map: Philippine Islands, C 5). The larger islands are volcanic, and the smaller are low-lying sandy tracts on a coral foundation. On a bay on the southwest shore of Grand Cuyo, the largest of the group, is the town of Cuyo, the capital. Its chief support is fishing and its population mostly women. It has defensive works and a thriving trade. Total number of islands in the group, 49; total area, 47 square miles; pop., 1903, 10,982.

CUYP, koip, ALBERT (1620–91). A Dutch landscape and animal painter. He was born at Dort, in October, 1620, and studied with his father, Jakob Gerrits Cuyp, a portrait and animal painter of mediocre ability. The son painted animals, still life, and even portraits, but in landscape he was one of the greatest and most original of his day. He was influenced by Jan van Goyen, but soon developed the fresh daring color and glowing atmospheric effects which constitute the peculiar beauty of his work. He was a close student of nature, though at times overhasty in execution. His landscapes found most appreciation in England, where most of them are still preserved, and he undoubtedly influenced such great English painters as Wilson and Turner. He is best represented in London—the National Gallery, Buckingham Palace, Bridgewater House, Wallace collection, Dulwich College, etc. Good examples of his work are also in the museums of St. Petersburg, Berlin, Paris, and Rotterdam, and a fine cattle piece in the Metropolitan Museum, New York. Consult Würzbach, *Niederländisches Künstler-Lexikon* (Leipzig, 1906), and De Groot, *Beschreibung und Verzeichniss der Werke holländischer Maler* (ib., 1908).

CUYPERS, koi′pĕrs, PETER (1827–). A Dutch architect, born at Roermond. He studied at the Academy of Antwerp. The Royal Museum at Amsterdam is by him. He restored the Mainz Cathedral and built a number of important church edifices, including those of St. Jacob at The Hague, St. Barbara at Breda, St. Catharine at Eindhoven, the Sacred Heart at Amsterdam, and St. Boniface at Leeuwarden. He wrote *Der Dam zu Mainz, Baugeschichtliche Skizze* (1878) and *Le Château de Haar à Haarzuylens* (1910).

CUZA, kōō′zȧ. See ALEXANDER JOHN I.

CUZCO, kōōs′kō, *Castilian Sp. pron.* kōōth′kō (Quichua, navel, as being the centre of the ancient Inca Empire). An episcopal city, the capital of the department of the same name, Peru, situated on the eastern end of that section of the Andes known as the Knot of Cuzco, more than 11,000 feet above sea level, and 360 miles east-southeast of Lima (Map: Peru, C 6). It is regularly built in part and contains several handsome buildings, prominent among which are the cathedral, in the Corinthian style, and the convent of Santo Domingo, built in part on the site of the great Inca Temple of the Sun. There are also hospitals, a university founded in 1692, a national college, and a museum. The city is the centre of a fertile agricultural district and has considerable trade and manufactures of cotton and woolen goods, refined sugar, leather, and embroidery. Pop. (est.), 20,000. Cuzco, the capital of the Incas, is said to have been founded in the eleventh century. It retains evidences of its former splendor, although the ancient city was destroyed by Pizarro in 1535. These remains include the palace of the Incas, a fortress built of massive and irregular stone blocks, the temple of the Sun, and the temple of the virgins of the Sun.

CUZCO. The second largest department of Peru, bounded by Loreto on the north, Bolivia on the east, Puno and Arequipa on the south, and Apurimac, Ayacucho, and Junín on the west (Map: Peru, C 6). Area, 156,317 square miles. The southern and western parts are mountainous, and the eastern and northern are low and covered with thick forests. The department is to a large extent unexplored, and only a small portion in the south is inhabited. It is watered by the Urabamba and the head streams of many tributaries of the Amazon. The population is chiefly engaged in agriculture and cattle raising. Pop., officially estimated in 1906 at 328,980. Capital, Cuzco (q.v.).

CUZZONI, kōō-dzō′nê, FRANCESCA (1700–70). An Italian dramatic contralto, born at Parma. After studying under Lenzi she achieved her first great success at Venice in 1719, and later (1722–26) she added to her fame by singing in London in the operas of Handel, during the composer's own venture as an impresario. (See HANDEL.) In 1727 she was engaged in a bitter rivalry with Faustina Bordoni, who had supplanted her in Handel's company. She was married to Sandoni, the pianist and composer, and thereafter sang in Vienna, in Italy, and in Holland, where she was imprisoned for debt. It is asserted that in her old age she earned a living by covering silk buttons and that she finally died in miserable poverty.

CYAM′ELIDE. See CYANIC ACID.

CYAN′AMID. A trade name for an artificial fertilizer containing about 45 per cent of calcium cyanamide and 27 per cent of calcium hydroxide. Calcium cyanamide is the name given by chemists and scientific agriculturists to the commercial cyanamid, though strictly it should apply only to the chemical compound designated by the formula CN . NCa, containing about 20 per cent of nitrogen. Free cyanamide, or acid cyanamide, designated by the formula $CN . NH_2$, was first obtained by Bineau in 1838, but was not isolated until 1851, when Cloez and Cannizzaro first described it. This work, however, was long before the commercial manufacture of calcium cyanamide, which is now made in the electric furnace. The calcium carbide, produced in the electric furnace, is removed, cooled, and crushed, and then packed into nitrifying ovens, which are cylindrical, perforated steel cans set in heat-insulated brick ovens. The carbide is heated to a temperature where it will combine with the nitrogen by means of a carbon rod in the centre of the can, through which the electric current passes, and nitrogen, which is obtained either from liquid air or more usually by the copper-oxide process, is admitted. The chemical reaction resulting in calcium cyanamide is as follows: $CaC_2 + N_2 = CaCN_2 + C$.

The material, both powdered and granulated, is sold to manufacturers of mixed fertilizers. Its use as a nitrogen fertilizer was proposed in 1901 by A. Frank and H. Freudenthal, while the basic patents for its manufacture were issued to Prof. Adolph Frank and Dr. Nicodem

Caro in 1908. A number of large works in Europe are engaged in the manufacture of the calcium cyanamide under these basic patents, and a large factory at Niagara Falls, Canada, in 1914, had a capacity in excess of 60,000 tons annually.

A number of tests have been made of the commercial cyanamid at various experiment stations in Europe and America, and in Germany it has been used as a weed destroyer in addition to supplying nitrogen to the young plants. It is said to be valuable for inducing a slow, steady growth of plants rather than as a forcing material, and is least efficient when used as a top dressing. It should be well mixed with soil at least a week before the crop is planted, and 250 pounds per acre is said to be the maximum amount that can be economically employed. It is not suited to acid soils, which should be first limed or treated with barnyard manure, as the latter material will supply the bacteria that are deficient in such soils. An even distribution of the material is facilitated by mixing it with two or three times its weight of damp earth. When used mixed with the standard commercial fertilizers, the cyanamid does not require any modification of the usual practice or special instructions. For its chemistry and use, consult: Pranke, *Cyanamid: Its Manufacture, Chemistry, and Use* (Easton, Pa., 1913); Fritsch, "Manufacture of Cyanamide and of Nitrate," in *Manufacture of Chemical Manures* (1911); and special bulletins from the various experiment stations as well as journals dealing with chemical technology. See also MANURES AND MANURING; NITROGEN, FIXATION OF.

CYANE, sī'ā-nē (Lat., from Gk. *Κυανή, Kyanē*). In Greek legend, the wife of Æolus, the god of the winds. Also a nymph, playmate of Persephone. She was transformed into the spring Cyane near Syracuse because of her grief when Hades carried off Persephone from this neighborhood. See CERES.

CYAN'IC ACID (from Gk. *κύανος, kyanos*, dark blue), HCNO. An unstable compound of carbon, hydrogen, oxygen, and nitrogen, obtained by heating cyanuric acid (q.v.) in a current of carbon dioxide. Under ordinary conditions it is a volatile liquid having a strong pungent odor, but is transformed with explosive rapidity into a white, porcelain-like mass of the same percentage composition as cyanic acid. This *polymeric* modification of cyanic acid is known as *cyamelide*. (See WÖHLER.) After a long series of unsuccessful attempts, Van't Hoff succeeded in showing that *three* molecules of cyanic acid come together in the formation of cyamelide; which does not prove, however, that the resulting cyamelide molecule is $(HCNO)_3$, and the probability is that the molecule of cyamelide is much more complex. Among the salts of cyanic acid may be mentioned the cyanate of potassium and the cyanate of ammonium. Potassium cyanate may be readily obtained by cautiously heating a mixture of potassium ferrocyanide and potassium bichromate; when pure, it forms a white crystalline powder readily soluble in water, in which, however, it gradually undergoes decomposition. Ammonium cyanate may be obtained from the cyanate of potassium by double decomposition. The transformation of ammonium cyanate into urea, observed by Wöhler in 1828, constituted the first synthesis of an organic compound and formed an event of the greatest importance in the history of chemistry. See CHEMISTRY.

The careful study to which many derivatives of cyanic acid have been subjected has led to the view that cyanic acid may possess two different constitutional formulas, viz., $N \equiv C - O - H$ and $O = C = N - H$. All efforts to produce two different compounds corresponding to those formulas having failed, chemists have proposed to explain this comparatively rare phenomenon on the following hypotheses: 1. Cyanic acid, like most other organic compounds, has a definite structure—say, $N \equiv C - O - H$; but while during some of its transformations that structure remains unaltered, other transformations involve an intramolecular change resulting in the formation of derivatives of the compound $O = C = N - H$ ("isocyanic acid"), which is, for some unknown reason, less stable than the compound $N \equiv C - O - H$ and incapable of existing in the free state. 2. According to another hypothesis, every single molecule of the acid is constantly changing its structure, its hydrogen atom rapidly oscillating between the nitrogen and the oxygen; so that while at a given instant the structure of the molecule might be represented by the formula $N \equiv C - O - H$, we should find its structure to be $O = C = N - H$ if we could stop the motion of the hydrogen atom at the very next instant. The substance is thus imagined to be composed, at any instant, of two different kinds of molecules; and as under certain conditions each kind may be capable of transformations which the other kind could not undergo, two series of derivatives should be expected, according to the nature of the transformations necessary to produce those derivatives and to the conditions under which the transformations take place. See also FULMINIC ACID.

CYANIDE PROCESS. See GOLD, *Metallurgy*.

CY'ANIDES. See HYDROCYANIC ACID.

CY'ANITE (from Gk. *κύανος, kyanos*, dark blue), KYANITE, DISTHENE, or SAPPARE. An aluminum silicate that crystallizes in the triclinic system. Although sometimes gray or green, it usually has a blue color and a vitreous to pearly lustre. The handsomest specimens are found in the St. Gotthard region in Switzerland; in the United States, Chesterfield, Mass., and Bakersfield, N. C., are well-known localities. Fine specimens have been cut as gems, but, as a rule, the material is too soft for wear.

CYAN'OGEN (Gk. *κύανος, kyanos*, dark blue + *γένης, genēs*, producing, from *γίγνεσθαι, gignesthai*, Lat. *gignere*, Skt. *jan*, to be born). An important compound of carbon and nitrogen obtained by heating dry cyanide of mercury in hard glass tubes. It is a poisonous gas, having a peculiar odor and dissolving quite readily in water and in alcohol. If ignited in air, it burns with a purple flame, its carbon combining with the oxygen of the air to form carbon dioxide, while its nitrogen is set free. When dry, cyanogen is an exceedingly stable substance and may be heated as high as 800° C. without being decomposed; in aqueous solution, however, it gradually undergoes a series of chemical changes resulting in the formation of ammonia, hydrocyanic acid, urea, oxalic acid, and other compounds. The molecular formula of cyanogen is C_2N_2, its molecule being composed of two "cyanogen groups" (CN, or, as it is still sometimes written, Cy), which enter into the composition of a large number of other substances known. Some of these interesting substances having a

blue color, the name "cyanogen" has been applied to the gas from which they are derived; but the gas itself is perfectly colorless. During the preparation of cyanogen from the cyanide of mercury an amorphous brown substance forms, which has the same percentage composition as cyanogen, but probably a much higher molecular weight; this compound is called *paracyanogen* and is denoted by the symbol $(CN)_x$. Paracyanogen may be readily transformed into cyanogen gas by heating.

The derivatives of cyanogen form a large group of compounds, including hydrocyanic acid and its salts, the ferrocyanides and ferricyanides, cyanic and cyanuric acids and their derivatives, etc. The most important of these compounds are described in special articles.

CY'ANOI'DEA (Neo-Lat. nom. pl., from Gk. *κύανος, kyanos,* dark blue + *εἶδος, eidos,* form). A suborder of the Carnivora (q.v.), composed of the family Canidæ (dogs, wolves, jackals, etc.), regarded as forming the most central group of the Carnivora, from which the bears, weasels, and raccoons (Arctoidea) depart on the one hand, and the cats, civets, and hyenas (Ailuroidea) depart on the other. Consult Huxley, *Anatomy of Vertebrated Animals* (New York, 1878), and the books mentioned under MAMMALIA; DOG; FOX; ETC.

CY'ANOM'ETER (Gk. *κύανος, kyanos,* dark blue + *μέτρον, metron,* measure). An instrument for determining the color of the sky, invented by Saussure—a disk divided into sections, the several sections being tinted and gradually increasing in intensity from white to deep blue. When used to compare with the color of the sky, some of its sections will appear deeper and some lighter in tint. The section where there is no perceptible difference gives the measure or degree of the blueness of the sky.

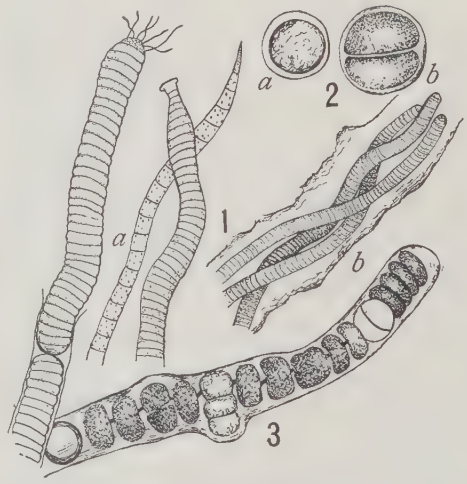
CY'ANOPHY'CEÆ (Neo-Lat. nom. pl., from Gk. *κύανος, kyanos,* dark blue + *φῦκος, phykos,* seaweed). The lowest of the four great groups of algæ. They are called blue-green algæ from the prevailing color of the cell contents, which are tinted by a diffused blue pigment named "phycocyan." The cell structure is very simple, agreeing in this respect with the Bacteria (q.v.), with which they are usually associated in a group "Schizophytes," distinct from the true algæ. For details of cell structure and classification, see ALGÆ.

Many of the Cyanophyceæ are one-celled, or consist of indefinite aggregations of cells situated in a common gelatinous matrix. Other forms are filamentous, and some are elaborately branched. A well-known unbranched form is *Oscillatoria,* interesting because of the movements of the tip of the filament, which swings in a complex curve. *Nostoc* forms large gelatinous balls filled with convoluted chains of cells. Certain cells in some filamentous forms lose their protoplasmic contents, becoming the so-called heterocysts, whose functions are but partly understood; they are responsible in many cases for the branching of the filaments, because the heterocysts become firmly fastened to the sheaths that inclose the vegetative cells. The growth of the latter causes such pressure between the fixed points, determined by the heterocysts, that the sheath is ruptured and the filament grows out at one side. Such branching is termed "false branching." Branches or portions of filaments that break off and start new plants are called "hormogonia."

The Cyanophyceæ are especially fond of warm shallow water, although many grow in damp situations on land, such as spray-wet rocks, damp timber, and earth. They live among the reeking vegetation of salt marshes and flourish in open sewers and drains. The fouling of shallow reservoirs in warm weather, when they give off the well-known "pigpen odor," is due to growth of Cyanophyceæ. The remedy is to deepen the water or apply copper sulphate. See ALGÆ.

One of the most remarkable displays of Cyanophyceæ is in warm springs, well illustrated in Yellowstone National Park, where the growths are brilliantly colored. Here certain species grow luxuriantly in water at a temperature of 75° C. and above, conditions which no other forms of algæ can endure.

Another conspicuous display of blue-green algæ is the water bloom or scum that frequently covers the surface of ponds and small lakes.



CYANOPHYCEÆ.

1, *a* and *b*, Oscillatoria; 2, Chroöcoccus (*a*), and its division (*b*); 3, Stigonema, showing false branching and heterocysts.

Most of the water blooms are due to Cyanophyceæ, and the largest of all has given name to the Red Sea, whose tint is due to the presence of a flocculent sediment made up of bundles of short filaments of *Trichodesmium.* This peculiar condition of the ocean is not confined to the Red Sea, but has been reported off the coast of Brazil and South Carolina and in the Indian and Pacific oceans.

Consult Wolle, *Fresh-Water Algæ of the United States* (Bethlehem, Pa., 1887).

CYAN'OPHYLL (Gk. *κύανος, kyanos,* dark blue + *φύλλον, phyllon,* leaf). A collective name for the blue coloring substance of leaves and flowers. See COLOR.

CY'ANO'SIS (from Gk. *κύανος, kyanos,* dark blue). Lividity of the skin, caused by interruption of the circulation or of the respiration caused by nonoxidation of the blood. It may be temporary, as in a convulsion, when the face or lips are blue, or in croup (q.v.), where the face is bluish during an attack. It may be permanent, as in a "blue baby," or child born with obstructed pulmonary circulation, or with a defect in the heart (patent foramen ovale), by reason of which the arterial and the venous

blood are constantly mixed. These children rarely live long.

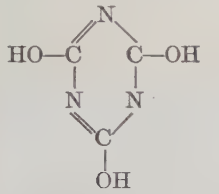
CY'ANU'RIC ACID (from *cyanogen* + *uric*, from Gk. *οὖρον, ouron*, urine), $C_3H_3O_3N_3$. An organic chemical compound produced by heating urea. The latter is probably first transformed into biuret and cyanic acid, which then combine to form cyanuric acid, according to the following equation:

$$\underset{\text{Biuret}}{C_2H_5O_2N_3} + \underset{\substack{\text{Cyanic}\\\text{acid}}}{NCOH} = \underset{\substack{\text{Cyanuric}\\\text{acid}}}{C_3H_3O_3N_3} + \underset{\text{Ammonia}}{NH_3}$$

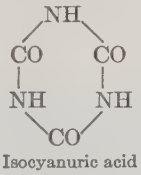
The most convenient method of preparing cyanuric acid is by heating the compound of cyanogen and bromine represented by the formula $C_3N_3Br_3$ with water at about 125° C., the formation of the acid taking place according to the following chemical equation:

$$C_3N_3Br_3 + 3H_2O = C_3N_3H_3O_3 + 3HBr.$$

Cyanuric acid is a colorless crystalline substance sparingly soluble in water and yielding, when heated, ordinary cyanic acid. Like cyanic acid (q.v.), it is capable of yielding two series of derivatives, the study of which has led to assigning to it two "desmotropic" formulas, corresponding to the two different ways in which the acid may behave chemically, according to the transformations to which it may be subjected and the conditions under which those transformations may take place. These formulas represent the structures of two different cyanuric acids, though only one can be actually prepared:



Normal cyanuric acid



Isocyanuric acid

CY'ATHAS'PIS (Neo-Lat., from Gk. *κύαθος, kyathos*, cup + *ἀσπίς, aspis*, shield). The name of a genus of Paleozoic fishlike forms, specimens of which are found in the Upper Silurian and Old Red Sandstone of Great Britain and strata of corresponding age in New Brunswick. It has been commonly regarded as an early ancestor of the fishes, but more recent study of the fossils which include only the dorsal and ventral shields has tended to show that the genus belongs to a class by itself, lying between the arthropods and the vertebrates. No evidences of vertebræ or notochord have been found, nor are the jaws of vertebrate type, consisting of a mere opening between the anterior margins of the shields.

CY'ATHOPHYL'LUM (Neo-Lat., from Gk. *κύαθος, kyathos*, cup + *φύλλον*, phyllon, leaf). A genus of fossil stony corals common in rocks of Middle Paleozoic age. The characters that distinguish this from other genera are of very obscure nature. The species, of which there are about 100 in number, ranging through Ordovician to Carboniferous rocks, vary greatly in form from small solitary individuals to large masses of closely compacted zoöids, and their generic affinity can be determined only by study of thin sections under the microscope. The family of which Cyathophyllum is the type is a large one and includes many genera, of which the most important, *Heliophyllum*, *Eridophyllum*, *Lithostrotion*, *Omphyma*, and *Columnaria*, occur abundantly in the fossil coral reefs of the Silurian, Lower and Middle Devonian and the Carboniferous. A recent reef-building coral, *Moseleya*, from Torres Straits, shows affinities with the ancient Cyathophylloidea and serves to link this family with the modern Astræidæ. See CORAL; CORAL ISLAND.

CYAX'ARES I (Gk. Κυαξάρης, *Kyaxarēs*, OPers. *Uvaxšatara*, having good growth or prosperity, Neo-Elam. *Vakištara*, Babylon. *Uvakuištar*). King of the Medes from 625 to 585, or 584 B.C., or, according to other authorities, from 634 to 594 B.C. Herodotus (i, 101–103) says he was the son of Phraortes, and grandson of Deioces, who was the founder of the Median Empire. He describes the pioneer work which Cyaxares did in organizing a powerful and well-trained army, and alludes to an eclipse which took place about 585 B.C., when this monarch was at war with Alyattes, King of Lydia. A large part of Asia was brought under Cyaxares' sway, and he was successfully invading Assyria and besieging Nineveh when his own kingdom of Media was invaded by the Scythians. In the combat which ensued the Scythians gained the day and held dominion over the Medes some 28 years. Media at last threw off the Scythian yoke, and Cyaxares once more successfully engaged the Assyrians and conquered Nineveh and the surrounding provinces with the exception of Babylon. The reign of Cyaxares lasted 40 years, including the Scythian domination, and his name is often mentioned in the Old Persian inscriptions as the one to whom the rebel princes of Media, who revolted against Darius, traced back their lineage in claiming the throne. Consult Messerschmidt, *Die Inschrift der Stele Nabonaids* in *Mitteilungen der vorderasiatischen Gesellschaft*, vol. i (1896). See MEDIA.

CYAXARES II. According to Xenophon (Cyrop. i, 5, 2), a grandson of Cyaxares I (q.v.) and son of Astyages, and maternal uncle of Cyrus the Great. On the authority of Herodotus, however, it is generally believed that Astyages had no son, and it has been suggested that Cyaxares II may have been the brother of Astyages and son of Cyaxares I. His identity with Ahasuerus of the Bible has likewise, but with uncertainty, been suggested. In this way it has been thought that Cyaxares II may perhaps be the same as Darius the Mede in the Book of Daniel or even be identical with Gobryas. But the whole matter is complicated and uncertain. See DARIUS THE MEDE.

CYBELE, sĭb'ĕ-lē (Gk. Κυβέλη, *Kybelē*, Ῥέα, *Rhea*), or RHEA CYBELE, or the GREAT MOTHER OF THE GODS. A divinity whose worship spread far and wide through the ancient world, though its early seats seem to have been Crete and Asia Minor. According to the myth which belonged to the worship of Zeus on Mount Ida, in Crete, Rhea was the wife of Cronus and mother of Zeus, Poseidon, and Hades, i.e., of the ruling race of gods. (See JUPITER; SATURN.) In Asia Minor we find widespread worship of a nature goddess, regarded as the mother and source of all life, and honored with orgiastic rites upon the mountains and among the wild woods and caves. The wild beasts attended upon her, especially the lion, by whom her throne was watched and her car drawn. Her priests were called Corybantes (q.v.). The Asiatic worship of Cybele had its chief centre at Pessinus in Phrygia, whence it passed into Lydia. United

with the similar but less orgiastic Cretan cult of Rhea, it was early adopted by the Greeks of the mainland and connected with local cults of a similar goddess. In Rome the worship of Cybele was introduced from Pessinus in 204 B.C., in consequence of a Sibylline prophecy, and the annual Megalensian games were established in her honor. To the Romans she was known as *Magna Mater Deum*, or *Mater Deum Magna Idæa*. From the first century B.C. this cult of the great Eastern goddess in various forms and under many names was spread among the people by wandering bands of begging priests and priestesses, professing to work wonders, predict the future, and by initiation into their mysteries to bring relief from sin. The cult became one of the three most important cults under the Roman Empire (for the others, see ISIS; MITHRAS). The *Galli*, or priests of Cybele in Asia Minor, were eunuchs, in imitation of the mutilation of Attis (q.v.), the original servant of the goddess. In works of art she is usually represented as seated on a throne, adorned with a mural crown, from which a veil is suspended. At either side of the throne are lions, or perhaps a lion lies on her lap or under her feet. Sometimes she is seen riding in a chariot drawn by lions. Consult Showerman, "The Great Mother of the Gods," in *Bulletin of the University of Wisconsin, No. 43* (1901), and Farnell, *Cults of the Greek States*, vol. iii (Oxford, 1907).

CYC'ADA'CEÆ (Neo-Lat. nom. pl., from Neo-Lat. *cycas*, Gk. *κύκας, kykas*, African coco palm). One of the four living groups of gymnosperms. In the present flora nine genera of cycads are recognized, which contain about 100 species. They are tropical or subtropical and are about equally distributed between the eastern and western tropics. The stems are either columnar shafts, crowned with a rosette of huge fernlike foliage leaves, having the general habit of tree ferns and palms; or they are like great tubers, completely invested by an armor of thick leaf bases and scale leaves and crowned with fernlike leaves, as in the other case. The group is of especial interest on account of its fernlike characters, and there seems to be general consent that it is a group which has been derived from the ferns. Although fernlike in appearance and in many structures, the cycads produce seeds and must be associated with seed plants, and, since the seeds are exposed, they are gymnosperms. See Plate of GYMNOSPERMS.

A discovery recently made emphasizes strikingly their fernlike character. In fertilization the male cells bear many cilia and are free-swimming, while in other seed plants they have no power of motion. This retention of the old ciliated sperm habit by undoubted seed plants is a very interesting transition condition. The group is also of interest in showing that the pollen tube, which is connected in other seed plants with the transfer of the male cells to the egg, may not have been originally developed for this purpose. In the cycads the tube is developed by the pollen grain, but it branches freely through the ovule and acts as an absorbing organ, the male cells never entering it. It was probably later in the evolution of plants that this absorbing organ came to be used as a means of transferring the male cells. Another characteristic feature of the group is that the seed coat, instead of being entirely hard, as in the conifers, is plumlike, since it develops in two layers, the inner hard and bony, the outer pulpy, making the ripe seed resemble a plum.

The structure of the stem in many cases is not essentially different from that of the ordinary conifer stems, but in certain genera it presents unusual and suggestive features. In these cases the primary cambium, by means of which the ordinary increase in diameter is effected, is short-lived, and a series of secondary cambiums is organized in the cortex. The vascular bundles thus formed in the cortex are frequently of the concentric type, which is characteristic of the ferns and not of the seed plants.

Although the strobili of the cycads have the general structure of those of conifers, in some cases the spore leaves do not resemble those of the other seed plants. For example, in the genus *Cycas* there is no distinct stamen in the ordinary sense, but a leaflike body whose under surface is thickly covered with groups of sporangia, as in ordinary ferns.

The geographic distribution of the nine genera of cycads is of great interest. Four of the genera belong exclusively to the Western Hemisphere and the other five to the Eastern. Of the Western genera, *Zamia* contains about 30 species and ranges from southern Florida to Chile. The three other genera are very limited, both in number of species and in distribution: *Microcycas*, with a single species, is confined to western Cuba; *Dioon*, with three species, is found only in southern Mexico; and *Ceratozamia*, with two or three species, is associated in range with *Dioon*. Of the five Oriental genera, *Cycas* is the most prominent; it has 16 species, ranging from Japan to Australia. The four other genera are very much restricted: *Macrozamia*, with 14 species, and *Bowenia*, with one species, belonging to Australia; while *Encephalartos*, with 12 species, and *Stangeria*, with two or three species, belong to southeastern Africa.

Fossil Forms. The Mesozoic has often been spoken of as the "Age of Cycads," but the plants referred to have been found to belong to another closely related group, the Bennettitales. The evidence of true Cycads in the Mesozoic is very meagre. It is a safe inference that they existed along with the Bennettitales, which were the dominant cycad-like forms of the esozoic. The oldest genus of the Cycads is *Cycas*, as indicated not only by its morphological structure, but also by the discovery of a few undoubted remains. The opinion that this genus existed in the Paleozoic is entirely unwarranted.

Since the Bennettitales are usually spoken of as "fossil Cycads," their history may be treated here. This characteristic Mesozoic type ranges from the early Triassic into the Lower Cretaceous, being extraordinarily abundant during the Jurassic. The present knowledge of this group has largely been obtained from the remarkably rich beds of the United States. In this country the remains of Bennettitales are known from the Triassic of Pennsylvania and North Carolina, through the Jurassic of Colorado and the Potomac formation of Maryland, to the Upper Jurassic and Lower Cretaceous of the Black Hills of South Dakota and Wyoming. Rich deposits of these plants have also been discovered in the Lower Jurassic of the mountains of western Oaxaca in Mexico. The known historical range of the group in Europe is even greater, beginning with the early Triassic of southern Europe. The remains of this group have been found in abun-

CYCADS AND CYPRESS

1. CYPRESS TREE near Monterey, Cal.

2. CYCAS REVOLUTA, In New York Botanical Garden.

dance wherever favorable Mesozoic deposits occur, ranging through North America, Europe, Asia, and extending into the Arctic regions, so that Bennettitales were evidently a world-wide type of great prominence. The evidence is clear that the group is directly connected with the extinct Paleozoic group of gymnosperms called Cycadofilicales. It is altogether probable that this Paleozoic group gave rise to a Mesozoic branch, which differentiated into Bennettitales on the one hand, and into Cycadales on the other —the former group dominating during the Mesozoic, and the latter continuing to the present day. In general habit the Bennettitales resemble the Cycads so closely that they were naturally mistaken for them until their internal structure, and especially that of their cones, was understood. Consult: Coulter and Chamberlain, *Morphology of Gymnosperms* (Chicago, 1910); Scott, *Studies in Fossil Botany* (London, 1909); Wieland, *American Fossil Cycads* (Washington, 1906).

CYCLADES, sĭk'lȧ-dēz (Lat., from Gk. Κύκλάδες, *Kyklades*, from κύκλος, *kyklos*, circle). A portion of the archipelago lying southeast of Greece, in the Ægean Sea, comprising, in ancient times, the islands of Ceos (Zea, Kea), Cythnus (Thermia), Seriphus (Serpho), Siphnus (Siphanto), Gyaros, Syros (Syra), Paros, Antiparos, Andros, Tenos, Myconus, Delos, Rhenea, Melos, and Naxos (Map: Greece, F 4). This group, arranged in three series, was supposed to form a circle with the sacred island of Delos at its centre, and this belief accounts for the name of the group. The modern nomarchy of the Cyclades includes, as well as the above, the islands of Cimolus, Polycandrus, Sicinus, Ios (Nio), Amorgos, Santorini (Thera), Anaphi, and about 200 smaller islands, some of which were formerly grouped with the Sporades (q.v.). The total area is 1041 square miles. The islands are mountainous, having altitudes of over 3000 feet in some instances. Some are of volcanic formation. With the exception of Naxos they are generally scantily watered and sparsely wooded. The formation of the most northern islands is limestone, slate, gneiss, and marble; in the south, eruptive rocks. They produce southern fruits and large quantities of marble, limestone, cement, fuller's earth, emery, manganese, and sulphur. Wine, brandy, hides, and tobacco are exported. Pop. (province), 1896, 137,747; 1907, 130,378. The chief town and capital is Hermopolis (q.v.), on Syra.

CYCLAMEN, sĭk'lȧ-mĕn (Neo-Lat., from Gk. κυκλάμινος, *kyklaminos*, from κύκλος, *kyklos*, circle; referring to its corolla). A genus of plants of the family Primulaceæ, having a wheel-shaped corolla with a long reflexed limb, and flower stalks twisted spirally downward after flowering. The species are herbaceous perennials, about 15 in number, and chiefly alpine in the south of Europe. They have turnip-like, partly subterranean stems, which are very acrid, but nevertheless are greedily eaten by swine, and the plants are accordingly often designated "sow bread." They are drastic and emmenagogic. Several of the species are frequent in our flower gardens, on account of the beauty and fragrance of their flowers. The most common species are *Cyclamen europæum* and *Cyclamen latifolium*, the latter being the source from which are obtained many of the forms cultivated as Persian cyclamens. The corolla of *Cyclamen latifolium* is strongly reflexed, giving the flower a curious appearance. Consult: Candolle, *Sur une monstruosité du Cyclamen neapolitanum* (Geneva, 1887); Wooster, *Alpine Plants* (London, 1885), with color illustrations; Bennett, *Flora of the Alps* (ib., 1897).

CY'CLE (Lat. *cyclus*, from Gk. κύκλος, *kyklos*, circle; connected with Skt. *cakra*, AS. *hweōl*, Eng. *wheel*). A term used in chronology to denote an interval of time in which certain phenomena always recur in the same order. Cycles have chiefly arisen from the incommensurability of the periods of revolution of the earth and other celestial bodies. Our unit of time is the day of 24 hours, being the period of revolution of the earth round its axis. But neither the year—the period of the earth round the sun—nor the month—the period of the moon round the earth—can be measured by days, or even by hours, so as not to leave fractions. Cycles have been invented in such a way that after a certain number of revolutions of the body whose period is to be compared with that of the earth on her axis, the body shall at last occupy the same place in the heavens and calendar as it did when the cycle commenced. Of the numerous cycles or periods of this kind that have been invented, the more important are noticed under their specific names. See Golden Number; Indiction; Metonic Cycle; Period; etc.

CYCLE CAR. A name given to a development of the motor cycle which has four wheels (or three) instead of two and is provided with a body within which the passenger and the driver sit. The capacity is usually two persons, and these may sit side by side, or the one in front of the other as in a tandem motor cycle. The driver usually is placed in front of the passenger. When the tandem arrangement is used, the gauge or centre distance between wheels on the same axle is 36 inches, or one meter in metric countries. The wheels are of small diameter (28 or 30 inches) and the construction light in weight (from 350 to 650 pounds), so that two persons can lift and carry the car. With side-by-side passenger seating, the gauge will be greater than 36 inches and the wheel base longitudinally between 7½ and 8½ feet. The motor will usually be two-cylindered, arranged either in V-form or parallel side by side, and with the shaft parallel to the axles, moving the latter by two chains at the sides of the body. Friction gearing has been popular as a means to secure the variable speeds and reversal between motor shaft and the driving wheels, and when belts are used from a jackshaft to the driving wheels, no compensating gear seems required to operate on curves. The air cooling of the motor cylinders is popular for the smaller sizes.

The line of separation between the small motor car and the cycle car is not very clearly defined, except so far as the gauge of wheel track and the volume of the motor cylinders determines one. The motor vehicle has a gauge of 56 inches, the same as that of the standard wagon, and will "track" with the latter in road ruts.

At a meeting of the Fédération Internationale des Clubs Motor Cyclistes, on Dec. 14, 1912, it was formally decided that there should be an international classification of cycle cars, this classification to hold good in England, Canada, United States, France, Holland, Belgium, Italy, Austria, and Germany. It was also decided to divide

the classification into two classes, large and small cycle cars, as follows:

LARGE CLASS

Maximum weight	784 pounds
Maximum piston displacement	1100 cubic centimeters (67.1 cubic inches)
Minimum tire size	60 millimeters (2⅜ inches approx.)

SMALL CLASS

Minimum weight	330 pounds
Maximum weight	660 pounds
Maximum piston displacement	750 cubic centimeters (45.75 cubic inches)
Minimum tire size	55 millimeters (2 1/16 inches)

The smallest class of standard motor has a cylinder volume of 160 cubic inches.

The cycle car has been developed to meet the demand for a low-priced, mechanically propelled vehicle, light in weight, using little fuel and small tires, cheap in first cost, in operation, upkeep, and stabling, carrying two persons, and safer against upset on poor roads or trails than the motor cycle. Its small wheels prevent its entering into the class of high-speed vehicles, and it is not so well adapted for long tours with luggage.

CYC'LICAL FORMS (from *cyclic*, Lat. *cyclicus*, Gk. *κύκλικος*, *kyklikos*, circular, from *κύκλος*, *kyklos*, circle). In music, forms that consist of a cycle or series of movements, such as the suite, concerto, sonata, or symphony. The origin of cyclical forms is to be found in the form of the old overture, which consisted of three parts—the first and third being slow, while the middle part was lively. Gradually these three parts were extended and detached. In the older compositions the movements were alternately slow and fast. But soon it became customary to begin and end with a fast movement. In the modern symphony the customary arrangement is: (1) fast; (2) slow; (3) fast; (4) fast. But Beethoven's "Sonata," opus 109, and Tschaikowsky's "Symphonie Pathétique," are two famous examples of cyclical compositions closing with a slow movement. Originally all the movements of a cyclical composition were written in the same key. The development of the sonata (q.v.) wrought a change in this direction, so that different keys (though always related to the fundamental) were assigned to the different movements. The first and last movements, however, are always in the same key, which is considered the fundamental key of the whole work. If the first movement is in minor, the last is generally in the parallel major.

CYC'LIC ANAPÆST. See VERSIFICATION.

CYCLIC CHORUS (Gk. *κυκλικὸς χορός*, *kyklikos choros*). The chorus of 50 men or boys which danced in a circle around the altar of Dionysus during the dithyramb. See CHORUS.

CYCLIC DACTYL. See VERSIFICATION.

CYCLIC POETS (Gk. *κυκλικοὶ ποιηταί*, *kyklikoi poiētai*). The name was given by the Greek grammarians of Christian times to a class of minor epic poets, who wrote on subjects dealing with events preceding, as well as during and following, the Trojan War; their works taken together formed a complete cycle of the events covered by the Trojan story. There was also a Theban cycle. The following titles are known to us: *Theogony, Titanomachy, Cypria, Little Iliad, Destruction of Troy, The Return, Telegony, Œdipodea, Thebaïs, Epigoni,* and *Æthiopis*. Our knowledge of the Epic Cycle is due largely to Photius and to Proclus. The scanty fragments with testimonia are best published by Kinkel, *Epicorum Græcorum Fragmenta* (Leipzig, 1877); also as an appendix to Welcker's *Der epische Cyclus* (Bonn, 1835–49). Consult the Appendix to Monro's edition of *Odyssey*, xiii–xxiv (Oxford, 1901), and Allen, "The Epic Cycle," in *The Classical Quarterly*, ii (1908). See ÆTHIOPIS; AGIAS; CYPRIA; LESCHES; PHOTIUS; PROCLUS; STASINUS; TABULA ILIACA; TELEGONUS; THEBAIS; THEBAN CYCLE.

CY'CLING (from *cycle*). The use or act of riding the cycle, either bicycle or tricycle. Although now a common utility of everyday business life, as well as a means of recreation, it had its origin at the beginning of the latter half of the nineteenth century in what was then an improved velocipede and was used only for sport or recreation. (See BICYCLE.) The progress of cycling as a means of recreation was very rapid, its greatest general popularity occurring between 1890 and 1900. Thereafter for several years it steadily lost ground as a sport, partly if not largely as a result of objectionable features of professionalism which appeared in many race meets. However, apart from the many physical advantages derived from the practice of cycling as an exercise, it has been of inestimable benefit to the community at large, in that it has given to all a capacity of locomotion which formerly none but those of ample means and leisure could enjoy, and, as a natural consequence, has developed a general interest in the many "good roads" movements through the United States and England. Many long-distance tours have been accomplished by its means, notably that of Thomas Stevens, who, between April, 1884, and December, 1886, rode round the world; and Lenz, who (1892–94) rode a wheel carrying all his necessaries, as well as a camera, across America, Samoa, Japan, through China, Burma, India, Baluchistan, Persia, and Armenia. *Road racing* has always been a popular sport, and in the early nineties had attained such proportions that nearly every city and town throughout England and America had its annual road-racing fixtures.

Track racing is entirely artificial, and confined usually to professional riders racing under unnatural conditions. Long-distance and relay races, such as have been held at Tattersall's, Chicago, and Madison Square Garden, New York, while financially profitable to their projectors, have been very severely condemned as of no real value to the sport and frequently injurious to the riders themselves. The League of American Wheelmen, which was formed while cycling was at its height, was an excellent institution and did much to improve the roads, but with the decline of the sport the League declined to a shadow. Similar advantages are obtained for tourists in Europe by the Cyclists' Touring Club of England, founded in 1873 with headquarters in London, S. W. With this latter organization is allied the Touring Club of France and the Deutsches Radfahrerbund. The military organizations of all the European countries include corps of specially equipped and drilled cyclists, whose principal duties are the transmission of orders and the securing of information; for which purposes their speed, their noiselessness, and the comparatively good roads

which prevail have made them conspicuously useful. See ARMY ORGANIZATION; TACTICS, MILITARY.

CY'CLOID (Gk. *κύκλοειδης, kykloeidēs*, circle-like, from *κύκλος, kyklos*, circle + *εἶδος, eidos*, form). A plane curve, the locus of a point on the circumference of a circle which rolls along a straight line. If, in Fig. 1, circle O rolls on

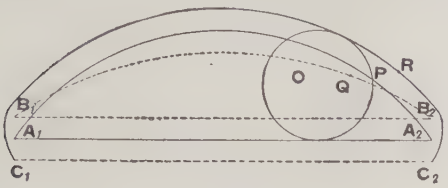


FIG. 1.

the line A_1A_2, the point P traces the arc of the cycloid A_1PA_2. If the generating point is taken at Q, within the circle, the resulting curve is B_1QB_2, called a "prolate cycloid." If the generating point is taken at R, in the plane of the circle, the resulting curve is C_1RC_2, a "curtate cycloid" or trochoid. If the generating circle rolls on a fixed circle, instead of a straight line, curves like those in Fig. 2 are produced. (See

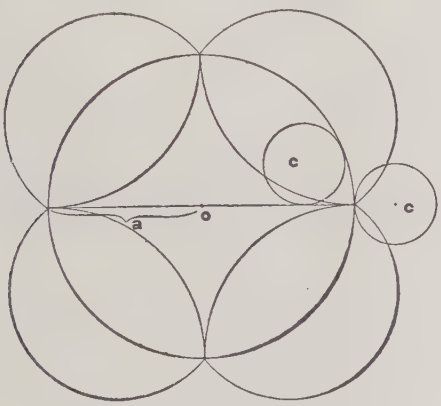


FIG. 2.

CARDIOID.) The curve formed by rolling the generating circle around the outside of the fixed circumference is called an "epicycloid." On the other hand, that produced by rolling the generating circle on the inside of the fixed circle is called a "hypocycloid." These curves belong to a general class called "roulettes," of which the cycloid is the simplest member. The construction for the cycloid was known to Bouvelles (1503), but its name is due to Galileo (q.v.), who in a letter to Torricelli (1639) recommends it for bridge arches. The term "trochoid" is due to Roberval (q.v.), and the term "roulette" (1659) to Pascal (q.v.). Roberval also effected (1634) the quadrature of the cycloid, showing that it equals three times the area of the generating circle, and he determined the volume obtained by revolution about its axis. Descartes constructed its tangents, and Pascal (1658) determined the length of its arc and the centre of gravity of its surface and of the corresponding solid of revolution. The length of one branch of the cycloid is four times the diameter of the generating circle, and its area is three times that of the same circle. If A_1 (Fig. 1) is taken as the origin of coördinates, and a is the radius of the generating circle, the equation of the cycloid is

$$x = a \operatorname{vers} y^{-1}\left(\frac{y}{a}\right) - \sqrt{2ay - y^2}.$$

It is simpler, however, to use the expressions for x and y separately; viz., $x = a\ (\theta - \sin\theta)$, $y = a\ (1 - \cos\theta)$. The equations of the hypocycloid are

$$x = (a-b)\cos\theta + b\cos\frac{(a-b)}{b}\theta,$$

$$y = (a-b)\sin\theta - b\sin\frac{(a-b)}{b}\theta,$$

where a and b are the radii of the fixed and rolling circles. If the radius of the fixed circle is four times that of the rolling circle, the equation of the hypocycloid is $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$, a being the radius of the fixed circle, as in Fig. 2. Because of the elegance of its properties and because of its numerous applications in mechanics, the cycloid is the most important of the transcendental curves. One of its most interesting properties is that the time of descent from rest of a particle from any point on its inverted arc to the lowest point is the same; i.e., the cycloid is an isochronous curve. Thus, on an ideally hard and smooth surface whose sections are cycloids, the particle, having reached the lowest point, will through the momentum received in its fall, ascend the opposite branch to a height equal to that through which it fell, losing velocity at the same rate as it acquired it. The cycloid is also the curve of quickest descent; i.e., an object acted upon by the force of gravity, and setting out from any point of the cycloid, will reach any other point of this curve in shorter time than by following any other path. The cycloid is therefore referred to as the *brachistochrone* (Gr. *βράχιστος, brachistos*, shortest, and *χρόνος, chronos*, time). The problem of finding the brachistochrone was proposed by Jean (Johann) Bernoulli in 1696 and formed the first important step in the calculus of variations. It was solved by Bernoulli himself, by Leibnitz, Newton, L'Hôpital, and Jacques (Jakob) Bernoulli. For the interesting history of the cycloid, consult any of the leading histories of mathematics, and also: Chasles, *Aperçu historique sur l'origine et le développement des méthodes en géométrie* (Paris, 1875); De Groningue, *Histoire de la cycloïde* (Hamburg, 1701); Tannery, "La cycloïde dans l'antiquité," in *Bulletin des sciences mathématiques* (Paris, 1883).

CY'CLOID FISHES. One of the four orders of fishes proposed by Agassiz, based on the character of the scales. Cycloid scales have the posterior or free margin smooth and not spinous. Cycloid-like ctenoid (q.v.) scales are not covered with enamel and belong to many of the present as well as many fossil fishes. The chub and its allies are examples.

CYCLOM'ETER (Gk. *κύκλος, kyklos*, circle + *μέτρον, metron*, measure). An instrument for recording the revolutions of any rotating object, as of a carriage wheel, bicycle wheel, or certain parts of machinery. One of the most common forms consists of a stud projecting from one of the spokes of a wheel and catching a toothed wheel, turning it one notch at each revolution. A similar instrument for measuring distances traversed is an odometer. This instrument, invented by Hudson, is extensively used by surveyors in collecting data for maps.

It is commonly attached to the wheel of a wagon, or to a light vehicle drawn by hand. The term "cyclometry" is often applied to the method of measuring circumferences or areas of circles (q.v.), but more generally it refers to the theory of circular functions. See FUNCTION.

CY'CLONE. See STORM.

CY'CLOPÆ'DIA. See ENCYCLOPÆDIA.

CY'CLOPE'AN ARCHITECTURE, or MASONRY. The name frequently used for an ancient wall of large, irregular stones, rudely hewn or quite unwrought. The term originated in Greece, where structures of this kind were fabled to have been the work of the Cyclopes. The ancients also attributed them to the Pelasgians (q.v.), whence such walls are sometimes called Pelasgian. The walls of Tiryns (q.v.), near Nauplia, are an example of the ruder style of Cyclopean masonry. They are made of huge stones, from 6 to 10 feet long, from 3 to 4 feet wide, and from 2 to 3 feet deep. The stones are either unwrought or roughly dressed with the hammer; some effort at horizontal joining was made. The interstices are filled up by small stones, and clay mortar was employed to bind them, though it has now been washed away to a great extent. The walls of Mycenæ (q.v.) are in part of the same rude construction as at Tiryns, but near the Lion Gate they are faced with huge rectangular blocks, fitted in rudely horizontal courses, and the same style of masonry (but more carefully executed) is employed in the great beehive tombs. A portion of the wall of Mycenæ—of much later date—is built of polygonal stones, carefully fitted so as to leave no interstices. Walls of the same general character are found in Asia Minor and Italy, where they surround many of the old Etruscan towns, though here the walls are more commonly in the rude ashlar masonry also found at Mycenæ. While in Greece these walls belong for the most part to the Mycenæan period, and are probably to be attributed to the Achæan domination, it is not likely that this style of fortification was peculiar to any one race, as similar masonry has been found in China and also in Peru and on a smaller scale in the British Isles. Polygonal masonry, composed of carefully hewn and fitted blocks, is common in Greek works of later times, and the early walls of Troy, as well as the tombs already mentioned, show that the Mycenæan civilization was capable of building walls of hewn and fitted stones, as good as, or better than, those erected in the classical times. The Cyclopean architecture is discussed in histories of architecture (q.v.), or in works dealing with the Mycenæan age (see ARCHÆOLOGY), or Etruria (q.v.). For a description of the remains of Cyclopean architecture in Greece and Italy, consult: Middleton, *Grecian Remains in Italy* (London, 1812), a rare work; Dodwell, *Views and Descriptions of Cyclopean or Pelasgic Remains in Greece and Italy* (ib., 1834); and, for a more general discussion, Petit-Radel, *Recherches sur les monuments cyclopéens* (Paris, 1841).

CYCLOPES, sī-klō'pēz (Lat., from Gk. *κύκλωπες, kyklōpes,* round-eyed, from *κύκλος, kyklos,* circle + *ὤψ, ōps,* eye). In Greek mythology, a race of one-eyed monsters, described as follows: 1. Homeric Cyclopes, a wild, lawless, gigantic race of shepherds, inhabiting an island in the western sea. The most famous is Polyphemus (q.v.). Homer describes him as one-eyed, and later poets attributed this characteristic to his companions. 2. The Hesiodic Cyclopes, Brontes, Steropes, and Arges (i.e., Thunder, Lightning, and Thunderbolt), each having one eye in the middle of his forehead. They were the sons of Uranus and Gæa. Hurled into Tartarus by their father, but delivered by their mother, they helped Cronus to usurp the government of heaven. Cronus, however, in his turn, threw them back into Tartarus, whence they were again released by Zeus, whose servants they now became. Finally, they were slain by Apollo, because they forged the thunderbolt with which Zeus killed Asclepius. The Alexandrian and the Roman poets represented them as the companions and assistants of Hephæstus at his forge, which was situated in a volcano, as at Lipari or Etna. In this capacity they were frequently represented on works of art. 3. The Cyclopes, a people who were said to have come from Thrace or Lycia to Argolis, and to have built the mighty walls of Tiryns, Mycenæ, and Argos for King Proteus. See CYCLOPEAN ARCHITECTURE. Consult Mayer, *Die Giganten und Titanen* (1887).

CY'CLOPS. A play by Euripides, following the Homeric account of the adventures of Odysseus with the Cyclopes, and remarkable as the only preserved specimen of a satyric drama. (See *Greek Drama,* under DRAMA.) It has been translated by Shelley, who omitted a few passages.

CY'CLORA'MA (Gk. *κύκλος, kyklos,* circle + *ὅραμα, horama,* sight). A term applied to a painting placed on the walls of a large cylindrical room representing a landscape, battlefield, or other subject, with true perspective. The spectator stands in the centre, and the effect is extremely realistic, especially in the case of the representation of a battle, the cyclorama of the battle of Gettysburg being a well-known American example. See PANORAMA.

CYCLO'SIS (Neo-Lat., from Gk. *κύκλωσις, kyklōsis,* a surrounding, from *κύκλος, kyklos,* circle). The rotation of the protoplasm within a plant cell. Only the outermost portions remain quiet. The various inclusions of the protoplasm, such as chloroplasts, nucleus, etc., are swept along with it. The mass descends on one side of the cell and ascends on the other. A line of no movement necessarily exists between the portions moving in opposite directions. See PROTOPLASM.

CYCLOS'TOMI (Neo-Lat. nom. pl., from Gk. *κύκλος, kyklos,* circle + *στόμα, stoma,* mouth). A class of eel-like marine animals, the lampreys and hags, regarded as the lowest existing vertebrates (excluding Amphioxus). They have eel-like bodies of very primitive construction. "The spinal column is represented merely by a thick, persistent notochord, inclosed in a sheath, with, in the lampreys, small cartilaginous processes representing neural and hæmal arches. The skull is cartilaginous and is peculiarly modified. Behind it in the lamprey is a remarkable basket-like apparatus, composed of cartilaginous processes. This branchial basket, as it is termed, supports the gill sacs. The gill sacs, of which there are either six or seven pairs, are the organs of respiration and represent the gills of the true fishes." They are, however, very differently arranged, opening externally in some forms by several gill slits, and in others by only one, and communicating internally with the pharynx in diverse ways. Other organs do not

differ so widely from those of the true fishes, the most remarkable fact being that there is only one nasal sac and nostril instead of a pair. The round mouth, without jaws, suggests that of leeches. The Cyclostomi, which by some ichthyologists are regarded as an order (Marsipobranchii) of fishes, are bottom-keeping, voracious, slimy creatures, occasionally truly parasitic, and are traceable back to Paleozoic times.

Fossil Forms. Minute teeth (conodonts), found in Paleozoic rocks, have been by some authors considered to be teeth of cyclostomid fishes, but they are more probably the teeth of carnivorous annelids like the modern Nereidæ. In the Caithness flagstones of the Old Red Sandstone of Devonian age, near Thurso, in Scotland, are found numbers of a small, eel-like fossil, which has, with much probability of correctness, been referred to the cyclostomes. These small fossils, known as Palæospondylus, vary in length from 1 to 2 inches and consist of an oblong skull, made of bony plates, armed anteriorly with small calcified cirri, and provided posteriorly with two long prolongations that parallel the vertebral column. From between these prolongations projects the long vertebral column, made up of distinct calcified elements, with neural spines in the abdominal region, and both neural and hæmal spines in the caudal region. A long, diphycercal tail fin with very slender rays, of which those of the *neural* series are bifurcated, must have formed a powerful swimming organ for this small fish. This fossil, if it be a true cyclostome, differs from all others of the group in having a calcified skeleton. Consult Calvet, "Diagnoses de quelques espèces nouvelles de Bryozoaires Cyclostomes," in *Institut Océanographique, Bulletin No. 215* (Monaco, 1911), and Dean, "The Devonian Lamprey, *Palæospondylus gunni*, Traquair, with Notes on the Systematic Arrangement of the Fish-like Vertebrates," *Memoirs of the New York Academy of Sciences*, vol. ii, part i (New York, 1899). This work includes a complete bibliography of fossil cyclostomes. See CONODONT; HAGFISH; LAMPREY; and Plate of LAMPREYS AND DOGFISH.

CY'CLOSYM'METRY. See SYMMETRY.

CYC'LUS (Lat., circle). A curious fossil crustacean found in the coal measures of North America and Europe. It is of a circular, convex form, with usually a low median ridge on its dorsum, and its surface is either smooth, radially striated, or nodular. A pair of small sessile compound eyes, like those of the horseshoe crab, have been found near the anterior lateral margin of some American examples. These fossils are perhaps the larval stages of other crustaceans, like *Belinurus, Euproops, Prestwichia*, of which adult specimens are often found in the same beds with *Cyclus*. Consult Woodward, "On the Genus Cyclus," *Geological Magazine*, vol. viii (1870), and 4th series, vol. i (London, 1894). See PRESTWICHIA; XIPHOSURA.

CYDIP'PE (Gk. Κυδίππη). See ACONTIUS.

CYD'NUS (Lat., from Gk. Κύδνος, *Kydnos*). A river of Cilicia, passing the city of Tarsus and emptying into the Mediterranean. It was on this river that Cleopatra made her voyage to meet Antony.

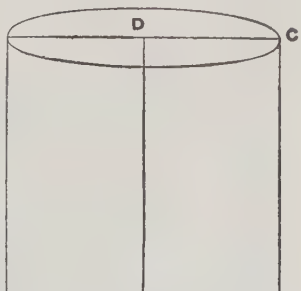
CYDO'NIA. See QUINCE.

CYGNÆ'US, FREDRIK (1807–81). A Finnish poet and literary historian. He was born at Tawastehus and was educated at the University of Åbo, where he lectured from 1839 to 1843, when he began an extensive tour through Europe. In 1854 he became professor of æsthetics and modern literature at the University of Helsingfors. He bequeathed his fortune and valuable art collection to the state. His poetic works were published by him under the title *Skaldestycken* (6 vols., 1851–70).

CYGNÆUS, UNO (1810–88). A Finnish educator, born at Tawastehus. From 1837 to 1839 he was a pastor and teacher at Wiborg, from 1839 to 1846 spiritual director of the colony at Sitka, Alaska, and in 1861 was appointed chief inspector of the Finnish public-school system, which he thoroughly reorganized. In 1863 he established the first normal school in Finland and became its director. He was the first to make manual work (*slöjd, sloyd*) a part of regular public-school instruction. He published *Förslag rörande folkskoleväsendet* (1861).

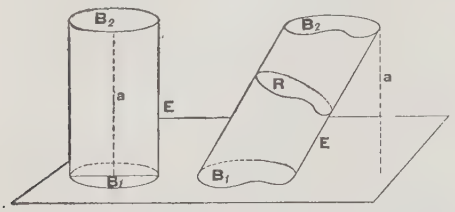
CYG'NUS (Lat., from Gk. Κύκνος, *Kyknos*, the swan). A northern constellation situated to the east of Lyra and northwest of Pegasus. Several stars in this constellation have received the particular attention of astronomers. *β Cygni*, first detected as a double star by Bradley, has two beautiful colored components of the third and fifth magnitudes—the former topaz yellow, the latter azure. *61 Cygni*, also a double star, was the first star to have its parallax (q.v.) determined; this was done by Bessel in 1838. The parallax, 0.37 sec., indicates a distance of 9 light years, so that, with the exception of *α Centauri*, 61 Cygni is our nearest stellar neighbor. *Nova Cygni*, discovered as a star of the third magnitude by Schmidt at Athens in 1876, is now, according to Barnard, of the 15th magnitude.

CYL'INDER (OF. *cilindre*, Fr. *cylindre*, from Lat. *cylindrus*, from Gk. κύλινδρος, *kylindros*, roller, from κυλίνδειν, *kylindein*, κυλιειν, *kyliein*, to roll). A surface generated by a line (the generatrix) which moves parallel to a fixed line and touches a given curve (the directrix) is called a cylindrical surface. The space inclosed by a cylindrical surface is called a cylindrical space. The portion of a cylindrical space limited by two parallel planes cutting all the elements of the cylindrical surface is called a cylinder. If the directrix is a circle, the cylinder is called a circular cylinder; if the directrix is an ellipse, the cylinder is called an elliptic cylinder, and so on. If the elements (positions of the generatrix) are perpendicular to the plane of the directrix, the cylinder is called a right cylinder; otherwise it is called oblique. If a rectangle is revolved about one of its sides, a cylinder of revolution, or a right circular cylinder, is formed. The plane figures which form the ends of a cylinder are called its bases, and these are always congruent. The perpendicular distance between the bases is called the altitude.



A CYLINDER OF REVOLUTION.

The lateral area of any cylinder, expressed in surface units, is the product of the number of linear units in the perimeter of a section perpendicular to the elements (right section) and the number of linear units in an element. The number of units of volume of a cylinder is equal to the product of the number of square units of the base and the number of linear units in the altitude of the cylinder.



A RIGHT CIRCULAR CYLINDER. AN OBLIQUE CYLINDER.

B_1, B_2, lower and upper bases; a, the altitude. E, an element; R, a right section.

A cylindrical surface may be considered as a conical surface (see CONE) with the vertex at infinity. Hence plane sections of the cylindrical space of a right circular cylinder lead to the so-called conic sections, in particular, to the ellipse. If $V \equiv$ volume, $C \equiv$ curved surface, $B \equiv$ base, $A \equiv$ total area of surfaces, $a \equiv$ altitude, $r \equiv$ radius of the base (or of the inscribed sphere), and $R \equiv$ the radius of the circumscribed sphere of a right circular cylinder, then $V = \pi r^2 a$, $C = 2\pi r a$, $A = 2\pi r^2 + 2\pi r a = 2\pi r\ (r + a)$, $R = \sqrt{\frac{a^2}{4} + r^2} = \frac{1}{2}\sqrt{a^2 + 4r^2}$. The volume of a sector of a cylinder of arc $k°$ is $\frac{k}{360}\pi r^2 a$; if the arc is given in radian measure, as n radians, the volume is $\frac{1}{2}nr^2a$. If a plane parallel to the axis cuts off a segment, the corresponding arc cut from the base being $k°$, the volume of the cylindrical segment is $V = \frac{r^2 a}{2}\left(\frac{k}{180} - \sin k°\right)$, or if $k° = n$ radians, $V = \frac{r^2 a}{2}(n - \sin n)$. The mensuration of the cylinder was well known to the Greeks and was studied specially by Archimedes (q.v.). He showed that the volume and surface of a sphere are equal to two-thirds of the volume and surface, respectively, of the circumscribed cylinder. In consequence of this discovery, as Cicero relates, the sphere and cylinder were sculptured on his tomb.

CYLINDER SNAKE. One of a family (Ilysiidæ) of small burrowing snakes allied to the Typhlopidæ and shield snakes, and retaining vestiges of pelvis and hind limbs, the latter showing in clawlike spurs protruding between the scales on each side of the vent. The form is cylindrical, the scales small, polished, and hardly larger on the belly than elsewhere, and the colors bright. The few species are scattered over the Malay Islands and Indo-China, where the common "red snake" (*Cylindrophis rufus*) reaches a length of 2½ feet, and occur in Ceylon and South America. A beautiful species (*Ilysia scytale*) in tropical South America is one of those called "coral snake," and is coral red with black rings. On account of its beauty, perfectly harmless nature, and "for cooling purposes," this snake is said to be sometimes worn as a necklace by the native women.

CYLIX. See VASE.

CYLLENE, sĭl-lē′nē (Lat., from Gk. Κυλλήνη, *Kyllēnē*). A mountain in northwest Arcadia, the fabled birthplace of Hermes. (See MERCURY.) Its modern name is Ziria. Height, 7790 feet.

CY′LON (c.660–c.610 B.C.). An Athenian noble, son-in-law of Theagenes of Megara, who sought to make himself tyrant of Athens. He was victor at Olympia (640 B.C.). In 612 B.C., with the protection of the Delphic oracle, and with outside help from Megara and the aid of a disaffected party in Athens, he seized the Acropolis of Athens. He was blockaded there by Megacles, an Alcmæonid, archon for the year, and surrendered on being promised his life, but was killed with his followers. The immediate result was war with Megara; the more lasting effect was the bloodguiltiness of the Alcmæonidæ (q.v.), of which their opponents so often took advantage to attack them.

CY′MA (Lat. *cyma*, hollow sphere, from Gk. *κύμα*, *kyma*, swelling, from *κύειν*, *kyein*, to swell). In architecture, a molding having a profile of double curvature, part convex and part concave, each part usually a quarter round. When the convex part is next the wall or shaft, it is a cyma recta; when it is the outermost part, the molding is a cyma reversa. It corresponds practically to the modern ogee molding. See MOLDING.

CYMATIUM, sĭ-mā′shĭ-ŭm. See CORNICE.

CYM′BALS (OF. *cimbale*, Fr. *cymbale*, Lat. *cymbalum*, Gk. *κύμβαλον*, *kymbalon*, from *κύμβος*, *kymbos*, cup, Skt. *kumbha*, pot, Ger. *Humpe*, drinking cup). Instruments of percussion in the form of round plates with leather holders. When struck one against the other, they produce a loud, harsh sound of no fixed pitch. The best cymbals are those made in Turkey and China. Attempts to discover and imitate the composition of the metal have all failed. The notes in music for this instrument are written on the same line or space, in rhythmical succession. Although originally military instruments, cymbals are now much used in the orchestra.

CYMBELINE, sĭm′bĕ-līn *or* -lĭn, or CUNOBELINUS. A king of the Britons, who lived in the earlier part of the first century of our era. His capital was Colchester. In 40 A.D. Cymbeline banished his son Adminius, who made his submission to Caligula. The Emperor considered Britain a part of the Roman Empire, but no attempt was made to subdue the island till after the death of Cymbeline. In 43 Aulus Plautius was sent to Britain by Claudius, but was opposed by Togodumnus and Caractacus, the sons of Cymbeline. We have no other authentic information of Cymbeline except what may be derived from the few coins extant. The story of Cymbeline which Shakespeare used in the drama is found in Holinshed's *Chronicle* and is in large measure mythical. Consult Boswell-Stone, *Shakespeare's Holinshed* (2d ed., London, 1907).

CYME, sīm (Gk. *κύμα*, *kyma*, swelling). A flat-topped flower cluster in which the pedicels arise at different levels upon an elongated axis and the innermost flowers bloom first. See INFLORESCENCE.

CYMOPHANE. See CHRYSOBERYL.

CYMRY or **KYMRY,** kĭm′rĭ. See WALES, *History*.

CYNANCHE, sĭ-năn′kē (Gk. *κυνάλχη*, *kynalchē*, dog quinsy, from *κύων*, *kyōn*, dog + *ἄγχειν*,

anchein, to press tight). An obsolete medical term applied to the severer forms of sore throat.

CYNANCHUM, sĭ-năn′kŭm. Several drugs, including the knotty, acrid emetic roots of *Cynanchum vincetoxicum*, a once reputed counterpoison; the nausea-producing leaves of *Cynanchum oleæfolium*, an adulterant of Alexandria senna; and *Cynanchum monspeliacum*, formerly considered as the source of Montpellier scammony. See ASCLEPIADACEÆ.

CYNEWULF, kĭn′*e*-wŭlf, or **CYNWULF**, kĭn′wŭlf (AS., king wolf) (c.750–c.825). A writer of some of the best Old English or Anglo-Saxon verse: *Juliana*, the story of the martyrdom of St. Juliana; *Elene*, a legend of the discovery of the true cross by the Empress Helena; *Christ*, celebrating the coming of Christ, His ascension, and the day of judgment; the *Fates of the Apostles; Andreas, or the Legend of St. Andrew*, and probably several other extant Old English poems. There is, however, no good reason for assigning to him (as is sometimes done) the riddles in the Exeter Book. About the poet nothing is positively known beyond what he himself has chosen to tell in his verse. In the first four poems cited above, he wove his name in runes. In the epilogue to *Elene*, he gave a brief sketch of himself, in which he speaks of his sinful youth, his conversion, his old age, and his reflection on poetic themes during the watches of the night. Cook has shown that Cynewulf's life must have been bounded very nearly by the years 750 and 825. It is uncertain whether he lived in Mercia, East Anglia, or Northumbria. Consult: Grein, *Bibliothek der angelsächsischen Poesie*, revised by Wülker (Göttingen, 1883–98); *Christ*, by Gollancz, (London, 1892), and by Cook (Boston, 1900); *Juliana* by Strunk (ib., 1905); Root, *The Legend of St. Andrew* (New York, 1899); *The Elene: Trans. into English Prose by L. H. Hall* (ib., 1904); *Legend of St. Juliana* (Princeton, 1906); *The Poems of Cynewulf, Translated into English Prose*, by C. W. Kennedy (New York, 1910).

CYN′ICS (Lat. *cynicus*, Gk. *κυνικός*, *kynikos*, doglike, cynic, from *κύων*, *kyōn*, dog). The name applied to a school of philosophers founded by Antisthenes, a pupil of Socrates. The main tenet of the extreme Cynics was that civilization is a curse, and true happiness can be obtained only by gratifying the most primary physical appetites which man has in common with the brutes. The general attitude of the Cynics, as distinguished from that of the Stoics, lay in the fact that while the Stoics regarded everything in the external material world with indifference, the Cynics viewed it with contempt. They were not an important philosophical school numerically, but attracted attention largely by their eccentricities and insolence. On account of their contempt for refinement, their name came subsequently to be applied to any one who takes a mean view of human life. The word "cynic" was probably suggested by the Cynosarges gymnasium where Antisthenes taught. See ANTISTHENES; DIOGENES; MENIPPUS.

CYNOCEPHALUS. See BABOON; MANDRILL.

CYNODON, sī′nō-dŏn (Neo-Lat., from Gk. *κυνόδων*, *kynodōn*, or *κυνόδους*, *kynodous*, dog-tooth, from *κύων*, *kyōn*, dog + *ὀδούς*, *odous*, tooth). A small genus of grasses, having digitate or racemose spikes, with spikelets on one side, glumes nearly equal, boat-shaped, and containing one floret, which has two awnless paleæ, the fruit coated with the hardened paleæ. The most important species is *Cynodon dactylon*, a grass very widely diffused, which is the principal fodder grass and best pasture grass of India, where it is the principal covering of many thousands of square miles and is known by the names of Dhob, Doorba, etc. It is also common in the south of Europe. It is introduced throughout the warmer parts of the world. Its creeping roots have medicinal virtues and are sometimes used as a substitute for sarsaparilla. See BERMUDA GRASS.

CYNOGNATHUS, sī-nŏg′nà-thŭs (Neo-Lat., from Gk. *κύων*, *kyōn*, dog + *γνάθος*, *gnathos*, jaw). A large theriodont reptile found fossil in the Karoo formation, of Jurassic age, of South Africa. It belongs to the group Cynodontia, which probably contains the ancestor of the mammals. The skull, which has a length of 16 inches, is, in respect to its form and dentition, remarkably like that of the carnivorous mammals and recalls that of a wolf. The vertebræ, which are 29 in number, are amphicœlous, and the ribs have double articulations. It is perhaps one of the reptiles which have given rise to some of the early mammals. See THERIODONTIA.

CYNOIDEA. See CARNIVORA.

CYNOSARGES, sĭn′ō-sär′jēz (Lat. from Gk. *κυνόσαργες*, *kynosarges*, explained in ancient days as from *κύων*, *kyōn*, dog + *ἀργός*, *argos*, white). A place on the outskirts of ancient Athens, usually regarded as near the present site of the American and British schools of archæology, northeast of the Acropolis, on the slope of Mount Lycabettos. For a different view, consult Weller, *Athens and its Monuments* (New York, 1913). It contained a number of temples and a gymnasium consecrated to Heracles, at which strangers with but one Athenian parent were obliged to exercise. The philosopher Antisthenes is said to have taught here, and thence his school probably derived the name "Cynic."

CYNOSCEPHALÆ, sĭn′ŏs-sĕf′à-lē (Lat., from Gk. *Κυνὸς Κεφαλαί*, *Kynos Kephalai*, Dogs' Heads). The name of two hills in eastern Thessaly, where the Thebans under Pelopidas defeated Jason, tyrant of Pheræ, 364 B.C., and the Romans, commanded by T. Quinctius Flamininus, defeated Philip V of Macedon, 197 B.C.

CYNOSURE, sī′nō-shōōr *or* sĭn′ō-shōōr (Lat. *Cynosura*, Gk. *Κυνόσουρα*, *Kynosoura*, constellation of Ursa Minor, from *κυνός*, *kynos*, gen. sing. of *κύων*, *kyōn*, dog + *οὐρά*, *oura*, tail). The constellation of which the pole star is the principal star. Milton's lines in "L'Allegro"—

> "Where perhaps some beauty lies,
> The cynosure of neighboring eyes"—

have made the word popular; the metaphor is grounded on *Ursa Minor* being the constellation towards which the others look, as it were, and round which they wheel.

CYN′OSU′RUS. See DOG'S-TAIL GRASS.

CYN′THIA (Lat., from Gk. *Κυνθία*, *Kynthia*). A surname of Diana (q.v.), from her birthplace, Mount Cynthus, on the island of Delos; and hence a poetic term for the moon. Queen Elizabeth is referred to under this name in Spenser's *Colin Clout's Come Home Again*, in Fletcher's *Purple Island*, and in Raleigh's poem "Cynthia." See CYNTHIUS.

CYNTHIA MOTH. See AILANTHUS MOTH.

CYNTHIANA, sĭn′thĭ-ăn′à. A city and the county seat of Harrison Co., Ky., 33 miles by

rail north-northeast of Lexington, on the South Licking River and on the Louisville and Nashville Railroad (Map: Kentucky, F 2). It is the centre of a fertile agricultural region and contains distilleries, flour mills, and a tobacco market of repute. The government is administered under a charter of 1893, which provides for a mayor, elected every four years, and a municipal council, chosen biennially. The city owns and operates the water works. Pop., 1900, 3257; 1910, 3603. On June 11, 1864, Gen. John Morgan, with 1800 men, captured Cynthiana and, later in the day, defeated 500 Union cavalry under General Hobson; but on the 12th he was in turn defeated by General Burbridge with a force of about 5400, the Union army losing, in killed, wounded, and missing, 414 men, the Confederates about one-third of their number.

CYN'THIA'S REVELS. A comical satire by Ben Jonson, first acted in 1600.

CYN'THIUS (Lat., from Gk. Κύνθιος, *Kynthios*). A surname of Apollo, from his birthplace, Mount Cynthus, in Delos. See CYNTHIA.

CYPERACEÆ, sĭp'ĕ-rā'sē-ē *or* sī'pē- (Neo-Lat. nom. pl., from Lat. *cyperos, cyperum*, Gk. κύπειρος, *kypeiros*, sedge), commonly called the sedge family. It is associated with grasses in the order Glumales, the feature of the order being the absence of a perianth and the protection of the flowers by special bracts called glumes. The sedge family is smaller than the grass family, containing about 3200 species under about 75 genera. They are generally thought of as grasses by those who do not know the distinctions between the two families. The general contrasting features are as follows: the sedges have three-ranked leaves and often triangular stems, closed leaf sheaths, no ligules, and solid stems; while the grasses have two-ranked leaves on round stems, open leaf sheaths, ligules, and hollow stems. The greatest differences, however, occur in the flowers of the two families. In the sedges the flowers occur in spikes, consisting of overlapping glumes, and in the axil of each glume there is a flower consisting of three stamens and a solitary carpel, which becomes an achene. This inflorescence is entirely different from that of the grasses.

There are two great series of sedges. In one series the flowers are perfect, so that there is only one kind of flower and one kind of spike. In the other series the flowers are monosporangiate ("unisexual"), which means two kinds of flowers, staminate and pistillate. These two kinds may be in the same spike or in different spikes, and the two kinds of spikes may be on the same plant or different plants (dicœcious).

By far the largest and most difficult genus of Cyperaceæ is *Carex*, the common sedges, with more than 1000 species. The other large genera are *Cyperus*, with 600 species; *Rynchospora* (beak rushes), with 200; *Scleria* (nut rushes), with 200; *Eleocharis* (spike rushes), with 150; and *Scirpus* (bulrushes), with 150.

Although sedges resemble grasses, they are by no means so nutritious, and many of them are so rough that they are not eaten by cattle except when very young. Much of the so-called marsh hay is made from sedges, which mostly frequent marshy grounds. See CYPERUS; SCIRPUS; BULRUSH; COTTON GRASS; PAPYRUS.

CYPE'RUS (Neo-Lat., from Lat. *cyperos, cyperum*, Gk. κύπειρος, *kypeiros*, sedge). A genus of plants of the family Cyperaceæ which contains about 600 species, chiefly tropical, and gradually decreasing in number towards the colder parts of the globe. Many of the species have tubers or corms, which in some are mucilaginous and nutritious; others contain a bitter principle and possess medicinal qualities. Of the latter class is *Cyperus longus*, or sweet cyperus, one of the species which is common in ditches and wet meadows in some parts of Europe, the rhizome of which has an odor of violets, and is astringent, tonic, and stomachic. It has been employed in medicine from very ancient times, but is now more used in perfumery. Some of the Indian species are also used medicinally and in perfumery in their native country, as well as species of kindred genera. Of those with esculent tubers, the most important is *Cyperus esculentus*. (See CHUFA.) A number of species are frequently grown as house plants, common among which are the umbrella plant, or umbrella palm, *Cyperus alternifolius*, and *Cyperus papyrus*, formerly called *Papyrus antiquorum*, the Egyptian paper plant. See PAPYRUS.

CY'PHEL. See HOUSELEEK.

CY-PRÈS, sē'prâ' (OF., as near). In English and American law, a rule of interpretation whereby a testamentary gift which cannot take effect in the precise manner intended by the testator is given an effect as nearly as possible like that which was intended. The doctrine has been applied in two classes of cases.

In the Creation of Fee-Tail Estates.—It is an established rule of real-property law that a gift of land by way of remainder to the issue of an unborn person is void if it follow a gift of a life estate in the same property by the same instrument to such unborn person himself. But if the gifts be made by will, the remainder to the issue may be saved by construing the life estate of such unborn person as a fee tail, in which case it is capable of descending to the issue as tenant in tail. See FEE TAIL; ESTATE.

In Charitable Gifts.—Where the object of a charitable gift fails, as by the dying out of the entire class of persons intended as beneficiaries of the charity, or where a charitable gift might be void in consequence of the indefiniteness of the charity or the operation of the rule against perpetuities, the Court of Chancery may direct the application of the property to another or to a specific charity. Thus, in the first case, a testamentary gift for the emancipation of slaves in the United States might, after the abolition of slavery, be devoted under the cy-près doctrine to the education of emancipated slaves; and, in the second case, a charitable gift for the benefit of the American Zionist Society—there being no such society in existence and there being a possibility that it may not come into existence within the period fixed by the rule against perpetuities—may be applied to the purposes which the testator had in mind, through the agency of any other society having similar aims and competent to make a beneficial disposition thereof.

It is in cases of charitable gifts that the cy-près doctrine finds most of its applications in the United States. It has been repudiated in several of the States, but in most of them it exists, and in New York, where it had for many years been in abeyance, it has recently been revived by statute. It is generally considered a salutary doctrine, as tending to preserve to charity a gift clearly intended for benevolent purposes, and as effectuating the general intention of the testator, even though the particular

1. MONTEREY CYPRESS (Cupressus macrocarpon).
2. BROOM (Cytissus scoparius).
3. CUBEBS (Piper cubeba).
4. AN ORNAMENTAL CROTON (Croton Cooperi).
5. RED CURRANTS (Ribes rubrum).
6. NUT GRASS (Cyperus rotundus).

intention entertained by him cannot be carried into effect. See CHARITABLE TRUSTS; PERPETUITIES; TRUST; INTERPRETATION; WILL; and the authorities referred to under those titles.

CY'PRESS (Fr. *cyprès*, Lat. *cupressus*, Gk. *κυπάρισσος*, *kyparissos;* connected by some with Heb. *gōpher*, a sort of tree, Assyr. *gipāru*, reed, canebrake). Evergreen trees and shrubs of the coniferous genus *Cupressus* and of the tribe Cupressineæ. They have small, often appressed, and imbricate opposite leaves and globular cones of a few thickened scales. There are about a dozen species, natives of Europe, Asia, and the western part of North America. One of the best known is the common cypress of the south of Europe (*Cupressus sempervirens*), and introduced into England and parts of the United States—a tree which attains a height of 80 feet and is famous alike for the great age it reaches and for the durability of its wood. The wood is red or yellowish, hard, compact, and durable. It is not subject to attacks of insects and was once in great demand for cabinetwork. It is believed to be the cedar wood of Scriptures and possibly the gopher wood also. Museum specimens of the wood are known to be several thousand years old, and the old doors of St. Peter's at Rome lasted for more than 1100 years until replaced by doors of bronze. Medicinal virtues were once attributed to the wood, but its present use is for cabinetwork and musical instruments. Perhaps the finest tree of this genus is *Cupressus macrocarpa*, the Monterey cypress of California. It is a beautifully symmetrical tree, attaining a height of 150 feet and a circumference of trunk of 8 to 10 feet. It grows rapidly, even on poor soils, and thrives best near the sea. It is not very hardy; freezing temperatures are fatal to it. A small tree (*Cupressus macnabiana*) of California is much hardier. *Cupressus funebris*, of China, has widespreading and often pendulous branches; it attains a height of 60 feet, and has been extensively planted as an ornament in regions adapted to it. *Cupressus glauca* is common ornamentally in the south of Europe, where it is known as cedar of Goa. *Cupressus torulosa* is a valuable species found in the north of India. *Thuja obtusa*, a related species of Japan, is hardy, attains a height of 100 feet, has a hard, close-grained, durable wood, which is considered of great value in Japan, where the tree is abundant in the forests. It is hardy in the latitude of New York, and some of its varieties are of great beauty. Other species occur in Japan, Mexico, and the United States. Among the best-known species are the yellow cedar (*Cupressus nootkatensis*), and Port Orford cedar (*Cupressus lawsoniana*), both of the Pacific coast region. The bald or southern cypress (*Taxodium distichum*) is a tall tree with deciduous leaves which occurs abundantly in the swamps from Maryland to Missouri and south to the Gulf of Mexico. The timber of this tree is valuable for many purposes. It works easily and is commonly used for shingles. In water it is very durable. When growing in wet places curious, conical, hollow upward growths, called "knees," rise from the roots. Their function is to aërate the roots when submerged temporarily by water. Permanent submergence kills the trees. The tree will grow in dry places and is frequently planted as an ornament as well as for its timber. For illustration of a California cypress tree, see Plate of CYCADS AND CYPRESS. For fossil forms of cypress, see CONIFERÆ. Consult Masters, "A General View of the Genus Cupressus," in *Journal of the Linnean Society*, vol. xxxi (1896).

CYPRESS SWAMPS. Swamps of the southeastern United States in which the bald cypress (*Taxodium distichum*) is one of the dominant trees. See SWAMP.

CYPRESS VINE. See IPOMŒA.

CYP'RIA (Lat., from Gk. *Κύπρια*, *Kypria*, from *Κύπρος*, *Kypros*, Cyprus). The title of a poem once ascribed to Homer, but declared by Herodotus not to be his, and later attributed to Stasinus. It relates the causes leading to the Trojan War, and so is a sort of preface to the *Iliad*. See CYCLIC POETS.

CYP'RIAN. A name sometimes given to a courtesan as being a follower of Venus, the Cyprus-born goddess of love.

CYP'RIA'NUS, or CYPRIAN, THASCIUS CÆCILIUS, SAINT (c.200–258). The great leader of the early African church. He was born in North Africa and was of a wealthy family. His training had been in the law, and he had attained prominence as a teacher of rhetoric at Carthage. Up to 246, when in middle life, he had been a pagan. Then he applied for admission to the Christian Church as a catechumen and after instruction was baptized. Such a man was a great gain to the Church. He soon gave evidence of his piety by voluntarily parting with his property and giving the proceeds to the poor. In 247 he was made a presbyter, and in 248 Bishop of Carthage. He owed his rapid elevation to his high character, his noteworthy gifts of administration, and to the promise he gave of being a devoted leader. These hopes he did not belie. No sooner had he become accustomed to the duties of his high office than the peace which the Church had enjoyed for many years was broken by the sudden exhibition of zeal for the old faith on the part of the Emperor Decius. By the Imperial decree of 249 Christianity became a forbidden religion; its profession meant confiscation, torture, exile, even death, and bishops had a price set upon their heads. Not from cowardice, but from the conviction that it was better for him to continue to guide his flock, which he thought he could do as well out of Carthage as in it, in January, 250, he went into retirement—not exactly concealment, because it must have been easy for the authorities to find him if they wished. Thus he lived 14 months and then as calmly returned to Carthage. His time had been well spent, and the fruits of it appear in his preserved correspondence and treatises. But when once more in the city he saw for himself the desolation the persecution had caused. Many had denied the faith or pretended to do so, many had abandoned their homes, many had died. The more pressing question related to the treatment to be accorded the "lapsed," whom he treated sternly and commanded to repent and show contrition; then he would receive them. (See LAPSED.) He had indeed dealt with the matter while in retirement, but now he must take a more decided stand. In March, 251, he held his first council at Carthage, in which he yielded somewhat to his opponents, who had grown stronger in his absence. The relation between Stephen, the Bishop of Rome, and the Bishop of Carthage is the most interesting point. They differ upon the important matter of the reception into the Church upon their renunciation of heresy of those who had been baptized by heretics.

Stephen—and this was the Roman and ultimately the general position—did not re-baptize such, while Cyprian did. The controversy was sharp and even acrimonious. Stephen called Cyprian a pseudo-Christian; Cyprian called Stephen a schismatic.

The episcopate of Cyprian was indeed a troubled one; heretics, schismatics, feeble, timid Christians, scheming, ambitious leaders, and, to add to the turmoil, the horrors of pestilence—all these must have greatly worried the Bishop. But he did much to strengthen the episcopate as an institution, and make Church councils part of the regular machinery of the Church. He held seven councils, the last in 256. But the end which he had long anticipated was very near. In August, 257, persecution once more broke out, this time under Valerian, the successor of Decius, and Cyprian was apprehended. He was treated with the utmost tenderness, for manifestly the officers were discharging a very disagreeable duty. He was brought before the proconsul (Aug. 30, 257), required to sacrifice to the gods, and on his refusal banished to Curubis, a free town near the sea (modern Xurbo), 50 miles southeast of Carthage. There he lived, attended by many friends and active in his episcopal duties, for 11 months, when he was recalled to Carthage and lived for a while in his own home. On Sept. 13, 258, he was again arrested, brought before the consul, sternly questioned, and sentenced to death. "Our pleasure is that Thascius Cyprianus be executed by the sword," to which Cyprian only said, "Thanks be to God." On September 14 the sentence was carried out.

The writings of Cyprian are most interesting and handle a great variety of topics. The 82 letters are the most important, but the treatises on the "Unity of the Church," the "Dress of Virgins," the "Lapsed," the "Lord's Prayer," the "Vanity of Idols," "Against the Jews," are very instructive. The best edition of his writings is by G. Hartel (3 vols., Vienna, 1868–71); there is an English translation in *The Ante-Nicene Fathers*, vol. v (Buffalo, 1886–96). Consult A. Harnack, *Drei wenig beachtete cyprianische Schriften und die Acta Pauli* (Leipzig, 1899); Von Soden, *Die cyprianische Briefsammlung* (i., 1904); and for his life E. W. Benson (London and New York, 1897), Faulkner (Cincinnati and New York, 1906).

CYPRINE, sĭp′rĭn *or* -rīn (Lat. *cyprinus, cuprinus,* from *cuprum,* copper). A name given to a pale sky-blue or greenish-blue variety of vesuvianite. Its color is said to be caused by a small amount of copper, whence its name.

CYPRIN′IDÆ (Neo-Lat. nom. pl., from Lat. *cyprinus,* Gk. *κυπρῖνος, kyprinos,* carp). A family of soft-rayed fishes inhabiting the fresh waters of North America, eastern Asia, and Africa. The head is naked, and the body, with a few exceptions, is covered with cycloid scales. The mouth bears no teeth, but the pharyngeal bones bear from one to three series of teeth, with a maximum of seven teeth in the main series. There are about 200 genera and 1000 species. They are usually very numerous in individuals. With exceptions like the gold fish, they are not highly colored. The males often differ from the females during the spawning season, not only in additional colors, but in the growth of tubercles on the head, fins, and other parts of the body. The family includes such familiar fish as the chub, dace, carp, tench, bleak, bream, barbel, minnow, goldfish, roach, loach, etc. Most of the North American species are small, under 12 inches in length. The Old World forms and some of the Pacific coast species grow to a much larger proportion and are often important as food. All important kinds are described elsewhere under their English names. See CARP.

CYPRIN′ODON′TIDÆ (Neo-Lat., from Gk. *κυπρῖνος, kyprinos,* carp + *ὀδούς, odous,* tooth). A large family of soft-rayed fishes closely related to the Cyprinidæ (q.v.), with which they were formerly placed. The body is elongate, compressed behind and usually depressed at the head, and both are covered with rather large cycloid scales. The mouth is small, extremely protractile, and provided with small teeth; the lower jaw usually projects, and the pharyngeal bones are not armed, as in the Cyprinidæ. The sexes are usually unlike, and some of the species are viviparous. In these the anal fin of the male is modified into an intromittent organ. The species are numerous, but none attains a large size, and some are extremely small. They inhabit the fresh-water streams, brackish waters and bays of America, southern Europe, Africa, and Asia. The family includes the top minnows, mummichog, killifish, etc., and the interesting anableps, or four-eyed fish. Many of the species are extremely resistant and have become adapted to very diverse habitats. See MINNOW; and Plate of KILLIFISHES AND TOP MINNOWS.

CYPRIOTES, sĭp′rī-ōts (from Lat. *Cyprius,* Cyprian, from *Cyprus,* Gk. *Κύπρος, Kypros,* Cyprus; Turk. *Kibris*). Natives or inhabitants of Cyprus. Since there appears to have existed at least as early as 4000 B.C. an indigenous civilization in the island of Cyprus, the creative and stimulative influences of which are discoverable all over the eastern Mediterranean, the relationship of its ancient inhabitants is a question of great importance. The idea that they were simply Semitic Phœnicians is being abandoned, since the civilization of the latter may very well have been derived from Cyprus, and not vice versa. Some of the latest authorities, like Ohnefalsch-Richter and Sergi, regard the autochthonous civilization of Cyprus as belonging, with the prehistoric Egyptian, to the Afro-Mediterranean or "Afro-European" culture centre, and its originators physically to the North African white race. Asiatic influence as such is later.

The literature about the Cypriotes and their culture is listed up to date in Cobham, *Bibliography of Cyprus* (London, 1900). The enthnological questions involved have been discussed by Ohnefalsch-Richter, in his article in the *Verhandlungen der Berliner Gesellschaft für Anthropologie* for 1899 and by Sergi in his *Mediterranean Race* (London, 1901).

CYP′RIPE′DIUM. See LADY'S-SLIPPER.

CY′PRUS (Lat., from Gk. *Κύπρος, Kypros*). The third largest island in the Mediterranean, in the northeast of that sea, nearly equidistant from Asia Minor on the north and Syria on the east, 40 miles from the former and about 60 miles from the latter (Map: Turkey in Asia, E 5). It is 140 miles long and 60 miles wide. Area, 3584 square miles. Cyprus formerly belonged to the Ottoman Empire, but since July 12, 1878, has been under British control. Two mountain ranges extend from east to west in northern and southern Cyprus respectively. The southern uplift is the more important of the two. Its highest summit is that of Mount Troodos,

about 6400 feet. This range terminates in the isolated peak of Oros Stavro, or Hill of the Holy Cross, a conspicuous landmark from Larnaca, and evidently the peak called Olympus by Strabo, although it is but 2260 feet high. The northern range is an unbroken ridge for 90 miles, inferior in elevation to the other, its highest summits not exceeding 3200 feet. Between these ranges is a broad plain extending across the island from the Bay of Famagusta to that of Morphou on the west, about 60 miles long and from 10 to 20 miles wide. This plain is called Messaria and is watered by two streams, the Pedias and Ialias. It is bare of timber, forests, mostly pine, being confined to the mountainous areas. The climate is generally healthy and dry except along the coast in summer. In the central plain and about Larnaca the heat is excessive, but is tempered by cool sea breezes until about the middle of September, between which time and the end of October is the hottest period. The winter is short and cold, but snow is seldom seen except upon high mountain peaks. Fevers are prevalent during the warm months.

In ancient times Cyprus supplied the Greek monarchs of Egypt with timber for their fleets. It was also celebrated for its copper, a metal which takes its name (*cuprum*) from the name of the island; but little work has been done in modern times. Silver also was produced; Pliny says precious stones were found there. Salt working, an ancient industry, is still carried on near Larnaca and Limassol. Gypsum, terra umbra, and asbestos are the chief minerals found. The majority of the rivers dry up in summer, being only mountain torrents fed by rains and melting snows. The Pedias and the Ialias are the most important. None is navigable.

Agriculture is the main industry; the chief products are cereals, carobs, wine and spirits, fruits and vegetables, linseed, aniseed, and cotton. Cattle, sheep, donkeys, and mules are raised; cheese, wool, and silk are produced for export. The development of the agricultural industries has been hindered by lack of water; but an irrigation scheme carried out by an Indian government engineer, the introduction of special machinery and implements, and compulsory reafforestation have done much towards bringing the soil to a high state of cultivation. Sponge fishing is remunerative, but sea fishing has declined. The imports, consisting mainly of cottons, flour, woolens, sugar, rice, petroleum, tobacco, minerals, etc., were valued, exclusive of specie, for 1911 at £547,772 (£402,961 in 1902); and the exports at £626,557 (£271,098 in 1902). The main articles of export (1911) were carobs, £182,883; live animals, £94,932; barley, £56,415; wine, £53,685; raisins, £29,636; silk cocoons, £27,587; raw cotton, £22,593; fruits, £21,585; vegetables, £14,106; wool, £13,452; hides and skins, £10,735; etc.

The formation of the coast line is unfavorable to commercial development, as there are few harbors. The Famagusta harbor was completed in June, 1906. Improvements were subsequently introduced to make it accessible to large steamers, an area 900 by 600 feet having been dredged, up to 1913, to a depth of 24 feet at low water; the channel of approach is 250 feet wide and 26 feet deep. The town, little more than a fortified ruin, is to be rebuilt and expanded. Its population in 1911 was 5327. Larnaca (9262 inhabitants) and Limassol (10,302) are open roadsteads. An extension of the pier at Larnaca was completed in 1909. The ancient harbor at Paphos, the old capital of Paphos, has been dredged to admit coasting craft. Nicosia (Lefkosia), with 16,052 inhabitants, is situated near the centre of the island and is the capital. The six administrative districts are Nicosia (capital, Nicosia), Larnaca (Larnaca), Limassol (Limassol), Famagusta (Famagusta), Paphos (Ktima, with 3091 inhabitants), and Kyrenia (Kyrenia, with 1726). A government railway from Famagusta to Nicosia (36 miles) was opened to traffic in August, 1905, and was subsequently extended to Morphou, a total distance of 60 miles. Telegraphic communication is maintained between the principal towns and by cable with Egypt by the Eastern Telegraph Company, Ltd.; the Imperial Ottoman Telegraph Administration has a cable to the coast of Asia Minor. Good roads connect the important towns and villages.

By the Convention of June 4, 1878, between the British government and the Ottoman Empire, the former promised to defend Asiatic Turkey against further aggression by Russia, in return for the permission to occupy Cyprus. Sir Garnet Wolseley was appointed Governor, and was installed as administrator, July 23. The head of the administration is the high commissioner, who is assisted by an executive council consisting of three office-holders, and a legislative council of 18 members, one-third of whom are office-holders; the rest are elected on a property qualification, three by the Mohammedan and nine by the non-Mohammedan population. The municipalities are administered by elected councils. Education is to some extent controlled by the government and is chiefly of an elementary character. The total number of elementary schools in 1911–12 was 595 (191 Moslem, 404 Christian), with a total enrollment of 31,780 (5926 Moslems, 25,854 Christians). Government aid amounted to £6110. Justice is administered by a supreme court, assize, district magistrate, and village courts, all of them, with the exception of the first, having natives for judges. The chief sources of revenue are tithes on cereals grown on the island, which are paid in kind, taxes on property, salt monopoly, customs, excise, export dues, etc. The revenue was £319,572 in 1911–12, and the expenditure £235,256. Under the terms of the Convention of 1878 the sum of £92,800 annually was payable to the Porte; it was not actually paid over, however, but was retained and applied to the interest on the guaranteed loan of 1855. Cyprus was definitely ceded to Great Britain in 1913. The currency consists of English, Turkish, French, and native coins. The Imperial Ottoman Bank has branches on the island. The weights and measures are Turkish.

The population by districts follows, census of 1911: Nicosia, 81,497 (56,300 in 1881); Famagusta, 58,530 (38,207); Larnaca, 29,737 (20,766); Limassol, 46,084 (28,717); Paphos, 38,508 (28,424); Kyrenia, 19,752 (13,216)—total, 274,108 (185,630). About 25.9 per cent of the people are Mohammedans; the majority of the remainder belong to the Cypriote church, an autocephalus branch of the Orthodox Greek.

The early civilization of the island is known only from the excavations of recent years, which have thrown little light on the ethnic affinities of the primitive inhabitants. (See CYPRIOTES.)

There are but scanty traces of the Stone age, but the Bronze age (c.3000–1000 B.C.), both in the earlier period when pure copper is used and in the later period after the introduction of tin and the making of bronze, is characterized by a well-developed and clearly marked civilization, presenting close analogies to that represented in the lower strata at Troy (Cyprus was one of the chief early sources of supply for copper; see COPPER). The people seem to have been pastoral and to have avoided the mountains and forests. They early learned to work the rich copper mines of the island, and seem to have been somewhat in advance of their neighbors in Syria and on the islands of the Ægean. From its situation, Cyprus was exposed to foreign influences and seems to have served as intermediary between Egypt and Syria and the Mycenæan civilization of the West. The Mycenæan (Late Minoan) civilization seems to have reached the island about 1600 B.C. and to have continued for about 800 years. Whether it was introduced by Greek colonists is uncertain, but these colonists certainly came to the island before the Dorians had occupied Peloponnesus, and before the introduction of the later Greek alphabet; for they spoke a dialect closely akin to that of the Arcadians and used a clumsy syllabic mode of writing, akin to that of Crete. The Greek and Phœnician settlements belong to the Iron age; the latter are found chiefly along the southern coast, where they remained predominant in Citium, Amathus, and Marion even in later times. The Greeks at first settled along the northern shores and at the eastern and western extremities of the great plain which crosses the island at Amathus, Salamis, Soli, and later predominated in Paphos, Curium, and Lapathus. Whether the worship of Aphrodite, which flourished greatly in Cyprus, developed from that of a nude nature goddess of the original inhabitants or from that of the Phœnician Astarte is uncertain, but it reached the greatest splendor and sensuality among the Greeks, who regarded Cyprus as specially favored by the goddess. The island was invaded by Thothmes III of Egypt, about 1500 B.C., and was forced to pay tribute. In the eighth century before Christ it was tributary to the Assyrians. In the sixth century it was conquered by Amasis of Egypt; on the conquest of Egypt by Cambyses it passed under Persian rule. The Greeks of Cyprus joined in the Ionic revolt against Persia (500 B.C.), but were conquered, and Cypriote vessels were in the fleet of Xerxes. The attempt of Cimon (q.v.) to bring Cyprus into the Athenian League was unsuccessful, and the island remained tributary until Evagoras (q.v.) became King of Salamis (410–374 B.C.), made himself master of much of the island, and nearly succeeded in casting off the Persian yoke. After the battle of Issus, when Alexander advanced into Phœnicia, all the cities of Cyprus declared in his favor and sent ships to assist him in the siege of Tyre. Under the Persian rule the cities had been allowed a large measure of self-government under the control of kings, who seem to have claimed descent from heroic ancestors. After the death of Alexander the island, so important for its seemingly inexhaustible forests (it is now quite bare of trees), became an object of contention among his successors, being especially sought by Antigonus and Ptolemy I. It finally passed into the hands of the latter and was for a long time a valued dependency of Egypt. In 58–57 B.C. the tribune Clodius proposed, and Cato effected, its annexation by Rome. Under Augustus it was made a proconsular province and from this time is scarcely mentioned in ancient history. Cyprus is noticed in Acts iv. 36, where it is mentioned as the native place of Barnabas; and in Acts xi. 19–20 it appears prominently in connection with the earliest spreading of Christianity. During the reign of Trajan (116 A.D.) it was the scene of a rising of the Jews, who are said to have killed 240,000 of the other inhabitants. After the division of the Roman Empire Cyprus passed under the Byzantine emperors. In 646 the Arabs became masters and destroyed the city of Salamis. Two years later the Greeks recovered sway; but in 802 it was again conquered by Harun al-Rashid, who was soon compelled to relinquish it to the Byzantine rulers. In 1184 Isaac Comnenus made Cyprus an independent sovereignty. In 1191 Richard of England ejected Comnenus because he had ill-treated the Crusaders, and in 1193 put Guy de Lusignan in possession as compensation for the loss of Jerusalem, of which Guy had been appointed King. For three centuries, under this dynasty, the feudal system flourished in Cyprus, the cities of Nicosia and Famagusta were adorned with churches, splendid even in their ruins, and the island seems to have been rich and prosperous. Through the Venetian Catarina Cornaro, the wife of James II, the Republic of Venice came into full possession of the island in 1489, after the death of James and his son, James III, and held it for about 80 years. In 1570 the Turks invaded Cyprus, quickly subdued the country districts, took the capital (Nicosia) after a siege, and murdered 20,000 of its inhabitants. Famagusta held out for a year and then made a capitulation, which was immediately violated by the Moslem general, who slowly tortured to death the governor of the city. From that period Cyprus continued a part of the Turkish Empire. In 1878 it was placed under English control by a treaty which recognized the sovereignty of the Sultan and assured him an annual income of £92,746. In 1882 a new constitution was promulgated, and under English rule the prosperity of the island has greatly increased.

The antiquities of the island have repeatedly been the subject of exploration; at first these efforts were largely unscientific and inaccurate, conducted chiefly for the purpose of obtaining booty. Of the earlier excavations the most productive were those of L. P. di Cesnola (q.v.), whose collections are for the most part in the Metropolitan Museum in New York. Later excavations in the modern scientific method have been conducted by the Cyprus Exploration Fund, the British Museum, Ohnefalsch-Richter, and others. Consult *Excavations in Cyprus*, published by the British Museum (London, 1900). See also IDALIUM; LARNACA; PAPHO; the second SALAMIS.

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treats well the ancient history of the island (Berlin, 1841); Cesnola, *Cyprus: Its Cities, Tombs, and Temples* (New York, 1878); id., *Salaminia* (London, 1882); *A Descriptive Atlas of the Cesnola Collection* (New York, 1885); Perrot and Chipiez, *Histoire de l'art antique*, vol. iii (Paris, 1884; Eng. trans. by Armstrong, London, 1885); Ohnefalsch-Richter, *Cyprus, the Bible, and Homer* (ib., 1893); Myres and Ohnefalsch-Richter, *A Catalogue of the Cyprus Museum, with a Chronicle of Excavations since the British Occupation, and Introductory Notes on Cypriote Archæology* (Oxford, 1899); Oberhummer, *Die Insel Cypern* (Munich, 1903 and later). The inscriptions in the Cypriote dialect are published in Collitz, *Sammlung der griechischen Dialekt-Inschriften*, vol. i (Göttingen, 1884), Schmidt, *Sammlung kyprischer Inschriften in epichorischer Schrift* (Jena, 1876), Deecke, *Die griechisch-kyprischen Inschriften* (Göttingen, 1883); consult also Larfeld, *Griechische Epigraphik* (Munich, 1914). For the coins of Cyprus, consult Hill, *British Museum Catalogue, Coins of Cyprus* (London, 1904).

CYRANO DE BERGERAC, sē'rȧ'nō' de bâr'zh-rȧk'. See Bergerac.

CYRANO DE BERGERAC. An opera by Walter Damrosch (q.v.), first produced in New York, Feb. 27, 1913.

CY'RENA'ICA (Lat., from Gk. Κυρηναϊκα, *Kyrēnaika*). The name of the district whose capital was Cyrene (q.v.). It comprised the table-land on the north coast of Africa from the Great Syrtis to the promontory of Ardanis (Râs el-Mellah), though its boundaries fluctuated according to the degree of subjection in which the neighboring tribes were held. This plateau of Cyrenaica was, and still is, one of the loveliest and most agreeable regions of the world. The climate is delicious, mountains on the south sheltering the land from the scorching blasts of the Sahara, and cool sea winds fanning it on the north. From the central plateau, whose breadth is about 80 miles, the land slopes down in verdant terraces to the Mediterranean. These terraces are cut and watered by mountain streams, forming luxuriant ravines. The productions of Cyrenaica mentioned by ancient writers are wheat, oil, wine, honey, fruits of all kinds, cucumbers, truffles, cabbage; flowers yielding the richest perfumes; and a plant called *silphium*. This plant, which was figured on the coins of Cyrene, has not been identified. The country was also celebrated for its breed of horses, but was much exposed to the ravages of locusts.

The chief cities of Cyrenaica were Cyrene, Taucheira (afterward called Arsinoë), Hesperides (afterward called Berenice), Barca, and Apollonia. Since it possessed five cities, in the time of the Ptolemies Cyrenaica was named Pentapolis and Pentapolitana Regia. To each city a certain amount of territory was attached. This favored their individual independence; and the consequence was that the dynasty of Battus, who led the first Greek colony to Cyrene (q.v.), exercised very little influence over Cyrenaica in general. After the death of Alexander the Great Cyrenaica became part of the Egyptian kingdom under the Ptolemies; in the second century B.C. it was a separate kingdom under a branch of the Ptolemaic family. In 96 B.C. it was bequeathed to the Romans by Apion, the last King, and shortly afterward was united with Crete as a Roman province. It continued to prosper for some time, but with the increasing weakness of the Eastern Empire, to which it belonged, was more and more exposed to the encroachments of the desert tribes, and in 647 A.D. was overrun by the Arabs. Ancient Cyrenaica nearly corresponds to modern Barca (q.v.).

CY'RENA'IC SCHOOL. A school of philosophy established by the followers of Socrates upon his death. Aristippus of Cyrene, its founder, taught that pleasure was the highest good, thus developing one side of the Socratic teaching to the exclusion of all others. Virtue for this school meant the course of life that secured the greatest enjoyment. For this, wisdom is necessary, since the pursuit of pleasure, prompted by instincts and impulses as they arise, often defeats itself. The wise man is the man who knows how he can obtain the maximum of enjoyment and who acts upon this knowledge. This doctrine received various modifications according to the view its adherents took as to the way in which the hedonistic end is attainable. Thus Theodorus insisted that in the form, not of the pleasure of the moment, but of enduring joy or "cheerful frame of mind," can true satisfaction be obtained; Hegesias urged that an excess of pleasure over pain is unattainable, hence the true end of human endeavor is to minimize the discomforts of life, and he carried this doctrine to its logical outcome, that death is preferable to life; hence he was called the "recommender of death." This is perhaps the earliest appearance of pessimism (q.v.) in Occidental philosophy. On the other hand, Anniceris maintained that in the search for pleasure the friendly, social, filial, patriotic man is most highly successful, and thus went far towards carrying egoistic hedonism beyond its most obvious limitations. The Cyrenaic school was the precursor of the Epicurean (q.v.). Consult Watson, *Hedonistic Theories from Aristippus to Spencer* (Glasgow, 1895), and the authorities referred to in the article on Ethics. See Ethics; Hedonism; Utilitarianism.

CYRENE, sī-rē'nē (Lat., from Gk. Κυρήνη, *Kyrēnē*). In ancient geography, the capital of Cyrenaica, in northern Africa, situated about 10 miles distant from the coast and 1800 feet above sea level (Map: Roman Empire, with article Rome, E 3). It is said to have been founded in 631 B.C., by Battus and a body of Dorian colonists from the island of Thera. (See Battiadæ.) After the expulsion of the Battiadæ, about 450 B.C., Cyrene had varying forms of government, republic and tyranny interchanging. The city submitted to Alexander in 331 B.C.; shortly afterward it passed into the control of the Ptolemies. (For its later history, see Cyrenaica.) For centuries the site has been without permanent inhabitants. In ancient days Cyrene carried on an extensive commerce with Egypt and Greece and was the birthplace of many distinguished men—the philosophers Aristippus and Carneades, the poet Callimachus, the astronomer Eratosthenes, and Bishop Synesius. Between 1703 and 1910 the site had been visited by various travelers. Explorations and excavations were made in 1821–22, and again in 1861, on the latter occasion in behalf of the British Museum. For a report of the latter excavations, consult Smith and Porcher, *Discoveries in Cyrene* (London, 1864). For earlier visits, consult Barth, *Wanderungen durch die Küstenländer des Mittelmeers* (1849), and

Hamilton, *Wanderings in North Africa* (1851). In May, 1910, a firman was issued to a representative of the Archæological Institute of America for the excavation of Cyrene, and the sum of $15,000 a year for three years was subscribed by members of the Institute. From October, 1910, to May, 1911, excavations were conducted at the site. On a hill believed to be the site of the ancient acropolis Greek and Roman walls were uncovered, and many small objects were discovered. It was found that a circle with the acropolis as its centre and a radius of 5 miles would not cover all the terraces, tombs, buildings, and reservoirs in sight. For a popular account of these excavations, consult the *Bulletin of the Archæological Institute of America*, ii (1910–11). Later work uncovered a group of Ptolemaic buildings, and 3000 terra cottas and some fine sculptures were found. Work was then suspended because of the war between Italy and Turkey in Africa. Consult Robinson, "Inscriptions from the Cyrenaica," in *American Journal of Archæology*, 2d series, vol. xvii (1913).

CYRI'ACUS, or CIRIACO DE' PIZZICOLLI (1391–c.1449). One of the most diligent antiquarians of the Renaissance in Italy. He was born at Ancona. He early entered upon the life of a merchant, which enabled him to gratify his passion for travel. Led by his admiration for Dante to Vergil, and thence to Homer, he turned to the study of the classics and devoted his travels to the enthusiastic study and description of the remains of the past. He visited Syria, Egypt, the islands of the Ægean, and finally Athens and the mainland of Greece, everywhere purchasing manuscripts, coins, and works of art, copying inscriptions, sketching and describing roads, walls, buildings, and any other evidences of the life of ancient Greece. His notes and drawings were collected in three large folio volumes, but after his death, which occurred about 1449, they became scattered and now are known only by fragments or partial copies. Though Cyriacus never became a thoroughly learned man and often made ludicrous mistakes, his breadth of interest and untiring zeal led him to copy much that others neglected, and to him we owe our knowledge of many inscriptions and monuments which have since disappeared. Consult: Voigt, *Wiederbelebung des klassischen Altertums*, vol. i (Berlin, 1893); Jahn, "Cyriacus von Ancona und Albrecht Dürer," in *Aus der Altertumswissenschaft* (Bonn, 1868); Sandys, *A History of Classical Scholarship*, vol. ii (Cambridge, 1908).

CYRIL, sĭr'ĭl (Lat. *Cyrillus*, Gk. Κύριλλος, Kyrillos), SAINT (c.376–444). A bishop of Alexandria, one of the most energetic but least amiable of the Church fathers. He was born in Alexandria and was educated in the desert, 65 miles south of Alexandria, by the cenobitic monks of Nitria, with whom he lived for five years, and who probably inspired him with that fiery, intolerant, and impetuous zeal which characterized him through life. Subsequently he went to Alexandria, where he became a presbyter, and on the death of his uncle, Theophilus (412 A.D.), obtained the episcopal see. The Alexandrian Jews, who were numerous and riotous, were the first to feel the effects of his inflexible character. Some Christian blood having been shed by them in a city tumult, Cyril put himself at the head of a rabble of zealots, attacked the Jewish quarter of Alexandria, destroyed the houses, and banished the inhabitants. Orestes, the Prefect of Egypt, having drawn up an accusation against Cyril, was attacked in the streets by 500 monks, who had come up from the deserts of Nitria, at the call of their old companion, ready to defend him against his foes. One of these monks having fallen in the skirmish, his corpse was carried in procession to the high church of Alexandria, where Cyril delivered a sanguinary discourse, gave the dead monk the name of Thaumasius ('the excellent'), and pronounced him a martyr and a saint. The violent death of Hypatia (q.v.), the famous woman philosopher of Alexandria, a friend of the Prefect Orestes, at the hands of a mob, has often been laid to the charge of Cyril, but perhaps all that can be justly alleged against him is that he was in great measure responsible for the riotous conditions which led up to this deplorable event. But the most important historic event in his career was his controversy with Nestorius (q.v.), whose doctrines were condemned by the Council of Ephesus, presided over by Cyril (431). All the sternest features of his disposition appeared in this contest. In the midst of disquietudes, which he himself had largely occasioned, he died June 9, 444 A.D. In the Greek church his day in the calendar of saints is June 9, in the Latin church January 28. Cyril's numerous writings consist of commentaries, treatises, homilies, epistles, etc. The best edition was published by Jean Aubert (Paris, 1638, reprinted in Migne, *Patrol. Græca*, lxviii–lxxvii). Certain of his works have been published in critical editions by English scholars, among them his commentaries on Luke (1859), John (1872), Minor Prophets (1868), *Five Tomes against Nestorius* (1881), and his *Scholia on the Incarnation* (London, 1907). For his biography, consult Kopallik (Mayence, 1881). Charles Kingsley's brilliant romance *Hypatia* gives a view of Cyril tinged with the author's prejudices against monasticism.

CYRIL, SAINT (c.315–386). A bishop of Jerusalem and an eminent Church father. He was born in Jerusalem about 315 A.D., and ordained a deacon in 334, a presbyter in 345, and, on the death of Maximus, in 351 was elected Bishop of his native city. His metropolitan was the Arian Bishop Acacius of Cæsarea, with whom he was soon engaged in hot conflict concerning originally the rights of his office, but ultimately their differences of doctrine. Acacius accused Cyril before a council at Cæsarea in 358, whose competency Cyril did not acknowledge, of selling the treasures of his church in a time of famine to feed the poor, and this Arianizing assembly undertook to depose him. He appealed to a larger synod, which was held at Seleucia (359), and was by it restored to his office; but once more, through the persevering hostility of Acacius, he was deposed by a council assembled in Constantinople in 360. On the death of the Emperor Constantius (361) he was again restored to his episcopate. Soon after his old enemy Acacius died, but Cyril was immediately involved in new difficulties, and was banished, by the Emperor Valens, in 367; he returned after the Emperor's death in 378. He died March 18, 386.

Cyril's writings are extremely valuable for the history of theology and ritual. They consist of 23 treatises, 18 of which are addressed to catechumens and five to the newly baptized.

The former are for the most part *doctrinal* and present to us in a more complete and systematic manner than the writings of any other father the creed of the Church; the latter are *ritual* and give us a minute account of baptism, chrism, and the Lord's Supper. Their style is simple and unattractive. Cyril's works were published by A. A. Touttée, the Benedictine monk (Paris, 1720; Venice, 1761); they were reprinted in Migne, *Patrol. Græca*, xxxiii, and by G. C. Reischl and J. Rupp (2 vols., Munich, 1848–60; Eng. trans. by E. H. Gifford in *The Nicene and Post-Nicene Fathers*, 2d series, vol. vii, New York, 1894). Consult Delacroix, *Saint Cyrille de Jérusalem, sa vie et ses œuvres* (Paris, 1865), and Mader, *Der heiligen Cyrillus* (Einsiedeln, 1901).

CYRIL (827–869) and **METHO'DIUS** (c.825–885). The apostles of the Slavs in the ninth century. They were brothers and sprang from a family of high rank in the half-Slavic, half-Greek town of Thessalonica. Having been ordained priest, Cyril (whose name was properly Constantine) became secretary to the Patriarch of Constantinople and later prominently connected with the anti-Jewish polemics. The latter interest it was which induced him to go forth, during the reign of the Byzantine Emperor Michael III, to evangelize the Khasars, dwelling by the Caspian Sea under a Jewish king who allowed Jews, Mohammedans, and Christians to live peacefully together. His labors were very successful, the Khan himself being among the converts. At this time Methodius, his elder brother, was abbot of a famous monastery in Constantinople. The Duke of Moravia, Rostislav, having established an independent Slavic kingdom and driven out the German priests, applied to Constantinople for Christian teaching. The Patriarch sent him Cyril and Methodius (864). Cyril was long thought to have invented the Slavic alphabet (see CYRILLIC ALPHABET), a modification of the Greek, and the brothers, assisted by a number of their pupils, completed their translation of the Holy Scriptures, which is in use to the present day among all Slavic Greek Catholic Christians (Russians, Bulgarians, and Serbs). Feeling the necessity of linking the Moravian church to the power of Rome, the brothers, after three and one-half years of work, went to Rome. There they were cordially received and were ordained. The younger of the two brothers died Feb. 14, 869, as monk in a monastery at Constantinople, where he had taken the name of Cyril. Methodius continued the work among the Slavs, but in Pannonia, not in Moravia. In 870 the Pope made him a bishop and in 873 archbishop. Supported by the Pope, he long kept up a constant fight with the German emissaries. He died at Wehlerad, April 6, 885. Consult: Ginzel, *Geschichte der Slawenapostel Cyril und Methodius* (2d ed., Vienna, 1861); Dümmler and Miklosich, *Die Legende vom heiligen Cyrillus* (Vienna, 1870); Goetz, *Geschichte der Slawenapostel Constantinus (Cyrillus) und Methodius* (Gotha, 1897); also *Vita Sancti Methodii*, ed. by Miklosich (Vienna, 1870); Maclear, *Conversion of the Slavs* (London, 1879). The *Apologia Moralis* ascribed to Cyril was published by Corter (Vienna, 1630).

CYRIL'LA (named in honor of Domenico Cirillo or Cyrillo, an Italian physician). An evergreen tree or shrub, of which there is but one species, leatherwood (*Cyrilla racemiflora*), found from the southern United States to Brazil. In the United States it occurs from North Carolina to Texas and is hardy as far north as Philadelphia. It has bright green leaves, and white flowers in racemes. The species is variable, and under cultivation some of the varieties are very ornamental.

CYRIL'LIC ALPHABET, or **KIRILLITSA**, kê-rĭl'lĭ-tsâ. A method of writing long supposed, wrongly, to have been invented by Cyril, apostle of the Slavs (see CYRIL and METHODIUS) between 855 and 863. It is based upon the Greek *uncials* of the ninth century, with the addition of some signs to represent sounds not found in Greek. It originally consisted of 38 characters, to which 10 more were added later. This alphabet is of somewhat more recent origin than the *glagolitic, or glagolitsa* (q.v.), which is probably the alphabet invented by Cyril. The oldest-known document written in Cyrillic characters is an inscription of the Bulgarian Tsar Samuel, of 993 A.D. The Old Bulgarian (Old Church Slavonic) manuscripts are mostly written in glagolitic characters, there being only two important Cyrillic manuscripts, the *Codex Suprasliensis*, and the *Gospel of Priest Sabba* (Savvina Kniga). With some modifications, the Cyrillic is the alphabet now used in Russia, Bulgaria, and Servia; it was formerly also used in the writing of Rumanian, although this is not a Slavic language. Consult: Taylor, *The Alphabet*, vol. ii (London, 1899); Karskiĭ, *Ocherk Slavianskoĭ Kirillovskoĭ Paleografii* (Warsaw, 1901); the introductory portion of Leskien, *Grammatik der altbulgarischen Sprache* (Heidelberg, 1909), and, passim, the *Archiv für slavische Philologie*.

CYR'IL LU'CAR. See LUCARIS, CYRIL.

CYR'OPÆDI'A (Lat., from Gk. Κύρου παιδεία, *Kyrou paideia*, education of Cyrus), THE. The longest work of Xenophon (q.v.), purporting to give a history of the early life and training of Cyrus the Great, but in reality an historical romance. Its elaborate scheme of government and education are Spartan rather than Persian, and the whole work is to be regarded as the exposition of an ideal government.

CYRTOCERAS, sẽr-tŏs'ẽ-ras (Neo-Lat., from Gk. *κυρτός, kyrtos*, curved + *κέρας, keras*, horn). A genus of curved tetrabranchiate cephalopods, of which fossil species are found in rocks of Devonian age. They have large, laterally compressed, or triangular curved shells, with subtriangular or T-shaped openings. The cameræ, or chambers, are very short, so that the septa are close together, and the siphuncle is large, ventral, or subventral, and restricted at each septum so that in a longitudinal section of the shell it gives the appearance of a string of elongated beads. The genus *Cyrtoceras* formerly included a great variety of curved shells, most of which have been proved by Hyatt to belong to other genera and even other families from that which includes the type species. Consult: Hyatt, "The Genera of Fossil Cephalopods," *Proceedings Boston Society of Natural History*, vol. xxii (Boston, 1884); Von Zittel and Eastman, *Textbook of Palæontology*, vol. i (London and New York, 1900). See also CEPHALOPODA; ORTHOCERAS; NAUTILUS; NAUTILOIDEA. For illustration, see Plate of CEPHALOPODA.

CY'RUS. River in Transcaucasia. See KUR.

CYRUS THE GREAT, or CYRUS THE ELDER (c.600–529 B.C.). The founder of the Persian Empire and conqueror of Babylon, whom Isaiah

called the *anointed* of the Lord and his *shepherd* (Isa. xliv. 28; xlv. 1). The name of this monarch appears in Old Persian as *Kūruš*, in the Babylonian inscriptions as *Kuraš*, in Hebrew as *Kōres*, and in Greek as Κῦρος, whence Latin *Cyrus*. According to Herodotus, the name signifies *sun;* but there is some possibility, judging from the Neo-Elamitic, that its signification may have been *shepherd*, with which the Isaiah passage might be compared. The lineage of this great King we have on his own authority on a famous cuneiform cylinder discovered some years ago. (Consult Rawlinson, *Journal Asiatic Society*, London, 1880, and Hagen, in Delitzsch and Haupt, *Beiträge zur Assyriologie*, vol. ii, Leipzig, 1894.) This was written in the Babylonian language and is now among the treasures of the British Museum. In this Cyrus traces his royal claim through his father, Cambyses, and his grandfather, Cyrus, back to Teispes; the latter was the son of Achæmenes (q.v.), founder of the Achæmenian line. The ancestral home was Anshan, or Anzan, which is believed to have been a city or district of Elam (q.v.). However that may be, there can be no doubt that Cyrus was a Persian, and he is rightly so called in the Old Testament.

According to the cuneiform records of Nabonidus (*Nabū-nā'id*), Cyrus was a vassal of Astyages (*Ištuvegu*), who is spoken of as King of the Medes, or again of the Scythians. There is good ground for believing that Cyrus was directly connected with this ruler by the ties of blood. Herodotus (i, 107 ff.) expressly states that Cyrus was the grandson of Astyages, whose daughter Mandane had been married to Cambyses, a Persian noble. The Greek historian has a number of interesting and highly colored legends to narrate regarding the fear of Astyages for the infant as his future vanquisher, with popular stories also regarding the fortunes of the youthful prince and his rapid elevation to power. Whatever value is to be placed on these picturesque accounts, there is no question that Cyrus's triumphant career began with his overthrow of Astyages and his final mastery of Media before the year 550 B.C. The conquest of the Median Empire opened the way for further success, and Cyrus turned his victorious arms against Crœsus of Lydia, whom he vanquished 546 B.C. Asia Minor was thus brought practically under this ambitious ruler's sway.

The time had now arrived to strike a mighty blow against Babylon. Nabonidus, the King of that ancient capital, seems to have estranged himself from his subjects and to have lost the favor of the priestly class. By preference he lived at Temā, or Tevā, and when the condition of affairs within Babylon itself became such as to call him back, it was too late. The account of the fall of the city we can gather by combining the testimony of the cuneiform records with the biblical narrative and Herodotus. Internal factions seem to have been numerous; the Jews, who were in captivity in the city, apparently played a part. Babylon is stated to have fallen *without fighting* before the victorious hosts of Cyrus, and Nabonidus was utterly overthrown. Belshazzar of the Old Testament may have been Bēl-šar-uṣur, the son of Nabonidus, who, according to the inscriptions, offered resistance to the advance of Cyrus's forces. The fall of the city itself occurred at the moment of the great Tammuz festival (July, 539), and it was actually accomplished by Cyrus's satrap Gobryas (Gubaru or Ugbaru of the inscriptions), who was in command of the advance army. Cyrus himself made his triumphal entry into the city in October, 539, and became King of Babylon. The famous cylinder above referred to records the inauguration of his rule. We know in general that his policy towards the conquered people was a most liberal one, and even though it may have fallen somewhat short, perhaps, of the enthusiastic hopes of a prophetic Isaiah, its ultimate influence and effects are undoubted as having contributed towards the restoration of the Jews from captivity. See BABYLON.

The ambition of Cyrus, growing with advancing years, led finally, it seems, to his own destruction. The vision which Herodotus tells us Astyages beheld in a dream of the figure of the youthful Cyrus adorned with wings that overshadowed all Asia seemed now on the eve of fulfillment. The great conqueror's dominions actually extended almost from the Hellespont to the Indus. But disaster was at hand. Cyrus engaged in an invading expedition against the Scythian hordes of the north (Herodotus, i, 204; Ammianus Marcellinus, 20, 6, 7, 40). In a battle against their Queen, Tomyris, Cyrus is said to have been slain. Ctesias (*Pers.* 6–8), however, states that Cyrus fell in battle against the Derbicæ, a tribe bordering on India. The year of his death was 529–528 B.C., and his age is given as 71 years. His body is said to have received a final resting place at Pasargadæ. A tomb, now empty, still stands there surmounting a series of rising stone steps. Near by is a huge monolith slab that once bore his name; but this is broken and tumbled down, a monument, like the empty and lonely mausoleum, silently recording the fall of greatness.

In estimating the character of Cyrus, after we have considered all the accounts of him, we may judge him to have been not only a man of great personal power, but an ideal king. The Persians called him father (Herodotus, iii, 89, 160); the Jews looked upon him as their liberator; the Greeks admired his qualities as a ruler and legislator (Æschylus, *Pers.* 764–68); and Xenophon chose him as the hero of his famous historic romance, the *Cyropædia*. Taken for all in all, his claim to be entitled Cyrus the Great, as history has crowned him, remains unchallenged with time. The best short account of Cyrus, with abundant references, is that of Justi, in Geiger and Kuhn, *Grundriss der iranischen Philologie* (Strassburg, 1897). Consult also Duncker, *History of Antiquity*, Eng. trans. (London, 1881). Passing mention may be made of Horner, *Daniel, Darius the Median, Cyrus the Great* (Pittsburgh, 1901); Amiaud, *Cyrus, roi de Perse* (Paris, 1887); and Lessman, *Die Kyrossage in Europa* (Charlottenburg, 1906).

CYRUS THE YOUNGER (?–401 B.C.). The second of the sons of Darius Nothus, or Ochus, and Parysatis, familiarly known through Xenophon's *Anabasis*. When his elder brother, Artaxerxes Mnemon (q.v.), succeeded to the throne (404 B.C.), Cyrus conspired to deprive him of his crown and his life. The plot, however, being discovered, he was at first sentenced to death, but afterward pardoned, through his mother's intervention, and was even restored to his dignity of satrap of Asia Minor. Here he employed himself in making arrangements for war against his brother, although he concealed

his purposes to the very last. In the spring of 401 B.C. he left Sardis at the head of 100,000 Asiatics and 13,000 Greek mercenaries, under pretense of chastising the robbers of Pisidia. These numbers given by Xenophon are greatly exaggerated, for the two armies combined probably failed to reach 100,000. Artaxerxes, being warned of Cyrus's perfidy, made preparations to oppose him, and the two armies encountered each other, in October, 401 B.C., in the Plains of Cunaxa, between 60 and 70 miles from Babylon. Cyrus was defeated and slain, although the Greeks fought with the greatest courage, and even routed that portion of Artaxerxes' troops immediately opposed to them. The fortunes of the Greeks, on their retreat through the highlands of Kurdistan and Armenia in severe winter weather, are recorded by Xenophon in his *Anabasis* (q.v.). That historian represents Cyrus the Younger as endowed with every amiable quality.

CYST (from Gk. κύστις, *kystis*, bladder). A tumor containing one or more cavities, the contents of which are of a fluid or semifluid consistence. Cysts arise from distention of preexisting spaces (retention or exudation cysts); or in spaces of new formation, as blood cysts; or they may be of congenital origin or parasitic. The cyst wall is formed of connective and fibrous tissue, rarely of muscular fibres, and the inner surface of the cavity is lined with epithelium. Cysts are classified according to their mode of development. Some are found in glands and are due to an excess of the normal cell secretion; others are caused by obstruction of the ducts through which the secretion naturally escapes. One class, known as dermoid cysts, are due to faulty embryonic development, and these at times contain hair, nails, or teeth. Occasionally solid tumors undergo cystic degeneration. Hydatid cysts are of parasitic origin and occur most frequently in the liver. Besides these there are numerous other varieties depending upon the tissues in which they grow. Cysts vary from minute retention cysts on the face to the enormous tumors of the ovary, weighing over 100 pounds. Surgical interference is frequently required. See OVARY; HYDATID; WEN.

CYSTEIN, sĭs'tê-ĭn, or α-amino-thiolactic acid, $CH_3C(NH_2)(SH)CO_2H$. A substance obtained by Baumann, by reducing cystin (q.v.) with nascent hydrogen from tin and hydrochloric acid. It is a white crystalline powder, soluble in water and in acetic acid as well as in the strong mineral acids. Its aqueous solution is readily oxidized by the air, with re-formation of cystin.

CYS'TICER'CUS. See TAPEWORM.

CYSTID'EA. See CYSTOIDEA.

CYS'TIN (from Gk. κύστις, *kystis*, bladder), $C_6H_{12}N_2S_2O_4$. An organic acid (amido-sulpholactic acid), allied to lactic acid. It occurs normally in urine in very small quantities, and it is the principal constituent of the urinary calculus known as cystic calculus, from which it may be obtained by dissolving in ammonia and allowing the solution to evaporate, the cystin separating out in the form of characteristic colorless hexagonal or orthorhombic crystals, which are insoluble in water, alcohol, or ether. The ammoniacal or hydrochloric-acid solution of cystin turns the plane of polarized light strongly to the left. The internal administration of sulphur appears to be the only remedy that produces an appreciable diminution of cystin in pathological cases. The constitutional formula of cystin is

$$\begin{array}{l} CH_3-C(NH_2)S-CO_2H \\ \quad\quad\quad\quad\quad\quad | \\ CH_3-C(NH_2)S-CO_2H \end{array}$$

CYSTI'TIS (Neo-Lat., from Gk. κύστις, *kystis*, bladder). Inflammation of the urinary bladder. Among the causes of cystitis may be mentioned injuries, exposure to cold, injection of irritating medicaments in treating the urethra, insertion of a dirty catheter when drawing off the urine, retention of fermenting urine, extension of inflammation from other adjacent tissues, or the presence of a calculus (q.v.). The inflammation is accompanied by chills, fever, some nausea, pain in the bladder, and a continual desire to urinate. The urine is generally cloudy, from mucus and pus, or bloody. In treating cystitis, heat should be applied to the abdomen, or the patient should take a hot sitz bath; he should take large quantities of alkaline drinks, and rest in bed. In many cases it is necessary to wash out the bladder, and a variety of drugs are used, according to the exact nature of the symptoms.

CYS'TOCARP (Gk. κύστις, *kystis*, bladder + καρπός, *karpos*, fruit). A complex form of fructification developed in the red algæ as a result of the sexual act. See RHODOPHYCEÆ; ALGÆ.

CYSTOI'DEA (Neo-Lat. nom. pl., from Gk. κύστις, *kystis*, bladder + εἶδος, *eidos*, form). A class of extinct echinoderms of the subphylum Pelmatozoa (q.v.), allied to the crinoids and blastoids, but differing from these chiefly in the irregular arrangement of the plates of the calyx and the imperfect development of their arms. In general appearance the Cystoidea resemble the crinoids, with the remains of which they are often found associated in the Ordovician and Silurian strata. The cystoid body was inclosed is a case or "calyx" of variable form, spherical, cylindrical, hemispherical, or discoid, which is made up of polygonal calcareous plates without regular arrangement. The calyx plates seem to have been, in many early genera, loosely united to each other, so that they became easily dissociated after death of the animal. This explains the rarity of perfect individuals in the Ordovician rocks, where the fragments are often exceedingly abundant. Another characteristic is the presence of pores that perforate the plates and that are arranged in rhombic series. These pores are supposed to have been connected with the respiratory apparatus. The number of plates in the calyx is very variable, from 10 or 12 to over 100, and as a rule those forms with the largest number of plates show the greatest irregularity in their arrangement. In some of the forms, with less number of plates, these are arranged in regular transverse rows, and the calyx then approaches more nearly the aspect of the simpler forms of crinoids.

The arms are absent in many genera of cystoids, and when present are seldom found attached to the calyx. They are never pinnulated like those of the crinoids, though they are composed in a similar manner, and are often supplied with grooves. In those cystoids without free arms there is generally found on the ventral surface of the calyx a system of ambulacral furrows that radiate irregularly from the mouth opening. These furrows, representing the arms, are bordered by rows of small plates that often

bear pinnules of delicate construction, as seen in *Callocystites*, *Glyptosphærites*, and *Agelacrinus*. The more primitive cystoids have neither arms nor ambulacral furrows. The openings of the calyx are four in number. The mouth is central or subcentral on the upper or ventral surface; the anal opening is eccentric, and is generally closed by a pyramid of small, triangular plates; a third opening, often present near the anal opening and generally closed by triangular plates, is considered to be the genital orifice; and a fourth small, slitlike aperture, present in only a few genera, is of problematic nature. The calyx of the cystoid is usually elevated on a stem which often resembles that of the crinoid in being composed of a single series of plates pierced by a central canal. In some genera (as *Dendrocystites*) the stem is made up of plates arranged in transverse rows, and the central cavity is then much enlarged and continuous with the general cavity of the calyx. In *Echinosphærites* the stem is reduced to a tubercle on the dorsal surface, and the animal seems to have been a free living form. The discoid genera *Agelacrinus* and its allies are sessile, and are attached either by a pedestal or by cementation of the dorsal surface of the calyx to foreign objects, generally the shells of mollusks.

Classification of the Cystoidea is a matter of difficulty, not alone because of the general imperfection of the material, but also on account of the great diversity of structure seen within the class, which contains a number of synthetic or ancestral types that seem to have given rise to all the other more specialized groups of the Echinodermata. Through assumption of a more regular arrangement of the plates and the development of the arms, with consequent rearrangement of the ventral surface, as in *Cryptocrinus*, *Porocrinus*, and *Caryocrinus*, they gave rise to the Crinoidea. Reduction of the plates and enlargement of the ambulacral grooves, with the assumption of the pentameral gemmiform shape, as in *Asteroblastus*, leads to the Blastoidea. *Agelacrinus* is suggestive of the starfish (Asteroidea) and brittle stars (Ophiuroidea), and finally the Echinoidea and Holothuroidea may be imagined to have been derived from the more spherical forms of armless cystoids, the echinoids presenting a series of progressive evolution, the holothurians a regressive series.

Range. The cystoidea is the oldest-known class of echinoderms; their isolated plates, rarely united to give a clue to the form of the animal, known under the names of *Eocystites*, *Protocystites*, etc., from the Cambrian rocks, are the earliest representatives. The class enjoyed two periods of expansion. First, in the early Ordovician time they flourished in hosts in some regions, their remains forming the larger part of certain limestones, such as the lower Chazy limestones of Lake Champlain. Other limestones, of Beekmantown and Trenton age, in the St. Lawrence and Champlain valleys, and beds of equivalent age in the Baltic provinces of Europe, contain abundant cystoid remains. The second expansion of the class occurred during the Silurian time, when these creatures lived in abundance in some portions of the seas of northern and middle Europe and eastern North America. In all about 250 species are known, and of this number only about 15 have been found in rocks above the Silurian system. The group entirely disappeared with the close of Paleozoic time.

Bibliography. Consult: Forbes, "On the Cystidea of the Silurian Rocks of the British Islands," *Memoirs of the Geological Survey of Great Britain*, vol. ii, part ii (London, 1848); Billings, "On the Cystideæ of the Lower Silurian Rocks of Canada," *Figures and Descriptions of Canadian Organic Remains, Decade III* (Montreal, 1858); Hall, "Descriptions of Some New Fossils from the Niagara Group," *Twentieth Annual Report of the New York State Cabinet of Natural History* (Albany, 1867); Barrande, "Cystidées," *Système Silurien du Centre de la Bohême*, vol. vii (Prague and Paris, 1887); Bather, "The Cystidea," in Lankester's *Treatise on Zoölogy*, part iii, chap. ix (London, 1900); Von Zittel and Eastman, *Textbook of Paleontology*, vol. i (London and New York, 1900); Jackel, *Stammesgeschichte der Pelmatozoen* (Berlin, 1899); Schuchert, "On Siluric and Devonic Cystidea and Camarocrinus," *Smithsonian Miscellaneous Collections*, vol. xlvii, part ii (Washington, 1904). See CRINOIDEA; ECHINODERMATA; and articles on the other classes of echinoderms.

CYS'TOLITHS (Gk. κύστις, *kystis*, bladder + λίθος, *lithos*, stone). Masses of cellulose and calcium carbonate (the chief constituent of limestones), found in the cells of plants belonging to the families Urticaceæ and Acanthaceæ. They are most common in the epidermis of both leaves and stems, but are found also in the cortex and pith. A single cystolith occupies a cell, nearly filling it, though the cell is enlarged. Cystoliths are irregularly warty or nodulated like a compact bunch of grapes. Each is attached to the wall of the cell in which it lies by a short stalk of cellulose. In reality the cystolith is an outgrowth from the cell wall, at first peg-shaped, later club-shaped, and finally warty. Its foundation substance is cellulose (the same as that of the wall), which is impregnated with a large quantity of calcium carbonate in the form of very fine granules, thus forming a stony mass. The stalk often contains silica. The carbonate is to be regarded as a waste product from the chemical processes occurring in the plant and is of no further direct use. It can readily be dissolved out by weak acids, the process of solution being accompanied by effervescence and the evolution of carbonic-acid gas (carbon dioxide). Good examples of cystoliths are to be found in the leaves of nettles (*Urtica*) and of the fig (*Ficus*).

CYS'TOSCOPE. An instrument for examining the interior of the bladder, and consisting of a hollow tube, electrically lighted, and furnished with miniature lenses which reflect the image to the eyepiece outside of the body. Several types of the instrument are in use, some being used merely for examination and others devised to carry instruments for operating, making applications to the interior of the bladder, or even catheterizing the ureters and pelvis of the kidneys. Previous to using the cystoscope the bladder is partly filled with warm, clear, sterile fluid, in order to keep its walls apart and prevent burning from the lights.

CY'TASE (from Gk. κύτος, *kytos*, cavity, cell). A name now commonly applied to an enzyme or perhaps a number of different enzymes that hydrolyze hemicellulose (q.v.), giving as final products mannose and galactose. It is of functional importance in digesting the reserve food in the seeds of *Iris*, *Phœnix*, *Lupinus*, and others. The enzymes that hydrolyze cellulose,

as well as those that digest wood vessels, are sometimes included under this general term.

CYTHE'RA. See CERIGO.

CYTH'ERE'A. See VENUS.

CYTHE'RIS. A well-known Roman courtesan, the mistress of Marcus Antonius and later of Gallus, the elegiac poet. She is referred to under the name of Lycoris in Vergil's tenth Eclogue.

CYT'ISUS (Lat., shrubby kind of clover). A genus of plants of the family Leguminosæ, of which some of the species, having long twiggy branches, are popularly called "broom," others are called "laburnum," while others still are generally known by the name "cytisus." The species are numerous—small trees or shrubs, with leaves of three leaflets, and yellow, white, or purple flowers, natives chiefly of the warmer temperate parts of the Old World. Many of them are very beautiful, and some are among the esteemed ornaments of our shrubberies, others of our greenhouses. Several species of *Cytisus* have been recommended as forage plants, stock readily browsing upon their green twigs. *Cytisus scoparius*, the Scotch broom, is a form so valued, while *Cytisus proliferus alba*, the tagasaste of the Canary Islands, is highly commended. Trials in California have not substantiated the rather extravagant claims made for it.

Cytisus adami, an interesting shrub that bears yellow and purple flowers on different branches, is a so-called graft hybrid between *Cytisus purpureus* and *Laburnum vulgare*.

CYTOL'OGY (Gk. κύτος, *kytos*, cell + λογία, *logia*, account, from λέγειν, *legein*, to say). A branch of the sciences of botany and zoölogy. As histology is largely concerned with tissues, so cytology deals principally with cells, the elements which make up the tissues. Although it is only recently that botanists have begun to make a specialty of this subject, the work has been prosecuted with great vigor, and the subject is beginning to assume some definiteness. The chief problems at present are the structure and activities of protoplasm, the life history of plastids, the structure and function of the nucleus, the reduction of chromosomes, the origin and development of the achromatic figure, the centrosome, the cell wall, the development of the sex cells, fertilization and the formation of the embryo, and, most difficult of all, the problem of heredity.

Botanical Cytology. As yet little is known regarding the structure of protoplasm in plants, but the investigations which have been made favor the assumption that its structure is identical with that in animals. Much more attention has been paid to the nucleus. Even the small nuclei of many of the algæ and fungi have been studied, and the details of their structure and mode of division quite accurately determined. No organ of the cell has been so assiduously investigated as the chromosome, but nevertheless most of its important problems remain to be solved. The fact that the number of chromosomes is constant for a given species, and the phenomena of fertilization, indicate that the chromosome is a permanent organ of the cell, but its life history from one cell generation to another has not yet been traced, the identity of the several chromosomes being lost in the resting nucleus. In vegetative cells the splitting of the chromosomes during nuclear division is longitudinal. During the process of forming four spores from a mother cell the number of chromosomes is reduced by one-half, and some claim that during the reduction there is a transverse splitting in the sense of the Weissmann school; most observers, however, now believe that the reduction in the number is brought about by a pairing and subsequent separation of whole chromosomes without any splitting. Both observations and theories are still very conflicting. The origin and development of the achromatic figure have received large attention, especially since the beginning of the present century. It was formerly supposed that the achromatic figure always rose under the influence of the centrosomes, but recent observations have proved that no centrosome exists at all in the angiosperms, and it is doubtful whether such an organ exists in the gymnosperms and pteridophytes, unless the "blepharoplast," a centrosome-like body which develops the cilia of the male cell, be interpreted as a genuine centrosome. In the other groups, except the mosses, which have received scant attention, an undoubted centrosome has been demonstrated.

The development of the sex cells, from the earliest appearance of the archesporium up to the time of fertilization, has been repeatedly studied in various plants, but the work has been morphological rather than cytological, little attention having been paid to the details of cell contents except in case of mother cells. In the study of cells more immediately concerned in fertilization, the cells of the sporogenous tissue have been slighted. Some of the most important cytological work deals with the problems of fertilization. The question of sexuality in the Ascomycetes has received a definite answer in the case of several forms by the demonstration of an actual process of fertilization. The fusion of the sex nuclei in ferns has been described with more or less completeness. In the gymnosperms, where the sex cells are extremely large, the process of fertilization has been more satisfactorily investigated, and it has been found that both the nucleus and the cytoplasm of the male cell enter the egg, but that the nucleus slips out from its cytoplasmic mantle before it reaches the nucleus of the egg. The male nucleus with its nuclear membrane still intact is then received bodily into the much larger egg nucleus. The chromatin of the two nuclei in the form of two distinct spirems has been observed, and in some species the chromatins of the two nuclei may remain distinct during the later stages of fertilization, and possibly during the cell divisions which follow. In the angiosperms, while the union of the sex nuclei has been repeatedly observed, the behavior of the chromatin has received little attention, but in a few carefully studied species the chromatin of the sex nuclei remains distinct during fertilization. Two male cells are discharged from the pollen tube into the embryo sac; the nucleus of one of these cells unites with the nucleus of the egg and the first cell of the sporophyte is formed. The second male cell often unites with the definitive nucleus of the embryo sac formed by the fusion of the two polar nuclei, so that there is a "double fertilization." Double fertilization has been observed in monocotyledons and dicotyledons, and it is the usual method. While it is becoming conceded that the problems of heredity must be ultimately problems of the cell, nearly all the work of botanists along this line

must be classed as morphological. See CELL (in plants); EMBRYOLOGY; SEX.

In medicine, cytology is the investigation of the cellular elements of exudates or other body fluids, particularly those not containing pus. In order to separate the cells, the fluid to be studied is shaken up in a sterile container having within it small glass beads in order to prevent clotting, or to disintegrate a clot if one is already present. The fluid thus separated is centrifuged for several minutes and the residue examined under the microscope after being stained. The method (termed "cyto-diagnosis") is useful in differentiating the various types of pleurisy; an undue proportion of lymphocytes and endothelial cells, e.g., indicates tuberculous or typhoid pleurisy, while in malignant pleurisy tumor cells may be found in the precipitate. In the same way the different types of peritonitis may be distinguished. Tuberculous peritonitis is characterized by lymphocytosis and the presence of polynuclear white blood corpuscles, whereas the fluid from ovarian cysts and that found in ascites contain only a few endothelial cells. Tuberculous meningitis is characterized by a lymphocytosis of the cerebrospinal fluid; while epidemic meningitis, due either to the pneumococcus or the meningococcus, will contain polynuclear white blood corpuscles.

CY'TOPLASM. See CELL (in plants).

CYZ'ICUS (Lat., from Gk. Κύζικος, *Kyzikos*). A colony of Miletus in the Propontis, founded about 700 B.C., on the south shore of the island of Arctonnesus, which has now become a peninsula (Map: Greece, Ancient, E 1). In ancient times the island was connected with the mainland by bridges. Its situation and two good harbors made it early a prosperous town, while its strong position enabled it to maintain its freedom. It was favored by the Romans, and after sustaining a long siege by Mithridates it was made a free city, a privilege which it lost under Tiberius. By 1100 A.D. the city had been destroyed by a series of earthquakes. The site is still covered with extensive ruins, which include walls, an amphitheatre, and the substructures of a splendid temple of Hadrian. It lies to the southeast of the island of Marmora, and about 70 miles southwest of Constantinople. Consult Hasluck, *Cyzicus* (Cambridge, 1913).

CZACKI, chäts'kē, TADEUSZ, COUNT (1765–1813). A Polish writer and statesman. He was born at Poryck, Volhynia. At 20 he obtained an office in the Superior Court of Justice at Warsaw, and in 1788 was appointed to the Treasury Commission of the Diet. His interest in the economic welfare of his country impelled him to travel through Poland and to produce a map of its river system. The development of navigation on the Dniester engaged his particular attention. When his property was confiscated at the second partition of Poland, he became a professor at Cracow; but Paul I, to whose coronation he went as deputy from Volhynia, restored what he had lost. After this Czacki's whole life was devoted to the education of his countrymen. His plans for disseminating instruction in the Polish provinces of Russia, the people of which were extremely ignorant, met with the approval of Alexander I, and in 1803 he was made inspector of the schools in the governments of Volhynia, Podolia, and Kiev. He gave, out of his various resources, about 500,000 thalers to various schools. He also donated a library containing some 4000 manuscripts, 12,000 works in Polish, and 80,000 miscellaneous works. The Gymnasium of Kremenetz, which he founded, was the main object of his care. For a generation this institution was the spiritual centre of Poland, furnishing the champions of national self-consciousness against the deadening influence of French pseudoclassicism. Accused of stirring up political discontent among his countrymen, Czacki went to St. Petersburg in 1807 and so ably defended himself that Alexander I appointed him deputy of Prince Czartoryski, who was curator of public instruction in the Polish section of Russia. Czacki died at Dubno, and his collections passed into the hands of Czartoryski. His miscellaneous works were published in 3 vols. (Posen, 1843). They are in the main historical and archæological. His most valuable work is a treatise *On Lithuanian and Polish Laws* (2 vols., Warsaw, 1800; 3d ed., Cracow, 1861).

CZAJKOWSKI, chī-kôf'skē, MICHAL (1808–86). A Polish novelist. He was born near Berditchev in the Ukraine, where, in 1831, he participated in the insurrection against Russia and was compelled to flee to Paris. In 1840 a number of Polish *émigrés* sent him on a secret mission to Turkey, and in 1851 he embraced Mohammedanism. As Mohammed Sadik, he commanded a body of troops called the Cossacks of the Sultan. He fought with distinction against the Russians in 1853–54. Amnestied by Russia in 1873, he removed to Kiev. In consequence of an accusation of treason subsequently made against him, he committed suicide. Czajkowski obtained wide celebrity through his stories of Cossack life, several of which have become extremely popular and have been translated into German, French, and English.

CZAR, zär (Russ. *tsarĭ*, Bohem. *tsar*, OChurch Slav. *tsēsarĭ*, *tsŭsarŭ*, through OHG. *keisar*, from Lat. *Cæsar*). The alternative title of the Russian Emperor; written also TZAR. During the Middle Ages the Emperor of the East and the Mongol Khans appear under the title of Czars in Russian contemporary literature, while the rulers of the various Russian provinces are called grand dukes till the sixteenth century. In 1547, however, Ivan the Terrible caused himself to be solemnly crowned Czar of Moscow. Henceforth the Russian monarchs called themselves by this title until the conquest of Little Russia and Smolensk caused them to assume that of Czar of All the Russias. The word then became practically synonymous with Emperor. Yet in 1724 Peter I thought fit to assume this latter title in addition, and, as the Russian language had no term corresponding to it, the Latin word Imperator was introduced, while the Empress was termed Imperatritsa. At first several European powers refused to sanction the assumption of Imperial dignity by the Russian Czar, but ultimately they consented to do so. The wife of the Czar was named Czaritsa (Czarina); his son, Czarevitch; his daughter, Czarevna. After the death of Alexis, Peter I's son, these titles were abolished, the Imperial princes being called grand dukes and the Imperial princesses grand duchesses. In 1799 the Emperor Paul I introduced the title of Cesarevitch (not Czarevitch) for his second son, the Grand Duke Constantine. The heir apparent and his wife are still called Cesarevitch and Cesarevna. Among the Russians

themselves the Emperor is more frequently called Gosudar, i.e., lord, than Czar. See RUSSIA.

CZARDAS. See CSÁRDÁS.

CZARNIECKI, or **CZARNECKI,** chärnyĕts'kē, STEFAN (1599–1665). A Polish general. He was distinguished by his bravery and brilliant generalship in the war against Charles X of Sweden (1655–60), upon the conclusion of which he was hailed as the liberator of his country, which, simultaneously with the great onslaught of the Scandinavians, had been assailed by the Russians and Transylvanians. He also won laurels in the war against the Cossacks (1660–61), successively defeating them in two great battles. He had attained the highest rank in the Polish army when, attended by only a few horsemen, he undertook an expedition to the Crimea, in order to secure an alliance with the Tatars. In consequence of the fatigue and exposure of this journey he died at a village in Volhynia. He has been styled the Polish Du Guesclin.

CZARTORYSKI, chär'tō-rĭs'kē, ADAM JERZY (GEORGE), PRINCE (1770–1861). A Polish patriot, born at Warsaw, Jan. 14, 1770. He was the son of Prince Adam Casimir Czartoryski, the head of an ancient Polish house. After studying in Edinburgh and London, he returned to his native country and took part against Russia in the war following the second partition of Poland, in 1793. On the defeat of the Poles Czartoryski was taken to St. Petersburg as a hostage, and here he exhibited so much ability and prudence as to gain the friendship of the Grand Duke Alexander and the confidence of Emperor Paul, who made him Ambassador to Sardinia. When Alexander ascended the throne (1801), he appointed Czartoryski assistant to the Minister of Foreign Affairs; and he took an active part in official life until after the Peace of Tilsit (1807). As curator of the University of Vilna he exerted all his influence to keep alive a spirit of nationality among the Poles, and when some of the students were arrested on a charge of sedition and sent to Siberia, Czartoryski resigned his office. His successor reported to the Emperor that the amalgamation of Russia and Lithuania had been delayed a century by Czartoryski's activity as head of the university. When the revolution of 1830 broke out, he threw in his lot with his countrymen. He was elected President of the provisional government, and in this capacity summoned a national diet, which met in January, 1831, and declared the Polish throne vacant, and elected Czartoryski head of the national government. He immediately devoted half of his large estates to the public service and adopted energetic measures to meet the Russian invasion. The Poles were soon crushed by superior numbers, and Czartoryski—specially excluded from the general amnesty, and his estates in Poland confiscated—escaped to Paris, where he afterward resided, the friend of his poor expatriated countrymen, and the centre of their hopes of a revived nationality. In 1848 he liberated all the serfs on his Galician estates, and during the Crimean War he ineffectually endeavored to induce the Allies to identify the cause of Poland with that of Turkey. He refused an amnesty offered to him by Alexander II, and died in Paris, July 16, 1861. Consult his *Mémoires et correspondance avec l'empereur Alexandre Ier* (Paris, 1887; Eng. trans., Sielgerd, London, 1888); Morfill, *Story of Poland,* in "Stories of the Nations Series" (London, 1893); Zaleski, *Life of Adam Czartoryski* (Pol.) (Paris, 1881). See POLAND.

CZAR UND ZIMMERMANN (Ger., Czar and Carpenter). An opera by Lortzing (q.v.), first produced in Leipzig, Dec. 22, 1837; in the United States in 1855 (New York).

CZASLAU, chäs'lou, or **CASLAU,** *Bohem. pron.* chäs'läv. A town of Bohemia, about 40 miles east-southeast of Prague (Map: Austria, D 2). The church of St. Peter and St. Paul was the place of burial of the blind Hussite leader Ziska, a fine statue of whom adorns one of the public squares. The town's manufactures include beet sugar, alcohol, pressed yeast, and beer. Between Czaslau and the neighboring village of Chotusitz the Prussians under Frederick the Great gained a decisive victory over the Austrians under Charles of Lorraine, May 17, 1742. Pop., 1890, 8145; 1900, 9105; 1910, 9122; mostly Czechs.

CZECH (chĕk), or **BOHEMIAN, LANGUAGE.** The Czech language, like the Polish, Kashubian, and Sorbian, belongs to the northwestern group of the Slavic languages. The number of persons speaking Czech, exclusive of the Slovaks, is over 7,100,000. These are distributed as follows: in Austria, about 6,500,000; in Germany, about 125,000; in Russia, about 65,000; and in America, about 500,000. The Czechs occupy the quadrangle bounded by the Bohemian Forest, the Erzgebirge, the Sudetic Mountains, and the Little Carpathians. They are thus surrounded on three sides by Germans, and only on the eastern side do the Czechs come in contact with Slavs: in Silesia with the Poles, and in southeastern Moravia and Hungary with the Slovaks, their nearest kindred, with whom the Czechs are usually grouped into the Czecho-Slovakian division. Within the quadrangle the Czechs are interspersed with Germans, against whom they have maintained a continuous struggle. (See CZECH LITERATURE.) Literary Czech is most nearly related to the dialect of the Prague District; but, taken as a whole, the Czech language presents a great variety of well-defined dialects.

The first mention of the existence of Czech dialects is found in Jan Blahoslav's *Grammar* (1571), published by Jireček in 1857. Just as Roman Catholicism displaced the earlier Greek Orthodox religion, so the Roman alphabet superseded the earliest Slavic characters. The Latin alphabet was insufficient to reproduce all the native sounds, and diacritical letters were introduced. Thus, *č* = Eng. *ch*, *ž* = Eng. *zh* (as in pleasure), *š* = *sh*, while the acute accent is used to denote long vowels. Among the phonetic characteristics of the language may be noted: 1. The disappearance of the old Slavic sounds, *ŭ*, *ĭ*, and their transition into *e:* Old Church Slavic *sŭnŭ*, sleep, *dĭnĭ*, day, *livŭ*, lion, *lĭva* (id., gen. sing.) = Czech *sen, den, lev, lva.* 2. The substitution of open sounds *u*, *ú* and *a*, *ě*, *e* for the old Slavic nasal vowels ^{a} and ^{e} *muka*, torture, *nesu*, I carry = Old Church Slavic *m^{a}ka, nes^{a}; patero*, five, *deset*, older *desĕt*, ten = Old Church Slavic *p^{e}tero, des^{e}tĭ.* 3. The so-called transvocalization, whereby *a* becomes *ě* (*e*), *á*, *ie* (*é*, *í*): *zeme*, land, for *zemĭa, dušĕ*, soul, for **dušĭa*, while *u*, *ú* = *ĭu iú*, become *í*, *í: duši* for **dušu* (acc. sing., cf. Russian *dushu*), *duši* for *dušú* (abl. sing., cf. Russian *dushoyu*), *lid* for **lud*, people (Russian *lyudi*). 4. The obliteration of distinction be-

tween *y* (= Eng. *ĭ*) and *i* (Eng. *ē*) in pronunciation: *býk*, bull, *myš*, mouse, *sýr*, cheese, are pronounced as if spelled *bik*, *miš*, *sir*; *byl*, I was, and *bil*, I beat, are pronounced precisely alike. 5. The syllabic or vocalic *r*, *l*, *m*, *n*: *zrno*, grain, *srdce*, heart, *vlna*, wave, wool, *slny*, strong, correspond to Russian *zerno*, *serdtse*, *volna*, *silniy*; *Rožmberg*, *Licmburk*, represent German Rosenberg, Luxemburg. This peculiarity is common also to the Slovakian and Serbo-Horvatan (Serbo-Croat). 6. Long and short vowels: short, *a*, *e*, *i*, *o*, *u*, *y*; long, *á*, *é*, *í*, *ó*, *ú*, *ý*. 7. The primary accent is expiratory or stressed and is always on the first syllable of the word, as in Slovakian, Serbo-Lusatian, and South Kashubian. This accent has been proved to be an historical development of the primitive Slavic free accent. See SLAVIC LANGUAGES.

The quantitative system of versification based on the Latin has been almost entirely superseded of late by the tonic system, better suited to the spirit of Slavic languages. Among the inflectional peculiarities of the language the following are most noteworthy: In the declension of nouns—loss of dual; confusion of various stems; confusion of case endings; change of quality and quantity of the root vowels. In conjugation it comes very close to the primitive Slavic, retaining both the infinitive and the supine. All past tenses are periphrastic, and the forms of the future are either periphrastic—in verbs of incomplete or imperfective action—or are represented by the present in verbs of completed or perfective action.

From the point of view of euphony, the Czech language stands lower than the Russian or Polish, although superior to the latter in some particulars, as in the comparative rarity of sibilants and the absence of nasal vowels.

Slovakian. Along with the Czech language must be mentioned the Slovakian language, spoken by some 3,112,000 persons—about 2,610,000 in Austria-Hungary, 500,000 in America, and 2000 elsewhere. Its literature is only a century old, and its independent development was due entirely to the great wave of national reawakening that swept over Europe at the end of the eighteenth and the beginning of the nineteenth centuries. The movement, communicated to the Czech language, spread to the kindred Slovakian. In spite of the serious opposition on the part of such prominent Bohemians as Havliček, Šafařik, and Kollar—the last himself a Slovak—a Slovakian literature was established. The pioneer of the movement was Antonin Bernolák (1762–1813), whose *Dissertatio Philologica-Critica de Literis Slavorum, Grammatica Slavica* (Pressburg, 1790) and *Lexicon Slavicum Bohemico-Latino-Germanico-Hungaricum* (6 vols., Buda, 1825–27) supplied the foundation for Slovak literature. The other great names are: the poet Jan Holly (1785–1849), who wrote odes and epics in classical style, Ljudevit Štur (1815–56), Josef Hurban, and Michael Hodž, who brought the language to its high standard of literary perfection. Among the more recent writers the following deserve especial mention: the famous Martin Hattala, one of the foremost of Slavic linguists; Svetozár Hurban Vajansky, son of Josef Hurban; the lyric poet Orsag Hvězdoslav, and the novelist Kukučin, a powerful portrayer of popular life and manners. The language, in the works of these writers, though closely kindred to the Czech, exhibits many well-defined peculiarities which justify its classification as a separate branch. There are numerous works that are not found in the Czech language, and many features bring it nearer to the Russian, Polish, and Servian than to the Czech. Ethnographically considered, the Slovaks are yielding before the march of the stronger and politically dominant Hungarian nationality; but Slovakian literature has received too strong an impetus at the outset to allow of any doubt as to its future development.

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CZECH, or BOHEMIAN, LITERATURE. Among the Slavic literatures the Czech is inferior to the Russian or the Polish, although chronologically it precedes them both.

First Period (to 1410).—The earliest literature of the Czech language came into existence with the introduction of Christianity in Bohemia, in 865, by Cyril and Methodius, the apostles of the Slavs. The earliest extant monument is the Kyrie Eleison *Hospodine pomiluj ny* ('Lord, have mercy upon us'). Greek Christianity and the Cyrillic alphabet (q.v.), however, gave way to Latin Catholicism and Roman script. The famous Grüneberg manuscript (eighth or ninth century), the *Judgment of Libusha*, and the Königinhof manuscript (thirteenth or fourteenth century), discovered by Hanka in 1817, are the only remains in the native tongue which belong to this period, and even their authenticity is somewhat doubtful. The influence of the Teutonic knights was growing rapidly among the natives, with the result that up to the fourteenth century Latin literature completely displaced works in the vernacular. At the end of the thirteenth century a Czech translation of the Latin *Alexandreis* of Gualterus de Insulis (Philip Gaultier de Châtillon) was made, and to the early years of the following century belong Czech versions of two episodes from the Arthurian legend—*Tristram*, according to Eilhart of Oberge and Gottfried of Strassburg, and *Taudariaš and Floribella*, after Pleier. Original works in Czech are the famous *Rhymed Chronicle of Bohemia*, by Dalimil, of 1314, and the romantic story *Tkadleček* (The Weaver), written in strikingly beautiful prose

about the end of the fourteenth century. Other works that contributed to the development of the literature were translations of the travels of Marco Polo and Sir John Mandeville. The original writers of the period are: Thomas Štitný (1325–1410), one of the first alumni of the University of Prague (founded in 1348); Andrew of Duba; and the poet Flaška. Stitný exercised a great influence over religion and literature in Bohemia, and paved the way, as it were, for the later Hussite movement. Andrew of Duba is the reputed author of *The Book of the Old Lord Rosenberg* and *The Exposition of the Law of the Bohemian Land.* Smil Flaška, Lord of Pardubitz, composed the didactic and satirical poems, "Father's Advice to his Son," "Contest between Water and Wine," "Dispute between Body and Soul," "New Council," and "The Groom and the Scholar." They abound in local allusions and are a rich mine of information for the culture history of the country.

Second Period (1410–1620).—The golden age of Czech literature.

The reformer John Huss, who, by the religious movement he inaugurated, contributed so powerfully towards the assertion of nationality by the Czechs, gave an immense impulse to the development of Czech literature, and 1410—the year of his open breach with Rome—is commonly considered the beginning of a new era. Though a master of the Latin tongue, Huss preferred Czech for works which were designed for the people as a whole, and the language received at his hands a perfection which it had never before attained. Since his time Czech has undergone comparatively little change from a linguistic point of view. Huss adopted as his basis the speech in actual use around Prague. He contributed, moreover, to the development of the language by grammatical works like his *Czech Orthography* (published in 1857 by Sembera). After the death of Huss the Moravian Brethren assiduously cultivated the spirit of nationalism and directed their energies to developing their native idiom. Among these champions of the people the following are the most noteworthy: Peter Chelčický (1390–1460), a pupil of Huss, was the theoretical expounder of his master's doctrines. In his works—in such as *The Net of Faith* and *Book of Expositions of Sunday Lessons*—various religious and political questions are treated in a surprisingly liberal manner. Other writers of distinction of this period are Victorin Cornelius Všehrd (1460–1520), the author of *Nine Books of Laws . . . in Bohemia,* and Ctibor Cimburg (1437–94), who wrote the famous *Tovačov Book*—only two out of a long line of famous jurists, who devoted their time and labors to the scientific exposition and systematization of Bohemian law. Their works, written in masterly style, contributed much to the progress of the Czech juridical language. These two, with several others, constituted the Hussite minority among the humanists who made their appearance in Bohemia with the Rennaisance. The other, more numerous, faction of the humanists was, strange as it may seem, solidly opposed to the doctrines of Huss. Among these were Bohuslav of Lobkovic (1462–1510) and Řehoř Hrubý of Jelení (1450–1514). Lobkovic collected the most remarkable library of his time, wherein he was greatly helped by the introduction of printing in Bohemia in 1468, when the *Trojan Chronicle,* the first book to be printed in the Czech language, appeared at Pilsen. Lobkovic and his contemporaries laid all subsequent Bohemian literature under deep obligations. They translated Greek and Latin classics, such as Cicero, Seneca, and Isocrates; wrote Latin poems; compiled lexicographical works (such as the *Lexicon Symphonum*) of the Czech, Greek, Latin, and German languages, by Siegmund Hrubý (1497–1554), son of Řehoř Hrubý. Grammatical studies of the Czech language were embodied in Jan Blahoslav's (1523–71) *Czech Grammar* (1571). It contains disquisitions on the subject of how to translate idiomatically various words, phrases, constructions, etc. Literary and scientific activity was at its height, and such men of science as Tycho Brahe and Kepler made Bohemia their home. The Bohemian historians of this period combined with their patriotic zeal a scientific preparation and seriousness of purpose which made their work especially valuable and reliable. They found their prototype in the anonymous *Old Bohemian Annals,* embracing the period of 1378–1527. Adam Veleslavin (1545–99), whose *Historical Calendar* is his best-known work, represents the highest type among these historians. Vaclav Hájek (?–1553) is the author of a *Chronicle* more interesting than accurate. Jan Blahoslav, who has been mentioned above, wrote an excellent history of the Moravian Brethren, of whom he was a Bishop. He is also famous for his supervision of the Czech translation of the Bible from the original tongues, which is for the Czech what the King James Version of the Bible is for the English. Blahoslav did not live to see his work printed; it was published in 6 vols. in 1579–93, at the expense of Jan of Žiegmund Hrbuý (1497–1554), son of Řehor Žerotin, a Moravian patron of letters, and is known as the *Kralitz Bible.* The unusual vigor displayed in the domain of prose and the widening of the intellectual horizon were naturally communicated to the field of poetry. Prince Hynek Poděbrad (1452–92) wrote his *May Dream* and other poems which won favor. Nicholas Dačicky (1555–1626) composed a satirical poem, *Prostopravda,* and many works of an historical character. Among the religious poets Jan (1500–72), a Moravian bishop, deserves special mention. The greatest poet of the latter part of this period, which is known as the "golden age," was Simon Lomnický (1552–after 1622). His works include didactic and satirical poems and sacred dramas. Chief among them are the satire *Cupid's Arrow,* for which the King, Rudolph II, ennobled him and granted him an annuity; and the didactic *Short Precept for a Young Householder,* which is full of valuable allusions to the manners and customs of the time.

Third Period (1620–1774).—In the battle at the White Mountain in 1620 the Bohemians lost their political independence. Seven years later Ferdinand I of Austria made Catholicism the state religion of Bohemia. The works of the Protestant writers that had made the golden age so brilliant were now seized everywhere and destroyed. Nevertheless, it was during the opening years of this period that Czech literature reached its highest stage of purity and finish in the works of Karl Žerotin and Jan Komenský. Karl Žerotin (1564–1636), great as are his polemical and historical writings, acquired a lasting fame through his enormous correspondence, in which he stands in the very first rank with the few famous letter writers

of the world. Jan Amos Komenský (see COMENIUS) (1592–1670), who became one of the great educational reformers, spent his life in exile, like Karl Žerotin. His *Magna Didactica, Janua Linguarum Reserata Aurea,* and *Informatorium* form his permanent contributions to the domain of pedagogy, philosophy, and religious controversy; they, besides, advanced materially the stylistic standard of Czech literature. His purely literary work, *Labyrinth of the World and Paradise of the Heart,* is naturally more important as a product of pure literature. All the other writers of this period are of little importance. The systematic efforts of the Hapsburgs to crush the Czechs were successful. Higher society became Germanized, the Czech language was heard only in out-of-the-way hamlets, and Czech books became a great rarity. The works of the Jesuit writers of the period, who employed the Czech language for religious propaganda among the masses — Sturm, Berlička, Steyer, and Koniaš—are full of barbarisms, monstrous forms and words. In 1774 Maria Theresa enforced by a decree the use of German in the intermediate schools as the language of instruction.

Fourth Period—Renaissance (1774 to the present day).—The forcible suppression of the native tongue in the common schools of Bohemia produced results entirely contrary to those expected and met a vigorous protest. Count Kinsky published in German a plea for the Czech language under the title *Erinnerung über einen hochwichtigen Gegenstand* (1774), which was followed in 1775 by Balbin's *Dissertatio Apologetica Linguæ Slovenicæ,* published by Pelzel. Pelzel himself (1734–1801) was one of a number of young scholars who devoted themselves to the study of their native tongue and the history of their country. Thus appeared Fr. Thomsa's *Böhmische Sprachlehre* (1782) and K. I. Thám's *Kurzgefasste böhmische Sprachlehre* (1785), which laid the foundations for the study of the language. Pelzel's own contributions were: *Typus Declinationum Linguæ Bohemicæ Novo Methodo Dispositarum* (1793); *Grundsätze der böhmischen Grammatik* (1795); and, especially, his historical works, of which the *New Bohemian Chronicle* was chief. These latter works awakened interest among the Czechs in their own history. A chair of Czech language was established at Prague in 1793 (Pelzel). The greatest name of this period of Czech literature is that of Josef Dobrovský (1753–1829), the "patriarch of Slavic philology." In his works on grammar and literary history he gathered enormous lexical materials, and the historical and comparative method brought him to the discovery of the richness of the ancient classical language, to the study of which his main efforts were directed. It is true that he made a *Collection of Czech Proverbs* in 1804, but all his works were written in German. Such men as Prochazka, Rulik, Puchmayer, Jan Nejedlý, V. Nejedlý, Hněvkovsky, and others wrote pamphlets for the instruction of the people, compiled dictionaries and grammars, translated the classics of European literature, published periodicals, composed plays for the theatre, and even poetry in the sentimental style of the idyls of Gessner. These attempts met with very serious obstacles, owing to the imperfect state of the language, which was practically that of the old language of the classical period and which naturally lacked terms for new ideas and concepts that had come into vogue during the third period. The language was brought to its final state of perfection in the works of Jungmann (1773–1847), the most illustrious name of the early renascence. His translation of *Paradise Lost* (1811), an almost incredible *tour de force,* widened the horizon of poetical speech; his *Czech Dictionary* contained the vocabulary of the language; while his *History of Czech Literature* presented a complete survey of all the literary remains. He was particularly happy in coining new words, and whenever this expedient proved unsatisfactory he borrowed from other Slavic languages, more commonly Russian and Polish. The four other names that are most closely linked with that of Jungmann as leaders of the renascence of Bohemia are Kollar, Šafařik, Palacký, and Hanka. Kollar (1793–1852), poet and scholar, is famous for his *Daughter of Slava* (1824), one of the poetic masterpieces of the Czech language, and his numerous prose works, among which that *On the Literary Reciprocity between the Families and Dialects of the Slavic Nation* (1831) advocated literary Panslavism. Šafařik (1795–1861) was one of the greatest philologists the Slavic countries have produced. Among his works, his *Slavic Antiquities* (1837) and editions of many literary monuments are works of importance. Palacký (1798–1876) is a historian, whose *History of Bohemia* (5 vols., 1836–67) presents an ideal combination of critical judgment, profound erudition, and striking style. Along with them may be mentioned Hanka (1791–1861), who discovered the manuscripts of Grüneberg and Königinhof and published a number of other important remains of Czech antiquities. The greatest poet of the period is František Ladislav Čelakovsky (1799–1852), whose *Echoes* of Russian and Czech songs and the long poem *The Rose of a Hundred Leaves,* together with the poetic works of Kollar, were most responsible for the reawakening of the poetic spirit of the nation. Other names of importance are those of the lyric poets Jablonský and Vinařický, the epic writers Wocel, Marek, Hollý, and Erben, and dramatists like Klicpera and Tyl. Poetry seems to have absorbed all the best energies of the nation at that time, and the novel, which holds the chief place of honor in the literature of all other nations, did not reach any high level of development. Most works of fiction dealt with themes from Bohemian history. The most noted novelists are Chocholoušek, Tyl, and, especially, Božena Němcova (1820–62), who deals with simple country life. The masterpiece of the latter, *Babička* ('Grandmother'), has been translated into English.

The reorganization of the Austrian Empire on a constitutional basis in 1860–61, which allowed the people of Bohemia scope in the development of political life, and the furtherance of national aspirations, marks the beginning of the modern period in Czech literature. The foundation of a new national theatre at Prague and the establishment of a Czech university by the side of the old one (1882) gave a great stimulus to literary activity. Little by little the narrow "national" current gave way to cosmopolitanism, with Mácha as the leading representative of Byronism. The recognized head of the young generation is Viteslav Hálek (1835–74). The greatest recent poet is Vrch-

lický (1853–1912), whose *A Year in the South, Pilgrimages to Eldorado,* and the historical dramas *Brothers* and *Drahomira,* as well as translations from European classics, are specially noteworthy. Equal in popularity is the poet and novelist Svatopulk Čech, whose best-known work is *Arabesky.* Zeyer, Heyduk, Arbes, Vlček, and the two women Eliška Krásnohorská (born 1847) and Karolina Světlá (1830–1899) are the most popular novelists of the present day. Great activity has also been exhibited in the departments of science, philology, and literary history, the most important names therein being those of Jireček, Šembera, Gebauer, and Patera.

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CZECH MUSIC. See SLAVONIC MUSIC.

CZECHO-SLOVAKIA. The name of a republic which was formed from the old Austro-Hungarian Empire in 1918. It comprises Bohemia, Moravia, Slovakia, part of Silesia, Ruthenia, and other territories assigned by the Peace Treaty (1919) to the republic, including particularly, the Teschen region, which was divided between Czecho-Slovakia and Poland. (July 28, 1920.) Capital and chief city, Prague.

Area and Population. The area of the new republic is approximately 54,500 square miles, and the population based on the census of 1910, 13,636,390. The old Crownland of Bohemia, which is the main part of the new government, had an area of 20,064 square miles in 1910, and a population of 6,769,548. At the census of November, 1919, the population of Slovakia was 2,940,374, of whom 2,141,000 were Slovaks, 655,000 Magyars and 140,322 Germans. The largest cities in the respective states with their latest available figures for population are as follows: In Bohemia, Prague, 674,476, and Budweiss, 43,961; in Moravia, Bruenn, 140,650; in Slovakia, Pressburg, 93,329; in Silesia, Troppau, 33,427; in Carpathian Russia, Munkacs, 20,794.

Government. The National Assembly proclaimed the new state a republic with Professor Thomas G. Masaryk as its first president, Nov. 14, 1918. The National Assembly then set about preparing a constitution and arranging for a general election. The constitution was adopted on Feb. 29, 1920. The form established was that of a democratic republic. All the territory under the control of the state is one separate unit. The president who acts through a responsible ministry, is commander-in-chief of the armed forces and appoints the higher officials. He is elected by the national parliament for seven years. Professor Masaryk was chosen first president by the parliament. The legislative power is vested in a bicameral legislature, which consists of a chamber of deputies of 300 members, elected for six years and a senate of 150 members chosen for eight years. Freedom of speech, press, religion, the protection of racial minorities, and proportionate representation are guaranteed by the constitution. There is universal adult suffrage without distinction of sex and all citizens over 30 are eligible for office. The official language is Czecho-Slovak, but it is provided that a minority in any district numbering over 20 per cent of the population may choose its own official language and have its own schools. The court system established by the Austro-Hungarian Empire was taken over by the new state.

As a result of the first elections held in April, 1920, 4,203,480 Czechs elected 199 deputies; 1,576,692 Germans, 72 deputies, and 274,630 Magyars, 10 deputies.

Communications. The railway system that was bequeathed to the new state was very inadequate. Most of the lines ran north and south, converging on Vienna and Budapest. No east and west lines were built, largely because it was the policy of Austria-Hungary to keep Slovakia separated from Bohemia and Moravia. The old empire took very little care of the roads and the result was that the rolling stock, machine shops, tracks, and roadbeds were in a deplorable condition. These conditions tended seriously to hamper trade. A five years' programme was begun in 1921 to put the old roads in a good state of repair, and to build new lines, particularly east and west. 6,481,050,000 crowns were appropriated for this purpose. The total mileage of the railways, all state-owned, amounted in 1921 to a little more than 8000. Attention was also given to the development of the Danube, the chief waterway of Czecho-Slovakia. A large company was formed to develop this line of communication which before the war carried about 2,000,000 tons annually from the industrial cities to the Balkan markets.

Education and Religion. There is a complete system of popular and secondary education, with about 5000 primary schools and more than 600 secondary schools. There are universities at Prague, Bohemia, and Bruenn, Moravia, and two new ones in Moravia and Slovakia. It is estimated that the percentage of illiterates is under two. The new government has decreed absolute separation of church and state. The vast majority of the population is Roman Catholic with a small minority of Protestants and Jews. For the last official census on education and religion see article AUSTRIA-HUNGARY.

Production and Commerce. The total national wealth of Czecho-Slovakia is estimated at more than 15 billion dollars. In natural resources it is one of the richest regions in Europe. Large quantities of timber are exported annually. Closely connected with the timber trade is the toy industry, which is one of the chief home occupations of the peasants, particularly in Slovakia. The mineral resources, which are very rich, have scarcely been utilized at all. A new coal field discovered during the war is producing 8,000,000 crowns of coal annually. (A Czecho-Slovak crown = $0.202 at par exchange.) In 1919 there were 366 coal mines employing 110,233 persons, and the output was 16,980,000 tons of lignite and 10,405,000 tons of hard coal.

40,000,000 crowns of iron are produced annually by the mines of Dobsina. To the north of Bratislava, petroleum has been discovered. Other minerals produced are gold, silver, antimony, magnesium, copper, mercury, salts, and

uranium. The supply of uranium was estimated to produce more than two grams of radium annually for a period of twenty years. There are numerous mineral springs throughout the country, particularly in Slovakia and Bohemia. Mineral water promises to be an important article of export if developed properly.

The factories in 1920 numbered 8833 of which 2000 were textile mills, 1755 glassworks or factories for precious stones, and 1358 factories for the production of foodstuffs. In 1921 there were about 1,150,000 working men who were members of trade unions.

The agricultural crops consist mainly of wheat, rye, barley, oats, corn, hops, and beets (for sugar). In 1921 the production of wheat was 11,069,572 quintals (one quintal = 220.46 pounds); rye, 13,813,700; barley 10,312,330; oats, 10,501,076; and corn 2,667,346. According to the enumeration of 1920 there were 581,257 horses, 4,213,454 beeves, 2,015,211 pigs, 975,899 sheep, and 1,174,045 goats in Czecho-Slovakia (including sub-Carpathian Russia).

The value of the imports in 1920 amounted to 16,383,532,000 crowns and the exports, 16,189,865,000. The chief articles of import were cotton (3,213,964,000), foodstuffs, wood, chemicals, fur, hides, oils, and silk. The chief articles of export were beet sugar (2,219,888,000 crowns), manufactures of wood (3,333,316,000), glass and glassware (2,643,615,000). The principal importing countries were Germany (3,857,730,000 crowns), the United States (3,042,209,000), and Austria (1,918,943,000). The principal countries of export, Austria (5,726,977,000 crowns) and Germany (2,501,022,000).

Finance. In 1920 the budget estimates were, revenue, 7,750,770,000 crowns, expenses, 10,416,175,000. In 1921 the revenues were estimated at 14,129,919,000 and the expenses at 13,841,738,000 crowns. The increased estimates of expenditure for 1921 were due to the proposed outlay for the departments of defense, education, and transportation, and also to the payments of interest on the national debt. The national debt may be divided into five different items: (1) The share of the country in the debt of the former Austro-Hungarian Empire; (2) the share of responsibility for the Austro-Hungarian war bonds in possession of Czech-Slovaks at the time of the Armistice; (3) internal floating debt; (4) debts incident to the currency reform measures necessitated by the influx of paper money from Austria, and (5) contributions to the reparations fund under the Peace Treaty. In 1922 the estimated expenditures amounted to more than 19,500,000,000 crowns and the estimated revenues to 18,700,000,000. The deficit had to be made up through the sale of bonds. The increase in the 1922 budget was again due to further expenditures on defense, education, and transportation. The increase in revenue was raised from customs, excises, government monopolies, turnover, luxury, and transportation taxes. The 1922 budget also contained provisions for the issuance of long term bonds to be used for public improvements. On January 1, 1922, the total internal debt was estimated at 25,000,000,000 crowns and the foreign debt at 3,500,000,000.

History. The history of Czecho-Slovakia is largely centred around that of Bohemia. It was the indomitable courage of the Bohemians that kept the spirit of independence alive through centuries of German, Austrian, and Magyar oppression. Bohemia was first settled by the Czechs about the sixth century, A.D. By the ninth century they had been converted to Christianity by German missionaries. In the next century the Bohemian regions were united under a house of dukes known as the Přemysl, who did homage to the German kings. By the twelfth century, the Přemysl dukes had been raised to the rank of kings, and as such, they became an integral part of the Holy Roman Empire. Under Ottokar II (1253–78), Bohemia was one of the most powerful nations in Europe, its sway extending from the Adriatic to the Elbe. Ottokar was overthrown by the Hapsburgs and his kingdom was cut up. Then followed a period of Germanification. The Přemysl line died out in 1306 and for one hundred and twenty-seven years the remains of the kingdom of Bohemia was ruled by the house of Luxembourg (1310–1437). In 1348 this line established the University of Prague. During the reign of Wencelas IV (1378–1419) and his successor Sigismund (1419–37) the terrible Hussite wars raged. (See Huss, John and Hussites.)

This religious movement stirred up the national feeling among the Bohemians and did much to check the Germanification of the country. Internal dissension, however, prevented the reëstablishment of the Bohemian monarchy under a Czech ruler. In the beginning of the sixteenth century the crown of Bohemia was bestowed on Ferdinand of Hapsburg, a brother of Emperor Charles V (q.v.). The lands of Bohemia (Bohemia, Moravia, Silesia, and Lusatia) now became practically hereditary in the house of Hapsburg.

The Protestant Reformation took a strong hold on the Bohemians, largely as a result of the Hussite movement. Bohemia was the battleground of a large part of the Thirty Years' War (1618–48) between the Protestants and the Catholics. The latter were triumphant at the Battle of the White Mountain (November, 1620) and Bohemia was turned over to the Jesuits. This war reduced the population of the country more than 50 per cent and completely devastated the region.

The Czechs meekly bore the Hapsburg rule until the close of the seventeenth century when there was a vigorous reawakening of the spirit of nationalism. The Czechs were unable to get any recognition at the Congress of Vienna however. In 1848, an insurrection occurred at Prague, but was quickly suppressed by the Austrians. The Czechs refused to enter the Vienna Reichsrat in 1867, and did everything in their power to hinder the Dual Monarchy. Many bitter struggles occurred in the nineteenth and twentieth centuries over the status of the Czech language and customs. The Czech movement was an ever-present threat to the integrity of the Austro-Hungarian monarchy and to the peace of Europe. Nationalist propaganda was carried on unceasingly. Newspapers, clubs, local committees, etc., worked day and night to cast off the foreign yoke. Their activities were carried on despite the stern repression and persecution of the Austrian military authorities and police.

The opening of the Great War in 1914 raised the hopes of the Czechs to the highest pitch, because they saw in it an opportunity to gain their liberty. A secret society known as the Mafia, organized on a thoroughly efficient basis, kept in touch with the Czecho-Slovak Committee

at Paris. It had spies in all the departments at Vienna and Budapest, and stole many documents of inestimable value. The efforts of the Czecho-Slovaks were recognized as early as December, 1917, when Premier Clemenceau authorized the establishment of a Czecho-Slovak army. Although the new state had not as yet come into existence, its independence was recognized by Italy on April 23, 1918, by Great Britain, August 3, by the United States, September 2, and by Japan on September 9.

The rapid decline of the Central Powers in 1918 was seized upon as the opportune time to launch the new republic. The declaration of independence was issued in Paris on Oct. 18, 1918. On October 28, the local government of Prague was seized and on the following day the Czecho-Slovak republic was proclaimed with Thomas Masaryk as president. The formal proclamation was issued on November 14.

The reconstruction period that followed the Great War was hampered by various conditions. The unstable condition of foreign exchange, threats of Bolshevist uprisings, internal dissensions among the various linguistic and religious groups, and a heavy war debt, tended to counterbalance, to some extent, the assistance of the victors and the cordial relations that existed between Czecho-Slovakia and the members of the Allies, particularly France. See SUPPLEMENT.

CZEGLÉD, tsĕ′glād. A market town of Hungary, about 46 miles southeast of Budapest (Map: Hungary, F 3). The inhabitants are chiefly employed in agricultural pursuits, the surrounding country being particularly adapted to the raising of grain, fruit, and cattle. Grain is ground in local mills. Considerable red wine is produced. It is a large military post for cavalry. Pop. (largely Magyar), 1900, 30,106; 1910, 33,942.

CZEKANOWSKI, chĕ′kȧ-nôv′skē, ALEXANDER (1832–76). A Russian explorer. He was born in Volhynia and studied at Kiev and Dorpat. Banished to Siberia in 1863 for his participation in the Polish insurrection of that year, he was permitted to settle at Irkutsk in 1868. Here, as the agent of the Imperial Geographical Society, he began a series of geological investigations extending along the lower Tunguska, the Olenek, and the Lena, the results of which were published chiefly in Petermann's *Mitteilungen* (1874 et seq.). Amnestied by the government, he returned to St. Petersburg, where during an attack of melancholy he committed suicide.

CZELAKOWSKY, chĕ′lȧ-kôv′skē. See CELAKOVSKY.

CZERMAK, chĕr′mȧk, JAROSLAW (1831–78). A Bohemian painter, brother of Johann Nepomuk Czermak, the physiologist. He was born in Prague, and studied in that city under Christian Ruben, in Antwerp under Wappers, and in Brussels under Gallait. His early paintings treated chiefly subjects from the history of Bohemia. They are powerfully conceived and carefully executed, but less rich and interesting in color than the genre scenes treating the southern Slavs, to which he devoted himself after a journey in 1858 through Hungary, Croatia, Bosnia, Dalmatia, and Montenegro. Among his most noteworthy pictures are: "Murder of Wallenstein's Companions at Eger," "Slavonian Emigrants," "Norman Fishermen in a Boat Reading the Bible" (1850); "The Court Poet of Rudolf II Begging on the Bridge of Prague" (1854; Czernin Gallery, Vienna); "Montenegrin Woman and Child" (1861); "Rape of a Herzogovinian Woman" (1867); "Return of Montenegrins to their Devastated Village" (1877). Consult Hantich, *L'Art tchèque en XIXe siècle* (Paris and Prague, 1904).

CZERMAK, JOHANN NEPOMUK (1828–73). A German physician, born in Prague. He studied at the universities of Vienna, Breslau, and Würzburg, and was appointed a lecturer on physiology and microscopic anatomy at the University of Prague. Subsequently he held a professorship of zoölogy and comparative anatomy at Graz (1855–56), and of physiology at Cracow (1856–58), Pest (1858–60), Jena (1865–69), and Leipzig (1869–73). At Leipzig he erected at his own expense a laboratory and an auditorium specially arranged for demonstrations in experimental physiology. He is best known for having made notable improvements in the laryngoscope and for having been the first systematically to employ that instrument. His publications include *Der Kehlkopfspiegel und seine Verwertung für Physiologie und Medezin* (1860; 2d ed., 1863). Consult the biography by Springer in the *Gesammelte Schriften* (2 vols., Leipzig, 1879), and *Populäre physiologische Vorträge* (1869).

CZERNHAUSEN, BARON VON. See CZÖRNIG, KARL.

CZERNOWITZ, chĕr′nô-vĭts (Ruman. *Cernăuz*). The capital of the Austrian Crownland of Bukowina, situated on a hill near the right bank of the Pruth, about 164 miles east-southeast of Lemberg, near the Rumanian and Russian frontiers (Map: Austria, J 2). Its growth has been largely within the last 40 years. Among the noteworthy public buildings are the Archiepiscopal Palace, a handsome Byzantine structure, the Greek Oriental cathedral, copied from the church of St. Isaac in St. Petersburg, the Armenian Church, the sumptuous Jewish synagogue in Moorish style, and a municipal theatre. Czernowitz is the seat of a Greek Oriental archbishop and the governor of the Bukowina. Its educational institutions include the Francis Joseph University, founded in 1875 (about 1000 students), with a library of 94,000 volumes, a gymnasium, industrial and trade schools. It has manufactures of machinery and oil, lumber and beer. It carries on a trade in wool, cattle, and spirits. Pop., 1890, 54,171; 1900, 67,622, of whom 34,441 were Germans, 13,030 Ruthenes, 9400 Rumanians, and 8601 Poles; among them 21,587 Jews; in 1910, 87,128. Up to 1774, when it was occupied by the Austrians, who made it the capital of the Province of Bukowina, Czernowitz was an unimportant village.

CZERNY, chĕr′nē, KARL (1791–1857). An Austrian pianist and composer, born in Vienna. He was at first instructed by his father, Wenzel Czerny (1752–1832), then studied under Beethoven, with whom he was a great favorite, and under Clementi. At the early age of 15 he was in great demand as a teacher and also rapidly won high reputation as a virtuoso. Among his pupils were Liszt, Thalberg, Jaell, and Kullak. He left over 1000 compositions, of which his instructive works for the pianoforte are of permanent value. They are: "Die Schule der Geläufigkeit," op. 299; "Tägliche Studien," op. 337; "Die Schule des Virtuosen," op. 365; "Die

Schule der Fingerfertigkeit," op. 740; and others.

CZERNY, VINCENZ (1842–1916). An Austrian surgeon, born at Trautenau, Bohemia. He studied at Vienna, and until 1871 acted as Billroth's assistant. In the latter year he was made professor of surgery at Frieburg-im-Breisgau and in 1877 at Heidelberg. In 1906 he was made director of the Institute for Cancer Experimentation. He introduced important improvements in operative surgery and published the following works: *Ueber die Beziehungen der Chirurgie zu den Naturwissenschaften* (1872); *Beiträge zur operativen Chirurgie* (1878); *Das Heidelbergen Institut für experimentelle Krebsforschung* (1912).

CZERNY (chĕr'nē) **GEORGE** (i.e., Black George) (1766–1817). The leader of the Servians in their struggle for independence, generally known as KARA (Turk. *kara*, black) GEORGE. He was born, Dec. 21, 1766, in the neighborhood of Belgrade. In 1787 he was involved in a rising against Turkish rule, but later settled down as a cattle dealer. In August, 1801, a band of Janizaries broke into his dwelling and plundered it, and in retaliation he collected a band of malcontents and entered upon a course of guerrilla warfare. Gradually his followers increased; in 1804 he captured the fortress of Shabatz and subsequently invested Belgrade. In the beginning of 1806 he routed the Turks at the rivers Drina and Morava and captured Belgrade in December, 1806. The cause of Servia was aided by the war which at this time broke out between Russia and Turkey. After the Treaty of Slobosic (July 8, 1808), Czerny George was elected Governor by the people and recognized as Prince of Servia by the Sultan. The French invasion of Russia in 1812 compelled the latter country to let Servia shift for itself. Hostilities recommenced; the Turks were successful, and Czerny had to flee to Russia. He afterward went to Austria, where he lived for some time. Meanwhile the freedom of Servia was secured through the leadership of Milosh Obrenovitch, and in July, 1817, when Kara George returned, intending, as some suppose, to rally his partisans round him for the furtherance of his ambitious schemes, he was murdered at the instigation of Prince Milosh. This was the beginning of a feud between the families of Obrenovitch and Karageorgevitch which lasted into the twentieth century. Kara George's second son, Alexander Karageorgevitch, was Prince of Servia from 1842 to 1858, but was finally expelled, and the Obrenovitch family held the throne till 1903, when, after the assassination of Alexander I (q.v.), Peter Karageorgevitch, grandson of Czerny George, assumed the crown as Peter I (q.v.). See SERVIA.

CZERNYSCHEWSKY, chĕr'nĭ-shĕv'skē. See TCHERNYSHEVSKI.

CZERSKI, chĕr'skē, JOHANNES (1813–93). A German divine, one of the founders of the German Catholics. He was born at Werlubien, West Prussia, and was educated at the Priests' Seminary at Posen. Sentenced to penitential confinement for contracting a secret marriage in 1844, he resigned his vicariate in Silesia and founded an independent community of Catholics, known as the Christlich-Apostolisch-Katholische Gemeinde. He was excommunicated in 1845. Although he maintained his own views, he participated in the struggles of the German Catholics and upon their downfall devoted himself to quiet religious activity. His most important work is the *Nachlass des sterbenden Papsttums* (12th ed., 1870). He defended his defection from Rome in *Rechtfertigung meines Abfalles von der römischen Hofkirche* (1845).

CZIRKNITZER SEE. See ZIRKNITZER SEE.

CZOLGOSZ, chŏl'gŏsh, LEON (1873–1901). An American anarchist, the assassin of William McKinley, twenty-fifth President of the United States. He was born of Polish-German parents at Detroit, Mich., and was by trade an ironworker. He was tried before the criminal term of the State Supreme Court at Buffalo, N. Y., on Sept. 23–24, 1901, and convicted of murder in the first degree. No witnesses were summoned for the defense, but ex-Judge Lewis, of counsel for the prisoner, protected his constitutional and legal rights and at the conclusion of the case addressed the jury in his behalf. The assassin was electrocuted in the State prison at Auburn, N. Y., on Oct. 29, 1901. See MCKINLEY, WILLIAM.

CZÖRNIG, chĕr'nĭk, KARL, BARON VON CZERNHAUSEN (1804–89). An Austrian statistician, born at Czernhausen, Bohemia. He studied at Prague and Vienna, and in 1841 became director of the bureau of administrative statistics at Vienna. In 1850 he represented his district in the Ministry of Commerce, in 1852 was made a baron, and from 1852 to 1863 was leader of a society for the preservation of architectural monuments. In 1859 he was appointed chief of the section of railway affairs in the Ministry of Commerce. In 1863–65 he was president of the central statistical commission, organized by himself. He published an ethnographic chart of the Empire, with text (1855), and other works.

CZUCZOR, tsōō'tsôr, GERGELY (or GREGOR) (1800–66). An Hungarian poet and linguist. He was born at Andód (County of Neutra), became a member of the Benedictine Order, and from 1825 to 1835 was a professor successively in the gymnasia at Raab and Komorn. In 1835 he was appointed second secretary and archivist of the Hungarian Academy, by which he was commissioned in 1844 to prepare the great lexicon of the Hungarian language (6 vols., 1861–74). Four volumes were edited by him, the remaining two by János Fogarassy (q.v.). His disregard of the historical and comparative method in philology often impaired the scientific value of his work as a lexicographer, particularly in connection with etymologies. His popularity was due chiefly to his epic poems, whose principal hero was John Hunyady. He was imprisoned in 1849 for the publication of his *Riado*, a poem calling Hungarians to action on behalf of their liberties, but obtained his release under the Amnesty of 1850. His poems appeared collected in 3 vols. at Pest in 1858. Besides his fables and translations of Latin authors, he composed a *Life of Washington*, which ranks among his best works in prose.

D

D The fourth letter and third consonant in the Græco-Roman alphabets. Its form is derived by a rounding of the sign Δ, evidently a cursive corruption of the triangle which is found in the West Greek inscriptions rather than from the familiar form of delta (Δ) seen in most Greek scripts. (See ALPHABET; LETTERS.) Flinders Petrie (*The Formation of the Alphabet*, London, 1912) considers it one of the oldest and most generally used signs in the prehistoric signaries of Egypt. It is probable that it gave rise to the regular hieroglyphic, with value *d* or *du*, the sign of giving; and *da* is one of the earliest and most widespread roots having that meaning. The rounded form is distinctly European, occurring in Athens and Italy and in the Runic inscriptions. The Greek name of the letter, *delta*, is a modification of the Semitic word *daleth* (originally *dalt*), which means a 'door.' The Greek capital, Δ, still retains the shape of the opening of a tent, the kind of door most familiar to a nomadic people. From the rounded form of the capital letter were gradually evolved during the Middle Ages the uncial and minuscule forms, the latter giving rise to our small *d*. Consult E. M. Thompson, *Introduction to Greek and Latin Palæography*, pp. 284 et seq. (Oxford, 1912).

Sound. In sound the English *d* is a dental or rather alveolar (lingual) voiced explosive, made by a contact of the tip of the tongue and the roof of the mouth near the upper front teeth. (Consult Jones, *The Pronunciation of English*, p. 16, Cambridge, 1909.) In French the contact is rather dental than alveolar. (Consult Passy, *The Sounds of the French Language*, p. 72, trans. by Savory and Jones, Oxford, 1907.) The North German *d* is between the English and the French. There is also in Northern English a slightly more cerebral *d*, as in *drown*, made by bending up the tip of the tongue and touching the roof of the mouth farther back than in the so-called dental sound. This is due to its position before the lingual *r*.

Source. English *d* comes: (1) from Indo-Ger. *dh* (Gk. *θ*, Lat. *f*, *d* (with *r*), *b*); as *door*, Gk. *θύρα*, Lat. *foras; udder*, Skt. *ūdhar*, Gk. *οὖθας*, Lat. *uber;* (2) from Indo-Ger. *t* when not immediately preceded by the accent; *hundred*, Skt. *çatám*, Gk. *ἑκατόν*, Lat. *centum;* (3) from Germanic *þ*, with *l; gold*, Goth. *gulþ;* (4) *d* arises as a special development from the affinity of *n* for *d* (as a transfer sound), in such words as Eng. *gender*, Lat. *gener*, Eng. *thunder* (OE. *þunor*), *riband* (ME. *riban*). The *d* sometimes disappears, as in *cruel* (Lat. *crudelis*), borrowed from French. The letter *d* is often assimilated, as *affirm*, *accept*, *gossip* (OE. *godsibb*); and in certain linguistic developments it interchanges phonetically with *l*, e.g., *l*, Lat. *Ulysses*, from Gk. *Ὀδυσσεύς*, or with *r* in Lat. *arbiter*, from *ad betere*. According to Grimm's Law, original *d* becomes *t* in English, *z* in German. Thus, Indo-Ger. **dekm*, Eng. *ten*, Ger. *zehn*. *Di* followed by a vowel becomes *j*, as in *journal* from *diurnal*, a phonetic law common to the Romance languages, from which this form is borrowed. Consult Schwan-Behrens, *Grammaire de l'ancien français* (Paris, 1913).

As Symbol. 1. As a numeral, D = 500; $\bar{\text{D}}$ = 5000. This use of D to denote 500 arose from a confusion with Ⅾ, the original symbol for that number. 2. In Roman names D = Decimus, Divus, Dominus, and Deus. 3. In academic degrees D stands for Doctor. 4. In music D is the second note of the natural scale and is a whole tone above C. It is written in the first added space below the treble clef or on the fourth line; in the bass clef it is on the third line or in the second added space above. (See MUSICAL NOTATION.) 5. In chemistry D = didymium. 6. In reckoning English money (£ *s. d.*), *d* = pence, penny (Lat. *denarius*). 7. In mathematics D = derivation, d = differentiation, Δ = differencing, and *δ* = variation.

DAB (probably from *dab*, gentle blow). A fish (*Limanda limanda*) closely related to the plaice and flounder (qq.v.). It is common on the sandy shores of northern Europe. It can easily be distinguished from the common flounder by the distinct arch in the lateral line at the anterior end. It attains a length of 12 inches and is much esteemed as food. A nearly related species, the rusty dab (*Limanda ferruginea*), possessing smaller scales, is rather abundant on the eastern coast of North America.

DAB, DABB, or **DHABB,** dŭb (Ar. *ḍabb*, lizard). A lizard of northeastern Africa, as the common spiny-tailed agamoid *Uromastix acanthinurus*. Two or more species, about a foot in length, are common in Algeria, Tunis, and Egypt, and in Algeria are called "lézards des palmiers," perhaps because they eat dates. This genus has no voice, and their color, which is very changeable, depends upon the weather, being dull on cool days and much brighter when it is warm. The term is also given to the dried flesh of lizards, especially of the skink (*Scincus officinalis*), preserved for use in medicine among the Arabs.

DAB'BAT (Ar. *ḍabbat*, reptile). The third

sign of the coming of the judgment, the Apocalyptic beast of the Mohammedan religion.

DAB'CHICK (variant of *dob-chick*, a diving bird, from *dap*, to drop bait into water, AS. *doppa*, a water bird, from *dypettan*, to dive, from *dypan*, to dip). A small grebe, as (1) in the United States, the pied-billed grebe (*Podilymbus podiceps*); (2) in England, the little grebe (*Podiceps minor*). See GREBE.

DABNEY, dăb'nĭ, CHARLES WILLIAM (1855–). An American agriculturist and educator, born at Hampden-Sidney, Va., and educated at Hampden-Sidney College and at the universities of Virginia, Berlin, and Göttingen (Ph.D., 1880). He was professor of chemistry at Emory and Henry College and at the University of North Carolina between 1877 and 1881, director of the North Carolina Agricultural Experiment Station and State chemist (1880–87), and director of the Tennessee Agricultural Experiment Station (1887–90). From 1887 to 1904 he served as president of the University of Tennessee; he then accepted the presidency of the University of Cincinnati. While in the South he added to his other duties those of Assistant Secretary of the United States Department of Agriculture (1893–96) and of president of the Summer School of the South (1902–04). He discovered phosphate and tin-ore deposits in North Carolina. Besides Agricultural Experiment Station reports his publications include: *Old College and New* (1896); *A National University* (1897); *Agricultural Education* (1900; 2d ed., 1904); *The Problem in the South* (1903); *Educational Principles in the South* (1904); *The Relation of Agriculture to Other Sciences* (1904); *Washington—Educationist* (1911).

DABNEY, dăb'nĭ, ROBERT LEWIS (1820–98). An American Presbyterian clergyman. He was born in Louisa Co., Va., and studied at Hampden-Sidney College, at the University of Virginia, and at the Union Theological Seminary of Virginia, in which he was professor of church history from 1853 to 1883. In the Civil War he served as chaplain of the Eighteenth Virginia Regiment and later became major and chief of staff to General "Stonewall" Jackson. In 1870 he was Moderator of the Presbyterian General Assembly of the South and in 1883 was appointed professor of moral philosophy in the University of Texas. He founded the Austin School of Theology. He published: *Life of Gen. T. J. (Stonewall) Jackson* (1864–66); *Sacred Rhetoric* (Richmond, 1867; 3d ed., 1881); *Defense of Virginia* (1867); *Sensualistic Philosophy of the Nineteenth Century Examined* (1875; 2d ed., 1888); *Theology, Dogmatic and Polemic* (1879; 3d ed., 1885); and the posthumous *Penal Character of the Atonement* (1898) and *Discussions* (4 vols., 1890–97). Consult Johnson, *Life and Letters of R. L. Dabney* (Richmond, 1903).

DABO, LEON (1869–). An American mural and landscape painter. He was born in Detroit, studied in Paris at the Ecole des Arts Decoratifs, the Académie Julian, and under the Spaniard Vierge, and in Rome and Florence under Gagliardi. He began as a mural painter, as may be seen in his decorations of the church of St. John the Baptist in Brooklyn and the frieze in the Flower Memorial Library, Watertown, N. Y. After 1900 he turned to landscape painting under the influence of Whistler and the Japanese, but with a distinct originality. His paintings are usually harmonies in a single or in related tones, wonderfully blended. They are highly decorative, subtle in the rendition of values, broad and precise in brush work. He has found even more appreciation abroad than in his native country. His favorite subjects are the Hudson, of which he has painted over 100 pictures, or the shores of Staten Island, with the subtle conflict of sunlight and mist, light and shadow. He is represented in the Luxembourg, Paris, in the museums of St. Louis, New York, Washington, Chicago, Detroit, and Tokyo, and in private collections. Among the best of his works are two "Nocturnal Fêtes on the Hudson," "The Wave," "Winter Scene" (Reisinger collection, New York), "Dawn beyond the Hudson" (1910), "The Rocket" (1912), and a portrait of Whistler.—His younger brother, THEODORE SCOTT DABO (1877–), born in New Orleans, paints landscapes, very similar in style. Consult Clemen, in *Kunst für Alle* (Munich, 1910), and the *Studio* for 1906.

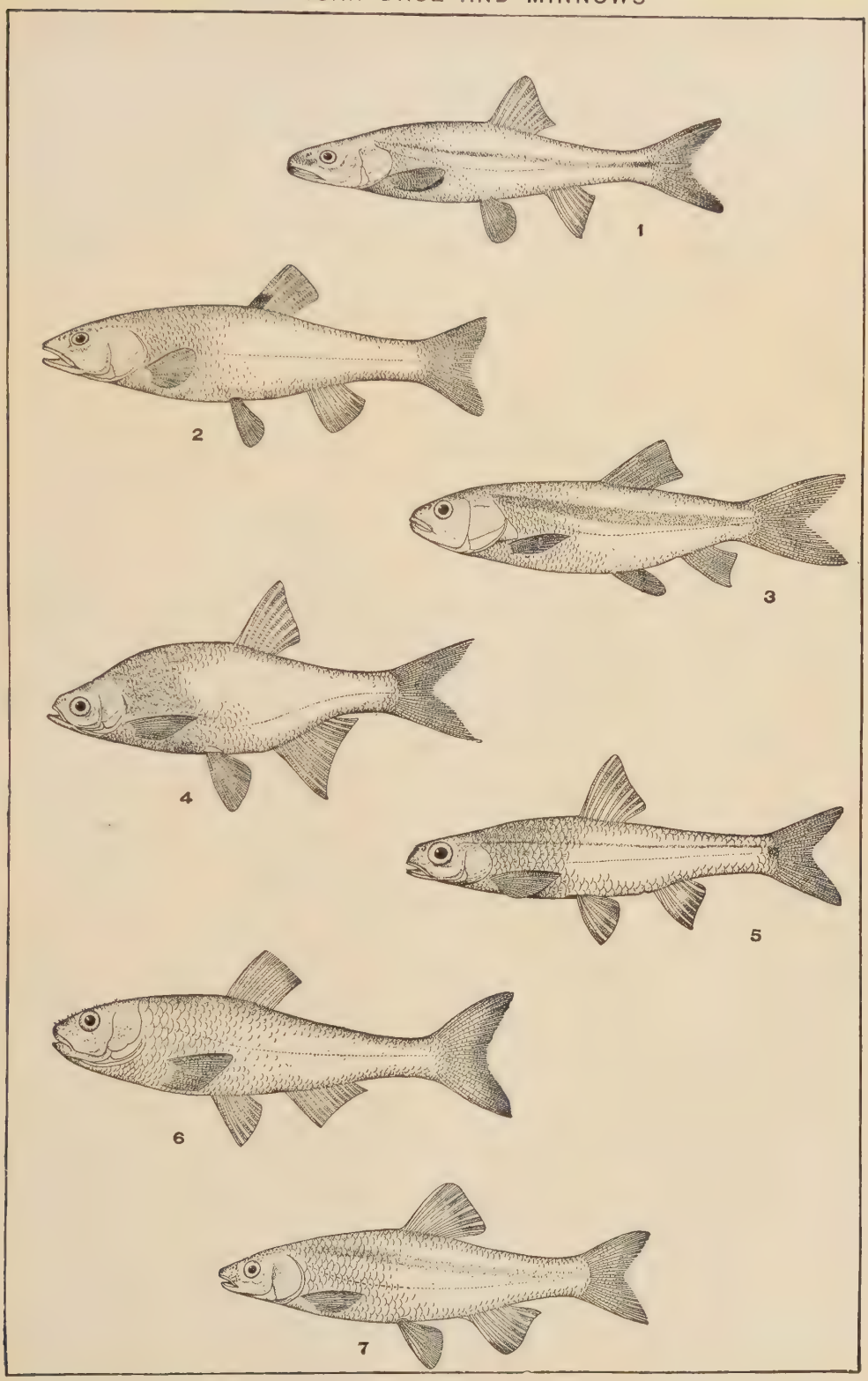
DABOI'A (East Indian). The formerly accepted generic name, which has passed into English, of the very deadly Russell's viper (*Daboia*—now *Vipera—russellii*). See VIPER; SNAKE, and Plate of SNAKE.

DABROWSKI, dà-brôv'skê, JAN HENRYK. See DOMBROWSKI.

DA CAPO, dà kä'pô (It., from the beginning). A term in music, frequently placed at the end of a phrase or movement, indicating that the performer must return to the beginning of the movement, or to some other part of it, usually marked with the sign 𝄋, and finish where the word *fine* is placed. Scarlatti is generally credited with being the first to introduce the use of the *da capo* in his opera of *Teodora* (1693), though it appears that a *da capo* occurs in Tenaglia's opera, *Clearco*, as early as 1661. The words are generally abbreviated *D.C.*, sometimes *D. C. al fine*. See ARIA.

DACCA, dăk'kà, or **DHAKA.** The Islam capital of the Presidency of Bengal, in the division and district of the same name in British India (Map: India, F 4). It is situated on the left bank of the Burhi Ganga, which connects the Brahmaputra with the Ganges, 150 miles northeast of Calcutta. It extends along the river bank for 6 miles; its port is Narryangany. The surrounding country is low and overflows during the rainy season. Many of the old temples and other public buildings are in ruins and give to the city an appearance of decay. Since 1870, however, it has recovered some of its ancient prosperity, and there are now a number of modern public buildings and educational institutions, including a college. The city has modern water works and gas. In 1801 Dacca was a flourishing city of great commercial importance, famous for its muslins, which in the phraseology of the East were characterized as "flowing water," "woven air," and "evening dew." In those days Dacca was filled with magnificent temples and palaces, and its population was estimated at 200,000. It was formerly on the Padma, but the change in the river system of that part of India broke up its inland commerce, while the invasion of British manufactures almost completely ruined the native textile industry. With the construction of the Dacca-Maimansingh Railway line the trade of Dacca has revived, and there is again a demand for the native textile products. Besides textiles, Dacca also produces fine silver and gold plate, filigree work, steel ornaments, carved shells, and

AMERICAN DACE AND MINNOWS



1. SQUAWFISH (Ptychocheilus oregonensis).
2. CREEK CHUB (Semotilus atromaculatus).
3. UTAH CHUB (Leuciscus lineatus).
4. GOLDEN SHINER (Abramis chrysoleucas).
5. SPOT-TAILED MINNOW (Notropis hudsonius).
6. HORNED DACE (Notropis cornutus).
7. SILVER-FIN (Notropis whipplei).

boats. There is a considerable trade in elephants. The chief exports are jute, oil seeds, and hides. Besides Dacca College, it has a college of fine arts, a college of medicine, and technical schools. In 1914 it had been decided to combine these into a university. Dacca was the capital of Bengal in the seventeenth century. Since 1912, when Bengal (q.v.) was reunited, it has been occupied by the entire administration for a certain period every year. Pop., 1891, 81,585; 1901, 89,733; 1911, 108,551.

DACE, DARE, or **DART** (OF. *dars,* dace, dart, ML. *dardus;* ultimately connected with Eng. *dart,* OHG. *tart,* javelin). A fresh-water fish (*Leuciscus leuciscus*) of the family Cyprinidæ, belonging to the same genus as the chub (q.v.) and common in the streams of western Europe. The body is robust and covered with rather large scales; the mouth is rather large. The upper parts are dusky blue, becoming paler on the sides and passing into white on the belly; the cheek and gill covers silvery white. The dace is gregarious and swims in shoals. They furnish the angler fair sport both with fly and bait, but the flesh is not highly esteemed. The genus includes many other species both in Europe and in the United States. In the United States the name is applied to species of various genera of the family, especially *Semotilus,* of which the best known is the "horned" dace, or creek chub (*Semotilus atromaculatus*), which commonly frequents brooks from the Hudson valley to that of the Missouri. It grows to a length of 10 inches, is bluish above and creamy below, has a vague dusty band on the side, and its dorsal fin always bears a conspicuous black spot at the base in front, bordered with red in the males. It is one of the favorite objects of boys' fishing, and it is a good fish for the aquarium. Several other species of *Semotilus* occur east of the Rocky Mountains and are called chubs, fallfishes, etc. See Plate of DACE AND MINNOWS.

DACE'LO (transposed from Lat. *alcedo,* also *alcyon,* Gk. *ἀλκυών, alkyōn,* kingfisher, halcyon). A book name for a genus (*Dacelo*) of Australasian kingfishers, representative of a subfamily (Daceloninæ) of kingfishers (q.v.), characterized by their large size, harsh voices, and their adaptations to a forest life and a diet of reptiles and insects. The best known is the laughing kingfisher (*Dacelo gigas*), also called laughing jackass and king hunter, which is the largest of kingfishers, and widely distributed throughout Australia. "It is an uncouth-looking bird," says Wheelwright, "nearly the size of a crow, of a rich chestnut brown and dirty-white color; the wings slightly checkered with light blue after the manner of the British jay; the tail feathers long, rather pointed, and barred with brown. It has the foot of a kingfisher; a very formidable, long, pointed beak, and a large mouth; it has also a kind of crest, which it erects when angry or frightened, and this gives it a very ferocious appearance. It is a common bird in all the forests of Australia throughout the year; breeds in a hole in a tree, and the eggs are white. . . . Its principal food appears to be small reptiles, grubs, and caterpillars. . . . The laughing jackass is the bushman's clock, and, being by no means shy, of a companionable nature, a constant attendant about the bush tent, and a destroyer of snakes, is regarded, like the robin at home, as a sacred bird in the Australian forests." See illustration of KINGFISHERS.

DACHSHUND, däks'hunt'. A breed of small, long-bodied dogs, formerly employed in central Europe in hunting badgers, but now kept wholly as pets. See HOUND.

DACIA, dā'shī-à. The land of the Daci, or Getæ. Its geographical limits were very indefinite until its conquest by the Romans. After that period it comprised modern Transylvania, with adjacent parts of Hungary, Rumania, and Bukowina (Map: Roman Empire, with Article ROME, E 2). The inhabitants, properly called Daoi or Dakoi (Daci), came originally from Thrace. Greek and Roman writers frequently confuse or identify them with their kinsmen the Getæ (q.v.). Their course northward can be only imperfectly traced, but we know that shortly before the time of Alexander the Great (335 B.C.) they had migrated across the Danube. It is not known when or for what reason the Getæ changed their name to Daci. They seem to have been the most valiant of the Thracian barbarians. Curio, the first Roman general to penetrate as far north as the Danube, did not venture to assail them. Julius Cæsar, however, is said to have contemplated their subjugation. In 10 B.C. Augustus sent an army up the valley of the Maros. From this time there was almost continual fighting between the Romans and the Daci, on the whole to the advantage of the latter, who actually compelled their civilized enemies, in the reign of Domitian, to pay tribute, in return for immunity from further raids. In 101 A.D. the Emperor Trajan crossed the Theiss and marched into Transylvania, where he fought a great battle near Torda. The Wallach peasant calls the battlefield, to the present day, *Prat de Trajan* (*Pratum Traiani,* 'Field of Trajan'). The Daci, who were commanded by their famous chief, Decebalus, were defeated. A second expedition of the Emperor resulted in the destruction of their capital, the death of Decebalus, and the loss of their freedom (106 A.D.). (See TRAJAN'S COLUMN.) Roman colonists were sent into the country, a bridge was built over the Danube—the ruins of which are still extant—and three great roads were constructed. The chief towns were Apulum and Sarmizegetusa. In 270–275 A.D. the Romans abandoned the country to the Goths, and the colonists were transferred to Mœsia.

DACIER, dà'syâ', ANDRÉ (1651–1722). A French classical scholar. He was born of Protestant parents at Castres, in Upper Languedoc, studied at Saumur, and in 1672 came to Paris, where he was employed to bring out, as part of the Delphin Classics (q.v.), an edition of the Latin writer *Festus* (1681). In 1683 he married Anne Lefèvre, also a Protestant. Two years later both entered the Roman Catholic church. Dacier subsequently became royal librarian, member of the Académie des Inscriptions, and perpetual secretary of the Académie. Dacier's principal works, besides his *Festus,* are *Œuvres d'Horace en Latin et en Français* (Paris, 1681–89), an edition of Valerius Flaccus, and numerous translations into French of Greek authors, such as Plutarch and Epictetus, all of which, in spite of his erudition, are of mediocre quality, while the expositions and criticisms are shallow.

DACIER, ANNE (1654–1720). The wife of the preceding. She was born at Saumur, and after the death of her learned father, Tanneguy Lefèvre, who had developed her talent, came to Paris, where she acquired such a reputation by her edition of Callimachus (1674) that the

Duke of Montausier commissioned her to edit Aurelius Victor, Dictys Cretensis, Eutropius, and Florus, for the Delphin Classics. Similarity of tastes and employment led to a marriage between her and André Dacier. Besides editing various classical works, she translated the comedies of Terence; the *Amphitryon*, *Epidicus*, and *Rudens* of Plautus, accompanied by an able dissertation on the origin, progress, and mutations of dramatic poetry; Anacreon, Sappho, and the *Plutus* and *Clouds* of Aristophanes. Her admiration of Homer was unbounded and led to her translation of the *Iliad* (1699), and of the *Odyssey* (1708), her masterpiece, which made Homer known for the first time to many French men of letters, and yet involved her in a controversy with two of these men concerning the relative literary merits of the ancients and the moderns. Consult Rigault, *Histoire de la querelle des anciens et des modernes* (1856). Madame Dacier is generally acknowledged to have possessed a more acute and vigorous mind than her husband.

DA'CITE. A volcanic rock of generally porphyritic texture, characterized by the occurrence of lime-soda feldspar and of quartz, and by mica, hornblende, or pyroxene. These minerals are imbedded in a ground mass or matrix of rock glasses or of a finer-grained aggregate of crystals. The color of the rock is generally gray, but under prolonged weathering it may become brownish. The newer or younger dacites are therefore, in contrast with the older, much less brown in color. The average chemical composition of dacite is: silica, 68 per cent; alumina, 17 per cent; ferric oxide, 2 per cent; ferrous oxide, 1.5 per cent; magnesia, 1.5 per cent; lime, 3 per cent; soda, 4 per cent; potash, 3 per cent. Dacite differs from andesite (q.v.) principally in its higher percentage of silica, due to the presence of quartz and a greater abundance of the light-colored mineral constituents. The name "dacite" has been given because of the great development of this type of rock in Dacia, an ancient Roman province comprising part of modern Hungary and vicinity. Many recent as well as more ancient volcanic lavas are dacite. Dacite graduates into trachyte, rhyolite, and diorite (qq.v.).

DACOITS' (Hind. *ḍakait, ḍākāyat*, robber, *dākā*, attack by robbers, from *ḍāknā*, to shout). The name given to bands of men in India who live by robbery. They resemble the thugs (q.v.) in that a slight religious element seems to enter into their conduct, but plunder, and not murder, is their guiding motive. On the whole, they are a national type of banditti, closely resembling the brigands of Sicily or Greece. Driven out by the British government from Hindustan, they are still fairly active in Burma. Technically, dacoity in British-Indian law means the conspiring of five or more men to engage in any act of theft.

DA COSTA, Claudio M. See Costa, Claudio M. da.

DACOSTA, dȧ-kō'stȧ, Gabriel. See Acosta, Gabriel.

DA COSTA, dȧ kŏs'tȧ, Isaac (1798–1860). A Dutch poet and Protestant theologian, born in Amsterdam. He studied at Leyden, in 1818 received the degree of LL.D., and that of Ph.D. in 1821. Though by parentage he was a Portuguese Jew, he embraced Christianity in 1822, and became a professor and director of the Free Scotch Church Seminary. He was an effective public lecturer. The friend of Bilderdijk, the latter's poetic mantle fell upon him, and he was thenceforth esteemed the greatest of Holland's poets. The more noteworthy of his volumes of verse are: *Prometheus* (1820); *Poems* (1821–22); *Festive Songs* (1828); *Hagar* (1840); *The Battle of Nieuwpoort* (1859). Da Costa translated Byron's *Cain* and, as a theologian, produced a *Gospel Harmony* and *Israel and the Gentiles*, both translated. He died at Leyden, April 28, 1860. His poems were collected and published by Hasebroek (1861–62).

DA COSTA, Jacob Mendez (1833–1900). An American physician, one of the greatest clinical teachers of his time. He came of an ancient Portuguese family long resident in St. Thomas, West Indies, received his early education in Europe, chiefly in Dresden, and his medical training at Jefferson College, Philadelphia, from which he graduated in 1852 at the age of 19. Subsequently he studied in Paris and Vienna and returned to Philadelphia to establish a practice. He specialized in pathology and clinical medicine and soon became a factor in the medical life of his city, his method of teaching and ability as a lecturer attracting much attention. In 1858 he became identified with Jefferson College, first as instructor, then as clinical lecturer, and finally, in 1872, as professor in the chair of practice. In 1858 he was made a fellow of the College of Physicians of Philadelphia, and he served as its president in 1884–85 and 1895–98. He was a member of the staff of the Pennsylvania Hospital from 1865 until the time of his death, was also connected with the Philadelphia Hospital and with the Episcopal and the Children's hospitals of that city, and took an active part in medical organizations—he helped to found the Pathological Society of Philadelphia and was its president from 1864 to 1867, and was president of the Association of American Physicians in 1897. He was made honorary and corresponding member of many learned and scientific organizations, and the degree of LL.D. was conferred upon him by Jefferson College, the University of Pennsylvania, and Harvard. As a writer, his style is clean cut, scholarly, and entertaining. His work includes many papers and addresses, among these being: *Harvey and his Discovery* (Philadelphia, 1879); *Modern Medicine* (Philadelphia, 1872); *The Physicians of the Last Century* (Philadelphia, 1857); *The Scholar in Medicine* (Boston, 1891). His chief work is his textbook on *Medical Diagnosis* (9th ed., Philadelphia and London, 1900). This has been translated into several foreign languages.

DACRES, dā'kērz, James Richard (1788–1853). An English naval officer, born at Lowestoft. He entered the navy in 1796, accompanied the expedition sent against Ferrol, and in 1806 was promoted captain and put in command of the sloop *Bacchante*. After distinguished service he was in 1811 transferred to the *Guerrière*. Upon the loss of that vessel in the famous contest with the *Constitution* he was taken aboard the latter—he and Captain Isaac Hull were intimate friends—and subsequently paroled at Boston. By the court-martial assembled in 1812 at Halifax he was honorably acquitted of all blame for the surrender of his vessel. In 1815, while commanding the *Tiber*, he captured the *Leo*, an American privateer. He became a rear admiral in 1838, commander at the Cape of Good Hope in 1845, and vice admiral in 1848.

DACRES, Sir Sydney Colpoys (1805–84). An English admiral. He entered the navy in 1817 and was captain of the flagship of the Channel fleet under Sir Charles Napier from 1847 to 1849, and as commander of the *Sans Pareil* took a prominent part in the bombardment of Sebastopol, for which he was made C.B. He was made rear admiral in 1858, and commanded the first ironclad squadron. He was second in command on the North American station during the controversy over the Trent affair (1861) and commanded the Channel squadron in 1863–66. In 1868 he was appointed Senior Lord of the Admiralty and in 1872 governor of Greenwich Hospital. He had been promoted admiral in 1870. In 1875 he retired.

DACRYD'IUM (Neo-Lat., from Gk. *δακρύδιον, dakrydion,* dim. of *δάκρυ, dakry,* tear; referring to the drops of gum exuded by the tree). A coniferous genus of lofty trees of the family Taxaceæ, belonging to the podocarp tribe. The species are chiefly natives of Australia and New Zealand. *Dacrydium franklinii* is called Huon pine, although it is not a pine. Its timber is harder than any Baltic pine and is excellent for spars for naval purposes. The tree attains a height of 100 feet, and a diameter of 6 feet. The wood is light, tough, and very durable. It is said to be one of the best Australian woods for carving. *Dacrydium cupressinum* and *Dacrydium kirkii* are two species occurring in New Zealand, where they are large trees of considerable economic value. The fleshy seeds of both species are edible. The young twigs of *Dacrydium cupressinum* are sometimes used for making a kind of beer. Closely related are the species of *Podocarpus,* of which there are about 40 species in Asia and through the islands of Australia. *Podocarpus totara* is the most valuable timber tree of New Zealand, where it attains a height of 60 to 100 feet and a diameter of 6 to 8 feet. The bark is extensively used for roofing houses. *Podocarpus spicata* and *Podocarpus excelsa* are other species of value.

DAC'TYL (Lat. *dactylus,* Gk. *δάκτυλος, daktylos,* finger). The name of a measure, or "foot," in Greek and Latin versification. It consists of one long and two short syllables, as in the word *ōmnĭbŭs,* and was so called from its resemblance to the finger, which consists of three joints—one long and two short. The same name is applied to a trisyllable measure in English verse, consisting of one accented syllable and two unaccented syllables, as in *dĕstiny.* (See Versification.) Dactylic verses consist of dactyls and equivalent feet. See Hexameter.

DAC'TYLIS. See Orchard Grass.

DAC'TYLOL'OGY (from Gk. *δάκτυλος, daktylos,* finger + *-λογία, -logia,* reasoning, from *λέγειν, legein,* to say). The art of communicating thought by the fingers. See Deaf Mute.

DACTYL'OMAN'CY. See Superstition.

DACTYLS, DAC'TYLI, DAK'TYLOI. In Greek legend, a supernatural folk who dwelt on Mount Ida in Phrygia. They were the discoverors of copper and iron and were deeply versed in the metal-working arts. The legends later transferred them to the Cretan Mount Ida and identified them with the Corybantes. They were originally three in number—Kelmis, the Smelter; Damnameneus, the Hammer; and Acmon, the Anvil. Later, they were increased to 5, 10, 52, and at last 100.

DADDY LONGLEGS. 1. In the United States, the long-legged, spider-like creatures of the arachnid family Opilionidæ. (See Harvestman.) 2. In England, the flies of the family Tipulidæ, which includes the crane flies—big, long-legged insects, resembling exaggerated mosquitoes, that swarm in late summer in grassy and bushy places. The eggs are not known. The larvæ of some live in damp earth, decaying wood, etc., and of others in the water, feeding on vegetable material, diatoms, etc. One curious wingless genus (*Chionea*) contains the "snow insects" occasionally seen in swarms on the surface of snow banks. Some of the earth-inhabiting forms injure the roots of grain and other grasses. More than 1000 species have been described.

DA'DO (It., a die). In architecture, the die or body of a pedestal. It is also applied to the lower part of the wall of a room, between the baseboard and the chair rail or cap molding, whether wainscoted with wood or other material, or otherwise decoratively treated to distinguish it from the rest of the wall. It is usually not over 3 or 4 feet in height. See Wainscot.

DADOX'YLON (Neo-Lat., from Gk. *δάς, das,* torch + *ξύλον, xylon,* wood). Fossil wood of Paleozoic age, found in the Devonian rocks of Europe and America, and having a microscopic structure like that of Cordaites wood and Araucaria wood. See Coniferæ; Cordaites.

DÆD'ALUS (Lat., from Gk. *Δαίδαλος, Daidalos,* literally, the 'cunning worker'). The mythical sculptor, placed by Greek legend at the beginning of native art, to whom were attributed many early wooden statues, apparently of the type of the early nude male figures, such as the "Apollo of Orchomenos." The early forms of the legend seem to have made him a native of Crete, and there seems to have been an early school of Cretan artists, the Dædalidæ, who claimed him as their ancestor. Later, under Athenian influences, however, the more common forms of the myth arose. In these Dædalus was a descendant of the Athenian royal race, the Erechthidæ, and having killed his pupil Talos, fled to Crete, where he was received by King Minos, for whom he built the Labyrinth for the Minotaur, and, for Pasiphaë (q.v.), the wooden cow. These stories seem to imply that Crete exercised an important influence on early Greek art. Having incurred the wrath of Minos, he fitted wings to his son, Icarus, and himself, and fled across the sea. Icarus flew too near the sun, the wax which fastened the wings melted, and he was drowned in the Icarian Sea. Dædalus escaped to Italy, where he built the temple of Apollo at Cumæ, and then crossed to Sicily, where local legend attributed to him many architectural works. Consult: Kuhnert, *Dædalus* (Leipzig, 1886); Pottier, in Daremberg and Saglio, *Dictionnaire des antiquités* (Paris, 1873); Robert, "Die Daidaliden," in *Archäologische Märchen* (Berlin, 1886); E. A. Gardner, *A Handbook of Greek Sculpture* (London, 1911).

DÆDALUS OF SICYON, sĭsh'ĭ-ŏn. A Greek sculptor, who lived in the earlier half of the fourth century B.C., the son of Patrocles of Sicyon, and kinsman of the famous Polyclitus (q.v.). One of his earliest works was a "Trophy," erected at Olympia by the Eleians to commemorate a victory over the Lacedæmonians. His other productions include the figures of "Two Boys Using the Strigil," the portrait statues of several of the victors in the Olympian or the Pythian games, and statues of Nike and

Arcadias in a large group set up at Delphi, by the Arcadians, after a victory gained in 369 B.C. over the Spartans. Consult Daidalos, 2, in Pauly-Wissowa, *Realencyclopädie der klassischen Altertumswissenschaft*, vol. iv (Stuttgart, 1901).

DÆD'ICU'RUS. See GLYPTODON.

DÆMON. See DEMON.

DÆMON'ELIX (Neo-Lat., from Gk. *δαίμων, daimōn*, demon + *ἕλιξ, helix*, spiral). A problematic fossil found in great numbers in the sandstones of the Loup Fork Tertiary of northwestern Nebraska and adjacent portions of Wyoming, and known to the ranchmen of the vicinity by the name of Devil's corkscrews. The fossil ranges through a thickness of about 250 feet of sandstones and varies in form from delicate fibrous structures in the lowermost beds, through cylindrical, spherical, cakelike, and irregularly twisted forms in successively higher horizons, till in the uppermost beds it assumes the form of a vertical left- or right-handed spiral spring, 2 to 10 feet high, with or without a central axis, and usually with a more or less curved fusiform or cylindrical "trunk," 3 to 20 feet long, that rises obliquely from the base of the spiral. The fibrous forms penetrate the sandstone and are also found traversing the surfaces of skulls and bones of fossil mammals entombed in the same beds. The spiral screws are wonderfully regular in their proportions, both as to the angle of pitch of the spiral and as to the increase in diameter of the same from bottom to top. The whole mass of the fossil consists of an aggregation of twisted plant fibres, which on examination with a microscope prove to have a simple cellular structure like that of parenchyma tissue. This cellular structure has been found in all parts of the fossil and clearly indicates its vegetable nature. The beds in which the Dæmonelix is found are of lacustrine origin, and it is possible that the fossil is largely of algal affinity. The finding of numerous fossils of burrowing rodents within the corkscrews has, however, led some to consider the latter as well-preserved burrows of animals; and no single suggestion as to the manner of origin seems as yet to cover all the varied features. Prof. E. H. Barbour, the discoverer of Dæmonelix, has described it fully in a paper on the "Nature, Structure, and Phylogeny of Dæmonelix," in the *Bulletin of the Geological Society of America*, vol. viii (Rochester, 1897). Consult also O. A. Peterson, "Description of New Rodents and Discussion of the Origin of Dæmonelix," in *Carnegie Museum Memoirs*, vol. ii (Pittsburgh, 1905).

DAENDELS, dän'dĕls, HERMAN WILLEM (1762–1818). A Dutch general. He was born at Hattem, in Gelderland, where he took part in the revolutionary disturbances that broke out in 1787. Compelled to seek refuge in France, he rendered important service to Dumouriez in 1793, in the latter's campaign against Holland, was made brigadier general, and, after the proclamation of the Batavian Republic, entered its service as lieutenant general. In 1799 he commanded a division of the Republican army, which compelled the Anglo-Russian forces to surrender. Daendels became successively Governor of Münster, commander in chief of the Dutch cavalry, marshal of Holland, and Governor-General of the Dutch East India possessions. This last office he held from 1808 to 1811 and discharged his duties with great ability and prudence. He participated in the Russian campaign of 1812–13 and distinguished himself by his stalwart defense of Modlin. On the overthrow of Napoleon his services were secured by the new King of Holland, William I, who intrusted him with the organization of government in those colonies on the west coast of Africa which had been restored to the Dutch. In this capacity he labored with energy and success until his death. The work he published (1814) on his administration of Java was an important contribution to our knowledge of that island.

DAET, dä-āt'. A town of Luzon, Philippines, on a river of the same name, in the Province of Ambos Camarines (Map: Philippine Islands, D 3). It is situated near the coast, 138 miles southeast of Manila. It has the ruins of an old Spanish fort. There are gold mines in the vicinity. Pop., 1903, 13,423.

DAF'FODIL. See NARCISSUS.

DAFNE. The first, strictly speaking, of the Italian operas, produced in 1594, under the auspices of the Society of the Alterati. The score was by Peri, and the libretto by Ottavio Rinuccini. When translated by Opitz to the new music of Heinrich Schütz, it became the first German opera as well (1627).

DAFOE, dā'fō, JOHN WESLEY (1866–). A Canadian journalist. He was born at Bangor, Hastings Co., Ontario, and was educated at the Arnprior high school. After some experience as a school-teacher, he became in 1883 the parliamentary correspondent of the Montreal *Star* and in 1885 was appointed editor of the Ottawa *Evening Journal*. In 1886 he went to Winnipeg, Manitoba, and for six years was a member of the editorial staff of the Manitoba *Free Press*, the most influential Liberal journal in the Canadian Northwest. In 1892 he became editor of the Montreal *Herald* and in 1895 joined the editorial staff of the Montreal *Star*. In 1901 he returned to Winnipeg and was appointed editor of the Manitoba *Free Press*. In 1906 he was a delegate to the Commercial Congress of the Empire at London, England; and in 1909 he was a delegate to the Imperial Press Conference, London. Among his publications are: *The Fortunes of a Manitoban* (1891); *Western Canada* (1907); *The Imperial Press Conference* (1909).

DAGAMI, dä-gä'mē. A town on the Binahaan River, of the island Province of Leyte, Philippines, 15 miles southwest of Tacloan (Map: Philippine Islands, E 5). It is in a plain, near the east coast of the island. The women of Dagami make fine embroidery. Pop., in 1903, 12,591.

DAGAN. See DAGON.

DAGDEN. See DAGÖ.

DAG'GER (Icel. *daggardr*, dagger, from Ir. *daigear*, Welsh *dagr*, dagger, from Bret. *dag*, OGael. *daga*, knife). A short sword, or two-edged, sharp-pointed knife. It is one of the oldest forms of the *arme blanche* and has its modern representative in the infantry sword bayonet. (See BAYONET.) In the Middle Ages soldiers often fought with sword or rapier and dagger, the latter being held in the left hand. (See FENCING.) The dagger proper has ceased to be part of the modern military equipment, except with some of the native or tribal troops of the British and Russian empires.

The dirk, practically a dagger, is still carried by the Highlanders of the British army, but only as an ornamental part of their national dress. The American bowie knife (q.v.) is in

effect a dagger. Many kinds of daggers are used by the Filipinos and Moros, the Malay *Kreese* being one of the most common. The *poniard*, *stiletto*, *misericorde*, and *anlace* are daggers, as is also the Indian *khuttar*.

DAGGER MOTH. A moth of the noctuid genus *Acronycta*, so named because of dagger-shaped marks on the wings.

DAGGERWING. One of the small, slender-tailed North American butterflies of the nymphalid genus *Timetes*.

DAGHESTAN, dä'ge-stän' (Pers., place of mountains, from Turk. *dagh*, *tagh*, mountain + Pers. *stān*, OPers. *stāna*, place, from *stā*, Skt. *sthā*, to stand). A province of Transcaucasia, Russia, bounded by the Caucasian Province of Terek on the north, the Caspian Sea on the east, Baku on the south, and the Caucasus mountain chain on the west (Map: Russia, G 6). Area, 11,471 square miles. A large portion of the territory belongs to the region of the Caucasus Mountains. Behind a narrow strip of level coast land rise heavily forested mountain ridges with single peaks attaining an altitude of 14,000 feet. The climate of the plateaus is severe; the rainfall is everywhere meagre, varying from 17 to 21 inches per annum. With the aid of irrigation the coast districts produce cereals, wine, fruit, cotton, and tobacco. Cattle and sheep are raised in the mountain regions. Sulphur, salt, and copper are worked. The commerce is insignificant, and the transportation facilities inadequate. Pop., Jan. 1, 1911, 689,300, mostly Lesghians; the remainder being made up of Tatars, Georgians, and a few Russians, Jews, and Persians. The natives are chiefly Mohammedans; educational facilities are very meagre.

The seat of the provincial government is Temir-Khan-Shura, and the chief commercial centres are Darbent (q.v.), and Petrovsk, both on the coast. Until 1812 Daghestan formed a province of Persia, although the inhabitants enjoyed partial independence under native khans and manifested their opposition to Persian rule by periodic revolts. It then passed into the nominal possession of Russia, whose authority was not established until after a fierce struggle of many years. (See SHAMYL.) Daghestan still continued to be ruled by native khans until 1868. The last outbreak of the natives against Russian rule occurred during the Russo-Turkish War in 1877.

DAGNAN-BOUVERET, dä'nyäN' bo͞o'v'rā', PASCAL ADOLPHE JEAN (1852–). A French historical and portrait painter. He was born in Paris, Jan. 7, 1852, studied under Gérôme, and won his first important success with "A Wedding at the Photographer's" (1879, Lyons Museum). "The Consecrated Bread" (1886), now in the Luxembourg, admirably displays his management of light in interiors and is painted with a sentiment that is poetic, yet quiet and serene. Other important paintings are: "The Conscripts" (1891, Ministère des Beaux-Arts); several Breton scenes; "Painting" and "Lady with a Child" (Palais des Beaux-Arts); "Madonna" (Pinakothek, Munich, and "Madonna of the Rose" (Metropolitan Museum, New York). Bouveret was made Chevalier of the Legion of Honor in 1885 and received the first medal at the Salon of 1889 for his "Breton Women at the Pardon." He painted excellent portraits of Gérôme, Courbet, and other prominent persons. Among his later pictures are "Spanish Dancer" (1909) and "Marguerite au Sabat" (1912). His work is characterized by a fine color sense and excellent draftsmanship. Consult Van Dyke, *Modern French Masters* (New York, 1896).

DA'GO. A name originally given by sailors to Spaniards, Portuguese, and Italians in general. It is said to be a corruption of the Spanish name Diego, equivalent to the English name James, or Jack. By others it is supposed to be a title given exclusively to those born of Spanish parents. Still others believe it to be purely a corruption or nickname derived from *hidalgo*, which came to be applied to any foreigner from Latin Europe. Whatever the derivation of the word may have been, it is a term of opprobrium applied chiefly to the lower class of Italian immigrants in America.

DAGÖ, dä'gē, or **DAGDEN,** däg'den. An island in the Baltic Sea, belonging to the Russian Government of Esthonia. It lies near the entrance to the Gulf of Finland, north of the island of Ösel, is quadrilateral in shape, and covers an area of 370 square miles (Map: Russia, B 3). The surface is mostly low land, partly covered with marshes; the rest is chalk land and infertile. Fishing and farming are the main industries. Pop., about 16,400, composed of Esthonians, Swedes, and Germans. Dagö belonged to Denmark until 1645, when it was acquired by Sweden, and was annexed to Russia in 1721.

DAG'OBERT, *Fr. pron.* dà'gô'bâr', **I** (?–638). King of the Franks, son of Clotaire II. He ruled in Austrasia from 622 to 632 and in Neustria and Burgundy from 628 to 638. In 632 he gave Austrasia to his son Sigibert. Consult Albers, *König Dagobert in Geschichte, Legende und Sage* (Kaiserslautern, 1884).

DAGOBERT, CHANSON DU ROI (Fr., song of King Dagobert). A French song, in which the characters are King Dagobert and St. Eloi, his counselor. It became very popular as a political song, the couplets being altered to fit different political conditions. A notable version which sprang up in 1814, aimed at Napoleon, was suppressed by police regulations.

DAGON, or **DAGAN.** A god worshiped by the Philistines, the Canaanites, the Amorites, the Chanaites in Mesopotamia, the Akkadians, and the Assyrians. In the Old Testament he is mentioned as a deity to whom a temple was dedicated at Gaza (Judg. xvi. 23), and another at Ashdod (1 Sam. v. 1 ff.; 1 Macc. x. 83 f., xi. 4). There seems to have been another at Ashkelon (Jerome to Isa. xlvi. 1). There was a Beth Dagon in Judah (Josh. xv. 41) and another in Asher (Josh. xix. 27). According to Philo Byblius, Dagon was one of the highest gods of the Phœnicians. The name Dagan takala occurs in the Amarna tablets (317, 318, ed. Knudtzon). Dagon was the chief god of Tirṣa, the capital of Chana, south of the Chaboras in southern Mesopotamia. Names compounded with Dagan meet us as early as in the days of Manishtusu, King of Kish, who is now supposed by Poebel (*Or. Lit. Zeitung*, 1912, pp. 481 ff.) and Ed. Meyer (*Gesch. d. Altertums*, 1913, 3d ed., i, 2, p. 517), to be the second successor of Sargon I of Akkad. Two kings of the dynasty of Isin have names compounded with Dagan, and Isme Dagan occurs at an early time in Assyria. (See BABYLONIA; ASSYRIA.) Dagon was probably an Amoritish deity, adopted by the Canaanites, and at a much later time by the invading Philistines, who probably found

him worshiped in the cities of the Shephela which they conquered. Since the time of Sargon I of Akkad he may have been recognized to some extent in Babylonia, but it was no doubt through the Amoritish dynasties in Babylonia and Assyria that his worship was established there. Priests and worshipers avoided stepping on the threshold of Dagon's temple at Ashdod, and this custom was explained in Israel as due to the fall of a part of the statue of Dagon on the threshold (1 Sam. v. 2–5); the same custom seems to have prevailed in Jerusalem (Zeph. i. 9) and probably originated everywhere in fear of, or respect for, the guardian spirits watching the threshold. Concerning the character of Dagon very little is known. Kimchi says that he was half man and half fish, but this may not be based on any tradition, but only on a popular etymology, deriving the name from *dag*, 'fish.' Whether the connection of the name with *dagan*, 'grain,' has any more validity is still uncertain. Consult: Menant, "Le mythe de Dagon," in *Revue de l'histoire des religions*, vol. ix (1886); Jensen, *Kosmologie der Babylonier* (1890); Martin A. Meyer, *History of the City of Gaza*, pp. 118 ff. (1907); Jastrow, *Die Religion Babyloniens und Assyriens* (1902–12); Ed. Meyer, *Geschichte des Altertums;* 3d ed., i, 2, pp. 513, 606, 633 (1913).

DAG'ONET, Sir. King Arthur's fool, in the "Round Table" legends.

DAGUERRE, dȧ'gâr', Louis Jacques Mandé (1789–1851). A French painter and physicist, inventor of photography in the form of the daguerreotype, born at Cormeilles, Seine-et-Oise. He first became a scene painter under Degoti, and was so successful in this art that he began to paint extensive panoramas and finally evolved the diorama, which attracted much attention. About 1829 he began to interest himself in the discoveries which became famous under his name. He entered into a correspondence with Nicéphore Nièpce, who had been studying in the same direction since 1814. Together they invented the art of photography on metal, the well-known daguerreotype process, the improvement of which was to result in modern photography. Before the completion of their experiments Nièpce died. In 1839 the discovery was made known, and immediately its value was appreciated. Daguerre was given a pension of 6000 francs and made a member of the Legion of Honor. While he was still laboring to bring his work nearer perfection, he died suddenly at Petit-Brie-sur-Marne, near Paris. He wrote the following volumes descriptive of his inventions: *Historique et description des procédés du daguerréotype et diorama* (1839) and *Nouveau moyen de préparer la couche sensible des plaques destinées à recevoir les images photographiques* (1844). Consult Ernouf, *Les inventeurs du gaz et de la photographie* (Paris, 1885). See Daguerreotype Process; Photography.

DAGUERREOTYPE (dȧ-gĕr'ô-tīp) **PROCESS** (Fr. *daguerréotype*, from *Daguerre* + Gk. *τύπος, typos*, impression). The original photographic process, as introduced by its inventor, Daguerre, in 1839. The pictures are positive or direct, though they appear as negative when viewed at certain angles, and are the result of the successive action of the vapors of iodine, bromine, and mercury upon a highly polished surface of chemically pure silver. The manipulations involved in conducting the process are: (1) cleaning and polishing the plate; (2) rendering the plate sensitive; (3) exposing it in the camera; (4) developing the latent image; (5) fixing the picture.

A copper plate of moderate thickness is first coated with silver by electroplating and polished as highly as possible; it is then exposed first to the vapor of iodine, and then to the vapor of bromine for a length of time, ascertained in practice by watching the succession of prismatic colors which begin to appear with the first contact of the vapor. The plate is then exposed in a camera, and the development of the latent image, which is the next operation, is effected by subjecting the plate to the action of the vapor of mercury, which attaches itself to the various parts of the picture in proportion as it has been acted on by the light. Those portions of iodide and bromide of silver unaffected by light are next removed by immersing the plate in a solution of hyposulphite of soda; and the picture is subsequently fixed and intensified by pouring over its surface a solution of hyposulphite of soda and chloride of gold and applying heat; by which means it is coated with a thin film of metallic gold and thereby rendered so permanent that it requires a chemical solvent for its removal. It may be mentioned in conclusion that, though Daguerre published in 1839 the first *practicable* process for taking pictures by the agency of light, his experiments would seem to have been suggested by the researches of Nièpce, who about 1820 obtained impressions on silver plates rendered sensitive by being coated with asphaltum saturated with oil of lavender. Consult Hunt, *A Manual of Photography* (London and Glasgow, 1854). Chapters from this volume, revised by T. W. Smillie, United States National Museum, as "The History of Some Discoveries in Photography," will be found in *The Annual Report of the Smithsonian Institution, 1904* (Washington, 1905). The Reports for 1903 and 1905 also contain valuable chapters on the early history of photography. See Photography.

D'AGUESSEAU, dȧ'gĕ'sô'. See Aguesseau.

DAGUPÁN, dä'gōō-pän'. A town of Luzon, Philippines, in the Province of Pangasinán, situated 8 miles from Lingayen, on the Dagupán River near the Gulf of Lingayen (Map: Luzon, C 2). It is the terminal of the Manila-Dagupán Railway. The surrounding region, generally level, is very fertile, producing cane, corn, and tobacco. Pop., 1903, 20,357.

DAHABEAH, dä'hȧ-bē'ȧ (Ar. *dhahabīya*, from *dhahaba*, to go). The name given to barges on the river Nile, much used by tourists, by whom they are hired by the week. They resemble in their conveniences and comforts the house boats so popular on English rivers.

DAHALAK. See Dahlak.

DAHL, däl, Johan Christian Clausen (1788–1857). A Norwegian landscape painter. He was born at Bergen, the son of a poor fisherman, and early showed such talent for drawing that he was sent to the Copenhagen Academy, where he studied under Lorentzen. He quickly developed an original style based upon nature and the old Dutch painters, particularly Everdingen, which made him one of the pioneers of modern landscape painting. In 1818 he removed to Dresden, where he was appointed professor at the Academy in 1824. In 1826 he revisited Norway, and his landscapes, until then romantic and dreamy, became more truthful to nature. Dahl is best represented in the galleries of Christiania, Ber-

gen, and Copenhagen. One of his finest paintings, "Kronberg by Moonlight," is in Schiefer Castle near Gotha. Consult Aubert, *Maleren Professor Dahl, 1788–1857* (Christiania, 1892–94).

DAHL, Vladimir Ivanovich (1801–72). A Russian lexicographer, born in Lugansk (Government of Ekaterinoslav). He was educated at the University of Dorpat and in 1828–31 accompanied the Russian army in a medical capacity in the Turkish and Polish campaigns. Subsequently he was a government official at Orenburg. Neither medicine nor his military experiences fully satisfied him, however. He therefore turned his attention to literature, coming into intimate contact with Pushkin, Krylóv, Gogol, and other great Russian writers of his day. His first literary work—a number of short stories—was published in 1832. After a few years' interruption came numerous papers, books, and essays on medicine, philology, and other subjects. At the same time he wrote or edited a number of textbooks on botany, zoölogy, and other biological subjects. From 1849 to 1859 he held an important government post, which gave him an excellent opportunity to organize his accumulated ethnographic material and publish his results to the world. His studies in Russian ethnography and philology are valuable, in particular his *Dictionary of Existing Russian Dialects* (4 vols., 1861–68; 2d ed., 1882). His works in belles-lettres were collected at St. Petersburg in 1860–61 (8 vols.).

DAHLAK, dä-läk′, or **DAHALAK,** dä′hä-läk′. An archipelago (a dependency of Italy) just off Massawa, Abyssinia, consisting of a number of islands of coral, rock, and sand (Map: Egypt, E 4). Three only have a permanent population. The entire area is about 420 square miles, the larger portion of which is taken up by the main island, Dahlak-el-Kebir, 32 miles long and 18 wide. The chief occupation since the days of the Roman Empire has been fishing for pearls and sponges. Domestic animals are raised to some extent. The people are of mixed Nubian and Arab extraction. The permanent population is about 1500.

DAHLBERG, däl′bĕrg, Erik Joenssoen, Count (1625–1703). A Swedish military engineer, born in Stockholm. He served under Charles X (1656–60) as an engineer officer, took part in that monarch's famous winter march across the ice belt, and directed the engineers in the sieges of Copenhagen and Kronberg. Becoming in 1676 director of fortifications, he rebuilt most of the works then existing with such skill as to be called the "Vauban of Sweden." He was appointed a royal councilor, in 1696 Governor of Livonia, defended Riga in two sieges in 1700, and retired as field marshal in 1702. Consult H. N. Heden, *Erik Dahlberg* (Stockholm, 1900).

DAHLGREN, däl′grĕn, Fredrik August (1816–95). A Swedish poet and historian, born at Nordmark, Aug. 20, 1816. He is the author of many popular dialect songs and ballads (3 vols., 1876) and of some successful dramas, of which *Värmländingarne* (1846) is most noteworthy. He was also a facile translator for the theatre and wrote a history of the Swedish stage.

DAHLGREN, dăl′grĕn, John Adolf (1809–70). An American naval officer, prominent on the Federal side during the Civil War. He was born in Philadelphia of Swedish parentage; entered the United States navy as a midshipman in 1826; cruised for a time on the *Macedonian* and the *Ontario;* and from 1834 to 1838 was engaged in the United States Coast Survey work, for which his aptitude and training in mathematical studies had well fitted him. In 1837 he was promoted to the rank of lieutenant, but in the same year was forced by failing eyesight to leave the active service and did not resume his duties until 1842. After a cruise of two years in the Mediterranean on board the *Cumberland,* he was assigned to the Ordnance Department, which absorbed the greater part of his energies from this time on, and of which he was twice chief—in 1862–63 and in 1868–70. In his many years of service he greatly increased the efficiency of the department and became especially well known through his invention (1850) of the Dahlgren gun, which proved of the utmost value to the government during the Civil War. In April, 1861, on the defection of Franklin Buchanan (q.v.), he succeeded that officer as commandant of the Washington Navy Yard, a position which he held until the fall of 1862, when he became chief of the Bureau of Ordnance. In February, 1863, he was raised to the rank of rear admiral, and in July replaced Admiral Dupont as commander in chief of the South Atlantic blockading squadron, the greater part of which was engaged in the siege of Charleston, S. C. Soon after taking command, he, in coöperation with General Gillmore, the commander of the Federal troops near Charleston, succeeded in capturing Morris Island, silencing Fort Sumter, and completing the closing of the port. Finally, in February, 1865, Charleston was evacuated by the Confederates, and Dahlgren occupied Charleston harbor, while General Schimmelpfennig took possession of the city. Soon afterward he resigned as commander of the South Atlantic squadron and from 1866 to 1868 commanded the South Pacific squadron. After finishing his second term as chief of the Bureau of Ordnance, he was placed in command, at his own request, of the United States Navy Yard in Washington, where several months later he died. In addition to many reports and magazine articles, he published: *Thirty-two-Pound Practice for Ranges* (1850); *Systems of Boat Armament in the United States Navy* (1852); *Naval Percussion Locks and Primers* (1852); *Ordnance Memoranda* (1853); *Shell and Shell Guns* (1856). An uncompleted volume entitled *Notes on Maritime and International Law* was published posthumously in 1877. Consult Madeleine V. Dahlgren (his widow), *Memoir of John A. Dahlgren* (Boston, 1882).

DAHLGREN, däl′grĕn, Karl Fredrik (1791–1844). A Swedish humorist and poet whose ballads and songs are widely sung. He was born near Norrköping, June 20, 1791, studied at Upsala, and was clergyman at Stockholm from 1815. Descriptions of natural scenes and the burlesque idyll are his fortes. Like Hood, whom in many ways he resembled, he published for some years an annual, *The Muses' Almanac,* as a receptacle for his stories and comic sketches. His sole novel, *Nahum Fredrik Bergströms krönika* (1831), is excellent. He died at Stockholm, May 2, 1844.

DAHLGREN, dăl′grĕn, Madeleine Vinton (1835–98). An American author, wife of Admiral J. A. Dahlgren, born in Gallipolis, Ohio. Under the name of Corinne, and later that of Cornelia, she wrote many sketches and poems. A list of her works includes the following: *Idealities* (1859); *South Sea Sketches* (1881); *Etiquette of Social Life in Washington* (1873; 5th

ed., 1881); *South Mountain Magic* (1882); *The Lost Name* (1886); *Lights and Shadows of a Life* (1887); *Divorced* (1887); *Chim* (1892). She also rendered from the Spanish Donoso Cortés's *Catholicism, Liberalism, and Socialism,* and from the French the *Pius IX* of Montalembert and the *Executive Power* of De Chambrun (1874), with a preface by James A. Garfield. She also wrote a memoir of her husband.

DAHLGREN GUN. The type of gun designed by Admiral Dahlgren after a series of experiments to determine the pressures at different parts of the bore. They were introduced into the navy in 1852 and were in general use during the Civil War, but are now obsolete. See BALLISTICS; GUNS, NAVAL; ORDNANCE.

DAHLIA, däl'yȧ *or* dāl'yȧ (Neo-Lat.). A genus of large perennial herbaceous plants of the family Compositæ, natives of Mexico. Most of the varieties in cultivation are derived from the species *Dahlia variabilis* and *Dahlia juarezii,* the latter being the parent of the cactus forms. Dahlias were first brought to Madrid by Spanish botanists in 1789. The name was given in honor of Dahl, a Swedish botanist. The dahlia varies greatly under cultivation. Some 3000 varieties have been catalogued. Most of these have been the showy and fancy kinds with spherical, symmetrical flowers differing mainly in color. The cactus or decorative types are more chrysanthemum-like in form. Their introduction within recent years has done much to increase the popularity of the dahlia. The dahlia possesses a wide range of colors and lacks practically only sky-blue and kindred shades. It is propagated by division of the root, cuttings, and seed. The first method is that usually employed by the amateur, the second that of the commercial grower, and the last is used chiefly in the production of new varieties. Interesting color effects can be secured by starting seedlings indoors and transplanting to the open when the weather is settled. In gardens the roots are planted 18 to 36 inches apart in any good soil and require ordinary cultivation, which should be frequent, but not more than 1 or 2 inches deep when the plants come into bloom. If the roots are set on their sides about 8 inches deep, covered at first with only 2 or 3 inches of soil, and the shoots pinched back when two or three sets of leaves have formed, the plants will branch below the surface of the ground and will be well braced against wind storms by the time they are ready to bloom. In the fall the roots are dug and stored in the cellar like potatoes.

A beetle injurious to dahlias (*Diabrotica 12-punctata*) is illustrated under CORN INSECTS.

DAHLMANN, däl'mȧn, FRIEDRICH CHRISTOPH (1785–1860). A German historian and statesman, born May 13, 1785, at Wismar. His earlier studies in Copenhagen and Halle were devoted to archæology and philology, but his attention was subsequently directed to political science and history. In 1812 he was made a professor in the University of Kiel, and in 1815 became secretary of the permanent committee of the Schleswig-Holstein clergy and nobility, in which capacity he opposed the Danish policy concerning those duchies. He published several historical works, and in 1829 was appointed professor of political science in Göttingen, where he published his valuable work, *Quellenkunde der deutschen Geschichte* (1st ed., 1830; reëdited by Weitz, 1875, and subsequent editions). Dismissed from the university in 1837, with six of his colleagues, by King Ernest Augustus, on account of their protest against the abrogation of the Hanoverian constitution, he went to Leipzig and afterward to Jena, where he wrote his admirable *Geschichte von Dänemark* (Hamburg, 1840–43). In 1842 he became professor of history and political science at Bonn, and later on took a prominent part in the political affairs of Germany. At the outbreak of the revolution, in 1848, he was appointed deputy of Prussia in the Germanic Diet, and was the principal member of the committee appointed to draft a new German constitution. He exerted his influence in the Frankfort Parliament in favor of an hereditary German empire, the dignity to inhere in the King of Prussia, but his views were not accepted, either by King Frederick William IV or the majority of the Parliament. After a less conspicuous parliamentary activity at Erfurt and Berlin, Dahlmann returned to his academic duties, to which he devoted himself till his death, Dec. 5, 1860. Besides the works mentioned above, he was the author of important histories of the English and French revolutions, of a work in two volumes on early Germanic history, and the editor of the Ditmarsh Chronicle. Consult: Springer, *F. C. Dahlmann* (Leipzig, 1870–72); Nasse, *F. C. Dahlmann,* an inaugural lecture (Kiel, 1885).

DAHLONEGA, dä'lô-nē'gȧ. A town and the county seat of Lumpkin Co., Ga., about 60 miles (direct) north-northeast of Atlanta (Map: Georgia, C 1). It is situated among the foothills of the southern portion of the Blue Ridge Mountains in a gold-mining region and has gold mills. Until the Civil War a United States branch mint was situated here. Dahlonega is the seat of the North Georgia Agricultural College, a department of the State University. The Cherokee Indians called the place Dah-lo-ne-ga, meaning "yellow money." Settled in 1831, it was incorporated in the following year and is governed by a mayor and a city council. Pop., 1890, 896; 1900, 1255; 1910, 829.

DAHLSTIERNA, däl-shĕr'nȧ, GUNNO EURELIUS (1661–1709). A Swedish poet, born at Öhr, Sept. 7, 1661. He was an intense patriot and beguiled the tedium of surveying expeditions in Sweden, Livonia, and Pomerania by composing songs that are at times the best of his epoch, and again nearly the worst in their pathetic puerility. He had the misfortune to choose bad models, the Silesian poets of the school of Lohenstein and the Italians of the school of Marini. But their florid pomposity could not always smother his true poetic fire, and his "Elegy on the Death of Charles XI" (1697) (*Kunga Skald*) is sometimes sublime, while his "Goth's Battle Song" (1701) is an admirable popular ballad, an exulting defiance of the Russians, whose triumph at Poltava Dahlstierna could not survive. He was a man of varied gifts, distinguished as a cartographer and as the author of a number of scientific papers. He died in Pomerania, Sept. 7, 1709.

DAHN, dän, FELIX (1834–1912). An historian, jurist, and novelist. He was born in Hamburg, Feb. 9, 1834. His parents were celebrated actors, his early training was classic. He studied history and law in Munich and Berlin, became privatdocent in Munich in 1857 and professor of law there in 1862. He afterward occupied the same position in Würzburg (1863), Königsberg (1872), and Breslau (from 1888). To history he contributed *Die Könige der Germanen* (9

DAHLIA ETC.

1. DOGBANE (Apocynum androsaemifolium).
2. CACTUS DAHLIA Dahlia juarezii).
3. SHOW DAHLIA (Dahlia sp).
4. SINGLE DAHLIA (Dahlia sp).
5. ENGLISH DAISY (Bellis perennis).
6. MALE FERN (Aspidium Filix-mas). Tip of frond showing a portion of the sori.
7. DURIAN LEAVES (Durio zibethinus).
7a. DURIAN FRUIT, much reduced.
8. DAMMAR (Agathis Dammara).
8a. CONE OF DAMMAR.

vols., 1861–1902), *Urgeschichte der germanischen und romanischen Völker*, 4 vols. (1881–90), and many other works; to jurisprudence, *Das Kriegsrecht* (1870); *Handelsrechtliche Vorträge* (1875); *deutsches Privatrecht* (1878); *Die Vernunft im Recht* (1879); *Die Landnot der Germanen* (1889); to poetry, several collections of ballads and lyrics. He also wrote several dramas, of which *Markgraf Rüdeger van Bechelaren* (1875) is typical, as also the comedy, *Die Staatskunst der Frau'n* (1877). He also wrote some opera texts, as *Armin* (1880), composed by H. Hofmann. But Dahn is most widely known, and deservedly, for his historical novels, which deal mainly with the primitive Germanic peoples, from the Vikings of Norway to the Goths of Italy, and from prehistoric times to the Crusades. Of these there are more than 20, the chief of which are *Odhins Trost* (1880) and the longest and best of all, *Ein Kampf um Rom* (1876). This latter work has an epic breadth and an artistic unity that make it one of the most striking historical novels of recent times, but its characters are actors and its life only that of the stage. It is an epitome of the history of the German invasion of Italy, involving immense learning, borne so lightly by the author that it only now and then oppresses the reader. The period is that of Justinian and Theodora, of the Gothic kings Theodoric, Totila, Vitiges, and Teja. Through the four volumes the interest seldom flags, and the dread of impending fate increases to the tragic close. Much of Dahn's later work was not carefully done. There are also many shorter stories of the Migrations, *Felicitas* (1883), *Fredigundis* (1885), *Attila* (1888), and *Stilicho* (1900). Later publications are *Sigwalt und Sigridh* (1898), *Herzog Ernst von Schwaben* (1902), and *Die Germanen* (1905). Dahn's complete literary works appeared in 21 vols. (1898–99; continued in 1903 et seq.).

DAHOMEY, dȧ-hō′mĭ *or* dȧ′hō′mā′. Formerly a negro kingdom, now one of the colonies of French West Africa. With a coast line of about 75 miles on the Gulf of Guinea, the colony (which extends much farther north than the old kingdom) is bounded on the north by the colony of Upper Senegal and Niger (French) and the Military Territory of the Niger (French), on the east by Nigeria (British), and on the west by Togo (German); the Niger River forms the boundary between the Military Territory and Dahomey (Map: Africa, E 4). In 1907 the circles of Fada N'Gurma and Say were, for ethnical reasons, incorporated with Upper Senegal and Niger, from which they had previously been detached; so that the area of Dahomey, as now estimated, is 107,000 square kilometers (41,313 square miles). The population in 1911 was estimated at 902,000. The terms "Upper Dahomey" and "Lower Dahomey" are often used, indicating the territories lying north and south respectively of 10° N. The littoral, which is part of the old Slave Coast, is low and sandy and contains a series of lagoons. The country for about 50 miles inland is flat and covered with dense vegetation. There is then a gradual rise to about 1300 feet near the 10th parallel. South of this line the watercourses flow south; north of it, mostly to the northeast. Upper Dahomey is hilly, but the highest point is only about 2600 feet; this is in the Atacora hills of the northwest, which form a watershed between the basins of the Niger, the Weme, and the Volta. The Weme, about 280 miles long, is the most important river within the colony. The climate is unhealthful in the coast lands, being moist, foggy, and hot (average temperature about 80° F., though the highest temperatures rarely exceed 95° F.). In the interior the climate is more favorable. The wet season is from May to November.

The forests contain baobab trees and coconut and oil palms. The soil is generally fertile, though waste districts occur in Upper Dahomey. Palm oil is the leading product, but corn, sweet potatoes, manioc, yams, plantains and other fruits, etc., are cultivated. Some cotton is produced. Fishing is important in the lagoons, and there is some native weaving and pottery making. Trade, which formerly was little more than an exchange of trinkets for gold and other valuable articles, has assumed a modern aspect and importance. The chief ports are Porto Novo, Kotonu, and Whydah. In 1910 imports were valued at 17,838,853 francs, and exports at 17,886,254 francs; in 1911, 19,524,531 and 21,958,301. In the latter year the importation of cotton tissues amounted to nearly 6,000,000 francs, and of alcoholic liquors to 2,250,000 francs (in 1914 the government undertook to reduce the consumption of alcohol, which was working much harm among the natives). Principal exports in 1911: palm kernels, 12,577,000 francs; palm oil, 8,088,000; dried fish, 441,000. About one-fourth of the trade is with France, the rest mainly with the United Kingdom and Germany.

A railway (begun in 1900) is under construction from Kotonu to the Niger River, 429 miles distant. A branch (20 miles long) passes through Whydah to Segborue. Another line (about 25 miles) opens up the well-cultivated district between Porto Novo and Sakete. Kotonu is connected by telegraph with Porto Novo, Abomey (capital of the old kingdom), and other towns of the colony and with the French territories to the north, there being through telegraphic communication to Senegal. By cable Kotonu is connected with Lagos, Grand Bassam, and Libreville. At Kotonu, also, is a wireless-telegraph station. There is regular steamship communication with Europe.

Dahomey was an absolute monarchy previous to the French occupation. There was a standing army estimated at over 15,000, consisting partly of female warriors or amazons, who were distinguished for superior physique and high skill in the use of weapons. At present the colony, which is an integral part of the governor-generalship of French West Africa, is administered by a lieutenant governor, assisted by a council of three officials and three prominent residents. The seat of the lieutenant governor is Porto Novo. The natives are full-blooded Guinea Negroes, or Nigritians of the coast (Deniker). The Dahomans are tall, very long-headed (index 75.1), but not so black as the tribes of Senegal. In their own tongue, a dialect of the Ewe language, common on this part of the Slave Coast, they are called Fon or Fawin. Their religion is purely fetish, and the sacrifice of human beings, a widespread custom in former times, is still supposed to be practiced. In spite of a low standard of morality and warlike attributes and usages, the Dahomans are polite in their intercourse. The activity of missionaries has thus far been attended with little success, except in the case of the dervishes, who are indefatigable in their efforts to spread the gospel of Islam. The population of Dahomey

was estimated in 1911 at 902,000. Whites number less than 500. Porto Novo had about 40,000 inhabitants; Whydah, 13,000; Abomey, 10,730; Grand Popo and Kotonu, 2000 each.

The kingdom of Dahomey arose in the seventeenth century around the city of Abomey as a nucleus. By successive conquests the kings extended their rule to the highlands of the Mahé on the north and to the Slave Coast on the south (1772). There they came into contact with the Europeans and succeeded in obtaining control of a large part of the slave trade, which was then carried on actively by the English, the French, and Portuguese. With the cessation of the slave traffic the prosperity of the country came to an end. France secured a firm footing on the coast in the second half of the nineteenth century. Between 1878 and 1885 it obtained possession of Kotonu, Porto Novo, and Grand Popo, and after a bloody contest in 1890 forced King Behanzin to acknowledge its title to the coast region. War broke out again in 1892 and resulted in the taking of Abomey, the deposition of Behanzin (since retained as prisoner at Fort-de-France, Martinique), and the establishment of a virtual French protectorate. Since then the French have been actively engaged in extending their authority over the region to the north, so as to bring Dahomey into touch with their possessions in the Sudan. In 1897 and 1898 they concluded treaties with the Germans and the English, and the sphere of influence claimed by each was determined. The boundary question settled, the French government busied itself with Gallicizing the native population. In 1902 compulsory education for all in the French language was inaugurated, and in a dozen different ways the paternal government undertook to win over the natives. Negro doctors educated in Paris dispensed free medical advice, and an elaborate system of medals and decorations was invented to show the rewards of virtue and patriotism. The second decade of the twentieth century has been marked by the beginnings of extensive railroad construction.

Consult: Careb, *Les territoires africains et les conventions anglaises* (Paris, 1901); Touttée, *Du Dahomé au Sahara* (ib. 1899); Keane, in Stanford's *Africa* (London, 1895); Verdier, *Trente-cinq années de lutte aux colonies, côte occidentale d'Afrique* (Paris, 1897); François, *Notre colonie du Dahomey* (ib., 1906); Le Herissé, *L'Ancien royaume du Dahomey* (ib., 1911).

DAIBUTSU, dī'bo͞o'tso͞o (Jap., great Buddha). A famous Japanese image of Buddha at Kamakura, near Yokohama. It dates from 1252 and is a unique production of Japanese art, wrought of bronze and silver, with eyes of gold, and measures 50 feet in height and 97 feet in circumference. More ancient, even, dating from 749, and of more gigantic proportions, but of inferior artistic merit, is the Daibutsu at Nara, in the main island of Japan.

D'AIGUEBELLE, dāg'bĕl'. See AIGUEBELLE.

DAILLÉ, dă'yā', or **DALLÆUS,** dăl-lē'ŭs, JEAN (1594–1670). A French Reformed theologian, born at Châtellerault. He was tutor to the grandsons of Philippe de Mornay and traveled with them through Italy, Germany, Holland, and England in 1612–21. He was ordained in 1623, became preacher at Saumur in 1625 and at Charenton in 1626, and was president of the last national synod of the Reformed church held in France in 1659. He held the modified predestinarianism of Amyraut (q.v.) and wrote a considerable number of controversial works, among which the *Traité de l'emploi des Saints Pères* (1623) is of permanent value.

DAILY COURANT, THE. A journal called the first English daily newspaper, which first appeared March 11, 1702.

DAIMIEL, dī-myāl'. A town in Spain, in the Province of Ciudad Real, 20 miles east-northeast of the city of that name, with which it is connected by rail (Map: Spain, D 3). It lies on the Auer River, in the fertile Campo de Calatrava; it has several squares, and its principal streets, though unpaved, are wide and comparatively clean. Its chief buildings are the churches of San Pedro and Santa María—the former a Doric and the latter a Gothic structure—a town hall, and a hospital. One of the most important towns in the La Mancha district, Daimiel has manufactures of woolens, linens, bricks, liquors, soap, hats, etc. Pop., 1900, 11,825; 1910, 15,940.

DAIMYO, dī'mē-ō (Jap., great name). A term applied in Japan to a territorial feudal lord, in contrast with the *kuge*, or landless noble of the Imperial court. There were two classes of *daimyos*, *fudai-daimyo*, and *tozama-daimyo*. The *daimyos* of the former class were the kin of the *shogun's* house and were naturally given special favors and privileges, while those of the latter class, who were not the *shogun's* relatives, not infrequently were suspected as rebellious. From the decay of the Mikado's power in the twelfth century this class, numbering nearly 350, flourished until the abolition of feudalism in 1868, when they were amalgamated with the *kuge*, the two forming the Kwazoku, or flowery nobility. According to their former rank, wealth, power, historical or personal importance, the individual *daimyos* have become princes, marquises, counts, viscounts, and barons. Consult: Dickson, *Sketch of the History and Government of Japan* (London, 1869); Griffis, *The Mikado's Empire* (New York, 1900); *The Japanese Nation in Evolution* (ib., 1907); Lloyd, *Every-day Japan* (London, New York, Toronto, and Melbourne, 1909).

DAINGERFIELD, ELLIOTT (1859–). An American historical and landscape painter. He was born at Harper's Ferry, Va., studied at the Art Students' League, New York, and first exhibited at the National Academy in 1880. In 1897 he visited Europe for purposes of study and later was appointed professor at the School of Design in Philadelphia. Among his religious subjects, the rich and glowing color of which is reminiscent of the Italian masters of the sixteenth century, are the pictures in Lady Chapel, St. Mary the Virgin, New York, a "Madonna and Child," "The Child of Mary," and "The Story of the Madonna," awarded a prize in 1902. He is also important as a landscape painter in such works as "Slumbering Fog" (Metropolitan Museum); "The Midnight Moon" (Brooklyn Museum), and "Pearls of the Morning." He was elected to the National Academy of Design in 1906.

DAIR'CELL. An Irish saint of the seventh century: the illegitimate son of a farmer at Luachair (near Castleisland, Kerry). He was born in the wilderness and would have been killed at birth by his mother, had not a dove descended from heaven to protect him, or "gather him to her in her wings"; whence his name *Dairċell*, meaning "a gathering."

DAIREN. See DALNY.

DAI'RYING (ME. *deyery*, from *deye*, dairymaid, Icel. *deigja;* probably connected with OSwed. *dæggja*, to suckle, Skt. *duh*, to milk). That branch of agriculture which has to do with the production and utilization of milk. It embraces the feeding and management of milch cows, the supplying of cream and milk, and the making of butter, cheese, etc. The term *dairy husbandry* is applied to a system of farming under which cows are kept and bred, and the principal crops grown with special reference to the dairy herd. *Dairy* was formerly used to designate the place or house where the milk was kept, cheese was made, etc. Like almost all other occupations, dairying has become in recent years divided into several distinct and special lines. These differ as to the form of the product and the manner of disposing of it. In one case milk or cream may be produced for delivery to consumers direct from the dairy, or the same product may be delivered to a creamery to be manufactured into butter and cheese, or the product of the herd may be converted into butter and cheese at home.

In no branch of agriculture has greater progress been made in recent years than in dairying, and it is now regarded as among the most progressive and highly developed forms of farming in the United States. While formerly believed to be confined by natural conditions to a limited area, known as the "dairy belt," it has been shown that the industry can be profitably and successfully carried on over a wide range of country, and that, generally speaking, good butter and cheese can be made by proper management in almost all parts of North America. Dairying was formerly confined to the spring and summer months, when pasturage could be had for the cows, and it was planned to have the cows calve as far as possible in the spring; they were generally allowed to go dry during the fall and early winter, and were neither well fed nor well housed through the winter. Winter dairying was practically unknown, as it was not supposed to be feasible or profitable. Under the system at present followed, dairying is not confined to any season, and the cows are fed succulent fodder during the winter in the form of corn silage, and roots, in addition to hay and liberal grain rations, composed largely of bran, cornmeal, and the by-products of factories where glucose and similar products are made. Great stress is laid upon the value of succulent foods as supplements to dry feed in winter, and in all countries where dairying has attained a high degree of development succulent feeds have occupied a prominent place in the ration given throughout the year. Corn silage is extensively relied upon for this purpose in the United States, being the cheapest food which can be supplied over a wide extent of the country. There may now be said to be two general systems of summer-feeding cows, the pasturage system and the "soiling" system, in which latter the green crops are cut for the animals. Pasturage is still extensively practiced where practicable, and it is quite customary to feed some grain to good cows on pasture. A large number of cows in the eastern part of the United States are now "kept up" during summer, such green feed as comes into condition in succession throughout the season being raised for them. This method is thought to be more economical in sections where land commands a high price. A much larger number of cows can be kept on a given area by this "soiling" system, and the animals are found to keep healthy and do well under it. Perhaps the most remarkable advance in dairying has been in the keeping of better cows and in giving more attention to their feeding, comfort, and general management. The introduction of the creamery and cheese-factory (qq.v.) systems has caused a great revolution in dairy practice, to a large extent transferring the manufacture of butter and cheese from the farm to the factory. The invention of the Babcock test, which has made practicable the payment for milk by test and placed it within the power of dairymen to test their individual cows, has been a very potent factor in improving the grade of cows which are kept and has probably done more than any other single thing to advance American dairying. Milk of guaranteed fat-content is now sold in most of the large cities, and cream is supplied of various degrees of richness, according to the purposes for which it is intended. The sanitary conditions of milk production have been greatly improved as a result of bacteriological and other studies which have been made, and pasteurized milk and cream are now extensively used.

Dairying has been very greatly advanced by the invention and introduction of various kinds of dairy machinery, such as creaming apparatus, notably the separator; hand and power churns, butterworkers, cheese vats and presses, etc. The cream separator, aside from its increased efficiency and reduction of labor, has almost eliminated the disturbing factor of climate from a large part of dairy management and has altogether worked a revolution in this industry. See BUTTER.

The numerous by-products of the dairy are now very generally utilized in a variety of ways. The skim milk and buttermilk are, where practicable, fed to animals; considerable quantities are sold in towns and cities for household consumption, and milk sugar is made from skim milk and whey. The casein of skim milk is also dried and prepared as a bakers' supply and substitute for eggs, as the basis of an enamel paint, as a substitute for glue in paper sizing, and is also solidified and used for making buttons, combs, and many similar articles.

The value of the principal dairy products of the United States (milk, butter, and cheese) was estimated by the thirteenth census (1909) at $596,413,463.

The leading dairy States are New York, Wisconsin, Pennsylvania, Illinois, Iowa, Ohio, Minnesota, Michigan, Indiana, Missouri, and Kansas. In the Middle and Eastern States the milk is used quite largely to supply the numerous large towns and cities. In the Central West and Northwest butter is the principal dairy product. The United States is far in the lead of all foreign countries in the extent of its stock-raising interests and the value of its dairy products. Dairying is also quite extensively practiced in Canada, where both butter and cheese of good quality are made. Canadian cheese, especially, enjoys an excellent reputation. Denmark has long been famous as a dairy country, having an unusually large number of cows in proportion to its inhabitants. The farms are small and numerous, and most of the butter is made in creameries. In 1902 that country, which is only about one-third the size of New York, exported 193,061,998 pounds of butter. Dairying is also extensively practiced in Australia and of late years has greatly developed in Russia.

For further discussion of topics relating to dairying, see CATTLE, *Dairy Cattle;* BUTTER MAKING; CHEESE MAKING; MILK PRODUCTION; CHEESE FACTORY; CREAMERY.

Consult: Gurler, *American Dairying;* Lane, *The Business of Dairying;* Wing, *Milk and its Products;* Eckles, *Dairy Cattle and Milk Production.*

DA'IS (Fr., canopy). This term was used with considerable latitude by mediæval writers. Its most usual significations are the following: 1. A canopy over an altar, shrine, font, throne, stall, chair, statue, or the like. The term was applied to the canopy without regard to the materials of which it was composed, which might be cloth, wood, stone, metal, or other substance. 2. The chief seat at the high table in a hall, with the canopy which covered it, from which probably the word in all its significations was introduced, its French meaning being a "canopy." 3. The high table itself. 4. The raised portion of the floor, or *estrade*, on which the high table stood, and by which the upper was divided from the lower portion of the hall. 5. A cloth of state for covering a throne or table. In old writings the word occasionally takes the form of *dois*, and more rarely that of *dez* or *detz*.

DAI'SY (AS. *dæges, ēage*, day's eye, referring to the form of the flower). A plant of the genus *Bellis*, of the family Compositæ. The common daisy (*Bellis perennis*), plentiful throughout Europe, flowers almost all the year in pastures, meadows, and grassy places. (For illustration, see Plate of DAHLIA, ETC.) What are called double varieties, with flowers of various and often brilliant colors, are very commonly cultivated in gardens. One variety has the flower (head of flowers) surrounded by smaller ones, the short stems of which grow from the summit of the scape or leafless stem. The daisy (*gowan* of the Scotch) has long been a favorite with poets and lovers of nature, characteristic as it is of many of the fairest summer scenes, its blossoms gemming the pastures, and recommended also by its frequent appearance during the severer seasons of the year. Its flowers close at night. It is sparingly introduced in America. A species of *Bellis* is, however, found in the United States (*Bellis integrifolia*), but it is confined to Kentucky, Tennessee, Arkansas, and the Southwestern States. The flower commonly called daisy, or oxeye daisy, in the United States is a species of chrysanthemum (*Chrysanthemum leucanthemum*). A number of other plants are called daisies in the United States, among them *Rudbeckia hirta*, also called yellow daisy and black-eyed susan. *Erigeron annuus, Erigeron ramosus*, and other species are called daisies or daisy fleabane, and a number of species of wild aster are likewise known as daisies.

DAISY MILLER. A well-known novel by Henry James (1878), so called from the name of its heroine, an American girl who disregarded European rules of conduct. This character sketch was much criticized as not being a true representation of the American type, but its veracity is now admitted.

DAITYA, dīt'yȧ (Skt., sons of *Diti*, a popular formation from *Aditi*, the boundless goddess). The Titans of Hindu mythology, hostile to the gods and disturbers of religious observances.

DAKAR, dȧ-kär'. A fortified seaport in the French colony of Senegal, Africa, situated on the Gulf of Gorée at the extreme point of Cape Verde (Map: Africa, C 3). It has an excellent harbor, finished in 1908, and is the terminal of the railway to St. Louis, 163 miles distant. The climate is unhealthful. There are four big docks, and an arsenal with a torpedo-boat basin. It is the chief port of call in the West African trade with South America. Pop., 1910, 24,914.

DA'KER HEN (dialectic Eng. and Scottish *daker*, to loiter; cf. OFlem. *daeckeren*, to move to and fro). An English local name for a corn crake. See CRAKE.

DAKO'TA. See NORTH DAKOTA; SOUTH DAKOTA.

DAKOTA INDIANS. See SIOUX.

DAKOTA RIVER. A river of North and South Dakota, more commonly called the James River (q.v.).

DAKOTA STAGE. A subdivision of the Cretaceous system in America, the rocks of which were first described as occurring in Dakota. It comprises conglomerates, sandstones, and clays, with layers of lignite, and is found along the western edge of the great plains from Texas to Canada. In the Black Hills the series of rocks is from 250 feet to 400 feet thick. The sandstone, which is the main element in the formation, has considerable importance in the plains region on account of its affording artesian waters. The supply of water comes from the mountain regions where the beds are upturned and then flows down along the dip of the latter under the plains, coming to the surface under its own pressure when tapped by wells. See CRETACEOUS SYSTEM.

DAKOTA WESLEYAN UNIVERSITY. An institution for higher education, under the auspices of the Methodist Episcopal church, founded at Mitchell, S. Dak., in 1883. The university consists of a College of Liberal Arts, and schools of education, commerce, elocution, and art. There is also a preparatory academy in connection with the university. The total enrolment in all departments in 1913 was 407. Of these, 133 were in the College of Liberal Arts, 134 in the School of Music, and 124 in the School of Commerce. The endowment of the university in 1914 was $250,000, and the annual income about $40,000. The library contained 40,000 volumes. The president is William Grant Seaman, Ph.D.

DAKSHA, däk'shȧ. A deity in Hindu mythology, represented as having a goat's head and regarded as a son of Brahma (q.v.). His name means the *dexterous* or *clever* god, and in the oldest of the Vedas he is accounted especially as a progenitor of the race of the gods. His daughter Umā, according to later mythology, was married to Siva (q.v.). Owing to an affront received in connection with a great sacrificial feast, Siva slew Daksha and cut off his head. The scene is portrayed in Hindu sculpture. Siva later restored his father-in-law to life and replaced his head, which had accidentally been destroyed, by the head of a goat, which the god still wears.

DALAGUETE, dä'lȧ-gä'tȧ. A town of Cebu, Philippines, 46 miles southwest of Cebu (Map: Philippine Islands, D 6). It is situated on the coast, at the mouth of the river of the same name. Dalaguete was founded in 1711. Pop., 1903, 21,354.

DALAI-LAMA, dä-lä'ē-lä'mä. See LAMAISM.

DAL'ARA'DIA. The ancient name applied to a district in Ireland, including the southern half of the present County of Antrim and the

eastern part of the County of Down. The name is not to be confounded with Dalriada (q.v.), as Dalaradia, or "Dal Araidh," takes its name from "Fiacha Ariad," a king of Ulster of the Irian race, while Dalriada belonged to the race of Heremon. A Pictish colony from Scotland settled in Dalaradia a century before the beginning of the Christian era. Consult Skene, *Celtic Scotland* (3 vols., Edinburgh, 1876–80).

DALARNE. See DALECARLIA.

DALAYRAC, dȧ'lȧ'rȧk', NICOLAS (1753–1809). A French dramatic composer, born at Muret. He was a pupil of Langlé and in 1781 produced his first opera, *Le petit souper*. Its success encouraged him, and in the next 28 years he wrote no less than 61 operas, of which several became very popular. In 1798 he was made a member of the Stockholm Academy and a little later a chevalier of the Legion of Honor. He died in Paris, and his bust is now in the foyer of the Opéra Comique.

DALBERG, dăl'bĕrK. The name of an ancient German family, the members of which possessed under the Holy Roman Empire the dignity of "First Knight of the Empire." The most distinguished member of the family was KARL THEODOR, BARON VON DALBERG (1744–1817), Archbishop of Mainz, and famous as a clerical magnate and patron of arts and letters. He assisted in the negotiations between Napoleon and Pius VII at Paris in 1804 and was much esteemed, both personally and as a scholar and ecclesiastical prince, by such men as Wieland, Schiller, and Goethe. He was made Prince Primate of the Confederation of the Rhine (1806) and Grand Duke of Frankfort (1810), but was constrained by public opinion to retire into private life on the fall of Napoleon (1814). His numerous writings are no longer of much value. For his *Life*, consult Krämer (Leipzig, 1821), and Beaulieu-Marconnay, *Karl von Dalberg und seine Zeit* (2 vols., 1879).

DALBERGIA, dăl-bĕr'jĭ-ȧ (Neo-Lat., named in honor of the Swedish botanist *Dalberg*). A genus of trees and climbing shrubs of the family Leguminosæ, having a stalked membranous pod, which is flat, tapers to both ends, and contains one to three flat seeds. The leaves are pinnate, with a terminal leaflet. All the species, about 75 in number, are natives of warm climates. Some of them are valuable timber trees, particularly the sissoo of Bengal (*Dalbergia sissoo*), much prized, and more extensively used in the north of India than any other timber tree except the sal (q.v.). The sissoo extends through India to Afghanistan, growing at elevations up to 5000 feet. The trees become 60 feet high; the wood is elastic, seasons well, does not warp, and has a greater transverse strength than teak or sal. *Dalbergia latifolia* furnishes the East Indian rosewood, or Malabar blackwood, which attains a diameter of 6 feet. The wood is heavy, dark, and very strong, and is extensively used in cabinetwork, for ship knees, gun carriages, and agricultural implements. *Dalbergia nigra* and *Dalbergia miscolobium* of Brazil furnish valuable woods for export. *Ecastophyllum monetaria*, a related tree, a native of Surinam, yields a resin very similar to dragon's blood. See ROSEWOOD.

D'ALBERT, dȧl'bȧr', EUGEN FRANCIS CHARLES. See ALBERT.

DALCROZE, dȧl'krôz', EMILE JACQUES (1865–). A Swiss composer and originator of a system of rhythmic training, eurythmics. He was born of Swiss parents at Vienna, July 6, 1865, but lived in Geneva from 1873 to 1910. While pursuing the study of literature at the University of Geneva, he also attended the conservatory. Later he studied with Fuchs, Graedener, and Bruckner at the Vienna Conservatory, and also with Delibes (orchestration) in Paris. In 1892 he became professor of harmony and solfeggio at the Conservatory of Geneva. It was here that he first conceived his idea of laying special stress on rhythm. He began by insisting on his pupils beating the time with their hands. Gradually the feet and the entire body were called into play, thus coördinating the music with elaborate and graceful rhythmic movement. He had developed his ideas to a considerable extent when he succeeded in interesting the French psychologist Edouard Claparide, and together with him he elaborated a special terminology and reduced his practice to a system. When his request to have his system introduced as a regular course into the conservatory was refused, he resigned and left Geneva. At Hellerau, near Dresden, he established in 1910 a special school for eurythmics, of which he was thereafter the director. The fame of this institution spread rapidly, so that within three years the system found its way into many schools of Germany, France, Russia, and England. In 1913 it was introduced into Bryn Mawr College, and two special schools were established in New York and Chicago respectively. Dalcroze's compositions show considerable inventive power and originality, but are deficient in formal structure. They include two operas, *Janie* (1893) and *Sancho Panza* (1897); *La Veillée* and *Poème Alpestre* for soli, chorus, and orchestra; a violin concerto, a string quartet and some really excellent songs.

DALE, DAVID (1739–1806). A Scottish manufacturer, born at Stewarton, Ayrshire. He secured the use of Arkwright's spinning patent, founded the New Lanark mills, and subsequently other important establishments, and became widely known for his many benevolences. Robert Owen married his daughter and succeeded him in the Lanark mills. Dale was the founder and chief pastor of a Scottish church of Congregational principles, the members of which were called Dalites, or Old Independents.

DALE, JAMES WILKINSON (1812–81). An American Presbyterian divine. He graduated in 1831 at the University of Pennsylvania and studied medicine there after studying theology at Andover and Princeton, was ordained in 1837, but had to give up his plan of being a foreign missionary, and was pastor from 1845 to 1876, with his last charge at Wayne, Pa. He died at Media, Pa. He wrote the elaborate works on baptism: *Classic* (1867), *Judaic* (1869), *Johannic* (1871), and *Christic and Patristic Baptism* (1874). For his biography, consult James Roberts (Philadelphia, 1886).

DALE, RICHARD (1756–1826). An American naval officer. At the opening of the Revolutionary War he entered the English service, but afterward joined the American navy, served under John Barry in the brig *Lexington* and later as first lieutenant under Paul Jones and gained distinction in the engagement between the *Bon Homme Richard* and the *Serapis*. He was several times taken prisoner. After the declaration of peace with England he was appointed captain and in 1801 had command of the squadron sent against Tripoli. (See BAR-

BARY POWERS, WARS WITH.) He resigned in 1802 and spent the rest of his life in retirement.

DALE, ROBERT WILLIAM (1829–95). An English Congregational minister and author. He was born in London, graduated at the University of London in 1853, and in the same year was ordained to the ministry and became pastor of Carr's Lane Chapel, Birmingham. He was chairman of the Congregational Union in 1868 and 1869, edited *The Congregationalist* for seven years, and in 1877 visited the United States to give the Lyman Beecher lectures on preaching at the Yale Divinity School. In 1891 he was president of the first International Council of Congregationalists. He was influential in municipal politics and was a member of the Birmingham school board. Among his writings are: a biography (1861) of John Angell James, copastor of Carr's Lane Chapel; *The Jewish Temple and the Christian Church* (1863); *The Atonement* (1875); *Impressions of America* (1878); *Congregational Church Polity* (1885); *The Fellowship of Christ* (1891); and a *History of English Congregationalism,* completed by his son (1907).

DALE, SIR THOMAS (?–1619). A Colonial governor of Virginia. He served for some time as an English officer in the Netherlands and in 1606 was knighted by King James. In 1611 he was sent to Virginia, by the London Company, with supplies, and, in the absence of Lord de la Warr (q.v.), the Governor-General, assumed control of the government, acting as Deputy Governor from May till August of this year. He was nominally relieved in August of this year by Sir Thomas Gates, but nevertheless remained the leading spirit of the Colony, holding the position of High Marshal, and from 1614 to 1616 was again in full control. He returned to England in 1616, was put in command of a fleet sent out by the East India Company against the Dutch in 1618, defeated a Dutch fleet off the site of the present Batavia in November of this year, and in 1619 died at Masulipatam, India. His administration in Virginia was remarkable for its pitiless severity. Finding the colonists dejected, listless, and disinclined to work, he placed them under martial law and republished a code which is always known as "Dale's Code," whose rigor has become proverbial. The years 1611–16 were long known among the colonists as "the five years of slavery." Dale founded a new settlement at Henrico and also Bermuda Hundred, overcame the Appomattox Indians, and by apportioning some of the lands among private individuals took the first step towards abolishing the pernicious communal system. His settlement at Henrico practically saved the Colony from destruction; for he thereby secured a more healthful location, thus preventing disease, and also a place comparatively safe from Indian attack, thus enabling the colonists to raise a supply of corn. His administration of affairs was approved by the London Company, and Sir Edwin Sandys (q.v.), one of the most influential members, said in 1619 that "Dale . . . with great and constant severity reclaymed almost miraculously those idle and disordered people, and reduced them to labor and an honest fashion of life." Much information concerning Dale and his administration is given in Brown, *The Genesis of the United States* (Boston, 1890), and *The First Republic in America* (ib., 1898). A copy of "Dale's Laws" may be found in Force, *Tracts and Other Papers Relating to the Colonies in America,* vol. iii (Washington, 1836–46). Consult also Prince, "The First Criminal Code of Virginia," in the *Report of the American Historical Association* for 1899 (Washington, 1900); Bruce, *Economic History of Virginia,* vol. i (New York, 1907).

DALE, THOMAS NELSON (1845–). An American geologist, born in New York City. He joined (1885) the United States Geological Survey, of which he became geologist in 1892. From 1893 to 1901 he was instructor in geology and botany at Williams College. He is author of *The Scientific Spirit Applied to Living Subjects* (1913), and also of the following bulletins of the United States Geological Survey: *Structural Details in the Green Mountain Region and in Eastern New York* (1902); *Geology of the Hudson Valley* (1904); *The Granites of Maine* (1907); *The Chief Commercial Granites of Massachusetts, New Hampshire, and Rhode Island* (1908); *The Commercial Granites of Vermont* (1909); *The Granites of Connecticut* (1911); *The Commercial Marbles of Western Vermont* (1912).

DALECARLIA, dā'le-kär'lī-ȧ, or **DALARNE,** dā'lär-ne. An old province of Sweden, now forming the Län of Kopparberg or Falun. The Dalecarlians are celebrated for the part they took under Gustavus Vasa in freeing their country from the yoke of Christian II of Denmark in 1519–23.

Besides the peasants who till the soil, there is a large number who are engaged in industrial occupations; especially in the manufacture of wood pulp and different steel trades due to the existence of extensive forests and iron mines in this region.

D'ALEMBERT, dȧ'läN'bâr' (1717–83). The assumed name of Jean le Rond, a French mathematician, philosopher, and encyclopædist. He was the natural son of Chevalier Destouches and Madame de Tencin and was left as an infant on the steps of the chapel of St. Jean le Rond, from which he received his name. He was tenderly reared by a glazier's wife, his father contributing secretly to his support, and was educated by Jansenists at the Collège Mazarin, where he showed a brilliant promise in mathematics, physics, and astronomy, to which he reverted after essaying law and medicine. At 22 he published a scholarly *Mémoire sur le calcul intégral;* at 24 another, *Sur la réfraction des corps solides.* His *Traité de dynamique* (1743) marks an epoch in mechanical philosophy. This work is based on the theory known as D'Alembert's principle, discovered by him at the age of 26 and expressed in the proposition: The impressed forces are equivalent to the effective force. His *Réflexions sur la cause générale des vents* (1746) contains the first conception of the calculus of partial differences. In 1749 he published the first analytical solution of the precession of the equinoxes. He was made a member of the Academy of Sciences in 1741, and in 1754 of the French Academy, whose perpetual secretary he became in 1772. As such he wrote a series of *Eloges* of members deceased between 1770 and 1772. In 1751 he undertook, with Diderot, the editing of the great French *Encyclopédie,* and, though he withdrew from the editorship in 1758, because of government interference with the publication, he continued to contribute articles in science and philosophy. Very noteworthy is his preliminary discourse, or general introduction, to the work, in which he traces in broad outlines the evolution

of human society, civilization, science, and art. An article of his on Geneva involved him in a celebrated dispute with Rousseau on the merits of Calvinism and the stage as teachers of morals. Meantime his scientific work had attracted the attention of Frederick II, who repeatedly offered him the presidency of the Berlin Academy. Catharine II of Russia offered him (1762) 100,000 francs a year as tutor to her son. This he also declined. David Hume left him a legacy of £200, and on the recommendation of Pope Benedict XIV he was admitted to membership in the Institute of Bologna (1755). But he continued to live simply, being by nature a plain, independent, bluff, benevolent, though sometimes rude man. He was a total abstainer from alcohol. His last years are closely associated with the name of Mlle. de l'Espinasse (q.v.), whom he learned to admire at the literary salon of Mme. du Deffand (q.v.). She nursed him during a serious illness in 1765, and they were never after separated, though not a breath of scandal attached to their connection till her death (1776), a shock from which he never recovered. D'Alembert is fully as important for his personality as for his works. While he ranks among the first geometricians of his century, he was not so highly esteemed in literature and philosophy, though his works abound in ingenious and often profound thoughts, and his style is always clear and firm. He gave learning an official status in French society and did a great service to letters, both by his example and by his *Essai sur les gens de lettres* (1753), in fostering the independence of his class from subserviency to social prominence and political power. This essay exposed thoroughly and finally the evils of patronage. His religious opinions, once the subject of eager controversy, are revealed as a tolerant theism in his correspondence with Voltaire, published in Bossange's partial edition of D'Alembert's *Works* (1821). Condorcet's *Eloge* of him before the French Academy (1784) gives a judicious account of D'Alembert's life and writings. Consult Bertrand, *D'Alembert* (Paris, 1889), and Tallentyre, "D'Alembert: the Thinker," in his *The Friends of Voltaire* (London, 1906).

DALÉN, dä'lĕn, (Nils) Gustaf (1869–). A Swedish engineer and expert on gas lighting. He was born in Stenstorp and was educated at the Gothenburg Engineering Institute and the Zurich Polytechnicum. An eminent consulting engineer, he was employed by the Swedish Carbide and Acetone Company (1905) and then by the Swedish Gas-Accumulator Company. He invented a method for dissolving acetylene in acetone which is used for automatic lighting in unmanned lighthouses and for railway signals; and he improved hot-air turbines, air compressors, and milking machines. In 1912 he received the Nobel prize in physics and in 1913 was elected to the Royal Swedish Academy of Science. He wrote technical papers and a book, *Chemische Technologie des Papiers* (1911).

DALGAR'NO, George (c.1626–87). A Scottish writer, who interested himself in the subject of a universal language and in the methods of teaching the deaf and dumb. He was born at Aberdeen, studied at Marischal College, and afterward kept a school in Oxford for 30 years. His *Ars Signorum, Vulgo Character Universalis et Lingua Philosophica* (1661) is an attempt to represent and classify ideas by specific arbitrary characters irrespective of words. His *Didascalocophus. or the Deaf and Dumb Man's Tutor* (1680) was designed "to bring the way of teaching the deaf man to read and write as near as possible to that of teaching young ones to speak and understand their mother tongue."

DALHART. A city in Hartley and Dallam counties, Tex., and the county seat of the latter, 280 miles west of Oklahoma City, Okla., on the Fort Worth and Denver and the Chicago, Rock Island, and Gulf railroads (Map: Texas, A 1). It contains machine shops of the Rock Island system and has cattle, sheep, and horse-raising interests. Dalhart was incorporated in 1901. Pop., 1910, 2580.

DALHOUSIE, dăl-hōō'zĭ *or* dăl-hou'zĭ. A popular summer resort and port of entry, the capital of Restigouche Co., New Brunswick, Canada (Map: New Brunswick, C 1). It is situated on the Intercolonial Railway, at the mouth of the Restigouche estuary on Chaleurs Bay, and has a large and well-protected harbor. Steamship connection with points along the coast is maintained. Good fishing and hunting abound. Among the manufacturing industries are lumber and shingle mills. There is a good trade in fresh and frozen fish and also in lumber. Boating, bathing, and beautiful hill scenery are among the town's varied attractions. Pop., 1901, 862; 1911, 1650.

DALHOUSIE, James Andrew Broun Ramsay, tenth Earl and first Marquis of (1812–60). A governor-general of India. The third son of the ninth Earl, he was born at Dalhousie Castle, Midlothian, Scotland, April 22, 1812. He was educated at Harrow and Oxford. In 1837 he was elected Conservative member of Parliament for Haddingtonshire, and at the death of his father in 1838 became Earl of Dalhousie and took his seat in the House of Lords. In 1843 he was appointed Vice President of the Board of Trade and in 1845 succeeded Gladstone as President. His administration at the time of the so-called "Railway Mania" marked his ability, and at the change of ministry in 1846 Lord John Russell paid him a rare compliment in asking him to remain in office to complete his work. In 1847 he became the youngest governor-general ever sent to India. His administration, through additions of territory, development of resources by railways, canals, and other public improvements, forms an important era in Indian history, although, on account of his reduction of the army of occupation, the Indian Mutiny was subsequently laid to his charge. He was the recipient of many honors and in 1849 was created Marquis of Dalhousie. In 1856 he returned to England as an invalid and died after a lingering illness, Dec. 19, 1860. Consult: Arnold, *History of the Marquis of Dalhousie's Administration of British India* (London, 1862–65); the Duke of Argyll, *India under Dalhousie and Canning* (London, 1865); Trotter, *Life of Dalhousie*, in the "Statesmen Series" (London, 1889); Oswell, "Final Development of the Company's Rule," in *Sketches of the Rulers of India*, vol. i (Oxford, 1908); Gilliat, "Lord Dalhousie: a masterful Ruler," in *Heroes of Modern India* (London, 1910); *Private Letters*, edited by Baird (Edinburgh, 1910).

DALIBOR, dä'lê-bōr. An opera by Smetana (q.v.), first produced in Prague, May 16, 1868.

DALIN, dä-lēn', Olof von (1708–63). "The Father of modern Swedish poetry," whose literary maturity is known in Sweden as the "age of Dalin," a period of transition from the domi-

nance of German to that of French, and especially English, literary ideals. He was born in the Province of Halland, Aug. 29, 1708, the son of a clergyman. He studied at Lund, went to Stockholm as tutor, and entered the civil service in 1731. In 1733 he began to issue anonymously a literary weekly, *Svenska Argus*, that soon became widely popular for its piquant wit. Dalin announced his editorship, published *Thoughts about Criticism;* a comedy, *The Jealous Man* (1738); a tragedy, *Brynhilda* (1739); and the witty *Story of the Horse* (1739), through which runs a satire on the history of Sweden, following it by another satire on contemporary politics, *April Work of our Glorious Time.* Dalin's highest poetic fight is *Swedish Freedom* (1742), a didactic allegory. In 1751 he was made tutor of the Crown Prince (later King Gustavus III), and commissioned by Queen Louise Ulrika, sister of Frederick the Great, to write a *History of Sweden* (4 vols., 1747–62). She also consulted him in establishing the Academy of Arts and Sciences (1753), of which he was made secretary. In this year he was made Privy Councilor, but fell under suspicion of political intrigue and was banished from the court, to which he returned in 1761, two years before his death at Drottningholm, Aug. 12, 1763. Dalin's selected *Works* (issued in 1767 by his half brother) show little of really permanent value, but his personal influence was path breaking and transforming in the national literature. Consult Lamm, *Olof Dalin,* an elaborate biography in Swedish (Upsala, 1908), and also a sketch in the *Nordisk Farmljebok,* vol. v (Stockholm, 1906).

DALKEITH, dăl-kēth′. A market town of Scotland, 6 miles southeast of Edinburgh (Map: Scotland, E 4). It has a corn market, a large and commodious market hall, erected in 1854; manufactures of carpets, brushes, and bricks, besides iron foundries and tanneries. There are large coal mines near by. Much truck gardening for Edinburgh is carried on in the neighboring country. Dalkeith arose around an ancient castle, which was long a stronghold. It was successively held by the Grahams, the Douglases, the Earls of Morton, and the Earls of Buccleuch. Dalkeith Palace, the chief seat of the Duke of Buccleuch and Queensberry, built about 1700 on the site of the old castle, is a large square structure overhanging the North Esk. Three times English rulers have occupied the palace on visits to Scotland. Three miles to the south of the town lies Cockpen, which took its place in literature in Baroness Nairne's lyric, "The Laird of Cockpen." Pop. (police burgh), 1901, 6753; 1911, 7019.

DALL, Caroline Wells Healy (1822–1912). An American author and philanthropist, born in Boston. She lectured frequently on theological subjects and on questions associated with the amelioration of conditions affecting woman and was a founder of the Social Science Association, the constitution of which she framed. For many years she conducted a class in literature and morals at her home in Washington. With Mrs. Pauline Wright Davis she founded *Una,* a journal devoted to woman's rights and the pioneer publication of its kind in Boston. The writings of Mrs. Dall are devoted chiefly to a discussion of the rights of woman, and her work entitled *The College, the Market, and the Court, or Woman's Relation to Education, Employment, and Citizenship* (1867), is a widely known contribution to that subject. She is also author of *What we Really Know about Shakespeare* (1885; 2d ed., 1886); *Nazareth* (1903); *Fog Bells* (1905).

DALL, William Healey (1845–1927). An American naturalist, born in Boston. He was a special student under Louis Agassiz. In 1865–68 he accompanied the International Telegraph expedition to Alaska, and from 1871 to 1884 he was on the United States Coast Survey of Alaska. In 1880 he became honorary curator of the United States National Museum, and in 1893 professor of invertebrate paleontology at the Wagner Institute of Science, Philadelphia. In 1884–1905 he was paleontologist to the United States Geological Survey. He wrote works on the natural history of Alaska, such as *Alaska and its Resources* (1870); *Reports of the Mollusca of the Blake Expedition* (1880–90); *Mollusca of the Southwestern Coast of the United States* (1890).

DALLÆUS. See Daillé.

DAL′LAS. A town and the county seat of Paulding Co., Ga., 34 miles northwest of Atlanta, on the Southern and the Seaboard Air Line railroads (Map: Georgia, B 2). There are cotton yarn, hosiery mills, and several gold mines. New Hope Church, 4 miles from Dallas, was the scene of a sharp conflict (May 25–28, 1864) between the armies of General Sherman and General Johnston. Pop., 1900, 644; 1910, 1259.

DALLAS. A city and the county seat of Polk Co., Oreg., 63 miles southwest of Portland, on the Southern Pacific, the Salem, Fall City and Western, and the Independence and Monmouth railroads, and on La Creole Creek (Map: Oregon, B 3). It is situated in the fertile Willamette valley, has lumber, saw, and planing mills, and railroad machine shops, and manufactures flour, woolen goods, sashes and doors, organs, foundry products, and tanned leather, the industrial interests being promoted by good water power. Sandstone is quarried in the vicinity. Dallas was settled in 1849 and in 1891 was chartered as a city. It contains a Carnegie library. Pop., 1890, 848; 1910, 2124.

DALLAS. The leading manufacturing city of Texas and the county seat of Dallas County, situated 185 miles (direct) north-northeast of Austin, the State capital, on Trinity River, and on the Chicago, Rock Island, and Gulf, the Gulf, Colorado, and Santa Fe, the St. Louis Southwestern, the St. Louis and San Francisco, the Trinity and Brazos valley, the Texas and Pacific, the Houston and Texas Central, the Texas and New Orleans, and the Missouri, Kansas, and Texas railroads, and on several interurban trolley lines (Map: Texas, D 3). Dallas is the seat of the Southern Methodist University, which has a campus of 625 acres and a $2,000,000 endowment. There are a number of other educational institutions, including the University of Dallas and St. Mary's College. Other noteworthy features are the municipal building, a fine Carnegie library, Baptist Memorial Sanitarium, St. Paul's Sanitarium, two city hospitals, the cathedrals of St. Matthews and the Sacred Heart, a concrete viaduct across Trinity River to Oak Cliff, and the courthouse. A city plan has been adopted, and all developments and changes are being made in accordance with it under the supervision of a city-planning expert. Eight parks and playgrounds, comprising 713 acres, have been set aside. City Park, Fair Park, and Forest Park with its zoo, are especially attractive. A boulevard system of 62 miles is being

developed. The State Fair of Texas, which has met here annually since 1886, and which in 1913 had 700,000 visitors, has grounds and permanent fireproof buildings worth $1,364,000. Dallas is the leading industrial city of Texas. Builders' casting, cement, confectionery and bakery products, leather goods, men's clothing, machine-shop products, and sheet-iron goods are among the principal manufactures. In the output of saddlery and harness and cotton-gin machinery Dallas occupies one of the leading positions in the country. The city is situated in the black-waxy belt, the chief cotton-producing region of Texas. The largest inland cotton market in the United States, Dallas handles 1,500,000 bales of spot cotton a year. It ranks second in the country in the distribution of agricultural implements. The city has a commission form of government, with a mayor, and four other commissioners who act as heads of the departments of police and fire, street and public property, water works and sewerage, and revenue and finance. The mayor and commissioners are elected by the people at large and appoint all the other city officers, who are responsible to the commissioners. The city's income in 1913 was $2,072,072; expenditures, $1,666,427, the chief items of which were $342,000 for education and $267,500 for streets. Because of the agricultural development of the surrounding region, the express and parcel-post businesses of Dallas have made great gains, the former now being seventh in volume of all cities in the United States. In 1914 Dallas was chosen as one of the reserve centres under the Banking Act of 1913. Pop., 1890, 38,067; 1900, 42.638; 1910, 92,104; 1914 (local est.), 131,278; 1920, 158,976.

DALLAS, Alexander James (1759–1817). An American politician. He was born in the island of Jamaica, was educated at Edinburgh and at Westminster, and in 1783 removed from Jamaica to Philadelphia. In 1785 he was admitted to the bar and soon became prominent both as a lawyer and a politician. From 1810 to 1814 Dallas was district attorney for the eastern district of Pennsylvania. He was Secretary of the Treasury in President Madison's cabinet from 1814 to 1816, and it was on his recommendation that in 1816 Congress passed an act to incorporate a new United States bank. For a time in 1815 he discharged the duties of the War as well as of the Treasury Department. The bankrupt treasury that he found on entering office he left with a surplus of $20,000,000, and with a definite financial policy for the future. He published *Reports of Cases Ruled and Adjudged by the Courts of the United States and of Pennsylvania before and since the Revolution* (4 vols., 1790–1807); *Address to the Society of Constitutional Republicans* (1805); *Exposition of the Causes and Character of the War of 1812–15* (1815). Consult *Life and Writings of Alexander James Dallas*, by his son, George Mifflin Dallas (Philadelphia, 1871).

DALLAS, George Mifflin (1792–1864). An American statesman and diplomat. He was born in Philadelphia, the son of Alexander J. Dallas, graduated at Princeton in 1810 and was admitted to the bar in 1813, and accompanied Mr. Gallatin in his special embassy to St. Petersburg, as private secretary. On his return he practiced law and filled the offices of deputy attorney-general and mayor in Philadelphia; he was also district attorney for the eastern district of Pennsylvania in 1829–31. From 1831 to 1833 he represented Pennsylvania in the United States Senate and from 1833 to 1835 was Attorney-General of Pennsylvania. In 1837 he was appointed American Minister at St. Petersburg, but was recalled at his own request in 1839. From 1845 to 1849 he was Vice President of the United States, and as such cast the deciding vote for the Tariff Bill of 1846. From 1856 to 1861 he was Minister to the Court of St. James's, where he was called upon to deal with two matters of importance, the Central American question and the recall of the British Minister at Washington, Sir John Crampton, both of which threatened for a time to cause considerable friction between the British and American governments. Consult his *Diary* of his stay in St. Petersburg and in London (Philadelphia, 1892).

DALLAS, Robert Charles (1754–1824). An English miscellaneous writer and a friend of Lord Byron. He was born at Kingston, Jamaica. He passed his life in Jamaica, the United States, England, and France. On his return from the East Byron showed Dallas the manuscript of *Childe Harold* (first two cantos) and was encouraged by Dallas to publish it. In gratitude for his many services Byron gave him the sums received for this poem and the *Corsair*. Dallas's *Recollections of Lord Byron* appeared in 1824. Dallas also wrote novels, tales, and tragedies.

DALLES, dălz (Fr., slabs, flagstones). A term applied, in regions which have been under French influence, to rapids where the rocky river bed wears in smooth slabs, and consequently especially to rapids produced by the narrowing of rivers between basaltic rocks. The best-known dalles are those in the Columbia, the Wisconsin, the St. Louis, Minn., and the St. Croix, Minn. (qq.v.).

DALLES, The, or Dalles City. A city and the county seat of Wasco Co., Oreg., 85 miles by rail east of Portland, on the Columbia River, at the head of navigation, on the Great Southern Railroad, and on the line of the Oregon-Washington Railroad and Navigation Company (Map: Oregon, D 2). The Dalles contains St. Mary's Academy, a Carnegie library, and a hospital. The city carries on an extensive trade in wool, live stock, grain, and fruit; its manufactures include flouring and planing mills, a wool-scouring plant, box factories, salmon and fruit cannery, lumber yards, machine shops, etc. A Methodist mission, followed by a trading station and military post, was established here in 1838, and the settlement was incorporated in 1858. The government is administered by a mayor, elected annually, and a municipal council. The water works are owned by the city. Pop., 1910, 4880.

DALLES INDIANS. See Chinook.

DALLIN, Cyrus Edwin (1861–). An American sculptor. He was born at Springville, Utah, where he came into close contact with Indian life, in the realistic and impressive portrayal of which he excels all other artists. He studied under Truman Bartlett in Boston and under Chapu in Paris, where Buffalo Bill's Wild West Show inspired his first equestrian statue, the "Signal for Peace" (1890), which received a gold medal at the Chicago Exposition (1893), and is now in Lincoln Park in that city; this was followed in 1899 by "The Medicine Man" (Fairmount Park, Philadelphia), considered one of the most notable products of American sculpture. His other works include the marble statue of Sir Isaac Newton in the Congressional Library at Washington; "Don Quixote," which received

a gold medal at the St. Louis Exposition (1904); the monument to the pioneers in Salt Lake City, and "Peace or War" (1906); and the "Redskin's Prayer" (1909). Consult his biography by Downs, in *Brush and Pencil*, vol. v, and Taft, *History of American Sculpture* (New York, 1903).

DAL'LING AND BUL'WER, Baron. See Bulwer, William Henry Lytton.

DAL'LINGER, William Henry (1841–1909). An English scientist, born at Devonport. He entered the Wesleyan ministry in 1861 and for many years preached in Liverpool. But he also gave a great deal of his time to scientific investigation with the microscope, and this work he continued while acting as principal of Wesley College, Sheffield (1880–88), as well as later. In 1880 he was made a fellow of the Royal Society and from 1883 to 1887 was president of the Royal Microscopical Society. He also lectured at Cambridge and at Oxford and was senior lecturer to the Gilchrist Educational Trust. He wrote: *Minute Forms of Life* (1866); *The Origin of Life* (1878); *The Creator and What we May Know of the Method of Creation* (1887); and a thorough revision of Carpenter's *The Microscope and its Revelations* (1901).

DALL'ONGARO, dȧl-ōn'gȧ-rō, Francesco (1808–73). An Italian poet, novelist, and patriot, born near Treviso. Abandoning the priesthood, for which he found himself unfitted, he started at Triest a revolutionary journal, the *Favilla*, served under Garibaldi in 1849, and, after living for some years in exile in Paris and Brussels, returned to Florence to accept a chair of literature. Later he taught at Naples. He led a life full of sorrow and misfortune. He left a great variety of writings, including plays once quite popular. He is remembered chiefly, however, for his graceful and spirited poems, many of them in the Venetian dialect, and for having adopted the *stornello*, a particular form of folk poem, as a medium for patriotic verse, his famous *Stornelli politici*.

DALMAN, Gustaf (Hermann) (1855–). A German Orientalist, born in Niesky, Silesia, and educated at Moravian schools there and in Guadenfeld. In 1881 he was made instructor in Old Testament theology at Guadenfeld and in 1887, after becoming doctor of philosophy at Leipzig, lectured in Delitzsch's Hebrew College. In 1891 he was appointed instructor, and in 1896 professor, at the University of Leipzig, from which in 1900 he went to a chair of theology at Halle. In 1902 he took charge of the German Evangelical Archæological Institute at Jerusalem, where he received appointments as Swedish Consul (1903) and Danish Consul (1910). His most important work was done in Palestine and includes: *Grammatik des jüdisch-palästinischen Aramäisch* (1894; revised 1905); *Aramäisch-neuhebräisches Wörterbuch* (1897–1901); *Wörte Jesu* (1898; Eng. by Kay, 1902); *Palästinajahrbuch* (1905 et seq.); *Petra und seine Felsheiligtümer* (1908); *Neue Petra-Forschungen* (1912).

DALMANITES, dȧl'mȧ-nī'tēz (named in honor of the geologist *Dalman*). A genus of fossil trilobites found in rocks of Ordovician to Devonian age, especially in those of the Silurian, in North America, Europe, Asia, and Australia. The carapace is depressed, with well-marked axis, is ovate in outline, tapering to the tail, and has 11 thoracic segments, with a large, often pointed, pygidium. The head shield is broad, sometimes with an anterior point, and the genal angles are pointed. The eyes are large and usually well raised above the general surface and are provided with numerous distinct facets. The glabella has a broad frontal lobe and three lateral lobes. *Dalmanites* has several related genera—*Acaste*, *Chasmops*, *Pterygometopus*, etc.—which differ in more or less conspicuous features, and which are all members of the family Phacopidæ, of which the type genus is *Phacops*. About 100 species are known in the genus *Dalmanites*, and of these the best known are *Dalmanites limulurus* of the North American Niagaran series, its representative *Dalmanites caudatus* of the English Wenlock, and *Dalmanites socialis* of the Bohemian Ordovician. See Phacops and Trilobite.

DAL'MANU'THA (Lat., from Gk. Δαλμανουθά, *Dalmanoutha*). A place mentioned in Mark viii. 10, as the locality to which Jesus retired after feeding the 4000. Its site is not certainly identified. Matthew, in the parallel passage (xv. 39), has "Magadan," which, if taken for "Magdala," must have been on the western shore of the lake, some 7 miles south of the Plain of Gennesaret. It is of interest to note that between Tiberias and Magdala there is a bowl-shaped valley or hollow, containing the ruins of a village and some more ancient foundations near several copious springs, called *'Ain el-Bârideh*. The dragomans speak of this valley as *Wâdy Dalmanutha*, and it is possible that Matthew and Mark may refer to the same general locality. Consult Tristam, *The Land of Israel*, p. 413 (1876), and Sanday, *Sacred Sites of the Gospels*, p. 22 (1903). Burkitt, *Earliest Sources of the Life of Jesus*, p. 328 (1910), considers the name due to the confusion of the copyist who was struggling with a poorly legible text, but offers no suggestion as to what the original name may have been.

DALMATIA, dȧl-mā'shī-ȧ (Fr. *Dalmatie*, Ger. *Dalmatien*, It. *Dalmazia*, Serbo-Croatian, *Dalmacija*, Gk. Δαλματία, from the name of the former capital city of the province, Gk. Δελμίνιον, Lat. *Delminium* or *Dalmium*, an Illyrian word believed to signify a sheep pasture). The southernmost crownland of Austria, occupying a narrow strip of land along the Adriatic, and bordering on Croatia, Bosnia, the Herzegovina, and Montenegro (Map: Austria, E 5). Its area, including the adjacent islands, is 4956 square miles. The eastern part of Dalmatia belongs to the region of the Dinaric Alps, which form a wall on the side of Bosnia, while parallel to the coast rise the mountain chains of Castella, Mosor, and a few others. The coast is deeply indented with numerous rock-bound bays and inlets and is skirted by many islands. The scenery of the Dalmatian coast is famed for its picturesqueness. The Gulf of Cattaro is one of the finest natural harbors in Europe. The mountains are generally composed of limestone and barren of vegetation. The limestone is porous, abounding in caverns and passages, so that there is a system of underground watercourses. There are no rivers of importance. A few small lakes occur, and considerable tracts are covered with swamps and morasses, but most of the country suffers from drought. Dalmatia has almost a subtropical climate. The average annual temperature varies between 57° and 63°.

Owing to the frequency of political upheavals in Dalmatia, agriculture has been in a back-

ward state. In 1912 about 12 per cent of the total area was in arable land; in addition, vineyard, garden, orchard, etc., probably covered less than 10 per cent. The geographical position of the region makes it well adapted to the cultivation of southern fruits. The vine and the olive grow profusely on the coast. The famous maraschino cordial comes from Dalmatia, where it is made from a cherry (marasca) peculiar to the country. Fishing is carried on to a considerable extent. Cattle raising and dairying are also of some importance. The chief mineral products are lignite, asphalt, and salt, mined on a small scale. The shipbuilding and the wine and oil-pressing industries should be mentioned. The most important ports are Zara, Ragusa, and Spalato. Cereals are imported; olive oil, fish, meat, hides, honey, wine, and asphalt are exported. In 1911 there were 145 miles of railway, 153 telegraph offices, and 217 post offices.

Local affairs are under the control of the Diet, consisting of 43 members, of whom 10 are elected by citizens paying a direct annual tax of at least 100 kronen, 8 by the towns, and 20 by the rural communities, and the remaining 5 consist of the Roman Catholic Archbishop, the Greek Orthodox Bishop, and three representatives of the chambers of commerce of Zara, Ragusa, and Spalato. To the Lower House of the Austrian Parliament Dalmatia sends 11 delegates, of whom two are elected by indirect universal suffrage. The crownland is divided into 14 administrative districts. In 1911 there were 458 public elementary schools, with an enrollment of 58,606 pupils. There are five gymnasia and three realschulen. The majority of the inhabitants, perhaps three-fourths, are illiterate. The population of Dalmatia in 1890 was 527,426; in 1900, 593,784; in 1910 (census of December 31), 645,666, or 2.26 per cent of the population of Austria. According to vernacular, in 1910, about 96.2 per cent of the inhabitants were Serbo-Croat, 2.8 per cent Italian, and 0.5 per cent German. Roman Catholics constituted over 83.3 per cent, and Greek Orthodox over 16.3 per cent. The population of the larger towns was as follows at the 1910 census (population of communes in parenthesis): Zara, capital of the crownland, 14,056 (36,595); Spalato, 21,407 (27,492); Sebenico, 12,588 (29,579); Ragusa, 8958 (14,367); Blatta, 6837 (8862). The Dalmatians are tall and short-headed (height, 1.715 m.; index, 87). They are supposed to be fundamentally the modern representatives of the ancient Illyrians, subjected by Augustus and modified afterward by Mœso-Goths, Avars, and Slavs. These Dalmatian Slavs often figure under the name of Morlaks. Capital, Zara (q.v.).

In ancient times Dalmatia was inhabited by the Dalmatii, who for nearly 150 years resisted successfully the Romans, but who were finally subdued by Augustus. After the fall of the Western Empire Dalmatia, which had formed the southern part of the Province of Illyricum, was occupied by the Goths, from whom it was taken by the Byzantines. Early in the seventh century the Croats and Serbs took possession of the country districts, but not the cities, which were the places of refuge for the older population. About the beginning of the twelfth century King Ladislas of Hungary incorporated a part of Dalmatia with Croatia, while the other part was in the possession of the Venetian Republic, the Doge of which had in 998 assumed the title of Duke of Dalmatia. In the south the little Republic of Ragusa (q.v.) maintained an independent existence. In the sixteenth century most of the country was conquered by the Turks. In 1699 almost all except Ragusa was restored to Venice. By the Peace of Campo Formio (1797) Dalmatia, with Venice itself, became subject to Austrian rule; and when Austria, in 1805, retroceded it to Napoleon, it was annexed to the Kingdom of Italy. In 1809 it was constituted part of the dominion of the Illyrian Provinces. Since 1814 Dalmatia has formed part of the Austrian Empire. Consult: Jackson, *Dalmatia, the Quarnero and Istria, etc.* (London, 1893); Freeman, *Subject and Neighbor Lands of Venice* (ib., 1881); Modrich, *La Dalmazia* (Turin, 1892); Royle, *Dalmatia Illustrata* (London, 1900).

DALMATIA, Duke of. See Soult.

DALMATIAN (dăl-mā'shən) **DOG.** See Coach Dog.

DALMAT'IC. In ecclesiastical art and in the usage of the Roman Catholic church, the distinguishing vestment of a deacon or subdeacon, taking its name from the ordinary costume of Dalmatia. Pope Sylvester, in the fourth century, ordered deacons to wear it in the church. It is also worn by bishops, cardinal priests, and abbots at pontifical functions. As an ecclesiastical vestment it was originally white, with broad perpendicular stripes of purple; it now follows the color of the day, with the stripes represented in embroidery. It reaches to the knee and has wide sleeves. Consult Simpson, *Use of Vestments in the English Church* (New York, 1909), and Namfa, *Costumes of Prelates of the Catholic Church* (Baltimore, Md., 1909). See Costume, Ecclesiastical.

DALMORÉS, dăl'mō'rĕs', Charles (1871–). A distinguished French dramatic tenor, born at Nancy. His musical talent manifested itself at an early age, and when only six years old he received systematic instruction. His first ambition was to become a violinist, and for this purpose he entered the conservatory at Nancy. Having to abandon the violin after breaking his arm, he took up the horn. He continued his study at the Paris Conservatory, won the first prize, and began his career as hornist in the Colonne orchestra. From 1888 to 1894 he was a member of the Lamoureux orchestra. At the same time he studied the 'cello and attained considerable skill on this instrument also. Ever since his arrival in Paris he had felt a burning desire to become a great singer. His opportunity for study came in 1894, when he accepted a position as teacher of the horn at the conservatory at Lyons. Here Dauphin, one of the singing masters, heard him and trained his voice. His début at Rouen in 1899 was an emphatic success. His great fame began when in 1906 he appeared as one of the principal tenors of the Manhattan Opera House in New York. After his return to Europe the doors of the principal opera houses were open to him, but he would not bind himself permanently. Until the dissolution of the Manhattan Company in 1910 Dalmorés remained leading tenor of the organization, and after that he was the foremost tenor of the Chicago Opera Company. He is not only a great singer, but also an actor of more than ordinary ability.

DALNY, dăl'nĭ, or Tairen, or Dairen. A seaport in Manchuria, on the peninsula of Liao-

tung, about 20 miles north of Port Arthur (Map: China, F 4). The harbor of 132 acres, ice-free throughout the year, is deep enough for large vessels. The port was intended by the Russians to become the centre of their trade on the Pacific, especially with Japan and China. Although founded in 1899, Dalny has a considerable and rapidly increasing population. It was occupied by the Japanese, under General Oku, May 28, 1904, following the battle of Kin-Chow or Nanshan. The lease of it, together with the rest of the Liao-tung peninsula, by Russia was transferred to Japan by the Treaty of Portsmouth. On Sept. 1, 1906, it became a free port. Its commerce has greatly increased in recent years. The imports, which a decade ago were extremely small, were in 1911 $17,047,199 and in 1913 $21,572,000; exports in 1911, $22,975,000, 1913, $28,973,000. About three-fourths of the most important imports are from Japan, chiefly cotton goods and other manufactures. Soya-bean oil and cake are the articles of export. The area of the leased territory is 1220 square miles and its population in 1913 was about 510,000.

DALOU, dȧ'lo͞o', (Aimé) Jules (1838–1902). The most eminent French sculptor, after Rodin, of the later nineteenth century. He was born in Paris, Dec. 31, 1838, the son of a glove maker. As a lad, he fought behind the barricades of 1848, and ever after he was identified with the workingman's cause. His talent in modeling attracted the attention of Carpeaux, under whom he studied at the Ecole des Arts Decoratifs, and although he afterward was a pupil of the Classicist Duret in the Ecole des Beaux-Arts, Carpeaux was his real master. The young revolutionary held aloof from official contests, but exhibited with varying success until 1870, when his "Women Embroidering" obtained a prize. He was also occupied with decorative works, such as the four groups for the Hôtel Païva, and with designs for goldsmith's work and ceramics. Having held office under the Commune, he was compelled in 1871 to flee to England. In London he was welcomed by his friend the painter Legros, who procured him commissions and aided him to secure an appointment as adjunct professor in the South Kensington Museum schools. The fruitful training which he gave his pupils was the principal factor in breaking the dreary classic traditions of British sculpture and establishing its present excellence. While in London he modeled many terra-cotta busts, statuettes, and several statues, one of which, reproduced in bronze as "Maternity," is in front of the Royal Exchange. After the general amnesty of 1879 he returned to Paris and soon received from the city the commission for his principal work, the colossal bronze "Triumph of the Republic," in the Place de la Nation (1880–89), one of the most important public monuments in modern sculptures. The figure of the Republic towers over a chariot drawn by two lions, attended by the four figures of liberty, justice, freedom, and peace. In 1883 he received a medal of honor for two admirable high reliefs, "The Republic" and "Mirabeau Answering Dreux-Brézé," the latter a composition of great power, now in the Chamber of Deputies. A bronze cast of his group "Silenus" (1885) is in the Jardin de Luxembourg. In 1889 he was awarded the Grand Prix of the International Exposition. He was an officer of the Legion of Honor and the first president of the sculpture section of the secessionist Société Nationale des Beaux-Arts.

Dalou may be well called the official sculptor of the Third Republic. His powerful public monuments adorn the provincial cities as well as Paris. Most of them are groups, in which the statue or bust of a hero surmounts the pedestal with allegorical or other figures at the base. Among the best are the monument to Delacroix in the Luxembourg Gardens, that of the engineer Alphand with the statues of Dalue and three others at the base, Lavoisier in the amphitheatre of the Sorbonne, Gambetta at Bordeaux, and Hoche in Quiberon. He also executed many genre groups, reliefs, and portrait busts, such as those of Charcot, Rochefort, and others, and much decorative work, architectural as well as ceramic, including the two celebrated vases in the Luxembourg. His last years were devoted to a colossal "Monument of Labor," for which many plastic sketches survive, but which an untimely death prevented him from completing. Dalou and Rodin are the most prominent and representative figures in French sculpture of the later nineteenth century. The former is the logical successor of Rude and Carpeaux, whose influence appears in his work; but his art is also reminiscent of mediæval sculpture and especially of the decorative art of the eighteenth century. For, unlike Rodin, who broke entirely with the past, he insisted upon conserving the national tradition. The best monograph on Dalou is by his friend Dreyfous (Paris, 1903); see also that of Cornu, in *Portraits d'hier* (ib., 1909).

DAL'RIA'DA. The ancient name for the northern half of the County of Antrim in Ireland, now known as "The Route." The Dalriads are supposed to have descended from Carbry Riada (Riogh-fhada, i.e., of the long wrist), a son of a chief of the Scots in Ireland, who ruled not only in the district of Ireland, named after him, but, according to Beda, crossed to Scotland and settled in the lands of the Picts. In the beginning of the sixth century the Dalriads, led by Fergus, passed over to Argyllshire, where they settled themselves permanently, and formed the kingdom of "Dalriada in Albany." The Scottish colonists increased so much in power that they threw off the yoke of Ireland and about 627 attempted to subdue that island, but were defeated at Magh Rath, in County Down. The Dalriads nevertheless extended their kingdom in Scotland, and in 844 their king, Kenneth, became King of the Picts and thus united under one sceptre the Dalriads, or Scots, and the Picts. Later his kingdom was known as the Kingdom of Albany, or Scotland. Consult Skene, *Celtic Scotland* (3 vols., Edinburgh, 1876–80).

DALRYMPLE, dăl'rĭm-p'l, Alexander (1737–1808). A British hydrographer; a younger brother of Sir David Dalrymple, Lord Hailes (q.v.). He was born at New Hailes, near Edinburgh, July 24, 1737. In 1752 he obtained an appointment in the East India Company's service; but he labored under the disadvantage of youth and imperfect education, until Lord Pigot, Governor of the Presidency, gave him lessons in writing. In 1758 he made a voyage of observation among the Eastern islands, and at Sulu negotiated a commercial treaty with the Sultan, which he returned to consummate in 1762, but was unsuccessful. In 1765 he returned to Britain and in 1775 was sent to Madras as a member of council, but was recalled in two years, apparently without good reason. Four years later

he was appointed hydrographer to the East India Company and shortly after received a pension. In 1795, when the British Admiralty resolved to establish a similar office, it was conferred on Dalrymple, who held it until his summary dismissal, occasioned by an excess of zeal, on May 28, 1808. Depression at the humiliation occasioned his death, three weeks afterward, on June 19, 1808, at Marylebone, London. He wrote a vast number of letters, pamphlets, etc., containing plans for the promotion of British commerce in various parts of the world, political dissertations, accounts of geographical expeditions, etc., and his library, containing valuable geographical and scientific works, was acquired by the Admiralty.

DALRYMPLE, Sir David, Lord Hailes (1726–92). A Scottish judge and antiquarian, born in Edinburgh, Oct. 28, 1726. He was the grandson of Sir David Dalrymple, youngest son of Viscount Stair. Educated at Eton, in Edinburgh, and finally in Leyden, he returned to Scotland in 1746 and in 1748 was called to the Scottish bar. In 1766 he was appointed judge of the Court of Session, with the title of Lord Hailes. Ten years after, he was made Justiciary Lord. He set a high standard for humanitarian treatment of criminal cases—a practice which was not prevalent at that time. He died Nov. 29, 1792. He was a voluminous writer. His most important works are: *Annals of Scotland, from the Accession of Malcolm III, Surnamed Canmore, to the Accession of Robert I* (1776); with continuation to the *Accession of the House of Stuart* (1779); and *An Inquiry into the Secondary Causes which Mr. Gibbon Has Assigned to the Rapid Growth of Christianity* (1786). He also wrote works on legal antiquities and ancient church history, edited old Scottish poems, and published biographical sketches of notable Scotchmen. He was the esteemed friend and correspondent of Dr. Johnson. Consult "Memoirs of Lord Hailes," in late editions of the *Inquiry.* Consult also Boswell, *Life of Johnson.*

DALRYMPLE, Sir James, first Viscount Stair (1619–95). A Scottish lawyer and statesman. The son of a small proprietor in Ayrshire, he was born at Drummurchie in May, 1619. Educated at Glasgow and Edinburgh universities, at an early age he entered the army raised in Scotland to repel the religious innovations of Charles I, but returned to civil and literary pursuits, and in 1641 was appointed professor of philosophy at Glasgow. In 1648 he entered as an advocate at the Scottish bar, where he rapidly acquired distinction. In 1649 and again in 1650 he was appointed secretary to the commissioners sent to Holland by the Scottish Parliament to treat with Charles II, and in 1657 was induced to become one of the "commissioners for the administration of justice" in Scotland under Cromwell's government. Dalrymple was a Royalist, but resigned his seat in 1664 on his refusal to take the "declaration" oath, which denied the right of the nation to take up arms against the King. Charles, however, unwilling to lose so faithful a servant, allowed him to take the oath in a modified form, and he returned to the bench. The King further honored him with a baronetcy and in 1671 appointed him Lord President of the Court of Session. He was invariably the advocate of moderate measures. In 1681 he refused to take the new test oath and resigned his appointments. The same year he published the *Institutions of the Law of Scotland,* which is still the grand textbook of the Scottish lawyer. After some time spent on his estate in Wigtownshire Dalrymple went to Holland in 1682 to escape factious persecution. During 1684–87, while residing at Leyden, he published at Edinburgh his *Decisions;* and in 1686, at Leyden, a Latin work entitled *Physiologia Nova Experimentalis.* He accompanied the Prince of Orange on his expedition to England. William reappointed him Lord President of the Court of Session and created him Viscount Stair, Lord Glenluce and Stranraer in 1690. He died in Edinburgh, Nov. 25, 1695. His daughter Janet, who died in 1669, within a month of her marriage to Dunbar, Laird of Baldoon, is the original of Scott's *Bride of Lammermoor.* Consult Mackey, *Memoirs of Sir James Dalrymple, First Viscount Stair* (Edinburgh, 1873), and Graham, *Annals and Correspondence of the Viscount and First and Second Earls of Stair* (ib., 1875).

DALRYMPLE, Sir James (?–c.1714). The second son of Viscount Stair and the author of *Collections Concerning Scottish History Preceding the Death of David I* (1705). He was appointed one of the commissaries of Edinburgh following his admission to membership of the faculty of advocates in 1675. He was made a baronet of Nova Scotia in 1698. As an antiquary he ranked among the best of his time.

DALRYMPLE, Sir John, first Earl of Stair (1648–1707). A Scottish statesman. He early became the leader of the Presbyterians in Scotland, and in 1687 he became Lord Advocate as a concession to that party. He took a leading part in the revolution of 1688 in Scotland and was one of those who brought the offer of the Scottish crown to William and Mary. William reappointed him Lord Advocate, and in 1690, on his father's elevation to a viscountcy, he became the Master of Stair. But, inspired by his fanatical hatred for the Highland clans, he instigated the "Massacre of Glencoe," which brought great odium on his head and forced his retirement. At the accession of Anne (1702) he was a privy councilor for Scotland, and the next year he was created Earl of Stair. He earnestly promoted the union of Scotland with England, and his death from apoplexy, Jan. 8, 1707, was very possibly brought about by his efforts in behalf of the treaty. Dalrymple was a strong partisan, and many of his acts are open to criticism, but his patriotism and love for Scotland are undoubted. Consult Graham, *Annals and Correspondence of the Viscount and First and Second Earls of Stair* (Edinburgh, 1875).

DALRYMPLE, Sir John, of Cranstoun (1726–1810). The grandson of Sir James Dalrymple, and author of *Memoirs of Great Britain and Ireland from the Dissolution of the Last Parliament of Charles II until the Sea Battle off La Hogue* (3 vols., 1771), which created a sensation at its appearance, owing to the revelations it contained, culled from authoritative state papers.

DALRYMPLE, Sir John, second Earl of Stair (1673–1747). A Scottish general and diplomat. The second son of the first Earl and grandson of Viscount Stair, he was born in Edinburgh, July 20, 1673. When eight years old he killed his elder brother by the accidental discharge of a pistol. Alienated from parental affection by this unhappy circumstance, he was placed under the care of a clergyman, who by prudence and kindness developed the excellent

qualities of the youth. He proceeded to Leyden University, where he won a reputation for scholarship, and, after completing his curriculum at Edinburgh, in 1701, accepted a commission as lieutenant colonel of the Scottish Regiment of Foot Guards and gained high distinction in Marlborough's campaigns. In 1711 he retired from the army, and, when George I succeeded to the throne, Dalrymple, who had become Earl of Stair by the death of his father in 1707, was made lord of the bedchamber, Privy Councilor, and commander in chief of the forces of Scotland. In 1715 he went as Ambassador to France and exhibited the highest ability in counteracting the schemes for the reinstatement of the Pretender. But, as he refused to flatter his countryman, Law, then high in favor with the regent Orleans, he was recalled. For 22 years he lived in retirement at Newliston, near Edinburgh, and devoted himself chiefly to scientific agriculture, in which he originated distinct advancements. He was the first to plant turnips and cabbages in the open fields. In 1742 he was sent as Ambassador to Holland and in the following year served under George II at the battle of Dettingen. Later he was made commander in chief of the forces of Great Britain. He died in Edinburgh, May 9, 1747. His Countess, a beautiful and cultured woman, who survived him 12 years, is the heroine of Scott's novel *My Aunt Margery's Mirror*. Consult Graham, *Annals and Correspondence of the Viscount and First and Second Earls of Stair* (Edinburgh, 1875).

DALSGAARD, däls'gård, CHRISTEN (1824–1907). A Danish genre painter, born at Knabbesholm, near Skive, Jutland. He studied at the Copenhagen Academy and under Rörbye, was made professor of drawing at the Academy of Sorö in 1862, and was elected to the Copenhagen Academy in 1872. His impressive delineations of Danish peasant life, showing a keen sense of observation and imbued with sincere sentiment, have justly caused him to be esteemed one of the typical masters of Denmark. Especially noteworthy among them are: "Christmas Morning on a Farm" (1848); "Seizure for Debt" (1860); "Fisherman and Daughter" (1854); "Mormons Visiting a Joiner's Home" (1856); all in the Gallery at Copenhagen and "The Farewell" (1860), in the Museum at Aarhus. Consult his biography by Knud Söborg (1902).

DALTON, dal'ton. A city and the county seat of Whitfield Co., Ga., 98 miles north-northwest of Atlanta, on the Southern and the Western and Atlantic railroads (Map: Georgia, A 1). It is in a region possessing extensive deposits of iron, limestone, and manganese; exports cotton, grain, and fruits, and has agricultural-implement and marble works, foundries, jail and convict car factory, and machine shops, cotton mills, chair factory, and lumber mills. Settled and incorporated in 1848, Dalton is governed by a mayor chosen every two years, a board of aldermen, and three commissioners. The water works, and gas and electric-light plants are owned by the city. During the latter part of 1863 and the spring of 1864 Dalton was the headquarters of the Confederate General Joseph E. Johnston, who commanded the army for the defense of Atlanta. Several minor battles were fought in this vicinity. Pop., 1890, 3046; 1900, 4315; 1910, 5324.

DALTON. A town in Berkshire Co., Mass., 5 miles east of Pittsfield, on the Boston and Albany Railroad (Map: Massachusetts, A 3). It contains a public library. The chief manufactures are paper, woolens, and spark coil, the paper being of an unusually high grade and used by the government for currency. Pop., 1900, 3014; 1910, 3568.

DALTON, HERMANN (1833–). A German Protestant theologian. He was born at Offenbach-on-the-Main, Aug. 20, 1833; studied at Marburg, Berlin, and Heidelberg; was pastor of the German Reformed congregation in St. Petersburg (1858–88) and has since lived in Berlin. He has written much on the history of religion in Russia, including *Geschichte der reformirten Kirche in Russland* (1865); *Johannes a Lasco* (1881; Eng. trans. 1886); *Verfassungsgeschichte der evangelisch-lutherischen Kirche in Russland* (1887); *Urkundenbuch der evangelisch-reformirten Kirche in Russland* (1888); *Zur Gewissensfreiheit in Russland* (1890); *Die russische Kirche* (1891); *Zur Geschichte der evangelischen Kirche in Russland* (1893–98); and also *Lebenserinnerungen*, vols. i–iii (1905–09).

D'ALTON, JOHANN SAMUEL EDUARD. See ALTON.

DALTON, JOHN (1766–1844). A celebrated English chemist and natural philosopher, born at Eaglesfield, near Cockermouth, in Cumberland. He received his early education in the Quakers' school of his native place, and from 1781 to 1793 acted as assistant and as joint manager in a boarding school kept by a relative in Kendal. Here his love of mathematical and physical studies was first developed. He wrote several mathematical essays and in 1788 commenced a journal of meteorological observations, which he continued throughout his whole life. From 1793 to 1799 he was teacher of mathematics and the physical sciences in the new college at Manchester, where he chiefly resided during the remainder of his life, though frequently employed, after 1804, in giving lectures on chemistry in several large towns. In the years 1808 to 1810 he published his *New System of Chemical Philosophy* (2 parts, London), to which he added a third part in 1827. In 1817 he was appointed president of the Literary and Philosophical Society at Manchester. He was also a member of the Royal Society and of the Paris Academy and in 1833 received a pension of £150, afterward raised to £300. In the same year Dalton's friends and fellow townsmen collected £2000 to raise a statue to his honor, which was executed by Chantrey and placed at the entrance of the Royal Institution in Manchester. Dalton was also honored by the University of Oxford with the degree of D.C.L. and with that of LL.D. by the University of Edinburgh. His chief physical researches were those on the constitution of mixed gases, on the force of steam, on the elasticity of vapors, and on the expansion of gases by heat. In chemistry he distinguished himself by his progressive development of the atomic theory (see CHEMISTRY), as also by his researches on the absorption of gases by water, on carbonic acid, carburetted hydrogen, etc. His papers are mostly contained in the *Memoirs of the Literary and Philosophical Society of Manchester*, the *Philosophical Transactions*, Nicholson's *Philosophical Journal*, and Thomson's *Annals of Philosophy*. Besides these, we have his *Meteorological Essays and Observations* (London, 1793; 2d ed., 1834). Profound, patient, and intuitive, Dalton had precisely the faculties requisite for

a great scientific discoverer. His atomic theory has revolutionized the science of chemistry and has yielded a greater number of valuable results than, perhaps, any other idea ever introduced into physical science. In his habits Dalton was simple; in his manners, grave and reserved, but kindly. Consult Roscoe and Harden, *A New View of the Origin of Dalton's Atomic Theory* (New York, 1896), and Meldrum, *Avogadro and Dalton* (Aberdeen, 1904, University Studies).

DALTON, John Call (1825–89). An American physiologist and physician. He was born in Chelmsford, Mass., and graduated at Harvard in 1844 and at the Harvard Medical School in 1847. He was professor of physiology successively in the University of Buffalo, in the Vermont Medical College, and in the College of Physicians and Surgeons, and in 1883 succeeded Alonzo Clark as president of the last. During the Civil War he served as surgeon in the Federal army. He contributed many articles on medical subjects to scientific journals and, in addition, published a *Treatise on Human Physiology* (1859); *A Treatise on Human Physiology for Schools, Families, and Colleges* (1868); *The Experimental Method of Medicine* (1882); *Doctrines of the Circulation* (1884); *Topographical Anatomy of the Brain* (1885).

DALTON-IN-FURNESS, dąl'ton-ĭn-fûr'nĕs. A market town in Lancashire, England, on the peninsula of Furness, about 4 miles northeast of Barrow-in-Furness (Map: England, C 2). The church of St. Mary, restored, is famous as the burial place of the painter George Romney. A canal about 3 miles long connects the town with the Irish Sea. It has extensive iron mines and iron works. Pop., 1890, 13,300; 1901, 13,020; 1911, 10,763.

DAL'TONISM. See Color Blindness.

DALTON'S LAW. See Gases, General Properties of.

D'ALVIELLA, dăl-vyĕl'lȧ, Count Goblet (1846–). A Belgian legislator and writer, born at Brussels. He served in the Belgian Parliament and as rector of the University of Brussels, and was Hibbert lecturer at Oxford in 1891. As correspondent of the *Independance Belge*, he went to India with Edward VII, then Prince of Wales; later he was Envoy Extraordinary to Constantinople; and for long he was director of the *Revue Belgique;* finally he became Vice President of the Belgian Senate, and professor in the University of Brussels. His publications include: *Sahara and Lapland* (1874); *Inde et Himalaya* (1877; 2d ed., 1880); *Contemporary Evolution of Religious Thought in England, America, and India* (1885); *The Migration of Symbols* (1894); *Ce que l'Inde doit à la Grèce* (1897); *Eleusinia de quelques problêmes relatifs aux mystères d'Eleusis* (1903); *A travers le Far West, souvenirs des Etats-Unis* (1906); *L'Université de Bruxelles pendant son troisième quart de siècle* (1909); *Croyances, Rites, Institutions* (3 vols., 1911).

DALY, Arnold (1875–1927). An American actor, born in Brooklyn, N. Y. He made his first stage appearance in 1892 in *The Jolly Squire.* He became known especially as a producer of the dramas of Bernard Shaw, having brought out that playwright's *Candida* (1903), and *Mrs. Warren's Profession* and *You Never Can Tell* (1904), and having toured with *Arms and the Man, Candida,* and *The Man of Destiny* in 1906. In 1911 he played the part of Bruntschli in *Arms and the Man* at the Criterion Theatre in London. He appeared in *General John Regan* in 1913–14 in New York.

DALY, dȧ'lĕ', César Denis (1811–94). A French architect and writer on architecture, born at Verdun, Meuse. His principal work as an architect is the restoration of the cathedral of St. Cecilia at Albi, for which designs were shown at the Exposition in 1855. But the work upon which his reputation rests is the monumental journal, *Revue générale de l'architecture et des travaux publics* (1840–90). The 45 volumes contain a theoretical and practical library of architecture. Among his other publications are: *Les motifs historiques d'architecture et de sculpture d'ornement* (1874); *L'Architecture funéraire* (1870); *L'Architecture privée au XIXème siècle* (Paris, 1870–77); *Motifs divers de serrurerie* (ib., 1881–82); *Des hautes études d'architecture* (1889).

DA'LY, Charles Patrick (1816–99). An American jurist and geographer, born in New York City. He was admitted to the bar in 1837 and was Chief Justice of the Court of Common Pleas in New York for 27 years, until retired by the age limit in 1868. From its organization in 1864 until his death, Judge Daly was president of the American Geographical Society. Besides his *Historical Sketch of the Judicial Tribunals of New York* (1855), and many legal papers of importance, he wrote: *When Was the Drama Introduced into America?* (1864); *First Settlement of Jews in North America* (1875); *What we Know of Maps and Map-Making before Mercator* (1879); and a *History of Physical Geography.*

DALY, John Augustin (1838–99). An American playwright and theatrical manager. He was born at Plymouth, N. C., and educated at Norfolk, Va., and in the public schools of New York City. He was dramatic critic for the *Sunday Courier* in 1859 and held similar positions on the *Express, Citizen, Sun,* and *Times* for some years. Meanwhile he was producing adaptations of several plays, and in 1867 his first original success, *Under the Gaslight,* was brought out at the New York Theatre. In 1869 he opened in Twenty-Fourth Street the playhouse known as the Fifth Avenue Theatre, which, with such "stars" as Fanny Davenport, Mrs. Scott Siddons, E. L. Davenport, and Clara Morris, quickly became very popular. After the destruction of this theatre by fire and an interval of a few months in another, he opened, in 1874, Daly's Fifth Avenue Theatre, which he managed till 1877. In 1879 he returned, after a year of study in Europe, and opened the house since known as Daly's Theatre on Broadway, near Thirtieth Street, which he controlled until the time of his sudden death in Paris. Mr. Daly had in his company at various times many of the best-known players in America. For years Miss Ada Rehan was his leading actress. Several times he went with his whole company to California, to England, and to Germany and France. In 1893 he leased a theatre in London. He wrote many adaptations from German and French plays, one of his earliest efforts being from Mosenthal's *Deborah* in 1862. In the long list of works which he wrote or adapted are: *Divorce, Pique, Under the Gaslight, The Railroad of Love, Seven-Twenty-Eight, The Great Unknown, Love on Crutches,* and *The Last Word* (1890). Mr. Daly was especially noted for excellence in scenic presentation, and his Shakespearean revivals

have received warm praise both in this country and in England. In 1894 he was presented with the Lætare medal of the University of Notre Dame, Ind. He was a great book lover and made a remarkable collection of plates on biblical subjects, Thackeray, etc., which was sold at auction in the settlement of his estate. Besides his plays and dramatic adaptations, he was the author of *Woffington: A Tribute to the Actress and the Woman* (1888), and various minor articles.

DALY, Joseph Francis (1840–). An American jurist, born at Plymouth, N. C. He studied law in New York City in 1855–62, was admitted to the bar in 1862, and from 1870 to 1890 was a judge of the Court of Common Pleas of New York, of which he in the latter year became Chief Justice. In 1896–98 he was a justice of the State Supreme Court and in 1900 was appointed United States Law Commissioner to Porto Rico.

DALY, Sir Malachy Bowes (1836–1920). A Canadian administrator. He was born at Quebec and was educated at St. Mary's College, Oscott, England. He entered the legal profession and was called to the bar in 1864. In 1878–87 he represented Halifax in the House of Commons in the Conservative interest, and in 1882–86 was Deputy Speaker of the House. In 1890 he was appointed Lieutenant Governor of Nova Scotia, and in 1895 he was appointed for a second term, which expired in 1900. He was knighted the same year. He became known as a prominent Imperialist.

DALY, Thomas Mayne (1852–1911). A Canadian lawyer and statesman. He was born at Stratford, Ontario, was educated at Upper Canada College, and was called to the bar in 1876. He later entered municipal life and was a member of the Stratford city council and public school board; but removed to Manitoba, and in 1887–96 was a Conservative member of the House of Commons. During 1892–96 he was Minister of the Interior in the administrations of Sir John Thompson and Sir Mackenzie Bowell. During his official term he went abroad on a mission in connection with the reorganization of the Canadian immigration system, in behalf of which he carried into effect important reforms. In 1897 he went to Rossland, British Columbia, where he became police commissioner; and he removed afterward to Winnipeg, where he was police magistrate in 1901–08. In 1909–11 he was judge of the juvenile court in that city. He published *The Canadian Spirit of the North-West* (1907). He was an ardent imperial federationist.

DALYELL′, or **DALZELL′,** Thomas (c.1599–1685). A Scottish general, born at Binns, Linlithgowshire. In 1642 he accompanied Gen. Robert Monro in the expedition to Ireland and fought in 1651 at Worcester and in 1654 in the Highland rebellion. Especially excluded by Cromwell from the Act of Grace, he took service under the Czar of Russia and participated as a general against the Turks and Tatars. In 1666 he was appointed by Charles II commander in chief of the forces in Scotland and was particularly commissioned to repress the Covenanters. His defeat of the Covenanting troops at Rullion Green was followed by cruelties which made his name a byword through the countryside. A stubborn Royalist, he did not, says Creichton, "shave his beard since the murder of King Charles I." In 1681 he enrolled the regiment afterward known as the Scots Greys.

DAM, Tinker's. A guard of dough or clay placed by a tinker around a cavity to confine the melted metal until it "sets." It is worthless after use; hence the vernacular expression, "not worth a tinker's dam."

DAMA, dä′mȧ (Lat.). A gazelle (*Gazella dama*) of the Sudan, with short lyrate horns and no dark band on the sides. See Gazelle.

DAMAGES (OF. *damage, domage,* Fr. *dommage,* from Lat. *damnum,* loss). The pecuniary recompense given by a court of law to one who has suffered an invasion of a legal right through the act of another. The right invaded may be one which the plaintiff enjoys in common with other members of society, as, e.g., his right to have his person or property not interfered with; or his right not to be injured through the negligence of others; or it may be a right which he has acquired through entering into a special legal relation with another, as by contract.

But, although the law furnishes a legal remedy for every violation of a legal right, that remedy is not always an action for damages. The entire jurisdiction of the equity tribunals is concerned with remedies of a different order—as injunction, the specific enforcement of contracts, etc.—the remedy of damages being for the most part left to the courts of common law. Furthermore, not even at common law does every invasion of a legal right give rise to an action for damages. The breach of a condition, e.g., is remediable only by action on the part of the one injured restoring both parties to their former condition. Thus, if the condition was attached to a sale of land or goods, its breach enables the injured party to rescind the transaction and place himself *in statu quo,* but not to sue for damages.

Strictly speaking, the term "damages" is not applicable to all cases of a recovery of money for infringement of legal rights, but only to such as call for an estimate or admeasurement by the court or jury of the injury suffered and of the proper compensation to be made therefor. Where the damages are liquidated, i.e., where the amount to be recovered is fixed in advance by agreement of the parties, they are not damages in the technical sense of the term. Thus, an action to recover the amount payable on a bond, or the amount due for goods sold and delivered, or to recover a sum of money paid to the defendant by mistake, is not an action for damages, but an action to recover a debt. But where the amount claimed is not ascertained, as where an injury has been done to a man's character or property, or in the ordinary case of breach of contract, the action will be to recover the damages suffered through the defendant's wrongful act or default. The complaint or declaration of the plaintiff sets forth an estimate of the damages sustained by him, the amount of which will then be conclusively ascertained by the court or jury (usually the latter) upon principles determined by law.

The principles upon which damages are measured by the courts vary according to the nature of the right infringed and sometimes of the act by which it was violated, and are of a most illogical and unsatisfactory character. To a considerable extent they are still influenced by considerations which belong rather to the conditions and feelings of primitive society than to those which now govern the relations of the parties and the administration of justice. In their origin damages were a pecuniary commu-

tation of the right of private vengeance, and were based not on any principle of restitution, but on that of satisfaction to the injured party. It was a long step towards the orderly administration of justice when the victim of a theft was compelled to rest satisfied with four times the value of the thing taken, instead of scourging the thief and selling him into slavery, as was the law of the Twelve Tables. But the damages so awarded were as clearly vindictive in character as was the harsher penalty of the earlier law, and this vindictive element still survives in the modern law of damages. Thus, it is still the law in England and in many of the United States that a tenant who commits willful waste on the premises shall pay thrice the amount of the damage committed, and that a tenant who refuses to quit after due notice shall thereafter pay his landlord double rent. To the same principle is due the doctrine of aggravation of damages, or "vindictive," "retributory," or "exemplary" damages, which permits a recovery in excess of the actual damage suffered in certain cases of breach of promise of marriage, libel, slander, and seduction. There was abundant justification for furnishing this solace to the vindictive feelings of the injured party in an age when it was necessary to buy him off from a more violent vindication of them, but it is submitted that the survival of this barbarous principle into our milder age cannot be justified.

Obviously, the sound principle for the award of damages is that of restitution rather than of satisfaction—the restoring to the injured party of the property of which he has been deprived, or making to him due compensation for the injury sustained by him—and this principle is generally followed by our law in most actions other than those above referred to. It is expressed in the phrase that damages are limited to the loss which the plaintiff has actually sustained. In practice, however, a more restricted rule is followed, the defendant being liable only for such damages as he did in fact contemplate or which are the natural and probable consequences of his acts, whether contemplated by him or not. This rule is equally applicable in cases of contract and of tort and operates to exclude what are called "remote" or merely "consequential" damages. That, under a perfect system, the latter would also be included in an award of damages can hardly be doubted, but the judicial distrust of the jury, by whom, both in England and America, the award is usually made, has induced the courts to adopt the narrower rule.

Damages are also an available remedy in some cases of injury, even where no actual loss has been sustained. It is the violation of a legal right, and not the detriment or loss resulting therefrom, which furnishes the ground for an action for damages. Such an action, accordingly, is the appropriate remedy in the case of a trespass upon land, an unauthorized interference with a watercourse, and the like, although no injury or serious inconvenience to the tenant or riparian proprietor results. The damages to which the plaintiff is entitled in such a case are not "substantial," but "nominal." And, on the other hand, where loss or harm is sustained, but without the violation of a legal right, the damage is irremediable by any legal process. It is *damnum absque injuria.*

For the measure of damages appropriate to the various classes of rights, see the articles in which those rights and the remedies for their infringement are considered. See especially CONTRACT; TORT; QUASI CONTRACT; INJURY; LIQUIDATED DAMAGES. Consult: Holmes, *The Common Law* (Boston, 1881); *Essays on Anglo-Saxon Law* (ib., 1876); Lee, *Historical Jurisprudence* (New York, 1900); Arthur G. Sedgwick, *Elements of Damages* (Boston, 1896); id., *Treatise on the Measure of Damages* (8th ed., New York, 1891); Sutherland, *Treatise on the Law of Damages* (3d ed., Chicago, 1903); Mayne, *Treatise on the Law of Damages* (5th ed., London, 1894); Watson, *Treatise on the Law of Damages for Personal Injuries* (Charlottesville, 1901); Harris, *Treatise on Damages by Corporations* (Rochester, 1894).

DAMAN, dȧ-män′, or Portug. **DAMÃO,** dȧ-moun′. A fortified seaport and district on the west coast of India, belonging to the Portuguese since 1558. The town stands at the mouth of the Daman River, about 100 miles north of Bombay, and has a good harbor (Map: India, B 4). The neighborhood is well stocked with suitable timber for the building and repairing of ships, which largely employ the inhabitants. Though the land is fertile, it has been little cultivated. The principal crops are rice, wheat, cereals, and tobacco. Daman has important deep-sea fisheries and salt works. It also engages in weaving and dyeing and the manufacture of mats and baskets. There is a scarcity of fresh water. The district is an administrative dependency of Goa. Area of district, 169 square miles. Pop. of district 1910, about 70,000.

DAMAN, dä′mȧn (Syrian). An old name for the Syrian hyrax (*Procavia syriaca*), the "coney" of Scripture (Prov. xxx. 24–28, etc.), also called rock rabbit. See HYRAX, and cf. DASSIE.

DAMANHUR, dä′mȧn-hōōr′ (Egypt. *Temaen-Hor,* city of Horus, Lat. *Hermopolis Minor*). A town of Lower Egypt, capital of the Province of Behira (Map: Egypt, C 1). It is situated on the Mahmudieh Canal, and has a cotton gin and considerable commerce in cotton and woolen goods. Pop., 1897, 32,122; 1907, 38,752. Known as Hermopolis Parva, it was the ancient "City of Horus."

DAMÃO. See DAMAN.

DAMAR, or **DHAMAR,** dȧ-mär′. A town of Yemen, Arabia, situated about 63 miles south of Sana, on the route to Mecca (Map: Arabia, with Turkey in Asia, Q 12). It is situated in the centre of an agricultural district and carries on some trade in horses. Pop. about 20,000.

DAMARALAND, dȧ-mä′rȧ-länd. See GERMAN SOUTHWEST AFRICA.

DAMASCENING. See DAMASKEENING.

DAMASCE′NUS, NICOLAÜS. A Greek historian. He lived in the time of Augustus and Herod the Great, at whose court he spent the greater part of his life. His principal work was a universal history in 144 books, of which only fragments remain. He also wrote an autobiography and a history of the education of the Emperor. Fragments of these works, as of the first seven books of his universal history, are preserved in the collections of Constantinus Porphyrogenitus. Nicolaüs was, in philosophy, an adherent of the Peripatetic school and wrote a compendium of Aristotelianism. The historical fragments are edited by Müller, *Fragmenta Historicorum Græcorum,* vol. iii (Paris, 1868–83).

DAMAS′CIUS (Lat., from Gk. Δαμάσκιος, *Damaskios*). A Neoplatonic philosopher of the

sixth century A.D. He was born at Damascus and was the last teacher of Neoplatonism (q.v.) at Athens. When the philosophic schools were closed by Imperial edict of Justinian in 529, he, with Simplicius, Diogenes, Priscian, and others, was forced to go to Persia. Of his writings we possess his book *On First Principles*, a discussion of the nature and attributes of God and of the human soul, a commentary to Aristotle, and an extract from his life of Isidorus of Gaza, preserved by Photius. His *On First Principles* was edited by Ruelle (Paris, 1889). Consult Whittaker, *The Neo-Platonists* (Cambridge, 1901).

DAMAS'CUS (Arab. *Dimishk-esh-Shâm*). The largest city of Syria, Asiatic Turkey, and capital of the vilayet of Syria (Map: Turkey in Asia, G 6). It is situated in a plain at the eastern base of the Anti-Libanus, 53 miles southeast of Beirut. The city, with its beautiful surroundings and its abundant supply of water, has since the earliest times been regarded by the Arabs as the most beautiful spot in the world and is supposed to have served as a model for the paradise described in the Koran. The appearance of Damascus from a distance is impressive, but upon a closer inspection it is, like most Oriental cities, disappointing. It is about 5 miles in circumference and is surrounded by partly ruined walls, pierced by seven gates. The streets, with the exception of the "Straight Street," on which St. Paul is supposed to have lived, are crooked and narrow. The houses are generally built in the Moorish style and not infrequently combine a splendidly decorated interior with a plain and sombre exterior. The walls fronting the street are usually without windows; the courts in the houses of the wealthy residents are adorned with splendid marble fountains, fine trees, and flowers. Damascus derives its water supply, by an excellent system of canals, conduits, and pipes, from the Barada, the Abana of the Old Testament, which traverses the city from west to east and divides the newer portion of the city on the north from the ancient walled city with its sectarian quarters on the south. The surrounding plain is rich in vineyards, orchards, and gardens, being well irrigated by the Barada, which, separating into seven branches, loses itself in marshlands about 18 miles east of the city.

Damascus has over 200 mosques. Of the 71 large mosques, that of the Ommiads is the most important. It is supposed to have been originally a heathen temple converted into a Christian church at the end of the fourth century. It then contained what was believed to be the head of John the Baptist and was named the church of St. John. The site of the church was later acquired by the sixth Ommiad caliph, who erected on it a mosque of fabulous splendor, according to the description of the Arabic writers. After the conquest of Damascus by Timur the mosque was despoiled. It covers a site of 143 × 41½ yards and has the shape of a basilica. It was partially destroyed by fire in 1893, and, though subsequently rebuilt, has lost much of its historical interest. The dome, 120 feet high, is flanked by three minarets, one 250 feet high. Other noteworthy mosques are the Sinânîyeh with its striking green-tiled minaret, and the Tekkîyeh, with its graceful minarets and dome, founded in 1516 on the river bank to the west of the city as a refuge for indigent pilgrims. There are also numerous beautifully ornamented chapels. The chapel of Abraham in the northern suburb of Burzeh, the leper hospital in the house of Naaman, the house of Ananias, the place of St. Paul's conversion near the east gate, and the point where he was lowered from the walls are traditionally sanctified localities. The English cemetery on the southeast contains the grave of Buckle the historian, who died here in 1862.

Damascus was once a famous seat of learning and contained numerous schools in which grammar, theology, and jurisprudence were taught. The higher schools, with a few exceptions, are now closed, and Damascus as a centre of culture has been surpassed by Cairo. Elementary education is provided to some extent by the missionary schools, and a number of higher schools are conducted by the French orders.

The municipal affairs are administered by a council in which Christians as well as Jewish residents are represented. Damascus is the seat of the governor (*vali*) of the vilayet of Syria and of the commander of the Syrian troops. The chief manufactures consist of silver and gold ornaments, stuffs interwoven with silver and gold threads, brass and copper work, and inlaid furniture. The manufacture of the blades for which Damascus was famous has ceased. The commercial importance of the city rests chiefly on the transit trade, which, however, has considerably declined since the construction of the Suez Canal. The bazaars of Damascus are numerous and well kept, but they are generally poorly stocked, and the magnificent khans formerly thronged by merchants are now but indifferently attended. The exports, which amount to about $2,000,000 annually, consist chiefly of wool, hemp, grain, and animal products, grapes, and dried fruit. The imports amount to about 4½ million dollars annually and consist chiefly of textiles, sugar, and rice. Damascus is connected by rail with its port, Beirut, and is the northern terminus of the Damascus-Medina line. It is visited monthly by caravans from Aleppo. The population is variously estimated, a figure often quoted being 154,000; a later estimate is 350,000. About three-fourths of the inhabitants are Mohammedans; Jews number upward of 11,000; and the rest are Christians of various denominations. The United States is represented by a consular agent.

Damascus has been thought to be the oldest city in the world. Its foundation is attributed by Josephus to Uz, the son of Aram. The city was the seat of a kingdom at the time of the Hebrew monarchy. Subjugated by David, according to 2 Sam. viii. 5, 6, and 1 Chron. xviii. 5, it soon regained its independence and even recovered sufficiently to attack the Kingdom of Israel, weakened by internal strife. In the second half of the eighth century B.C. Damascus was conquered by the Assyrians, under Tiglath-pileser III, and its inhabitants were carried away to the land of the conquerors and replaced by colonies from Assyria. After the death of Alexander the Great Damascus became part of the Kingdom of the Seleucidæ. Conquered by Pompey in 64 B.C., it became a dependency of Rome, under which it enjoyed local autonomy and regained a part of its former prosperity. Christianity was early introduced into Damascus (see PAUL), and the city became the seat of a bishopric. In 635 it was taken by the Mohammedans, under whose rule it was for a time (previous to the founding of Bagdad) the residence of the caliphs and was greatly adorned and fortified. After an unsuccessful siege by the Crusaders under Baldwin in 1148, Damascus was

taken by Nureddin in 1154, and, at the death of the latter, passed into the hands of Saladin, who died there in 1193. The victory of Tamerlane over the Egyptians at Damascus in 1401 placed the city in the hands of the Mongol conqueror, who after exacting a large tribute from its residents slaughtered most of them and pillaged and burned the city. It was soon rebuilt and in 1516 was wrested from Egypt by the Turks under Selim I. Retaken by the Egyptians under Ibrahim Pasha in 1832, Damascus remained under the rule of Egypt until 1841, when, together with Syria, it was restored to Turkey. An uprising of the Moslem population in 1860 resulted in the destruction of the Christian quarter and the massacre of about 6000 Christians. Consult: Porter, *Five Years in Damascus* (London, 1870); Macintosh, *Damascus and its People* (ib., 1882); and the article "Damaskos," in Pauly-Wissowa's *Real-Encyclopädie der classischen Altertumswissenschaft* (Stuttgart, 1901).

DAMASCUS BLADE. See DAMASKEENING.

DAM'ASK. A textile with satin, twill, or taffeta figures on satin ground of the same color, the lines of the figures contrasting sharply with the lines of the ground and causing the shifting sheen that marks the appearance of damask as viewed from different angles. In satin damask the figures are in weft satin, the ground in warp satin. Just as tapestry (q.v.) is primarily a wool weave and a weft weave, so damask is primarily a silk weave and a warp weave, the figures of tapestry being formed by the manipulation of the weft on bobbins, the figures of damask by the manipulation of the warp with harness. In damask the weft, being shuttle-thrown the whole width of the warp, is manipulated with difficulty. In tapestry the warp threads, being divided into only two sets—one consisting of the odd threads, the other of the even threads—instead of five or more sets as in damask, permit plain weave only. Damask, then, marks the development of the loom to a point where the warp threads can be freely manipulated to form figures. (See WEAVING.) Most upholstery and drapery silk damasks have the figures in taffeta, giving a bolder contrast than would the finer lines of the weft satin threads. Damasks are also woven in wool, linen, mercerized cotton, and other materials less expensive than silk.

An important class of damasks are those in linen and cotton intended for use as tablecloths and napkins, usually white (the finer grades being woven in the gray and bleached after weaving), but sometimes (especially in the coarse grades and for the cheaper and less civilized peoples) in red or blue. The better grades are made of very fine linen threads woven close, with the warp in eight or more sets, and in patterns that are often most elaborate, picturing architecture and landscapes and human figures, against a comparatively plain or striped ground.

The word "damask" has for generations been so carelessly and incorrectly used that it is still incorrectly defined in almost all books of reference in all languages, and often employed inaccurately in museum labels and catalogues. Perhaps the simplest and most comprehensive, though hardly the clearest, definition would describe damask as *flat-figured satin.*

DAM'ASKEEN'ING, or **DAM'ASCEN'ING.** The art of producing upon ordinary steel certain ornamental appearances resembling those on the famous Damascus blades. Attention was first drawn to this branch of industry by the Crusaders, who brought from Damascus to Europe many articles made of superior steel, such as sword blades and daggers. These were found to possess not only great elasticity, united with considerable hardness, but their surfaces were covered with beautiful designs, formed by a tissue of dark lines on a light ground, or light lines upon a dark ground, and occasionally by the inlaying of gold on the steel-blue ground. In genuine Damascus blades the designs run through the substance of the blade, and the watering, or regular, almost symmetrical, figuring, is not worn off by friction, or even grinding. Imitations of the watering of Damascus steel are produced on common steel by etching with acids; and in this way landscapes, inscriptions, and ornaments and decorations in general, are imprinted on the steel-blue ground. Gold and silver are also inlaid in the higher class of sword blades and other articles. Gun barrels are occasionally subjected to the process of damaskeening.

DAMASTES, dȧ-măs'tēz (Lat., from Gk. Δαμάστης, *Damastēs*), OF SIGEUM. A Greek historian, a contemporary of Herodotus. According to Suidas, he wrote a *History of Greece,* a work on the *Ancestors of Those who Warred Against Troy;* and a *Catalogue of Nations and Towns.* Strabo charges him with ignorance and credulity. Consult Müller's *Fragmenta Historicorum Græcorum* (Paris, 1868–83).

DAM'ASUS. The name of two popes.—DAMASUS I, SAINT (Pope 366–84). A Spaniard by extraction, he was born in Rome about 305. In 355 he was made archdeacon. On his consecration to the episcopal office he was opposed by Ursicinus, who was the choice of a considerable faction, but finally acknowledged by all. His reign was far from peaceful. It was spent in subduing the still numerous Arians in the West, in combating the heresy of Apollinaris, which he caused to be condemned at the Council of Constantinople in 381, and in defending the cause of Paulinus against Meletius. He was a great friend of St. Jerome and was primarily instrumental in inducing him to undertake the revision of the early Latin texts of the Bible, thus producing the version later known as the Vulgate. His works are in Migne, *Patr. Lat.,* xiii. For his life, consult: Rade, *Damasus, Bischof von Rom* (Freiburg, 1882); Wittig, in *Römische Quartalschrift für christliche Alterthumskunde und für Kirchengeschichte,* 14th suppl. Heft (Freiburg, 1902).—DAMASUS II (Pope, for 23 days from July 17, 1048). He was a Bavarian by birth, and Bishop of Brixen, in Tirol, when he was chosen Pope on the nomination of Emperor Henry III. He died in Palestrina, near Rome, Aug. 9, 1048.

DAMBACH, däm'bäg, OTTO (1831–99). A German jurist, born at Querfurt. In 1862 he was appointed Justiciary of the General (now Imperial) Post Office, Berlin. The copyright laws and the postal laws of the Empire were devised chiefly by him. In 1873 he was appointed professor extraordinary of law in the University of Berlin. He wrote: *Fünfzig Gutachten über Nachdruck und Nachbildung* (Leipzig, 1891); *Das Telegrafen-Strafrecht* (2d ed., ib., 1897); *Das Gesetz über das Postwesen des Deutschen Reichs erläutert* (6th ed., ib., 1900).

DAMBUL, dȧm-bo͞ol'. A vast rock temple of the Buddhists in Ceylon, about 40 miles north of Kandy, containing, among a profusion of

carvings, figures of Buddha of extraordinary magnitude.

DAME (OF., Fr. *dame*, from Lat. *domina*, lady, fem. of *dominus*, master, Skt. *damana*, conquering, Lat. *domare*, Gk. *δαμᾶν*, *daman*, Skt. *dam*, to tame; connected with OHG. *zam*, Ger. *zahm*, Icel. *tamr*, AS. *tom*, Eng. *tame*). A title of honor which long distinguished high-born ladies from the wives of citizens and of the commonalty in general. In the age of chivalry it was customary even for a queen to be so called by her chosen knight ("the dame of his heart," of his thoughts, etc.). Hence, too, the Virgin mother was called in France "Notre Dame" ('*our* Lady'), as the mother of the whole human race. From *dame*, with the possessive pronoun *ma* prefixed, arose an ordinary title of honor, answering in modern French to the English "Mrs." A daughter of the King of France was called *Madame* as soon as she came into the world; and this was also the sole title of the wife of the King's eldest brother, who was himself known simply as *Monsieur*. In England the word "dame," though not much used, is now applied to married women of all classes. The word "madam" (or "ma'am") is to-day the informal manner of address used in England for the Queen. A curious local usage at Eton College applies the title "dame" to men as well as to women in charge of the boys' boarding houses.

DAME AUX CAMÉLIAS, dâm ô kà'mâ'lyà', La (Fr., The Lady of the Camellias). A novel by the younger Dumas (1848), dramatized in 1852. It has been translated under the title *Camille*. The heroine is Marguerite Gautier, a courtesan.

DAME BLANCHE, La (Fr., The Lady in White). An opera by Boieldieu (q.v.), first produced in Paris, Dec. 10, 1825; in the United States, May, 1831.

DAMEROW, dä'me-rô, Heinrich Philipp August (1798–1866). A German physician, born in Stettin. He studied medicine at the University of Berlin and became professor extraordinary there in 1830. The following years of his life, with the exception of a few years during which he held office in the Ministry of Public Instruction, he spent at Halle as director of a sanitarium for mental and nervous diseases. He is remembered for the important improvements that he introduced in the treatment of insanity and the management of asylums. His published works include the following: *Ueber die relative Verbindung der Irrenheil- und Pflegeanstalten* (1840); *Sefeloge, eine Wahnsinnsstudie* (1853); *Zur Kretinen- und Idiotenfrage* (1858); *Ueber die Grundlage der Minick und Physiognomik, als freier Beitrag zur Anthropologic und Psychiatrie* (1860). He was also one of the founders of the *Allgemeine Zeitschrift für Psychiatrie*.

DAMES, dä'mĕs, Wilhelm Barnim (1843–98). A German paleontologist, born in Stolpe. He studied at the universities of Breslau and Berlin, and became teacher of paleontology in Berlin (1878), regular professor (1891), and director (1896) of the department of paleontology at the museum there. Several of Dames's publications, especially those on fossil vertebrates, have been of the greatest importance, nearly all of them having appeared in *Paläontologische Abhandlungen*, issued in Berlin from 1883 to 1886, at which date the place of publication was transferred to Jena. Special features of his work are his descriptions of the echinoderms of the Jurassic and Tertiary; a memoir on the Jurassic bird Archæopteryx; various publications on the ganoids of the Mesozoic, together with other shorter memoirs on the philogenetic relations of both the invertebrate and vertebrate fossils of Germany. Consult Frech, "Nekrolog an W. B. Dames," in the *Paläontologische Abhandlungen* (Jena, 1900)

DAME SCHOOLS. See Common Schools.

DAME'S VIOLET, *Hesperis*. A genus of plants of the family Cruciferæ, containing about 20 species, annual and biennial herbaceous plants, natives chiefly of the middle and south of Europe. The common dame's violet, or white rocket (*Hesperis matronalis*), cultivated in America to some extent, is found in Great Britain in hilly pastures, but has perhaps escaped from cultivation. It has an erect branched stem, with ovate-lanceolate leaves, and terminated by numerous large lilac flowers, which are scentless by day but very fragrant at night, on which account it is often cultivated in flower-pots by ladies, from which custom the plant appears to have derived its common name. The night-scented rocket (*Hesperis tristis*) is a favorite flower in Germany, numerous double, hardy, attractive forms of which are well known.

DAMGHAN, däm-gän'. A town of Persia, in the Province of Semna va Damghan, on the south slope of the Elburz Mountains, 45 miles south of Astrabad (Map: Persia, E 3). It is on the highroad from Khorasan to Teheran, at an altitude of 3770 feet. It was a large city, containing 15,000 houses, in the reign of Shah Abbas, and has a ruined mosque, fine wood carvings, and several minarets of the eleventh century. It has a large export trade in nuts, especially of khaghazi, or thin-shelled almonds, and pecans. The extensive ruins of Hecatompylos lie a few miles to the southwest. Pop. (est.), 10,000.

DA'MIA'NA. See Aphrodisiacs.

DAMIANI, dä'mĕ-ä'nĕ, Pietro (1006–72). A saint and doctor (1828) of the Catholic church. He was born in Ravenna in 1006 or 1007 and had a sad boyhood through neglect and cruelty. Feeling the call to the monastic life, he resigned a promising career as teacher and became a hermit at Fonte Avellana, near Perugia, in 1035, became prior in 1043, and did much to reform his monastery and to cure the abuses which had crept in. He also threw himself energetically into reform of the clergy throughout the whole church. To these ends he employed his promotion in 1057 to be Cardinal Bishop of Ostia, and his friendship with successive popes. He also endeavored to effect reforms through the German emperors. His efforts were, however, not always successful, as he could not secure the requisite backing; but he prepared the way for the greater reformer, Gregory VIII. He died at Faenza, Feb. 23, 1072. His works are printed in Migne, *Pat. Lat.*, cxliv, cxlv. His *Liber Gomorrhianus* gives a frightful picture of the corruptions of the time. For his biography, consult L. Guerrier (Orleans, 1881); J. Kleinermann (Steyl, 1882).

DA'MIANISTS, or Angelists. 1. A sect of the sixth century, followers of Damianus, a Monophysite patriarch of Alexandria, who taught that there was only a single substance in the Godhead. 2. A name for the Sisters of St. Clare, a Franciscan order of nuns, which began with the convent of San Damiano, Assisi.

DA'MIA'NUS (Lat., from Gk. Δαμιανός). A celebrated sophist and rhetorician of Ephesus, who lived about 200 A.D. He taught rhetoric at Ephesus and followed the methods of Adrianus and Ælius Aristides, of whom he had been a pupil. Philostratus gives an account of him in his *Lives of the Sophists*.

DAMIANUS. See COSMAS AND DAMIANUS.

DAMIEN DE VEUSTER, dä'myăn' de vē'stâr', JOSEPH (1840–89). A Belgian priest of the Roman Catholic church, better known as Father Damien, a missionary to the leper settlement of Molokai, Hawaii. He was born near Louvain, studied theology at the university there, entered the Society of the Sacred Hearts of Jesus and Mary in 1863, was appointed to the mission to the Hawaiian Islands. In 1873 he was sent, at his own request, to the Molokai settlement established by the Hawaiian government in 1865 for the enforced segregation of lepers and their maintenance at public expense in the villages of Kalaupapa and Kalawao. He found the water supply unfit, the food bad, the people ill-washed, ill-clothed, and ill-housed. He improved these conditions, organized religious worship, established schools, erected a general shop for leper trade, lent his own skilled hand to the building of the church at Kalaupapa, and dug the graves of many of his parishioners. He gradually gathered about him priests, lay brethren, and nuns as associates. In 1884 he perceived in the insensibility of his skin the sign of the approach of the disease and could begin his sermons with the words, "We lepers." He finally succumbed to the concentration of the leprosy in his lungs. His simple, heroic life and death attracted wide notice, and led to agitation by Englishmen of the difficult leper problem in India. Much of his fame is due to Robert Louis Stevenson's *Open Letter to the Reverend Dr. Hyde*, a reply to an attack on Damien by a Presbyterian clergyman. Consult: Stoddard, *The Lepers of Molokai* (Notre Dame, 1885); Father Pamphile, *Life and Letters of Father Damien* (London, 1889), and a biography (1889) by Clifford.

DAMIENS, dä'myăn', ROBERT FRANÇOIS (1715–57). A French fanatic, known for his attempt to assassinate Louis XV. He was born near Arras, in France. Opium and accompanying dementia caused him to crown a life of idleness, mischief, and dishonesty with an attempt to kill the King of France. He himself alleged that it was the conduct of Louis towards the Parlement that drove him to the act; the opponents of the Jesuits sought to implicate them in this crime. On Jan. 5, 1757, as the King was entering his carriage, bound for the Trianon, Damiens stabbed him in the side, but not seriously. All the agencies of slow fire, glowing pincers, and boiling oil were visited upon the poor wretch to make him reveal the names of possible accomplices. He confessed nothing, however. He was torn apart by four strong horses, and his remains were burned and his family was driven from France. Consult d'Heilly, *Le Parlement, la cour, et la ville pendant le procès de Robert-François Damiens* (Paris, 1875).

DAMIETTA, dä'mĭ-ĕt'tà (Ar. *Damyāt*, Copt. *Damiati*, Lat. *Tamiathis*). A town of Lower Egypt, situated on the right bank of the eastern branch of the Nile, about 10 miles above its mouth and 125 miles north-northeast of Cairo by rail (Map: Egypt, C 1). It contains a number of ancient mosques, marble baths, and several bazars. It is the seat of a governor and a Coptic bishop and of a number of European consular representatives. The mouth of the river is closed by a bar which prevents the entrance of large vessels. In former years Damietta was a flourishing manufacturing and commercial centre, with a population of about 80,000. With the opening of the Suez Canal and the rise of Alexandria its commerce declined and its manufacturing industries, with the exception of the weaving of cotton fabrics, have almost wholly disappeared. The exports consist of rice, southern fruits, and fish. Damietta is connected by rail with Cairo and Alexandria and had a population in 1907 of 29,354, including a few foreigners. The existing town was erected about 1260, but prior to that a city of the same name (anciently Tamiathis) stood about 4 miles nearer the sea. It was strongly fortified by the Saracens and formed on that side the bulwark of Egypt against the Crusaders, who, however, succeeded in capturing it in 1219 and 1249. It was razed and rebuilt farther inland, on the site it now occupies, by the Sultan Bibars.

DAMIRON, dà'mē'rôn', JEAN PHILIBERT (1794–1862). A French philosophical writer. He studied under Burnouf, Villemain, and Cousin, lectured on philosophy in various Parisian institutions, and became professor in the Normal School and titular professor at the Sorbonne. He was one of the founders (1824) of the *Globe*, contributed largely to it, and afterward collected his contributions under the title *Essais sur l'histoire de la philosophie en France au XIX siècle* (1828). His most important works are on the history of French philosophy: *Cours complet de philosophie* (1842); *Essai sur l'histoire de la philosophie en France au XVII siècle* (1846); *Mémoires pour servir à l'histoire de la philosophie du XVIII siècle* (1858–64), and an edition of Jouffroy in which he so edited and changed the original text as to stir up a famous controversy, especially with Pierre Leroux.

DAMJANICS, dŏm'yŏ-nĭts, JOHANN (1804–49). A Hungarian revolutionist, of Servian origin. He entered the Austrian army, in which he rose to a captaincy; was received into the councils of Kossuth in 1848, and, at the outbreak of hostilities, organized a battalion, with which he fought bravely against the Servians. In March, 1849, he took Szolnok and was made general. He fought under Görgei and was placed in command of the fortress of Arad. After the disaster of Világos he surrendered to the Russians, by whom he was turned over to Austria. He was condemned to death and with 12 other generals was hanged by Haynau at Arad.

DAM'MAR, or **DAMMAR PINE** (Hind. *dāmar*, pitch, resin), *Agathis*, formerly called *Dammara*. A genus of coniferous trees of the araucarian tribe, distinguished by their broad, lanceolate, leathery leaves, which have numerous nearly parallel veins. The name, originally applied to its resinous product, has been extended to a number of different trees, one of which is the Moluccan dammar (*Agathis orientalis*), which grows on the high mountain ridges of the Molucca Islands. It grows to a great height, attains a diameter of 9 feet, and generally has the lower part of the trunk beset with knots as large as a man's hand. The timber is light and of inferior quality, and the tree is chiefly valuable for its resin, which is soft, transparent,

hardens in a few days, and is then white, with a crystalline appearance. The resin often flows spontaneously from the tree in such quantity that it hangs in masses like icicles of a handbreadth and a foot long. At another period of the year it is yellow and less valued. By incision, especially in the protuberances, of the stem, it is obtained in large pieces. So long as dammar resin is soft it has a strong smell; upon drying this odor is lost. It contains only a trace of volatile oil, but consists of two distinct resins, one of which is soluble in alcohol, the other not. It is light, brittle, and easily friable, readily soluble in oil of turpentine. It is used in Asia for domestic purposes, and in the arts like other resins; it is an article of commerce, and in Europe is employed in various ways to form varnishes, which dry quickly, have a very bright lustre, are colorless, but readily become viscid again, and are not permanent, so that this resin cannot be made a substitute for copal and amber. It is almost completely soluble in benzole and in this solvent makes an excellent colorless varnish for positive photographs on glass. To this genus belongs also *Agathis australis*, the Kauri pine (q.v.) of New Zealand, which produces the resin known as Kauri resin, or Kauri gum. The tree attains a height of 80 to 100 feet and a diameter of 15 feet. The timber is straight-grained and very durable. The Kauri resin is dug in waste places where there were Kauri forests in the past, whence the trees have long since disappeared through fire, etc. This gum is fossilized. *Agathis robusta* is a valuable Queensland tree. The resin known as black dammar is obtained in the Molucca Islands from the trunk of *Protium obtusifolium*, a tree of the family Burseraceæ. It is a semifluid, strong-smelling resin, which becomes black when dry; it is used as pitch, also to yield a kind of turpentine, which is obtained by distillation. *Canarium microcarpum* and *Canarium strictum*, trees of the same family, also natives of the farthest East, yield by incision of the trunk a viscid, odorous, yellowish substance, very similar to balsam of copaiva, which is called damar, or dammar, and is used in naval yards, mixed with a little chalk and the bark of reeds, for calking boats. The resin called white dammar, or piney dammar, in India, often also called copal in India, is the product of *Vateria indica* and related species, large trees of the family Dipterocarpaceæ. It is obtained by wounding the tree, and when fresh is clear, fragrant, and acridly bitter; when dried, it becomes yellow, brittle, and glasslike. It is used in India as a varnish ("piney varnish") which is hard, tenacious, and much esteemed. It is also made into candles in Malabar, which, in burning, diffuse an agreeable fragrance and give a clear light with little smoke. *Shorea robusta*, the Sal (q.v.), so much valued in India as a timber tree, of the same natural order, and some other species of *Shorea*, yield a resin, also known as dammar and as ral and dhoona, which is much used in dockyards in India as pitch. For illustration of *Agathis dammara*, see Plate of DAHLIA, ETC.

DAM'MARA. See KAURI PINE.

DAMMARTIN, dȧ'mär'tăN'. A family of distinguished French architects of the late fourteenth and early fifteenth centuries.—ANDRÉ DAMMARTIN was architect of the Chartreuse, near Dijon (1383), in the service of the Duke of Burgundy.—GUI DAMMARTIN was architect of the Duke de Berri. Both were engaged on the Old Louvre and died about 1400.—JEAN DAMMARTIN was employed (1421–32) in the construction of the great cathedrals of Le Mans and Tours, completing the north transept of the former and the nave of the latter of these cathedrals.

DAMNATION DE FAUST, dȧ'nȧ'syôN' de fôst, LA (Fr., The Damnation of Faust). The title of a symphony cantata by Berlioz, first produced in Paris, Dec. 6, 1846; in the United States in 1880 (New York).

DAMOCLES, dăm'ô-klēz (Lat., from Gk. Δαμοκλῆς, *Damoklēs*). A courtier and sycophant of the elder Dionysius, the tyrant of Syracuse. When Damocles lauded the lot of royalty, Dionysius, to set him right, invited him to a luxurious banquet. On looking upward, he saw a keen-edged sword suspended over his head by a single hair, and at once changed his views concerning the happiness of kings. Consult Horace, *Odes*, iii, 1, 17 ff.

DAM'ODAR. A river of India, rising in Ramgarh, in Bengal, and, after a generally southeasterly course of 350 miles, entering the Hooghly from the right, below Calcutta (Map: India, E 4), draining an area of 248 square miles. The valley of the Damodar, traversed by the East Indian Railway, abounds in coal and iron. It is navigable from the mouth of its chief tributary, the Barakhar, which flows into it from the north. It is the sacred river of the Santals of Hazaribagh.

DÄMON, DER. An opera by Rubinstein (q.v.), first produced in St. Petersburg, Jan. 25, 1875.

DAMON, ISAAC (?1780–?1840). An American architect of the early nineteenth century, a pupil of Ithiel Town (q.v.), and the designer of many churches, houses, and public buildings in Springfield, Northampton, Lenox, and other Massachusetts towns.

DA'MON AND PHIL'LIDA. A mock pastoral in dramatic form by Cibber (1729), published anonymously.

DAMON (Lat., from Gk. Δάμων) **AND PHIN'TIAS** (Lat., from Gk. Φιντίας), less correctly PYTHIAS. Two Pythagoreans of Syracuse, models of faithful friendship. When Phintias was condemned to death by Dionysius, the Tyrant of Syracuse, he begged to be allowed to go home, to arrange his affairs, and Damon pledged his own life for the reappearance of his friend. Dionysius consented, and Phintias returned just in time to save Damon from death. The tyrant pardoned Phintias, and desired to be admitted to fellowship with the friends. Consult: Plutarch, *De Amicitia;* Valerius Maximus, iv, 7; Cicero, *De Officiis*, iii, § 45.

DAM'OPHON (Lat., from Gk. Δαμοφῶν). A brilliant, erratic Greek sculptor of Messene, whose works, statues of gods in temples, were found chiefly at Messene, Megalopolis, and Lycosura. He was skilled enough in chryselephantine technique to be called upon to repair the statue of Zeus by Phidias at Olympia. His date is uncertain. Frazer, in his *Pausanias*, iv, 372–379, puts him in the fourth century B.C. Dickins, *Annual of the British School at Athens*, xii, xiii, assigns him to the second century B.C.; so too Ida C. Thallon, "The Date of Damophon of Messene," in *The American Journal of Archæology*, 2d series, x (1906). For a good account of Damophon's work, consult **E. A.**

Gardner, *A Handbook of Greek Sculpture* (London, 1911).

DAMOX'ENUS (Lat., from Gk. Δαμόξενος). An Athenian comic poet. Two of his plays, *The Foster-Brothers* (Σύντροφοι) and *The Self-Tormentor* (Ἑαυτὸν Πενθῶν), are mentioned by Suidas and by Athenæus, who quotes a long passage from the former and a few lines from the latter work. Consult Meineke's *Fragmenta Comicorum Historicorum*, vol. iv (1839–57).

DAMP'ER. 1. A door or valve which, by sliding, rising and falling, turning on a hinge, or otherwise, diminishes the aperture of a chimney or air flue; this lessens the quantity of air that can pass through a furnace or other fire and thus "damps" or checks the combustion. The damper of a pianoforte is that part of the mechanism which, after a key is struck, and the finger is lifted up from the key, immediately checks or stops the vibration of the string. It consists of a second hammer, which, on the rising of the key, strikes the string and remains upon it instead of bounding off as the sounding hammer does. 2. Damper is also the name given in Australia to a simple kind of unleavened bread formed of wheat flour. It is made while traveling in the bush and baked among the ashes of a fire.

DAMPIER, dăm'pēr, William (1652–1715). An English freebooter and explorer. He early went to sea with a party of buccaneers, crossed the Isthmus of Panama in 1679, and embarked on the Pacific with a considerable force in canoes and similar small craft, and captured several Spanish vessels, in which he cruised along the coast of Spanish America, waging war on Spanish subjects. In 1684 he engaged in another buccaneering expedition with Captain Cook, in which he coasted along the shores of Chile, Peru, and Mexico. After Cook's death he sailed with Captain Swan to the East Indies, touching at Australia and stopping six months in the Philippine Islands. In desperation Dampier and the majority of the crew left Swan and 36 others marooned in the islands where they might continue their orgies. In 1688 Dampier was himself marooned at his own request in the Nicobars. After great hardships he was again in England in 1691, where in 1697 he published an interesting account of the expedition, entitled *A New Voyage Round the World.* He was afterward (1699) deputed by the government to conduct a voyage of discovery to the South Seas, during which he explored the west and northwest coasts of Australia and the coasts of New Guinea, New Britain, and New Ireland, giving his name to the Dampier Archipelago and the Dampier Strait. In 1703–07 he made his third, and in 1708–11 his fourth, trip around the world, the last time as pilot of the privateer *Duke*, which returned with specie and merchandise to the value of nearly £200,000. He also published: *A Discourse of Winds* (1699); *A Vindication of the Voyage to the South Sea in the Ship St. George* (1707); *Voyages to the Bay of Campeachy* (1729).

DAMPIER ARCHIPELAGO. A group of high rocky islands, extending about 40 miles east-northeast and west-southwest, off the northwest coast of Australia, between lat. 20° and 21° S. and long. 116° and 117° E. (Map: Western Australia, C 5). Rosemary, the outer island of the group, is distant 12 miles from the mainland.

DAMPIERRE, dăn'pyâr', Auguste Henri Marie Picot, Marquis de (1756–93). A French general. He was born in Paris and entered the military service at the age of 16. After the battle of Valmy (Sept. 20, 1792) he was made general of division, and he contributed largely to the victory of Jemappes (November 6). He was in command of the centre at Neerwinden (March 18, 1793), where he stood his ground until the retreat of the left wing of the army. After the defection of Dumouriez to the Austrian ranks he assumed supreme command. He was mortally wounded, May 8, 1793, while leading the attack on the intrenchments of the Allies near the city of Condé.

DAMPIER STRAIT. 1. A strait, 35 miles wide, separating the island of Waigiu from western New Guinea (Map: East Indies, H 5). It offers one of the safest channels from the Indian to the Pacific Ocean. 2. A strait separating New Pomerania from Rook Island, east of New Guinea (Map: East Indies, J 2).

DAMPING OFF. A fungus disease of plants induced by an excess of moisture in the soil and atmosphere. Young seedlings in hothouses and hotbeds are particularly liable to it. Although the cause is sufficiently obvious, prevention is not always easy; not only because some plants are very sensitive to moisture, but also because the necessity of keeping sashes closed on account of temperature often stands in the way of the ventilation which would otherwise be desirable, and it is when a moist atmosphere stagnates around them, and the temperature is not very low, that plants are most liable to damp off.

The excessive moisture of soil and atmosphere gives the proper conditions for the development of the fungus *Pythium debaryanum*, which is the most common cause of damping off. It is a soil fungus that lives on decaying vegetation until the conditions are right for attacking seedlings. If examined, the seedlings will be seen to show weak, thin spots near the surface of the soil, and on account of this weakening the plant falls over and dies. The disease spreads with great rapidity in the seed bed, so that in a few days all the plants may be reduced to a rotten mass. This fungus attacks many kinds of plants in the open ground, among which are mustard, cress, spurry, maize, clover, lettuce, eggplant, peppers, cucumbers, melons, and forest-tree seedlings. Drying or freezing does not destroy the fungus or its spores. The best precautionary measures are to avoid infested soil, sow thinly, ventilate freely, shade little, water sparingly, and burn all diseased plants.

Damping off is also caused by species of *Rhizoctonia*, *Sclerotinia*, *Phoma*, *Phytophthora*, etc., the general symptoms and conditions applying to all.

DAMROSCH, dăm'rŏsh, Frank Heino (1859–). A prominent American musician, son of Leopold Damrosch. He was born in Breslau, where he received his musical instruction from Pruckner and Vogt. In 1871 he came to New York and continued to study with Von Inten and his father. From 1885 to 1891 he was chorus master of the Metropolitan Opera House. In 1892 he organized the People's Singing Classes in New York. (See Choral Societies.) In 1893 he established the Musical Art Society, and in 1898 the Symphony Concerts for Young People. In 1898 he also succeeded his brother Walter as conductor of the Oratorio Society, which he directed until 1912. In 1897–1905 he was director of music in the public schools of New York, which position he resigned to become

the director of the newly established Institute of Musical Art.

DAMROSCH, Leopold (1832–85). A German-American musician, violinist, composer, and conductor, born in Posen, Prussia, Oct. 22, 1832. His parents chose the profession of medicine for him, and after graduating at the University of Berlin he returned to Posen to practice; but his passionate love of music, which he had continued to study incidentally, prevailed, and in 1854 he abandoned medicine for the study of counterpoint and composition under Hubert, Ries, and Dehn. In 1855 he started out as a concert violinist in Magdeburg, became acquainted with Liszt, and under his influence began to write for the *Neue Zeitschrift für Musik.* He was director in Posen and in Breslau, and in 1871 came to New York as director of the Arion Society. The credit of firmly establishing choral organizations in New York belongs entirely to Damrosch. He founded the Oratorio Society (1873) and the Symphony Society (1877) and organized several large musical festivals. All these played a most important part in the musical life of New York City. But the most brilliant achievement of his life was the successful establishment, in 1884, of German opera in New York City, at the Metropolitan Opera House, notwithstanding the obvious difficulties of the undertaking. Among the operas given, *Fidelio, Tannhäuser, Lohengrin,* and *Die Walküre* were the most important as comparative novelties. He died in New York, Feb. 15, 1885, and imposing funeral services were held in the Opera House. His works comprise several cantatas, a festival overture, violin works (including a concerto in D m.), and songs.

DAMROSCH, Walter Johannes (1862–). An American musician, son of Leopold Damrosch, born in Breslau, Prussia, Jan. 30, 1862. Even before he came to the United States, in 1871, he had studied piano and harmony with his father and F. Draeseke. In New York he continued his studies with Von Inten, Boekelmann, and Pinner. He was made conductor of the Harmonic Society of Newark, N. J., in 1881, and organist of Plymouth Church, Brooklyn, in 1884. In 1885 he succeeded his father as conductor of the Oratorio and Symphony societies, and became assistant conductor of German opera at the Metropolitan Opera House, New York. In 1894 he organized the Damrosch Opera Company, which he directed for five seasons, giving German opera, chiefly Wagner, in the principal cities of the United States. For two seasons (1900–02) he conducted the German operas at the Metropolitan Opera House. For the season of 1902–03 he was the conductor of the Philharmonic Society. In 1903 he completely reorganized the New York Symphony Society as a permanent orchestra. He wrote two operas, *The Scarlet Letter,* produced in 1896 in Boston by his own company, and *Cyrano de Bergerac,* produced at the Metropolitan Opera House in 1913; also a *Manila Te Deum* (1898), a sonata for violin and piano, and a number of songs. In 1914 Columbia University conferred on him the degree of Doctor of Music.

DAMS AND RESERVOIRS. A dam is a barrier built across a stream or across a valley or other depression, to raise the level of water or to retain or store water for the supply of cities, towns, or villages, for irrigation, hydraulic mining, power, navigation, or manufacturing purposes. A reservoir is a basin or other receptacle used for receiving, storing, or distributing water. Reservoirs are often, but by no means always, formed by a dam connecting the banks of a stream or the sloping sides of a valley, canyon, or some more basin-like depression.

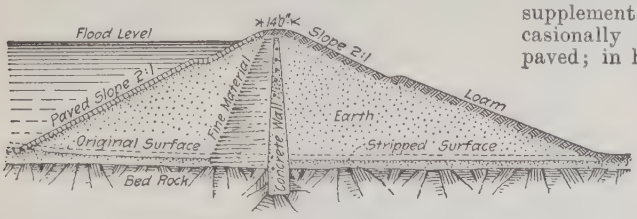
DAMS

Where earth could not be used, the choice of materials until about the close of the nineteenth century was between timber, timber and loose stone, and some kind of masonry or, rarely, steel. Since then many dams of concrete masonry reinforced by steel have been erected. Of course the greatest care must be taken to provide against dam failures, for which there are the following common causes: (1) by sliding on the base or on some horizontal joint; (2) by overturning; (3) by fracture due to tension; (4) by crushing, in the case of masonry dams; (5) by erosion, in the case of earth, or, though rarely, by breaking up and washing away, from the top downward, in the case of masonry structures. After a good site has been chosen and the utmost care devoted to the construction of the foundations and the supervision of the material and workmanship, the chief factor of safety in dam construction is obtained by placing a sufficient volume and weight of material in the dam itself to withstand the pressure upon it. This pressure is directly proportioned to the height of water behind the dam and not to the total volume, as is sometimes supposed. In well-designed earth dams the cross section is so great, for other reasons, as to give a weight far in excess of that which could be removed by the pressure of the retained water. But in masonry dams the cross section may be proportioned to resist the pressure with mathematical nicety, allowing, of course, the factor of safety common to all good engineering work.

A most essential feature in the design of dams of all classes is ample provision for passing waste or flood water. Otherwise the increased pressure against the up-stream face of the dam due to the excessively high water in the reservoir, or else the force of the current in passing over the top of the dam, may cause a serious rupture. In overfall dams relief may be obtained, in some cases, by providing floodgates at one end of the structure, either connected with or detached from the main dam; by having a crest to the whole dam which can be dropped in time of floods (see *movable dams,* below); or, in connection with one or both of the foregoing precautions, there may be an artificial overflow or waste channel leading from a spillway above or at one side of the dam down to the natural channel of the stream some distance below. Such a spillway and overflow channel are essential to all earth dams. It should also be noted that waste gates, or under sluices, are sometimes provided beneath the crest of masonry dams, particularly in India. These may be placed near the bottom of the reservoir to permit washing out deposits of silt. Where no other means are feasible, waste water may be carried to a point below the dam through a tunnel cut in the solid rock at one side and beyond the structure itself.

Earth Dams are usually formed by depositing the natural soil from the vicinity of the site in thin successive layers and carefully rolling or otherwise rendering compact each layer before another is added. Water is sometimes applied to the earth to help compact it. Soil

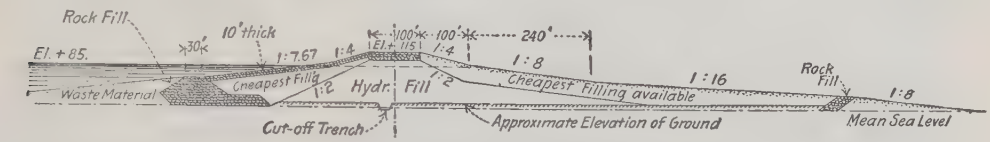
that will compact readily and be as little porous as possible should be selected, but it is difficult and generally impracticable to make earth dams



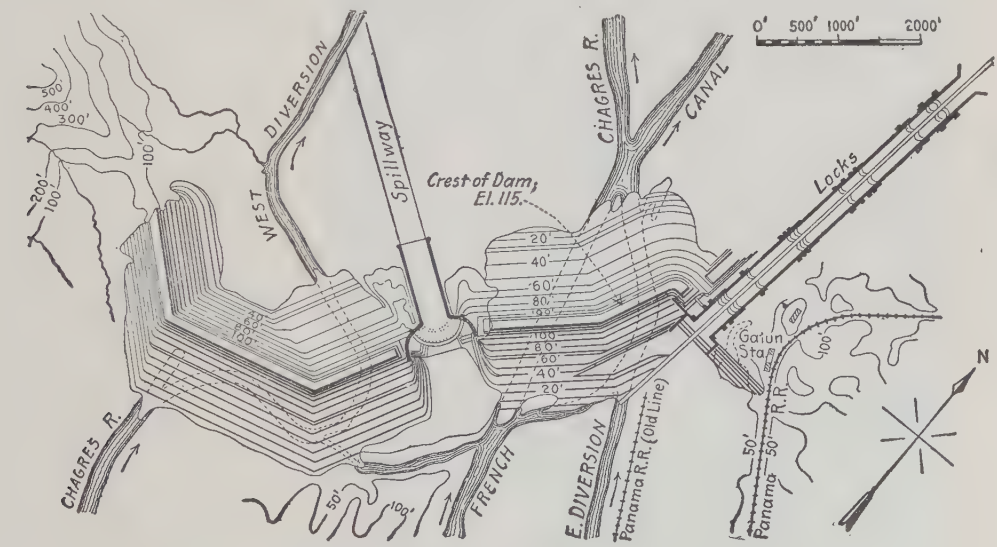
CROSS SECTION OF EARTH DAM,
with concrete heart wall and upper slope paved; Metropolitan Water Works, Southboro, Mass.

impervious to water. Since continuous percolation through an earth dam would lead to its ruin, it is customary, where an attempt is not made to secure imperviousness through the whole structure, to place a water-tight barrier either on the upper face of the dam or at its center. The former is known as a lining and the latter as a heart or core wall. Both a lining and a heart wall may be used. Heart walls may be composed of a carefully selected mixture of clay and loam or sand, called puddle; of concrete, or of stone masonry plastered with cement. One of the advantages of the heart wall is that it can be carried well into the bed and banks of the valley, beneath and beyond the main part of the dam, which is a great safeguard against leaks between the natural ground and the artificial structure. Whether or not the upper face of the dam is lined to prevent leakage, it must be paved with stone, concrete, or brick to prevent damage to the earth slope by the action of the waves at the water level, which latter varies with the fullness or depletion of the reservoir.

Where a water lining is desired, puddle is generally employed, often with concrete or masonry above it. Asphalt has sometimes been used to supplement concrete, brick, or stone lining. Occasionally the lower slope of earth dams is paved; in high dams it is frequently built with a level place, or *berm*, part way up its height. Water is rarely allowed to come within 5 feet of the top of earth dams or reservoir embankments, and it may be kept even lower. The minimum advisable thickness of the base will increase with the height of the dam and the gentleness of the slopes. The angle of repose, or natural slope, of ordinary earth, dumped in banks, gives a base of 1½ feet to 1 foot of height, but wet earth has a less angle of repose. It is common, therefore, to give dams of ordinary earth a slope of 2 to 1 on the lower or dry face, and 2½ or 3 to 1 on the wet face, and even these figures may be exceeded. Some earth dams are backed with loose stone or rock, to give greater stability. In some cases the material composing earth dams is brought into place by means of flowing water, instead of by carts, scrapers, or buckets running on and dumped from a cableway. *Hydraulic-fill dams* is the name applied to this rather novel class of structures, which are being increasingly used. Earth dams vary in height from a few feet to 100 feet or more, and in length from a few score to thousands of feet, or even to miles, although most of the structures running into miles are more properly called reservoir embankments.



SECTION OF GATUN DAM.



PLAN OF GATUN DAM.

The Gatun Dam across the Chagres River on the line of the Panama Canal (q.v.) was constructed in large part by the hydraulic-fill method. Its earth portion is about 115 feet

high and about 1½ miles long, separated into two parts by a spillway channel and dam. The earth portion of the dam has its base at about sea level. Here the dam is 2019 feet thick. At the normal water line, 85 feet higher, the dam is 390 feet thick, and at the top its thickness is 100 feet. The purpose of these unusual dimensions and of the very flat slopes of 4 to 1 above and from 7.67 to 16 to 1 below the water level is to provide stability. The dam contains about 21,000,000 cubic yards of material, including the rock fill in each toe and on the upstream slope and the top. Only the center of the dam was built by the hydraulic-fill process. This portion is 1200 feet thick at the base and was confined by rock-fill toes built lengthwise of the dam. As the hydraulic fill was pumped into place, the dry fill was carried higher and higher, confining the hydraulic fill. To carry the immense flood flows of the Chagres River, a spillway or overflow concrete dam was built, about midway in the length of the earth dam, advantage being taken of rising ground at this point. Where closed by the spillway dam, the spillway channel is 819 feet wide. The spillway dam is curved upstream and has a crest length of 808 feet and a maximum height of 67 feet above rock at the downstream toe. Thirteen piers and two abutments, carried to an elevation of 115.5 feet, or 113.5 above the lowest point just named, divide the spillway into 14 bays, each 40 feet wide, giving a total waterway of 630 feet. The spillway crest is 16 feet below normal lake level. A Stoney gate, 19 feet high and 47⅓ feet wide, closes each bay. The level of the lake will be controlled by opening one or more of these gates. Assuming a lake elevation of 92 feet, the danger line, the spillway would pass 222,000 cubic feet per second, as compared with an estimated momentary flood discharge of 182,000 cubic feet per second. In addition the Gatun locks have a provision for flood discharge.

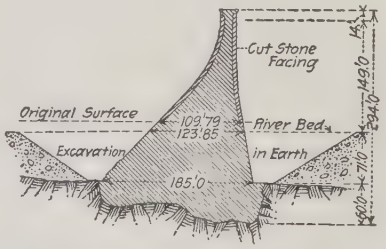
A notable group of earth dams were the five retarding dams in the flood protection project of the Miami Conservancy in Ohio. The Germantown Dam 110 feet high and the Englewood Dam, were pierced by outlets of concrete masonry at the bottom, while the dams at Taylorsville, Huffmann, and Lockington were supplied with concrete notches in the embankment.

The highest earth dam in 1922 was that of the Spring Valley Water Co., of San Francisco forming the Calaveras Reservoir. It was designed for a total height of 253 feet with a crest length of 1300 feet and a base width of 1300 feet, and a top width of 25 feet. The upstream slope is 3.1, and the downstream slope 2½.1. When it was first built to 85 feet height it stored 8,000,000,000 gallons, an amount increased to 43,000,000,000 when raised to 175 feet, and 53,000,000,000 at full height. An accident occurred in 1918 causing part of the dam to slide out and by 1922 it was not carried beyond 70 feet below the design of the crest height.

Earth dams or earth embankments for reservoirs are among the oldest of engineering structures, having been built for irrigation thousands of years ago, in Egypt, India, and other Oriental countries.

Masonry Dams, particularly of notable size, are of comparatively recent origin, their construction having awaited the development of modern engineering. Moreover, while masonry dams of great height date from the sixteenth century, it was only during the last half of the nineteenth century that their design accorded with the great principle of engineering—maximum strength with a minimum of material and cost. The accompanying table, taken from Wegmann, *The Design and Construction of Dams* (6th ed., New York, 1911), gives particulars of a number of masonry dams over 100 feet in height located in various parts of the world, and is supplemented by a summary of more recent structures of this type of notable height.

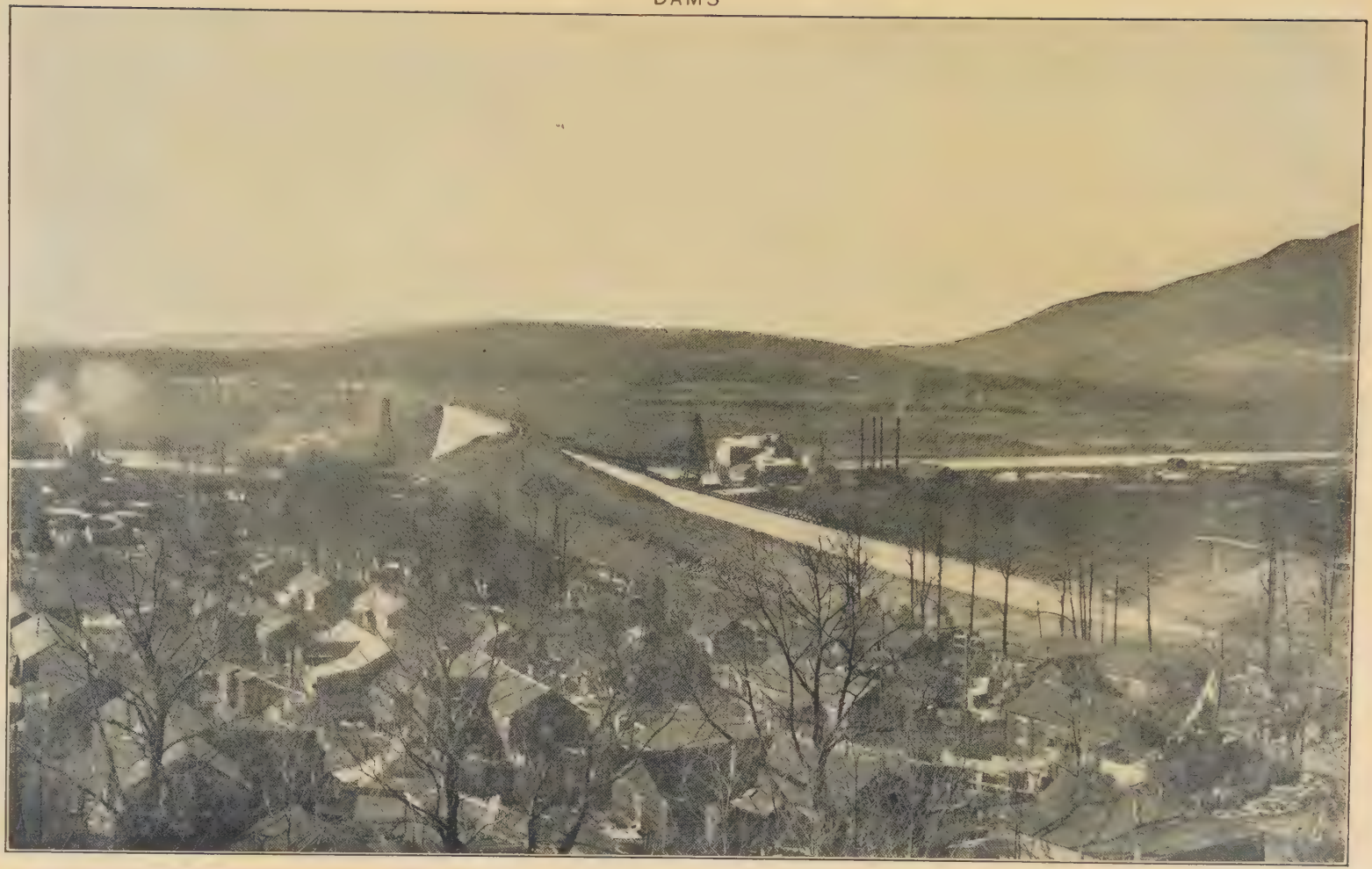
Masonry dams are designed as though they were monolithic structures, and for this reason, as well as because of the fact that the pressure



CROSS SECTION OF A MASONRY DAM.
(New Croton Dam for New York City Water Works.)

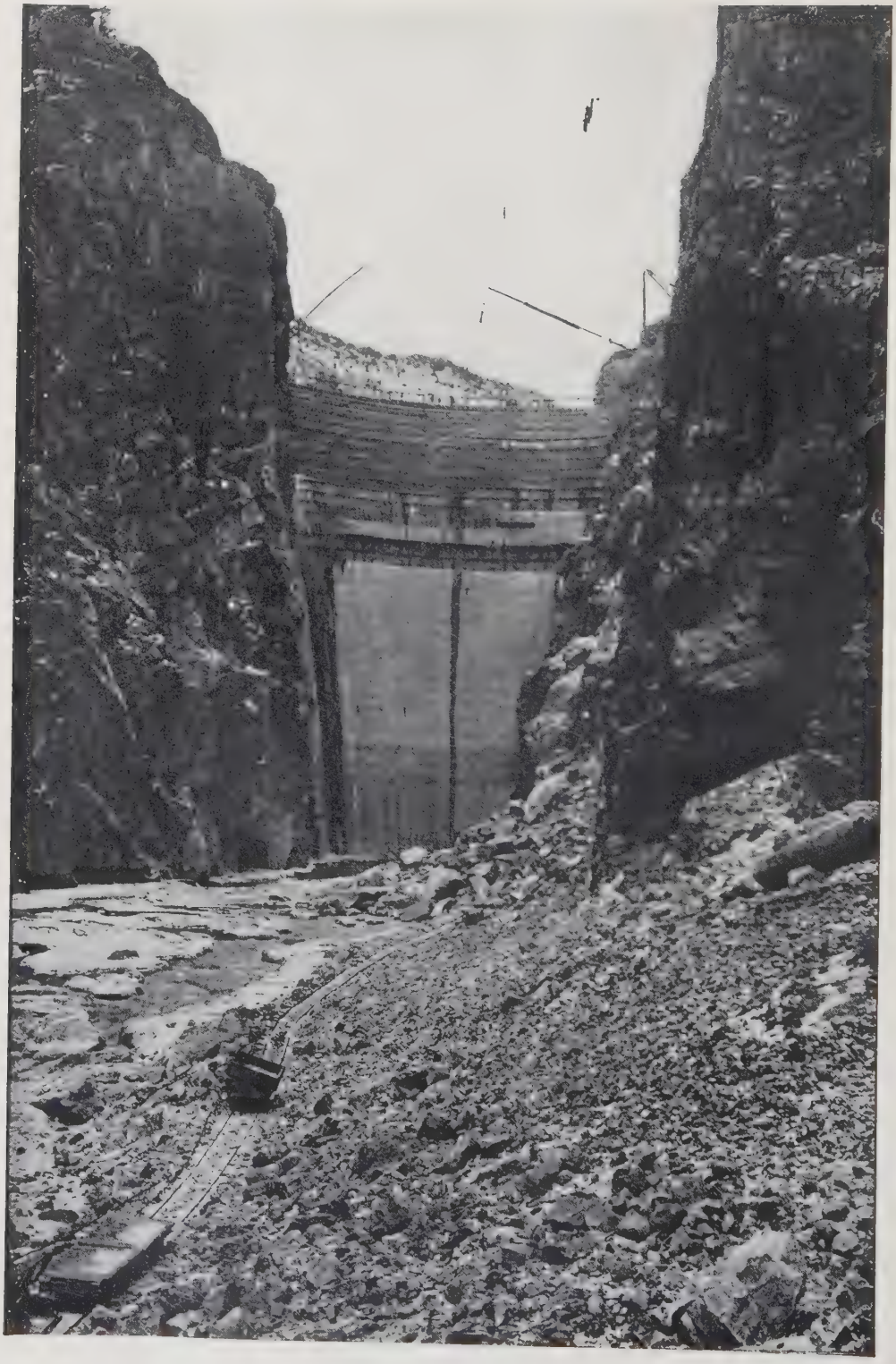
against the face of the dam tends to rupture it both vertically and horizontally, the blocks of stone are not laid in regular courses. Portland cement mortar is used to bind the stones in one homogeneous mass, or the dam may be composed of irregularly shaped masses of stone with the intervening spaces filled with concrete, or it may be made of concrete alone. (See CONCRETE.) Overturning is guarded against by giving the structure such a cross section that the lines of pressure will be thrown within the center third of the dam. To provide against crushing, a material with high resistance to such action is selected, and the structure is so proportioned that its own weight will not crush the material in its lower part. As a general rule, the pressure should never exceed 15 tons per square foot, and with some materials it may need to be as low as six tons. Obviously the only way to prevent excessive or crushing pressures at the bottom of very high dams is to diminish the thickness as the height increases. The action of ice and of the actual or possible current of overflowing water renders it necessary to make the top of the dam thicker than would be required to resist water pressure alone; otherwise the dam might be tapered to a knife edge at the top. The common type of cross section for high masonry dams approaches a right-angled triangle, with the perpendicular side upstream, but it varies from a real triangle in having both sides curved somewhat, particularly so as to give a broader base, and in having the extreme upper part built with nearly parallel sides, while the top is flat, or perhaps more or less rounded. While some of the early dams were quite bold in cross section, most of them were far otherwise.

Up to the time of its completion, in 1907, the highest masonry dam in the world was the New Croton Dam, built in connection with the New York City water supply to secure an increased storage reservoir capacity of about 32,000,000,000 gallons of water. It is located on the Croton River about 3¼ miles from its junction with the Hudson River and has a maximum height of 297 feet and a crest length of 2168 feet. The



THE OLIVE BRIDGE DAM OF THE CATSKILL WATER SUPPLY, NEW YORK, FORMING THE ASHOKAN RESERVOIR

THE PHOTOGRAPH, FROM LEFT TO RIGHT, SHOWS THE CONSTRUCTION CAMPS, THE OLIVE BRIDGE DAM WITH COMPLETED SOUTH WING AND MASONRY PORTION, THE COMPLETED CORE WALL OF THE NORTH WING, THE MAIN MIXING PLANT, AND THE SURFACE OF WATER IN THE WEST BASIN OF THE RESERVOIR



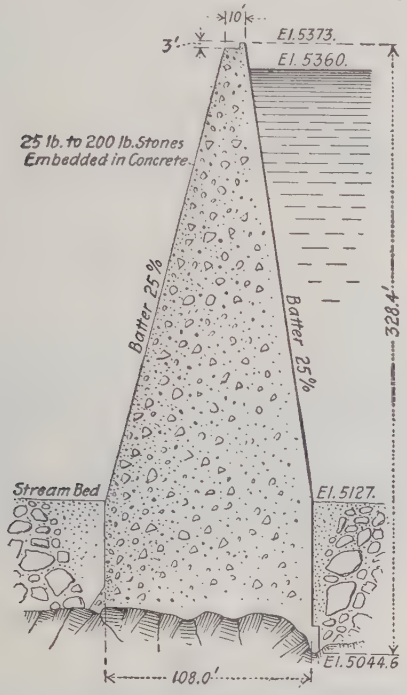
SHOSHONE DAM

HEIGHT 328 FEET

COMPLETED JANUARY 20, 1910

spillway is at one end of the dam and has a channel 1000 feet long, 50 feet wide at its upper end, and 125 feet wide where it meets the top of the dam. There is a roadway on top of the dam, and a bridge spans the spillway.

The Shoshone Dam, in Wyoming, has a maximum height of 328.4 feet above the lowest point in the foundation. The dam was built by the



SECTION OF SHOSHONE DAM.

United States Reclamation Service in 1905–10 and forms a 148,500,000,000 gallon reservoir to store water for irrigation. It was built across the Shoshone River, near Cody, Wyo., in a deep narrow canyon. It is curved upstream in plan, with a radius of 150 feet for the center line of the crest. The dam is only 10 feet thick at the crest, 108 feet thick at the river bed, and the same thickness from there to the foundation. Other high-curved masonry dams built by the United States Reclamation Service are the Roosevelt, in Arizona, 284 feet in maximum height, storing 420,000,000,000 gallons, built in 1905–11; and the Pathfinder, in Wyoming, 190 feet high, storing 326,700,000,000 gallons, built in 1905–10.

The Arrowrock Dam, near Boise, Idaho, also built by the United States Reclamation Service, put under construction about 1910, and finished 1916, has a height of 354 feet to the top of the parapet wall, and it is 1060 feet long on the crest. It is curved upstream, but is of gravity section. It was built of concrete, with large stones imbedded in the concrete. Another high masonry dam constructed by the United States Reclamation Service was the Elephant Butte Dam, across the Rio Grande, near El Paso, Tex. This dam, finished in 1916, has a maximum height of about 275 feet and a crest length of about 1200 feet.

The Hetch Hetchy Dam across the Tuolumne River, California, 150 miles east of San Francisco was begun in 1920. See AQUEDUCTS. This is a straight cyclopean masonry gravity dam 600 feet long and about 340 feet high with a siphon spillway. It has a height above stream level of 212 feet and to the depth of the foundation of 344 feet. It closes the river so as to form a reservoir.

The highest curved dam in the world and the highest dam in Europe in 1922 was the Camarasa Dam, crossing the Pallaresa River in Spain. It is 334.66 feet in height. The San Antonio Dam across the same river is 269 feet high. It has cut off walls at both faces and the length on the crest is 666 feet.

The Olive Bridge Dam, forming the Ashokon Reservoir of the Catskill Water Supply, New York City, was completed in 1914. Its central masonry portion, about 1000 feet long, is 252 feet high above bedrock and is flanked by earth portions 3660 feet long. The Kensico Dam, near the lower end of the Catskill Aqueduct, was completed in 1916. It is straight in plan with a crest length of 1843 feet, a top width of 28 feet, and a maximum width at foundation of 235 feet. The maximum height above foundation is 307 feet. It is built of cyclopean concrete with the same profile as the Olive Bridge Dam. In 1921 construction was begun on the Gilboa Dam, another important dam in the Catskill water supply across Schoharie Creek, consisting of a masonry overflow weir about 1300 feet long with a maximum height of about 160 feet continuing from its crest end with an earth portion with masonry core wall and heavy rock paving on the upstream slope.

The Keokuk Dam across the Mississippi River between Keokuk, Iowa, and Hamilton, Ill., completed for power purposes in 1913, is a relatively low concrete dam of great length. From the east, or Illinois, shore the spillway portion of the dam extends 4278 feet towards the Iowa shore, then changes to an abutment 290 feet long, then turns downstream in the form of a power house 1700 feet long and finally turns and continues to the shore as a lock dam, perhaps 500 to 700 feet long, at the lower end of the forebay. The spillway portion of the dam is 53 feet high above the river bed and 29 feet high on top. Above the crest stop planks of I-beams and steel plate, raised and lowered from above, extend to a height of 11 feet. The masonry raises the normal water level about 24 feet and the stop planks 11 feet more, or 35 feet in all.

The Wilson Dam at Muscle Shoals (q.v.) across the Tennessee River, Ala., was designed as a part of the power and navigation development undertaken in 1918. It is a straight concrete masonry structure about 80 feet in height from the river bed to pool level and 4111 feet long. At the north end there is a flight of locks 60 feet wide and 350 feet available length while the power house was placed over a section 1221 feet long. See MUSCLE SHOALS.

The Assuan Dam across the Nile, in Egypt, is notable because of its association with that great river and with irrigation in Egypt, as well as for its great length of 6200 feet, and for being designed to permit so mighty a stream as the Nile to pass through it. The dam was originally built to a height of about 96 feet in 1898–1902 and was raised to a height of 112 feet above bedrock in 1907–11. The increase of 16.4 feet in height raised the water level 22.96 feet above that of the original dam, due to changes in the level-regulating works. At the new height the level of the water in the river is affected for a distance of about 180

HIGH MASONRY DAMS OF THE WORLD (FROM WEGMANN'S "DAMS")

	Dam	Location	Date of construction	Depth of water	Height above bedrock	Width		Length on crest	Plan
						Top	Base		
1	Alicante	Spain	1579–94	127	135	65.6	110.6	190	Curved
2	Puentes *	"	1785–91	154	164	35.7	144.3	925	Polygonal
3	Val de Infierno	"	1785–91	...	116	41.1	137.0	330	"
4	Zola	France	About 1843	120	123	19.0	41.8	205	Curved
5	La Zoya	Spain	1852	94	105	22.0	128.0	238	Straight
6	Furens	France	1862–66	164	171	9.9	161.0	328	Curved
7	Ternay	"	1865–68	113	125	13.1	81.7	....	"
8	Habra †	Algiers	1865–73	117	125	14.1	95.0	1476	Straight
9	Ban	France	1867–70	138	157	16.4	127.0	....	Curved
10	Gileppe	Belgium	1869–75	148	154	49.2	216.5	771	"
11	Villar	Spain	1870–78	162	170	14.8	154.5	546	"
12	Pas du Riot	France	1872–78	...	113	...	....	....	"
13	Poona	India	.....	...	108	13.8	60.8	5136	Polygonal
14	Hijar	Spain	1880	...	141	16.4	147.0	236	Curved
15	Garzente	Italy	1880–83	121	126	13.1	99.6	492	"
16	Lagolungo	"	About 1883	...	144	16.4	....	....	.....
17	Gran Chemfas	Algiers	1882–84	...	131	13.1	134.5	509	Straight
18	Hanriz	"	1885	115	135	16.4	91.2	532	"
19	Vyrnwy	England	1882–89	...	146	20.0	117.8	1350	"
20	Tansa	India	1886–91	...	118	12.0	100.0	8800	....
21	San Mateo	United States	1887–89	...	170	20.0	176.0	700	Curved
22	Tâche	France	1888–92	...	161	13.1	....	....	"
23	Bhatgur	India	.....	...	130	12.0	74.0	4067	....
24	Beetaloo	"	1888–90	...	110	14.0	110.0	580	Curved
25	Periar	"	1888–97	...	180	12.0	136.0	1200	Straight
26	Mouche	France	About 1890	95	101	11.5	....	1346	"
27	Lagrange	United States	1890	...	125	24.0	90.0	320	Curved
28	Titicus	" "	1890–95	...	135	18.0	75.0	534	Straight
29	Hemet	" "	1891–95	...	136	10.0	100.0	....	Curved
30	Butte City	" "	1892	...	120	10.0	83.0	350	"
31	New Croton	" "	1892–1907	150	297	22.0	206.0	2168	Straight
32	Echapre	France	1894–98	116	121	17.0	88.6	541	Curved
33	Cotatay	"	1900–04	121	144	16.7	....	509	"
34	Lake Cheseman	United States	1900–04	...	232	18.0	176.0	....	"
35	Spier Falls	" "	1900–05	80	154	....	....	1369	Straight
36	Boonton	" "	1900–05	105	114	17.0	77.0	2150	"
37	Wachusett	" "	1900–06	...	228	25.8	187.0	1476	"
38	Ondenon	France	1901–04	107	123	15.4	93.8	420	Curved
39	Urft	Germany	1901–04	...	190	18.0	165.7	1037	"
40	Komotau	Austria	1901–04	...	139	13.1	98.4	509	"
41	Cher	France	About 1907	...	154	15.4	141.1	323	"
42	Cataract	Australia	1902–08	150	192	16.5	158.0	811	Straight
43	Roosevelt	United States	1905–11	240	280	16.0	170.0	1080	Curved
44	Pathfinder	" "	1905–10	...	206	10.0	94.0	425	"
45	Shoshone	" "	1905–10	...	324	10.0	108.0	....	"
46	Cross River	" "	1905–09	106	170	23.0	116.3	772	Straight
47	Croton Falls	" "	1906–11	97	173	23.0	127.7	1100	"
48	Olive Bridge	" "	1914	210	252	26.33	200.0	1000	"
49	Assuan Dam	Egypt	Raised 1907–11	82	112	36.0	....	6200	"

* Ruptured on April 30, 1802. † Failed in December, 1881.

RECENT HIGH MASONRY DAMS
(Approximate Dimensions)

Dam	Location	Date of Construction	Height above Bedrock	Width		Length on Crest	Plan
				Top	Base		
Arrowrock	United States	1912–1916	354	15.5	238.0	1,000	Curved
San Antonio	Spain	1914–1917	261.75	13.12	228.55	666	"
Elephant Butte	United States	1916	304.5	20.0	215.0	1,200	Straight
Kensico	Spain	1916	307.0	28.0	235.0	1,843	"
Yadkin	United States	1917	217	....	....	1,400	Curved
Camarasa	" "	1918–1920	334.66	....	....	....	"
Hetch-Hetchy	" "	1921–	345–430*	....	....	....	Straight
Don Pedro	" "	1921	279.0	16.0	176.4	975	Curved
Gilboa	" "	1921–	160.0	15.0	158.0	1,300	Straight
Wilson	" "	1918–	95.0	46.5	156.0	4,111	"
Krishnarasa Sagra	India	1919–	80–120*	....	....	....	"
Lake Arthur Hill	"	1916–	270.0	....	234.0	1,600	Curved

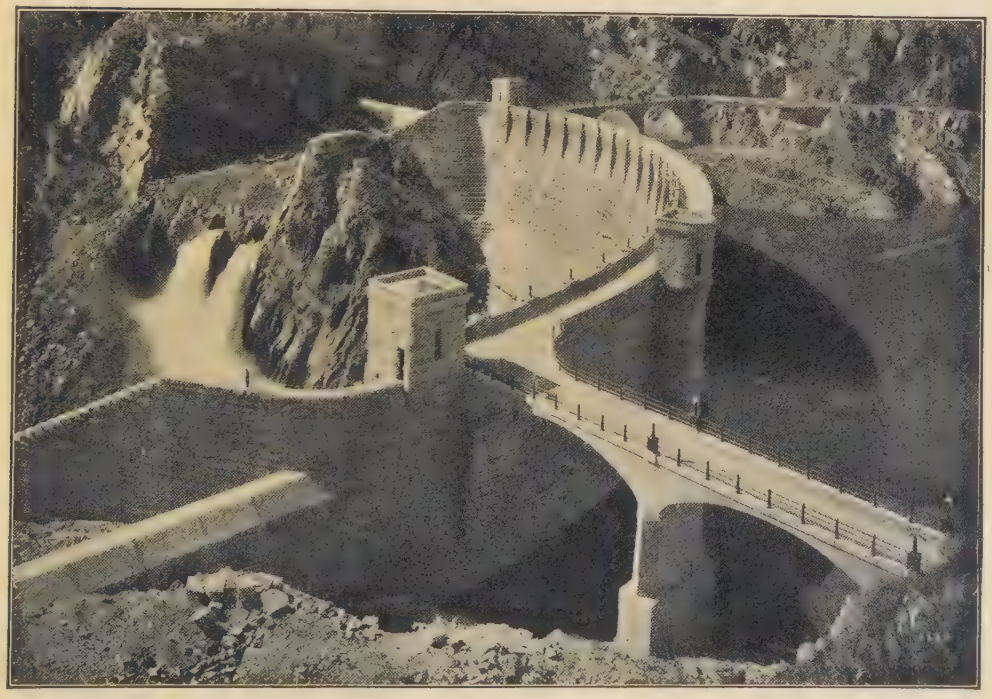
* Ultimate Height

miles upstream. In raising the dam it was necessary to increase its thickness as well. This was done by adding masonry to the downstream face of the dam. Among the many notable dams for power and irrigation in India the Lake Arthur Hill Dam across the Pravara River at Bhandara in the Bombay Presidency was one of the highest, rising ultimately to 270 feet above the river bed. It was a gravity section dam of rubble masonry. The dam is arched across the gorge for a length of 700 feet in a 6000-foot radius. The total length of the dam is 1600 feet and its width the lowest point of the foundation is 234. The total masonry up to the surplussing sill was 12,650,000 cubic yards, and at this height of 260 feet the water in the reservoir is 10,831,000,000 cubic feet or nearly 85,000,000,000 gallons. There are automatic waste weir gates at the surplussing sill.

Arched or Curved Dams have given rise to a great amount of discussion as to the wisdom of utilizing the arch principle to resist a part of

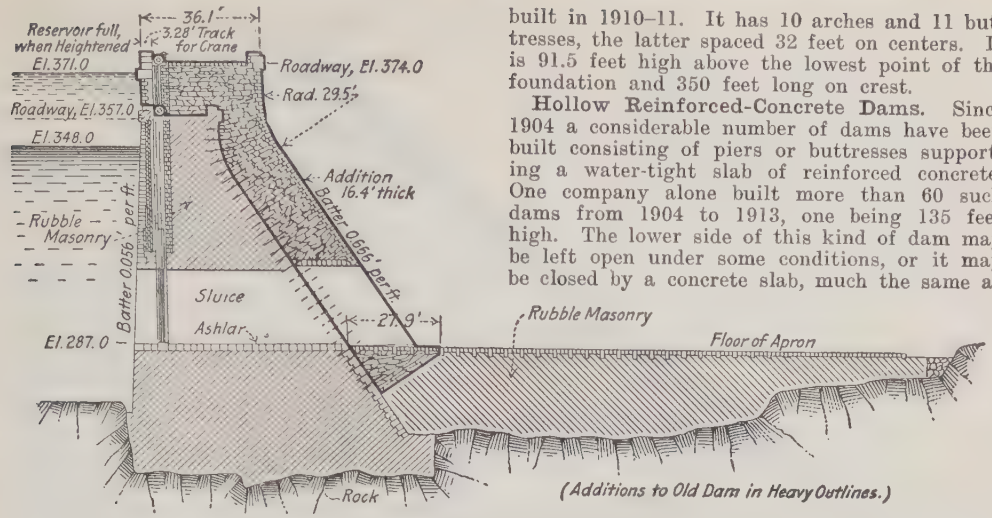
THE ASSUAN DAM ACROSS THE NILE

THE ORIGINAL DAM BEFORE IT WAS HEIGHTENED



THE ROOSEVELT DAM

THE SALT RIVER IRRIGATION PROJECT, ARIZONA

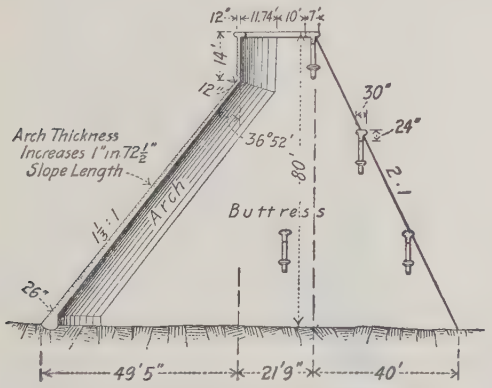


SECTION OF ASSUAN DAM.

the thrust of the water on the dam, instead of relying wholly on *gravity dams*, or those with a section which gives sufficient weight to resist overturning and sliding.

The Shoshone, Roosevelt, and Pathfinder Dams, already mentioned, are of the arched type. Earlier examples are the Zola, in France (see No. 4 in table); the Sweetwater, built in California in 1886–88, with a height of 98 feet above bedrock, a thickness of 12 feet at the crest and 46 feet at the base, and a crest length of 380 feet; and, most remarkable of all for slenderness, the (old) Bear Valley Dam, built in 1884, and only 3.17 feet thick on top, 20 feet at the bottom, and 60 feet high, a development of this idea the constant angle arch has found application in the United States.

Multiple-Arch Dams. Instead of a single arch reaching from bank to bank, a number of thin arches are sometimes thrown between a series of piers or buttresses. The Hume Lake Dam, a concrete structure built in 1908 in California, has 12 circular arches of 50 feet span, supported by 13 buttresses, and with each end of the dam built into the side of the valley. This dam is 61 feet high and 677 feet long,



TYPICAL CROSS SECTION BEAR VALLEY MULTIPLE-ARCH DAM.
(The downstream toe of one of the buttresses is 91.5 ft. below the crest of the dam.)

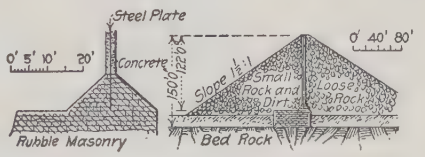
measured on the center line of the crest. A similar structure is the New Bear Valley Dam, built in 1910–11. It has 10 arches and 11 buttresses, the latter spaced 32 feet on centers. It is 91.5 feet high above the lowest point of the foundation and 350 feet long on crest.

Hollow Reinforced-Concrete Dams. Since 1904 a considerable number of dams have been built consisting of piers or buttresses supporting a water-tight slab of reinforced concrete. One company alone built more than 60 such dams from 1904 to 1913, one being 135 feet high. The lower side of this kind of dam may be left open under some conditions, or it may be closed by a concrete slab, much the same as on the upper side. Where the lower side is inclosed, the compartments inside the dam are sometimes used as power houses or for other purposes.

One of the highest hollow reinforced-concrete dams built to the end of 1913 was constructed in 1908–09 across the La Prele River, near Douglas, Wyo., for a private irrigation system, and is illustrated herewith. It is 330 feet in top length and 110 feet at the bottom. The other dimensions appear in the diagram. These hollow dams effect a great saving of masonry, as compared with the solid masonry structures, which is an object at points remote from cement mills or where long wagon hauls are necessary.

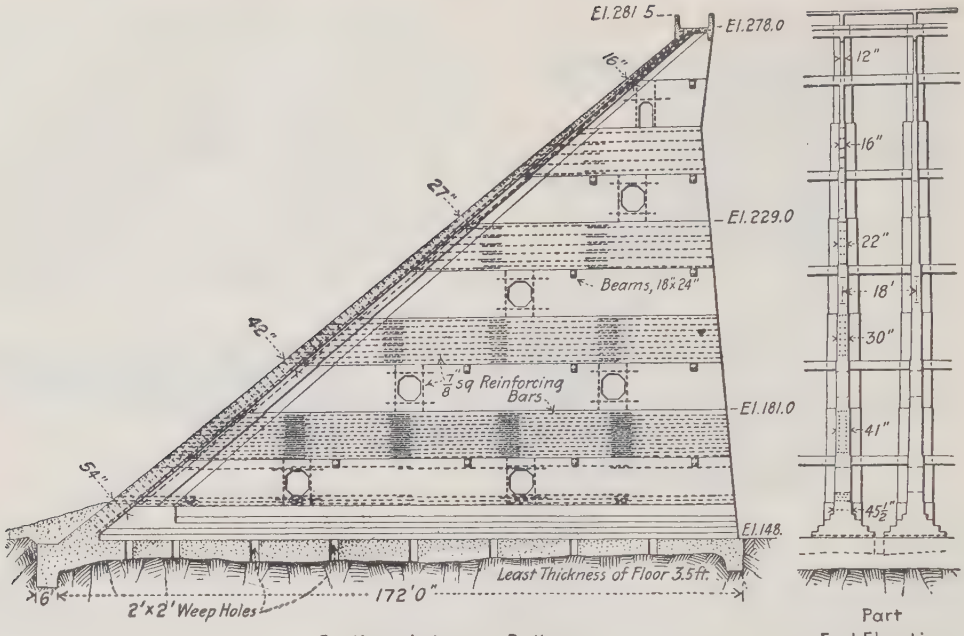
Concrete Dams are not essentially different from other masonry structures, except in their composition and today concrete figures in whole or in part in most dam construction as those mentioned indicate. (See CEMENT; CONCRETE.)

Rock-Fill Dams are built of large stones, or rock, loosely put in place, but with hand-laid face or slope walls. To make such dams water-tight, or sufficiently so for the objects to be attained, the upstream or wet slope may be faced with plank, concrete, concrete and asphalt, or steel. It is also possible to use earth to form



ROCK-FILL DAM WITH STEEL-HEART WALL OR DIAPHRAGM.
Southern California Water Company, San Diego. Cal.

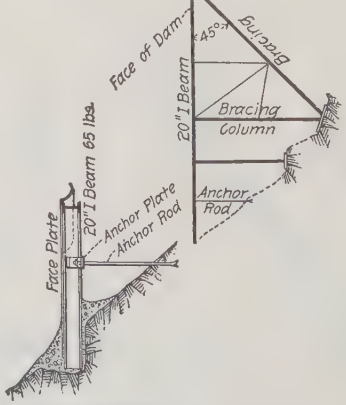
either the upper or the lower section; or riveted steel plates may be built in the center of the structure. A masonry wall, with earth above and rock fill below, faced on the lower slope with stone laid in mortar, is another variation. The adoption of this form of construction is generally in the interests of economy, in localities where the transportation of cement would be very costly, where earth dams are out of the question, and where stone is abundant and easily thrown into place. The stream flow must be passed around and not over rock-fill dams.



LA PRELE DAM.—A Hollow Reinforced Concrete Dam.

The Escondido Dam, built by a California irrigation district of that name, was one of the earliest of the rock-fill structures. It is 76 feet high, 10 feet thick at the top, and 140 feet thick at the base, has top and bottom lengths of 380 feet and 100 feet respectively. The hand-laid dry wall on the upper or wet slope is 15 feet thick at the base and 5 feet at the top. It is covered with redwood plank, and the space between the plank and the stone was rammed full of concrete. The joints in the planking were calked with oakum and daubed with asphalt. The Lower Otay Dam, near San Diego, Cal., completed in 1897, is a rock-fill dam with a steel core. The dam was started in masonry, but being carried to a height of 40 feet above its lowest point, when its top length was only 85 feet, it was decided to change the design. An inverted T-iron (thus, ⊥) was bolted to the masonry, and steel plates ⅓ of an inch thick, 17½ feet long, and 5 feet high were riveted first to the T-iron, then to each other, until three courses had been placed. The plates were diminished in thickness as they neared the top. The dam is 161 feet high above its lowest point, 130 feet high above the natural earth, and is of rock fill for 121 feet. The steel plates were protected by a coat of hot Alcatraz asphalt, then a layer of burlap, then harder asphalt, and finally one foot of Portland cement concrete, on each side. A part of the rock fill was deposited in place by the force of a very heavy blast, and the rest was transported from the quarry by a cableway (q.v.) 948 feet long. Nearly 180,000 cubic yards of stone were used. The Morena Rock-Fill Dam, which, like the Lower Otay, is a part of the water-supply system of San Diego, Cal., is 150 feet high in its rock-fill portion, but, counting a concrete coping wall 3 feet high and a concrete wall carried down 112 feet beneath upstream side of the dam, the structure has a maximum height of 265 feet. The upstream slope is composed of individually placed stone, with the facing stone laid in cement for water-tightness. The dam was started in 1896, but construction was suspended from 1898 to 1909. The failure of the Walnut Grove rock-fill dam, 110 feet in height, is described under *Failures of Dams*, below. The Rimrock Dam, one of the largest of the earth and rock-fill type, forms an impounding reservoir or storage basin of 185,000 acre feet, by damming the headwaters of the Tieton River, Washington. This dam is 900 feet long, 222 feet high, and contains about 1,785,000 cubic feet of material. The excavations for the core wall were carried down to bedrock 95 feet below the bed of the stream. Construction of this dam was interrupted in 1917 by the World War but was resumed in 1921.

Steel Dams have been built in a few instances. The first of these, so far as known, is near Ash Fork, Ariz., and was built in 1897 or 1898 by the Atchison, Topeka, and Santa Fe Railway Company to supply its engines and incidentally to

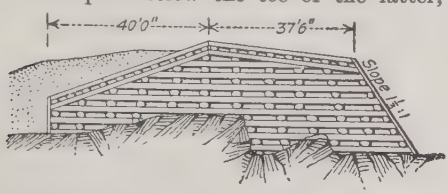


CROSS SECTION OF STEEL DAM.
Ash Fork, Ariz.

furnish water to the village of Ash Fork. It forms a reservoir of 36,000,000 gallons' capacity. The steel portion of the structure is 184 feet long at the top, and its greatest height is 46 feet. It consists of a series of triangular steel frames, against the upper sides of which rest the riveted steel plates, three-eighths of an inch thick. These plates are curved so as to form a series of channels from the top to the bottom of the inclined face of the dam, with flat strips between. Water flows over the top of the steel dam and between two masonry abutments having a combined length of 116 feet.

A similar dam, but higher, longer, and resting on a concrete foundation, was built in 1900–01, at Redridge, Mich., to supply water to copper stamp mills. The steel portion of the Redridge Dam is 464 feet long between abutments, and its maximum height is 74 feet, including foundation. Earth embankments at either end bring the total length of the dam to 1006 feet.

Timber Dams include a great variety of structures built of framed timber, logs, and cribwork of either timber or logs filled with stone. They are generally comparatively low, overflow dams. They frequently have a sloping upstream face and either a sloping or stepped downstream face, with an apron below the toe of the latter, to



CROSS SECTION OF TIMBER AND STONE DAM.
Bangor, Me.

break the force of falling water. Sometimes piles are used in their construction, and often earth is filled against their upper side.

Movable Dams are those which can be lowered or raised at will, according to the stage of water in the river. They are generally aids to navigation, placed at stretches where there are shallows or rapids, but where permanent structures to raise the water level might do damage by causing floods at times of high water. They may also be used on any ordinary dam or on waste weirs. It is more common, however, to call movable devices connected with ordinary dams *flashboards* or *floodgates*. Flashboards are generally comparatively low and are of fragile construction or have supports designed to give way in time of freshet. There is a great variety of movable dams, but they fall more or less closely into three groups—*needle, wicket,* or *shutter,* and *bear-trap*. The latter have some decided points of superiority, being raised and lowered by the force of the water itself, on its being turned under or discharged from chambers beneath or within the dam. *Needle dams* were developed in France about the close of the eighteenth century. They are an outgrowth of the earlier French and English needle dams and consist of horizontal beams, or stop planks, dropped into grooves built in the two abutments of a pass through the dam. These beams could be lifted out at times of high water. Later, to facilitate handling, they were set vertically, or nearly so, resting against a sill below and a beam above. A chain was finally substituted for this beam to make greater lengths of dam feasible. In this way movable dams 40 feet wide were developed on the Yonne, in France. In 1834 M. Poirée increased the width of one of these dams, or passes, to 72 feet by substituting iron bars for the chains. The bars were short and were supported by means of vertical iron frames, placed at right angles to the length of the dam. To throw down the dam, it was only necessary to remove the needles one by one, detach the horizontal bars, then lower the frames into recesses in the top of the masonry portion of the dam. Needle dams were somewhat modified subsequently and used in various parts of France, Belgium, Germany, and the United States.

A notable installation of eight movable dams of the bridge type was made on the New York State Barge Canal based upon a system used on the Moldau River in Bohemia, but so modified as to form virtually a new type. These movable dams hang from bridge trusses, the gates of the dam rolling on hanger beams, the gates being attached to small wheels which travel in the channel beams forming the upstream face of the hanger beams. They are operated by electric winches. See CANALS.

The first needle dam in the United States was built in 1891–97 across the Big Sandy River at Louisa, Ky. The whole improvement includes a lock 52 feet wide, a navigable pass 130 feet long, and an overflow weir 140 feet long. The sill of the pass was 13 feet, and that of the weir was 7 feet below the normal height of water in the pool. The steel frames supporting the pass needles were originally 4 feet between centers, but later the alternate frames or trestles were removed. The horizontal bars connecting the frames and supporting the upper ends of the needles were hinged at one end and hooked at the other. The frames had a sheet-iron floor, forming a footbridge, which fell with them, and were connected by a chain. The pass needles were of white pine, 12 inches wide, 8½ inches thick at the bottom, and 4½ inches thick at the top, and 14 feet 3 inches long, each weighing 263 pounds when wet. The needles were set in place by means of a derrick on a boat, and were lifted out by means of a chain passing through irons fastened to their top, operated by an engine. The frames were raised or lowered from one of the abutments to the pass by means of a chain crab. This dam was raised 4½ feet in 1907–08, or to a height of 17½ feet on the pass sill and 11½ feet on the weir sill. The span of the pass frames or trestles was increased to 20 feet, needles still being used. On the weir the needles were replaced by wickets.

Wicket or Shutter Dams have been developed from simple gates or shutters working on a horizontal axis near their tops, which have been used in Holland for centuries. These simple shutters have been elaborated until they are now made of short lengths, which may be revolved on their horizontal axis, then lowered so as to rest flatwise on the sill of the dam. They are operated from a bridge placed above them, which can be lowered much the same as the frames of the needle dams just described. In 1880 two wicket dams were completed on the Great Kanawha River by the United States government, and others have since been built on that stream. Many Chanoine wickets are in use on the rivers of the United States. Most of the wickets were of wood, but some were of steel. Metal wickets were first used at the La Mulatière Dam, near Lyons, France, in 1879.

Drum Dams are modifications of the wicket

or shutter dam. One of these, named after its inventor, Capt. H. M. Chittenden, may be described, roughly, as being shaped like one-sixth of a cylinder. When lowered by revolving on a horizontal axis at the center of the cylinder, it drops into the chamber, leaving one radial side of the cylinder flush with the sill. The sections are raised by the force of the water acting from beneath.

Rolling Dams are steel cylinders, either alone or provided with sheaths. On being opened, by power, they roll up inclined rails placed in recesses in the abutments or piers between which they extend. The first rolling dam was built in 1901–02, at Schweinfurt, Bavaria, and was 6.6 feet high and 114 feet long. Later rolling dams have been much higher, reaching nearly 28 feet. One built across the Spokane River, Washington, in 1910, is 19 feet high and 100 feet long. A roller dam of 30 feet span with a chord length of 8 feet was placed in the logway of the Boise Division Dam. It can be raised entirely clear of the water surface to permit the passage of logs.

The dam across the Grand River, Colorado, 536.5 feet in length between abutments, consists of a concrete overflow base of ogee section with projecting apron surmounted by seven roller dams, six of which are 70 feet long and 10.25 feet high from the dam proper, while the seventh controlling the sluiceway is 60 feet long and 1.53 feet high. The rollers are operated by electricity and when closed act to raise the water 20 feet above the bed of the river.

Bear-Trap Dams or Gates, in their simplest form, consist of two leaves extending across the pass or opening to be closed, and so hinged to the sill of the dam on their outer edge that they form a triangle when in use and lie flat on the sill of the dam when open; one leaf, when open, overlaps the others. The space within the triangle is filled with water. On drawing out this water through suitable openings, the dam fills, and on admitting water beneath the leaves, when the dam is open, the leaves are raised slowly into position. Thus the dam is operated by the force of the water. The first dam of this type was built on the Lehigh River, in 1818, by Josiah White and Erskine Hazard, managers of the Lehigh Navigation Company, to secure slack water for shipping anthracite coal. In 1819, 12 more of these dams were built on the Lehigh. Until 1880 or later this type seems to have been used but little outside of Pennsylvania; but in 1886 two bear-trap gates, each 60 feet long, were built by United States engineer officers in the Beattyville Dam, across the Kentucky River. Since 1886 a number of other dams of this type have been built in this country. A study of bear-trap dams was made for the United States government by Capt. H. M. Chittenden and Major A. O. Powell, both of the Corps of Engineers, United States Army, beginning in 1892. Consult *Journal Association Engineering Societies* (Philadelphia, Pa.), for June, 1896, also an article by Captain Chittenden reviewing the whole subject, in *Engineering News* (New York), Feb. 7, 1895.

Various modifications of the bear-trap dam have been made, including a hinge at the apex and another in the upper leaf, so in falling the dam falls over on itself, and there is no overlapping at the apex. The largest bear-trap dam yet built forms a part of the regulating works of the Chicago Drainage Canal, where the canal discharges into the Des Plaines River. The pass closed by this dam is 160 feet long and 20 feet high, besides which there are 15 sluice gates, 30 feet wide and 20 feet high, working vertically between masonry piers. Eight of the gates were walled up, as the full capacity was not deemed necessary for some time. This bear-trap dam is not for navigation, so it is mounted on a masonry structure of some height, permitting the upper gate to slide down the upper face of the masonry. This dam differs from others of the same type not only in being of steel instead of wood, but in having various mechanical devices to supplement its operation. A full illustrated description of this structure was given in *Engineering News* (New York) for March 24 and May 26, 1899.

Stony Roller Sluice Gates, first built at Belleek, Ireland, in 1883, have been put in at many important dams throughout the world to close large openings. These gates are usually suspended from service bridges by chains or rods, and when lifted from above they work on trains or rollers which with ends of the gates are placed in vertical grooves in piers. They have been used in water depths of 30 feet and, in lesser depth, to close openings 80 feet wide. A general review of movable dams, by B. F. Thomas, is given in the *Transactions of the American Society of Civil Engineers* (New York, 1888); much space is given to the various kinds of movable dams in both Thomas and Watt, *The Improvements of Rivers*, and Wegmann, on *Dams*, each cited below, the latter summarizing the more notable projects in which they are employed in both America and Europe. In connection with the use of movable dams on western rivers in the United States, consult *Reports Chief of Engineers, United States Army* (Washington, 1860 et seq.), particularly those for 1884 and 1887.

Cofferdams (q.v.) are employed to exclude water from foundations and other classes of work while under construction. See FOUNDATIONS.

FAILURES OF DAMS

The Bradford earth dam, Sheffield, England, failed in March, 1864. This dam, built to supply water and furnish power to the city of Sheffield, was about 90 feet in height, 13 feet wide, and 1250 feet long, with slopes of 2½ to 1. The dam, except for a puddle wall extending from end to end and 60 feet into the ground, was of earth loosely dumped from carts. Cast-iron outlet pipes about 500 feet in length, surrounded by clay puddle, extended through the base of the dam. While the reservoir was being filled for the first time, a leak suddenly appeared, and enlarged so rapidly that in 30 minutes the reservoir had emptied itself. The flood reached Sheffield at midnight, without warning, causing great destruction of property and the loss of 238 lives. In the official inquiry made as to the cause of the failure, it was claimed that in a work of such great magnitude the outlet pipes should not have been placed through the dam itself.

The failure of the Mill River Dam at Williamsburg, Mass., in 1874, was a conspicuous example of improper construction which resulted in complete saturation of the embankment. No engineer had been employed in constructing the work, and no proper means used for consolidating the embankment. One morning, when the water was 4 feet from the top of the dam,

masses of earth were observed to slide from the outer slope of the embankment. In 20 minutes the reservoir was emptied of 100,000,000 cubic feet of water, which drowned 143 persons and destroyed $1,000,000 worth of property.

The most disastrous reservoir failure of the nineteenth century was the destruction of the South Fork Dam, which caused the famous Johnstown flood on May 31, 1889. That this disaster was due to an insufficient spillway has been abundantly proved. The South Fork Dam was built on the headwaters of the Conemaugh River, 10 or 12 miles above Johnstown. It was of earth, 70 feet in extreme height. The original specifications for the dam required a spillway 150 feet wide. The spillway existing at the time of the disaster was 130 feet wide at its upper end, but was obstructed by a bridge and by screens to prevent the escape of fish. It extended across a channel 176 feet long and at its lower end only 69 feet wide. In other words, the spillway was only half that originally contemplated, besides which a brick outlet culvert had been abandoned. Unusually heavy rains had been falling for several days, and for 3½ hours before the break occurred the water had been flowing over the entire length of the dam. When the dam was carried away, the reservoir emptied itself in about 45 minutes. Over 2000 lives were lost in this disaster, and between $3,000,000 and $4,000,000 worth of property. No engineer was employed on the design or construction of the dam.

The Walnut Grove Dam, in Arizona, failed on Feb. 22, 1890. It was one of the highest rock-fill dams over built, having been 110 feet in height, about 10 feet thick at the top and 140 feet at the base, with a top length of some 400 feet and a bottom length of 100 feet. Both faces were composed of granite blocks, laid by hand and derrick, these dry-faced walls being 20 feet thick at the base and 5 feet thick at the top. It is supposed that a very heavy rainfall and an altogether inadequate spillway caused the destruction of the dam, which was overtopped for a number of hours. Many deaths resulted from the failure.

The failure of the Puentes masonry dam, in Spain, in 1802, was due to defective foundation, the central part of the dam resting upon piles instead of being carried down to bedrock. In the Habra masonry dam, in Algiers (see table), whose failure caused the drowning of 400 persons, the disaster was probably due to defective masonry work. The failure of the Bouzey masonry dam, near Epinal, France, in 1895, was caused by defective construction between the base and the foundation, although in its dimensions the dam was carried to the extreme of lightness. An earth dam across the Weisse Desse River in Bohemia, Austria, failed on Sept. 28, 1916 resulting in great damage and loss of life. This dam was 47½ feet high above the foundation, with a bottom width of 147 feet and a crest width of 13 feet, and approximately 800 feet long and of 40,000 cubic yards volume. It had a clay cut off and water side facing. The failure of the dam was due to inadequate design and construction.

The failure of the dam on the Colorado River, at Austin, Tex., which occurred in April, 1900, was due to defective foundation, largely on account of the soft limestone rock on which the foundation was laid. The dam was 1090 feet long, 66 feet high above the foundation, and 60 feet above low water. The upstream face of the dam was vertical, and the downstream face was curved, giving a thickness of 66 feet at the base and 20 feet near the top. On April 7, 1900, after a heavy rainfall of several days, when the water was flowing over the crest of the dam to a depth of 11.07 feet, a portion some 500 feet in length was detached from the remainder of the dam, broke into two parts, and was carried downstream. Two sections were left standing upright in the stream a few feet below the original portion. One of these broke up in a few hours, but the other remained intact. When the dam broke, eight people in the power house were drowned by the sudden rush of water, and during the following night the power house itself was partially destroyed. This dam was reconstructed, but in September, 1915, when practically completed, a heavy flood carried away 20 of the large gates installed between piers on the crest and most of the smaller ones. This mishap led to a further consideration of the design.

A dam at Austin, Pa., which had previously failed but had been continued in use, went out on Sept. 30, 1911. The resulting flood in the narrow valley caused the death of 85 persons at Austin, 1½ miles below the dam, and at Costello, 3 miles farther downstream. The dam was of reinforced concrete, gravity section, about 50 feet high and 554 feet long, with a low spillway near the center. On its completion, about Dec. 1, 1909, a vertical crack appeared, and later a second one showed. On Jan. 22, 1910, the river being in flood, water leaked through what proved to be porous rock beneath the dam. The following day the middle portion of the dam slid downstream, 18 inches at the bottom and 31 inches at the top, and vertical cracks elsewhere separated the dam into a number of parts. The water was lowered by dynamiting, but the reservoir was subsequently allowed to partly refill. Although engineers employed by the owners advised that the dam be strengthened, nothing to that end was done. On Sept. 30, 1911, heavy rains caused overtopping of the dam, and about four-fifths of its length was broken into seven large fragments, most of which remained upright, but two of which were carried from 15 to 25 feet downstream. The failure was due to defective foundation, which might have been made safe had the engineer not been limited in the sum allowed for building the dam. The Austin failure and many lesser failures about that time led to more thorough public supervision of the design and construction of reservoirs in a number of States.

In the State of New Jersey, for example, plans for all proposed dams which raise the water level more than five feet, or which have a drainage power of more than one square mile, must be approved by the engineers of the State Department of Conservation and Development. This department is given power to order owners of dams to repair them, if its engineers are of the opinion that life and property below the structures are in any way imperiled. This provision was given to this New Jersey department in 1912, and in other states similar legislation has been enacted.

RESERVOIRS

Reservoirs may be classified broadly into *impounding*, *settling*, *storage*, and *distributing* reservoirs, all of which, except impounding, may be covered or open, the latter being the general

form. *Impounding reservoirs* are formed by throwing a dam across some stream and flooding the country above. *Storage reservoirs* are often created in the same way; or they may be formed more or less completely by embankments or excavation, or a combination of the two. Both impounding and storage reservoirs are designed to conserve a supply of water above the normal consumption, for times when either the natural yield is below the average or the consumption is unusually great. Impounding reservoirs are always for storage purposes, whether the capacity be for a few hours' supply or for a much longer period. For flood protection such reservoirs are employed temporarily to impound and regulate flood waters that if uncontrolled might overflow their ordinary channels and do vast damage.

The larger and more regular the daily yield of the stream or other source of supply, as compared with the consumption, the smaller need be the storage capacity. In some cases storage is required for months or even for a year. The new Croton Dam provides a storage of about 32,000,000,000 gallons; the Kensico Dam of the Catskill Water Supply of New York City, 38,000,000,000 gallons and the Olive Bridge or Ashokan Dam, 132,000,000,000 gallons, and the Gilboa Dam an additional supply of 20,000,000,000. The Wachusett Dam, of the Metropolitan Water-Supply District (Boston and vicinity), retains about 63,000,000,000 gallons of water. Much larger are the storage capacities of a number of the reservoirs of the United States Reclamation Service, that formed by the Roosevelt Dam holding 420,000,000,000 gallons.

An important sanitary question involved in the construction of impounding and storage reservoirs for public water supplies is the stripping of the sites, or flooded areas, of all heavy accumulations of organic matter which, either through their decay or through serving as a food supply to low forms of life, would impart unpleasant tastes and odors to the stored water. It is a common practice to remove stumps and timber and to burn over the site, where practicable, before filling such reservoirs. Aside from stripping and clearing the sites, the construction of impounding reservoirs pertains mostly to the dam and its accessories. One additional element of importance in some cases is the excavation at the border of reservoirs to prevent shallow flowage and the growth and decay of vegetable matter which would occur when these slopes are alternately exposed and covered by the varying levels of water in the reservoir.

Settling Reservoirs, also known as *subsiding* and as *sedimentation* reservoirs, are shallow basins, with long weirs between the several compartments over which the water flows in thin sheets, thus drawing off only the upper and most clarified layer. (See WATER PURIFICATION.) It is desirable to make provision for removing the mud, to which end the paved bottoms may slope to a common point and then connect with a scour pipe, through which the mud may be flushed with a stream of water from a hose.

Distributing Reservoirs are generally located within or near the city which they serve. They are often classified as high, low, and middle service, according to their elevation and the areas in which they supply. They may afford storage for periods ranging from a day or two up to several weeks; but in the latter case they would perform the duty of a storage reservoir as well. Occasionally distributing reservoirs are formed by a dam across a stream, but, as a rule, they have masonry walls above or below the natural surface. The construction of embankments or walls does not differ essentially from that of earth and masonry dams, except that when masonry is used the principles of design are more like those involved in the planning of earth-retaining walls, subjected, of course, to water pressure on the other side at times, but also liable to be empty. It is common to line the inner slopes of reservoir embankments with stone, brick, concrete, or asphalt. The bottoms are frequently lined like the sides. When concrete is used, it is well to lay it in relatively small squares, with a good filling for the joints, to prevent cracking.

Covered Reservoirs may have vaulted roofs of masonry, generally concrete masonry, or else less expensive and more temporary roofs of timber. The cost is so great that covering is rarely attempted in the United States, except for relatively small reservoirs receiving either filtered water or that from underground sources, either of which is liable to injury through the development of organisms giving rise, in their life processes, to bad tastes and odors.

Bibliography. Wegmann, *Design and Construction of Dams* (7th ed., revised and enlarged, New York, 1922), has a full bibliography of the available literature; Schuyler, *Reservoirs for Irrigation, Water Power and Domestic Supply* (ib., 1901); Frizzell, *Water Power* (ib., 1901); Morrison and Brodie, *High Masonry Dams* (2nd ed., ib., 1916); Thomas and Watt, *The Improvement of Rivers* (2d ed., ib., 1913); Fortier and Bixby, *The Storage of Water for Irrigation Purposes* (United States Department of Agriculture, 1912, two parts)—describes timber, earth, hydraulic-fill, and rock-fill dams; Davis, *United States Irrigation Works* (ib., 1917); also general treatises on water works by Fanning, Folwell, Goodell, and Turneaure, and Wilson, *Manual of Irrigation Engineering* (New York, 1897); and the files of the *Engineering News-Record* (New York); *Reclamation Record* (Washington); *Engineering* (London); and *Engineer* (London), and *Transactions of the American Society of Civil Engineers* (New York, current), as well as *Reports Chief of Engineers U. S. Army* (Washington, annual).

DAMSEL FLY (so called from the French name *demoiselle*). An insect of the family Agrionidæ, order Odonata, closely allied to the dragon flies. They are, says Howard, the small, graceful species, with extremely slender bodies and narrow, clear wings, held vertically in repose, which are very commonly found over large bodies of still, fresh water. "All of our North American species [about 75] are small, but in tropical regions they grow to a large size, and some South American forms are among the largest species of the order Odonata. They do not fly high in the air, but frequent low-growing aquatic vegetation. The colors, as a rule, are rather dull, but the slender bodies of some are brilliantly blue, green, or even red." Many authors unite with these as a subfamily the dark-colored, prominent-eyed flies otherwise regarded as constituting the separate family Calopterygidæ. The life history of these flies is substantially that of the dragon flies (q.v.). See Plate of DRAGON FLIES.

DAMSEL OF BRIT'TANY. A title given to Eleanor of Brittany, sister of Arthur, Count of Brittany, and niece of King John of England, who confined her in the castle of Bristol, where she died in 1241.

DAN. A city on the northern boundary of Israel, called originally Laish (Judg. xviii. 29), but renamed Dan by the Danite invaders. Owing to its northerly location (Gen. xiv. 14), it was often used in connection with Beersheba (1 Sam. iii. 20; 2 Sam. iii. 10) in the phrase "from Dan to Beersheba," to express the whole land of Israel. The Danites introduced in this city the worship of Yahwe with the image taken from Micah's sanctuary in Mount Ephraim, and with the Levite who is said to have been the grandson of Moses (Judg. xviii). Later Yahwe was worshiped there under the form of a bull, and the cult was organized by Jeroboam (1 Kings xii. 29). At the solicitation of Asa, King of Judah, Bar Hadad, King of Damascus, invaded Israel, and among other cities Dan was destroyed (1 Kings xv. 20; 2 Chron. xvi. 4). The ruins of the city are identified with modern Tel el Kadi. Kadi is the Arabic equivalent of Dan, which means 'judge.' The mound is very extensive. No excavations have yet been undertaken.

DAN. The eponymous ancestor of the tribe of Dan, the son of Jacob and his concubine Bilhah (Gen. xxx. 5, 6). The tribe was one of the smallest and weakest of the Hebrew confederacy. Belonging to the northern group, its territory lay southwest of Ephraim, occupying the valleys of Sorek and Ajalon (Josh. xix. 40–46). Owing, however, to difficulties with the Amorites (Judg. i. 34), we find them later migrating to the far north, and conquering the city of Laish, which they rebuilt and called Dan (Josh. xix. 47; Judg. xviii.). Samson (q.v.) was of the tribe of Dan (Judg. xiii. 2, 24, 25). The tribe is referred to in the song of Deborah (Judg. v.); the text is somewhat uncertain, but Schmidt has proposed to read "Dan stayed where the stream breaks forth," referring to the Jordan, at whose fountain the city of Dan was situated, and "Asher sought protection in ships, he dwelt on the shore of the sea," which is in harmony with what is otherwise known concerning the location of these tribes. If this is correct, Dan already occupies the territory around Laish in the time of Deborah. The description of Dan in the blessing of Jacob (Gen. xlix.) may even be older. It refers to the tribe as being self-governing and skilled in making raids on travelers. Dan, though designated as a "concubine" tribe, which generally indicates secondary rank, plays no unimportant part in the early traditions and legends. This is in part due to the fame and antiquity of the sanctuary at Dan, which as late as the days of Amos is put on a level with Bethel and Beersheba (Amos viii. 14). In this sanctuary the older rites and practices were preserved with great fidelity, and its priests traced their origin to Moses himself (Judg. xviii. 30). The name Dan ('judge') may originally have been the title of a deity. Consult Ed. Meyer, *Die Israeliten und ihre Nachbarstämme*, pp. 524 ff. (1906); N. Schmidt, *The Messages of the Poets*, pp. 356 ff. (1911).

DA'NA, Charles Anderson (1819–97). An American journalist, born at Hinsdale, N. H., Aug. 8, 1819. He studied at Harvard, but, owing to defective eyesight, did not graduate. He joined the Brook Farm Association in 1841, edited in its interest the *Harbinger*, contributed to the Boston *Chronotype*, and, after the failure of Brook Farm, was, with its founder, Ripley (q.v.), connected with the *New York Tribune* (1847–62). Disagreement with Horace Greeley in war politics, proclaimed in a once-famous editorial, "On to Richmond," forced his resignation. He was Assistant Secretary of War in 1863–64. After the war he edited the Chicago *Republican*, which failed. He then returned to New York and became part proprietor and editor in chief of the New York *Sun*—a position which he held from 1868 to his death. With George Ripley he planned and edited the *New American Cyclopædia* (1857–63), and its successor, the *American Cyclopædia* (1873–76). He compiled also the well-known *Household Book of Poetry* (1857) and collaborated in a *Life of Grant* (1868). Other works are: *The Art of Newspaper Making* (1895); *Lincoln and his Cabinet* (1896); *Recollections* (1897). At the time of his death at Glen Cove, L. I., on Oct. 17, 1897, Mr. Dana was in many ways the most noted journalist in the country. He had a brilliant intellect, a finished and incisive style, and a gift for mordant irony which made him a dangerous enemy. Every detail of the art of making a good newspaper he thoroughly understood, but he was generally believed to be so intense in his prejudices that he failed to acquire the authority to which his talents entitled him. Consult J. H. Wilson, *Life of Charles A. Dana* (New York, 1907).

DANA, Charles Loomis (1852–). An American neurologist. He was born at Woodstock, Vt., and was educated at Dartmouth College and the New York College of Physicians and Surgeons. He served as professor of physiology in the New York Woman's Medical College in 1880–86, of nervous and mental diseases at the New York Postgraduate Medical School in 1884–96, and of nervous diseases in Dartmouth Medical College in 1890–93, and four years later he became professor of nervous diseases in Bellevue Hospital Medical College. He was also an editor of the *Journal of Comparative Medicine* and associate editor of the *Medical Record*. His publications include a *Text-Book of Nervous Diseases* (1892; 7th ed., 1908).

DANA, Edward Salisbury (1849–). An American mineralogist, born at New Haven, Conn. He graduated at Yale University in 1870 and became tutor there in 1874. He received his doctor's degree at Yale in 1876 and also studied at Heidelberg and Vienna. In 1879 he was made assistant professor of natural philosophy and astronomy, and later professor of physics, at Yale. After 1875 he edited the *American Journal of Science*. His publications include numerous papers on mineralogical topics; "Appendix I" and "Appendix II" of Dana's *System of Mineralogy;* a *Text-Book of Mineralogy* (1877); *Minerals and How to Study Them*, and a *Text-Book of Mechanics* (1881).

DANA, Francis (1743–1811). An American statesman and jurist. He was born in Charlestown, Mass., graduated at Harvard in 1762, soon became a leading member of the bar and, as a Whig, prominent in Colonial politics, and from 1776 to 1780 was a member of the Executive Council of Massachusetts. He was elected to the Continental Congress in 1776 and from the first took an important part in the work of that body. In 1778 he was made chairman

of a committee appointed to draw up plans for the reorganization of the army and in the same year was a member of the committee of three to which the conciliatory proposals of Lord North were referred. He went abroad in September, 1779, as the official secretary of John Adams, recently appointed to negotiate a treaty of peace with Great Britain, and, after spending some time in Paris and Amsterdam, was sent in March, 1781, as United States Minister to the court of St. Petersburg. Catharine persistently refused to receive him as an accredited Minister, however, and in 1783 he returned to America. He was again elected to the Continental Congress (1784) and in January, 1785, was appointed Justice of the Supreme Court of Massachusetts. In 1786 he was a delegate to the Annapolis Convention (q.v.) and in the following year was also elected as a delegate to the Constitutional Convention at Philadelphia, but was prevented by illness from attending. In the State Convention of 1788 he coöperated with Theophilus Parsons and John Hancock in securing the ratification of the Federal Constitution by Massachusetts. He was Chief Justice of the Massachusetts Supreme Court from 1791 to 1806, during which period he took no active part in State or national politics.

DANA, James Dwight (1813–95). An American geologist and one of the eminent scientists of the nineteenth century. He was born in Utica, N. Y. His father was a successful business man of New England birth, and his mother was Harriet Dwight, daughter of Seth Dwight, of Williamsburg, Mass. Dana early became interested in scientific studies. In his school days at Utica he devoted much time to chemical investigations, and he frequently made excursions to distant points for the purpose of collecting minerals. Attracted by the reputation of the elder Professor Silliman, he entered Yale College in 1830, where for three years he pursued the study of classics, mathematics, and natural sciences. In 1833 Dana received an appointment as instructor in the United States navy, a position that afforded him an opportunity of European travel. During a cruise in the Mediterranean he wrote a description of Vesuvius, the first of his long series of scientific papers that were published in the *American Journal of Science.* Three years afterward he returned to Yale and was appointed assistant to Professor Silliman. While at New Haven he published his first important scientific work (*The System of Mineralogy*), a book that subsequently passed through several editions and attained a reputation in both Europe and America as a standard of reference. From 1838 to 1842 Dana was a member of the Wilkes Exploring Expedition sent out by the United States government. While on this expedition, which explored the little-known parts of the Pacific Ocean, he had a wide field for scientific discovery and description. The opportunities presented were such as few scientists have received; so extensive was the material collected that, upon his return to the United States, Dana devoted 13 years of almost constant labor to its study. The results were published by the government in three voluminous reports: "Zoöphytes," in *United States Exploring Expedition* (Philadelphia, 1846); "Geology," in *United States Exploring Expedition under C. Wilkes, U. S. N.* (Philadelphia, 1849); and "Crustacea," in *United States Exploring Expedition under C. Wilkes, U. S. N.* (New York, 1852–54). In the work on "Zoöphytes," 230 species were described by Dana for the first time, while the report on "Crustacea" contained descriptions of no less than 658 new species. The intense zeal with which Dana pursued this task seriously impaired his health, and although he was able to accomplish much in after years, his life henceforth was a continual struggle against disability.

The value of Dana's services to science received prompt recognition from Yale College, which appointed him in 1850 to the professorship of natural history, a position he filled from 1855 to 1890. During this period his activities found expression in lectures to college students, in several textbooks on geology and mineralogy, and in numerous contributions to scientific journals. His work was characterized by keenness of perception, great powers of analysis, and by vivid imagination. These qualities eminently fitted him for geological investigations, and his discussions of the grander features of the earth, such as the form and origin of continents, mountain building, and volcanoes, are among the most valuable contributions to scientific literature. From 1846 until his death he served almost continuously as editor of the *American Journal of Science,* in which many of his papers were published. Dana received many marks of honor from American and foreign institutions. He was elected president of the American Association for the Advancement of Science in 1854 and of the Geological Society of America in 1890, and was at various times a member of the Royal Society of London, the Institute of France, the Royal Academy of Berlin, the Royal Academy of Vienna, and of many other learned societies. In 1872 the Geological Society of London conferred upon him the Wollaston medal "in acknowledgment of his services to mineralogy and geology," and in 1877 he received the Copley medal "for his biological, geological, and mineralogical investigations, carried on through half a century, and for the valuable works in which his conclusions and discoveries have been published." The more important of his contributions to scientific literature, in book form, are the reports previously mentioned, and the following, some of which have passed through several editions: *A System of Mineralogy* (1837); *Manual of Mineralogy* (1848); *Manual of Geology* (1862); *Corals and Coral Islands* (1872); *Text-Book of Geology* (1864); *The Geological Story Briefly Told* (1875). He died in New Haven, April 13, 1895.

DANA, John Cotton (1856–). An American librarian, born in Woodstock, Vt. He graduated at Dartmouth College in 1873, studied law, was admitted to the New York bar in 1883, but after working as a land surveyor and civil engineer in Colorado became librarian of the Denver Public Library in 1889. He took charge of the Springfield (Mass.) City Library in 1898, and in 1902 of the Newark (N. J.) Free Public Library, which he brought to a remarkable degree of efficiency. He was president of the American Library Association in 1896. He wrote *A Library Primer* (1899), *Notes on Book-Binding for Libraries* (1906), and several chapters in *Modern American Library Economy* (1910 et seq.); and with Henry W. Kent edited *Literature of Libraries in the Seventeenth and Eighteenth Centuries* (6 vols., 1906–07). With C. L. Dana he compiled *Horace: The Roman Poet Presented to Modern Readers* (1908), a selection

of versions of the odes, and published *Copa: The Hostess of the Inn* (1909), a version of the pseudo-Vergilian poem.

DANA, Napoleon Jackson Tecumseh (1822–1905). An American soldier, born in Eastport, Me. He graduated at West Point, and was assigned as second lieutenant of infantry in 1842. During the Mexican War he served in both the northern and the southern campaigns, and in April, 1847, was brevetted captain at Cerro Gordo, where he was severely wounded. In 1855 he resigned and thereafter until 1861 was engaged in the banking business in St. Paul, Minn. On the outbreak of the Civil War he entered the service as colonel of a regiment of Minnesota volunteers, and in February, 1862, was appointed brigadier general of United States volunteers. He served throughout the Peninsular and Maryland campaigns; was seriously wounded at Antietam; became a major general of volunteers in November, 1862; was engaged in various operations in the Department of the Gulf, and then commanded successively the District of Vicksburg, the Sixteenth Army Corps, the districts of West Virginia and Vicksburg, and the Department of the Mississippi. In May, 1865, he resigned from the service, and subsequently took an active interest in railway management, becoming president of the Montana and Union Railway Company in 1885. He was appointed captain and assistant quartermaster U. S. A., by special act of Congress, and retired from active service in 1894.

DANA, Paul (1852–). An American journalist, born in New York City and educated at Harvard and Columbia universities. He joined the staff of the New York *Sun* in 1880 and in 1897 succeeded his father, Charles Anderson Dana (q.v.), as editor; in 1903 he retired. He was also major in the National Guard of New York State in 1883 and was commissioner of public parks of New York in 1891.

DANA, Richard (1699–1772). An American jurist. He was born in Cambridge, Mass., graduated at Harvard in 1718, and soon became one of the leaders of the Massachusetts bar. He was also prominent, as a Whig, in Colonial politics, frequently presided over Boston town meetings, was chosen to administer the oath to Andrew Oliver binding him not to carry out the provisions of the Stamp Act, and in 1770 was a member of the committee appointed to make a careful investigation of the Boston Massacre.

DANA, Richard Henry (1787–1879). An American poet, essayist, and novelist, born in Cambridge, Mass., Nov. 15, 1787. He entered Harvard College in 1804, but remained there only three years. Adopting law as a profession he was admitted to the Boston bar in 1811, but after some activity in politics renounced the practice of law for literature. In 1815 he became associated with the *North American Review*, to which he contributed, and of which he was for a time an editor. He then (1821) started a miscellany, *The Idle Man*, to which his friend Bryant contributed, but which came to an end after the sixth number had been issued. His published works are: *Poems* (1827); *Thoughts on the Soul* (1829), a poem; *Poems and Prose Writings* (1833; enlarged ed., 2 vols., 1850), the best of which were republished in *The Buccaneer and Other Poems* (London, 1844). He did his best work as a critic and had considerable influence in forming the taste of New England in the early part of the century. His poetry was good for the time, but is read little to-day. "The Buccaneer" is probably his best poem; his prose tales, such as "Paul Felton," display imagination, but are poorly constructed.

DANA, Richard Henry (1815–82). An American author, born in Cambridge, Mass., a son of Richard Henry Dana the poet. He developed in early life a passion for the sea and was with difficulty restrained from entering the navy. He entered Harvard, but suffered from weak eyes, and, to cure them, undertook a Pacific voyage as a common sailor, a record of which is given in his sea classic *Two Years Before the Mast* (1840; augmented ed., 1869), a book often republished and translated. On his return Dana reëntered Harvard and graduated in 1837. He studied law and attained eminence in practice. On sea usages and laws he wrote *The Seaman's Friend* (1841), reprinted in England as *The Seaman's Manual*. He contributed to legal journals and to the *North American Review*, wrote *To Cuba and Back* (1859), and edited *Wheaton's International Law* (1866). In 1876 he was appointed Minister to England, but was refused confirmation through a paltry political intrigue and unfounded accusations of plagiarism. He richly deserved the honor because of his patriotism, his high character, and his diplomatic and legal learning. To prosecute studies on international law he went to Europe in 1878. He died in Rome of pneumonia. Consult Adams, *Richard Henry Dana: A Biography* (2 vols., 1890). *Two Years Before the Mast* retains its position as a classic in its kind. A notable edition of it, with an introduction by Dr. Wilfred T. Grenfell and with illustrations, appeared in New York and London in 1911.

DANA, Richard Henry (1851–). An American lawyer, son of Richard Henry Dana (1815–82). He was born in Cambridge, Mass., graduated from Harvard College in 1874 and from Harvard Law School in 1877, and was admitted to the bar in Boston. In 1878–79 he organized the Associated Charities of Boston. He drafted the Civil Service Reform Act of Massachusetts in 1884 and the Australian Ballot Act in 1888, and from 1889 to 1892 was editor of the *Civil Service Record*. His activities in behalf of civil service, taxation, ballot, election, and social reforms led to his being made chairman of the Council of the National Civil Service Reform League. He is author of *Double Taxation in Massachusetts* (1895); *The Corrupt Practices Act* (1906); *The Australian Ballot System of Massachusetts* (1911); *Trent: an Aftermath* (1912).

DANA, Samuel Luther (1795–1868). An American chemist. While chemist of the Merrimack print works he invented a method of bleaching cotton goods which was widely adopted, and discovered that sodium phosphate is a mordant, a fact of considerable importance in the art of calico printing. His writings include *A Muck Manual for Farmers* (2d ed., 1843) and *An Essay on Manures* (1850).

DANA, William Parsons (1833–1927). An American marine, genre, and animal painter, born in Boston. He studied art in Paris under Picot and Le Poitevin and lived in New York and Newport from 1862 to 1870. He then took up his permanent residence in Europe. He depicts the sea in all its phases and reaches a high degree of poetry and sentiment in such marines as "Solitude," exhibited at the Paris Exposition

in 1878, where he was also awarded a medal for his "Gathering Seaweed." Other good examples are "Emby's Admiral" (Pennsylvania Academy of Design, Philadelphia); "Burning Wreck"; "Ebbtide at Yport"; "Chase of the Frigate Constitution," and "Heartsease" (Metropolitan Museum, New York), the best known of his genre pictures, which, though happy in composition, are rather weak in execution. He was elected to the National Academy of Design in 1867.

DANAË, dăn'ā-ē (Lat., from Gk. *Δανάη*). The daughter of Acrisius, King of Argos. According to the legend, an oracle declared that her son would kill his grandfather. Acrisius therefore confined Danaë in an underground chamber or in a tower of bronze. Here she was visited by Zeus in a shower of gold and bore him Perseus (q.v.). Acrisius set mother and child adrift in a chest. They came safely, however, to the island of Seriphos. Danaë remained in the island until Perseus had grown up and become a hero famous for his exploits. She afterward accompanied him to Argos. On his approach Acrisius fled, but was subsequently slain accidentally by Perseus at Larissa. Danaë's story was often told in Greek and Roman tragedy. Rembrandt, Correggio, and Titian have made the picturesque union of Danaë and Zeus the subject of famous paintings, which hang respectively in the Hermitage at St. Petersburg, the Palazzo Borghese at Rome, and the Museo Nazionale at Naples. A second Titian on the same myth is in the Imperial Gallery, Vienna. Consult Gayley, *The Classic Myths in English Literature and in Art* (Boston, 1911).

DANÆUS. See DANEAU.

DANAI, dăn'ā-ī, or **DANAOI,** dăn'ā-oi (Lat., from Gk. *Δαναοί, Danaoi*). A term originally applied to the Argives as the descendants of King Danaüs (q.v.). Homer uses the name as a general designation of the Greeks before Troy.

DANAIDE, dăn'ā-īd (from Lat. *Danaides,* Gk. *Δαναΐδες,* the 50 daughters of Danaüs, condemned, with one exception, to pour water eternally into sieves as a punishment for murdering their husbands on their wedding night at their father's bidding). An early form of water wheel, sometimes called a tub wheel. It resembled a smaller tub set in a larger one, with a free annular space and with a horizontal space between the two bottoms provided with radial floats, arranged spirally. The whole device revolved on a vertical axis, water flowing through it vertically.

DANAIS, dăn'ā-ĭs (Neo-Lat., from Gk. *Δαναΐς,* daughter of Danaüs). A genus of large blue- and brown-winged, strongly marked nymphalid butterflies of the tropics, of especial interest to the students of mimicry and protective coloration. According to Bates and Wallace certain South American species are distasteful to the local birds, monkeys, and other butterfly hunters, and therefore fly about regardless of exposure; and they are "mimicked" by other butterflies, which are eatable, in order to secure immunity through this gradually acquired resemblance. (See MIMICRY.) An Australian species is the bugong "moth," whose grub the aborigines regard as a dainty. (See BUGONG.) The representative of the group in the United States is the familiar milkweed butterfly, formerly classified as *Danais archippus,* now known as *Anosia plexippus.* See MILKWEED BUTTERFLY.

DANAKIL, dä'nä'kĭl. An Ethiopian people, calling themselves Afar. See also AFRICA, *Ethnology.*

DANAO, dä-nä'ō. A town of Cebu, Philippines, situated 4 miles north of Cebu, on the coast, near the mouth of the Danao River (Map: Philippine Islands, E 5). Its harbor is poor, the mouth of the Danao River being choked by a sand bar. The town is very old, having existed from the time of the Spanish conquest. Pop., 1903, 16,173.

DANAÜS, dăn'ā-ŭs (Lat., from Gk. *Δαναός*). In Greek legend, the son of Belus and Anchinoë, grandson of Poseidon, brother of Ægyptus, and originally ruler of Libya. Thinking his life in danger from the machinations of his brother, accompanied by his 50 daughters, known as the Danaides, he fled to Argos, where he was chosen king, after the banishment of Gelanor, the last of the Inachidæ. The 50 sons of Ægyptus followed him and sought the hands of his daughters in marriage. Danaüs consented, but, in fear of treachery or in revenge for his exile, gave each of his daughters a dagger and made them promise to murder their husbands on their wedding night. All did so, except Hypermnestra, who saved her husband, Lynceus. The future of the Danaides was variously told. According to one version, Danaüs found no suitors for his daughters and finally offered them as prizes in a racing contest. They were thus married to the Argive youth and became the ancestors of the Danai. The story of Lynceus was also variously told; according to one version Hypermnestra was forgiven, and Lynceus chosen by Danaüs as his successor. The other version was that Lynceus later slew Danaüs and his guilty daughters. The Danaides in the lower world were condemned to the never-ending task of filling with water a vessel full of holes. The Danaides seem to have been regarded as nymphs of the springs in the plain of Argos; Danaüs is said to have been the first to dig wells for the inhabitants, who thereupon chose him king. The murder of their husbands by the Danaides has been supposed to represent the drying up of the springs and rivers in summer by the nymphs. The tomb of Danaüs, in the Agora of Argos, was shown as late as the time of Pausanias. See DANAIDE.

DAN'BURITE. A silicate of calcium and boron crystallizing in the orthorhombic system. It was first found at Danbury, Conn.

DAN'BURY. A city and one of the county seats of Fairfield Co., Conn., 64 miles by rail north-northeast of New York City, on the Danbury and Highland divisions of the New York, New Haven, and Hartford Railroad (Map: Connecticut, B 4). Noteworthy features include the State normal school, Danbury Hospital, Danbury Agricultural Society, courthouse, State armory, county jail, public library, parks, two soldiers' monuments, and one to General Wooster. The manufacture of hats dates from 1780, and the city in 1914 stood first in that industry in the United States. Other products are machinery for making hats and cutting fur, paper and wooden boxes, underwear, silk, and silver-plated ware. The government is vested in a mayor and a city council, which confirms the mayor's nominations to the police department and elects all other administrative officials. The water works are owned by the city. Pop., (town) 1910, 23,502; 22,325; (city) 1910, 20,234; 18,943.

Danbury was organized as a town in 1687, was incorporated as a borough in 1822, and was chartered as a city in 1889. Supplies were stored here during the Revolution, and in April, 1777, General Tryon destroyed the stores and burned a large number of the buildings. A force pursued, and, in a skirmish at Ridgefield, General Wooster (q.v.) was mortally wounded. Consult Bailey, *History of Danbury, 1684–1896* (New York, 1896).

DAN'BY, Francis (1793–1861). An Irish painter, born at Common, near Wexford, Nov. 16, 1793. He entered the Royal Dublin Society's school and also studied under O'Connor. In 1820 he began to exhibit, at the Institute and Royal Academy, a number of romantic compositions, such as "Disappointed Love" (South Kensington Museum) and "Sunset at Sea after a Storm," which established his reputation. For "The Delivery of Israel out of Egypt" he was made associate of the Academy, and three scenes from the Apocalypse increased his growing popularity; but in 1829 he was forced to leave England on account of a domestic scandal and went to live in Switzerland. After his return in 1840 he settled at Exmouth, where he painted a number of poetical landscapes, usually sunrise or sunset effects, such as "The Fisherman's Home" (National Gallery, London), and the "Evening Gun." He was a painter of imaginative scenes, reproducing his impressions of nature in a fanciful style which sometimes erred on the side of the theatrical. His execution is smooth and thin. His son, James Francis Danby, was a landscape painter of some repute.

DANBY, Frank (Mrs. Julia Frankau) (1864–1916). A British author. She received her education under Mme. Paul Lafargue, the eldest daughter of Karl Marx, and in 1883 she was married to Arthur Frankau. She contributed to the *Saturday Review* and gained popularity as a novelist. Her writings include: *Dr. Phillips, a Maida Vale Idyll* (1887); *A Babe in Bohemia* (1889; 3d ed., 1913); *Eighteenth Century Colour Prints* (1900); *Life of John Raphael Smith* (1902); *The Lives of James and William Ward* (1904); *Pigs in Clover* (1903; 2d ed., 1913); *Baccarat* (1904); *The Sphinx's Lawyer* (1906); *A Coquette in Crape* (1907); *The Heart of a Child* (1908; 2d ed., 1913); *An Incomplete Etonian* (1909); *Sebastian* (1909); *Let the Roof Fall In* (1910); *The Story of Emma, Lady Hamilton* (1910); *Joseph in Jeopardy* (1912; 2d ed., 1913); *Concert Pitch* (1913); *Full Swing* (1914).

DANBY, Thomas Osborne, Earl of (1631–1712). An English statesman, Duke of Leeds after 1694. He entered Parliament in 1665, with Buckingham attacked Clarendon in 1667, and became Treasurer of the Navy in 1671. In 1673 he was appointed Lord High Treasurer and in 1674 was created first Earl of Danby. During five years of power he showed himself a venal and unscrupulous politician and was party to Charles II's shameful negotiations with Louis XIV of France. In 1678 he was accused of carrying on treasonable negotiations with France—partly as a result of Louis XIV's intrigues against him—and imprisoned in the Tower, with some interruptions, for five years, his conviction being delayed by repeated dissolutions of Parliament. The marriage of Mary, daughter of the Duke of York, to William of Orange was due mainly to his persistent efforts, and upon the accession of William III in 1689 he became President of the Council. He was impeached for bribery in 1695, but the charge was not pressed for lack of evidence.

DANCE, George, Jr. (1741–1825). An English architect, born in London. He was associated with his brother Nathaniel in the foundation of the Royal Academy, of whose original members he was for several years the last survivor. Newgate Prison was rebuilt in 1770 from his plans, and the front of the Guildhall was also designed by him. In later life he exhibited chalk portraits.

DANCE OF DEATH. See Death, Dance of.

DANCETTE, dăn-sĕt' (Fr., irregular formation from Lat. *dens,* tooth). One of the lines of partition in heraldry, which differs from indented (q.v.) only in the greater size of the notches. The indentations where the division is *per fess dancette* never exceed three in number.

DANC'ING (from *dance,* from OF. *dancer, danser,* Fr. *danser,* to dance, from OHG. *dansōn,* to drag, from *dinsan,* OS. *thinsan,* to drag; connected with Lat. *tenus,* cord, Gk. *τείνειν, teinein,* Lith. *tensti,* Skt. *tan,* to stretch). The origin of dancing may be traced to a universal desire of expressing emotion by action. At a later period comes the element of pantomime, the suggestion of an *idea* by means of motions. As far into antiquity as history reaches, every dance, whether belonging to civilized or to savage nations, was accompanied by music, or by rhythmic beats on the drum, shells, rattle, sticks, or by clapping of hands. Frequently the dance was accompanied by chants or songs. Records show in a general way that in the very earliest times people danced and sang at the same time; afterward some danced while others sang an accompaniment, and finally musical instruments took the place of voice accompaniment. Ultimately music and the dance separated, the former improving and the latter deteriorating.

A consideration of savage dances as we find them at present (and it is remarkable how world-wide are the principal forms) will give us a general idea of dancing before the beginnings of civilization. Folk dancing may be divided into three groups—*social, warlike,* and *religious.* Under the first may be included all comic and erotic dances. Under the second we have those dances which were used to inspire the warriors before a battle, to celebrate a victory, or to imitate the motions of animals after a successful hunt. The *religious* class comprises medicine, incantation, and mystery dances. Although this general classification does not by any means exhaust the list of savage dances, it will be found that all others are derivative or of merely local importance. In all forms of savage dancing exactness is insisted upon. Each dance has its particular step, and among certain tribes mistakes on the part of the performer are sometimes punished by death. This insistence on absolute precision is characteristic of their idea of dancing. It is a serious business, and even in comic dances the performer maintains an air of absolute gravity. The separate forms of savage dances are too numerous to describe, but of greatest importance are the religious ones. A common custom is the dancing of women while the men are away at war. It is a sort of prayer, for they continue it day and night, believing that by so doing they protect the warriors from evil spirits and from danger. The medicine dances have two purposes—one to

ward off harmful influences; the other, strange as it seems, to keep the patient awake. This latter motive is explained by the belief of some savages that when a man is asleep his soul temporarily leaves his body. When he dies, the departure of his soul is final; if, then, the sick man falls asleep, his soul may take advantage of the opportunity to go away and not return; and consequently the most heroic measures are employed to keep him awake. However, all such ideas apply to particular tribes and are by no means universal. Dancing is universal, but the motives vary from tribe to tribe. In the savage mysteries, as in the Greek, dancing plays an important part; but so great and universal is the secrecy maintained about them that we know practically nothing of the elaborate dances used. One of the most sacred rites is the initiation of a lad to manhood. Sword, snake, and fire dances are especially developed among the American Indians.

Ancient Dances. In Egypt dancing reached a state of considerable excellence, for, although Egyptian dances were monotonous and unimaginative, the use of the body and of the hands and arms was carried to great perfection. Their most important dances—those in honor of the dead—were slow and gliding, but they had also many lively forms. Being almost entirely religious, most of their dancing consisted of men and women in procession. The *pirouette* in particular was developed in Egypt about 4000 years ago. As dancing was never, at least in the early and middle empires, practiced by the higher classes, its cultivation was carried on wholly from the religious and spectacular standpoints. See Egyptian Music.

Hebrew dancing was essentially a religious rite. It was an act of praise, and no religious festival or feast was complete without dances. Miriam, leading out the women in a dance, is typical of a form used in Arabia to-day. It should be noticed that each sex danced by itself, and that in this particular Hebrew dancing differed from its Egyptian prototype. See Hebrew Music.

When we come to Greece, we approach the golden age of the art of dancing. Here for the first time it ranked with poetry and music, and, as Lucia expresses it, dancing and music were "the married pair." This relation was known as *orchesis*. Heretofore dancing had represented emotions; now it was also made to represent ideas, and pantomime arose. Hands and arms were used still more than legs; but an atmosphere of gayety and expressiveness foreign to Oriental nations was created. The Greeks were a cheerful nation, whose sense of dignity did not interfere with their dancing, as it did in the case of the Romans; and as long as their morality remained unshaken the dance retained its purity. It was at first religious, then educational, and finally popular. There were four great classes of sacred dances—the *Emmeleia*, the *Hyporchema*, the *Gymnopædia*, and the *Endymatia*. From these four types the later forms were derived. The characteristics of the first were its gentle gravity, strength, and nobility. It was danced without the support of either a chorus or a voice. The second class was danced by both men and women and was of a dignified, elevated character, usually with a chorus. The *Gymnopædia* was a favorite of the Lacedæmonians in the festivals of Apollo. It was danced by youths and was often a preliminary to the wild Pyrrhic dance. In the last, the *Endymatia*, the performers wore most brilliant clothes, and this was the first of all the sacred dances to lose its sacred character and become merely a popular dance. The military dances came later and were principally educational. They were divided into two groups: (*a*) Pyrrhic and (*b*) Memphitic. The first was really a military pantomime and was used especially at festivals in honor of Minerva. It was danced by both men and women, was wild and rapid, and finally degenerated into the rites of Bacchus. The Memphitic was less warlike and wild, but its general character was the same. On the Greek stage there were tragic, comic, and satiric dances. The costumes and scenic arrangements were often elaborate, and the evolutions were accompanied by choral song. The forms were multitudinous, and the performers became so adept in the expression of emotions that the sculptors and painters of Greece selected them as their models, and it is from Greek sculpture we get most of the history of the Greek dancing. Although the pantomime was introduced first in Greece, it never reached the height of perfection which characterized it among the Romans.

Rome borrowed her dances, but adapted and made them more vivid. The *Belicrepa* was a war dance said to have been invented by Romulus. The Salian dance was the original of many later forms and was danced by the priests of Mars. Later the Romans took some forms from Etruria and still others from Greece. One of the most interesting of their dances was the May-day dance, which corresponded to the flower dance of the Greeks. It is really the original of the old English May-day sports, for, as in England, the youths and maidens danced out into the fields, gathering flowers and branches, returning to the city again to continue their dancing. Upon the deterioration of Greek power Rome inherited its arts, and among them its dances, to which she added more pantomime and an increasing use of the saltatio, or leap. In the reign of Augustus the dance was introduced into the theatre. It became widely popular, there being at the time about 3000 foreign women dancers in Rome. At this time pantomime had reached its height, fable, history, poetry, all being perfectly expressed in mute action. The most cultured persons studied the art; but under Nero and his successors the decline began, dancing became exaggerated and licentious, and, falling into disrepute, was shunned by the higher orders.

Early and Mediæval Dances. After the fall of Rome dancing as an art practically disappeared. Christianity at first encouraged it as an inheritance from the Jews; St. Basil recommended the practice of the dance on earth because it was the principal occupation of the angels in heaven, and sacred dances were given on feast days and later every Sunday. In reality they were hardly so much dances as processions, each sex going through the evolutions separately. Gradually, however, they degenerated from their solemn character, and in 692 were expressly forbidden by the Church, though they still lingered in some localities for a considerable length of time. There are curious survivals of these old church dances, such as *Los Seises* (q.v.), which is still performed annually by the choir boys in the cathedral at Seville, on Corpus Christi and the Immaculate Conception; the

Guilia di San Paolino is a ritual dance performed on June 26, in front of the cathedral of Nola, near Naples, in honor of San Paolino, who, on his return from Barbary, was met by a procession of the citizens of Nola. Meanwhile the simpler forms of the dance had been preserved by the peasants of Gaul, who kept them alive until they were taken up by the knights and nobles. In Spain the heritage of dances left by the Romans was more or less imperfectly preserved. Even the Arab invasion could not completely destroy the old forms; and there are some dances used at present in Spain, such as the *Turdion* and *Gibidana*, which date from about the twelfth century. Liveliness is characteristic of early as well as later Spanish dances.

Dancing in Germany and England developed along the lines originated by the barbaric nations which governed their early history. In England the egg dance and the Carole were derived from Saxon sources. The Morris dance was introduced in the reign of Edward III. All English dances are lively and varied in motion. In Germany, war, funeral, and harvest dances were among the earliest popular kind, and with the formation of the guilds each trade adopted its characteristic dance. Hans Sachs gives an excellent description of the Schönpart, which was a carnival dance peculiar to the city of Nuremberg. From the thirteenth century on, each class of society had its own dances; but there were two general classes—the "circular dance" and "the measure." The first was a rapid, uneven sort of dance; the second, a slow, gliding movement.

Modern Dances. The revival of dancing as an art began in Italy in the fifteenth century. The Renaissance awoke an interest in dancing as well as in the other arts, and ballets were given on an elaborate scale. Catharine de' Medici introduced the fashion into France, and from that time on France has led the world in the refinement of its dances and the gracefulness of its performers. It borrowed dance forms from almost every civilized country, but so adapted and changed them that their value was immeasurably increased. The origin of modern French forms may be traced to the *danses basses* and the *danses hautes* of the sixteenth century. The former were so called because of their slow, even motion; they were practiced by the nobility. The *danses hautes* were lively, jumping dances and were performed only by the country people and the lower classes. Later the *galliard*, *courante*, and *volta*, which were of a more lively character than the old court dances, were introduced; and still later the *branle* became popular. It was a dance of exceedingly varied character, each province having its own form, the *passepied* of Bretagne and the *minuet* of Poitou being branles. Court entertainments had developed into formal ballets, and Richelieu gave many famous performances during the reign of Louis XIII, while Louis XIV was himself an enthusiast of the dance, founding in 1661 the Academy of the Dance. In the seventeenth century many of these court dances were enjoyed for the sake of the music alone, and the idea arose of playing several of them in succession as a merely instrumental entertainment. Out of this custom originated the suite. The suites of Bach, Handel, and Corelli contain excellent examples of some of these old dances. In Italy these groups of dances were early known as *Sonate da Camera*. As the classic composers used these old dance forms, so modern composers have utilized more recent dances in their compositions. Thus the *csárdás* is found in Liszt's *Hungarian Rhapsodies;* the *seguidilla* in Bizet's *Carmen;* and there is a charming series of Spanish dances in Massenet's *Le Cid*. The list of national dances is large, but the most representative are the *seguidilla, cachucha, fandango*, and *bolero* of Spain; the *tarantella*, the *saltarello*, and the *forlana* of Italy; the *mazurka* and the *polonaise* of Poland; the *cainca* of Russia; the *reel* and the *Highland fling* of Scotland; and the *jig* in Ireland and Wales. Numerous classes of national dancers have arisen, of which the Bayederes or Nautch girls in India and the Geishas in Japan are well-known examples. In all the Eastern countries the dance is really a sort of pantomime containing a series of gestures, postures, and mimicries.

Of the more popular modern dances, the *quadrille* is probably the oldest. Its recent development dates from 1815, but before that time it was common in Europe for centuries. The *lancers* was invented in 1836; the *polka* was introduced about 1835; and the *waltz*, from Germany, about 1795. The *two-step* is of American origin. During the nineteenth century, owing to the growing popularity of the dance as a theatrical entertainment, the purely social variety has tended to follow the theatre, as it has not done before. Until 1850 the ballet reigned supreme, and private dancing was popular, but with the decline of the stage type in favor of the high kickers and skirt dancers, the waltz, too, which had reigned supreme in social life, became spiritless and out of joint with the times. Of course, in countries like Spain, where the dance is part of the national life and not a social occupation, there was no change. In England, France, and America during this period the dance was engaged in perfunctorily at formal balls, and it was not until the introduction of the two-step about 1890 that interest revived. A few years later, in 1896, Isadora Duncan, a young American girl, after having received little recognition in America, appeared in France in a revival of classic dances and took Paris by storm. After her followed Maud Allan and Adeline Genee. Ruth St. Denis then gave her interpretation of Oriental dances, most famous of which was the Nautch dance. With the visit of ballet performers from the Russian Imperial School to other European capitals, public interest began to revive. In 1911 the "negroid and animal" dances began by the introduction of the *turkey-trot* in San Francisco, Cal. In its train followed the *bunny hug*, the *grizzly bear*, the *Texas Tommy*, and others, all variations of the *turkey-trot*, which spread rapidly over Europe and America. Even more popular proved the *tango* (Tango Argentina), a dance of doubtful character from the Argentine Republic, which being expurgated created a dansomania on the Eastern and Western continents. For a discussion of the development of the *ballet*, see that article. There is no authoritative and comprehensive history of dancing, but the best works are: Grove, and collaborators, *Dancing* (London, 1895); Vuillier, *A History of Dancing*, trans. from the French (New York, 1897); Giraudet, *Traité de la danse* (Paris, 1900), which gives exact descriptions of a great number of dances; Cahusac, *La danse ancienne et moderne* (La Hague, 1754), which,

although completely out of date, contains much of historical value; and Emmanuel, *La danse grecque antique d'après les monuments figurés* (Paris, 1896); Flitch, *Modern Dancing and Dancers* (London, 1912); Caffin, *Dancing and Dancers of Today* (New York, 1912). See also Allemande; Bayadere; Bolero; Cachucha; Canarie; Cancan; Carmagnole; Chaconne; Corroboree; Cotillon; Country Dance; Courante; Csárdás; Egg Dance; Fandango; Farandole; Fire Dances; Flower Dance; Galop; Gavotte; Geisha; Highland Fling; Hormos; Hornpipe; Jig; Jota; Kirmess; Lancers; May Dance; Mazurka; Medicine Dances; Minuet; Morris Dance; Nautch; Passepied; Pavane; Polka; Polonaise; Pyrrhic Dance; Quadrille; Redowa; Reel; Rigadoon; Salmon Dance; Sarabande; Schottische; Seguidilla; Siciliana; Coverley, Sir Roger de; Snake Dances; Sun Dances; Skirt Dances; Strathspey; Sword Dances; Tambourin; Tarantella; Tarasque, La; Torch Dance; Waltz.

DANCING FAUN. An antique bronze representing a faun dancing and snapping his fingers to mark the time. It was discovered in 1853 in a house in Pompeii, hence known as the House of the Faun.

DANCING GIRLS. See Bayadere; Geisha; Nautch.

DANCING MANIA. A form of epidemic disorder allied to hysteria (q.v.), and evidently the result of imitative emotions acting upon susceptible subjects, under the influence of a craving for sympathy or notoriety. There is little doubt that imposture entered to a considerable extent into all the epidemic forms of the dancing mania, which indeed were usually attended by consequences that showed clearly the presence of impure motives; but there is also evidence that in many cases the convulsive movements were really beyond the control of the will, whatever may have been the original character of the motives that promoted them. Epidemics of this sort were common in Germany during the Middle Ages; in Italy a somewhat similar disease was ascribed to the bite of a spider called the tarantula (see Tarantism); and similar convulsive affections have been witnessed in Abyssinia, India, and even in comparatively modern times and in the most civilized countries in Europe, under the influence of strong popular excitement, especially connected with religious demonstrations. The true dancing mania of the Middle Ages, however, prevailed chiefly in the crowded cities of Germany.

In July, 1374, there appeared at Aix-la-Chapelle assemblies of men and women who began to dance on the streets, screaming and foaming like persons possessed. The attacks of this mania were various in form, according to mental, local, or religious conditions. The dancers, losing all control over their movements, continued whirling in wild delirium till they fell in extreme exhaustion, and groaned as in the agonies of death; some dashed out their brains against walls. When dancing, they were insensible to external impressions, but were haunted by visions, such as of being immersed in a sea of blood, which obliged them to leap high, or of seeing the heavens open and the Saviour enthroned with the Virgin Mary. The frenzy spread over many of the towns of the Low Countries. Troops of dancers, inflamed by intoxicating music and followed by crowds, who caught the mental infection, went from place to place, taking possession of the religious houses and pouring out imprecations against the priests. The mania spread to Cologne, Metz, and Strassburg, giving rise to many disorders and impostures and much profligacy. Exorcism had been found an efficacious remedy at the commencement of the outbreak; and in the beginning of the sixteenth century Paracelsus, that great reformer of medicine, applied immersion in cold water with great success. At the beginning of the seventeenth century the St. Vitus's dance, as the affection was called (see Chorea), was already on the decline; and it now occurs only in single cases as a sort of nervous affection. For a detailed account of the phenomenon, consult Hecker, *The Dancing Mania of the Middle Ages* (3d ed., London, 1859), from which much of the above account is abridged.

DANCLA, dän'klä', Jean Baptiste Charles (1818–1907). A French violinist and composer. He studied under Baillot, Halévy, and Berton, and gained many prizes for his proficiency. In 1857 he was appointed professor of the violin at the Paris Conservatory and had many eminently successful pupils. He was famous for his execution and tone as a player, as much as for his many successful compositions, notably his *Etudes*, and exercises for the violin.

D'ANCONA, Alessandro. See Ancona.

DANCOURT, dän'kōōr', Florent Carton (1661–1725). A French dramatist and actor. He was born at Fontainebleau, Nov. 1, 1661, and was educated by the Jesuits. He practiced law for a time, but after marrying an actress, Thérèse Lenoir de la Thorillière, took to the stage, and in 1685 the two appeared as actors at the Théâtre Français with popular success and royal favor. In that year his first play, *Le notaire obligeant*, won applause. It was followed by many others, of which *Le chevalier à la mode* (1687) is his best. In 1718 he retired from Paris and the stage and occupied his declining years with a metrical version of the *Psalms* and a sacred tragedy. He died at Courcelles (Indre et Loire), Dec. 6, 1725. His rather farcical comedies are best when dealing with middle and low life and the peasantry. They are easy and witty in dialogue, realistic in treatment, and not infrequently introduce events and persons of passing notoriety. His two daughters, Manon and Mimi Dancourt, also became distinguished members of the Théâtre Français. Dancourt's *Works* were collected in 12 vols. (1760), his select *Works* in 5 vols. (1810), and, in 1884, an edition of Dancourt's best plays appeared under the title of *Théâtre choisi*, with a preface by F. Sarcey, the eminent dramatic critic. Consult Lemaître, *La comédie après Molière et le théâtre de Dancourt* (Paris, 1882).

D'ANCRE, dän'kr'. See Ancre.

DAN'DELION (Fr. *dent de lion*, tooth of a lion, referring to the teeth on the leaves), *Taraxacum officinale*. A stemless perennial or biennial plant of the family Compositæ, native to Europe and Asia, and now common in all temperate countries. A red-seeded dandelion (*Taraxacum erythrospermum*) occurs in dry situations from Maine to Pennsylvania. This plant is usually smaller and the leaves more divided than those of the common dandelion. The dandelion is used to a considerable extent, both in Europe and the United States, for greens, and the blanched leaves for salads. Several im-

proved varieties, mostly of French origin, are in cultivation. The root is employed in medicine and is sometimes ground and used to adulterate coffee. The plant called the fall dandelion is *Leontodon autumnalis*. For illustration, see SALAD PLANTS.

DAN'DIE DIN'MONT. See TERRIER.

DANDIN, dŭn'dĕn. A Sanskrit author who is believed to have flourished in the latter part of the sixth century A.D. He composed a well-known Sanskrit novel, or series of stories, entitled *Daśa-kumāra-carita*, or *Adventures of the Ten Princes*, a sort of romance of roguery. He is also the author of a valuable rhetorical treatise entitled *Kāvyādarśa*, or *Mirror of Poetry*, and some scholars, like Pischel, have sought to ascribe the Sanskrit play *Mṛccha-kaṭikā* (q.v.) to his pen. Dandin was probably the earliest of the Sanskrit novelists whose works are extant, preceding Subandhu, the author of the romance *Vāsavadattā*, which formed the model for Bana's *Kādambarī*. Dandin's works have been edited several times: *Daśa-kumāra-carita* (London, 1846; ed., with native commentaries, Bombay, 1883–89; also, with notes by Bühler and Peterson, ib., 1873–91), and translated into English by Jacob, under the title *Hindoo Tales* (London, 1873), by Bhattacharyya (Calcutta, 1899—incomplete), into French by Fauche (Paris, 1862), and into German by J. J. Meyer (Leipzig, 1902). There is an edition with German translation of the *Kāvyādarśa* by Böhtlingk (ib., 1890).

DANDOLO, dän'dô-lô. A famous Venetian family, already powerful in the seventh century, which furnished four doges.—The most illustrious of its members was ENRICO DANDOLO, born about 1120. Eminent in learning, eloquence, and knowledge of affairs, he ascended from one step to another until in 1171 he was sent as Ambassador to Constantinople and in 1193 became Doge. In this latter capacity he extended the bounds of the Republic in Istria and Dalmatia, defeated the Pisans, and took part in the Fourth Crusade (q.v.). By this Venice obtained great possessions in the Ionian Sea and the Archipelago, several harbors and tracts of land on the Hellespont, in Phrygia, the Morea, and Epirus, and also, by purchase, the island of Crete. Soon after the conquest of the Byzantine Empire by the Crusaders Dandolo died (June, 1205) in Constantinople and was buried in the church of St. Sophia. His monument was destroyed by the Turks at the taking of Constantinople in 1453.—ANDREA DANDOLO, Doge from 1343 to 1354, was the author of a Latin chronicle recording the history of Venice from the pontificate of St. Mark to the year 1339 in 10 books. The last seven books are printed in Muratori, *Rerum Italicarum Scriptores*, vol. xii. Consult Kretschmayr, *Geschichte von Venedig*, vol. i (Gotha, 1905); Simonsfeld, *Andreas Dandolo und seine Geschichtswerke* (Munich, 1876).

DANDOLO, VINCENZO, COUNT (1758–1819). An Italian chemist and agriculturist. He was born in Venice, studied at Padua, and became a chemist in his native city. When Venice came under Austrian rule, he went to Milan, where he became a member of the Grand Council of the Cisalpine Republic. He went to Paris in 1799, but soon afterward returned to the vicinity of Milan and engaged in scientific agriculture. In 1805 Napoleon made him Governor of Dalmatia, where he proved himself an excellent officer. In 1809 he returned to his estate near Varese, where he contributed much to the progress in silkworm culture, and distinguished himself by draining marshes and introducing better methods of agriculture. He published *Fondamenti della fisicochimica applicati alla formazione de' corpi e de' fenomeni della natura* (6th ed., 1796), and *Il buon governo de' bachi da seta* (1816).

DANDRIDGE, N(ATHANIEL) PENDLETON (1846–1910). An American surgeon, born in Cincinnati, Ohio. He graduated from Kenyon College in 1866, studied at the Medical College of Ohio and also in Paris and in Vienna, and received his M.D. from the College of Physicians and Surgeons (Columbia) in 1870. From 1880 to 1907 he served as professor of surgery at Miami Medical College, and he was surgeon to the Cincinnati Hospital and to the Episcopal Hospital for Children. In 1903 he was president of the American Surgical Association.

DAN'DRUFF. See HAIR; PITYRIASIS.

DANDURAND, dän'dụ-rän', RAOUL (1861–). A Canadian lawyer and statesman, born at Montreal and educated at Montreal College and Laval University. He studied law, was admitted to the bar in 1883, and rapidly gained an extensive practice, being acknowledged as one of the leaders of the provincial bar. He was prominent as a local organizer of the Liberal party, and served as member of the Royal Commission on Education in the Province of Quebec in 1910. He was appointed a member of the Senate in 1898, was Speaker of the Senate in 1905–09, and in the latter year became a member of the Privy Council. He published a treatise on criminal law and manuals for police officers and justices of the peace.

DANDY FEVER. See DENGUE.

DANE, GREAT, or GERMAN BOARHOUND. See HOUND.

DANE, NATHAN (1752–1835). An American legislator and jurist, born in Ipswich, Mass. He graduated at Harvard in 1778, studied law in Salem, began to practice in 1782 at Beverly, and was successively a member of the Massachusetts House of Representatives, the Continental Congress, and the Massachusetts Senate. In addition, he was appointed on various commissions to codify or revise the laws of the Commonwealth and was judge of Common Pleas. While in Congress, he was a member of the committee appointed to draw up an ordinance for the government of the Northwest Territory and made the original draft of that document, though in a larger sense it seems that Manasseh Cutler (q.v.) probably deserved the credit of authorship. The question of the relative credit due to each man has, however, been much debated. He was a member of the Hartford Convention (q.v.) in 1814. Dane contributed $15,000 towards founding the Harvard Law School, and the Dane professorship of law was named in his honor. He published *A General Abridgment and Digest of American Law* (1823–29) and an *Appendix* (1830).

DANEAU, or **DANÆ'US,** dă'nô', LAMBERT (c.1530–95). A French Reformed theologian. He was born at Beaugency; studied law at Orléans, Paris, and Bourges; became a Protestant in 1560; was preacher in France (1561–72); fled to Geneva on the outbreak of the St. Bartholomew massacres (Aug. 24, 1572), preached in various places, was pastor and

professor of theology at Leyden (1581–82), and died at Caspres, Nov. 11, 1595. He was the author of many learned volumes, the most famous of which is his *Ethica Christiana* (1577; 7th ed., 1640), the first Protestant attempt at a system of morals apart from dogmatics. For his life, consult Paul de Félice (Paris, 1882).

DANEBROG, dän'*e*-brōg, Order of. The second in rank of the Danish orders, instituted by Waldemar II in 1219. According to tradition the order was founded in honor of the banner of Denmark, which graciously fell from heaven for the inspiration of the army. In 1500 the order was suppressed, but reinstituted in 1671, by Christian V. In 1808 Frederick VI made it an order of merit for all the Danish people. The Danebrog has four degrees, besides a class composed of those on whom the cross has been bestowed for certain meritorious services, but who are not members strictly of the order. These are known as "Danebrogsmænd." The decoration of the order consists of a cross of gold *pattée*, enameled with white, and bordered with red or gold. Consult Werlauff, *Om Danebrog og Danebrogsorden* (Copenhagen, 1872).

DANEFF, dä'nĕf', Stojan (1858–). A Bulgarian statesman, born in Shumla and educated in Bohemia and at Heidelberg and Paris. He became a member of the Commission of Codification after the Russo-Turkish War and in March, 1901, entered the cabinet as Minister of Education and the Interior.

He was Prime Minister and Minister of Foreign Affairs from January, 1902, to May, 1903, heading a Tzankovist (anti-Stamboulovist) cabinet and floating a foreign loan. In January, 1910, he was sent to Constantinople and secured momentary relief from the outrages of the Young Turks in Macedonia. In March, 1911, he formed a cabinet which survived only a few days. Then, when Gueshoff's ministry, a coalition of the Progressive and Nationalist parties, came into power, Daneff became President of the Chamber (Sobranje). He was one of the three Bulgarians delegated in November, 1912, to carry on the negotiations with Turkey over the armistice and one of the three sent in December to London for the Balkan-Turkish Peace Conference, in which he and Venezelos of Greece were the leading figures. On May 30, 1913, he signed for Bulgaria the Peace of London between Turkey and the Balkan allies. In June of the same year he formed a new cabinet in Bulgaria.

DANEGELD, dän'gĕld, or **DANEGOLD,** dän'gōld' (AS. *Dene*, Danes + *geld, gild*, payment, Goth. *gild*, tax, OHG. *gelt*, Ger. *Geld*, money). A tax of two shillings upon each hide of land, first levied by the Witan under the Saxon King Ethelred the Unready, in 991. It was probably the first money taxation imposed in England and was used as tribute money to buy off the Danes. The tax was collected five times within 21 years. Edward the Confessor abolished the impost, but William the Conqueror revived it and, in 1084, demanded from each hide of land, not held by himself in demesne, or by his barons, a sum of six shillings, or three times the old rate. Stephen (1135–54) promised to abolish Danegeld, but it was not repealed till Henry II's time (1163). A similar tax on land, however, was still levied under another name. See Carucate.

DANELAW, or **DANELAGH,** dān'lą' (AS. *Dene*, Danes + *lagu*, Eng. law). The name applied to that part of England which by the provisions of the Treaty of Wedmore or Chippenham, in 878, was ceded to the Danes by Alfred the Great. It included Northumbria, East Anglia, Essex, and the northeastern part of Mercia, the boundary line being constituted partly by the rivers Thames, Lea, and Ouse and by the ancient Roman road of Watling Street. Within this region the laws and customs of the Danes were distinctly recognized and were later enumerated by Canute. The term "Danelaw" is used in contradistinction to Mercian and West Saxon law until after the reign of Stephen (1135–54).

DAN'ENHOW'ER, John Wilson (1849–87). An American Arctic explorer, born in Chicago. He graduated at the United States Naval Academy in 1870, served for a time in the line and on the coast survey, and in 1878 joined the *Jeannette* expedition for polar research, commanded by Lieutenant De Long, U. S. N. The ship was crushed in the ice, June, 1881, in lat. 77°, long. 157° E. Traveling by sleds, the crew reached Bennett's Island, July 27, whence they embarked in three whaleboats for the Siberian coast. The one containing Lieutenant Danenhower and 10 others, in command of Chief Engineer G. W. Melville, arrived at the Lena delta in September. Danenhower reached New York in June, 1882, and was compelled by an affection of the eyes to desist from further explorations. He published *Narrative of the Jeannette* (1882).

DANES ISLAND. A small island off the northwest coast of Spitzbergen (Map: Arctic Region, G 4). Andrée started from here for the North Pole, July 11, 1897.

DANE'WORT. See Elder.

DAN'FORTH, Moseley Isaac (1800–62). An American engraver, born in Hartford, Conn. He was one of the founders of the New York Drawing Association (1825) and of the National Academy of Design (1826). He lived in London for 10 years, during which time he executed some well-known drawings of the Elgin Marbles and many of his best plates, among which are the "Sentry Box," "Don Quixote," and portraits of Washington Irving, Walter Scott, after Leslie, and others. On his return to America he worked principally upon bank-note engraving and became vice president of the American Bank-Note Company.

DANGEAU, dän'zhō, Philippe de Courcillon, Marquis de (1638–1720). A French courtier. After commanding the King's regiment he became aid-de-camp to Louis XIV, and in this capacity took part in the principal campaigns of the period. In 1667 he was appointed Governor of Touraine. He was a favorite at Versailles, enjoyed the fullest confidence of the King, and was the patron of Boileau, who addressed to him the well-known satire on the nobility. He was frequently sent on diplomatic missions, and he encouraged the marriage between Mary of Este (Modena) and James II of England. The *Journal* of Dangeau, a diary from 1684 to his death, is a dull but valuable historical document; the best edition is in 19 vols. (Paris, 1854–60).

D'ANGOULÊME, dän'gōō'lâm'. See Angoulême.

DANHAUSER, dän'hou-zēr, Joseph (1805–45). An Austrian historical and genre painter. He was born in Vienna, studied at the Vienna Academy under Peter Krafft, and first appeared

as an historical painter with scenes from the *Rudolph von Habsburg* (Vienna, 1824) of Johann Ladislaus Pyrker. At Pyrker's invitation he went to Venice, where he studied the great Venetian masters. On his return he determined to attempt genre subjects, in which he was very successful. He had abundant humor and fancy and chose his subjects generally from the life of the upper bourgeoisie in old Vienna. He introduced into his pictures a personal note, hitherto lacking in that style of painting, which with their fine and delicate color distinguishes them from those of his contemporaries. He also painted religious pictures, including "The Martyrdom of St. John" (1834), in the cathedral of Erlau; "Hagar and Ishmael" (1835), in the Vienna Museum. Among his genre pictures are "The Gourmand" (1836), "The Grandmother" (1843), both in the Vienna Museum, and "Liszt at the Piano" (1840).

DANICAN, dȧ'nē'kăn', François André. See Philidor, François André Danican.

DANIČIČ, dä'nē-chich, Gjuro (1825–82). A Servian philologist, born in Neusatz. He studied at Pesth and Vienna, became librarian of the National Library at Belgrade, and afterward professor of the history of literature in the University there. In 1877, under commission of the Academy of Sciences at Agram, he began the compilation of the Servian-Croatian Dictionary, of which he finished but three parts. His works further include a Servian grammar (1863; 8th ed., 1892), a concordance to old Servian literature (1863; 3d ed., 1864), and a history of the Servian and Croatian languages (1874).

DANIEL (Heb., God is my judge). In the Book of Ezekiel (xiv. 14, 20, and xxviii. 3) a personage with this name is introduced between Noah and Job as a well-known type of wisdom and righteousness. If these passages were written by Ezekiel, they would seem to show that Dăniel was already, before the fall of Jerusalem in 586, regarded as an ancient hero, but some scholars consider them as late interpolations based on acquaintance with the Book of Daniel. There is a reference to Daniel's experience in the lions' den in 1 Macc. ii. 60, but this book was not written before c.100 B.C., and it is held by many interpreters that the speech of Mattathias is the work of the author or has at least been edited by him. Daniel is not mentioned among the famous men whose praise is sung in Ecclus. xliv, ff. It is not necessary, however, to suppose that the author was ignorant of Daniel; as in the case of Ezra, he may have had reasons for leaving him out. In the book that bears his name Daniel is represented as a Jewish captive carried to Babylon in the third year of Jehoiakim (i.e., 606 B.C.), who through his supernaturally imparted wisdom rose to a position as ruler of the Province of Babylon and chief of the wise men of Babylon in the time of Nebuchadnezzar (ii. 48), and as one of the three presidents who were set over the satraps in the reign of Darius the Mede (vi. 2). According to i. 21 his career extended until the first year of Cyrus; according to x. 1 he is said to have had visions as late as the third year of Cyrus, but the oldest Greek version has the first year of Cyrus, and the editorial superscriptions may be late. In Matt. xxiv. 15 and Mark xiii. 14 he is called "Daniel the Prophet." Many scholars entertain grave doubts as to the historic existence of Daniel because of the character of the book that forms our only source. See Daniel, Book of.

DANIEL, Book of. One of the canonical books of the Old Testament. In the Hebrew Bible it is not counted among the Prophets, but has its place among the Writings, or Hagiographa. (See Bible.) This is in harmony with the rabbinic arrangement of the triple canon at the end of the second century A.D., which is preserved in *Baba bathra*, 13 b, 14 a. On the other hand, the Greek version places the book after Ezekiel, and in the Latin Vulgate and all modern translations (except those made by Jews and some recently produced by Christian scholars, who follow the order in the Hebrew Bible) it appears as one of the four *prophetæ majores*. In all probability, this is more original, as Daniel is counted by Josephus as among the Prophets, and the New Testament refers to "Daniel the Prophet." The influence of the book in fanning the Messianic hope which led to so many disenchantments and its use in Christian apologetics naturally account for its relegation to the third canon. There is no reason to believe that any Jewish scholars of the tannaitic period looked upon it as later than the time of Ezra and therefore excluded it from the prophetic canon.

The book consists of 12 chapters: chaps. i–vi contain stories concerning Daniel and (chap. iii) his friends; vii–xii visions told by Daniel himself. The first chapter relates how Daniel was brought to Babylon by Nebuchadnezzar in the third year of Jehoiakim (606 B.C.). With Daniel are three other youths of noble descent—Hananiah, Mishael, and Azariah. Babylonian names are given to them in place of their Hebrew ones, Daniel being called Belteshazzar, while the other three are called Shadrach, Meshach, and Abednego. They are portrayed as being in the royal service, but also as steadfast in their fidelity to their God, declining to partake of the food provided for them for fear of polluting themselves. God rewards them for this, and when brought before the King they are found 10 times superior to the Babylonian magicians, Daniel excelling every one in the matter of visions and dreams. In the second chapter proofs are given of Daniel's supernatural wisdom; he saves the lives of the magicians as well as his own by his ability not only to interpret Nebuchadnezzar's dream, but also to tell him what the dream was. The King had seen a great image with its head of gold, and other parts of the body of silver, brass, and iron. The gold is interpreted to refer to the Babylonian Empire, the other three metals to the kingdoms that are to follow the Babylonian. The image is destroyed by a stone quarried without human intervention out of a mountain, and this destruction symbolizes the disappearance of all the kingdoms. The third chapter tells of the fiery furnace into which the three friends of Daniel are thrown because of their refusal to worship the golden image which Nebuchadnezzar had set up and how they came out of the furnace unscathed. In the fourth chapter Nebuchadnezzar issues a proclamation to all peoples of the world, declaring, in consequence of Daniel's success in interpreting another of his dreams, his intention of glorifying the King of Heaven. The dream itself consists of a vision of the uprooting of a great tree with its numerous branches, under which all birds have shelter and which feeds all mankind. The vision, as interpreted by Daniel, forebodes the downfall of the kingdom, and the

King himself is humbled by being bereft for a time of his reason and conducting himself like an animal. The fifth chapter recounts a great feast arranged by Belshazzar (q.v.), during which the mysterious writing appears on the wall as a punishment for the King's desecration of the sacred vessels of Jerusalem, which Nebuchadnezzar had brought to Babylon (i. 2). Daniel succeeds in reading and interpreting the handwriting, which predicts the overthrow of Belshazzar, who indeed is slain that very night. The crown passes to Darius the Mede. The sixth chapter introduces King Darius, who, at the instance of his nobles, issued a decree forbidding any one for the space of a month to pray to or ask a petition from any one except Darius. Daniel, as a pious Jew, accustomed to pray thrice daily, disobeys and is thrown into a den of lions. By divine protection Daniel escapes the fate of being torn to pieces. He is taken out of the den, and his accusers are thrown into it and at once are torn to pieces by the lions. The first of Daniel's visions (chap. vii) is of four beasts, the last having 10 horns, from each of which in turn supremacy is taken away, until it is finally given to one like a man, probably the angel Michael as the celestial representative of the Jewish people. In the second vision (chap. viii) he sees a ram pushing in all directions with its two horns, which are eventually broken through a he-goat with a notable horn between its eyes. In time the kingdom of the he-goat is broken, and in its place four other horns arise, and out of one of these comes forth a little horn which exalts itself even against the host of heaven and against God Himself, destroying His sanctuary and interrupting the daily service for 2300 evenings and mornings. In the third vision (chap. ix) the angel Gabriel appears to Daniel and explains that the 70 years of desolation prophesied by Jeremiah (xxv. 11; xxix. 10) will be 70 weeks (of years), after which the guilt of the people will be atoned for. In the last vision, which comes to him in the third year of Cyrus (chaps. x–xii), an angel reveals to Daniel glimpses of the future. Under veiled names the doings and fate of various kings are described. After the last of these has disappeared, the end comes when the heavenly kingdom is established, and the dead are raised—some to eternal glory, others to eternal shame. But Daniel is bidden to seal the vision until this time, and to go to his rest.

The book is written in two languages: chaps. i. 1–ii. 4a, viii–xii, are in Hebrew, while ii. 4b–vii are in Aramaic. The Aramaic is not of the Mesopotamian or Babylonian type, but is the Judæan dialect. Many theories have been propounded to account for the two languages. Some scholars have thought that the author began his work in Hebrew, but was led by his desire to reproduce the words of the Chaldæans accurately to change into the Aramaic, which they spoke, and then returned in chap. viii to the Hebrew in order to conceal from outsiders in the sacred tongue the allusions in the visions which were meant only for the wise men of his own people. A modified form of this view makes him wrongly suppose that the Chaldæans spoke Aramaic and were ignorant of the distinction between East and West Aramaic. Quite a number of scholars have suggested that the whole work was originally written in Hebrew, but that, some chapters having been lost through an accident, they were replaced by the Aramaic targum. Some think that the Hebrew text was still extant when the earliest Greek version was made which, in their opinion, represents it. Huet, Bertholdt, Marti, Wright, and Charles supposed that the entire book was written in Aramaic, but the beginning and the end translated into Hebrew in order to give it a place among the sacred books written in that language. The first suggestion of a diversity of origin as furnishing an explanation of the difference of language seems to have been made by Spinoza, who regarded the stories in ii–vi as having been drawn from Chaldæan chronicles. Eichhorn maintained that ii. 4b–vii. 28 came from an earlier Aramaic work, while the Hebrew portion was written by an author living in the Maccabæan period. This view has been revived by Meinhold, Strack, Dalman, Torrey, and Sellin. These scholars regard i. 1–ii. 4a as having been translated from the Aramaic into the Hebrew, and vii as an Aramaic version of a Hebrew original, and they suggest that these translations were made to give the impression of unity and conceal the difference of origin. But if the author or editor sought to secure for his work canonical recognition, which is altogether improbable (see BIBLE, *Canon*), and deemed it necessary for this purpose that the Hebrew language should be used, it is strange that he should have translated so much and yet not all; and the evidence adduced to prove a translation one way or the other is not very convincing. A simpler theory would be that the storybook from which ii. 4b–vi comes was written in Aramaic, that vii was a later addition in the same language, that viii–xii formed an appendix written in Hebrew, and that an editor wrote i. 1–ii. 4a as an introduction to take the place of some other exordium in the storybook. Kennicott found a Hebrew text of the Aramaic parts in Codd. 240 and 512 and printed it in his Hebrew Bible from Cod. 240, but this is unquestionably a later translation from the Aramaic.

The early versions differ from the Masoretic text in that they combine also the Song of the Three Holy Children, the story of Susanna, and the stories of Bel and the Dragon. Besides, there is a very marked divergence between the earliest Greek version and Theodotion's translation which took its place in the Greek Bible, notably in chaps. iii–vi. It is found in Codex Chisianus, published in 1772, and in the Hexaplaric Syriac published in 1866. Already Eichhorn pointed out the superiority of its readings; while even this version clearly represents an annotated text, especially in iv, it is, in the judgment of some scholars, free from many accretions, both in iv and in v and vi, that disfigure the Masoretic text. On the longer additions found already in this version, which manifestly were translated from an Aramaic original, see DEUTEROCANONICAL BOOKS.

According to Jewish and Christian tradition, all parts of the book were written by Daniel. This tradition was rejected in the third century A.D. by the Neoplatonist philosopher Porphyry, who in the twelfth of his 15 books against Christianity maintained that the work was written in the time of Antiochus IV. His arguments have been in part preserved by Jerome, who attempted to refute them (Com. ad Danielem). The same opinion has been held by some of the Anabaptists, Uriel d'Acosta, Anthony Collins, Corrodi, Eichhorn, and the majority of Protestant exegetes since. Hitzig and Farrar supposed on insufficient grounds that Onias IV was the author.

That the visions in viii–xii point with special emphasis to the situation in the early Maccabæan period is the opinion of a vast majority of scholars, Catholic and Protestant. Among the latter it is generally held that they were also written at that time. The fourth kingdom in chap. vii is regarded by many Catholic and some Protestant interpreters as referring to the Roman Empire, and Legarde held that it was written c.70 A.D., in which he has recently been followed by Hertlein; but the majority of Protestant scholars assign this chapter also to the Maccabæan period. There is less agreement as to the age of the stories in i–vi. While König, Behrmann, and Driver deem it sufficient to assume that they had long been current in Jewish folklore before they were written down together with the rest of the book, a separate origin in written form has long been suspected. Spinoza, Newton, and Beausobre thought of a distinct authorship for the Aramaic section. Eichhorn assigned the visions to the Maccabæan age and the stories to an earlier period. Bertholdt, assuming that the whole book was originally written in Hebrew, divided it among 10 authors, and Barton, to some extent following along his lines, has suggested three or four. Lagarde thought of the different sections as political pamphlets. Meinhold assigned to the stories the date of c.300 B.C. More convincing are the arguments of Torrey to prove that chap. ii cannot have been written before or after the reign of Ptolemy III Euergetes (247–223 B.C.), and that therefore the Aramaic storybook was composed at that time. Cornely and Torrey have from different standpoints summed up the objections to the current assumption that Nebuchadnezzar, Belshazzar, and Darius are simply meant to symbolize the great persecutor Antiochus Epiphanes. On the other hand, a date in the middle of the third century is sufficiently late to account for the ignorance of the author concerning the period in which his hero was supposed to have lived. Nebuchadnezzar did not capture Jerusalem in the third year of Jehoiakim (606 B.C.); there was no interregnum of seven years in his reign (604–562); he had no son by the name of Belshazzar; there were no satraps in his reign; Bilsharuzur was the son of Nabunaid, the last King of Babylon (556–539), who was not a descendant of Nebuchadnezzar; the last King of Babylon did not lose his kingdom to Darius the Mede, but to Cyrus; there was no Median Kingdom succeeding the Babylonian in Babylon, and history knows of no Darius the Mede. It has been indeed suggested that Nebuchadnezzar's "coming" to Jerusalem means his "starting" for Jerusalem in 606, which he reached in 597; that "son" and "father" mean 'successor' and even distant 'predecessor'; that Belshazzar was another name for Evil Merodach or Nabunaid, and that Darius was another name for Cyaxares II, Gobryas, or Cambyses. But it can scarcely be claimed that any of these attempts to explain the difficulties is either ingenious or ingenuous. Many stumbling blocks may be removed by the textual criticism, but figures of Belshazzar and Darius the Mede are likely to belong to the original form of the stories, as well as the conception of these kings.

Clermont Ganneau's interpretation of the famous *Mene, Mene, Tekel, Upharsin* as names of weights "a mina, a shekel, and two half-minas" (*Journal Asiatique*, 1886, pp. 36 ff.), though ingenious and widely adopted, will have to be abandoned, as the original text read *mene, tekel, peres*, and "tekel" does not mean 'shekel' in Aramaic. The additon to the Aramaic storybook of a vision told by Daniel himself in the first person in the same language (chap. vii) is likely to have suggested the style of the Hebrew book which forms the appendix (chaps. viii–xii). In spite of Lagarde this vision probably was written in the year 165 B.C., though earlier than the visions in Hebrew, which seem to come from the end of November or the beginning of December of that year. The suggestion of Schmidt, that the one "like a son of man" (vii. 13) here, as elsewhere where a manlike being is spoken of, refers to an angel and in this case the angel Michael, taking the place in Jewish folklore of the god Marduk, has been adopted by Marti, Bertholet, and others. Chap. xi gives an historic sketch in the guise of prophecy, which shows a growth of accurate knowledge as the author advances towards the end of the year 165; but while a little help has come through Mattathias and Judas, the temple has not yet been recovered and dedicated, Baal Shamen (the Heaven God, Zeus Olympios) being still worshiped there. Bertholet and others have shown that much of the apocalyptic material of the book has a foreign origin, in Babylonian and Persian mythology. But its deep religious significance lies in the conception of a succession of world empires permitted to rule by divine providence until the time set for them to be followed by the Kingdom of the Saints of the Most High, and in the encouragement it gave to the maintenance of religious ideas that were threatened with obliteration through the influence of Hellenistic thought and customs.

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DANIEL, JUDGMENT OF. See SUSANNA, HISTORY OF.

DANIEL, dȧ'nyĕl', ANTONY (1601–48). A French Jesuit missionary in America, born at Dieppe. He became a Jesuit in 1621, came to Quebec with Samuel de Champlain in 1633, began his labors among the savages of Cape

Breton, and in 1634 was transferred to the Huron mission. In 1636 he returned to Quebec to teach in a seminary. Afterward he went back again to St. Joseph, or Teanaustayé, one of the largest Huron towns. On July 4, 1648, he had just concluded mass when the town was attacked by a band of the hostile Iroquois. He roused such defense as was possible and urged all that could to escape. As he came from the church and confronted the enemy, he overawed them by his calmly majestic bearing. A moment later, pierced by a bullet, he fell, and his body was burnt with his church. Consult Parkman, *The Jesuits in North America* (Boston, 1867).

DANIEL, Arnaut. A celebrated French troubadour of the twelfth century, styled by Petrarch "Il gran maestro d'Amore" ('the great master of love'). He was born at Ribérac, Dordogne, was a jongleur at the court of Richard Cœur de Lion, and is said to have been acquainted with several distinguished troubadours, such as Bertrand de Born. He was the author of a number of amatory poems, which, although technically masterpieces of versification, are frequently characterized by an artificial straining after effects. Dante was indebted to him for several of his stanzas, and ranks Daniel far above Giraud de Borneil. An edition of his works was published by Canello under the title *La vita e le opere del trovatore Arnaldo Daniel* (Halle, 1883).

DANIEL, dä'nĕ-ĕl, Ernst von (1843–). A Hungarian politician, born at Ellemér, County of Torontál. He studied law at Budapest, became judge lateral in 1868, and in 1870 a Liberal member of the Hungarian Parliament. From 1895 to 1899 he was Minister of Commerce, and from 1896 to 1899 he was a member of the Table of Magnates.

DAN'IEL, George (1616–57). A Cavalier poet, about whom very little is known. Some of his best verse is represented in *Scattered Fancies*, composed in 1645–46. The beautiful manuscript copy of his poems was printed (in a limited edition) by Grosart (4 vols., Blackburn, Lancashire, 1878).

DANIEL, Hermann Adalbert (1812–71). A German geographer and theologian. He was born at Cöthen, studied theology at Halle in 1830–34, and was from 1834 to 1870 instructor and professor at the Pädagogium there. He was one of the most eminent followers of the geographer Ritter, and by the attractive style of his various geographical writings greatly contributed towards arousing an increased interest in the study of geography in the schools and among the educated generally. Of these works the following deserve especial mention: *Lehrbuch der Geographie für höhere Unterrichtsanstalten* (76th ed., 1895), *Leitfaden für den Unterricht in der Geographie* (201st ed., 1896), *Hanbuch der Geographie* (6th ed., 4 vols., 1894–95), all of which were translated into several European languages.

DANIEL, John Moncure (1825–65). An American editor, born in Stafford Co., Va. He was privately educated, studied law, and in 1845 became librarian of a small public library in Richmond. In 1847 he joined the staff of the Richmond *Examiner*, the organ of the radical wing of the Democratic party, and as the result of expressions contained therein was compelled to fight several duels. He was a friend of Theodore Parker, whose famous sermon on Webster he published in the *Examiner*, and of Poe, a sketch of whom he wrote for the *Southern Literary Messenger*. In 1853 he was appointed Minister to the court of Victor Emmanuel. By demanding for some Italians naturalized in the United States and visiting Sardinia rights equal to those of other Americans, he nearly brought about a rupture in the diplomatic relations of Italy and the United States, and afterward, by a breach of social etiquette at Turin, he greatly lessened his influence at the Italian court. Upon the outbreak of the Civil War he was appointed to the staff of Gen. A. P. Hill. His arm having been shattered, he resumed the *Examiner;* and for attacks upon Jefferson Davis and Elmore, the Treasurer of the Confederacy, was challenged by the latter to a duel, in which he was wounded. Consult his *Writings*, with a memoir by his brother (New York, 1868); also George W. Bagby's *John M. Daniel's Latch Key* (Lynchburg, Va., 1868).

DANIEL, John Warwick (1842–1910). A United States senator, born in Lynchburg, Va. After the Civil War, in which he fought on the Confederate side and became major and chief of staff to Gen. Jubal A. Early, he studied law and became active in politics. He was a member of the Virginia House of Delegates in 1869–72, and of the State Senate in 1875–81. In 1884 he was elected to the Lower House of Congress, as a Democrat, and thereafter was sent to the Senate for the successive terms from 1887 to 1911. His writings include: *The Character of Stonewall Jackson* (1868); *Attachments under the Code of Virginia* (1869); *Negotiable Instruments* (1876; 5th ed., 1903). A collection of his *Speeches and Orations* was published in 1911.

DANIEL, Samuel (1562–1619). An English poet, born near Taunton, Somersetshire. He entered Magdalen Hall, Oxford, in 1579, but left without a degree and visited Italy. In 1590 he became tutor to William Herbert at Wilton and wrote masques for the court of James I. Later he retired to a farm near Beckington, in Wiltshire, where he died in October, 1619. Daniel's principal works are a series of sonnets to Delia (1592), unsurpassed in their time by any except Shakespeare's; the beautiful *Complaynt of Rosamond* (1592); a long historical poem in eight books, entitled *The Civill Warres between the Houses of York and Lancaster* (1595–1609); two tragedies in the style of Seneca; and a prose history of England. Daniel's verse has been praised for its grace and purity by a long succession of critics. His works were collected in 1623. Consult *Complete Works*, ed. by Grosart (5 vols., London, 1885–96).

DANIEL DERON'DA. A novel by George Eliot published serially in 1876 and in book form in 1877. It is a study of race feeling and tradition, the title character being a Jew.

DAN'IELL, John Frederick (1790–1845). An English physicist, born in London. He was elected a fellow of the Royal Society in 1814, and in 1816, in connection with Professor Brande, established the *Quarterly Journal of Science and Art*. From this period he devoted almost all of his time to the subjects of chemistry and meteorology. In 1824 the Horticultural Society awarded him their silver medal for his *Essay on Artificial Climate*. He was appointed professor of chemistry in King's College, London, in 1831, and in 1839 published his *Introduction to Chemical Philosophy*. He is the only person who ever obtained all of the three

medals in the gift of the Royal Society. His *Meteorological Essays* (1823; 3d ed., 1845) contain the first scientific account of the known phenomena of the atmosphere. He made the first precise determinations of atmospheric moisture by the use of the hygrometer of his invention and invented the *Daniell cell*, an electric battery furnishing a tolerably constant current. (See VOLTAIC CELL.) Besides the works mentioned he wrote a large number of papers for the Royal Society.

DANIELL, MOSES GRANT (1836–1909). An American educator. He was born in Boston, Mass., graduated at Harvard in 1863, and for 32 years was prominent in secondary-school work, being master of the Everett School in Dorchester for three years and of the Roxbury Latin School for 17 years, and then principal of the Chauncy Hall School in Boston for 12 years. He was later connected with the editorial department of Ginn & Co., an educational publishing house of Boston. He was prominent in Boston musical circles, being long treasurer of the Boston Handel and Haydn Society. His textbooks for the early study of Latin—some written with William C. Collar—are widely used in American secondary schools.

DANIELL, THOMAS (1749–1840). An English painter and etcher, born at Kingston-on-Thames. He was a pupil of the Royal Academy and was elected an R.A. in 1799. Accompanied by his nephew William, he went to India in 1784 and remained in the East 10 years. The fruit of these travels was the remarkable collection "Oriental Scenery" (1808, 144 aquatints). Besides these he published "Antiquities of India" (24 plates, 1800); "Hindu Excavations at Ellora" (24 plates, 1804); and *Picturesque Voyage to China by Way of India* (London, 1810, 50 plates). Many of his drawings and water colors are in the British and South Kensington museums.

DANIELS, FRED HARRIS (1853–1913). An American mechanical engineer, born at Hanover Centre, N. H. He was educated at the Worcester Polytechnic Institute and later made a special study of iron and steel manufactures in Europe. He entered the employ of the Washburn & Moen Co. in 1873 and was for a time general superintendent and chief engineer. In 1899, when the firm's business was acquired by the American Steel & Wire Co., he was retained as chief engineer, and in 1902 he also became a director. When, in turn, the United States Steel Corporation obtained control of the American Steel & Wire Co. (1901), Daniels was chosen chairman of their board of engineers. More than 150 patents, principally relating to the manufacture of wire rods, represent his contribution to the iron and steel industry.

DANIELS, JOSEPHUS (1862–). An American newspaper man and public official, born in Washington, N. C. He was educated at Wilson Collegiate Institute and in 1880 became editor of the *Advance* of Wilson, N. C. He studied law and was admitted to the bar in 1885, but did not practice, instead taking the editorship of the *State Chronicle* of Raleigh, N. C., which he merged in 1894 in the *News and Observer*, with a weekly edition called the *North Carolinian*. He was State printer in 1887–93 and chief clerk of the Federal Department of the Interior in 1893–95. Long prominent in State and national politics as a Bryan Democrat, in 1912 he had charge of the publicity department in Woodrow Wilson's preconvention campaign, and in the actual campaign was not merely a member of the national committee (which he had been on since 1896) but of the special directing committee. In President Wilson's cabinet he received the post of Secretary of the Navy, an office in which he did much for the general efficiency of the service and particularly for the enlisted men.

DAN'IELS, WINTHROP MORE (1867–). An American political economist, born at Dayton, Ohio. He graduated in 1888 at Princeton University, studied at Leipzig, and in 1892 was appointed professor of political economy at Princeton. In 1911 he became a member of the Board of Public Utility Commissioners of New Jersey for the term ending 1917 and in 1914 he was appointed a member of the Interstate Commerce Commission. His publications include: *Revision and Continuation of Alexander Johnston's History of the United States* (1897); *Elements of Public Finance* (1899); *Continuation of Alexander Johnson's History of American Politics* (1902).

DANIELSON. A borough in Windham Co., Conn., 25 miles north by east of Norwich, on the New York, New Haven, and Hartford Railroad, and on the Quinebaug River (Map: Connecticut, H 2). The chief industry is the manufacture of cotton. Pop., 1900, 2823; 1910, 2934.

DANILO, dän'ĭ-lō, **I,** or DANILO PETROVITCH NIEGOSH (1826–60). A prince of Montenegro. He was educated at Vienna and succeeded his uncle, Peter II, in 1851, dispensing, however, with the customary title of prince bishop. In 1852 he became involved in a war with Turkey, the Porte claiming jurisdiction in Montenegro, and the boundaries between the two countries were not defined until 1858. Danilo devoted himself steadfastly to the achievement of Montenegrin independence and the furtherance of civilization throughout the land. He introduced financial reforms, organized a military service, and issued a legal code. He was assassinated by a personal enemy, Aug. 12, 1860. His nephew, Prince Nicholas, succeeded him.

DA'NISH LANGUAGE AND LITERATURE.—Language. The history of the Danish language begins properly about the year 1000 A.D., when the different Scandinavian dialects, which until that time had formed one speech, developed into separate languages. (For an account of the earliest Scandinavian monuments, see RUNES.) The Danish and Swedish formed together the East Northern group; the Icelandic and Norwegian, with the Faroese, the West Northern. The oldest specifically Danish records are runic inscriptions and a few names in Latin manuscripts. About 1300 appeared several collections of laws which show the existence of at least three distinct dialects, there being at that time no standard form for literary use. The leveling of inflections, which is as marked a feature of Danish as of English, had already begun, although many forms were still retained. The vocabulary is still in the main Northern, with very few foreign elements. Between 1350 and 1500 the loss of inflections and of other grammatical distinctions increases rapidly, and the language approaches more and more its present form. A striking feature of the vocabulary is the introduction of foreign words, especially those from the French, Latin, and Low German, High German words being sparingly borrowed. The syntax, too, is affected

by Latinisms in consequence of the wide use of Latin by Danes. As a result of the publication of the first modern Danish translation of the Bible, that of Christian III (1550), the vocabulary became fairly fixed, receiving practically its present character. The relation of the Danish Bible to the Danish language is very similar to that of the English Bible to the English language. After 1537 Danish became the official language of Norway, the Norwegian language remaining as a collection of dialects spoken chiefly in the country districts. (For the relation of these dialects to Danish, see NORWEGIAN LANGUAGE.) In the following century, on the other hand, Denmark suffered a loss by the cession to Sweden of the Province of Skåne, or Schonen, and within a generation the Swedish took the place of the original Danish.

The principal grammatical changes between the Reformation and 1700 are the partial substitution of the natural for the grammatical gender and the simplification of the inflections. The vocabulary shows a generous borrowing of French and German words. The different dialects are still used for literary expression, and it was not until Holberg (1684–1754) that a standard literary Danish may be said to have existed. During the last half of the eighteenth century German and Danish were used side by side in Denmark, very much as Latin and Danish had been used earlier, and so great was the German influence that the Danish State Calendar was published in that language until the first year of the nineteenth century. During the last 30 years, mainly as a result of the war with Germany, the vocabulary has become more and more pure. Whole classes of German words have been replaced by Danish equivalents, and no new German words have been borrowed.

Danish differs in general from its nearest Scandinavian neighbor, Swedish, by a greater leveling of inflections and by less archaic sounds. The most striking single feature of the spoken language is the glottal "catch," called in Danish *Stöd* (literally, a push or thrust). It occurs after certain consonant sounds and consists of a momentary closure of the glottis. It has been compared in its effect upon foreigners to a hiccough. The glottal catch is not found in Dano-Norwegian, and it is lacking in some of the dialects in Denmark, while Jutish occasionally employs the catch where it is not found in the Zealand dialect. The cultivated standard speech is characterized by a marked tendency to slurring, the enunciation being much less distinct than that of Swedish or of the Danish spoken in Norway. There is also much less vocal inflection. In Danish, as in German, the pronunciation of the stage is very different from that of social intercourse.

The principal Danish dialects are the Zealand, including the slightly differing uses of the neighboring smaller islands, and with a distinct type for Copenhagen, the Jutish, including the speech of Schleswig, and the Bornholmsk, which latter is the sole remnant of the East Danish dialects. The Dano-Norwegian will be considered in connection with the Norwegian (q.v.). Mention should be made of the Danish spoken in the United States, which really constitutes a modern dialect. It differs from the home tongue in pronunciation, apparently as a result mainly of English influence, and in vocabulary. Danish-American newspapers contain many English words not recognized in Denmark, and the speech of our Danish citizens is even more mixed, the English influence extending to the syntax as well as to the vocabulary. As the subject has never been scientifically investigated, it is impossible to determine how far the original dialectic peculiarities are preserved.

Danish orthography is in an even more unsettled state than the English. There are several distinct systems of spelling in use in Denmark, and at least two others in Norway. The official system is employed in all school books and government publications, but is generally disregarded by writers, whose system in turn is scorned by philologists. As in German, both the so-called Gothic and Roman type are in use, and substantives are sometimes uniformly spelled with initial capitals, sometimes not. There is, however, a decided tendency in recent times towards simplification of spelling, and in time uniformity will probably be reached.

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Literature. The first Danish book is a treatise on medicine by Henrik Harpenstreng, who died in 1244. The first Danish law dates from 1386, but the first distinctly literary writings in the language are the chivalric ballads, *Kjaempeviser*, which must have been composed from 1300 to 1500, though they survive only in sixteenth-century form, best edited by Gruntvig (8 vols., unfinished; continued by H. Olrik, Copenhagen, 1895) and by Abrahamson, Nyerup, and Rahbek (5 vols., 1812–14). Of these there are some 500, partly historical, partly mythical, but wholly popular in origin. The first Danish book was printed in 1495, and sequential literary history begins with Christian Pedersen, who translated the Bible (1550) and gave to his people the legends of Charlemagne and Ogier in their final form. Vedel (1542–1616) stimulated national literature by publishing 100 of the *Kjaempeviser* (1591) and translating Saxo Grammaticus (1575). *Reynard the Fox* had been translated into Danish in 1555. Hvitfeld gave Denmark its first history (1595) and

Rauch its first drama (about 1600). Clausen's translation of the Icelandic *Heimskringla* appeared in 1633, and Arrebo's (1587–1637) *Hexæmeron*, the first Danish epic, in 1641. Hymn writing was soon after inaugurated by Kingo (1634–1703) and Brorson (1694–1764). But these beginnings were all overshadowed by the genius of Holberg (q.v.), the first Dane whose work is still an actuality in Danish culture. All branches of learning and art felt his stimulating influence, the University was reopened (1742), the Society of Sciences founded, and the Society for the Improvement of the Danish Language. Then Klopstock, who had settled at Copenhagen, though his direct influence was bad, fostered the founding of the Society of the Fine Arts, and Frederick V patronized all.

Under these influences, or the spirit that prepared for them, many poets were born (1742–49)—Johannes Evald, Wessel, Brun, Frimann, Fasting, Pram, Storm—who brought about a lyric and dramatic revival in the last quarter of the century. The first, Evald (q.v.), aided the revival of interest in Scandinavian mythology; Wessel helped to emancipate the Danish stage from French bondage; the others, Norwegians by birth, gave the language a richer imagery. The only prose writer of importance till near the close of the eighteenth century was the philosopher Treschow (1751–1833); and poetry, after the passing of the group just named, sank into a mechanical insignificance, from which Baggesen (q.v.) and romanticism revived it.

The literary births from 1758 to 1777 are mainly of prose writers—Rahbek (1760–1830), a good novelist, catholic-spirited critic, and editor of older poets; Heiberg the elder (1758–1841), a political and æsthetic critic; Malte-Brun (1775–1826) and Olufsen (1764–1827), geographers; Nyerup (1759–1829), a diligent literary compiler; Engelstoft (1774–1850), an historian; Mynster (1775–1854), a theologian; and the great and genial scientist Oersted (1777–1851), are the most prominent names for two decades, where the only poet of distinction is Baggesen (1764–1826), an erratic exception to prove the rule that an "age of enlightenment is not an age of song."

The romantic movement in Denmark centres around Oehlenschläger (q.v.) and dates from 1802. His more important assistants in fostering national individualism in literature were Blicher (q.v.), novelist and poet; Grundvig, scholar, antiquarian, poet, politician; Ingemann (q.v.), the historical novelist; Hauch (q.v.), a dramatist and novelist; Countess Gyllembourg-Ehrensvard (q.v.), the greatest woman writer of Denmark, and mother of J. L. Heiberg (q.v.), critic, poet, dramatist, and, on the whole, the most important figure of the generation. These writers were born between 1779 and 1791. To the second generation of the Romanticists, born between 1798 and 1809, belong Hertz (q.v.), the poet; Andersen, of the world-famed *Fairy Tales;* Bagger (1807–46), who died, like Keats, with unmatched promise unfulfilled, and Paludan-Müller (1809–76), a dramatic and epic philosophic poet of much power.

Aside from poetry the romantic period was not fruitful. One may note the antiquarians Rask (1787–1832), Rafn (1795–1864, q.v.), and Petersen (1791–1862); the lexicographer Molbech (1783–1857); the botanist Schouw (1789–1852); and the philosopher Sibbern (1785–1872), succeeded by the brilliantly subtle Kierkegaard (1813–55). The period counts no significant novelist or dramatist who was not primarily a poet, though writing perhaps like Andersen in prose.

The 30 odd years that separate the birth of Paludan-Müller from that of Georg Brandes (q.v.) are singularly unproductive of Danish literary genius. The most prominent names are those of the poet Ploug (1813–94), the novelist Goldschmidt (1819–87), and Herman Evald (1821–1908). Politics absorbed popular interest after 1848. Romanticism seemed bankrupt, but the Danes were slow in attuning themselves to the modern spirit of realism. That they have done so at all, through political distractions, national humiliation and dismemberment, is largely the work of Brandes, supplemented by the example of Björnson and Ibsen. Of the new school the most distinguished are Drachmann (q.v.), Richardt (q.v.), and Christiansen (q.v.). One may record also the names of Bergsöe (1835–1911, q.v.), Jacobsen (1847–85), Skram (1847–1905); Edward Brandes (1847–), Bang (1858–1912), Gjellerup (1857–), Pontoppidan (1857–), Karl Larsen (1860–), and Esmann (1860–1904); but on the whole there seems little promise in this generation.

Aside from literature proper, Denmark has seen, in the nineteenth century, a host of thinkers and scholars. To name a few of them: the philosopher Höffding (1843–); the theologian Martensen (1808–84); the philologists Madvig (1804–86), V. Thomsen (1842–), Westergaard (1815–78), Fausböll (1821–1909), Nyrop (1858–), Jespersen (1860–), Holger Petersen (1867–); archæologists like Sophus Müller (1846–). There is also an important group of historians, such as N. M. Petersen (1791–1862), K. F. Allen (1811–71), Edward Holm (1833–), A. D. Jörgensen (1840–97), Troels Lund (1840–), J. Steenstrup (1844–), Schjern (1846–82), Erslev (1852–). Among the writers on æsthetics we may mention Hyen (1798–1870), J. Lange (1838–96), and C. Lange (1834–1900). In the realm of the exact sciences, too, a number of Danes achieved noted distinction; to enumerate them here is, however, out of place as with the nineteenth century science and literature have entirely different goals and methods.

Bibliography. Consult the writings of Nyerup, Rahbek, Molbech, Overskou, and, in addition, the following: Horn, *Den danske Literaturs Historie* (Copenhagen, 1879); trans. by Anderson, *History of the Literature of the Scandinavian North* (Chicago, 1884), with bibliography; Hansen, *Nordiske Digtere i vort Aarhundrede* (Copenhagen, 1879); id., *Illustreret dansk Literaturhistorie* (ib., 1900); N. M. Petersen, *Bidrag til den Danske Literatur Historie* (ib., 2d ed., 1867–71); Rönning, *Den danske Literaturshistorie i Grundrids* (ib., 1890); id., *Rationalismens Tidsalder* (ib., 1886–90); Rosenberg, *Nordboernes Aandsliv fra Oldtiden til vore Dage* (ib., 1878–85), incomplete, but highly important; Arentzen, *Baggesen og Oehlenschläger* (ib., 1870–78); id., *Danske Digtere i det 19de Aarhundrede* (ib., 1864); Vedel, *Studier over Guldalderen i dansk Digtning* (ib., 1890); Paludan, *Renaissancebevaegelsen i Danmarks Literatur isaer i det 18de Aarhundrede* (ib., 1887); Schück, "Schwedisch-dänische Litteratur," in Paul, *Grundriss der germanischen Philologie*

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DANISH POLITICAL PARTIES. See Political Parties, *Denmark*.

DANISH WEST INDIES. See West Indies, Danish.

DAN'ITES, or Destroying Angels. In American history, a name given to members of a secret society connected either officially or unofficially with the Mormon church, which was organized about 1837 for the purpose, as alleged, of "dealing as avengers of blood with Gentiles." Many crimes were attributed to the society. The Mormons themselves either disavow any connection with it or flatly deny its existence. Other names by which the society was known are Daughters of Zion, Big Fan, Daughters of Gideon, and Flying Angels. The term "Danites," or "Sons of Dan," is said to have owed its origin to Gen. xlix. 17. During the political campaign of 1858 in Illinois, which has become famous because of the contest between Lincoln and Douglas for the United States senatorship, the term "Danites" was applied as a nickname to the anti-Douglas Democrats. Consult Ferris, *Utah and the Mormons* (New York, 1854), and Whitney, *History of Utah* (3 vols., Salt Lake City, 1892–98).

DANJURO, dän'jo͞o'rō', Ichikawa (1837–c.1910). A Japanese actor, born in Tokyo and educated in the Chinese classics and in Japanese literature, history, and painting of the Tosa school. He was the ninth of his name, the first Danjuro having been a dramatic actor near the close of the seventeenth century. He was a member of his father's company when only six years old, and later he succeeded his brother, the eighth Danjuro, at his death as the bearer of the family name. To the repertory of the famous 18 pieces inherited by each generation of his family he added 18 new pieces, including the *Kasuganotsubone*.

DAN'NAT, William T. (1853–). An American painter, born in New York City. He studied in Munich and under Carolus-Duran and Munkacsy in Paris, where, after a journey in Spain, he afterward took up his residence and became a teacher at the Ecole des Beaux-Arts. Munkacsy's influence is strong in his early works, of which "The Quartette" (1884), now in the Metropolitan Museum, New York City, is a fine example. It shows the technical ability, the daring style, the solid, broad painting, and absence of conventionality characteristic of all his work. Towards the end of the eighties he abruptly changed his method and under the influence of Japanese art began to occupy himself with color problems. Among the many Spanish subjects done at this time are a "Sacristy in Arragon" (1888), in the Chicago Art Museum, and "A Café Chantant" (Munich, 1892), which was the sensation of the exhibition. For sheer bravura, this startling, masterly study of artificial light has been equaled by no other American artist and by few foreigners. His "Lady in Red," a one-color scheme, is in the Luxembourg. The difficulties presented by such a subject as this one are managed with consummate ease. Something in the same manner is his "Lady in White." Among the portraits that have made him at once criticized and praised are that of "Madame E." (1895), the three-quarter length of a woman almost colorless except for the vivid red of her lips, and that of the dancer Otéro (1895). Since that time Dannat has exhibited very little and predominantly portraits. He was president of the Society of American Artists, a member of the Société Nationale des Beaux-Arts and of the International Art Jury in 1889, in which year he received the cross of the Legion of Honor. Consult Isham, *History of American Painting* (New York, 1905), and Dayot, in *Art et Décoration*, vol. i (Paris, 1904).

DANNECKER, dän'nĕk-ĕr, Johann Heinrich von (1758–1841). A German sculptor, born in Stuttgart, Oct. 15, 1758. His father, a groom of the Duke of Württemberg, first wished him to be a ballet dancer, but through the favor of the Duke the lad was educated in the Karlsschule at Ludwigsburg, where he formed his lifelong friendship with Schiller. He afterward studied drawing and sculpture under Le Jeune, Guibal, and others, and in 1777 he obtained the prize for the best model of "Milo of Croton Destroyed by the Lions." In 1783 he studied in Paris under Pajou and soon afterward went to Rome, where he remained until 1790. At Rome he met Goethe, Herder, and Canova. The latter befriended him and gave him instruction in sculpture. Here he executed his first marble statues, of "Ceres" and "Bacchus." On his return to Germany he was appointed professor of sculpture in the Military Academy of Stuttgart and remained in that city until his death, Dec. 8, 1841. Dannecker was one of the greatest sculptors of the classic school. His art is midway between that of Canova and Thorvaldsen and shows a continual struggle between the classic style and the naturalistic. His chief forte lies in expressing individual characteristics. This gives great value to his busts, among the best of which are those of Schiller at Weimar, of Lavater in the Public Library of Zurich, and of the kings Frederick and William of Württemberg. His earlier works are chiefly pagan in subjects, while his later ones are Christian and are pervaded by a sensitive idealism. Among the former are his "Sappho" (Stuttgart Museum), "Psyche," and his best-known work, the "Ariadne," in Frankfort—a figure larger than life, reclining on the back of a panther. His most ambitious work, however, is his colossal "Christ." The original is in Tzarskoye-Selo, but the sculptor executed a replica, which is now at Regensburg. Consult Grüneisen and Wagner, *Dannecker's Werke in einer Auswahl* (Hamburg, 1841), and Spemann, *Dannecker* (Stuttgart, 1909).

DANNEMORA PRISON. See Clinton State Prison.

DANNENBERG, dän'nen-bĕrk, Hermann (1824–1905). A German numismatist, born in

Berlin. He became president of the Numismatic Society in that city and is an authority on mediæval coins, on which subject he published the standard work entitled *Die deutschen Münzen der sächsischen und fränkischen Kaiserzeit* (3 vols., 1876–98). He wrote also *Grundzüge der Münzkunde* (2d ed., 1899) and *Münzgeschichte Pommerns in Mittelalter* (1893; 2d ed., 1896).

DANNEVIRKE, dän'ne-vēr'ke, or **DANNEWERK** (Dan., Danes' work). A wall or intrenchment, built by the Danes about the end of the eighth century and strengthened by Harold Bluetooth in the tenth century. The Dannevirke extended from the Schlei to the Treene, a distance of over 10 miles, and protected the Danes from the incursions of the Saxons and Wends. In 974 Otho II attacked the Dannevirke and finally burned and destroyed a part of it. Waldemar the Great rebuilt a section with brick and stone about 1180. During the Schleswig-Holstein wars the Dannevirke fell into the hands of the Prussians, April 23, 1848, and, when attacked by the Austrians and Prussians in 1864, was abandoned by the Danes. It has since been leveled. Consult Philippsen und Sünksen, *Führer durch das Dannewerk* (Hamburg, 1903).

DANNREUTHER, dän'roi-tĕr, EDWARD GEORGE (1844–1905). An English pianist and writer on music. He was born at Strassburg, Nov. 4, 1844, but grew up in Cincinnati, where F. L. Ritter was his first teacher. In 1859–63 he studied at the Conservatory of Leipzig. The success of his first public appearance as a pianist in London in 1863, when he played Chopin's concerto in F minor for the first time in England, was such that it determined him to settle permanently in London. He soon rose to great prominence as a teacher, writer, and lecturer, and became one of the most zealous champions of Wagner and musical progress. In 1872 he founded the London Wagner Society, directing its concerts for the first two seasons, and was chiefly instrumental in arranging the great Wagner festival of 1877, when the master was his guest during his stay in England. He translated several of Wagner's prose works into English, wrote for several musical journals, and was an important contributor to Grove's Dictionary. His very valuable articles on Wagner, published originally in the *Monthly Record* in 1872, were reprinted separately in 1904 in book form as *Richard Wagner and the Reform of the Opera.* His book on *Musical Ornamentation* (2 vols., London, 1893–95) is a standard work. For the *Oxford History of Music* he wrote the sixth volume, "The Romantic Period" (London, 1905). In 1895 he was appointed professor of pianoforte at the Royal College of Music. He also holds the distinction of having first introduced into England the piano concertos of Grieg (A minor), Liszt (A), and Tschaikowski (B flat minor).

DAN RIVER. A river rising in the Blue Ridge Mountains (q.v.), in Patrick Co., Va., and flowing southeast into North Carolina. After crossing and recrossing the boundary between these States four times, it combines with the Staunton River in southern Virginia to form the Roanoke River (q.v.) (Map: North Carolina, C 1). It is 180 miles long, draining an area of 3700 square miles. Between 1881 and 1888 the United States government expended about $50,000 in making the channel navigable for bateaux and boats of light draft, as far as Madison, in Rockingham County. The river furnishes extensive water power at several points.

DANS'VILLE. A village in Livingston Co., N. Y., 76 miles east-southeast of Buffalo, on the Delaware, Lackawanna, and Western and the Dansville and Mount Morris railroads (Map: New York, C 6). The Jackson Health Resort, three parks, the high-school building, and the village library are noteworthy features. Shoes, machinery, and paper are manufactured, and there are important nursery interests. The water works are owned by the municipality. Dansville was settled in 1795 and was incorporated as a village in 1845. It is governed by a mayor and a council. Pop., 1900, 3633; 1910, 3938.

DANTAN, dän'tän'. A family of French artists.—ANTOINE LAURENT (1798–1878), called the elder, was born at Saint-Cloud. He was a pupil of his father, a wood carver, and of Bosio and Brion. Having won the Roman prize in 1828, he continued his studies in Rome and after his return acquired reputation by important public monuments, like the statues of Admiral Duquesne at Dieppe, François Malherbe at Caen, and "The Archangel Raphael" in the Madeleine, Paris, and by his eminently characteristic portrait busts of celebrated contemporaries, such as Beethoven, Rossini, and the actress Rachel (Théâtre Français), the Marshal de Villars and Duc de Berwick (Versailles). Among his ideal works are "Young Bather Playing with his Dog" (1835) and "Neapolitan Tambourine Girl." His work is characterized by purity of line.—JEAN PIERRE (1800–69), his younger brother, also a sculptor, was born in Paris, studied under Bosio, and confined himself almost exclusively to portrait busts and statues. His works include such celebrities as Cherubini (Palais de l'Institut), Rossini (Opera House, Paris), Baron de Rothschild, Victor Hugo, Meyerbeer, Beethoven, Veridi, and Rosa Bonheur. He is especially known for clever caricature busts and statuettes in terra cotta of all the notabilities of the time, a large collection of which is in the Musée Carnavalet, Paris. He may be said to have created modern caricature in sculpture.—His son JOSEPH EDOUARD (1848–97), a painter, was born in Paris and studied under Pils and Henri Lebeman at the Ecole des Beaux-Arts. He painted portraits, religious, mythological, and genre scenes, among the best of which are "Studio Interior" (Luxembourg) and "Entracte during a First Night" (Théâtre Français). His drawing is correct, his execution smooth, his color pleasing.

DAN'TAS, JULIO (1876–). A Portuguese dramatist. He practiced medicine in Lisbon, was director of the Conservatório, and there produced revivals of classic Portuguese comedies, notably Camoens, but he was best known for his own dramas. These include: *O que morreu d'amor* (1899), *O viriato tragico* (1900), *A severa* and *Os crucificados,* these two being especially popular in Portugal and Brazil, and *A ceia dos cardeães,* which was played in Germany in a version by Louise Ey as *Das Nachtmal der Kardinäle* (1905). In 1912 *Roses all the Year Round,* a version of a one-act play by Dantas, was given successfully in London.

DANTE ALIGHIERI, *Ital. pron.* dän'tā ä'lē-gyā'rē (1265–1321). An Italian poet, au-

thor of the *Divine Comedy*, and one of the greatest writers of all time. He was born in Florence in May, 1265, of a middle-class family that had been ennobled. His youth was spent in Florence, where he had intimate friends among poets, scholars, and politicians: Guido Cavalcanti, his "first friend"; Cino da Pistoia, jurist and poet; Casella, musician; Brunetto Latini, scholar and poet; Forese Donati, a turbulent roysterer; Giotto, painter; Lapo Gianni, a poet and notary. Dante had learned unaided the art of versifying, and had read widely in the science, philosophy, and literature of his time. Before 1290 he engaged in at least two military campaigns. His father died in 1283; he himself married Gemma Donati in or before 1297, and probably four children came from the union. Dante entered political life about 1295. He served on at least one embassy and in 1300 was for two months one of the six priors of the city.

There was at this time a variety of conflicting tendencies in the politics of Florence. A long struggle between proletariat and nobility had culminated in the triumph of the popular party, which nevertheless looked to the nobles for leadership. The nobles, then, were divided into two factions—the Whites, so called, headed by the Cerchi family, representing largely the ennobled rich; the Blacks, headed by the Donati, representing the older conservative nobility and supported by the unpropertied mob. The foreign policy was complicated by the conflicting interests of the Emperor and of the Pope in alliance with France, and by the rivalry of surrounding cities, such as Pisa, Lucca, and Arezzo. The Whites, of which Dante was a partisan, had come into power since 1290 on the back of victorious democracy. But the Blacks were constantly aggressive, and public turmoils were frequent. In 1300 the chief offenders on both sides were banished. But in 1302 came a coup d'état. Pope Boniface sent Charles of Valois to Florence ostensibly as arbiter. His army took possession of the city and put the Blacks in power. Along with other leaders of his party Dante was exiled, fined, and later condemned to death.

He never saw Florence again. His first refuge was at Verona with the Scala family; he may have been at Bologna in 1304; in 1306 he was with the Malaspina in Lunigiana; Boccaccio and Villani credit him with a journey to Paris (between 1307 and 1309). In 1310 the hope of the exiles rose with the descent of Henry VII into Italy. Dante was probably present at the congress of the Imperials at Pisa in 1311. But the death of the Emperor put an end to the dreams in 1313. Dante returned to Verona in 1314; he spurned an offer to buy his return to Florence the following year. Soon after he accepted the hospitality of Guido Novello da Polenta at Ravenna, where he lived till his death, in September, 1321.

If thus Dante's biography is known only in meagre fragments, the loss is compensated by the fullness with which he reveals to us his life. It was in his ninth year, according to his *Vita nuova*, that he first met Beatrice. This name is associated with his entire existence, and the emotions connected with it form the corner stone of Dante's intellectual and moral life. According to Boccaccio, the Beatrice of Dante was one Beatrice Portinari, daughter of Folco Portinari and wife of Simone de' Bardi. There is no adequate evidence either to refute or to confirm this statement. If her human figure tends to vanish in a blaze of allegorical idealism in Dante's poetry, Dante's statements concerning her are definite enough to create the feeling that the experiences which he idealizes had actual existence in reality. The story of the early love of Dante and Beatrice is told in the *Vita nuova*, a work of which the charm overrides an obscurity that has effectually baffled criticism. It is certain, however, that here love, which first comes to Dante as a normal experience of sex psychology, is progressively idealized, assuming constantly a broader scope, till in the vision, fleetingly noted at the end of the *Vita nuova* and expanded in the *Comedy*, it takes on a universal character and is set up as the foundation of cosmic order, the agency through which God acts through the all.

This idea of love is subjected in Dante to a vast and comprehensive intellectual elaboration. The *Convito* is, in a sense, his notebook and furnishes the best key to his whole production. There, as in the *Vita nuova*, we have poems in Italian with a commentary, which in the *Convito* is largely scientific and philosophical. In reading them he holds in mind four different lines of interpretation—the *literal*, the *allegorical*, the *moral*, and the *anagogical*. To a certain extent (the *Convito* is incomplete) the poems are worked out along these lines. And there he brings to bear upon them his readings in science and in philosophy, especially in Thomas Aquinas and Albertus Magnus. Meanwhile his grasp of the gigantic problems of life was growing firmer, and as the scheme of the *Comedy* ripened in his mind, he groped for his medium of expression. In the *Vita nuova* he limits the use of Italian to love poetry, a genre where it seemed to him the natural tongue. In the *Convito*, still recognizing the preëminence of Latin, he nevertheless writes his philosophical commentary in Italian, for a variety of reasons, but finally because he liked it best. Then, in a special treatise, *De vulgari eloquentia*, he comes to extend vastly the true field of the vernacular, regards it definitely as "nobler" than Latin, and fit to be used on any subject whatsoever. For Italian specifically he recognizes and scientifically classifies the different dialects, holding them to be variations of some universal type, which he seeks vaguely to define. If the process of abstraction from particular dialects be possible only through the establishment of a cultural tradition, Dante may here be said to have foreseen the course of development the Italian language was to take, and to have anticipated, though on different grounds, the modern Manzonian linguistic school. This treatise too is incomplete, possibly because the *Comedy* was the conclusive answer to all the questions of language, rhetoric, and versification he there approaches.

The political question also was a deep concern to Dante, especially after his exile. The *De monarchia* was finished late in his life, but it was begun much earlier. Here too he reaches out for the universal. He had the tradition of Rome before his eyes, but his general system of thought led him as well to overstep national distinctions and propound the notion of an international empire, resting on universal brotherhood and love, ruled temporally by one Emperor and spiritually by one Pope, each un-

DANTE

FROM A PORTRAIT BY GIOTTO, IN THE NATIONAL GALLERY, FLORENCE

obstructive to the other and both acting as agents of God's will and goodness. This limitation of the Pope's prerogatives led to the condemnation of this work.

But no one of these productions adequately foreshadows the greatness of that miracle of human achievement we have in the *Comedy*, which later critics called *Divine*. Here we have a complete mastery of life by Dante's intelligence. The universe spreads out before him—material, intellectual, spiritual. His mind grapples with its manifold problems—scientific, philosophical, ethical—and does not rest till it has found an answer. Dante's fundamental preoccupation is the moral one: he studies how man, endowed with various faculties, intelligence, and soul, may utilize the materials of knowledge and experience the world affords to attain the vision of reality, of God. What he strives for preëminently is a conscious rise to salvation. Keenly aware of the limits of human intellect, he is equally alive to the danger of unguided faith. He seeks, then, so to employ the intelligence that the soul may be brought to an attitude of receptivity towards divine revelation, that alone imparts ultimate truth. Love, which originally came to him as simple experience of sex psychology and which he universalized in the *Vita nuova*, is the guiding principle of this evolution. It is the impulse that creates a desire for truth, it is the touchstone for measuring the attainment of it. In the *Comedy* Vergil symbolizes human reason or intellect; Beatrice, divine revelation. Vergil can interpret human experience of sin and virtue, while the mysteries of beatitude, of the divine vision, can be unfolded only by the higher power. We find in the *Inferno* three categories of sin—incontinence (lust, gluttony, avarice, prodigality, anger); violence (heresy, homicide, suicide, squandering, blasphemy, sodomy, usury); fraud (pandering, seduction, flattery, simony, soothsaying, swindling, hypocrisy, thieving, evil counsel, creation of schism, alchemy, impersonation, counterfeiting, falsehood, treason). In this order sins descend through the abyss of Hell, covered at the top by the continent of the Northern Hemisphere, and descending cone-shaped to the central point of the earth. Dante's geography held that the Southern Hemisphere was covered by the vast ocean, out of which rose the mount of Purgatory. At its base are the negligent (excommunicated, procrastinators, victims of sudden death, those distracted from repentance by public affairs), whose indolence prevents them from beginning at once the cleansing ascent. Above, on seven ascending terraces, are those to be purged of pride, envy, wrath, sloth, avarice, prodigality, gluttony, and lust. The torments of Hell symbolize the consequences of sin; in Purgatory the sinners are forced to act the opposite of their shortcomings, sustained by examples of the opposite virtues. At the summit of the mount of Purgatory is the Earthly Paradise—all that man can attain through reason and human virtue unilluminated by grace. Thence we ascend to Paradise. Dante's heaven is that of the Ptolemaic system: around the earth's globe are nine concentric spheres, one for each of the seven planets, one for the fixed stars, beyond which come the Crystalline Heaven (*primum mobile*) and finally the empyrean where is God. With God dwell the souls of all the blessed; but they cast projections back upon the spheres according to the intensity of their love, which determines the degree of their beatitude: in the sphere of the Moon, ruled by the angels, are the inconstant, of *incipient* charity; in Mercury, ruled by the archangels, are the ambitious of *proficient* charity of *deed;* Venus, ruled by the Principalities, reflects the sensuous, of proficient charity of *will;* the Sun, ruled by the Powers, teachers, of proficient charity of *intellect;* Mars, ruled by the Virtues, militant Christians, of *perfect* charity of deed; Jupiter, ruled by the Dominations, just rulers, of perfect charity of will; Saturn, ruled by the Thrones, contemplative spirits, of perfect charity of intellect. In the sphere of the Fixed Stars appear the apostles, of divine wisdom, ruled by the Cherubim; in the Crystalline Heaven appear only the Seraphim reflecting divine love.

Dante's moral system was derived largely from St. Thomas; and he owed much to St. Augustine and the Neoplatonics. But his own mastery of the science and speculation of his time was such that his contemporaries and immediate followers regarded the *Comedy* as a book of divine wisdom. They studied it and commented upon it as such. But few works in all literature have so deeply entered into the consciousness of mankind. It is true that, owing to its peculiar view of life, the *Comedy* was for a time, even in Italy, dimmed, as a work of art, by such productions as those of Petrarch and Boccaccio. Since the end of the eighteenth century, however, its preëminence has been undisputed. For, even if philosophy and science have profoundly changed since Dante's time, the *Comedy* created figures that are immortal possessions of humanity, and it exhaustively portrayed states of mind that are common to all ages and races of men. In Dante's Francesca da Rimini all that the world has felt concerning love and death is objectified, brought near to every reader, just as in his Ugolino we have an unsurpassable expression of pathos and outraged sense of justice. The insignificance of man in the presence of the immensity of the universe was never more impressively described than in his Ulysses. In every picture of the *Inferno* there is the pictorial vividness of a Giotto, while in the *Purgatorio* we find the manifold emotions of hope and confidence, as in the *Paradiso* the highest imaginings of ecstatic vision.

Dante literature itself is one of the great phenomena of modern culture. We can outline only a few instruments that an English-speaking reader would find indispensable or useful at the beginning of Dante study: 1. BIBLIOGRAPHY: fundamental is Koch's *Dante Catalogue* (Ithaca, 1900); for current bibliography since that time, consult the files of the *Giornale Dantesco* (Florence) and of the *Giornale Storico della letteratura italiana* (Torino). 2. EDITIONS and TRANSLATIONS of the works: Moore, *Tutte le opere di D. A.* (Oxford). Of the *Comedy:* annotated ed. of Grandgent (Boston, 1913); trans. by Longfellow (ib., 1867); by Norton (ib., 1893); with text opposite by Okey ("Temple Classics"). Of *Vita nuova:* ed. by Scherillo (Milano, 1911); trans. by Norton (Boston, 1893); by Rossetti (Portland, Me., 1898). Translation of *Convito* (London, 1908). Of *De Monarchia* by Church (ib., 1879). Crit. ed. of *De Vulgari Eloquentia:* by Rajna

(Florence, 1896); trans. by Howell (London, 1890). Trans. of *Letters* by Latham-Carpenter (Boston, 1891). Of *Quæstio de aqua et terra* (doubtful authenticity) by Bromby (London, 1897). Of *Canzoniere*, with text opposite, by Wicksteed ("Temple Classics"). 3. CRITICAL WORKS, BIOGRAPHY, ETC.: Early biographies of Dante collected by Zanichelli (Bologna, n. d.); trans. in *Yale Studies* (New York, 1901); Moore, *Dante Studies* (Oxford, 1898); Wicksteed, *Dante and Aquinas* (London, 1913); Reade, *The Moral System of Dante's Inferno* (ib., 1909); D'Ovidio, *Il purgatorio e il suo preludio* (Turin, 1906); Busnelli, *Il concetto e l'ordine del Paradiso dantesco* (Florence, 1911–12); K. Vossler, *Die göttliche Komödie* (Leipzig, 1907–10); Flamini, *Introduction to the Study of Dante* (trans. Josslyn, Boston, 1912); Toynbee, *Dante Dictionary* (London, 1900); Scartazzini, *Enciclopedia dantesca* (Milan, 1896–99); Sheldon-White, *Concordanza delle opere di D. A.* (Oxford, 1905); Rand-Wilkins, *D. A. Operum Latinorum Concordantiæ* (ib., 1912). Farinelli, *Dante e la Francia* (Turin, 1908); Toynbee, *Dante in English Literature* (New York, 1909); Sanvisenti, *I primi influssi di Dante del Petrarca e del Boccaccio sulla letteratura spagnuola* (Milan, 1902); De Sanctis, *Storia della letteratura italiana*, vol. i (Bari, 1913), and *Nuovi saggi critici* (Naples, 1898); Fletcher, *Dante Alighieri* ("Home Library," New York, 1914); Santayana, *Three Philosophical Poets* (Boston, 1912).

DANTÈS, dän'tâs', EDMOND. The Count in Dumas's romance *The Count of Monte Cristo.*

DANTON, dän'tôn', GEORGES JACQUES (1759–94). A great popular leader in the French Revolution. He was born, Oct. 28, 1759, at Arcis-sur-Aube, of a bourgeois family. Though his parents wished him to become a priest, Danton preferred the law, and, after being educated in his native town and at Troyes, he went to Paris. A born orator, Danton quickly rose in his profession, and as early as 1785 he was known as a successful practitioner before the Parlement of Paris. In 1787 he married, purchased, at a cost of 80,000 livres, a position as advocate of the Royal Council, and was soon earning an income of 25,000 livres a year. At this time he is described as a forcible and eloquent speaker, a man of liberal tastes, fond of books, and happy in his domestic life. He saw the Revolution approaching and as early as 1787 said to his patron, M. de Barentin, "Moderate reforms are no longer possible; do you not see the avalanche soon to descend?" It is said that Mirabeau, perceiving Danton's genius, sought to attach him to himself. In the early revolutionary outbreaks Danton took no prominent part, but early in 1790 he was threatened with arrest for protesting in violent terms against Marat's arrest, and in June of the same year he appears as one of the chief founders of the club of the Cordeliers, or ultra-Jacobins, while in the autumn he was chosen to be commander of the National Guard of his district. The next year he appeared as the advocate of the extremists of Paris and publicly attacked the antirevolutionary leaders. His utterances having exposed him to arrest, he fled to England and remained there some six weeks, during which time he had conferences with the chief leaders of the Whig opposition. On returning to Paris he was elected to office in the commune and probably was largely instrumental in inciting and bringing to a successful issue the insurrection of Aug. 9 and 10, 1792. After the taking of the Tuileries and the suspension of the royal power, Danton became Minister of Justice, and in this capacity entered the provisional government and became a member of the executive.

The strongest personality of them all, Danton at once assumed the leadership. He took active measures to free the country of its foreign invaders. His eloquence thrilled the people, and when, on September 2, he made his wonderful speech before the Assembly and cried *Pour les vaincre, pour les atterer, que faut-il? De l'audace, encore de l'audace, et toujours de l'audace* ('To vanquish them, to crush them down, what is necessary? To dare, to dare again, and always to dare'), France responded by placing 14 armies in the field. In October, 1792, partly by force and partly by diplomacy, the foes had been expelled. In the fearful days of the September massacres, when political prisoners were taken out and butchered by hundreds, Danton would not let the government leave Paris. Of the atrocities that took place he was presumably not guilty, but he certainly acquiesced in and condoned the deeds of his associates. In September, 1792, he resigned as Minister of Justice and was elected to the Convention. There he successfully repelled a venomous attack made on him by the Girondists and, later, on his return from his mission to Dumouriez, answered Marat's insinuations that he had been privy to the treachery of that general. Danton was among those who voted for the death of the King (January, 1793). After being elected president of the Jacobin Club Danton, in March, 1793, became a member of the Committee of Public Safety and later its president. This was the period of his greatest services to France, when he organized her defenses and directed her foreign policy. The irreconcilable attitude of the Girondists forced him to take active measures for their suppression (June 2, 1793), for he felt that they were not true revolutionists. In his revolutionary enthusiasm, however, Danton called up a force that was destined to crush him. After the fall of the Girondists he advocated the formation of a new and more powerful Committee of Public Safety, endowed with unlimited authority and ample resources. He himself ceded his right to a seat on this tribunal, an error of judgment which cost him his life. Danton's aim at this time was undoubtedly the conciliation of the various republican and revolutionary factions in France into a stable and peaceful government; the aim of the committee was to make its own power supreme over all others. Robespierre began to emerge as its leader, supported by Saint-Just, Billaud-Varennes, and Couthon. While Danton, with his friend and ally, Camille Desmoulins (q.v.), the inspirer and chief author of the Vieux Cordelier papers, was advocating moderation, the followers of Robespierre were preparing to strike. The first of their opponents to fall were the fanatical Hébertists, in March, 1794; after them came the turn of the Dantonists. Their leader seemed no longer to care for the turmoil of politics, but pursued a policy of inaction and awaited the attack. For a short time Danton retired to his home at Arcis-sur-Aube, having recently married a second wife. His enemies were active, and, after some show of hesitation, Robespierre yielded to Billaud-Varennes (q.v.),

and the fate of the Dantonists was sealed. On March 30, 1794, Danton, Camille Desmoulins, and others of the party were seized and imprisoned.

Before the revolutionary tribunal the strength of Danton's character shone forth. Questioned by the president as to his name and dwelling, he replied: "My name? It is Danton: a name tolerably well known in the Revolution. My dwelling? It will soon be annihilation; but my name will live in the pantheon of history." His trial was a farce, the formal charge being that of conspiring to restore the monarchy. The eloquence of the man was so great that Paris thrilled as he hurled defiance at his accusers, and there was danger of a popular revolt in his favor. The Convention eagerly seized on the infamous suggestion of Saint-Just, that disrespect for justice merited summary conviction, and, with 14 of his supporters, Danton was at once condemned to the guillotine. Almost his last words were inspired by the treachery of Robespierre. "I could have saved him," he said; "I leave it all in a frightful welter; not a man of them has any idea of government. Robespierre will follow me; he is dragged down by me." On April 5, 1794, Danton mounted the scaffold with calm courage. A moment he stood erect, facing the mob, then, turning to the executioner, said, "Show the people my head; it is worth seeing." Danton was extremely large and extremely ugly, his face roughly corrugated by pockmarks, his nose crushed by an early accident, his eyes small and deep-set. He was rough in word and overquick in action: his speeches were always extemporaneous, the hot, passionate declamations of the moment, as, e.g., those on the trial of the King; his acts, such as the law of the 40 sous, equally hot-headed and ill-considered. But the accusations of venality, of dissolute conduct, of bloodthirsty ferociousness, so often made against Danton, have been long since disproved.

Bibliography. Following the lead of Comte, the French Positivists have sought with considerable success to redeem the reputation of Danton and to establish his claim to rank as a patriot. The biographies of him that are of any value represent this tendency. His chief biographer has been Dr. Robinet, whose studies are supported by an ample array of documents and *pièces justificatives*. These are: *Danton, mémoire sur la vie privée* (Paris, 1865); *Le procès des Dantonistes—documents avec introduction historique* (ib., 1879); *Danton émigré, recherches sur la diplomatie de la République, 1793* (ib., 1887); and *Danton, homme d'état* (ib., 1889), the most important of the series, published on the revolutionary centenary. All recent writers have relied largely upon the researches of Robinet. Other important works are: Bougeart, *Danton* (ib., 1861); Dubost, *Danton et la politique contemporaine* (ib., 1880), a study of Danton's influence on French republicanism, which the author regards as permanent, and *Danton et les massacres de Septembre* (ib., 1886); Beesly, *Life of Danton* (London, 1889). Belloc, *Danton: A Study* (ib., 1899), is a well-written book by a strong admirer. Danton's works have been collected and edited by Vermorel, *Œuvres de Danton* (Paris, 1886). An admirable selection of significant extracts from his important speeches will be found, preceded by a useful introduction, in H. Morse-Stephens, *Orators of the French Revolution* (Oxford, 1892). Consult also: Aulard, *Notes sur l'éloquence de Danton* (Paris, 1882), *Les orateurs de la législative et de la convention* (ib., 1885–86), and *Les grands Français* (ib., 1887); Warwick, *Danton and the French Revolution;* Gibbs, *Men and Women of the French Revolution* (Philadelphia, 1906).

D'ANTRAIGUES, dän'trāg'. See ANTRAIGUES.

DANTZIC, dän'tsĭk. See DANZIG.

DAN'UBE (Ger. *Donau*, Hung. *Duna*, Lat. *Danuvius*, OChurch Slav. *Dunavŭ, Dunay;* connected with OHG. *tuonaowa*, foreign). The second of European rivers, inferior only to the Volga. It has its origin in the Brege and Brigach, two mountain streams rising in the eastern part of the Black Forest, in Baden, at an elevation of 2200 feet above sea level, in lat. 48° 6′ N. and in long. 8° 9′ E. (Map: Europe, E 4). The total length of the Danube is about 1750 miles. The area which it drains is estimated at about 315,000 square miles, comprising countries differing widely in climate and productions, including southern Germany, a great part of Austria-Hungary, Bosnia, Servia, Bulgaria, and Rumania. The Danube is joined in its course by 60 navigable rivers, whose waters, with those of many lesser streams, it conveys into the Black Sea. From its source it flows in an easterly and then in a northeasterly direction through Baden, Hohenzollern, Württemberg, and Bavaria. Passing Ulm, near which it receives the Iller, and at which point the river becomes navigable for small steamboats, it receives from the south the Lech and flows past Ingolstadt and Regensburg (Ratisbon), between which two towns it is joined by the Altmühl from the left; then, altering its course to the southeast. it receives the waters of the Isar and the Inn from the south, the latter joining it at Passau. It then traverses Upper and Lower Austria from west to east, passing Linz and Vienna, and about 40 miles beyond the latter city it enters Hungary near the town of Pressburg. Between Passau and Pressburg it receives from the south the Enns, and from the north the March, in a country rich in minerals, well peopled, and highly cultivated. Below Pressburg it divides, inclosing the low-lying islands called the Great and Little Schütt. Between Pressburg and Budapest, in which part of its course it passes the famous fortress of Komorn and the town of Gran (Esztergom), it receives from the north the Waag, the Neutra, the Gran, and the Eipel, and from the south the Raab. A few miles above Budapest it turns directly south and enters the great Hungarian plain, in which it is continually forcing new channels and silting up old ones, sometimes sweeping away towns, or capriciously removing its channel to a distance of several miles from those formerly upon its banks. Here it receives from the west the Drave. After this the river turns towards the southeast and, joined by the waters of the Theiss from the north and the Save from the west, sweeps past Belgrade, forming the boundary between Servia and Hungary and receiving the Morava from the south. From Belgrade to Orsova, where it reaches the borders of Wallachia, the Danube pursues an easterly course.

Leaving Orsova, the Danube passes the famous "Iron Gate," where the river formerly rushed over a broad plateau of rock 1400 yards wide. This rapid, which was followed by a series of

whirlpools, eddies, and shallow falls, formed an effectual bar to the upward progress of vessels, no craft drawing more than 2½ feet of water being able to pass it. In 1847–49, however, the obstruction formed by the Iron Gate was to some extent removed by blasting, and since then further improvements have been made in this part of the course, the Austrian government in 1890 having begun works for making the river constantly navigable at this point. The new passage was formally opened Sept. 27, 1896. The work of improvement cost $10,000,000, and to meet the cost of maintenance and the annual interest, tolls are exacted at this point. For a short distance below this the river flows south between Wallachia and Servia and then, turning eastward, traverses a vast plain, in which it forms the boundary between Wallachia and Bulgaria. From the Carpathians it receives the Shil and the Aluta and Veda, and from the Balkan Mountains the Isker, the Osma, and the Yantra. Increased by these rivers and by numerous lesser streams, it progresses through a poorly cultivated and thinly peopled but fertile district, occasionally broadening like a sea, as at Hirsova, and encircling many islands. After being joined by the Sereth and the Pruth from the north, and about 50 miles from the Black Sea, it divides into several branches, forming a great delta with an area of about 4000 square miles. The principal channel mouth is the Sulina, through which the greater number of ships pass. This has been deepened by means of jetties, so as to admit vessels of 20 feet draft. The other principal mouths are the Kilia and St. George, which, although useless for navigation, discharge a large proportion of the water. The Danube is the chief natural highway for central European commerce. Communication has been established between it and the Rhine by the construction of the Ludwigs-Kanal in Bavaria, connecting the Altmühl with the Regnitz, an affluent of the Main. At the Peace of Paris in 1856 the navigation of the Danube was declared free to all nations, and its management was intrusted to two commissions—one representing the European Powers, another named by the states on the banks of the river. At the Berlin Congress of 1878 it was stipulated that no ships of war should navigate the Danube below the Iron Gate. The Austrian government has executed great works for the improvement of the navigation of the river at Vienna and for the regulation of its flow, so as to avert disastrous inundations. The Danube Steam Navigation Company has done much to increase the commerce. In the five years ending with 1890 this company handled 1,263,000 tons of traffic, while in the single year 1900, after improvements had been made, it handled 1,503,000 tons. Since 1900 it has steadily increased and now reaches 2,000,000 tons.

DANU'BIAN PRIN'CIPAL'ITIES. See MOLDAVIA; WALLACHIA; RUMANIA.

DA'NUM. See DONCASTER (end).

DAN'VERS. A town, including several villages in Essex Co., Mass., 4 miles northwest of Salem, on the Boston and Maine Railroad (Map: Massachusetts, F 2). It contains St. John's Preparatory College (Roman Catholic), the Danvers State Hospital, Peabody Institute Library, Essex County Agricultural College, and Danvers Historical Society. The manufactures include shoes, leather, morocco, brick, electric lamps, iron, rubber, soap, etc. The government is administered by town meetings. The water works and electric-light plant are owned by the municipality. Pop., 1890, 7454; 1900, 8542; 1910, 9407; 1920, 11,108.

Until 1752, when it was incorporated as a separate town, Danvers was part of Salem. In 1855 the town was divided—the southern part becoming South Danvers, afterward Peabody, the northern keeping its original name. Here the witchcraft delusion of 1692 first appeared, and 10 of the inhabitants within this district were convicted and hanged, many more being arrested and acquitted. Danvers has many places of historic interest, notably the birthplace of Israel Putnam; Oak Knoll, the home of Whittier; and Mount Burnett, a favorite haunt of Hawthorne. Consult: Hudson, *History of the Town of Danvers* (Danvers, 1848); Hurd, *History of Essex County* (Philadelphia, 1888); Hines, *Historic Danvers; Celebration of the One Hundred and Fiftieth Anniversary of Danvers* (1902).

D'ANVILLE, dăn'vēl'. See ANVILLE.

DAN'VILLE. A city and the county seat of Vermilion Co., Ill., 125 miles by rail south of Chicago, on the Vermilion River, and on the Wabash, the Chicago, Indiana, and Southern, the Illinois Traction, the Chicago and Eastern Illinois, and the Cleveland, Cincinnati, Chicago, and St. Louis railroads (Map: Illinois, E 3). Among the features of interest are the Danville Branch National Soldiers' Home, Carnegie library, government building, Elks' Home, and five fine parks. Danville has coal-mining interests, machine shops and foundries, and manufactures zinc, handles, tools, boxes, glass, and clay products. Settled about 1830, the city was incorporated in 1867. It is governed by a mayor, elected biennially, and a council which selects the city engineer and confirms the executive's appointments to the police and fire departments and public library board. Other administrative officials are chosen by popular election. Pop., 1900, 16,354. Between 1900 and 1906 several suburbs were annexed. The population of the city in 1910 was 27,871; 1914 (U. S. est.), 30,847; 1920, 33,750.

DANVILLE. A town and the county seat of Hendricks Co., Ind., 20 miles west of Indianapolis, on the Cleveland, Cincinnati, Chicago, and St. Louis Railroad (Map: Indiana, C 3). It is the seat of the Central Normal College, and contains a fine courthouse and Carnegie library. There are manufactories of flour, lumber products, canned goods, etc. The water works are owned by the municipality. Pop., 1910, 1640.

DANVILLE. A city and the county seat of Boyle Co., Ky., 117 miles south by west of Cincinnati, Ohio, on the Queen and Crescent and the Southern railroads (Map: Kentucky, F 4). The city is the seat of the Kentucky School for Deaf Mutes; Central University of Kentucky (Presbyterian), opened in 1822; and Kentucky College for Women (Presbyterian), founded in 1860. It has a park named in honor of Dr. Ephraim McDowell. Danville is in a stock-raising and agricultural region and carries on a large trade in tobacco and hemp. It is governed by a mayor, elected every four years, and a unicameral city council. The water works are owned and operated by the city. Here in 1785, 1786, 1787, and 1792 important conventions were held, the first State constitution for Kentucky being drawn up in 1792. Danville was the birthplace and early home of James G. Birney. The settlement was

first incorporated in 1789. Pop., 1890, 3766; 1900, 4285; 1910, 5420.

DANVILLE. A borough and the county seat of Montour Co., Pa., on the north branch of the Susquehanna River, 12 miles from its intersection with the West Branch, and on the Lackawanna, the Philadelphia and Reading, and the Pennsylvania railroads (Map: Pennsylvania, H 5). It has a large hospital, opera house, public library, and is the seat of a State hospital for the insane. There are deposits of limestone in the vicinity, and the borough has iron and steel works, silk and knitting mills, rolling mills, stove works, etc. The government is vested in a burgess, elected every three years, and a borough council. The water works and electric-light plant are owned and operated by the municipality. Pop., 1900, 8042; 1910, 7517.

DANVILLE. An independent city of Virginia, 141 miles by rail southwest of Richmond, on the Dan River and on the Southern Railroad (Map: Virginia, E 5). Situated in the Piedmont section of Virginia, amid picturesque mountain scenery, Danville rises from the river, which furnishes splendid water power, to an altitude of from 400 to 600 feet above tide. Its streets are paved with brick and Belgian blocks and are well shaded. The surrounding region is adapted to the cultivation of tobacco, grain, fruits, and other produce. The city is the seat of Roanoke Institute (Baptist), established in 1859; Randolph Macon Institute (Methodist), 1897; Danville School for Boys; and contains a general hospital, orphanage, Elks' Home, several parks, and a public library. Danville has an extensive tobacco trade and many tobacco warehouses and factories, a cheroot factory, several large cotton mills, furniture factories, flour mills, elevator works, knitting mills, and pants and overall factory. The government is administered, under the charter of 1890, by a mayor, chosen for two years, and a city council which controls the appointments to the important administrative offices; the sergeant, attorney, treasurer, and the clerk of the court being elected by the people. The water works and electric-light and gas plants are owned and operated by the city. Danville was incorporated as a town in 1792. It was for a short time the seat of government of the Southern Confederacy during its last days. Pop., 1900, 16,520; 1910, 19,020; 1920, 21,539.

DANZIG, dän'tsĭk, in English commonly written DANTZIC (Pol. *Gdansk*, Lat. *Gedanum*). An important seaport, manufacturing centre, and fortress, capital of the Province of West Prussia, on the left bank of the western branch of the Vistula, about 3 miles from its mouth in the Baltic, 253 miles northeast of Berlin by rail, and in 54° 21′ N. lat. and 18° 41′ E. long. (Map: Prussia, H 1). The strong fortifications and moats which formerly surrounded the city were removed on the north and west sides in 1895–96, and the area thus secured was laid out in streets and public gardens. On the east and south sides the defenses remain, strengthened by 20 bastions. To the east is a chain of forts which extend north along the Vistula to its mouth at Neufahrwasser. In addition, the garrison possesses the means of laying the surrounding country under water on three sides. The former, which flows through the city in two branches, divides the older sections of the Altstadt, Rechtstadt, and Vorstadt from the newer Niederstadt and Langgarten. The Radaune, which enters the town through an artificial channel, separates the Altstadt from the Rechtstadt. Between the two branches of the Mottlau is the Speicherinsel, an island on which enormous granaries have been erected for the accommodation of the vast stores of grain exported from Danzig. The rivers and canals are crossed by about 50 bridges. The Lange Brücke, a quay extending along the bank of the Mottlau, opposite the island, is one of the picturesque sights of the town. The city is generally very mediæval in aspect, successive old styles of its buildings having been well preserved, including in the residences the countless gable façades and a peculiar feature known as Beischläge—elevated, open-air landings. Many of the streets of Danzig are narrow and crooked, but the principal streets, Lange Gasse and Langer Markt, intersecting it from east to west, abound in fine specimens of antique architecture and have a most picturesque appearance. Among the most noteworthy buildings are the church of St. Mary, a fine structure, commenced in 1343, but not finished until 1503, and containing, besides a fine high altar by Michael and other interesting objects of art, a celebrated picture of the "Last Judgment," generally attributed to Memling; the church of St. Catharine; Trinity Church; the fine fourteenth-century Gothic Rathaus, surmounted by a graceful spire; the Artushof, or Junkerhof, the former merchants' guild, now used as the exchange; and the old Franciscan monastery, restored in 1871, containing the municipal museum.

Danzig is the seat of the provincial government and of a provincial court. The city's affairs are administered by a municipal council of 63 and an executive board of 23 members. It has exhibited an enterprising spirit in the matter of municipal undertakings. It has excellently organized fire and street-cleaning departments. Two large aqueducts supply it with water, and a modern system of sewers connected with sewage farms on the Baltic gives the town a satisfactory drainage. The municipality maintains gas works, an electric-light plant, slaughterhouses, and a market hall. Danzig is well provided with educational institutions, which include two gymnasia, a realgymnasium, two realschulen, a navigation school, military school, industrial trade and music schools, a municipal library (over 100,000 volumes), and a theatre. Its charitable institutions include two municipal hospitals as well as numerous other institutions.

Danzig has advantageous connections by rail, river, and sea. It maintains a large trade in lumber and grain, serving as a clearing place for the agricultural products of eastern Prussia and the whole of the Vistula region, which embraces a considerable part of Russian Poland. The imports include coal, iron, petroleum, machinery, spices, and other agricultural products of tropical countries, whereas the exports, as already stated, consist largely of lumber, grain, and a few other agricultural products. The growth of Danzig's sea trade has been interfered with by the competition of Stettin and of the Russian ports on the Baltic, and it is losing its relative importance as a port. The manufactures of Danzig are developing rapidly. There are large shipbuilding yards, breweries, distilleries, and factories for the production of firearms, machinery, and other ironware, paper, glass, soap and candles, flour, sugar, etc. Danzig is the seat of a United States consular agency. Pop., 1900,

141,000; 1910, 170,337. The environs are very attractive.

Danzig is mentioned in 997, when Christianity was first preached there. Its possession was contended for by the Danes, Swedes, Pomeranians, and Teutonic Knights, of whom the last became masters of the town in 1310. Under their rule Danzig prospered exceedingly; about 1358 it joined the Hanseatic League. In 1466 the town declared itself a free city, under the protection of Poland. The wars of the seventeenth and eighteenth centuries destroyed its prosperity, and though it was left a free city on the first partition of Poland, in 1772, its trade ceased almost entirely. In 1793 it became Prussian. Taken by the French Marshal Lefebvre (who received the title of Duke of Danzig) in 1807, it was retaken by the Allies in 1814 and restored to Prussia. Consult: Prutz, *Danzig, das nordische Venedig* (Leipzig, 1868); Wistulanus, *Geschichte der Stadt Danzig* (Danzig, 1891); Puttner, *Danzig* (ib., 1899).

DANZIG, Duke of. See Lefebvre, François Joseph.

DAPHNE, dăf′nē (Lat., from Gk. Δάφνη, laurel). The personification of the laurel, Apollo's sacred plant. According to the legend, Daphne was a nymph, beloved and pursued by Apollo. On crying to her mother, Earth, for help, she was transformed into a laurel, which Apollo chose as his favorite plant.

DAPHNE. A magnificent grove and sanctuary of Apollo, near Antioch (q.v.), on the Orontes. It was founded by Seleucus Nicator, who localized here the story of the transformation of the nymph. The temple of Apollo, containing a statue of the god by Bryaxis (q.v.), stood in a grove of cypress and bay trees and was surrounded by baths, porticoes, and gardens. The beauty of the surroundings made it a favorite place of resort for the luxurious, and it has been described as a scene of continual vice. With the growth of Christianity the worship of Apollo fell into neglect, and shortly after the attempt by the Emperor Julian (q.v.) to revive its splendors the temple was burned and the site gradually abandoned. The probable site of Daphne is now called Bêt el-Mâ and still shows luxuriant vegetation, though the ancient remains are scanty.

DAPHNE. A genus of plants of the family Thymelæaceæ, containing about 80 species of European or Asiatic shrubs or small trees, some of which have deciduous and some evergreen leaves, and all more or less acid in all their parts, which makes some of them even caustic. The berries are poisonous, but the flowers of some are deliciously fragrant. To this genus belongs the *Daphne mezereum*, well known both for the fragrance of its flowers and for its medicinal uses, naturalized in some places in England and escaped in Canada and the United States. The garou bush (*Daphne gnidium*), a native of the south of Europe, less hardy than *D. mezereum*, has the same medicinal properties. The spurge laurel (*Daphne laureola*), a native of Great Britain, is an evergreen shrub 3 to 4 feet high, with obovate-lanceolate leaves, which grow in tufts at the end of the branches and give it a remarkable appearance. It grows well under the shade of trees. *Daphne odora*, a species introduced from Japan, has lemon-scented leaves. Of species in cultivation, *Daphne mezereum* is the only one hardy as far north as New York. The evergreen species are, as a rule, less hardy, though *Daphne cneorum* is fairly resistant. (For illustration, see Plate of Mountain Plants.) From the bark of some species of *Daphne* and of the most nearly allied genera paper is made in different parts of the East, particularly Nepal paper, from that of *Daphne cannabina*. Slips of the inner bark are boiled in a lye of wood ashes for half an hour, till quite soft; are then reduced to a homogeneous pulp by beating with a wooden mallet in a mortar, churned with water into a thin paste, and poured through a coarse sieve upon a cloth stretched on a frame. The paper is subsequently polished by friction, with a shell or a piece of hard wood, and is remarkable for its toughness, smoothness, and durability. Most of the paper used in Tibet is made from the bark of different species of *Daphne* and allied genera, particularly of *Edgeworthia gardneri*, a beautiful shrub, with globes of waxy, cowslip-colored, deliciously fragrant flowers, growing on the Himalaya, at an elevation of 6000 to 7000 feet. The bark of *Lasiosiphon madagascariensis* is made into paper and ropes in Madagascar.

DAPHNEPHORIA, dăf′nē-fō′rĭ-ȧ. See Greek Festivals.

DAPHNIN, dăf′nĭn (from *Daphne*), $C_{15}H_{16}O_9+2H_2O$. A glucoside found by Vauquelin in the *Daphne alpina* and by Gmelin and De Baer in the *Daphne mezereum* and readily decomposed into sugar and a substance called *daphnetin*, which, like the æsculetin obtained from the glucoside æsculin, has the composition represented by the molecular formula $C_9H_6O_4$. Daphnetin has also been prepared artificially.

DAPHNIS, dăf′nĭs (Lat., from Gk. Δάφνις). A favorite character in the bucolic poetry of the ancients, reputed inventor of such poetry. The first certain appearance of the story in literature is in the early part of the third century B.C., in Timæus and Theocritus. In its earliest form it seems a Sicilian folk tale. The herdsman Daphnis, son of Hermes and a nymph, was beloved by a nymph, who made him promise never to love a mortal. Under the influence of wine he was seduced by a Sicilian princess; thereupon the nymph punished him with blindness or petrifaction. The bucolic poets altered the details of this very common folk tale to suit themselves, and Daphnis became merely a conventional figure. Late writers indeed made him the inventor of the Sicilian herdsman's song, which was regarded as the original bucolic poetry. Consult Prescott, "A Study of the Daphnis Myth," in *Harvard Studies in Classical Philology*, vol. x (Boston, 1899). See Chloe; Daphnis and Chloe.

DAPHNIS AND CHLOE, klō′ē (Gk. Δάφνις καὶ Χλόη, *Daphnis kai Chloē*). The title of an exquisite Greek pastoral love story by Longus (q.v.). It is the source of Tasso's *Aminta*, Bernardin de Saint-Pierre's *Paul et Virginie*, and Ramsay's *Gentle Shepherd*, through the rendering into French by Amyot (1559).

DAPONTES, dȧ-pōn′tēs, Constantinos (c. 1714–84). A Greek monk and poet. He was attached to the court of the Hospodar of Moldavia, Mavrocordatos, and frequently came into conflict with the Mohammedan authorities. He was the most distinguished of the modern poets of the Greek church, and several of his works, such as the *Garden of Mercy*, are still read. He died in a monastery on Mount Athos. One of his works has been translated into French by E. Legrand under the title *Ephemérides Daces, ou chronique de la guerre de quatre ans, 1736–39* (1880–88). Consult the biographical sketch in vol. iii of Legrand's work.

DAP'PLE. In Cervantes' *Don Quixote*, the ass ridden by Sancho Panza.

DAQĪQĪ, dä-kē'kē. The name of a Persian poet, one of the predecessors of Firdausi. See FIRDAUSI; PERSIAN LITERATURE.

DARAB, dä-räb', or **DARABGHERD,** -gērd' (Pers., city of Darius, from *Dārā*, OPers. *Dārayavansh*, Gk. Δαρεῖος, *Dareios*, Darius + *gird*, OPers. *vardana*, city: connected with Lat. *urbs*, city). A town of Persia in the Province of Fars, situated on a small river, about 140 miles southeast of Shiraz (Map: Persia, E 6). It has some tanneries and exports dates, oranges, and lemons. About 3 miles south of the town is situated a caravansary hewn in rock, and also a relief commemorating the victory of Shahpur I over Valerian (260 A.D.). It is claimed Darius founded the town. The population is estimated at from 4000 to 12,000.

DARAGA, dä-rä'gä. A town of Luzon, Philippines. See CAGSAUÁ.

DARBHANGA, dŭr-bŭn'gä. The capital of a district of the same name in the Patna division, Bihar and Orissa, India (Map: India, E 3), on the Little Baghmati River, 68 miles northeast of Patna. Its chief building is the maharajah's palace, with noteworthy menagerie and library. It has a large market place, important bazars, and a hospital. Its chief exports are oil seeds, ghi and timber, and a considerable trade is carried on in the agricultural and mineral products of the region. Pop., 1891, 73,561; 1901, 66,244; 1911, 62,628.

D'ARBLAY, där'blā', FRANCES BURNEY (1752–1840). An English novelist. She was a daughter of Charles Burney, a musician, and was born at King's Lynn, June 13, 1752. Eight years later the Burneys removed to London. At the famous musical assemblies given by her father Miss Burney saw, from the outside, fashionable life, and this she depicted with spirit and humor in her first novel, *Evelina* (1778). No novel since *Clarissa Harlowe* attracted more notice. It was read by Burke, Reynolds, and Johnson, and lavishly praised. This brilliant success was followed by *Cecilia* (1782), which, though not so fresh as *Evelina* and a little heavy, had a large sale. In 1786 Miss Burney was appointed second keeper of the robes to Queen Charlotte. Disliking the service, she resigned her position five years later. While visiting her sister at Mickleham, she became acquainted with a French refugee, General D'Arblay, whom she married in 1793. The rest of her life was passed partly in England and partly in France. She published two other novels, *Camilla* (1796) and *The Wanderer* (1814), neither of which is readable. A play of hers, *Edwy and Elvina*, was performed in 1795 and was unsuccessful, though Mrs. Siddons and Kemble took the leading parts. She also published memoirs of her father (1832), written in an affected style resembling her last novels. In 1842–46 appeared her interesting *Letters and Diaries*. A new edition in six volumes was published in London in 1904–05. The *Early Diary, 1768–1778* (2 vols., New York, 1907) was edited by A. R. Ellis. Consult: Macaulay, *Essays;* Dobson, *Fanny Burney, Madame D'Arblay* (New York, 1903); C. Hill, *Fanny Burney at the Court of Queen Charlotte* (New York, 1912).

DARBOUX, där'bōō', JEAN GASTON (1842–). A French geometrician, born at Nîmes. He studied at the Ecole Normale, was appointed senior professor of geometry in the faculty of sciences there, and in 1887 became dean of that faculty. His *Mémoire sur les solutions singulières des équations aux dérivées partielles* was in 1876 awarded the mathematical grand prize by the Academy of Sciences. In 1904 he delivered an address before the section of geometry of the International Congress of Arts and Sciences on "A Survey of the Development of Geometric Methods" (published, 1904). His works include: *Sur les théorèmes d'Ivory relatifs aux surfaces homofocales du second degré* (1872); *Mémoire sur l'équilibre astatique* (1877); *Leçons sur la théorie générale des surfaces et les applications géométriques du calcul infinitésimal* (1887–96; 2d ed., Paris, 1914). Consult E. Lebon, *Gaston Darboux: Biographie, Bibliographie, etc.* (Paris, 1910).

DARBOY, där'bwä', GEORGES (1813–71). A French prelate, born near Langres. He was educated at the Seminary of Langres and became professor there in 1840, having been ordained priest in 1836. He went to Paris in 1845, became almoner of the Collège Henri IV in 1846, and titular vicar of Paris in 1855. He was in high favor at the court of Napoleon III, was made Bishop of Nancy in 1859, Archbishop of Paris in 1863, and afterward grand almoner to the Emperor, and Senator. He stoutly opposed the declaration of the dogma of papal infallibility at the Vatican Council. When it was declared, he submitted, yet in his diocese continued to disregard papal interference. Decidedly at variance with the Jesuits, he incurred the displeasure of Pius IX. During the siege of Paris in 1870–71 he was indefatigable in his care for the sick and wounded soldiers and could not be induced to leave his post or to seek safety in flight. He was seized as a hostage by the Communists, and while the combat raged in the streets of Paris after the entry of the Versailles troops, he was shot, with several of his priests, in the court of La Roquette Prison. Among his writings worthy of mention are: *Saint Thomas Becket, sa vie et ses lettres* (1859); *Les femmes de la Bible* (8th ed., 1876); *Les saintes femmes* (4th ed., 1877). For his biography, consult Foulon (Paris, 1889).

DAR'BY. A borough in Delaware Co., Pa., 5 miles southwest of Philadelphia, on the Baltimore and Ohio and the Philadelphia, Baltimore, and Washington railroads, and on Darby River (Map: Philadelphia and Vicinity, C 6). It has a public library, erected in 1743, and a Friends Meeting House and burying ground more than 200 years old. There are woolen, silk, cotton, and worsted mills, and manufactories of water filters, wooden tanks, augurs, and bits. Darby was settled about 1660. Pop., 1900, 3429; 1910, 6305.

DARBY, JOHN NELSON. See PLYMOUTH BRETHREN.

DARBY AND JO'AN. The hero and heroine of an eighteenth-century ballad which first appeared in the *Gentleman's Magazine*, March, 1735, under the title *The Joys of Love Never Forgot: A Song.* Its author was Henry Woodfall, a London printer. In his youth Woodfall had been apprenticed to the printer John Darby, of Bartholomew Close; and he took Darby and his wife as the subject of this popular song.

D'ARCEN, CHEVALIER DE. See ARMOR PLATE.

DARCET, där'sā', JEAN (1725–1801). A French chemist, director of the porcelain works at Sèvres. He was one of the first to manufacture porcelain in France. He devoted himself

chiefly to applied chemistry and made valuable contributions to that science. In 1774 he was appointed professor of chemistry in the Collège de France and in 1795 he became a member of the Institute. His publications include: *Sur l'action d'un feu égal sur un grand nombre de terres* (1766–71); *Expériences sur plusieurs diamants et pierres précieuses* (1772); *Rapport sur l'electricité dans les maladies nerveuses* (1783).

DARCET, Jean Pierre Joseph (1777–1844). A French industrial chemist, son of Jean Darcet (q.v.). He introduced important improvements in the manufacture of soap, soda, alum, sulphuric acid, etc., and contributed a number of important papers to the *Annales de chimie et de physique.*

DARDANELLES, där'dȧ-nĕlz' (named after the Greek city *Dardanus,* on the eastern side; the ancient Hellespont). A narrow channel separating southeast Europe from southwest Asia and uniting the Sea of Marmora with the Ægean Sea (Map: Turkey in Europe, B 2). It extends from northeast to southwest, between lat. 40° and 40° 30′ N. and long. 26° 10′ and 26° 40′ E., having a length of about 42.3 miles and a breadth varying from 1 to 5 miles. The average depth of the channel is 180 feet. From the Sea of Marmora a strong current runs through the strait to the Grecian Archipelago, except in the presence of a strong southwest wind, but there is an undercurrent in the opposite direction.

The European shores are steep and sterile, while the Asiatic shores are sloping and clad with beautiful forests. To prevent an attack on Constantinople by water from the Ægean, the Dardanelles is strongly fortified on both sides with many guns of large calibre. The narrow and meandering course of the strait lends itself admirably to render the Dardanelles a formidable natural fortress. A treaty concluded between the five Great Powers and Turkey in 1841 arranged that no ship of war belonging to any nation save Turkey should pass the Dardanelles without the express consent of Turkey. All merchant ships are still required to show their papers to the Ottoman authorities as they pass the narrows. These provisions were confirmed at London in 1871 and at Berlin in 1878, but in 1891, by an agreement with the Porte, Russia secured for her "volunteer fleet" the right of passage through the Dardanelles. The Dardanelles is celebrated in ancient history on account of Xerxes and Alexander having crossed it, the former in 480 B.C. to enter Europe, and the latter in 334 B.C. to enter Asia. The point at which Xerxes crossed was in the neighborhood of Abydos, on the Asiatic shore, opposite to Sestos, where the strait is 6500 feet wide. Alexander crossed at nearly the same place; and here also, in the ancient legend, young Leander nightly swam across to visit Hero —a feat performed in modern times by Lord Byron. The Asiatic coast of the Dardanelles is known for its gold mines. Numerous old workings are found at Astyra and Osmanlar, but operations have not been carried on in modern times.

DAR'DANI. In Greek legend, a people living in the heart of the Troad, descendants of Dardanus (q.v.), adjoining the territory of Ilium. Under the leadership of Æneas (q.v.) they were allies of the Trojans and were so closely identified with them that their name was often used, particularly by Roman poets, as equivalent to Trojan. Consult Leaf, *Troy: A Study in Homeric Geography,* pp. 176–180 (London, 1912). The name "Dardani" was borne also by a sturdy people of Upper Mœsia.

DAR'DANUS (Lat., from Gk. Δάρδανος). The mythical ruler of the Dardanians, son of Zeus and Electra, the daughter of Atlas. In some legends he is closely connected with Arcadia and Samothrace and is celebrated as introducing the Samothracian mysteries and the worship of Cybele into Asia Minor. At Troy he married the daughter of Teucer (q.v.). In Roman story he was said to have come to Phrygia from Italy, so that Æneas, who was his descendant through Tros, Assaracus, and Anchises, really returned to the home of his ancestors. See Dardani.

DARDS (Skt. *Darada,* Gk. Δάρδαι, *Dardai,* Δάραδραι, *Daradrai,* or Δέρδαι, *Derdai*). The natives of what is known as Dardistan, a region of Asia between Kafiristan and Baltistan, to the northwest of Kashmir. The Dards (Dardi, Dardu) belong by language to the Aryan stock. Physically they are of the short-statured dolichocephalic (or mesocephalic) variety of the white race, rather dark-skinned and black-haired, but presenting also a number of taller and lighter individuals. Among the chief divisions of the Dards are the Chins and the Yeshkuns. The religion of the Dards is now Islamism, which only recently has superseded Buddhism among them. Surrounded by Asiatics, these Aryans seem to have preserved some of the primitive social characteristics of their remote ancestors, and in spite of Mongoloid intermixture they have never been completely Orientalized. Since Leitner's *Languages and Races of Dardistan* (1867–73), the more recent literature of the subject includes Biddulph's *Tribes of the Hindoo Koosh* (1880); De Ujfalvy's *Aus dem westlichen Himalaya* (1884); Leitner's *Hunza and Nagar Handbook* (1893).

DARE. See Dace.

DARE, Virginia (1587–?). The first child born in America of English parents. She was born on Roanoke Island, Va. (now North Carolina), and was the granddaughter of John White, who was sent out by Sir Walter Raleigh as Governor of the Colony, which, during the founder's absence in England, disappeared without leaving a trace.

DAR-EL-BEIDA, där'el-bā'dȧ, or Casablanca (Ar., white house). The largest seaport of Morocco, north Africa, handling over one-fourth of the entire trade of the country, situated on the west coast (Map: Africa, D 1). It is surrounded by walls and has a deep but unprotected roadstead. Its population is estimated at 25,000, including about 5000 Christians. Wool and leather are the principal exports. The town was founded in 1468 by the Portuguese. It was the centre of the revolt against the assumed control of Moroccan ports by the French in 1907, and its neighborhood was the scene of numerous engagements. See Morocco.

DARES, dā'rēz (Lat., from Gk. Δάρης). A Trojan priest of Hephæstus, mentioned in the *Iliad,* v, 9. To him was attributed an account of the destruction of Troy, extant only in a Latin version. It is doubtful whether the Latin work had a Greek original; if it had, that original cannot have been older than the Hellenistic period. In the Middle Ages the Latin version, then much read, was ascribed to Cornelius Nepos, but in reality it belongs to the fifth century A.D.; it is quoted by Isidorus. Together with the work

of Dictys (q.v.) of Crete, it was the basis of a famous romance written by Guido delle Colonne (q.v.) in the thirteenth century. The best edition is by Meister (Leipzig, 1873). On the various late versions, consult: Dunger, *Die Sage vom trojanischen Kriege in den Bearbeitungen des Mittelalters* (Dresden, 1869); Körting, *Dictys und Dares* (Halle, 1874); Von Fleschenberg, *Daresstudien* (1908).

DAR-ES-SALAAM, där'ĕs-sȧ-läm'. A rapidly growing city, the capital of German East Africa (q.v.), situated on the coast a few miles south of Zanzibar (Map: Congo Free State, G 4). It has a good harbor and a number of churches, schools, and public buildings, government and customs offices, the governor's residence, state hospital, and barracks. In the botanical gardens it has a collection of African flora. There is telegraph connection with Zanzibar, Tanga, Kilwa, and other important centres in the colony. Principal exports are ivory, rubber, and copal. Its population is about 24,000, including about 500 Europeans and 480 Arabs.

DARESTE DE LA CHAVANNE, dȧ'rĕst' de lȧ shȧ'vȧn', Antoine Elisabeth Cléophas (1820–82). A French historian, born in Paris. He occupied the chair of history successively at the Collège de Rennes, the Collège Stanislas in Paris, the University of Grenoble, and that of Lyons, with which he remained associated in that capacity for more than 20 years. His partiality to the Catholic interests, however, compelled his resignation, in 1878. His principal publication is the *Histoire de France* (2d ed., 7 vols. and suppl., 1879), a work distinguished by remarkable accuracy and profound scholarship, but now superseded by Lavisse. Consult the biographical sketch (Lyons, 1883) by Heinrich.

DARET, Jacques. See Flemalle, Maître de.

DAR FERTIT, där fĕr-tēt'. A region in the Anglo-Egyptian Sudan, situated south of Darfur, in the upper part of the basin of the Bahr-el-Ghazal (Map: Congo, D 1). It is a country rich in ivory and rubber, but very thinly populated. It was once well peopled, but as the slave trade drew on it at the beginning of the nineteenth century, the old race stocks died out. The population is extremely heterogeneous, consisting of a number of negro tribes.

DARFUR, där'fo͝or (Ar., House of the Furs, a negro tribe of the region). A region with undefined boundaries in central Africa, under British control. It lies between Wadai, Kordofan, the Libyan Desert, and the Bahr-el-Ghazal region, covering an area of about 150,000 square miles (Map: Africa, G 3). It is traversed through the centre in a direction from northeast to southwest by the volcanic mountain range Marrah, whose extinguished craters rise above 5000 feet. On the east and west it is generally flat and sandy. Among the mountain chains there are numerous fertile valleys growing wheat, cotton, sesame, tobacco, etc. During the rainy season, which lasts from June to September, the lower portions of the country are frequently covered with water, which produces a rich vegetation. Cattle raising is carried on by the natives on a large scale. The manufacturing industries are insignificant and are chiefly confined to weaving and the manufacturing of small metal products. In some parts of the country copper and iron ores are found. The population is variously estimated, 750,000 being commonly given. It consists of Arabs and Furs, all professing Islam. Capital, El Fasher. Prior to the revolt of the Mahdi, Darfur was a great centre of the caravan trade. It was annexed to Egypt in 1874–75, but was surrendered to dervish rule after the Mahdi's revolt in 1883. In 1890–91 the greater part was acknowledged by Germany and Italy to be within the British sphere of influence. In 1898 it became a part of the Anglo-Egyptian Sudan. The management of its internal affairs is left to its hereditary sultan.

D'ARGENS, där'zhäN'. See Argens.

DARGOMYZHSKY, där'gô-mĭzh'skĕ, Alexander Sergeyevich (1813–69). A famous Russian composer; founder, with Glinka, of the Russian National School of Music. He was the son of a wealthy nobleman in the Government of Tula. Speechless to his sixth year, he early exhibited fondness for music and was taught the piano at six and violin at eight; his teachers, later, were Schoberlechner, a pupil of Hummel, in piano, and Zeibich in musical theory and singing. At St. Petersburg in 1833 he met Glinka, who lent Dargomyzhsky his copy of Dehn's lectures on musical theory, which "he studied through in five months." Orchestration and composition he learned practically by assisting Glinka in the production of his *Life of the Czar* and by organizing various aquatic serenades on the Neva River, with private orchestras. He had by this time acquired a reputation as a song writer, pianist, and quartet violinist, and he decided to embrace music as a career. Later, in 1843, he gave up his governmental clerkship. He selected Hugo's *Lucrezia Borgia* for an opera, but, on the advice of Zhukovsky (q.v.), abandoned it in favor of *Esmeralda*, based on the *Hunchback of Notre Dame*. In 1839 the finished opera was translated into Russian, but was not produced till 1847, at Moscow. In 1840 he began a cantata, *The Triumph of Bacchus*, but, owing to the delays of *Esmeralda*, he stopped work on it and did not finish it till 1848, as an opera ballet, first produced in 1868. In 1844–45 he traveled, meeting Halévy and also Fétis, who made him known to western Europe. The delays of his opera "deadened his inspiration," but his personal success in 1853 at a charitable concert encouraged him, and in 1855 the opera *Russalka* ('The Mermaid') was ready. Its production at St. Petersburg (1856) left much to be desired, and the public received it coldly; the Halévy-Meyerbeer style of *Esmeralda* gave way to powerful dramatic recitatives, pronounced characterization, especially in comic scenes, and a strong national element. Only 10 years later the opera, when revived, achieved an unheard-of success. During this decade Dargomyzhsky became more and more retired. He spent his time giving vocal instruction to gifted amateurs and in a measure trained a new generation of singers. He wrote three orchestral works—*Kazachok* (Cossack dance), *Finnish Fantaisie*, and *Baba-Yaga*—and while in Brussels (1864–65) won high praise with the *Kazachok* and the overture to *Russalka*. His songs (he wrote about 100 in all) of this period possess more than ordinary merit. Among the members of the Young Russian school he found the moral support he so sadly needed, and in 1868 he undertook to embody his new theories by setting to music Pushkin's dramatic sketch *The Stone Guest*, a variant of the Don Juan story. Even during his final illness he worked unceasingly and so successfully that after his death only 10½ lines had to be completed by Cui. The orchestration was finished by Rimsky-

Korsakoff. The work was produced in 1872, but had little success. Beginning in the style of the Italian opera, Dargomyzhsky gradually changed his views of dramatic music and in his last work carried Wagner's theories to such extremes that he practically sacrificed the music to the drama. Of a fourth opera, *Rogdana*, he had sketched several scenes. Consult: Cui, *La musique en Russie* (Paris, 1880); Pougin, *Essai historique sur la musique en Russie* (Turin, 1897); Fétis, *Biographie universelle des musiciens* (Paris, 1862).

DAR'IC (Gk. *δαρεικός, dareikos;* supposed by the Greeks to be derived from *Δαρεῖος, Dareios*, OPers. *Dārayа-va[h]uš*, Darius, but probably really from Babylonian *dariku*, weight, measure). A gold coin of ancient Persia, used also in Greece. On the obverse is the figure of a crowned archer kneeling, holding in one hand a spear, and in the other a bow, and on the reverse an irregular oblong stamp. It contained about 125 grains of gold, an amount of gold worth now $5.40.

DA'RIEL. A transverse gorge in the main chain of the Caucasus Mountains, at an altitude of 4122 feet. It is traversed by the main road, known as the Georgian Military Road, from Vladikavkaz to Tiflis, which ascends to the Pass of the Cross, 8015 feet, and is the *Porta Caucasica* of Strabo and the *Dariallan* of Oriental authors. The Dariel Gorge has served as a strategic point for the successive mountain tribes which overran Georgia, and which completely dominated the defile before it came under Russian power.

DARIEN'. An open-mouthed gulf of the Caribbean Sea on the western part of the north coast of South America, separating the Republic of Panama and the Colombian Department of Bolívar (Map: Colombia, B 2). Its southern extension, called Gulf of Urabá (a name originally given to the Gulf of Darien), affords good anchorage. The rainy coastland is hilly and thickly overgrown. The chief affluent is the Atrato (q.v.). The name "Darien" was also applied to the Isthmus of Panama (q.v.) and to a province in the Republic of New Granada, corresponding to the present Republic of Panama. One of the earliest Spanish settlements on the mainland was in Darien, the region being then also called by the Spaniards Castilla de Oro ('the Golden Castile') and forming the best-known part of their Tierra Firme. In 1513 Balboa, Governor of the Darien settlement, crossed the isthmus with 290 men and on September 25 first caught sight of the Pacific. Consult Dr. C. L. G. Anderson, *Old Panama and Castilla del Oro.*

DA'RIEN. A residential town in Fairfield Co., Conn., 5 miles northeast of Stamford, on the New York, New Haven, and Hartford Railroad (Map: Connecticut, B 5). In 1913, on the shore of Gorham's Pond, an elaborate and beautiful pageant was held, depicting the history, life, and problems of the town. Pop., 1900, 3116; 1910, 3946.

DARIEN. A city and port of entry, and the county seat of McIntosh Co., Ga., 63 miles south by west of Savannah, on the Altamaha River, 12 miles from the ocean, and on the Georgia Coast and Piedmont Railroad (Map: Georgia, E 4). It exports large quantities of pine lumber, crossties, handles, rice, fish, and garden produce. Settled in 1736, Darien was incorporated as a town in 1816 and was chartered as a city in 1818. It is governed by a board of five aldermen selected by the grand jury, one of these five being chosen mayor. The water works are owned by the city. Pop., 1910, 1391.

DARIEN' SCHEME. A scheme projected by William Paterson (q.v.) in 1695, for the purpose of forming a settlement on the Isthmus of Darien for controlling the trade between the Eastern and Western hemispheres. It was one of the most disastrous commercial speculations in history. Nine hundred thousand pounds were quickly subscribed, a large part of it by Scottish merchants, though only a little more than half of the subscriptions are said to have ever been paid up. In 1698, 1200 colonists, recruited in Scotland, proceeded to the isthmus to lay the foundations for their prospective commercial centre, "New Caledonia." Their number was rapidly reduced, however, by starvation and disease, and in June, 1699, the survivors returned. Soon afterward the Scotch sent out another company, of 1300, but this likewise was soon forced to return, and a third company, which arrived in February, 1700, was almost immediately driven away by the Spaniards. For a brief account of the enterprise, consult H. H. Bancroft, *History of Central America*, vol. ii (San Francisco, 1883).

DA RIMINI, dä rē'mē-nē, FRANCESCA (?–1288). A woman of extraordinary beauty, daughter of Guido da Polenta, Lord of Ravenna. She was married to Gianciotto Malatesta of Rimini, a cripple, who detecting her in criminal relations with his brother, Paolo, killed them both. The story forms the basis of one of the most famous episodes of Dante's *Divina Commedia* (*Inf.*, v, 73–142), for which consult De Sanctis, "Francesca da Rimini," in *Nuovi Saggi critici* (Naples, 1898). Leigh Hunt wrote a poem, the *Story of Rimini* (1819); Silvio Pellico, G. H. Boker, and D'Annunzio have each found in the tale the subject of a tragedy, and so also has the English poet Stephen Phillips (q.v.) in his *Paolo and Francesca.* It also inspired a famous painting by Fuseli. Consult bibliography in Koch's *Dante Catalogue* (Ithaca, 1900).

DARI'US. The name of several Persian kings, and, like the Egyptian Pharaoh, *titular* and not *personal.* According to Herodotus (vi, 98), *Δαρεῖος* signifies 'one who restrains'; but the old Persian form, *Dārayа-va(h)uš* shows that it signifies 'upholding what is good.'—The most famous of the name is called DARIUS I, or DARIUS HYSTASPIS, from his father's name. (See HYSTASPES.) He was born 558 B.C., and was a Persian and of the Achæmenian line. On the death of Cambyses (522 B.C.) he leagued himself with six other nobles to murder Smerdis the Magian, who had usurped the throne. The conspirators were successful in their plot, and Darius was chosen King. An account of these occurrences is given in the great Behistun inscription, which serves to supplement or correct the narrative of Herodotus. His position at first was very insecure, but his caution, skill, and energy enabled him to govern his vast dominions for 36 years. To strengthen himself, he married the daughter of Otanes, who had been the head of the conspiracy, and likewise took three wives from the royal household, viz., two daughters of Cyrus and one of Cyrus's son, Smerdis. He then divided his empire into 20 satrapies and determined the

exact amount of the taxation to be borne by each. In some of the remoter provinces great confusion seems to have prevailed after the death of Smerdis the Magian; and a proof of how little Darius could effect at first is afforded by the conduct of Orœtes, the Governor of Sardis, who for some time was quite defiant of his authority. The inscriptions of Darius contain the account of no fewer than 9 or 10 rebellions against his sway. Babylon also revolted, and Darius besieged the city unsuccessfully for two years. At last, however, it was taken by an extraordinary stratagem of his general, Zopyrus (516). It is more likely, however, that the account of the conquest of Babylon, as given by Herodotus (iii, 150), belongs to the first siege of the city. In the year 514 B.C. Darius is thought to have begun the great rock inscription of Behistun, which records the events of his reign. In 513 Darius, with an army of 700,000 (though this figure, given by Herodotus, is in all probability absurdly exaggerated), crossed the Bosporus by a bridge of boats, marched to the mouths of the Danube, crossed the river, and advanced against the Scythians. The expedition proved a failure. Darius retreated, but detached from his main force an army of 80,000 men, under Megabyzus, to conquer Thrace, while he himself returned to Asia, whence he extended his authority in the east as far as the Indus. About 501 B.C. the Ionian cities rose in revolt against Persian dominion. They were unsuccessful, the final victory of the Persians being achieved in the naval battle at Lade and the taking of Miletus (494). The assistance given by the Athenians and Eretrians to the Ionians, and the part which they had taken in the burning of Sardis, determined Darius, who was also influenced thereto by the banished Hippias, to attempt the subjugation of the whole of Greece. In 492 he sent Mardonius with an army into Thrace and Macedonia, and at the same time dispatched a fleet against the islands. The former was routed by the Brygi in Thrace, the latter was shattered and dispersed by a storm when rounding the promontory of Mount Athos. In 490 he renewed his attempt. His fleet committed great ravages in the Cyclades, but his army was entirely defeated at Marathon by the Athenians, under Miltiades, the tyrant of the Chersonese. In the midst of his preparations for a third expedition Darius died, about 486 B.C., and was succeeded by his son Xerxes. His tomb is still to be seen at Nakshi-Rustam. Darius was an able ruler, and he organized and wisely administered the kingdom which Cyrus had founded. His liberality to the Jews in connection with the rebuilding of the temple at Jerusalem is referred to in the Bible. For the inscriptions of Darius, consult: Rawlinson, *Journal of the Royal Asiatic Society of Great Britain*, vol. x (London, 1847); Spiegel, *Altpersische Keilinschriften* (Leipzig, 1882); Weissbach and Bang, *Altpers. Keil.* (ib., 1893); Tolman, *Old Persian Inscriptions* (New York, 1893); *The Behistun Inscription of King Darius* (Nashville, 1908), with translation and critical notes; Justi, in *Grundriss der iranischen Philologie* (Strassburg, 1897); Strassmaier, "Inschriften von den Thontafeln des Britischen Museums copirt und autographirt," in *Babylonische Texte*, vols. x–xii (Leipzig, 1892–97). See ACHÆMENES; CAMBYSES; CYRUS; PERSIA.

DARIUS II, called, before his accession to the throne, *Ochus*, and after his succession *Nothus*, the Bastard. He was one of the 17 bastard sons of Artaxerxes I Longimanus. When Sogdianus, another of the bastards, had murdered the rightful King, Xerxes II, and assumed for himself the regal power, Ochus declared war against him, slew him, and secured the diadem for himself (424–423 B.C.). He now called himself Darius. His reign was ignoble. He showed himself to be completely under the control of his eunuchs and his cruel step-sister and spouse, Parysatis. Rebellions were constantly breaking out among his satraps, all of which, however, were crushed except that of Amyrtæus, Satrap of Egypt, who made himself independent in 414. It was during the life of Darius, and chiefly through the craft of Tissaphernes, Satrap of Asia Minor, and of his successor, Cyrus the Younger, son of the King, that the Persians exercised so great an influence over the affairs of Greece in the last years of the Peloponnesian War. Darius died 405–404 B.C.

DARIUS III, called before his accession *Codomannus*. A monarch noted for his mild disposition, handsome person, and courageous spirit. He was great-grandson of Darius II and was raised to the throne through the help of the eunuch Bagoas, after the murder of Artaxerxes III in 338 B.C. and of his son Arses in 336 B.C. But in spite of his superior qualities he could offer no solid opposition to the advance of the Macedonians. At the battle of Issus, in 333, his mother, wife, and three children fell into the hands of Alexander; the victory of Gaugamela, near Arbela (q.v.), in 331, opened to the latter the way to Susa and Persia proper. Darius now fled to Ecbatana, in Media, and, on the approach of his opponent, fled from there to the northern provinces, where he was seized by Bessus, Satrap of Bactria. Alexander, in a fit of generosity, hurried to deliver Darius. Bessus then prepared for flight; but Darius, refusing to follow, was stabbed by the barbarian and left. The scouts of Alexander's cavalry found Darius dying and administered to his last necessities. Thanking the Grecian King for his magnanimity and commending his family to his care, he expired (330). Alexander sent the dead body to Sisygambis, mother of Darius, to be interred in the tomb of the Persian kings. With him the Achæmenian line and the Persian Empire, that had so long dominated Asia, came to a close. Consult Justi, *Grundriss der iranischen Philologie* (Strassburg, 1897).

DARIUS THE MEDE. The son of Ahasuerus, and conqueror of Babylon, according to the biblical narrative of the Prophet Daniel (Dan. v. 31; vi. 28: ix. 1; xi. 1). His age is given as 62 years at the time of the taking of the city. There is great difficulty in identifying this ruler, whom Daniel speaks of as "Darius the son of Ahasuerus, of the seed of the Medes, which was made king over the realm of the Chaldeans" (Dan. ix. 1). Some scholars have suggested an identity with Cyaxares II (q.v.), or more likely with Gobyras, Governor of Gutium, who actually took the city of Babylon as chief in command for Cyrus. (See CYRUS THE GREAT.) But much uncertainty on the whole subject prevails. Some suggestions may be gained from Horner, *Daniel, Darius the Median, Cyrus the Great* (Pittsburgh, 1901).

DARJEELING, där-jēl'ing (Tib. *Dar-rgyas-glin,* land of the diamond thunderbolt, i.e., of the Lama's sceptre). A popular sanitary station of Bengal, British India, capital of a district of the same name, in the Sikkim Himalayas (Map: India, E 3). The average height of the town is 7200 feet above sea level, on the side of a great hollow or basin, in which flows the Rangit, a branch of the Tista. It is the summer residence of the Governor of the Bengal Presidency. It commands a magnificent view of the Himalayas to the north and west. The mean annual temperature is 54° F. Darjeeling has good bazars, a fine sanitarium, beautiful botanical gardens, two Anglican churches, an excellent water supply, and is, especially during October, the fashionable Indian health resort. It has a number of schools for Europeans. Tea growing is the principal industry of the district. One hundred and fifty thousand acres are devoted to its cultivation, and as much as 12,000,000 pounds has been produced annually. It was obtained by the British government from the Rajah of Sikkim in 1835, in order to be made a sanitary station. Pop., including the adjacent cantonment, 1911, 17,053; of district, 250,000.

DARK AGES. A name formerly applied either to the whole or the earlier part of the Middle Ages (q.v.).

DARK AND BLOODY GROUND, The. A name given to the State of Kentucky as the scene of frequent Indian warfare in the days of the early settlers. The phrase has also been said to be a translation of the Indian word "Kentucky."

DARK DAY. Any day in which the sunlight appears to be remarkably dim or altogether absent. In New England the term is specifically applied to May 19, 1780, also known as Black Friday; but many similar dark days are also on record in other parts of the world. Other notable dark days in the United States were those of Oct. 21, 1716, and Oct. 19, 1762. Stygian darkness often prevails during eruptions of ashes from volcanoes. In recent years the months of August and September, 1881, were remarkable in the eastern part of the United States for a long series of days in which artificial light was oftentimes necessary at midday and business was generally very much interrupted. In this case the darkness is known to have been the result of a combination of ordinary cloudiness with the smoke from forest and prairie fires, and it is presumable that the same conditions must have obtained during the historical dark days of the previous century. The *United States Monthly Weather Review,* for September, 1881, p. 27, says: "The foggy or smoky condition of the atmosphere became quite general from the first to the tenth of this month over that portion of the United States between the meridians of 67° and 87° W. and the parallels of 40° and 45° N. It reached an unusual culmination in density in the eastern portion of the Middle Atlantic States and throughout New England, where it interrupted the prosecution of business and compelled the use of artificial light. The destructive violence of prairie and forest fires throughout northern Michigan and portions of Canada has perhaps never been exceeded, and the intensity of the accompanying smoke was simply dreadful. On September 6 southwesterly winds prevailed from Tennessee northward to Lake Superior, and thence eastward to the Canadian maritime provinces, and smoke was reported as far south as Knoxville, westward to Milwaukee, northward to Rockliffe, Canada, and eastward to New Brunswick. To show the progress eastward of this condition in the atmosphere it is necessary to trace the movement of low-pressure areas over Canada and northern New England, and watch the accompanying change in wind directions." The darkness of the dark day of May, 1780, covered very much the same area, with southwest winds and occasional light rains, and was undoubtedly of the same nature, although in both cases it was attributed by the superstitious to supernatural causes. On the plains of Tibet, according to Marco Polo and other travelers, dark days are sometimes caused by clouds of dust so fine and light that it is carried to a great distance by the wind. Similar days of darkness have been caused by clouds of mingled vapor, smoke, and dust emanating from volcanic eruptions, although such clouds do not usually extend to the great distances reached by clouds of smoke from forest fires. Cases of such volcanic clouds occurred in connection with the eruption of Mont Pelée and La Soufrière in the West Indies in May, 1902, and Katmai, Alaska, in June, 1912.

DARKE, William (1736–1801). An American soldier, born in Philadelphia, but taken by his parents to Virginia in 1740. He served under Braddock, rose to the rank of colonel in the American army during the Revolutionary War, and in 1791 commanded the left wing of St. Clair's army, which on November 4 was defeated by the Miami Indians. He was a member of the Virginia Legislature and of the Convention of 1788, in which he voted for the Federal Constitution.

DARK HORSE. A term familiarly used in the vocabulary of American politics and applied to a comparatively unknown man brought forth in a nominating convention at the supreme moment as a candidate for office in the place of a prominent rival candidate of his own party whose nomination would incur the risk of a divided vote. James K. Polk and Franklin Pierce were typical "dark horses" of the Democratic party, Rutherford B. Hayes and James A. Garfield of the Republican.

DARK LADY, The. In Shakespeare's *Sonnets,* the woman thought, by those who maintain that William Herbert is the dedicatee, to be Mary Fitton, one of Elizabeth's maids of honor. It is certain that Herbert and she created a scandal. Another suggestion, with fewer supporters, is Penelope Devereux, Lady Rich, the "Stella" of Sidney's sonnets. See also the theory advanced in the Comtesse de Chambrun's *The Sonnets of Wm. Shakespeare* (London and New York, 1913).

DAR'LASTON. A town in Staffordshire, England, 4 miles southeast of Wolverhampton. It has extensive mines of iron and coal and manufactures of hardware. Pop., 1901, 15,395; 1911, 17,107.

DAR'LEY, Felix Octavius Carr (1822–88). An American painter in water color and illustrator. He was born in Philadelphia and was practically self-taught. He illustrated the works of Irving, Cooper, Longfellow, Hawthorne, Dickens, and Shakespeare, and made 500 drawings for Lossing's *History of the United States.* Among his lithographic illustrations are those for the *Legend of Sleepy Hollow, Rip Van Winkle,* and scenes in Indian life. The swing and vigor of his style, his facility and versa-

tility and the high average merit of his numerous works, make him one of the most noteworthy of American illustrators. In 1868 he published, after a visit to Europe, *Sketches Abroad with Pen and Pencil*. His water-color paintings of incidents in American history are full of spirit and his bank-note vignettes are also worthy of mention. Consult F. Weitenkampf, *American Graphic Art* (New York, 1912).

DARLEY, George (1795–1846). An English poet. He was born in Dublin in 1795, was graduated from Trinity College, Dublin, in 1820, and went to London, where he wrote critical papers for the magazines, and about 1830 joined the staff of the *Athenæum*, becoming famous for his caustic reviews. He died Nov. 23, 1846. Under the inspiration of the Elizabethans Darley produced several lyrical dramas containing passages of great beauty—*Sylvia, or the May Queen* (1827; 2d ed., 1892), and the inferior *Thomas à Becket* (1840) and *Ethelstan* (1841). As early as 1822 he had published *The Errors of Ecstasie*, a melodious poem in blank verse, followed by *Lilian of the Vale* (1826), a thrilling tale, and his best poem, *Nepenthe* (1835; republished in 1897). In 1840 he edited the works of Beaumont and Fletcher. He also wrote several treatises on mathematics, which were praised by Carlyle. For specimens of his verse, consult: Stedman, *Victorian Anthology* (New York, 1895); Streatfield, *Selections from the Poems of George Darley* (1904); also the edition of Colles in the *Muses' Library* (1906).

DAR'LING. A mountain range of Western Australia, extending north and south for about 250 miles, parallel with the coast and from 20 to 70 miles distant (Map: Western Australia, B 9). It ends near Point d'Entrecasteaux. Its highest summit reaches 3500 feet.

DARLING, Grace Horsley (1815–42). An English heroine. She was born in Bamborough, Northumberland, the daughter of William Darling, lighthouse keeper on Longstone, one of the Farne Islands. On the morning of Sept. 7, 1838, the steamer *Forfarshire* was wrecked near the lighthouse, and all but nine of the 63 passengers perished. In spite of the danger of such an undertaking the father and daughter made a trip to where the survivors lay and rescued four men and a woman in the first trip, and William Darling and two of the rescued men returned and brought off the four others. News of the exploit was received with great enthusiasm by the English people, and by popular subscription the sum of £750 was raised for the heroine and £270 for the father. Both father and daughter were rewarded with gold medals. Consult *Grace Darling: Her True Story, from Unpublished Papers in the Possession of the Family* (1880), and Mabie, *Heroine that Every Child Should Know* (New York, 1908).

DARLING RIVER (named in honor of Sir Ralph Darling, Governor of New South Wales, 1825–31), or Barwon River. An Australian stream, the most important tributary of the Murray (Map: New South Wales, B 2). It rises in southeastern Queensland, flows through New South Wales, and joins the Murray on the Victorian border, its length being 1160 miles. The area of its basin is about 200,000 square miles. During the dry season its course is marked by a succession of pools or small lakes; but during the winter, when it is subject to sudden floods, it is navigable by light-draft steamers for over 600 miles to Bourke, the terminus of the Great Western Railway, from Sydney. Most of the region of the Darling is but a desert in the dry season.

DAR'LINGTON. A parliamentary and municipal borough and market town in Durham Co., England, on the Skerne, near its junction with the Tees, 18 miles south of Durham City (Map: England, E 2). The town is laid out in wide and regular streets and has a spacious market place. The parish church of St. Cuthbert, a handsome Early English edifice, was founded about 1160 by Bishop Pudsey. It is built in the form of a cross. It received its charter of incorporation in 1867, has owned its gas and water works since 1854, and maintains public baths and markets. Its principal manufactures are iron, worsteds, carpets, bricks, stone, bridge material, gun castings, and shells, and there are extensive locomotive works belonging to the Northeastern Railway. The first passenger railway in England operated by steam was opened in 1825 between Darlington and Stockton. Pop., 1891, 38,000; 1901, 44,511; 1911, 55,631. At Oxen-le-field, 3 miles from Darlington, are curious cavities of unknown origin, called Hell Kettles. From Anglo-Saxon times till 1867 Darlington was under the authority of the Bishop of Durham. Consult Longstaffe, *History and Antiquities of Darlington* (London, 1854).

DARLINGTON. A town and the county seat of Darlington Co., S. C., 70 miles (direct) east-northeast of Columbia, on the Atlantic Coast Line and the South Carolina Western railroads (Map: South Carolina, E 2). It carries on a considerable trade in cotton, tobacco, and grain, the principal products of the surrounding agricultural region, and manufactures cottonseed oil, cotton goods, and fertilizers. Pop., 1900, 3028; 1910, 3789.

DARLINGTON, James Henry (1856–). An American bishop, born in Brooklyn, N. Y. He was educated at New York and Princeton universities and at Princeton Theological Seminary. In 1882 he was ordained a priest in the Protestant Episcopal church. Thereafter he was assistant (1882–83) and rector (1883–1905) of Christ Church, Brooklyn, and archdeacon of Brooklyn (1896–98); and in 1905 he was elected first Bishop of Harrisburg. In 1902–03 he lectured at New York University and in 1910–11 he served as chaplain of the Masonic Grand Lodge of Pennsylvania. He edited *The Hymnal of the Church* and wrote *Pastor and People* (1902).

DARLINGTON, William (1782–1863). An American botanist, born at Birmingham, Pa. In 1806 he went to India, and on returning published an account of his voyage. He was a member of Congress in 1815–17 and again in 1819–23. At Westchester, Pa., he founded an athenæum, an academy, and a society of natural history. Among his publications are: *Mutual Influence of Habits and Disease* (1804); *Agricultural Chemistry; Agricultural Botany* (1847); *Memorial of John Bartram* (1849). The California pitcher plant was named *Darlingtonia californica* for him.

DAR'MESTETER, Agnes Mary Frances. See Robinson, Agnes Mary Frances.

DARMESTETER, därm'ste-târ', James (1849–94). A French Orientalist, whose eminence was achieved especially in the field of Iranian scholarship. He was born, of Jewish parentage, at Château-Salins, in Lorraine. He was educated at the Lycée Bonaparte, Paris, from which he grad-

uated with the highest honors in 1867, when he began to devote himself to Oriental philology, chiefly under the guidance of the gifted Michel Bréal. In 1877 he was appointed assistant professor of Zend at the Ecole des Hautes Etudes and in 1885 was advanced to the professorship of Iranian languages and literature at the Collège de France. In 1886 he visited India, to make special philological researches in connection with the sacred books of the Parsis, and was afterward honored by an appointment as fellow of Bombay University. After the death of Renan he became secretary of the Société Asiatique de Paris and was likewise busily engaged as an editor of a leading political and literary periodical, *La Revue de Paris*, during the last years of his life. His writings in the field of Avestan philology and Zoroastrianism are of prime importance, even if his theories, which are often very radical, cannot always be accepted. Among his works may be mentioned: *Haurvatāt et Ameretāt, Essai sur la mythologie de l'Avesta* (1875); *Ormazd et Ahriman, leurs origines et leur histoire* (1877); *Etudes iraniennes* (2 vols., 1883); *Essais orientaux* (1883); *Chants populaires des Afghans* (1888–90); *Les prophètes d'Israël* (1892); and his most important work, *Le Zend-Avesta; Traduction nouvelle* (3 vols., 1892–93). Besides his Oriental work, he wrote a volume of *Essais de littérature anglaise* (1883), and a volume on Shakespeare (1889) for the *Collection des Classiques populaires*. A number of his literary essays have been translated into English by Helen Jastrow (Boston, 1895) and by his wife (London, 1896). Consult Bréal, "James Darmesteter," in the *Annuaire de l'école des hautes études* (Paris, 1895).

DARMSTADT, därm'stät (Ger., city of the Darm, the river near which the city lies). The capital of the Grand Duchy of Hesse (and of Starkenburg Province), Germany, and residence of the Grand Duke, about midway between the Rhine and the Main, at the northwestern extremity of the Odenwald, and 17 miles south of Frankfort-on-the-Main (Map: Germany, C 4). It consists of an old and new town, the streets of the former being narrow and crooked, but those of the latter broad and handsome, exhibiting many imposing specimens of architecture. Its principal square, the Luisenplatz, adorned with a lofty column, surmounted by a bronze statue of Grand Duke Louis I, who founded the new town, contains the post office, the government building, and the old palace. The Luisenplatz is crossed by the Rheinstrasse, the most important street in Darmstadt. The grand-ducal palace, surrounded by pleasant gardens, was begun in the fifteenth century, but practically rebuilt in the early part of the eighteenth. It contains a valuable library of over 564,000 volumes, an archæological collection, and a picture gallery with some good examples of the early German and Dutch masters. The chef-d'œuvre is the "Madonna of the Burgomaster Meyer," by Holbein the Younger. Prominent among numerous churches are the Stadtkirche, with the handsome monument of Landgrave George I, and the Roman Catholic church built after the Pantheon at Rome, with a lofty dome supported by 28 columns. Other notable features include the new palace, the palace of Prince Henry, the old and new town halls, theatre, and the Herrngarten, a fine public garden and park. The town's affairs are administered by a municipal council of 42, and an executive board of 3 members. It owns its water supply and operates gas works and an electric-light plant. Its educational institutions include a technical high school (1392 students in 1913), two gymnasia, an artisans' school, and a school of agriculture. Among its charitable institutions are a municipal hospital and the Alice and provincial hospitals.

Darmstadt is a manufacturing town of growing importance. The chief articles of manufacture are machinery, carpets, hats, tobacco, chemicals, scientific instruments, playing cards, and beer. Darmstadt is an important railway centre. An electric street railway accommodates internal traffic. The famous chemist Justus von Liebig was a native of the town, and the composer Flotow died here. To the east of the town is the palace of Rosenhöhe, with the grand-ducal mausoleum, containing the tombs of the Grand Duke Louis IV and his wife, Princess Alice, daughter of Queen Victoria of England. Pop., 1890, 56,000; 1900, 72,381; 1910, 87,089.

Darmstadt appears as Darmundstadt in the eleventh century. It acquired municipal rights in 1330 and became in 1567 the capital of Hesse-Darmstadt. It was burned by the French in 1688 and 1693, but attained great prosperity towards the end of the eighteenth century. Consult Zernin and Wörner, *Darmstadt und seine Umgebung* (Zurich, 1890).

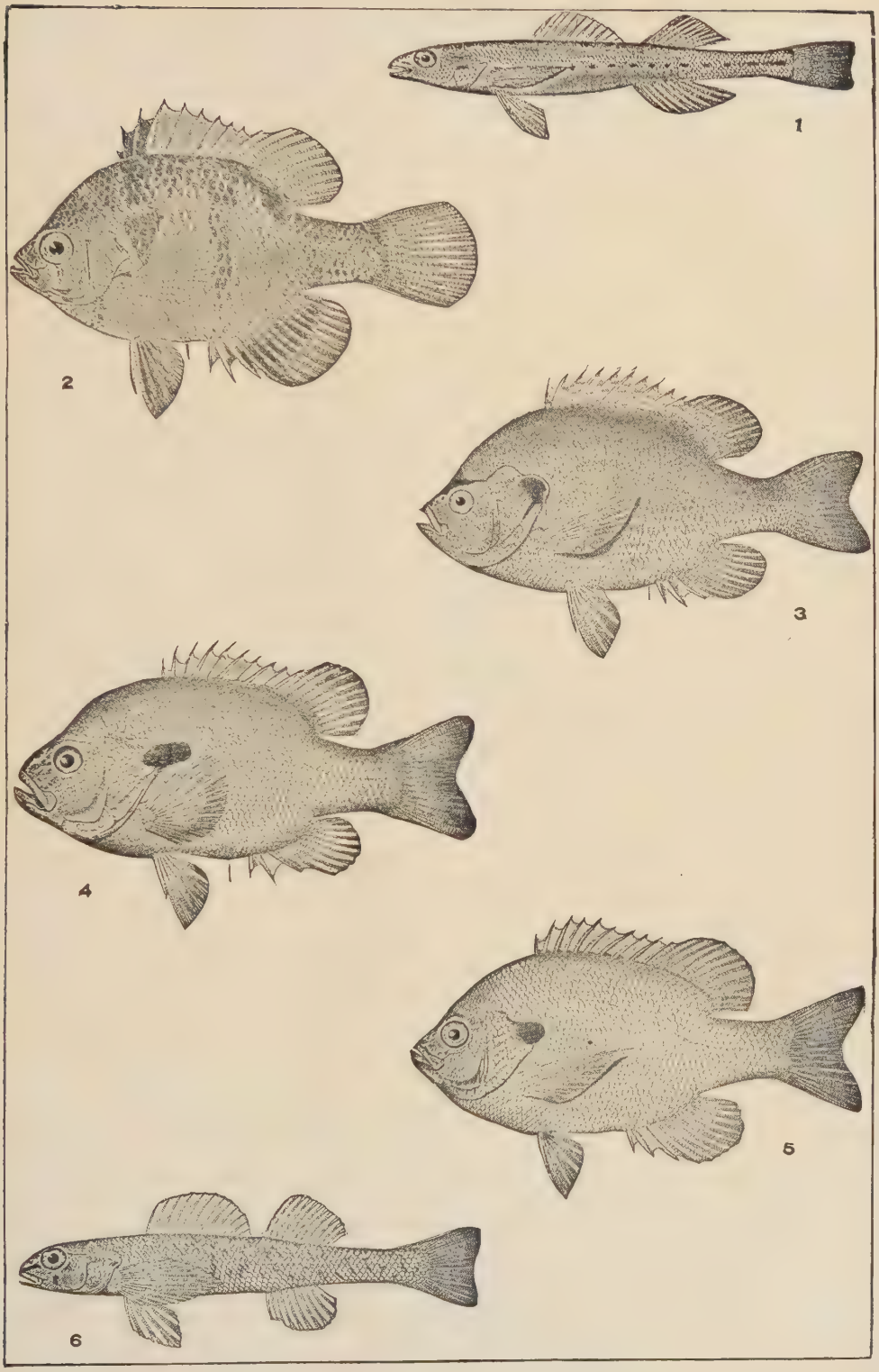
DAR'NEL (Fr. dial. *darnelle;* probably from OF. *darne*, stupid, Dan. *daare*, fool; so called from its supposed stupefying power), *Lolium temulentum*. A grass of the same genus with the valuable rye grass (q.v.), an annual, common in grain fields in England and in many parts of continental Europe, and introduced in some parts of the United States. This grass has from ancient times been reputed to have a narcotic, poisonous seed, to which many bad effects were ascribed. Lindley, in his *Medical and Œconomical Botany*, published in 1849, ascribes narcotic and acrid qualities to darnel seed. Recent investigations have shown the presence of a fungus in the grain of this grass, and to it the poisonous qualities are attributed. The fungus seems to be almost always present in the seed of this species and less frequent in the other species of the genus.

DAR'NELL, Henry Faulkner (1831–). An English Protestant Episcopal clergyman, born in London and educated at Dublin and Cambridge. He was principal of Hellmuth Ladies' College at London, Ontario, in 1874–83, and rector of a church at Avon, N. Y., in 1883–1904, and of St. Mary's, Detroit, in 1904–07. His publications include: *Philip Hazlebrook* (1887); *The Craze of Christian Englehart* (1890); *Songs of the Season* (1895).

DARNÉTAL, där'nā'tàl'. The capital of a canton in the Department of Seine-Inférieure, France, at the confluence of the Aubette and Robec, a suburb of Rouen (Map: France, N., G 3). Its noteworthy buildings are the Gothic church of Long-Paon, a fine early sixteenth-century belfry, and the town hall. The town commands a good view of Rouen. It has important manufactures of woolens, calico, cotton goods, and cast iron. Pop., 1901, 6826; 1911, 7218.

DARN'ING NEEDLE. A dragon fly, or damsel fly; supposed by ignorant folk to be attempting to pierce and "sew up" one's ears or do other mischief as it darts about one's head; hence the term is frequently extended to "devil's darning needle." See Dragon Fly.

DARTERS AND SUNFISH



1. SAND DARTER (Ammocrypta pellucida).
2. BLACK-BANDED SUNFISH (Mesogonistus chætodon).
3. COMMON SUNFISH OR PUMPKIN-SEED (Eupomotis gibbosus).
4. YELLOW-BELLIED SUNFISH (Lepomis auritus).
5. BLUE OR COPPER-NOSED SUNFISH (Lepomis pallidus).
6. JOHNNY DARTER (Boleosoma nigrum).

DARN'LEY, Henry Stewart, or Stuart, Lord (1545–67). The second husband of Mary, Queen of Scots. The second but eldest surviving son of the Earl of Lennox by Lady Margaret Douglas, niece of Henry VIII, he was born, Dec. 7, 1545, at Temple Newsam, Yorkshire, where he received a private education. He was handsome and of accomplished manners, but destitute of moral and intellectual power. He married Mary on July 29, 1565, but soon disgusted her by intemperance, profligacy, and insolence. As an accessory to the assassination of Rizzio, he intensified Mary's hatred by holding her while the deed was committed in her presence. While recovering from an illness, he met his death in an isolated house which was blown up by the Earl of Bothwell, Feb. 9, 1567. The question of Mary's complicity in the deed will probably always remain one of the problems of history. See Mary Stuart.

D'ARREST, där-rĕst', Heinrich Ludwig (1822 or 1823–75). A German astronomer. He was born in Berlin and studied astronomy there under Encke. He was subsequently connected with the observatories of Berlin and Leipzig and became in 1852 professor in the Leipzig University. In 1857 he became professor of astronomy in Copenhagen, where he died. His important publications include: *Resultate aus Beobachtungen der Nebelflecke und Sternhaufen* (1857); *Siderum Nebulosorum Observationes Havnienses* (1867); *Untersuchungen über die nebulosen Sterne in Bezug auf ihre spektralanalytischen Eigenschaften* (1872); and numerous astronomical papers in scientific journals. His original observations include discoveries of several comets, and of the planet Freia (1862).

DART. See Dace.

DART'ER (so called from the quick motion). One of a group of small fresh-water fishes of the perch family, peculiar to the United States. None is more than 10 inches in length, and the least is only 1½ inches long—the smallest spiny-rayed fish known. All are powerful swimmers and have been spoken of by Forbes as concentrated rather than dwarfed fishes. "They have developed," he says, "an activity and hardihood, a vigor of life, and a glow of high color almost unknown among brook fishes elsewhere." They have been the subject of special study by Dr. D. S. Jordan, who tells us that most of them prefer clear running water, where they lie on the bottom concealed under stones, darting, when frightened or hungry, with great velocity for a short distance, then stopping as suddenly. All are carnivorous and feed chiefly on the larvæ of flies. These beautiful and very interesting little fishes exist in great variety throughout the central and southern United States and are universally known to country boys as "Johnny darters," a name particularly given to a typical species (*Boleosoma nigrum*). A few others of the larger ones have received other names locally, as the sand darter (*Ammocrypta pellucida*), indicating the preference of its genus for sandy bottoms. This fish is very transparent and, when disturbed, plunges into the sand. (See Plate of Darters and Sunfish.) Excellent popular accounts will be found in the *American Naturalist* for 1876 and 1880; and a full history of the group in Jordan and Evermann's *Fishes of North America*, pp. 1016–1105 (Washington, 1896).

DARTER, or Snake Bird. A name given to certain steganopode birds, nearly allied to cormorants, but having a bill longer than the head, perfectly straight, slender, and sharp-pointed; and also remarkable for the great length of the neck, which has obtained for them the name "snake birds." They generally live in pairs near bodies of fresh water. If alarmed while sitting on a branch over a stream or by the edge of a lake, they drop off quietly into the water, sink gently beneath the surface, and disappear; or they may fly upward and circle about like a hawk. They make rude nests upon trees and lay chalky-blue eggs. They eat great quantities of fish, which they kill by a quick, snakelike darting forward of the closed beak, impaling the prey, which is then flung into the

BEAK OF THE DARTER.

air, caught in the mouth, and swallowed entire. Four species are known, constituting the family Anhingidæ. One species occurs in Africa, one in southern Asia, one in Australia, and one in tropical and subtropical America. The last (*Anhinga anhinga*) is sometimes called the water turkey and wanders in summer as far north as southern Illinois. It is a handsome bird, about 3 feet long, glossy black, the back marked with numerous silvery-white spots or streaks. See Plate of Fishing Birds, and Colored Plate of Eggs of Water and Game Birds.

DART'FORD (AS. *Darentford*). A town in Kent, England, 14 miles east-southeast of London Bridge, on the Darent, about 3 miles from its junction with the Thames (Map: London and Vicinity, F 11). It lies in a narrow valley between two steep hills. It has large powder and paper mills; also manufactures of oil, iron, machinery, and chemicals. One of the first paper mills in England was built here by Spielman, jeweler to Queen Elizabeth in 1590. The City of London Lunatic Asylum is situated here, and there are interesting ruins of a nunnery, founded 1355 by Edward III. Wat Tyler's insurrection, in the reign of Richard II, broke out at Dartford in 1381. Pop., 1891, 12,000; 1901, 18,600; 1911, 39,909.

DART'MOOR (named from the river Dart, which rises in the region). A granitic tableland in the southwest of Devonshire, England, remarkable for its wild, rugged scenery and cyclopean relics of aboriginal inhabitants (Map: England, C 6). Dartmoor proper (or the ancient forest of that name) and the outlying common lands are about 20 miles square. This moorland region, encircled by a natural rampart and moated by deep valleys, has a considerable elevation above the surrounding country and culminates in Yes Tor, 2077 feet above sea level. Copper is found, and at Wheal, Duchy, and Birch Tor are productive tin mines. The largest kaolin works in England are at Lee Moor, which is also the seat of a meteorological observatory. The soil is composed chiefly of peat, which in the bottoms has accumulated in some places to the depth of 25 feet, and it rests on a subsoil of fine sand. Many of the well-watered dells and ravines are fertile, while the whole moor affords pasturage for cattle, sheep,

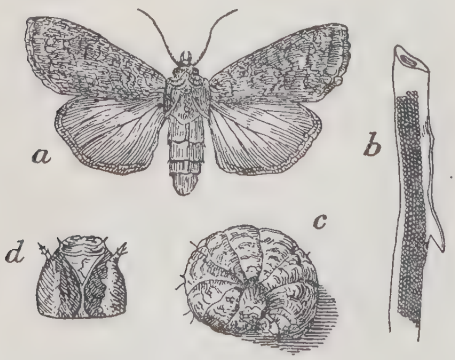
and horses. The antiquities include the Gray Wethers, a fine specimen below Sittaford Tor of what is now styled a Druidical temple, the vestiges of a large aboriginal village at Grimspound, the cromlech at Drewsteignton, logans, stone avenues, dolmens, barrows, cairns, rock pillars, and ancient trackways.

During the long war with Napoleon a prison, now used for convicts, was erected in western Dartmoor for French captives. Prince Town sprang up close by and soon became a thriving place. During the war with the United States (1812–15) many captured Americans were confined at Dartmoor. See DARTMOOR MASSACRE.

The castle, manor, and forest of Dartmoor were granted by Henry III to his brother Richard, Earl of Cornwall, and since 1337 Dartmoor has been, in part, permanently annexed to the Duchy of Cornwall. Dartmoor figures conspicuously in poetry and romance. Consult Rowe, *A Perambulation of the Ancient and Royal Forest of Dartmoor*, etc. (Plymouth and London, 3d ed., 1896), and S. Baring Gould, *Book of Dartmoor* (London, 1900).

DARTMOOR MASSACRE, THE. The killing (April 6, 1815) by a company of English soldiers of some American prisoners, who, together with 6000 others, had been confined in the Dartmoor (England) prison for several months after the close of the War of 1812 between England and the United States. To quell what they reguarded as a mutiny and to thwart an apparent effort at escape, the prison guard, probably under orders from Capt. T. G. Shortland, their commanding officer, fired upon the prisoners, killing seven and wounding about 60—30 of them dangerously. The Americans at the time regarded this as an act of wanton murder, but it was pronounced justifiable by a joint commission, which, however, acquitted the prisoners of the charge of organizing a mutiny or of planning an escape. The British government soon afterward promoted Shortland, but made liberal provision for the families of those who had been killed or permanently disabled. Consult Andrews, *The Prisoners' Memoirs: or, Dartmoor Prison* (New York, 1852), and Cobb, *A Green Hand's First Cruise, Together with Five Months in Dartmoor* (Boston, 1841).

DARTMOOR PRISON. See DARTMOOR, and DARTMOOR MASSACRE.



A DART MOTH (*Agrotis saucia*).
a, Adult moth; *b*, deposit of eggs; *c*, caterpillar (a cutworm); *d*, head of caterpillar.

DART MOTH. A noctuid moth of the genus *Agrotis*, whose caterpillars are cutworms, sometimes called "climbing cutworms." A species very widespread in both Europe and America is *Agrotis saucia*, whose wings expand 1¼ inches. The fore wings are grayish brown variegated with black; the hind wings whitish, deepening into brownish towards the margin. The caterpillar is nearly 2 inches long when mature and is of a dull flesh color mottled with brown and black. When ready to pupate, it descends and forms a smooth cavity in the ground for that purpose. These caterpillars feed on the leaves of fruit-bearing trees and shrubs.

DARTMOUTH, därt'mŭth. A town of Halifax Co., Nova Scotia, Canada, situated on Halifax harbor, opposite the city of Halifax, of which it is practically a suburb connected by a 15-minute service of ferries (Map: Nova Scotia, F 4). It is the terminus for the Halifax and Eastern Railway. It contains handsome residences, the provincial asylum for lunatics, and a park. The manufactured products include sugar, lumber, spice, soap, chocolate, cordage, corn meal, beer, skates, and bolts. There are also boiler works, rolling mills, and a marine railway. Dartmouth, founded in 1749, was destroyed by Indians in 1751. Fort Clarence, below the town, commands the narrow and dangerous eastern passage, which was considered impassable for large vessels until 1862, when the Confederate steamer *Tallahassee* escaped through it. Pop., 1901, 4806; 1911, 5058.

DARTMOUTH. A town and seaport of Devonshire, England, built in terraces on a steep slope 300 to 400 feet high on the river Dart, 27 miles east of Plymouth, and not far from the sea (Map: England, C 6). The streets are narrow, and many of the houses have the old-style overhanging stories, projecting gables, and wood carvings. In St. Saviour's Church, of the fourteenth century, are a richly sculptured stone pulpit, a highly ornamented, painted, and gilt interior, a carved rood loft, and interesting monuments. A battery and the remains of a castle built during the reign of Henry VII stand at the entrance to the excellent harbor. In the river above the town is anchored the cadet training ship *Britannia*. The commerce and shipping trade of Dartmouth are of considerable importance. Its fisheries are extensive, it is a coaling station for the south coast, and has shipyards, paint factories, breweries, and engineering works. It has a resident United States consular agent. Pop., 1901, 6579; 1911, 7005. Sir Humphrey Gilbert, the Newfoundland explorer, was born near the town. At Dartmouth, in 1190, the Crusaders, under Richard Cœur de Lion, embarked for the Holy Land. Its earliest-known charter dates from 1342. The French burned the town in the time of Richard II, but were repulsed in another attack on it in 1404. In the Civil War of the seventeenth century it was captured by the Royalists under Prince Maurice and retaken by the Parliamentarians under Fairfax.

DARTMOUTH. A town in Bristol Co., Mass., about 5 miles south of New Bedford, on the Paskamansett River (Map: Massachusetts, F 6). It is in a region of summer resorts and contains three public libraries. There are poultry and dairying interests and manufactories of box boards. Pop., 1900, 3669; 1910, 4378.

DARTMOUTH COLLEGE. An institution for higher education situated at Hanover, N. H. Dartmouth originated in Moor's Indian Charity School, organized about 1750 at Lebanon, Conn., by the Rev. Eleazar Wheelock, and receiving

its name and first endowment from Joshua Moor, or More, in 1755. Support for the school came from gifts made chiefly by the general courts of Massachusetts Bay and New Hampshire and by persons in England interested in the project of educating the Indians. This interest was fostered by Sampson Occom, an Indian preacher and pupil of Dr. Wheelock, who toured England and Scotland in 1766–67, raising funds for the school. The proceeds, some £10,000, were intrusted to a board of trustees, of whom the Earl of Dartmouth was chairman. Encouraged by this success, plans were made for the enlargement of the school, so that both whites and Indians might be taught, and for placing it upon a legal and permanent basis. Largely through the influence of John Wentworth, Governor of New Hampshire, large tracts of land were given by that province on the present site of the college, and in 1769 George III granted a royal charter to "Dartmouth College" —named in honor of its patron, the Earl. At the same time Moor's School was made a separate institution, though under the control of the same trustees as those of the college. This school was maintained until 1849 and still retains a legal if fictional existence under the title "The President of Moor's Charity School." Dr. Wheelock was made the first president of the college and retained office until 1779, when he was succeeded by his son John. In 1816, a religious controversy having arisen, the Legislature of New Hampshire passed acts intended to deprive the trustees of authority and to take to itself the control of the institution. These acts were sustained by the State court, but were, in 1819, upon argument by Daniel Webster (q.v.), invalidated by the Supreme Court of the United States, which declared the original charter to constitute an inviolable private trust. (See DARTMOUTH COLLEGE CASE.) Dartmouth comprises the College; the Medical School, founded in 1798; the Thayer School of Civil Engineering, founded in 1867; and the Amos Tuck School of Administration and Finance, founded in 1900. The Chandler School of Arts and Sciences, founded in 1851, was merged into the college in 1893 as the Chandler Scientific Course. In 1866 the New Hampshire College of Agriculture and Mechanic Arts was established by the State in connection with Dartmouth, but was separated from the college in 1893 and moved to Durham, N. H. The course of the Medical School was reduced in 1913 to two years of preparatory medical work in conjunction with undergraduate courses leading to the bachelor's degree. Dartmouth thus offers no degree in medicine, but makes possible a ready transition from college to advanced standing in metropolitan professional schools which offer unusual clinical facilities. The courses of the Thayer and Amos Tuck schools are two years; but the first year in any of the graduate schools may, under certain restrictions, be credited also as the last year in the undergraduate school.

Degrees are conferred in arts, science, civil engineering, and commercial science. The college buildings, numbering some 40, include laboratories, an observatory, two medical buildings, dormitories, a large dining hall, and commons. There is, besides, the Mary Hitchcock Memorial Hospital, having lecture and clinic facilities at the disposal of the Medical School. The library represents the accumulations of a century and a quarter and consists of over 125,000 volumes and 20,000 pamphlets. The student enrollment in 1913 was 1329, of whom 21 were in the Medical School, 37 in the Thayer School, and 64 in the Amos Tuck School. The presidents of the college have been: Eleazer Wheelock, 1769–79; John Wheelock, 1779–1815; Francis Brown, 1815–20; Daniel Dana, 1820–21; Bennett Tyler, 1821–28; Nathan Lord, 1828–63; Asa Dodge Smith, 1863–77; Samuel Colcord Bartlett, 1877–92; William Jewett Tucker, 1893–1909; Ernest Fox Nichols, 1909– .

DARTMOUTH COLLEGE CASE. One of the most important and far-reaching decisions in constitutional law ever decided by the United States Supreme Court. The charter of Dartmouth College was granted by the British crown in 1769, incorporating 12 persons by the name of the Trustees of Dartmouth College, and giving them full power to govern the college and to fill all vacancies in their body. In 1816 the Legislature of New Hampshire passed an act amending the original charter, providing for the appointment of 11 new trustees by the Governor of the State, and for a board of overseers to inspect and control the conduct of the trustees. The old trustees refused to accept the amended charter, and brought suit against the officers of the new board who had obtained possession of the college property. The Supreme Court of New Hampshire upheld the constitutionality of the statute, and the case was then taken on writ of error to the Supreme Court of the United States. For the plaintiffs the main argument was made by Daniel Webster (q.v.), and for the defendants by William Wirt (q.v.), Attorney-General of the United States. In its decision, handed down in 1819, and in which all but one of the justices concurred, the court held, through Chief Justice Marshall, that the acts of the New Hampshire Legislature in question were unconstitutional and void. The college was declared to be a private and not a public corporation; the charter of such a corporation was declared to be a contract between the crown (to whose obligations the State of New Hampshire had succeeded) and the corporators and their successors, and the State statute which attempted to change the charter without the consent of the corporation was held to be within the prohibition of the Federal Constitution, that "no State shall . . . pass any . . . law impairing the obligation of contracts." The consequences of this decision have been very far-reaching, both in securing the inviolability of private trusts and in limiting State sovereignty and extending, through the Federal courts, the authority of the Federal Constitution. The principles of the decision have been repeatedly applied, and in some important respects limited, both by Federal and State courts. The case is reported in 1 *New Hampshire Reports*, 111, and 4 *Wheaton* (*United States*) *Reports*, 518. For favorable comments on the decision, consult: Kent, *Commentaries on American Law*, vol. i (Boston, 1884), Lect. xix; Story, *Commentaries on the Constitution of the United States*, vol. ii (ib., 1891); Pomeroy, *Introduction to the Constitutional Law of the United States* (9th ed., Boston, 1886); Maine, *Popular Government* (London, 1885). For a searching criticism of the case, consult Shirley, *The Dartmouth College Causes* (St. Louis, 1879), and Walker, *The Dartmouth College Case*.

DARTON, NELSON HORATIO (1865–).

An American geologist, born in Brooklyn, N. Y., and educated in the public schools. He was a chemist for four years and in 1886 became geologist to the United States Geological Survey, from which in 1910 he was transferred to the post of geologist to the Bureau of Mines of the Geological Survey. His studies in water analysis when he was a young chemist led to the condemnation of many insanitary wells, and much of his later work was in government reports on artesian waters and structural materials. He edited the Survey's first bibliography of North American geology, from 1732 to 1891, in *Survey Bulletin 127* (1896).

DARU, dȧ′rụ′, Pierre Antoine Noël Bruno (1767–1829). A French historian, poet, and statesman, born at Montpellier, Jan. 12, 1767. He entered the army in 1783, was imprisoned (1792–93) on a charge of treason to the Republic for 18 months, during which he produced a creditable translation of Horace. One of Napoleon's most trusted lieutenants, owing to his undisputed probity and signal administrative qualities, he held some of the most exalted positions in the Empire, such as Councilor of State, intendant général de la maison militaire, Secretary of State, and Minister of War. He was in charge of the Commissary Department of the Grand Army during the campaign of 1812 and also during the retreat through Russia. During the Restoration he was made intendant général by Louis XVIII in 1814. At the second Restoration he retired for a time (1815–19) to private life and study, but was made member of the Chamber of Peers in 1819 and became a distinguished defender of constitutional liberty. He wrote some important pamphlets on free speech and even defended the educational theories of Rousseau. In spite of his military and political activity, his literary production was of such excellence that he was elected to the Académie Française and later named its president. He died on his estate, near Meulan, Sept. 5, 1829. His *Histoire de la république de Venise* and *Histoire des ducs de Bretagne* (1826) are impartial, erudite, and accurate. Sainte-Beuve devotes three articles to him in the *Causeries* (vol. ix). A *Life* by Viennet is prefixed to the fourth edition of *Histoire de la république de Venise* (Paris, 1853).

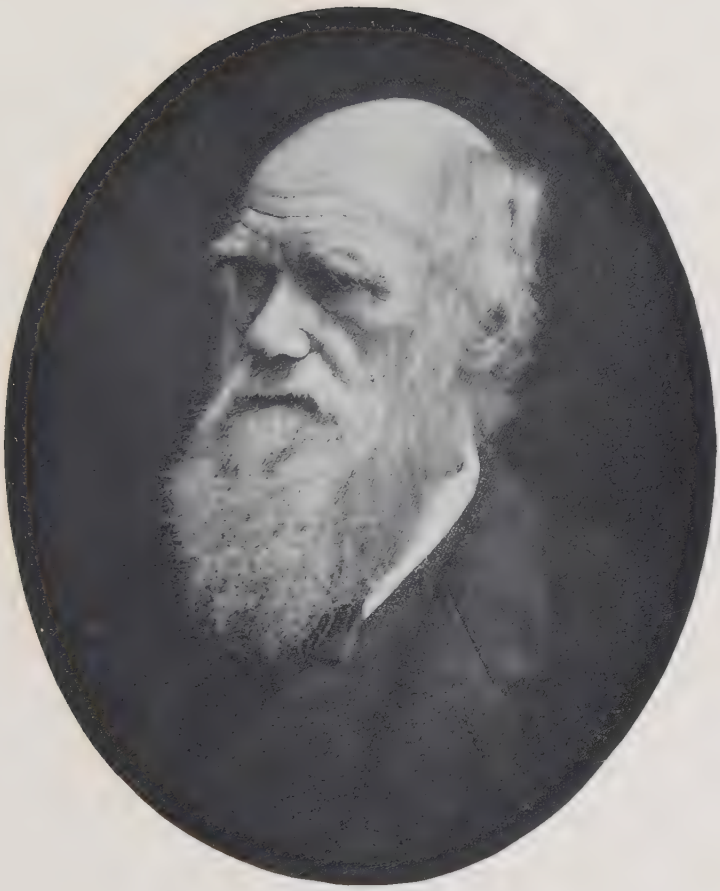
D'ARUSMONT, dȧ′rụs′môn′, Frances. See Wright, Fanny.

DAR′WEN. A town of Lancashire, England, on the river Darwen, situated amid moorland hills, 3½ miles south of Blackburn and 18 miles northwest of Manchester (Map: England, D 3). The town is irregularly built and unattractive. It owes its importance to a trade with India and China in calicoes, for which it employs a large number of spindles and looms. The India Mill, one of the finest in the country, covers an area of 31,000 square feet and runs 160,000 spindles. The town also contains paper-staining works, paper manufactories, calico-printing establishments, works for the manufacture of fire bricks, stained paper, tiles, and sanitary tubes, iron and brass founding, bleaching, machine and reed making. Coal mines and stone quarries also find employment for a considerable number of the inhabitants. It has numerous places of worship, large and commodious schools for elementary education, technical schools, and a cooperative public hall. The municipality owns gas, water, electric light supply, tramways, slaughterhouses, markets, public baths, free library, technical school, cemetery, artisans' dwellings, and lodging house, and a modern system of sewage disposal for fertilizing purposes. The place was known as Over Darwen from the reign of Henry II and with several hamlets was incorporated in 1878 as the municipal borough of Darwen. Pop., 1851, 11,702; 1891, 34,192; 1901, 38,212; 1911, 40,344. Consult Shaw, *History of Darwen* (London, 1891).

DAR′WIN, Charles Robert (1809–82). The greatest English naturalist of the nineteenth century. He was born at Shrewsbury, Feb. 12, 1809, the son of Dr. Robert W. Darwin, F.R.S., and grandson of Erasmus Darwin (q.v.). His mother was a daughter of Josiah Wedgwood, the famous manufacturer of pottery. After attending a public school at Shrewsbury for some years, he studied at Edinburgh University for two sessions, and then at Christ's College, Cambridge, where he took his degree of B.A. in 1831. His father had originally intended him for the Church, but hereditary tendencies towards natural history led him in another direction. Shortly after graduation he seized an opportunity to go around the world as naturalist in H. M. S. *Beagle,* commanded by Captain Fitzroy, R.N. This expedition which continued from Dec. 27, 1831, to Oct. 2, 1836, and spent much time in making surveys of southern South America, afforded Darwin a great opportunity for making original observations and for contemplation. It was, indeed, his studies on the fauna of the Galapagos Islands that planted the germ of his evolutionary theories. The account of his voyage, finally (1860) entitled *Voyage of a Naturalist on H. M. S. Beagle,* which has passed through many editions, is a classic work and shows a degree of intelligence in the author that promised great things for his future. This voyage had a marked effect on Darwin's health, leaving him with a tendency towards nausea which during life permitted of only a limited amount of work each day. In the seclusion of his country place at Down the great thinker was able by steady application, despite his disability, to produce his great works.

The scientific outcome of his voyage was a series of important books. In 1839 was published his first *Journal of Researches;* in 1840–43 the *Zoölogy of the Voyage of H. M. S. Beagle,* published by the government and edited by Darwin; in 1842, *The Structure and Distribution of Coral Reefs,* in which was proposed the theory of the origin of coral reefs that is most generally held to-day; in 1844, *Geological Observations on Volcanic Islands;* and in 1846, his *Geological Observations on South America.* Darwin's valuable *Monograph of the Cirripedia* (1851–55) was the immediate outcome of his voyage and remains to-day the standard systematic work on this group.

It had long been known to a number of scientific friends that Darwin was working on a theory of evolution when, in 1858, he received from A. R. Wallace, then in the East Indies, the manuscript of a paper containing precisely the same explanation of adaptation that Darwin had hit upon. Darwin was naturally much embarrassed, but seemed willing to throw aside the work of years and give precedence to his friend's paper. On the advice of friends, however, his paper and Wallace's were read at the same meeting of the Linnæan Society of London and were published in their *Transactions* for 1858. In



Ch. Darwin

1859 Darwin's book, *The Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Struggle of Life*, appeared. It at once created the greatest interest, and, largely through the extraordinarily able championship of Huxley, its ideas soon gained widespread acceptance. Although Darwin's theory of natural selection is primarily only an explanation of adaptation, yet adaptation is of such fundamental importance that its explanation paved the way for the acceptance of the general theory of evolution; for Darwin contributed a mechanical or natural explanation of what had before required a supernatural explanation. Development by natural law took the place of the special-creation hypothesis. Darwin's mechanical theory is that of the struggle for existence, the annihilation of the unfit, and the consequent "survival of the fittest." It rests upon the evident fact that every species of animal produces more young than will develop to maturity and breed; for if all the young produced by any species bred the world would soon become filled with that species to the exclusion of every other. The vast number of individuals that are killed off are, on the whole, below the average of those that survive. The latter have been preserved on account of a certain, perhaps slightly, greater fitness to their environment, which may protect them from their enemies or give them greater power in gaining food or reproducing their kind. Their slight advantage will be inherited, and so the next generation will start from a fitter plane, and, by a continuance of the selective process in successive generations, perfect adaptation will result. The theory of natural selection has been subjected to the most rigorous criticism, but it still remains a useful explanation of certain phenomena. See NATURAL SELECTION; EVOLUTION.

The importance of the change wrought by Darwin's book cannot be overestimated. First, it revolutionized the method of work and the aims of natural history. The aims of zoölogical investigation were thenceforth the retracing of zoölogical *history*, determining the stages through which plants and animals have passed in their development. Before Darwin's time systematic work was the mere enumeration of species; since, it has been the study of relationships. Before Darwin embryology was the description of the earlier stages of development; since, it has been the reading of the phylogeny in ontogeny. Before Darwin comparative anatomy was the comparison of types; since then it has become the study of the effect of function and environment in molding the bodily form.

But the influence of Darwinism was by no means confined to natural history. Darwin himself early extended his general theory to man, especially in *The Descent of Man and Selection in Relation to Sex* (1871). Thus extended, Darwin's theory came into opposition to the Bible, literally and narrowly interpreted, and so it aroused a vast storm of opposition from Church officials. In fullness of time not only ecclesiastics but philosophers of every sort have come to base their teachings and doctrines on evolution. Darwin taught that the mind of man in its lowest stages was essentially an animal mind, and the upward progress of man is viewed as effected by natural causes, chief among which is the action of natural selection. He does not inquire into the exact way in which the mental and bodily are connected. He simply assumes that, just as the bodily organism is capable of varying in an indefinite number of ways, so may the mental faculties vary indefinitely in correspondence with certain physical changes. In this way he seeks to account for all the higher mental powers, as the use of language and reason, the sentiment of beauty, and conscience. Finally, Darwin seeks to give a practical and ethical turn to his doctrine, since he defines the general good—the proper object of man's action—as "the rearing of the greatest number of individuals in full health and vigor, and with all their faculties perfect under the conditions to which they are subject." It is well to observe that if Darwinism confined itself to a strict following of the great investigator, it might involve less of philosophic and metaphysical theory than has become popularly associated with it, for much of which Darwin is not to be held responsible. For further exposition of Darwin's views, see EVOLUTION and NATURAL SELECTION, and the discussion of special phases of his doctrine and investigations under other titles there indicated.

Darwin's later life was devoted to the demonstration of his theory by a series of studies, the results of which appeared chiefly in the following books: *Fertilization of Orchids* (1862); *Variation of Animals and Plants under Domestication* (1868); *Expression of the Emotions in Man and Animals* (1872); *Insectivorous Plants* (1875); *Climbing Plants* (1875); *The Effects of Cross and Self Fertilization in the Vegetable Kingdom* (1876); *Different Forms of Flowers in Plants of the Same Species* (1877); *The Power of Movement in Plants* (1880); and *On the Formation of Mold by the Action of Earthworms* (1881).

Personally Darwin was characterized by a kind disposition, gentle manners, and brilliant conversational qualities. His warm-heartedness, added to his genius, made for him strong friends, many of whom were of great assistance to him in gaining an acceptance of his theories. His methods of study were interesting. He was a voluminous gatherer of notes on topics which interested him; in experimentation he was quick in his movements and accurate. As in the case of many other leaders of science, his brain was fertile in hypotheses, which were readily rejected when experiment had shown them to be faulty. Although his correspondence was voluminous, he attended to it all with scrupulous care, replying courteously even to a request from a young man who was preparing a lyceum lecture for an abbreviated statement of his views, as the writer had no time to read his books. He died April 19, 1882, full of years and honors. He was awarded the Prussian order *Pour le Mérite* (1871), and was made a member of the French Academy in 1878.

The centenary of the birth of Charles Darwin and the fiftieth anniversary of the publication of the *Origin of Species*, which was celebrated in 1909, was the occasion of the publication of many important volumes. The most significant of these concerned the relation of modern trends of thought to the original "Darwinism." Among these volumes may be mentioned: Francis Darwin (ed.), *The Foundations of the "Origin of Species"* (Cambridge, 1909); essays by various American authors, *Fifty Years of Darwinism* (New York, 1909); essays by various foreign authors, *Darwin and Modern Science* (Cam-

bridge, 1909); J. A. Thomson, *Darwinism and Human Life* (New York, 1910).

Consult also: *Life and Letters of Charles Darwin* (3 vols., London, 1887; reprinted in 2 vols., New York, 1893); *More Letters of C. Darwin* (1903); Pauly, *Darwinismus und Lamarckismus* (Munich, 1905).

DARWIN, Erasmus (1731–1802). An English physician and naturalist, the grandfather of Charles Darwin. He was born at Elton. He was a keen and philosophic observer of nature and embodied much of his observations and thoughts in didactic verse, which form several long poems, whose style is stilted and fancifully elaborate. The principal of these is *The Botanic Garden* (1789), of which the second part, entitled "The Loves of the Plants," became famous and was translated into French and Italian. It contained many suggestions as to "protective mimicry" and other features afterward a part of the elaborated doctrine of the evolution of plants. In 1794–96 was published his *Zoönomia*, in prose, which was primarily a medical work, but contained many more general reflections, and received wide notice. Its ideas were so novel and revolutionary that, according to Samuel Butler, Paley's *Natural Theology* was aimed at it and extinguished for a time its influence. Charles Darwin wrote of it, in his *Origin of Species:* "It is curious how largely my grandfather anticipated the views and erroneous grounds of opinion of Lamarck"; and modern students see also that he anticipated much that Charles Darwin himself advanced to acceptance. Erasmus Darwin's views on evolution include the belief that all animals have originated from a single living "filament"; that changes are produced by differences of climate; that all animals undergo constant changes and that many of their acquirements are transmitted to their posterity; that the contests of the males for the possession of the females lead to such results as were afterward stated under the name of "sexual selection"; that many structures have been acquired as a means of security in a struggle for existence; and that a vast length of time has elapsed since these modifications began. The debt which Charles Darwin, Lamarck, and other exponents of the doctrines of organic evolution owe to Erasmus Darwin is discussed by Packard in his biography of *Lamarck* (New York, 1901), and by Krause in *The Scientific Works of Erasmus Darwin* (1879); also by Butler, *Evolution, Old and New* (London 1879). A biography by Anna Seward appeared in London in 1804. In *Phytologia, or the Philosophy of Agriculture and Gardening* (1799), Darwin expresses a belief that plants have sensation and volition. *The Temple of Nature, or the Origin of Society, a Poem with Philosophical Notes* appeared posthumously in 1803. See Evolution.

DARWIN, Francis (1848–1925). An English botanist, a son of Charles Robert Darwin, born at Down, Kent. He received his education at Trinity College, Cambridge, studied medicine at St. George's Hospital in London, assisted Charles Darwin at Down, in 1888 was made reader in botany at the University of Cambridge, and in 1903 became foreign secretary of the Royal Society, and president of the British Association in 1908. His publications include: *Life and Letters of Charles Darwin* (1887); *Charles Darwin* (1892); *Practical Physiology of Plants*, jointly with Acton (1894); *Elements of Botany* (1895); *More Letters of Darwin*, with A. C. Seward (1903); *Foundation of the Origin of Species* (1909). Charles Darwin's *Power of Movement in Plants* was prepared with the son's aid.

DARWIN, George Howard (1845–1912). An English geologist, son of Charles Robert Darwin. He was born at Down, Kent, and after graduating at Trinity College (1868), where he was later a fellow (1868–78), he was admitted to the bar; he did not practice, however, but devoted his entire attention to mathematical science and particularly to experimental investigation on the pressure of loose sands, changes in the level of the earth's surface, and minor earthquakes. His publications include papers on *The Harmonic Analysis of Tidal Observations* (1883); *The Effects of Tidal Friction on the Earth and Moon; Periodical Orbits* (1896); *Tides and Kindred Phenomena* (1898). In 1882 he assisted Sir William Thomson in the preparation of a new edition of Thomson and Tait's *Natural Philosophy*. A year later he was appointed Plumian professor of astronomy and experimental philosophy at Cambridge. He was a member of the Royal Society and a member of the council of the Meteorological Office (1885–1905), and was elected president of the Royal Astronomical Society in 1899 and president of the British Association a short time before his death.

DARWIN, Mount. A mountain of Tierra del Fuego, South America, 6890 feet in altitude (Map: Chile, D 14). It is named after Charles Darwin.

DARWINISM. See Darwin, Charles; Evolution; Natural Selection.

DASE, dä'ze, Johann Martin Zacharias (1824–61). A mathematical prodigy, born in Hamburg. When a boy, he gave public exhibitions as an expert calculator. One of his feats was the rapid multiplication of a series of 50 figures or more by another series of equal length; and he is said to have been equally expert in extracting the cubic root of numbers containing from 80 to 100 figures—a task he frequently performed in less than an hour. He published *Tafeln der natürlichen Logarithmen der Zahlen* (1850) and *Factoren-Tafeln für alle Zahlen der siebenten Million, oder genauer von 6,000,001 bis 7,002,000 mit den darin vorkommenden Primzahlen* (1862–65).

DASENT, dā'sent, Sir George Webbe (1817–96). An English scholar and author, born at St. Vincent, West Indies. He was educated at Oxford, was appointed civil-service commissioner in 1870, and in the following year assumed the editorship of *Fraser's Magazine*. He was also associated for some time with the London *Times* and edited the *Icelandic-English Dictionary* (1874). In addition to a translation of *The Younger Edda* (1842), he wrote the following: *The Norsemen in Ireland* (1855); *The Story of Burnt Njal* (1861); *Selection of Norse Tales* (1862); *The Vikings of the Baltic* (1875); *Heroes of Iceland* (1905). His *Annals of an Eventful Life* passed through five editions (latest ed., 3 vols., 1870).

DASHEEN'. A tuberous-rooted species of *Colocasia*, of the family Araceæ, extensively cultivated in the West Indies, where it is known under a variety of names, such as coco, eddo, tanier, malanga, etc. It has often been confused with the yautia (*Xanthosoma sagittifolium*), but it is much more closely allied to the taro (*Colocasia esculenta*) of the Pacific islands. The

tubers form a substitute for potatoes, the young leaves are used as a potherb, and the young shoots may be substituted for asparagus. The cultivation of dasheens has been undertaken with some success in the South Atlantic and Gulf States, large yields of tubers being reported.

DASHKOFF, däsh'kôf, Ekaterina Romanovna, Princess (1743–1810). A prominent figure in Russian political and literary circles during the latter half of the eighteenth century. She was the daughter of Count Vorontsoff. At the age of 15 she was married to Prince Dashkoff, an officer of the Imperial Guard. As an intimate friend of the Grand Duchess Catharine, the Princess appears to have taken an active part in the conspiracy of 1762, which placed her mistress on the throne as Catharine II (q.v.). Prince Dashkoff died in 1761, and his widow gave herself up to her children, to literature, and to politics. A coldness between herself and the Empress now ended in a quarrel and in her retirement from the court. After an extended tour through Europe the Princess returned to Russia in 1782, and was at once restored to Imperial favor. She was appointed director of the Russian Academy of Science and in 1783 became first president of the Russian Academy, which was established through her efforts. On the death of Catharine II, in 1796, she was deprived of her offices and ordered by Paul I to retire to her estates at Novgorod. Later on she was allowed to reside in Moscow, where she died. The Princess wrote several comedies and was mainly instrumental in inducing the Russian Academy to draw up a dictionary of the Russian language. The work was completed under her direction and was in part written by her. Her memoirs have been edited by Mrs. W. Bradford (London, 1840). Consult Souvorine, *La Princesse Dachkov* (St. Petersburg, 1888, Russian).

DASHORST, Antonis Mor van. See Mor van Dashorst.

DASHT, däsht, or **DESHT,** dĕsht. A river of Baluchistan, Asia, running through the southwestern portion of the country and falling into the Arabian Sea (Map: Persia, H 7). Its northern branch, the Nihing, forms a part of the boundary between Baluchistan and Persia. The combined rivers are 175 miles long.

DASKAM, dăs'kam, Josephine Dodge (Mrs. Selden Bacon) (1876–). An American author. She was born in Stamford, Conn., and graduated at Smith College in 1898. Her first book was *Smith College Stories* (1900), but she first excited general interest by *The Madness of Philip* (1902), a volume presenting with much humor and common sense some elements of modern primary education. Her later works include *Memories of a Baby* (1904); *The Domestic Adventures* (1907); *Biography of a Boy* (1910); *The Inheritance* (1912); *The Luck o' Lady Joan* (1913); *To-Day's Daughter* (1914).

DASS, dăs, Peter (1647–1708). The father of modern Norwegian poetry. He was born at Nord-Herö, the son of an immigrant Scottish merchant and a Norse woman of good breeding. He attained in the Church a position of dignity, responsibility, and some danger, on the north coast of Norway, where with brief intermissions he lived peacefully and wrote unremittingly verses and a garrulous *Autobiography*. His work circulated in manuscript, but little was printed in his lifetime, and the first collection of his *Works* was by Eriksen (Christiania, 1873–77). *The Northland's Trumpet*, his most famous poem, was not printed till 1739. This rhyming description of land and people, quaint, witty, fanciful, and in an unforgettable lilting measure, is known by heart throughout northern Norway. Noteworthy, too, are the *Valley Song* (1696) and *Spiritual Pastime* (1711), a collection of religious verse.

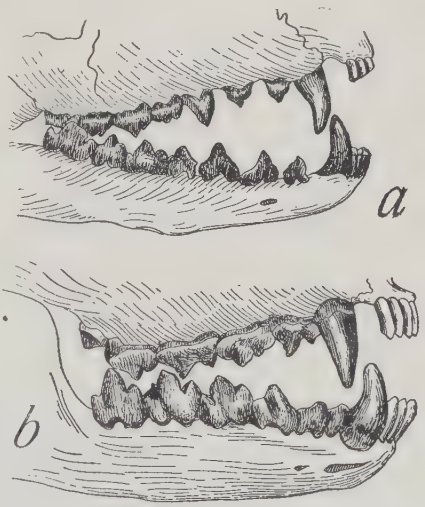
DAS'SIE, or **DASSY** (South African). A familiar diminutive in Cape Colony of the local Dutch name *Klip-das* for the South African hyrax (*Procavia capensis*); also called rock rabbit by English colonists. See Hyrax.

DASTRE, dăs'tr', Frank Albert (1844–). A French physiologist, born in Paris. He studied at the École Normale Supérieure, of which he became fellow, and was appointed professor of natural history at the Lycée Louis-le-Grand. In 1887 he was called to the chair of physiology at the Sorbonne. He translated S. Weir Mitchell's *Injuries of Nerves, and their Consequences* (1872), as *Des lésions des nerfs et de leur conséquence* (1873), and wrote: *Rôle physiologique du sucre de lait* (1882); *Recherches expérimentales sur le système vasomoteur* (with Morat, 1884); *Les anesthétiques: physiologie et applications chirurgicales* (1890); *La vie et la mort* (1903–11; Eng. trans., *Life and Death*, by W. J. Greenstreet, 1911); and other scientific works.

DASYPÆDES, dăs'ĭ-pē'dēz. See subtitle *Plumage*, in the article Bird.

DAS'YPUS. See Armadillo.

DASYURE, dăs'ĭ-ūr (from Gk. *δασύς, dasys*, shaggy + *οὐρά, oura*, tail). A marsupial of the family Dasyuridæ, which includes various highly generalized carnivorous and insectivorous forms of Australasia allied to the opossums, and closely representative of Tertiary forms found fossil in South America and elsewhere. Eventually it



DENTITION OF DASYURES.

a, Tasmanian wolf (*Thylacinus*); *b*, Tasmanian devil (*Sarcophilus*).

appears certain that this group will be split into several families based on such important characters as a varying number of premolars and the presence or absence of epipubic bones, but at present they may be kept under the one heading. Their hind and fore limbs are approximately equal, and the toes (of which the second and

third of the hind feet are entirely free) are well developed and clawed; their tails are long, hairy, curling, and not prehensile; their dentition is carnassial, the canines often being large tusks, and there are eight large incisors in the upper jaw; and a cæcum is lacking. Many of the dasyures are strong, fierce, catlike beasts of prey, scattered over Australia, New Guinea, and especially prevalent in Tasmania, where, as also in southeastern Australia, they have become rare owing to the war made upon them by the colonists. All are mainly terrestrial and live in burrows.

Prominent among these beasts is the thylacine, or Tasmanian zebra wolf or pouched dog (*Thylacinus cynocephalus*). It is very wolflike in appearance, but somewhat smaller than the common wolf, with shorter hair, a long terete, comparatively smooth tail, and more rounded ears. Its color is grayish brown, with the hinder part of the back and root of the tail barred with blackish stripes diminishing to points on the flanks. It dwells in rocky dens, seeks its prey at night, and until reduced in numbers was a destructive pest to the flocks of sheep.

Another is the ferocious Tasmanian devil (*Sarcophilus ursinus*), which is a heavy, powerful, long-furred, almost black animal resembling a bear, but only about the size of a badger, and having a long thick tail. It also is decidedly nocturnal, sleeping by day in some dark lair or burrow, and attacking sheep and lesser prey by night, nothing being safe from its strength and ferocity; but this pest is now nearly exterminated.

On the continent of Australia several very catlike or civet-like dasyures occur, of which the handsomest is the spotted "native cat," nearly as large as a house cat; but some of this genus (*Dasyurus*) are much smaller. To the genera *Phascologale* and its allies belong a variety of small insect-eating dasyures greatly resembling rats and mice in their appearance and living mainly on insects, birds' eggs, etc.; and another now very rare form (*Antechinomys laniger*) has much the form and appearance of a jerboa. Finally, there must be mentioned the banded anteater (*Myrmecobius fasciatus*), "which derives its special interest from the circumstance that it comes closer to some of the extinct marsupials of the Secondary rocks of Europe than does any other living type." This animal is about the size of a squirrel, but has a viverrine form and long, somewhat bushy, tail. In many of the dasyures the pouch is rudimentary, but here the female has no pouch, "the young, when first born, being merely concealed by the long hair of the belly as they cling to the teats (four in number)." Its teeth are all small and adapted to eating the insects that constitute its fare—mainly ants and termites, which are gathered by the long and protrusile tongue. Hence it is found chiefly in the sandy plains of southern and western Australia, where it dwells in the hollows of ant hills and similar retreats. Its general hue is white beneath, and on the upper part dark chestnut red marked by broad transverse bars of white. See MARSUPIALIA; and Plate of PHALANGERS.

DATE. See CALENDAR; CHRONOLOGY.

DATE and **DATE PALM** (OF. *date, datil, datille*, Fr. *datte*, from Lat. *dactylus*, Gk. *δάκτυλος, daktylos*, finger, date; so called from the shape). The common date of commerce is the fruit of the date palm (*Phœnix dactylifera*). Besides this there are several other species which bear fruits of more or less value, but none rank in importance with *Phœnix dactylifera*. This plant is a native of the southwest of Asia and the northern half of Africa, finding its most congenial home and most extensive cultivation in Arabia and the oases of Africa. The plant is also cultivated in China, in France, Italy, and sparingly in the United States. California and Arizona, however, promise to become commercial date-producing sections.

The date is borne on one of the tree palms, although many of the representatives of the genus *Phœnix* are low-growing plants. The date palm is a tree ranging from 40 to 80 feet in height, bearing a dense head of pinnated leaves several feet in length. The plant is diœcious, the staminate flowers being borne on one plant, while the pistillate ones are borne by another individual. This peculiarity is well understood by the natives, who cut off the staminate flower clusters and place them in the pistillate trees to insure fertilization. Since each tree reproduces its sex in the sprouts or suckers from its base, date orchards or plantations are made up of the young plants taken from the roots of bearing trees, with only a sufficient number of staminate plants to insure fertilization. The date enjoys a hot, bright, sunny situation, thrives on soils too alkaline for other vegetation, but must have water within reach of its roots. The bearing age is reached in about eight years, and as the plants are long-lived and frequently bear as much as 300 to 500 pounds of fruit in a season when at full bearing, they become enormously profitable; in fact, the date is the chief source of wealth for Arabia, and is used as the staple food by caravans crossing the great desert. The fruit possesses a high food value, being chiefly composed of sugar, together with pectin, gum, and proteids. The fruits are eaten both fresh and dried, and there are two kinds—soft dates, the ones usually seen at confectioners, and dry dates, which are the ones most commonly grown and used in their native habitats. Both kinds vary in size, color, and quality. The seeds when roasted form a substitute for coffee, and when ground yield a valuable oil as well as a pomace used as a cattle food. Besides these products the tree itself yields in its leaves materials for baskets and wickerwork; the trunk yields a fibre from which twine and rope can be made; an edible bud known as "palm cabbage" is produced at the crown of the tree, and the wood is used for fencing and for the construction of light shelter. Besides these economic uses, the date palm has long figured conspicuously in religious services among Jews and Christians as well as among pagans. The *palm tree* of the Scripture is *Phœnix dactylifera*, and Christ's triumphal entry into Jerusalem is to this day celebrated on Palm Sunday. It has other symbolic meanings; to the Hebrews and Hellenes it stood as the symbol of beauty and of victory. See Plate of MONOCOTYLEDONS.

DATE LINE. See INTERNATIONAL DATE LINE.

DATE PLUM. See PERSIMMON.

DATE SHELL, or DATE FISH (so named from its shape). 1. A shell of a small bivalve mollusk or date fish of the genus *Lithodomus* (or *Lithophagus*), closely allied to the horse mussel (*Modiolus*), which burrows deeply into calcareous rocks, the shells of larger mollusks, etc. One species (*Lithodomus lithophagus*)

abounds in the Mediterranean and is of interest mainly because of its perforations of certain columns of the ancient temple of Serapis at Pozzuoli (ancient Puteoli), a few miles west of Naples, Italy. These columns are of African marble and several centuries ago were carried by the sinking of the ground below the level of the sea, which overflowed the site of the ruins and submerged the pillars to the height of 13 feet, exposing them to attack by these mollusks, which burrowed into them in large numbers. Subsequently they were slowly elevated and have since been above the water. The method of boring rocks is not thoroughly understood, but is thought to be mainly by abrasive movements of the foot. 2. In California, an edible bivalve mollusk (*Zirphæa crispata*) related to the piddock (q.v.).

DATHOLITE. See DATOLITE.

DATI, dä'tê, CARLO ROBERTO (1619–75). An Italian philologist and writer, born in Florence. His *Discorso dell' obbligo di ben parlare la propria lingua* (1657) is an important document in the campaign for linguistic purism based on classic imitation. In this work, and as professor of the Grand Duke in Florence, Dati was supported by the Crusca Academy, praised by Fontanini (*Biblioteca dell' eloquenza italiana*, annotated by Apostolo Zeno, Venice, 1753, and *Elogio*, Florence, 1794), and opposed by Daniello Bartoli (q.v.). Consult Trabalza, *Storia della grammatica ital.* (Milano, 1908).

DATIA, dūt'ê-à. The capital of the principality of the same name in Central India, 280 miles west of Benares (Map: India, D 4). It stands on a rocky height surrounded by a stone wall and is well built, with an unusual number of stone houses. The chief of the Datia State dwells here. West of the town rises a palace of immense size and remarkable beauty, one of the best pieces of Hindu architecture in India, and there are interesting Jain temples, 4 miles distant. Pop., 1901, 24,071; 1911, 17,329.

DA'TIS (Lat., from Gk. Δᾶτις, from Pers. *Dātvēh*, good according to the law, from *dāt*, OPers. *dāta*, law + *vēh*, Av. *vohu*, good). A Persian general. With Artaphernes, he commanded the army of Darius which was defeated at Marathon by Miltiades 490 B.C. Afterward he was killed by the Spartans.

DA'TIVE. See DECLENSION.

DATO É IRADIER, dä'tô ā ē'rä-dyâr', EDUARDO (1856–). A Spanish jurisconsult and statesman, born at Coruña, Aug. 12, 1856. After studying law at the University of Madrid he there received his doctorate in jurisprudence in 1875. The following year he attained some prominence through certain articles that he published in the *Revista de los Tribunales*. In 1884 he was elected deputy for the District of Murias de Paredes (León), and again in 1891, 1893, etc. Although originally affiliated with the Conservatives under the leadership of Cánovas, he later withdrew with Silvela. Raised (1887) to a seat on the governing board of the Colegio de Abogados of Madrid, he served (1890–94) as third vice president of the Real Academia Matritense de Jurisprudencia y Legislación, which had previously honored him with election as academician and professor. Previous to 1890 he had often appeared at congresses of jurists as the exponent of important themes of jurisprudence. Charity also claimed his interest, and in 1899 he became a member of the Provincial Board of Charities. As Minister of Internal Affairs in Silvela's cabinet, he made in 1900 a trip to Catalonia in order to be able to study on the ground the labor question. With the return of the Conservatives in 1902 (after the fall of the intervening Liberal cabinet), he became Minister of Grace and Justice. The Real Academia de Ciencias Morales y Políticas honored him with election as member in 1905. When the Conservatives again came into power, in 1907, Señor Dato was Mayor of Madrid; and upon the organization of the new Cortes, he was elected President of the Chamber of Deputies. After the fall of the Liberal ministry of the Count of Romanones in 1913, the Conservative Dato was appointed Prime Minister and asked to form a new ministry.

DAT'OLITE, or **DATH'OLITE** (Gk. δατεῖσθαι, *dateisthai*, to divide + λίθος, *lithos*, stone; referring to its granular structure). A boron and calcium orthosilicate that crystallizes in the monoclinic system. It is usually found in the form of glassy, greenish crystals, but sometimes has a yellow or reddish tinge. A compact, massive variety occurring with the copper of Lake Superior is white and opaque and breaks with a conchoidal fracture like porcelain. Datolite usually occurs in veins and cavities in basic eruptive rocks, often with calcite, prehnite, and the zeolites. It is found in Scotland, Norway, Sweden, and various places on the Continent. In the United States it occurs at Bergen Hill and Paterson, N. J., in Connecticut and Massachusetts, and in the Lake Superior region. The crystals take a high polish and have been cut as opaque gems or ornamental stones.

DATU'RA. See STRAMONIUM.

DATU'RINE. See ALKALOIDS; ATROPINE.

DAUB, doup, KARL (1765–1836). A German speculative theologian. He was born at Cassel and educated at Marburg, where he was tutor for a time; became professor of philosophy at Hanau in 1794, and soon afterward of theology at Heidelberg, where he remained until his death. He was one of the leaders of a school which attempted to reconcile theology and philosophy. His writings, based on the philosophies, successively, of Kant, Fichte, Schelling, and Hegel, were once important for their argumentative method, but are no longer much read. The principal ones are: *Lehrbuch der Katechetik* (1801); *Theologumena* (1806); *Einleitung in das Studium der Dogmatik* (1810); *Die dogmatische Theologie jetziger Zeit oder die Selbstsucht in der Wissenschaft des Glaubens* (1833).

DAUBAN, dō'bäN', JULES JOSEPH (1822–1908). A French painter. He was born in Paris and studied there under Auguste Debay. He became director of the School of Fine Arts at Angers in 1850 and was made a member of the Legion of Honor in 1868. Among his works are "Trappists Receiving a Stranger" (1864), in the Luxembourg; "Trappists Exchanging the Kiss of Peace" (1865), in the Angers Museum; and "Fra Angelico da Fiesole" (1873). He produced several decorative paintings in the theatre and hospital at Angers, and in the church of Saint-Louis-en-l'Isle, Paris. Despite a certain coldness of color, his compositions are dignified and impressive. His last important work was six decorative compositions for the church of Quintin (côtes du Nord).

DAUBENTON, dō'bäN'tôN', LOUIS JEAN MARIE (1716–99). A French naturalist, born at Montbard, May 29, 1716. In 1742 he became associated in Paris with Buffon in the prepara-

tion of the latter's great *Histoire naturelle*, for which he furnished the anatomical descriptions relating to mammals. In 1745 Daubenton became curator and demonstrator of the cabinet of natural history of the Académie des Sciences and in 1778 professor in the Collège de France. He wrote voluminously, and has been especially influential in the science of herpetology. He died in Paris, Dec. 31, 1799.

DAUBER, dąb'ẽr, or MUD DAUBER. See MUD WASP.

D'AUBIGNÉ, dô'bē'nyā'. See MERLE D'AUBIGNÉ.

D'AUBIGNÉ, THÉODORE AGRIPPA (1552–1630). A Protestant historian, poet, and soldier, born near Pons in Saintonge, France, Feb. 8, 1552. He was educated at Geneva. Latin, Greek, and Hebrew were familiar to him from his earliest youth, and at seven years of age he is said to have made a translation of Plato's *Crito*. His father had inspired him with an enthusiasm for the Huguenot cause, and he was present at the siege of Orléans in 1563, when the elder D'Aubigné was slain. The son played a prominent part in the religious wars preceding the accession of Henry of Navarre. Though opposed to that prince's conversion, he consented to serve him and was made vice admiral of Guienne and Brittany. D'Aubigné was famous for his rough wit and frank speech, and he did not hesitate to use the most outspoken sarcasm against the King and other members of the royal family. The assassination of Henry IV, in 1610, caused D'Aubigné to retire to his estates, and later he took up his residence at Geneva. There he employed himself in literary work and in furthering the cause of Protestantism in every way possible. His last years were embittered by the conduct of his son Constant, who betrayed the trust reposed in him by the Huguenots. This son was the father of the Duchess de Noailles and of Madame de Maintenon. D'Aubigné died April 29, 1630, leaving as his literary legacy a number of works, of which the following deserve mention: *Histoire universelle, 1550–1601; Confession catholique du Sieur de Sancy; Aventures du baron de Fœneste: histoire secrète écrite par lui-même.* They are very outspoken and free in their criticism of the men and measures of the times, so much so that the third volume of the *Histoire universelle* was ordered to be burnt by the common hangman in Paris. These, above mentioned, with others of less importance, will be found in *Œuvres complètes de Th. d'Aubigné*, edited by MM. Réaume and de Caussade, which also contains *Sa vie et ses enfants*, the best biography. Consult also Réaume, *Etude historique et littéraire sur A. d'Aubigné* (Paris, 1883), and Rocheblave, *Agrippa d'Aubigné* (Paris, 1910); id., *La vie d'un héros* (Paris, 1913).

DAUBIGNY, dô'bē'nyē', CHARLES FRANÇOIS (1817–78). A French landscape painter and etcher, one of the chief masters of the Barbizon. He was born in Paris, Feb. 15, 1817. His father was a teacher of drawing and a painter who occasionally exhibited at the Salon. Charles François was brought up by an old nurse at Valmandois, near Ile-Adam, where he remained until his tenth year. In this, his childhood home, to which he frequently returned and where he finally settled, he imbibed his great love for nature. On his return to Paris he studied under his father and uncle, a miniature painter, and helped support the family by painting articles like fans, snuffboxes, and even business signs. In his seventeenth year he went to Italy with a friend and fellow artist, traveling on foot. He remained there for a year, but was not much influenced by his sojourn. In 1840 he entered the studio of Delaroche, with a view to competing for the Prix de Rome, but, having been disqualified, he was thrown upon his own resources. He turned to nature and was thenceforth a landscape painter. With the exception of the years 1842–46, he exhibited every year in the Salon. He received first-class medals in 1853, 1857, and 1859, and in 1857 he was made Chevalier of the Legion of Honor. Gratified with his success in painting river scenery, he built a house at Auvers on the Oise, near his childhood home. He constructed a curious boat, the *Botin*, at the same time a house and a studio, in which, accompanied by his son Karl, he navigated at will, sketching river scenery. In 1876 he visited Normandy, bringing back with him many sketches of the sea and the shores of the channel. During the latter part of his life he suffered much from rheumatism contracted on his river trips. He died in Paris on Feb. 19, 1878.

Daubigny was the youngest of the five great landscape painters of the Barbizon school. The rest were perhaps greater discoverers than he. They painted nature with figures as a subordinate incident of the scene and only adding to the artistic sentiment they wished to express. Daubigny painted the country, that is to say, nature as affected by man, although men do not usually appear in his scenes. There are certain kinds of landscapes which he may be said to have discovered and which are indissolubly linked with his name. He is the great painter of river scenery of central France, on the Seine, the Marne, and the Oise; of orchards, full of white blossoms or laden with ripe fruit, and of the fields; of the sea and of the shores of the Channel. His favorite light was at dusk, in the cool of the evening, or the pale light of the moon. A delicate shade of vaporous air pervades his paintings; his values are just, and the colors are properly juxtaposed. His paintings do not always present distinctness of outline, for drawing was not his strong point, but the handling is massive and powerful. In his early period he paid more attention to detail, but he increasingly adopted greater breadth of treatment, and his last works may almost be called impressionist.

Among his chief works are the "Valley of Optevoz," which took the gold medal in 1853. In the Louvre are his "Springtime," in which one can fairly smell the apple blossoms and see the green grass grow, the "Lock of the Optevoz," and the "Vintage." Other important works are the "Beach at Villerville" (1859); "Moonrise" (1861); "The Sheepfold" (1866); and the "Apple Orchard" (1876), an autumnal scene in which the prevailing tone is a dark, rich green, with apples ripe for the pickers. The chief public galleries of America are well supplied with his works, as are also some of the private collections. Daubigny unfortunately sold to art dealers a large number of works which are little more than sketches. These are frequently met with in picture collections, but no adequate conception of his work can be formed from them. Besides being a great painter, Daubigny was an etcher of repute, especially in the period after his return from Italy.

Consult his biography by Hustin, in *Les artistes célèbres;* Tryon, in Van Dyke's *Modern*

French Masters (New York, 1896); Henriet (Paris, 1878); Bourges (ib., 1900); and his biography by Laran (ib., 1913). See also the bibliography of BARBIZON, THE PAINTERS OF.

DAUBIGNY, KARL PIERRE (1846–86). A French landscape painter and etcher. He was born in Paris, the son and pupil of Charles François Daubigny (q.v.), whom he accompanied on his famous houseboat voyages on the rivers of France. His pictures, the subjects of which were mostly chosen from the valleys of the Seine and Oise, the coasts of Brittany and Normandy, and the Forest of Fontainebleau, were at first painted in his father's style, but his later works bear the impress of his own individuality. Among them may be mentioned: "Return from Fishing" (Aix Museum), "The Thames Near Chelsea," "Road from Paris to Fontainebleau," "The Farm of St. Simeon Near Honfleur," and "Moonrise at Sunset" (1886), his last, and also one of his best, efforts.

DAUBRÉE, dô'brâ', GABRIEL AUGUSTE (1814–96). A French geologist and mineralogist. He was born at Metz and was educated at the Ecole Polytechnique in Paris. At the age of 20 he had qualified as a mining engineer; in 1838 he was appointed to take charge of the mines in the Bas-Rhin (Alsace) and was also given a chair at Strassburg. In 1861 he became a member of the Academy of Sciences in Paris, where he held professorships at the Museum of Natural History and at the School of Mines, of which latter he became director in 1872. Besides a very large number of original papers, Daubrée's published works include: *Etudes et expériences synthétiques sur le métamorphisme et sur la formation des roches cristallines* (1860); *Etudes synthétiques de géologie expérimentale* (1879); *Les météorites et la constitution du globe terrestre* (1886); *Les eaux souterraines* (3 vols., 1877). His researches resulted in valuable contributions to our knowledge of the mode of formation of various mineral substances and of crystalline rocks.

DAU'CUS. See CARROT.

DAUDET, dô'dâ', ALPHONSE (1840–97). A French humorist and satirist, remarkable for the grace of his style and the keenness of his observations. Born in Provence, of which he was typical in the warmth of his imagination, he lived for a time at Lyons and later migrated to Paris, where he came in contact with the literary Bohemians of the capital. He held a sinecure secretaryship on the staff of the Duc de Morny in 1861–65, and had an opportunity to study the life of the aristocrats and higher politicians of the Second Empire. At the age of 27 he married Mlle. Julia Allard, an ideal helpmeet, also a writer, whose inspiring though practical mind guided his impulsive and impressionable nature.

In *Tartarin de Tarascon* (1872), *Tartarin sur les Alpes* (1886), and the inferior *Port Tarascon* (1890), he gave a most good-natured and satirical caricature of his fellow southerners, whom he pictured as the victims of their own wild boastfulness and as the dupes of their exaggerated imaginativeness. The sufferings of his early life, especially of the year when he was usher in a provincial school, are described in his *Le petit chose* (1867) and in *Jack* (1876). With *Froment jeune et Risler aîné* (1874) Daudet began his famous series of "Parisian Dramas" that depict certain types, such as the talentless and selfish comedian, Delobelle, and Sidonie, the feminine incarnation of evil. Then came *Le nabob* (1877), in which we find a capital portrayal of the Duc de Morny and the aristocracy of the day. *Les rois en exil* (1879) is a picture of Paris as a refuge for dethroned kings. *Numa Roumestan* (1881) is a humorous and kindly satire of Gambetta. *Sapho* (1884), a work of great power and noble purpose, sounds a note of warning against the dangers of illicit liaisons. The realism in the too accurately described scenes of sensual love weakens the ultimate effect of the work. This was due to the temporary influence of the Naturalist school upon Daudet. *L'Immortel* (1888), a cruel and pointless satire of the French Academy, marks the decline of the author's genius, due to the ravages of a chronic nervous trouble. The *Lettres de mon moulin* (1869) and *Contes du lundi* (1873) contain the shorter compositions of Daudet, several of which are now ranked among the greatest classics of the French language.

Literary critics appreciate Daudet for his polished style, his originality, and his insight into the foibles of humanity. His unaffected sympathy, somewhat tinged with a certain melodramatic sentimentality, and his saving sense of humor, probably constitute Daudet's greatest appeal to the average reader. Daudet, better than any other author of his day, reflected the spirit of the south of France, and the life of Paris in many of its most interesting and varied aspects. His reminiscences are embodied in *Trente ans de Paris* (1888) and *Souvenirs d'un homme de lettres* (1889). His works have been translated into English, a complete edition appearing in Boston in 1900. Consult: Ernest Daudet, "Mon frère et moi," included in *Alphonse Daudet*, by Léon Daudet, trans. by Charles DeKay (Boston, 1898); Brunetière, *Le roman naturaliste* (Paris, 1896); Doumic, *Portraits d'Ecrivains* (ib., 1892); L. A. Ashelman, *La société française d'après l'œuvre d'Alphonse Daudet* (ib., 1910); G. A. Ratti, *Les idées morales et littéraires d'Alphonse Daudet d'après ses œuvres* (ib., 1911); Arthur Ransome, *Portraits and Speculations* (London, 1913).

DAUDET, ERNEST (1837–). A French novelist, journalist, and historian, born at Nîmes, May 31, 1837. Of Alphonse Daudet, his brother, he wrote an interesting biographical sketch, *Mon frère et moi* (1882), translated as an appendix to *Alphonse Daudet*, by Léon Daudet (Boston, 1898). Completely overshadowed in fiction by his brother, he devoted his energies to the field of historical research, in which he became known as a prolific and reliable contributor. His most noteworthy works are: *Histoire des conspirateurs royalistes* (1881); *Le roman d'un conventionnel* (1904); *Histoire de l'emigration* (3 vols., 1905–07); *Les récits des temps révolutionnaires* (1908); *Tragédies et comédies de l'histoire* (1912). His *Madame Royale*, in an English translation by Mrs. Rodolphe Stowell, was published in New York (1913). Consult Ernest-Charles, *Les samedis littéraires* (Paris, 1903).

DAUDET, LÉON (1869–). A French novelist, son of Alphonse Daudet. He was born at Paris and studied medicine, but made some mark in literature with his first works, *Germe et poussière* (1891) and *L'Astre noir* (1893), the latter a sharp satire against Victor Hugo, whose granddaughter was Daudet's first wife. His subsequent publications include *Les morticoles* (1894), which was an attack on the medical pro-

fession; *Les deux étreintes* (1900); *Les parlementeurs* (1901); *La déchéance* (1904) and *Le partage de l'enfant* (1905); *Comte de Chamarande* (1906); *Le lit de Procruste* (1912). In 1908 he founded a Royalist daily, *L'Action Française*. He wrote a *Life* of his father (1898), trans. into English by Charles DeKay. Consult a critique in *Revue de Lille*, August, 1910, by Lecigne.

DA UDINE. See UDINE.

DAUGHTERS OF THE AMERICAN REVOLUTION, SOCIETY OF. A woman's patriotic society, organized in Washington, D. C., Oct. 11, 1890. Its objects are: to perpetuate the memory of the spirit of the men and women who achieved American independence; to promote institutions for the general diffusion of knowledge; to cherish, maintain, and extend the institutions of American freedom; to foster true patriotism and love of country; and to aid in securing for mankind all the blessings of liberty. Membership is restricted to those women of whose ancestors at least one aided in establishing American independence. The society up to 1914 had admitted to membership about 104,000 women, organized into some 1317 local chapters. Delegates from all chapters meet in annual congress in Washington in the week in which April 19 occurs. The society has collected many historical relics, which have been deposited in the United States National Museum in Washington, and it has also a valuable historical and genealogical library at its headquarters. During the Spanish-American War it aided the government by securing nurses of proper character and qualifications. In 1902 the society purchased a site in Washington, and upon this a Memorial Continental Hall was erected. The National Society was incorporated by Act of Congress in 1896 and, in accordance with that act, reports annually to Congress. The society publishes *The American Monthly Magazine* and also a series of lineage books containing the record of the ancestry of each member of the organization.

DAUGHTERS OF THE CONFEDERACY, UNITED. See CONFEDERACY, UNITED DAUGHTERS OF THE.

DAUGHTERS OF THE KING, THE ORDER OF. An organization of the women of the Protestant Episcopal church, founded in 1885. A distinction should be made between this order and the King's Daughters. The former is the older organization and differs from the latter in many important particulars. It is distinctively an Episcopal and a spiritual organization, and its work is definitely for the "spread of Christ's kingdom among women" and the "active support of the rector's plans in the parish in which the particular chapter may be located." Its constitution is framed as far as it is possible on the terms of the Brotherhood of St. Andrew, the men's organization of the Protestant Episcopal church, to whose purposes and work it closely corresponds. The membership in 1914 was 4500, with 417 senior chapters and 45 junior chapters, with about 400 members. It holds a triennial convention, with headquarters in New York. Its official organ is *The Royal Cross*.

DAUGHTERS OF THE REVOLUTION, SOCIETY OF. A women's hereditary patriotic society organized in New York City in 1891. As originally composed, the society consisted largely of those who had withdrawn from the Society of the Daughters of the American Revolution (q.v.), because that society then admitted to membership women of collateral descent. The patriotic objects of the two societies are similar, but the requirements for admission to the Daughters of the Revolution are the more stringent. They require a member to be the lineal descendant of an ancestor who actively assisted in the establishment of American independence, and who became thereby liable to conviction for treason against the government of Great Britain. The General Society, which meets annually, is composed of national officers and delegates from the following organized State societies: Arizona, Arkansas, Colorado, Delaware, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, New Jersey, New York, North Carolina, Pennsylvania, Texas, Utah, Washington, West Virginia, and Wisconsin. The total membership is about 4000.

DAULATABAD, dou'lâ-tâ-bäd' (Ar., city of prosperity; Hind. *Deogriri*, Skt. *Dēvagiri*, mountain of the gods, from the cliff which commands the town). A strongly fortified town of India, Aurangabad District, State of Hyderabad, near their northwestern frontier, in lat. 19° 57′ N. and long. 75° 18′ E. (Map: India, C 5). The town is noted for its commanding rock fortress, the scene of many past contentions, which has a height of about 500 feet. The outer wall is 2¾ miles in circumference, with three lines of fortifications within it. The town has now a population of less than 1000. The famous cave temples of Ellora are within 7 miles of Daulatabad.

D'AUMALE. See AUMALE.

DAUMAT. See DOMAT.

DAUMER, dou'mĕr, GEORG FRIEDRICH (1800–75). An eccentric German poet and philosophical writer, known also by his pen name, Eusebius Emmeran. He was born at Nuremberg, studied at the universities of Erlangen and Leipzig, and from 1822 to 1829 was a professor in the Nuremberg Gymnasium. He passed in a few years from violent rationalism to ultra-Romanism. His writings include: *Glorie der heiligen Jungfrau Maria* (1841); *Polydora*, a collection of secular poems (2 vols., 1855); *Die Urgeschichte des Menschengeistes* (1827); *Die Geheimnisse des christlichen Altertums* (2 vols., 1847); *Aphorismen über Tod und Unsterblichkeit* (1865); *Das Wunder* (1874). For somewhat more than a year he was guardian and instructor of the famous foundling Kaspar Hauser (q.v.), in regard to whom he published *Mittheilungen über Kaspar Hauser* (1832); *Enthüllungen über Kaspar Hauser* (1859); *Kaspar Hauser, sein Wesen, seine Unschuld* (1873).

DAUMET, dō'mā', PIERRE JÉRÔME HONORÉ (1826–1911). A French architect, born in Paris. He studied at the Ecole des Beaux-Arts and obtained the Prix de Rome in 1855. Afterward he accompanied an archæological mission to Greece under the directorship of M. Heuzey. After the death of Viollet-le-Duc he was made architect in chief for the rebuilding of the Palais de Justice and completed it. In 1885 he became a member of the Institute and inspector general of civil buildings, and later he was appointed government architect. M. Daumet's name became connected with all the important architectural societies in France, and he was elected an honorary member of the Royal Society of British Architects. For many years he maintained an "unofficial" *atelier* of the Ecole des

Beaux-Arts, Paris, which won a high reputation. His most notable work is the restoration of the Château de Chantilly for the Duc d'Aumale (1876–81).

DAUMIER, dō'myā', Honoré (1810–79). A celebrated French caricaturist, painter, and sculptor. He was born at Marseilles, the son of a glass painter of poetic aspirations, who migrated to Paris in 1816. His boyhood was spent in poverty, and after scant and intermittent instruction in drawing he started in 1831 to contribute satirical and political lithographs to the weekly paper. For caricaturing King Louis Philippe as Gargantua, he was imprisoned for six months. Fashion, tittle-tattle, scandal, politics, blemishes of figure, and oddities of character in turn inspired his genius for caricature. Few among his illustrious contemporaries escaped his pencil. His most celebrated work is the series of "Robert Macaire," published in the *Charivari*. The Revolution of 1848 suggested several of his most remarkable political series—"Idylles parlementaires" and "Les représentants représentés." He has left some 3958 lithographs, 200 paintings, and 300 drawings, besides statuettes, busts, and a bas-relief.

Daumier's reputation as a caricaturist eclipsed his ability as a painter, which, though appreciated by fellow artists, has only become generally known since the exhibitions of his work in 1900 and 1901. He is now recognized as one of the most original and important French painters of the nineteenth century. His paintings are small in form and are characterized by excellent modeling, striking treatment of light and shade, and a remarkable facility of execution. Lafontaine's fables, Don Quixote, and Molière's comedies furnished the subjects, which also include popular scenes of all kinds, interiors, religious subjects, and portraits. Good examples are "Christ and the Disciples" (Rijks-Museum, Amsterdam); "The Thieves and the Ass," the portrait of Theodore Rousseau, and a large allegorical canvas, "Republic," all in the Louvre. He is also represented in the museums of Berlin, Bucharest, The Hague (Mesdag Museum), Montreal, Reims, and by two pictures in the Metropolitan Museum, New York. Of his sculpture the best known is the statuette "Ratapoil," cast in bronze by the French state; an example is in the Luxembourg. Though appreciated and loved by his greatest contemporaries, such as Victor Hugo, Balzac, Rousseau, Diaz, Corot, Daubigny, Millet, Courbet, he struggled all his life against poverty and lack of popular appreciation. In 1870 he refused the cross of the Legion of Honor. He became blind in 1877, and died, Feb. 10, 1879, at Valmondois (Seine-et-Oise) in a house given him by Corot, who had ere this procured for him a pension from the Third Republic.

Bibliography. The most important monographs on Daumier are by Alexandre (Paris, 1890) and Klossowski (Munich, 1914); the complete catalogue of his lithographs by Hazard and Delfteil (Paris, 1904). Consult also Champfleury, *Histoire de la caricature moderne* (ib., 1872); Frantz and Uzanne, in the *Studio* (London, 1904), and the brief works on his lithographs by Marcel (Paris, 1906) and Cary (London, 1907).

DAUN, doun, Leopold Joseph Maria, Count von (1705–66). An Austrian field marshal and commander in chief of the Austrian forces during the Seven Years' War. He was born Sept. 24, 1705, in Vienna, and entered early upon his military career as an officer in the regiment of his father. In the Turkish campaigns of 1737–39 and in the War of the Austrian Succession he found opportunities for distinction and rose rapidly in rank, being made a field marshal and Privy Councilor after the Peace of Aix-la-Chapelle. He was the first director of the military academy at Wiener-Neustadt and introduced many reforms in the organization of the Austrian army. In 1757 he succeeded to the chief command. He took the field against Frederick the Great in Bohemia and, after a hard-fought battle at Kolin, forced the King to retire from that country. He and Prince Charles of Lorraine were thoroughly beaten by the King of Prussia at Leuthen on December 5 of the same year. On Oct. 14, 1758, he gained another victory over Frederick at Hochkirch, and, but for the late arrival of the Prince of Baden-Durlach with reinforcements, he would probably have annihilated the Prussian army. Again, on Nov. 25, 1759, at Maxen, he compelled the Prussian General Fink to surrender, with 11,000 men. He won no other important victories and was defeated by Frederick at Torgau (1760), where he was wounded for the third time upon the field of battle. He was brave and a skillful strategist, but too deliberate in his movements and no match for his alert antagonist. He won victories without following them up, while Frederick, though losing battles, nearly always derived signal advantages from his campaigns. The Peace of Hubertsburg in 1763 closed Daun's active military career. He died in Vienna, Feb. 5, 1766. Consult *Leben und Thaten des grafen Leopold von Daun* (Frankfort and Leipzig, 1759–60). See Seven Years' War.

DAUNOU, dō'nōō', Pierre Claude François (1761–1840). A French publicist and statesman. He was born at Boulogne-sur-Mer and entered the Congregation of the Oratory in 1777. In 1792 he became a member of the National Convention for Pas-de-Calais, where he had previously held the position of grand vicar under the bishop of the department. He opposed the execution of Louis XVI, but voted for his deportation until a settlement might be effected; and he refused his support to the law proscribing the Girondists. For these views he was imprisoned and escaped death only by the downfall of Robespierre. Throughout this critical period he was distinguished for his moderate policy. He was elected to the Council of the Five Hundred by more than a score of departments, and was its first President. His programme for study in central schools was adopted in 1795. In 1801 he became librarian at the Panthéon, for which he obtained the valuable collection of Pius VI. In 1807 he was appointed the Archivist of the Empire, and in 1808 he founded the Bibliothèque des Archives Nationales. He was editor of the *Journal des Savants* from 1816 until shortly before his death. His works include *Histoire littéraire de la France*, upon which he was employed for 20 years, and *Essai historique sur la puissance temporelle des papes* (1810). Consult Taillandier, *Documents biographiques sur Daunou* (Paris, 1841).

DAUPHIN, dą'fĭn; *Fr. pron.* dō'făN' (OF. *dauphin, doffin*, Fr. *dauphin*, Port. *dalfin*, from Lat. *delphinus*, dolphin, on account of the three dolphins on their family crest). Formerly the title of the eldest son of the French King. It was originally the appellation of the lords of

the Province of Dauphiné (q.v.). The last of these, Humbert II, dying childless (1349), bequeathed his possessions to Charles of Valois, grandson of Philippe VI of France, on condition that the heir apparent to the throne of France should bear the title of Dauphin of Vienne and govern the province. Louis XI conferred on the Dauphin almost sovereign rights; but after his time these were gradually abridged, until Dauphiné was placed under the same laws as the rest of the kingdom, and the title became merely honorary. After the Revolution of 1830 it was abolished altogether. Consult Tricaud, *Histoire des dauphins français* (Paris, 1713), and Prudhomme, "De l'origine et du sens des mots dauphin et dauphine," in *Bibliothèque de l'Ecole des Chartes* (ib., 1893).

DAUPHIN. The chief town in the District of Dauphin, Manitoba, Canada, on Vermilion River and the Canadian Northern Railway, 178 miles northwest of Winnipeg by rail (Map: Manitoba, C 2). Among the principal buildings are the opera house, collegiate institute, and hospital. It is situated in a grain-growing district and possesses four grain elevators. The manufacturing establishments include flour and saw mills, machine works, a creamery, sash and door factories and a mineral-water factory. Good fishing is to be had in Lakes Dauphin and Winnipegosis, and good hunting in the Riding Mountain Forest Reserve. The town owns its electric-light system and water works. Pop., 1911, 2815.

DAUPHINÉ, dō'fē'nā'. Formerly a frontier province in the southeast of France, comprising the present departments of Drôme, Isère, and Hautes-Alpes. After the fall of the Roman Empire Dauphiné formed the southernmost part of the Kingdom of Burgundy. It then passed under the dominion of the Franks, and after the dismemberment of the Carolingian monarchy it became a portion of the new Burgundian Kingdom of Arles. It then passed into the possession of the German Emperor in 1032, and remained united with Germany till the middle of the fourteenth century, when it was presented to France by the last of the lords of Dauphiné. Governed for a century as a separate state, by the heir to the French throne, it was finally incorporated with France. During the Civil Wars Dauphiné was the stronghold of Protestantism and the scene of many bloody conflicts, in which the Huguenots gained the upper hand. The old rulers of the land bore the title of Dauphin (q.v.), and the name was afterward transferred to the district. Consult Charier, *Histoire générale du Dauphiné* (Valence, 1883), and Chenavas, *La Révolution de 1788 en Dauphiné* (Grenoble, 1888).

DAURAT, dō'rä', or **DORAT,** Jean, Latin name Auratus (c.1500–88). A French poet, born and educated at Limoges. He was appointed preceptor of the pages at the court of Francis I, who took a deep interest in him; became director of the College at Coqueret, and in 1560 was appointed professor of Greek in the Royal College in Paris. He was called the "modern Pindar" and ranked among the "Pleiades," or seven great poets of the age. Report makes him the first organizer of a theatrical *claque*. His numerous odes and epigrams, written in Latin and published in 1586, do not justify the high estimation in which he was held in the sixteenth century. Consult Marty-Labeaux in *Pléiade française* (Paris, 1875).

DAUTHENDEY, dou'ten-dī', Max (1867–). A German poet, born in Würzburg. As a young man he traveled first in Denmark and Sweden, then in Mexico (1897) and Greece (1898), and after extensive travels in North America and in the near and far East, returned to Europe, to live first in Paris and then in Würzburg. He wrote a romance, *Josa Gerth* (1893), but was more successful with his dramas and lyrics, which with occasional affectation and extravagant mannerism are yet vivid, passionate, and beautiful in diction and metre. Among his plays are: *Frau Raufenbarth* (1905); *Ein Schatlen fiel über den Tisch* (1907; played in Cologne in 1912); *Maja* (1908); *Die Spielereien einer Kaiserin* (1910; played successfully in Berlin, Munich, Vienna, etc.), which dramatized Catharine I of Russia; *Der Drache Grauli* (1911). Even more characteristic of his mannered and traveled muse are his volumes of verse: *Reliquien* (1895); *Die Ammenballade* (1903); *Der Venusinenreime: Schalkhaftheroische Liebesmär* (1904); *Singsangbuch* (1906); *Lieder der langen Nächte* (1908); *Weltspuk* (1909); *Die Geflügelte Erde* (1910), which he called "a song of love and wonder about the seven seas," and, like his *Lingam: Asiatische Novellen* and *Die acht Gesichter am Biwasee*, was distinctly exotic. There is much autobiographical material in his book, *Der Geist meines Vaters* (Munich, 1912), and in *Gedankengut aus meinen Wanderjahren* (ib., 1914).

DAUTZENBERG, dou'tsen-bĕrk, Johann Michael (1808–69). A Flemish poet, born at Heerlen, Netherlands. He is known chiefly through his *Volksleesboek* (with Duyse, 1854), his valuable writings on prosody, and his introduction of foreign metres into Dutch poetry, a task in which he succeeded despite the numerous difficulties presented. His valuable poetic works, which include a translation of the *Odes* of Horace, were published at Brussels in 1850, under the title of *Gedichten*. Those written after 1850 were collected by Frans de Cort (q.v.), his son-in-law, in the volume entitled *Verspreide en nagelatene gedichten* (2d ed., 1875). Among his other works are: *Verhalen uit de geschiedenis vau België* (1853; 3d ed., 1867). Dautzenberg exercised a most favorable influence upon the development of Flemish poetry and at the same time advocated a closer union with the German.

D'AUVERGNE, Henri de Latour. See Turenne.

DAUW, dą. A local name in South Africa for Burchell's zebra, also called by the Dutch there "bonte quagga" and by the Bechuanas "peetis." See Zebra.

DÁVALOS, dä'välōs, or **DE ÁVALOS,** Gil Ramírez (c.1505–61). A Spanish soldier, born at Baeza in Castile. He accompanied Antonio de Mendoza to Peru, served as Corregidor of Cuzco, and, after the revolt of Girón, succeeded his brother, Egidio Ramírez Dávalos, as Governor of Quijós (the Land of Cinnamon) on the river Naho. He founded Cuenca (1557) and several other towns, which are now abandoned.

DAVENANT, dăv'e-nant, Sir William (1606–1668). An English poet and playwright. He was born at Oxford, where his father kept the Crown Inn. When only 10 years old, the precocious boy composed, on the occasion of Shakespeare's death, an ode to the memory of the great dramatist, and afterward was accustomed to claim that he was, in fact, Shake-

speare's son. In 1628 he began to write for the stage, and nine years after, on the death of Ben Jonson, he was appointed poet laureate. The next year he became manager of the Cockpit, a theatre in Drury Lane; but, entering into the intrigues of the Civil War, he was apprehended. He finally escaped, however, to France, and, returning, distinguished himself so much in the cause of the Royalists that he was knighted by Charles after the battle of Gloucester. Davenant a second time got into difficulties, and was confined in the Tower for two years, when he was released, as is said, on the intercession of Milton. There he continued his epic poem *Gondibert*, begun in France. Once more set free, he set about establishing a theatre. Obtaining at first permission to give dramatic performances at private houses, he reopened the Cockpit in 1658. After the Restoration he was favored by royal patronage, and continued to write and superintend the performance of plays until his death. Davenant was one of the most popular playwrights of his time. Though none of his plays rank high as literature, they seem to have been suitable to the stage. He made some curious adaptations of Shakespeare's plays; e.g., of *Measure for Measure* and, aided by Dryden, of *The Tempest*. In 1656 he introduced opera on the English stage and women to play the female rôles. His epic has some interest in that it was written in a stanza afterward employed by Gray in his famous *Elegy*. Consult Davenant's plays, with memoir, ed. by Laing and Maidment (5 vols., Edinburgh, 1872–74). Two representative plays, *Love and Honor* and *The Siege of Rhodes*, were edited by Tupper, and published in New York (1909).

DAV'ENPORT. An important manufacturing city and the county seat of Scott Co., Iowa, on the west bank of the Mississippi River, 330 miles above St. Louis, Mo., and opposite Rock Island, Ill., with which it is connected by two bridges—an iron railway and carriage bridge, built at a cost of $1,200,000, and an iron railway bridge, which cost $800,000 (Map: Iowa, G 3). It is 183 miles by rail west by south of Chicago and is on the Chicago, Rock Island, and Pacific, the Chicago, Milwaukee, and St. Paul, the Chicago, Burlington, and Quincy, the Davenport, Rock Island, and Northwestern, the Iowa and Illinois, the Davenport and Muscatine, and the Rock Island Southern railroads. River packets from St. Louis to St. Paul afford additional transportation facilities. Davenport is situated on the slope of a steep bluff and commands an extensive view. On Rock Island, which is crossed by the great bridge, are the United States arsenal and military headquarters and other government buildings. The city has several fine parks, a large public library, Academy of Natural Sciences, St. Luke's, Mercy, and other hospitals, numerous public and parochial schools, two opera houses, and many other notable buildings, and is the seat of the Academy of the Immaculate Conception, St. Ambrose College, St. Katherine's Hall, and the State Orphan Home. It is an episcopal see of the Protestant Episcopal church and of the Roman Catholic church. The city is in a rich agricultural and coal-mining region, ships large amounts of farm produce, and has extensive manufactures of washing machines, macaroni, locomotives, steel cars, carriages, agricultural implements, machinery, lumber, flour, woolen goods, cordage, glucose and its products, pottery, cigars, buttons, beer, soap, etc. Founded in 1835 by a company headed by Col. George Davenport, Davenport was incorporated as a town in 1838 and as a city in 1851. The Chicago and Rock Island Railroad was completed in 1854. The government is conducted by a mayor, elected every two years, and a city council, composed of the executive and aldermen, chosen by wards and on a general ticket. The annual income of the city amounted, in 1912, to $1,367,000; expenditure to $1,279,000; the principal items of expense being: police department, $53,000; fire department, $81,000; schools, $243,000. Pop., 1890, 26,872; 1900, 35,254; 1910, 43,028; 1914 (U. S. est.), 46,340; 1920, 56,727.

DAVENPORT, Charles Benedict (1866–). An American zoölogist, born at Stamford, Conn. He graduated at the Brooklyn Polytechnic Institute in 1886, at Harvard in 1889, and took the degree of Ph.D. at the latter place in 1892. In 1888 he began to teach at Harvard, where he was instructor in zoölogy until 1899. In 1904 he became director of the station for experimental evolution at Cold Spring Harbor, L. I., and in 1889–1904 was assistant professor of zoölogy at the University of Chicago. In 1906 he was president of the American Society of Naturalists. His works include: *Observations on Budding in Paludicella and Some Other Bryozoa* (1891); *On Urnatella Gracilis* (1893); *Experimental Morphology* (1897-99); *Statistical Methods, with Special References to Biological Variation* (1899; 2d ed., 1904); *Introduction to Zoölogy*, with Gertrude Crotty Davenport (1900); *Inheritance in Poultry*, Carnegie Institution Publication, No. 52 (Washington, 1906); *Inheritance of Characteristics in Domestic Fowl*, Carnegie Institution Publication, No. 121 (Washington, 1909); *Heredity of Skin-Color in Negro-White Crosses*, Carnegie Institution Publication, No. 188 (1913); *Heredity in Relation to Eugenics* (1913). He contributed to the first edition of the New International Encyclopædia.

DAVENPORT, Edward Loomis (1816–77). An American actor. He was born in Boston, Mass., and made his first appearance in Providence, R. I., playing a minor part in *Sir Giles Overreach*, with the elder Booth as Sir Giles. Davenport made rapid progress and was soon recognized as a leading artist in tragedy, comedy, and melodrama. He supported Mrs. Mowatt (Ritchie) in a wide range of characters and accompanied her, about 1847, to England, where he also played with Macready and other stars. There, too, in 1849, he married Miss Fanny Vining, an actress, whom he later introduced to the American stage. She died in 1891. Returning in 1854, he traveled over the United States, playing in the principal cities, chiefly in Shakespearean characters and those drawn from Dickens's novels. At different times he was manager of the Howard Athenæum, in Boston, and other theatres. Among his latest conspicuous representations were such widely divergent characters as Brutus in *Julius Cæsar* and Bill Sikes in *Oliver Twist*. His renderings of the part of Sir Giles and of Hamlet were also especially admired. Davenport was highly esteemed for his genial and open-hearted manners. He died at his summer home in Canton, Pa. Consult Edwards, in Matthews and Hutton, *Actors and Actresses of Great Britain and the United States*, vol. iv (New York, 1886), and Montrose J. Moses, *Famous Actor-Families in America* (New York, 1906).

DAVENPORT, Eugene (1856–). An American educator and agriculturist, born at Woodland, Mich., and educated at Michigan Agricultural College (B.S., 1878). In the Michigan Experiment Station he was assistant botanist in 1888–89 and then superintendent of the farm and professor of practical agriculture. In 1891–92 he was president of the Collegio Agronômico of São Paulo, Brazil. He became dean of the College of Agriculture in the University of Illinois in 1895 and, in addition, director of the Experiment Station and professor of thremmatology in 1896. In Illinois he did particularly important work in investigations on animal breeding. He wrote: *Principles of Breeding* (1907); *Education for Efficiency* (1909); *Domesticated Animals and Plants* (1910).

DAVENPORT, Fanny Lily Gipsy (1850–98). A well-known American actress, the daughter of Edward Loomis Davenport. She was born in London, England, but was brought to America when a child and was educated in the Boston public schools. When seven years old she appeared at the Howard Athenæum in Boston, as the child of Metamora, but her real début was at Niblo's Garden in February, 1862, as King of Spain in *Faint Heart Never Won Fair Lady.* This was followed by a season in soubrette parts in the South. While playing at the Arch Street Theatre, Philadelphia, under the management of Mrs. John Drew, she attracted the attention of Augustine Daly, who promptly gave her a place in his Fifth Avenue Theatre in 1869. Afterward she visited the principal towns and cities of the United States as a star in a wide variety of rôles in both comedy and tragedy. Among her greatest successes were those won in Sardou's *Fédora* (1883), *La Tosca* (1888), and *Cleopatra* (1890). In 1897 she produced *The Soldier of France,* a play with Jeanne d'Arc as the heroine. It was a failure, and the chagrin of that is thought to have hastened her final illness. She appeared on the stage for the last time at the Grand Opera House, Chicago, March 25, 1898. Her death occurred at Duxbury, Mass. She was the wife of Mr. Willet Melbourne MacDowell, her second husband, whom she married in 1889. Consult Benton, in McKay and Wingate, *Famous American Actors of To-Day* (New York, 1896), and Montrose J. Moses, *Famous Actor-Families in America,* (ib., 1906).

DAVENPORT, Homer Calvin (1867–1912). An American caricaturist. He was born in Silverton, Oreg., received but little education, and never attended an art school. He early became acquainted with the cartoons of Nast, which impressed him deeply, and after being in turn a jockey, a clown, and a printer's devil, he was employed as a cartoonist on the San Francisco *Chronicle.* He attracted the attention of William Randolph Hearst, who brought him to New York in 1895 and employed him on the *Evening Journal.* He had a wide range of subjects, but is best known for his political cartoons. He originated the brutal giant figures of the Trusts and the dollar-marked suit of Senator Hanna, and took an active part in molding public opinion during the silver campaign of 1896, the Spanish-American War, the McKinley and Roosevelt campaigns of 1900, 1904, and 1908. His famous Roosevelt cartoon "He's good enough for me" was drawn in 1904. Though his lack of technical training is sometimes apparent in the crudeness of his draftsmanship, his cartoons are remarkable for their simplicity, force, and stern satire. His figure of "Uncle Sam" is one of the best ever produced. In 1906 he visited Arabia and drew the only picture ever made of the Sultan of Turkey. He is the author of *The Belle of Silverton and other Stories, The Dollar or the Man* (1900), and *The Diary of a Country Boy* (1910).

DAVENPORT, John (1597–1670). An eminent Puritan clergyman, one of the founders of the New Haven Colony in Connecticut. He was born in Coventry, England; studied at Oxford University from 1613 to 1615; acted for about a year as chaplain at Hilton Castle, near Durham; and from 1616 to 1633 was a preacher in London. In 1625 he passed the examinations at Oxford for the degrees of B.D. and M.A. He came into conflict with the ecclesiastical officers, especially with Archbishop Laud on account of his nonconforming tendencies, and in 1633 withdrew from the Established church and removed to Amsterdam, Holland, whence he returned, however, in 1636, after engaging in a controversy with the Dutch classis on the subject of indiscriminate or promiscuous baptism of infants. In 1637, eluding the authorities, he embarked for Massachusetts, whose charter he had assisted in obtaining in 1629, and in June arrived at Boston, where he remained for nine months, during which time he took a prominent part in the famous Ecclesiastical Synod at Cambridge. He coöperated with Theophilus Eaton (q.v.) in founding the Colony of New Haven in April, 1638, and here, as minister and as one of the "seven pillars" of the civil government, he exercised a powerful influence. In 1661 he concealed the regicides Goffe and Whalley (qq.v.) for more than a month in his own house. He opposed the union of the New Haven and Connecticut colonies, which was effected in 1665, and three years later accepted a call to succeed John Wilson, the original pastor, as pastor of the First Church in Boston. Part of the congregation, who opposed his views on the "half-way covenant," seceded and organized the famous Old South Church. He was one of the editors of the works of Dr. John Preston, leader of the Puritan party in England, and published a number of volumes, including: *Discourse About Civil Government in a New Plantation, Whose Design is Religion* (1663); *The Knowledge of Christ Indispensably Required of All Men that Would Be Saved* (1653); *The Power of Congregational Churches Asserted and Vindicated* (1672); *The Saints' Anchor-Hold* (1661); and (with William Hooke) *A Catechisme Containing the Chief Heads of Christian Religion* (1659). Consult "A Sketch of the Life and Writings of John Davenport," by Dexter, in the *Papers of the New Haven Colony Historical Society,* vol. ii (New Haven, 1877).

DAVENPORT, William Edwards (1862–). An American social worker, born at North Stamford, Conn. He was educated at Brooklyn Polytechnic Institute, was from 1881 to 1896 a clerk in the New York post office, and then for three years he studied in Union Theological Seminary. In 1901 he founded the Brooklyn Italian Settlement, which in 1910 was consolidated with other organizations to form the United Neighborhood Guild. He was foreign correspondent in 1902, 1904, and 1909 for the New York *Evening Post* and the Brooklyn *Daily Eagle.* He came to be regarded as an authority on questions relating to Italian immigration. His publications include: *The New Dispensa-*

tion (1884); *Visions of the City* (1884); *The Perpetual Fire* (1886); *Beecher: An Ode* (1891); *The Praise of Plymouth* (1892); *The Poet and his Friends* (1893); *Poetical Sermons* (1896, 1897); *The Beggar Man of Brooklyn Heights* (1904); *More Outcries from Brooklyn Hollow* (1905).

DAVENPORT BROTHERS, THE. The name of two Americans professing to be spiritualistic mediums who flourished between 1845 and 1865. They performed a number of remarkable feats which gained them many followers, but were finally exposed as impostors. See SPIRITUALISM.

DA'VID (Heb., beloved). A king of Judah and Israel (c.1033–993 B.C.). He was the youngest son of Jesse, a Judæan, dwelling in Bethlehem. His family was one of the principal ones in the town. The number of Jesse's sons is given by later tradition as seven (1 Chron. ii. 13–15), but as eight in 1 Sam. xvii. 12. The chronology of David's reign is very doubtful, but the traditional date, 1055–1015 B.C., is generally regarded as somewhat too early. It may not be necessary, however, to reduce it more than about 20 years. The duration of his reign is fixed at 40 years (1 Kings ii. 11); but this number, being a round one, is viewed by some scholars with suspicion. David is not referred to in any early documents outside of the Bible. The biblical account is found in (1) 1 Sam. xvi–1 Kings ii and (2) in 1 Chron. ii, iii, and x–xxix. Of these two sources the first alone can lay claim to historical value. The second, in so far as it is not based on the other (see CHRONICLES), must be used with great caution, and its statements are, as a general thing, to be discarded as unhistorical or untrustworthy; while the picture that it gives of the King, differing considerably from that found in the books of Samuel, is an idealized David, such as he had become by the end of the third century B.C. in the mind of a pious Jew. Coming to the narrative in Samuel and Kings, great difficulties confront the student, due largely to the composite character of the historical documents and in part to the corrupt state of the text. The existence of "doublets," i.e., two accounts of the same event, in the story of David is believed sufficient to show that in the Book of Samuel different documents have been pieced together. Thus we have two accounts of David's introduction to Saul (1 Sam. xvi. 19–23 and xvii. 1–xviii. 5); of the slaying of Goliath (1 Sam. xvii. 1–xviii. 5 and 2 Sam. xxi. 19); of Saul's throwing a spear at David (1 Sam. xviii. 10–11 and xix. 9–10); and more of the same sort. All these doublets, however, are limited to the First Book of Samuel, and from the ninth chapter of the Second Book of Samuel to the end of the twentieth chapter we have a continuous narrative, which is brought to a close in the first two chapters of 1 Kings. Chapters xxi to xxiv of the Second Book of Samuel again represent an addition of a composite character like the first eight chapters of the First Book of Samuel, and in addition to these we have a number of editorial additions and interpolations, of which the two principal ones are 2 Sam. viii. 1–15 and 1 Kings ii. 1–12. Of these authorities, the most authentic, according to many interpreters, is the long, continuous narrative in 2 Sam. ix–xx. This excellent piece of historic writing is regarded by a number of scholars as coming from a contemporary; and Klostermann has adduced many reasons, not altogether lacking in plausibility, for his view that the author was Ahimaaz, the son of Zadok. The date of the other sections is supposed to be much later. They reveal a tendency to idealize David, which becomes more pronounced as the popular hero recedes into the background of history and becomes a favorite subject for romance, legend, poetical embellishment, and eventually the type of the ideal king and religious poet. In consequence, it is often difficult to pick out the genuinely historical incidents in David's career. Thus the story of David's encounter with the giant Goliath is believed to be a piece of romance (1 Sam. xvii–xviii) and the genuine account of Goliath's death to be found in 2 Sam. xxi. 19, where we learn that Elhanan was the slayer. Similarly, the stories of the friendship of David and Jonathan are romantic, though based on historical facts. On the other hand, there is no reason to question that he acquired musical skill, which, together with his personal charm and the indications that he gave of becoming valorous in war, attracted Saul to him and led to his entering into close relations with the "melancholy" King. He becomes Saul's armor-bearer and among the personal services that he renders is to be reckoned his soothing the King by achievements in minstrelsy. His success in the wars against the Philistines increases his popularity with King and people, and he becomes the son-in-law of the King by marrying Michal.

Soon after, however, a momentous change ensues. Saul, subject to fits of brooding, becomes jealous of David's popularity and entertains suspicion of the latter's fidelity. The story of his actually hurling a javelin at David may be a romantic touch, but it is certain that Saul's jealousy eventually led to David's banishment from the court. David now becomes a freebooter and gathers a retinue of brave but reckless warriors about him. With them he leads the life of a Bedouin chief, attacking defenseless landowners and hiring his services in attacks upon Amalekites (q.v.), and other tribes in the Negeb. The exact course of his wanderings during this period can no longer be followed. After first trying his fortunes at Nob, he is obliged to seek refuge from Saul at Adullam. We find him next in the wild and desert country south of Judæa, and he passes at times as far east as the Dead Sea, but after taking up his abode for a time at Engedi, Saul's pursuit drives him to Gath, where he offers his services to Achish, King of the Philistines, in an expedition against Amalekites, Ashurites, and other desert tribes. In reward for his services he obtains the town of Ziklag as a possession. Achish prepares an attack upon the Israelites and calls upon David to join him. The latter consents, but yielding to the protests of his chief men, who feared treachery on David's part, Achish compels David to depart. Upon reaching Ziklag he finds that the Amalekites had raided the town during his absence. In his pursuit he surprises the Amalekites and routs them. At this moment the tidings reach David of the death of Saul and his three eldest sons at Gilboa in an encounter with the Philistines. The opportunity had now come for David's return to his native country. He secures the favor of the inhabitants of Hebron and the surrounding district and is anointed King in Hebron, while still retaining Ziklag. Meanwhile Israel passes into the hands of Ishbaal, Saul's youngest son, who, however, was entirely a tool of Abner, the ambitious and

powerful general. Ishbaal foolishly alienates Abner's interest by reproaching him for taking one of Saul's concubines to himself, an act which may have indicated Abner's intention to seize the throne for himself. Abner enters into secret communication with David, but during a visit to him is murdered by Joab, David's great general. Soon afterward Ishbaal is murdered, and David, being recognized as the natural leader of all Israel, is solemnly anointed King of the whole people at Hebron by an assembly of the elders of the tribes. He is said to have been 37 years old at this time. Seven years, according to the biblical account, had passed since the death of Saul. The accounts of David's reign are quite fragmentary except for occurrences in his immediate family. We learn of successive wars against Moabites, Ammonites, Edomites, Philistines, and Aramæans, and, while the accounts of his exploits are portrayed perhaps in too vivid colors, there is no doubt that he succeeded in firmly establishing the independence of Israel and in extending his power to a number of neighboring nations that were incorporated in the empire or made tributary. Of great importance was his selection of Jebus, which becomes known henceforth under its old name, Jerusalem, as the capital of his dominion. He also laid the foundation for its future significance as the centre of the Yahwe cult by removing the sacred ark to this city. After securing peace from his enemies David had to quell opposition which arose in his own household. His eldest son, Amnon, outraged his half-sister Tamar, and in revenge Absalom caused Amnon to be murdered. Subsequently Absalom organized a rebellion against his father, which obliged the King to leave Jerusalem for a time. The uprising is quelled, but not until Absalom has fallen as a victim. Amasa, David's nephew, who had taken part in the rebellion, but had been pardoned by David and promised the chief command in place of Joab, also falls a sacrifice to the latter's jealousy. Once more, as the King stands on the verge of the grave, serious trouble threatens regarding the question of succession. The court was divided between two candidates—Adonijah, the surviving eldest son, and Solomon, the son of David by Bathsheba. Through the influence of the prophet Nathan the King decides in favor of Solomon. David dies at an advanced age and is buried in his capital. These family troubles are looked upon by the Jewish writers as a punishment for David's adulterous act with Bathsheba and his subsequent connivance at the murder of Bathsheba's husband, Uriah. There is no doubt that this act, which took place during the war with the Ammonites, is the most serious charge to be brought against him, and there is no reason to question its authenticity, since it is fully in keeping with the conditions that prevailed at the time. In forming an estimate of David those conditions must be taken into consideration, and no true picture can be obtained of him unless we are willing to recognize his human limitations. That he was a great warrior admits of no doubt. Indeed, he was essentially a soldier, courageous and of boundless energy. He possessed the faculty, moreover, to an extraordinary degree, of gathering men to himself, and as a natural-born leader he overcomes obstacles that would have crushed others. But he also shows traits of cruelty in the treatment of his enemies, connives at treachery, and is willing to make use of underhand measures to accomplish his ends. The best evidence of the virility and resourcefulness of his character is the empire he founded. He united under his sceptre Judah and Israel, the tribes of the Negeb (q.v.), Edom, Moab, and Ammon, while the Aramæan tribes, Zoba, Beth Rechob, and Beth Maacah, were made tributary. Thus he became the most powerful ruler in southern Syria. His moral sense was not strong, and it is probably due to this defect that he shows such lamentable weakness in dealing with his family affairs. But, with all his faults, he remains one of the most notable figures in Hebrew history, and it is not surprising that the attachment to him should have led to the idealization of him by popular tradition, evidenced by later writers. That he was a poet as well as a musician cannot be doubted. His authorship of the Elegy over Saul and Jonathan (2 Sam. i. 17–27) is generally admitted; and this alone would prove his right to be remembered as "the sweet singer of Israel" (2 Sam. xxiii. 1). But the Psalms, of which 73 are by Jewish tradition ascribed to him, do not belong to his age. They reflect in all but a few cases the religious thought and aspirations of postexilic Judaism. See PSALMS, BOOK OF.

Consult: Klostermann, *Die Bücher Samuelis und der Könige* (1887); Cheyne, *Aids to Devout Study of Criticism* (1892); id., "David," in *Encyclopædia Biblica* (1899); Stähelin, *Leben Davids* (1866); Dieulafoy, *Le Roi David* (1897); Beer, *Saul, David, Salomo* (1906); Baentsch, *David und sein Zeitalter* (1907); Winckler, *Geschichte Israels*, ii (1900); Ed. Meyer, *Die Israeliten und ihre Nachbarstämme* (1907); Kittel, *Geschichte des Volkes Israel*, ii (2d ed., 1909); Wellhausen, *Israelitische und jüdische Geschichte* (7th ed., 1914).

DAVID. A favorite subject with the sculptors of the Italian Renaissance, in which the youthful Israelitish shepherd is represented either with sling in hand, or holding Goliath's sword, with his foot upon the giant's head. The most important representations of the subject are the bronzes by Donatello and Verrocchio and the colossal marble statue carved by Michelangelo, which are described in the articles on these sculptors.

DAVID I (1084–1153). King of Scotland from 1124 to 1153. He was the youngest son of Malcolm Canmore by his wife, St. Margaret (q.v.). During the fierce struggle for the possession of the Scottish crown which followed the death of his father in 1093, the youthful David found refuge in England, together with his sister Eadgyth, or Matilda, who in 1100 married Henry I, King of England. The residence of David at the English court would appear to have been prolonged for several years, and the assertion of William of Malmesbury may well be credited that "it freed him from the rust of Scottish barbarity." In 1107 his elder brother, Alexander, succeeded to the throne, and David became Prince of Cumbria (q.v.). Together with this great principality he seems to have held lands in Lothian; and by his marriage, in 1113, with Matilda, widow of the Earl of Northampton, he acquired possession of that earldom too. In 1124 he succeeded his brother as King. In 1127 he took an oath, with the other great barons of England, to maintain the rights of his niece, Matilda, as heiress to the English crown, should her father, Henry I, die without male issue. The event thus contemplated came to pass in 1135, and when Stephen mounted the

English throne David took up arms in behalf of Matilda. Peace was restored by the grant of the earldom of Huntingdon and the promise of the earldom of Northumberland to David's son, Henry, then in his twentieth year; but the war was soon resumed, and in 1138 the King of the Scots, deserted by Bruce and others of his Anglo-Norman vassals, was signally defeated in the battle of "the Standard," near Northallerton. In the next year a second peace was concluded between the two kings, when the promised earldom of Northumberland was bestowed on Prince Henry. In 1140 the Scottish King marched into England for the third time to assert the rights of Matilda. He was again defeated and only regained his own country with difficulty.

The rest of his reign was devoted to the introduction of English civilization into Scotland, a task which had been begun by his parents and continued by his brothers, King Edgar and King Alexander. He secured the peace and safety of the country by building castles; and by erecting burghs he promoted trade, shipping, and manufactures. He showed his favor for learning by endowing many bishoprics and monasteries. David died at Carlisle on May 24, 1153. His son Henry had died in the previous June, and he was succeeded by his grandson, Malcolm. The remains of David's legislation, including the interesting code of the *Leges Burgorum*, have been carefully collected in the first volume of *The Acts of the Parliament of Scotland* (Edinburgh, 1844). Consult Robertson, *Scotland under her Early Kings* (2 vols., Edinburgh, 1862), and Skene, *Celtic Scotland* (3 vols., Edinburgh, 1876–80).

DAVID II. See under BRUCE, ROBERT.

DAVID, dȧ'vêd', ARMAND (1826–1900). A French missionary and naturalist, born at Espelette, Basses-Pyrénées. In 1848 he entered the congregation of the Lazarists and in 1862 went as a missionary to China. Here he made valuable collections of animals, plants, and minerals, which he presented to the Museum of Paris. From 1869 to 1871, on behalf of the museum, he made scientific explorations in China and Tibet, discovering many new genera and species of flora and fauna. Subsequently he accomplished a third journey, of which he wrote in the *Journal de mon troisième voyage d'exploration dans l'empire chinois* (2 vols., with maps, 1875). The results of his previous travels are to be found in the *Nouvelles Archives du Muséum d'Histoire Naturelle* (1866, 1868–70). His *Les oiseaux de la Chine* (with 24 plates, 1877) is an important work.

DA'VID, CHRISTIAN (1690–1751). A Moravian missionary, born at Senftleben, Dec. 31, 1690. Brought up a Roman Catholic, he embraced Lutheran views and then Moravian (1717) and founded the Moravian colony of Herrnhut (1722) and was elected the first of the 12 elders. Henceforth he was a missionary in Europe and even went to Greenland, where he founded the first mission (1747). Consult Thompson, *Moravian Missions* (New York, 1882). See MORAVIANS.

DAVID, dă'vêt, EDWARD. A Flemish buccaneer of the latter part of the seventeenth century. He early became one of the "Brethren of the Coast," as the West Indian pirates styled themselves, achieved prominence in that organization, and in 1683 sailed as leader of an expedition of three ships for the Pacific. Reinforced by French filibusters with two vessels and a fire ship, he devastated the coasts of Chile and Peru. A fleet of three galleons and two fire ships was sent against him by the Viceroy of Peru, but after an indecisive battle he succeeded in making his escape. Subsequently he returned to the coast of Peru, pillaging towns, slaughtering, and exacting ransoms in true piratical fashion. He then transferred his depredations to Central America and Mexico. In 1688, under a general amnesty granted by King James II, he betook himself to England, where he lived for many years in undisturbed possession of his plunder.

DAVID, dȧ'vêd', FÉLICIEN CÉSAR (1810–76). A distinguished French composer. He was born at Cadenet, Vaucluse, April 13, 1810. At first a chorister and later chapelmaster in the cathedral at Aix, he entered at 20 the Paris Conservatory, where he studied with Benoist (organ), Fétis (composition), and Reber (harmony). His uncle cut off his paltry monthly allowance of 50 francs, and David had to give lessons. He joined the Saint-Simonists, but their commune broke up at Ménil-Montant in 1833; with a number of fellow dreamers he went to the East—Turkey, Egypt, and Syria. After two years of hardship and suffering he returned to France, rich in novel experiences. The fruit of his journeys, *Mélodies orientales*, received scant notice, and David retired for more serious study and composition, but his first symphony (1838) had a like fate. In 1844 his "symphonic ode," *Le désert*, was performed at the Conservatory amid tumults of applause, which continued day after day at the successive performances of the work. His next productions, the oratorio *Moïse au Sinaï* (1846), the symphonic ode *Christophe Colomb* (1847), and the mystery *L'Eden* (1848), had little success. But he was now a recognized master; even his earliest compositions found a hearing, and the doors of every theatre were open for his new works, chiefly operas. *La perle du Brésil* (1851) was received with acclamation, and a national prize of 20,000 francs was awarded (in 1867) to his *Herculaneum*, produced at the Grand Opéra in 1859. *Lalla Roukh* (1862) was equally successful, but *Le Saphir* (1865) found less favor. *La captive* was withdrawn by the composer before it was performed. In 1862 he was appointed an officer of the Legion of Honor, and in 1869 elected to succeed Berlioz at the Institute and as a librarian of the Conservatoire de Musique in Paris. His compositions include also chamber music, songs, and pieces for solo instruments. David, the "musical Orientalist," occupies a singular position in the history of music: he inaugurated a new movement. During his long years of wandering in the East he absorbed the quaint and weird Oriental melodies, and to express these in the most gorgeous orchestral colors that a rich fancy could think of was his task. It was the easier as Berlioz (q.v.) had already worked out orchestral effects that glowed and blazed, and it remained only to give them an Oriental setting, which David did in *Le désert* and subsequent works. His followers were numerous, and among them the most famous—Bizet (*Djamileh; Les pêcheurs des perles*), Massenet (*Roi de Lahore*), and Délibes (*Lakmé*)—were the most directly influenced. He died at Saint-Germain-en-Laye, Aug. 29, 1876. Consult A. Azevedo, *Félicien David* (Paris, 1863), and R. Brancour, *Félicien David* (ib., 1908).

DAVID, dă'vêt, FERDINAND (1810–73). A German violinist, born in Hamburg, June 19,

1810. For two years he was a pupil of Spohr, in Cassel, studying at the same time with Hauptmann. In 1825, when only 15 years old, he made his first appearance as a violinist at the Gewandhaus in Leipzig. During 1827 and 1828 he played in the orchestra of the Königsstädtisches Theatre, Berlin. At this time he met Mendelssohn, with whom he formed a warm friendship. He left Berlin to become first violin of the private quartet of Baron von Liphardt, of Dorpat, whose daughter he married. During his sojourn in Russia, which continued until 1835, he appeared with great success in St. Petersburg, Moscow, Riga, and other large cities. In 1836 he was, through Mendelssohn's influence, appointed concertmeister of the famous Gewandhaus Orchestra in Leipzig, a position which he filled ably until his death, near Klosters, Switzerland, July 19, 1873. In Leipzig he was active as a virtuoso, teacher, editor, and composer. As a virtuoso, he had the solid foundations of Spohr's method, combined with the freer development of technique and feeling demanded by more modern taste. His leadership of the violins has left its traditions impressed upon the Gewandhaus Orchestra. Of his success as a teacher it is only necessary to say that Joachim and Wilhelmj were among his pupils. As an editor, he has left *Die hohe Schule des Violinspiels*, a collection of standard works of old masters of the instrument, which, together with his own *Method for Violin*, has had much to do with determining the lines along which modern violin playing has developed and is still a standard work. When, in 1843, the Leipzig Conservatory of Music was established, David became instructor of violin there. While Mendelssohn was writing his violin concerto, he was in constant communication with David, who was the first to play the work. As a composer, David is not important, although he wrote an opera, *Hans Wacht*, two symphonies, and five violin concertos. Consult J. Eckard: *Ferd. David und die Familie Mendelssohn* (Leipzig, 1889), and C. Bellaigue, *Etudes Musicales et nouvelles silhouettes des musiciens* (Paris, 1898).

DAVID, dä'vêt, Gerard (between 1450 and 1460–1523). One of the greatest painters of the Early Netherlands school. He was born at Oudewater (Holland) between 1450 and 1460 and studied with Dutch masters, perhaps with Aelbert Ouwater at Haarlem. He came to Bruges as a finished master about 1483, and in the following year was enrolled in the painters' guild. At Bruges his art was modified by the study of the works of the Van Eycks, Van der Weyden, Van der Goes, and especially of Hans Memling. He soon became recognized as the chief master of Bruges. In 1488, 1491, and 1499 he received important commissions from the city; soon after 1496 he married Cornelia Cnoop, a daughter of the wealthy and powerful dean of the goldsmiths' guild; and in 1501 he became dean of the painters' guild. An influential citizen, he was prominently identified with the religious life of the city. In 1508 he presented the Carmelite nuns of Sion in Bruges with a magnificent altarpiece of the Madonna with saints, now in the Rouen Museum. In 1515 he was enrolled in the painters' guild of Antwerp, but his stay there was temporary. He was active in Bruges, at the head of an important school, until his death, Aug. 13, 1523.

Although celebrated in his own day and known to early writers, David was until recently a forgotten master. The data of his life we owe to the researches of Weale in the archives of Bruges, but his importance as a painter was not recognized until the comparative exhibition of Early Flemish masters at Bruges in 1902. He is in no sense an innovator, His art is rather the culmination of Netherlandish painting of the fifteenth century, the Dutch as well as the Flemish. To the former he owes his delicate and subtle color, his treatment of light and shade, and, above all, the excellence of his landscapes, which are the best of the school; to the latter, his orderly architectonic composition and superior rendition of the human form. His work is characterized by a depth of mystic religious feeling analogous to that of Thomas à Kempis in literature. He excels all others in the unison of his figures and landscape backgrounds in serene sentiment.

David's work may be divided into three periods—an early or formative period, a middle period of his most perfect work, and a last period after his sojourn at Antwerp (1515). Among his earliest surviving works, primitive and thoroughly Dutch in character, are: "Christ Nailed to the Cross" (Layard collection, Venice; Antwerp Museum); "The Adoration of the Christ Child" and "St. John" (Kaufmann collection, Berlin); and "St. Jerome" (Salting collection, London). Somewhat later and showing the influence of the Bruges masters are the madonnas of the Kahn collection (New York), the Louvre, Berlin galleries, and the Johnson collection (Philadelphia). His independent style begins with "The Judgment of Cambyses" and "The Flaying of Sisamnes," painted for the court room of the town hall of Bruges and now in the Bruges Academy. To the period of his best work belong: "The Marriage of Cana" (Louvre); "The Baptism of Christ," a triptych (Bruges Academy); the Rouen altarpiece, mentioned above; two pictures in the National Gallery, London; the Madonna of the Museo Brignole Sala, Genoa; "The Annunciation" (Sigmaringen); the altar of St. Anne (Widener collection, Philadelphia); and "Rest on the Flight to Egypt," in the Morgan collection (Metropolitan Museum, New York). The works of his last period in their dramatic quality may reflect the influence of Quentin Matsys of Antwerp; such as: "The Crucifixion" (Museo Brignole Sala, Genoa); "The Transfiguration" (Notre Dame, Bruges); "Pièta" (National Gallery, London); and the "Madonna giving the Child Soup" (Traumann collection, Madrid). Of all the early masters of the Netherlands, David is best represented in the United States. Besides the paintings mentioned above, there are others in the collections of J. G. Johnson, Philadelphia, and Otto H. Kahn ("Christ's Farewell to the Holy Women"), the Metropolitan Museum, New York ("Crucifixion"), and in the New York Historical Society ("Marriage of St. Catharine"). Consult Bodenhausen, *Gerard David und seine Schule* (Munich, 1905)—an admirable and complete monograph, with catalogue of his works. For David's paintings in America, see Bodenhausen and Valentiner, *Zeitschrift für bildende Kunst*, vol. xxii (Leipzig, 1911). See also the publications of Weale in the *Portfolio* (London, 1895), and the *Burlington Magazine* (ib., 1903).

DAVID, dà'vêd (Jacques) Louis (1748–1825). A French historical and portrait painter, the founder of the so-called Classical school.

DAVID

THE CORONATION OF JOSEPHINE, FROM THE PAINTING IN THE LOUVRE, PARIS

He was born in Paris, Aug. 30, 1748. On the advice of Boucher (q.v.), who greatly influenced his early art, he studied under Vien and entered the schools of the Academy. In 1774 he took the first Prix de Rome with "Antiochus and Stratonice" (Ecole des Beaux-Arts, Paris) and went to Rome with Vien shortly after. A five years' sojourn devoted to the diligent study of classic antiquity brought about a complete change in style, which he himself compares to an operation for cataract. Returning to Paris in 1780, he achieved celebrity with "Blind Belisarius Asking Alms" (1781, Lille Museum) and "Andromache Bewailing the Corpse of Hector" (Ecole des Beaux-Arts), which caused his election to the Academy.

More than any other painter of his time, David, with his classical tendencies, represented the spirit of the age—the reaction against the frivolity of monarchical France and the return to the stern virtues of antiquity. His "Oath of the Horatii" (1784) and "Brutus Condemning his Sons to Death" (1789, both in the Louvre) were hailed with universal applause. Entering politics he became the great painter of the Revolution and presented to the Convention, of which he was a leading spirit, the "Deathbed of Lepelletier," the first martyr of liberty. When Marat was killed, he was called by the Assembly to memorialize his death, and he responded with a painting in which the murdered man is portrayed with great naturalistic strength. Twice imprisoned during the Revolution, he narrowly escaped the guillotine and renounced politics. Those of his works which represent what he himself lived and experienced are painted in this manner. The same is true of his portraits of the Revolutionary epoch, like those of Madame Récamier (Louvre), of Barrère, and especially of the young Bonaparte, whose follower he became (Versailles), etc. When Napoleon became Emperor, he was appointed court painter. His chief masterpiece in this capacity was the colossal picture of the "Coronation of Napoleon I" (finished 1807, and now at Versailles). This is a stately composition, noble in color, and with a tender, quivering light, justifying Muther's encomium of being the best historical painting of the past century. His portraits of this period, as, e.g., those of the Emperor, the Pope, and Murat, are all of the highest naturalistic merit. Upon the restoration of the Bourbons he was exiled to Brussels, where he died on the 29th of December, 1825. During his exile he painted nothing of real merit except his portraits, which include the double likenesses of the daughter of Joseph Bonaparte (Toulon Museum), Abbé Sieyès, and the "Three Ladies of Ghent" (Louvre), all depicted with keen realism and great pictorial strength. All of these works show a realistic talent of the first order, with high powers as a draftsman and a colorist.

But the best known and most influential side of David's art is his large canvases representing antique subjects. While these paintings show great excellence of drawing, they are cold in composition and color, exaggerated and theatrical in action. Besides those mentioned above, the "Death of Socrates," "Leonidas at Thermopylæ" (1814, Louvre), the "Rape of the Sabines" (1799, Louvre), are among the chief of this class. These were the works which had the greatest influence upon the pupils of his large atelier. Throughout the Revolution and under the Empire he was the supreme dictator of art in France, and his influence upon its development was very great. While he rescued it from the trivialities of the followers of Watteau, he established a despotism of classicism which had to be broken before there could be real progress. Nevertheless, he was in a way the regenerator of modern French art, and the accuracy of his drawing exercised a salutary influence upon its development.

Consult: the monographs by Thomé (Paris, 1826); Coupin (ib., 1827); Lenoir (ib., 1835); Thoré (Brussels, 1843); De Villars (Paris, 1850); Delécluze (ib., 1855); Blanc (ib., 1860); Chesneau (ib., 1862); Jules David (ib., 1880); Saumier (ib., 1904); Rosenthal (ib., 1905); Muther, *History of Modern Painting*, vol. ii (London, 1907).

DAVID, dȧ'vêd', Johannes Baptista (1801–66). A Flemish philologist, born at Lier. For more than 30 years he held the chair of Belgian history and Flemish literature at the Catholic University of Louvain. He was one of the greatest Flemish scholars of the century and a very prolific writer. His principal work is the famous *Vaderlandsche historie* (10 vols., 1842–64; 4th ed., 1885 et seq.), a history of Belgium which was never completed. The most important of his linguistic works is entitled *Eerste beginselen der nederduitsche spraekkunst* (10th ed., 1858).

DAVID, dȧ'vêd', Laurent Olivier (1840–). A Canadian journalist and statesman, born at Sault au Recollet, Quebec Province. He was educated at the College of Sainte Thérèse, and was called to the bar in 1864. From 1870 to 1884 he was editor of *L'Opinion Publique*, but the paper was discontinued owing to his criticisms of the Catholic clergy for alleged political interference in elections. At different times he was also connected with *Le Bien Public* and *La Tribune*. He was for a short period a translator for the House of Commons, but resigned in 1878 and practiced his profession in Montreal, of which he was appointed city clerk in 1892. Originally a Conservative in politics, he afterward joined the Liberals, and was a member of the Quebec Legislature during 1886–90. In 1887–88 he was president of the Saint Jean Baptiste Society of Montreal. He did much to promote a patriotic national spirit among French-Canadians, though without favoring revolutionary and separatist projects. In 1888 he was a delegate to the French-Canadian National Convention at Nashua, N. H.; in 1898 he assisted in preparing a new city charter for Montreal; and in 1903 he was appointed to the Senate. His writings are distinguished for lucidity and beauty of style. His publications include: *Biographies and Portraits* (1876); *Les héros de Chateauguay* (1883); *Les patriotes de 1837–38* (1884); *Mes contemporains* (1894); *Les deux Papineau* (1896); *Le clergé canadien: sa mission et son œuvre* (1896), a work which reproves certain Roman Catholics for intervention in political affairs and was condemned by the Congregation of the Index at Rome; *L'Union des deux Canadas, 1841–1867* (1898); *Le drapeau de Carillon*, a drama (1901); *Laurier et son temps* (1905); *Vingt biographies* (1910); *Souvenirs et biographies* (1910). See Canadian Literature.

DAVID, or **DEWI,** Saint (?–?601). The patron saint of Wales. He was, according to tradition (probably worthless), the grandson of

Ceredig, King of Cardiganshire. He was educated by monks and later went through Wales on a preaching tour. He also founded monasteries, especially that one at Menevia, now called St. David's, in Pembrokeshire, and there he became abbot, which office was equivalent to bishop, and its holder was so designated. As bishop, he presided at the synods of Brefi and "Victory." His shrine became a favorite place of pilgrimage, and he was canonized in 1120; his festival is held on March 1. He was celebrated for his eloquence and success in conversion. Several works have been ascribed to him, but these are no longer extant. His life was written by Ricemarch, Bishop of St. David's, who died about the year 1099, reprinted in W. J. Rees, *Lives of the Cambro-British Saints of the Fifth and Immediately Succeeding Centuries* (London, 1853). Consult Rice Rees, *An Essay on the Welsh Saints* (ib., 1836).

DAVID AP GWILYM, dä'vĕd äp gwĕ'lĭm (c.1300–70). The greatest of mediæval Welsh poets. He was born either in Cardiganshire or Glamorganshire, and was the son of Gwilymlsam. He was a man of considerable education, and his knowledge of Latin and Italian literatures has given rise to the belief that he was educated in Italy. His tendency to satirize his neighbors, as well as his numerous love affairs, brought him into frequent difficulties. He has been compared to Shakespeare, Burns, Ovid, and Petrarch, and addressed to Morvydd, who may be called his Laura, more than 147 poems that form a kind of *ars amandi*. Morvydd was the daughter of Madog Lawgain, and her marriage to a wealthy suitor was soon followed by her elopement with the poet. They are said to have escaped to France, but a lawsuit was brought against David by the outraged husband, to whom damages were adjudged in a large sum. Unable to pay it, the poet might have languished in prison had not the people of Glamorgan generously remitted the obligation. In gratitude for this the poet dedicated two of his principal poems to Glamorgan. Most of his poems were written in the metre called *cywydd*, consisting of seven-syllable lines rhyming in couplets. His frequent use of this metre led his contemporaries to call him *Dafydd gywydd gwin*, 'David of the sweet wine cywydd.' Because of the lustre that he gave to this verse, it has become the most frequent genre used by Welsh poets from his time to the present day. Though love forms the main theme of his poems, he is probably better known for his treatment of nature, for which he shows a love that is unequaled in any literature of that period. Two hundred and sixty-two of his poems were edited by Owen Jones (Myfyr) and William Owen-Pughe (London, 1789), and more have been lately discovered in the Mostyn Library and British Museum. An admirable English version of the poems was published by Arthur James Johnes (1834). Consult L. C. Stern, "Davydd ab Gwilym," in the *Zeitschrift für celtische Philologie*, vol. vii, pp. 1–265 (Halle, 1910). See WELSH LITERATURE.

DA'VID CITY. A city and the county seat of Butler Co., Neb., 90 miles (direct) west of Omaha; on the Union Pacific, the Burlington and Missouri River, and the Chicago and Northwestern railroads (Map: Nebraska, G 3). The city contains a public library, park, and Chautauqua grounds. It is the centre of an agricultural and stock-raising region and has manufactories of bricks. The water works and electric-light plant are owned by the city. Pop., 1900, 1845; 1910, 2177.

DAVID COP'PERFIELD. A novel by Dickens, published serially, beginning May, 1849. It was the author's favorite book and is said to be partly autobiographical.

DAVID D'ANGERS, dä'vĕd' dänN'zhā', properly PIERRE JEAN DAVID, so called to distinguish him from David the painter (1788–1856). A French sculptor of the early nineteenth century. He was born at Angers March 12, 1788, the son of a wood carver. Overcoming his father's opposition, he went to Paris in 1808. After a bitter struggle with poverty he entered, in 1810, the atelier of the sculptor Rolland, at the same time studying drawing with Jacques Louis David, who befriended him. The Prix de Rome enabled him to spend five years (1811–16) in the Eternal City, where he came under Canova's influence, without, however, relinquishing his naturalism. He then studied the Parthenon statues in London, and on his return to Paris he received his first important commission. This was the monument to Le Grand Condé, now in the Court of Honor, Versailles. During the revolution of 1830 David, an ardent Republican, fought in the ranks, and after its successful termination he received the commission for his masterpiece—the sculptures of the pediment of the Panthéon. Under the inscription, "Aux grand hommes la patrie reconnaissant," "France" bestows crowns, placed in her hand by "Liberty," upon her illustrious sons, among whom the figures of Mirabeau, Carnot, David the painter, Voltaire, Rousseau, Bonaparte, and the "Trumpeter of Arcola" are prominent. He participated also in the revolution of 1848 and was a member of the Constituent Assembly. After the coup d'état by Napoleon III he went into exile to Greece, but soon returned, broken in health, to France. He died in Paris, Jan. 5, 1856. His patriotism and ideal devotion to the cause of liberty were only equaled by a lovable character, which endeared him to all classes of men.

David D'Angers is an epoch-making figure in the history of French sculpture. Notwithstanding his classical training, which is often evident in his work, he rendered nature with freedom and truth. He is most eminent in portrait sculpture, in which he was the first to insist upon contemporary costume; but he also excelled in reliefs and especially in medallions. He has left behind no less than 55 statues, 150 busts, 70 bas-reliefs, 20 statuettes, and over 500 medallions. He is represented in the national collections of the Louvre, Versailles, and Sèvres, in almost all the important provincial museums, and in his native town there is a museum devoted entirely to his works. His two most important works, besides the pediment of the Panthéon, are the tomb of General Gobert (Père Lachaise), and his "Philopœmen" (Louvre), a colossal heroic type in classic garb. Among the best of his portrait statues are those of Gutenberg at Strassburg, Talma at Montpellier, Corneille at Rouen, Fénelon at Cambray, Lafayette and Thomas Jefferson at Washington. He himself most prized his statue of "Barra," a drummer boy killed in the war of La Vendée, and the beautiful Greek female figure of the monument to the Greek hero Marco Bozzaris. In his portrait busts and medallions he has left us faithful and characteristic likenesses of most of the French celebrities of his day, and of many Eng-

lish and German notables, which he modeled during repeated visits to these countries. Among his principal busts are those of Goethe (Ducal library, Weimar), the sculptor Rauch, Washington, etc.; among the medallions are those of Napoleon and Madame David. Consult the monographs by Maillard (Angers, 1839); Lomenie (Paris, 1844); Saint-Amour (Dunkerque, 1845); Halévy (ib., 1857); Karcher (London, 1865); Jouin (Paris, 1878). Consult also Brownell, *History of French Art* (New York, 1892), and Gonse, *La sculpture française depuis le XIV siècle* (Paris, 1895).

DAVIDEIS, dâ-vĭd'ê-ĭs. A sacred poem on the troubles of David, the chief work of Cowley, published in 1656.

DAVID GAR'RICK. A comedy by Robertson, which appeared in 1864 and is a translation from the French play *Sullivan.* It purports to represent amatory incidents in the life of the famous eighteenth-century English actor and was first produced at the Haymarket with the elder Sothern in the principal rôle.

DAV'IDGE, William Pleater (1814–88). An English comedian, who came to the United States in 1850 and became identified with the American stage. He was born April 17, 1814, in London, and appeared as a youthful amateur at Drury Lane in *The Miller's Maid.* Afterward he acted in various English cities, especially in Manchester. His first appearance in America was in August, 1850, as Sir Peter Teazle at the old Broadway Theatre, New York; later he supported many well-known actors in the metropolis and elsewhere, among them Edwin Forrest and Fanny Davenport. Some of his notable parts were Caliban; Eccles, in *Caste;* Dick Deadeye, which he created, in *Pinafore;* Old Hardy, in *The Belle's Stratagem;* and Hardcastle, in *She Stoops to Conquer.* His last engagement was with the Madison Square Company, beginning in 1885. He died at Cheyenne, Wyo., Aug. 7, 1888. He was the author of a volume of autobiographical reminiscences called *Footlight Flashes* (New York, 1866); *The Drama Defended* (ib., 1859); and other works.

His son, William Davidge (1847–1899), also an actor, was born at Manchester, England, and brought to the United States when a child of three years. During his career he played with William H. Crane (1870–71), Kate Claxton (1877–78), and later for several seasons with Roland Reed. He died in Chicago.

DAVID HAR'UM. A very popular story by Edward Noyes Westcott, which, after rejection by a number of publishers, attained a remarkable success. The character of the shrewd, horse-trading David Harum is distinctively an American type, and was drawn from an original who was a resident of the town of Homer, N. Y. An identification of the characters and scenes has been published by Arthur T. Vance, under the title *The Real David Harum* (New York, 1901).

DA'VIDISTS. A name used for three Christian sects: 1. Followers of David of Dinant, a teacher in the University of Paris, whose philosophical work was condemned by the Synod of Paris in 1209, and who, in consequence of the ban laid upon him in 1215 by the Pope, had to flee from France. The place and date of his death are unknown. His fundamental idea was that the Deity alone had any real existence, being the *materia prima* of all things. 2. Davidists, or David Georgians, followers of David George, or Joris, a native of Ghent or Bruges. In 1530 he was whipped, had his tongue bored, and was imprisoned for obstructing a Roman Catholic procession. He founded a sect of his own and in 1542 published his *Book of Wonders,* retailing the visions which he professed to have received. After his death his body was dug up and burned by order of the Senate of Basel, where he had passed the latter part of his life as a merchant under an assumed name, John of Bruges. The sect, under the leadership of Henry Nicholas, became known in Holland and England as the "Familists." They interpreted the whole of Scripture allegorically, and maintained that, as Moses had taught hope and Christ had taught faith, it was their mission to teach love, the service of which was the highest and best of the dispensations. The result was an extreme Antinomianism in practice, which attracted the notice of the authorities in both countries. Early in the seventeenth century the sect was suppressed or absorbed by others. See Joris, David. 3. The followers of Francis David, who in 1568 began a widespread Unitarian movement in Hungary. See Unitarianism.

DAVIDOFF, dä'vê-dôf, Karl (1838–89). A Russian violoncellist, born at Goldingen, Courland, March 17, 1838. He was educated at the Moscow University and studied the violoncello under H. Schmitt in Moscow and Schuberth in St. Petersburg. He then entered the Leipzig Conservatory, where he continued to study the 'cello under F. Grüzmacher, and also completed a course in composition under Hauptmann. He first appeared at the Gewandhaus, Leipzig, in 1859, and was made first violoncellist in the Gewandhaus orchestra and professor in the Leipzig Conservatory. In 1862 he was appointed solo violoncellist to the Emperor of Russia and professor in the Conservatory of St. Petersburg and was director of the latter from 1876 to 1887. As a virtuoso, he was equalled by few, and won great fame on his concert tours through Europe. Besides four concertos and a number of minor pieces for his instrument, he composed some works for orchestra, pianoforte pieces, and songs. Consult W. Hutor, *Karl Davidoff und seine Art das Violoncell zu behandeln* (Leipzig, 1899).

DA'VIDS, Thomas William Rhys (1843–1922). An English Orientalist. He was born at Colchester, was educated at the University of Breslau, entered the civil service in Ceylon, and filled various judicial appointments in that island. He was called to the bar of the Middle Temple in 1877, and was professor of Pāli and Buddhist literature at University College, London, from 1882 until 1912. In 1904 he became professor of comparative religion at Manchester. He devoted himself especially to the study of Buddhism. His works include: *Buddhism: A Sketch of the Life and Teachings of Gautama, the Buddha* (1878; 22d ed., 1910); a translation from the Jātakas, or *Buddhist Birth Stories,* vol. i (1880); *Buddhism: Its History and Literature* (1896, composed from American lectures); *Buddhist India* (1902; 2d ed., 1905); *Early Buddhism* (1908); *Dialogues of the Buddha* (1899; 1910); and with J. E. Carpenter, he edited the Pāli text *Dīgha-nikāya* (3 vols., London, 1890–1911). He was made president of the Pāli Text Society, which he founded in 1882.

DAVID'S DEER. See Elaphure.

DAVIDS ISLAND. An island lying in Long

Island Sound, off New Rochelle, N. Y., the nearest railway station, a quarter of a mile north of the boundary between Greater New York and Westchester County (Map: New York City and Vicinity, G 2). It is owned and occupied by the United States government, and is the site of Fort Slocum (q.v.), a recruit depot of the United States army, for which extensive barracks and other buildings are maintained. Its extent is about 100 acres.

DA'VIDSON. A town in Mecklenburg Co., N. C., 22 miles north of Charlotte, on the Southern Railway (Map: North Carolina, B 2). It has cotton and cottonseed-oil mills, a ginnery, and a flouring mill. The town is the seat of Davidson College (q.v.), founded in 1837, and of the North Carolina Medical College, established about 1890, connected with which is the Munroe Private Hospital. There is also a Carnegie library. Pop., 1890, 481; 1900, 904; 1910, 1056.

DAVIDSON, ANDREW BRUCE (1831–1902). A Scottish biblical scholar. He was born in Aberdeenshire and, after studying at Aberdeen, in 1863 was ordained and was appointed professor of Oriental languages in New College, Edinburgh. He was a member of the Old Testament Revision Committee, being recognized as the foremost British biblical critic of his day. George Adam Smith and W. Robertson Smith were among his pupils. His publications include a *Commentary on Job*, vol. i (1862); *An Introductory Hebrew Grammar* (1874; 9th ed., 1888); primers on *Job*, *Ezekiel*, *Hebrews* (1877); "Isaiah," in the *Temple Bible* (1902); and two volumes of sermons, *The Called of God* (1903) and *Waiting upon God* (1904), with a life by Taylor Innes.

DAVIDSON, CHARLES (1852–). An American scholar. He was born in Streetsboro, Ohio, and was educated at Iowa College and at Yale University. In 1893–94 he was assistant professor of English at Indiana University, in 1894–96, associate professor of English at Adelbert College (Western Reserve University), and in 1906–11 professor of education at the University of Maine. He wrote much for scholarly reviews and these books: *Studies in the English Mystery Plays* (1892); *Motor Work and Formal Studies* (1911).

DAVIDSON, GEORGE (1825–1911). An American astronomer. He was born in Nottingham, England, but went to the United States in 1832. He did notable work on the Government Coast and Geodetic Survey (1845–95), but it was in astronomical research that he gained his greatest distinction. He traveled on every continent to make observations, particularly of transits of Venus. He wrote: *The Alaska Boundary* (1903); *The Glaciers of Alaska* (1904); *The Discovery of San Francisco Bay* (1907); *Francis Drake on the Northwest Coast of America* (1908); *Origin and Meaning of the Name California* (1910). In 1895 he became professor of geography in the University of California.

DAVIDSON, JAMES WOOD (1829–1905). An American author, born in Newberry District, S. C. He became professor of Greek in South Carolina College, then principal of the high school at Columbia, and, during the Civil War, adjutant of infantry in Jackson's corps of Lee's army. He was literary editor of the New York *Evening Post* (1873), and American correspondent of the London *Standard* from 1873 to 1878. His published works include: *The Living Writers of the South* (1869); *School History of South Carolina* (1869; rev. ed., 1894); *The Correspondent* (1886); *The Poetry of the Future* (1888); *The Florida of To-Day* (1889).

DAVIDSON, JOHN (1857–1909). An English poet. He was born at Barrhead, near Glasgow, Scotland; at the age of 13 became assistant in the chemical laboratory of a sugarhouse at Greenock, attended for a short time Edinburgh University, and went to London in 1890. He had already published three plays—*Bruce* (1886); *Smith: A Tragic Farce* (1888); and *Scaramouch in Naxos* (1889)—which contain many striking scenes. His later plays include *Godfrida* (1898) and *Self's the Man* (1901). In 1901 he began the issue of a series of verse pamphlets called *Testaments*, of which have appeared "A Vivisector," "A Man Forbid," and "An Empire Builder." He came to repudiate entirely the past in art, literature, morals, and religion. His philosophy, partly derived from Schopenhauer, is thoroughly pessimistic. In man he sees matter striving through brutal effort towards self-knowledge. Hence his defense of vivisection. He is best known by his ballads, individual in subject and style. His thought and manner are well represented by *Making of a Poet, Houndsditch*, and the ballads of "Heaven" and "Hell," in *Ballads and Songs* (1894). Other volumes are *Fleet Street Eclogue* (1st series, 1893; 2d series, 1895); *New Ballads* (1896); *The Last Ballad and Other Poems* (1898); *Testaments* (1901–02); *The Knight of the Maypole* (1902); *A Rosary* (1903); *The Testament of a Prime Minister* (1904); *Selected Poems* (1904); *The Theocrat* (1905); *Holiday and Other Poems* (1906); *Mammon and his Message* (1908); *The Man Forbid and Other Essays* (1910). For critical analysis of his work, consult Archer, *Poets of the Younger Generation* (London and New York, 1902).

DAVIDSON, JOHN WYNN (1824–81). An American soldier. He was born in Fairfax Co., Va., graduated at West Point, and was assigned as second lieutenant of dragoons in 1845, and during the Mexican War was with the Army of the West at San Pasqual, the passage of the San Gabriel River, and at Mesa. In 1848 he was promoted to be first lieutenant and was assigned to frontier duty. From 1861 to 1862 he served in the defenses of Washington, D. C., and in the latter year, with rank of major of cavalry, fought in the Army of the Potomac during the Peninsular campaign, becoming brigadier general of volunteers in 1862. He was brevetted colonel after the battle of Golding's Farm (Va.) and in 1865 major general in both the regular and volunteer services. In 1863 he commanded a cavalry division at Brownsville (Ark.) and Ashley's Mills (Ark.) and in the capture of Bayou Metre (Ark.). He was appointed in 1864 chief of cavalry of the division west of the Mississippi and in 1866 became lieutenant colonel of the Tenth United States Cavalry. From 1873 to 1881 he was in command of various posts in the Indian Territory, Texas, and Montana, and in 1879 became colonel of the Second Cavalry.

DAVIDSON, LUCRETIA MARIA (1808–25). An American poet, remarkable for her precocity in rhyming. Many of her pieces were lost or destroyed, but nearly 300 were collected and published by S. F. B. Morse under the title *Amir Khan and Other Poems* (1829). Her sis-

ter, MARGARET MILLER DAVIDSON (1823–38), was also a precocious writer, and at the age of 10 composed a drama called the *Tragedy of Alethia*. Washington Irving was her patron and supervised the publication of the two sisters' works (1850).

DAVIDSON, RANDALL THOMAS (1848–). A British prelate, Archbishop of Canterbury, born in Edinburgh and educated at Harrow and at Trinity College, Oxford. He was curate of Dartford, Kent, in 1874–77; private secretary and chaplain to Archbishop Tait, whose daughter he married, and (1882–83) to Archbishop Benson; dean of Windsor and domestic chaplain (1883–91) to Queen Victoria; clerk of the closet (1891–1903) to Queen Victoria and to King Edward; and Bishop of Rochester in 1891–95 and of Winchester in 1895–1903. In 1903 he succeeded Temple as Archbishop of Canterbury. He helped to draft the unsuccessful Compromise Education Bill of 1908 and in the same year presided at the Pan-Anglican Congress and the Lambeth Conference. He edited in 1889 *The Lambeth Conferences of 1867, 1878, and 1888*. By 1904 he had visited the United States and Canada. He wrote: *A Life of Archbishop Tait* (1891; with Benham); *The Christian Opportunity* (1904); *Captains and Comrades of the Faith* (1911).

DAVIDSON, SAMUEL (1806–98). An Irish biblical critic. He was born at Kellswater and was educated at the Royal College of Belfast, where he became professor of biblical criticism in 1835 after being ordained to the Presbyterian ministry. He entered the Presbyterian ministry and in 1835 was given the chair of biblical criticism in the Royal College of Belfast. Soon afterward he became a Congregationalist, and in 1842 he took the chair of biblical literature and Oriental languages in the Lancashire Independent College at Manchester, which he was forced to resign in 1857. He was one of the Old Testament Revision Committee. His principal works are: *Sacred Hermeneutics* (1843); *Text of the Old Testament Considered, with a Treatise on Sacred Interpretation* (1856), written for Horne's *Introduction; The Canon of the Bible* (1877); *The Doctrine of Last Things Contained in the New Testament* (1882). He translated Fürst's *Hebrew and Chaldee Lexicon to the Old Testament* (1867; often reprinted) and Gieseler's *Ecclesiastical History* (1846).

DAVIDSON, THOMAS (1817–85). An English geologist and paleontologist, born in Edinburgh. He studied on the Continent and at Edinburgh University, made extensive geological tours, and at the suggestion of Leopold von Buch, the German geologist, undertook the study of the Brachiopoda. In 1851–70 he published, under the direction of the Paleontographical Society, his *Monograph on British Brachiopoda* (3 vols.), containing 250 plates drawn by himself. To this work he added (1873–85) three supplementary volumes. His *Memoir on Recent Brachiopoda* was posthumously published by the Linnæan Society. In 1852 he was elected fellow of the Geological Society of London and in 1857 fellow of the Royal Society. His splendid collection of recent and fossil brachiopods, together with his books, he presented to the National Museum at South Kensington.

DAVIDSON, THOMAS (1840–1900). An American philosopher, born near Tetterangus, Scotland. He graduated in 1860 at the University of Aberdeen, removed in 1866 to Canada, and in 1867 to the United States, and in 1875 settled at Cambridge, Mass., where he was active as scholar, author, and lecturer. A close student of Thomas Aquinas, he was invited by the Pope to assist the corps of Italian professors in the preparation of a new edition of the works of that philosopher. His *Philosophical System of Antonio Rosmini-Serbati* (1882) was the first introduction of the latter to English readers. For many years he conducted at Keene, in the Adirondacks, a "summer school for culture sciences," and from 1898 a class of Russian Jews in New York City. His personality was large and commanding. His published works include further: a translation of the fragments of Parmenides (1869) and one of Bleek's *Origin of Language* (1869); *A Short Account of the Niobe Group* (1874); *The Parthenon Frieze and Other Essays* (1882); *The Place of Art in Education* (1886); *Giordano Bruno* (1886); *Handbook to Dante* (1887); *Aristotle and Educational Ideals; A History of Education* (1900).

DAVIDSON, WILLIAM (1746–81). An American soldier. He was born in Lancaster Co., Pa., was taken when a child to North Carolina, and became a major in one of the first regiments raised in that State for the Revolutionary War. He was in the engagements at Brandywine, Germantown, and Monmouth, and advanced to the rank of a brigadier general of North Carolina militia. In the attempt to check the advance of Cornwallis over the Catawba River at Cowan's Ford, Feb. 1, 1781, he was killed. Davidson College, N. C., was named in his honor.

DAVIDSON COLLEGE. An institution for higher education established in 1837 at Davidson, N. C. The college was founded by members of the Presbyterian church and is at present governed by a board of trustees appointed by the presbyteries of North Carolina, South Carolina, Georgia, and Florida (Presbyterian church, South). No theological department, however, is maintained, and the degrees conferred are the academic ones in art and science. The student attendance in 1913 was 353, the endowment of the college was $250,000, and the total value of the college property, $360,000. The library contained 23,688 volumes. The president in 1914 was William Joseph Martin.

DAVID THE PHILOSOPHER (Arm. *Davit 'Imasdaser*), or DAVID THE ARMENIAN (?–c.500 A.D.). An Armenian scholar, born at Nerken in the Armenian Province of Durnperan. He studied in Greece and wrote learned translations of, and commentaries on, the works of Aristotle. Consult Neumann, *Mémoire sur la vie et les ouvrages de David* (Paris, 1829).

DA'VIE, WILLIAM RICHARDSON (1756–1820). An American soldier, born in Egremont, England. He came to the United States in 1763, graduated at Princeton in 1776, studied law at Salisbury, N. C., and in 1779 received the commission of a lieutenant of dragoons. His troop was subsequently assigned to Count Pulaski's legion, in which he rose to the rank of major. He resumed the study of law at Salisbury and in 1779 was admitted to the bar of North Carolina. Under the authorization of that State in 1780 he raised at his own expense a troop of dragoons and two mounted infantry companies, with which to assist in the defense of the southwestern districts against British attacks from South Carolina. In 1780 he was promoted to

the command of the State cavalry, with the rank of colonel. At the entry of Lord Cornwallis into Charlotte, N. C., he distinguished himself by his spirited resistance to the repeated charges of Tarleton's famous legion. He was appointed in 1781 to the post of commissary general of the American army in the South. After the Revolution he became a successful lawyer, was a delegate to the Constitutional Convention of 1787, and for a number of years represented the borough of Halifax in the Lower House of the State Legislature. He drew up the Act, passed in 1789, for the establishment of the University of North Carolina; in 1794 was commissioned major general of militia; became Governor of North Carolina in 1799, but resigned in the same year to accept appointment to the embassy which concluded with the French government the Convention of Sept. 30, 1800. Consult the biography by Hubbard, in vol. xxv (Boston, 1848) of *The Library of American Biography*, edited by Jared Sparks. Consult Peele's *Lives of Distinguished North Carolinians* (1898).

DAVIES, Arthur B. (1862–). An American landscape, marine, and figure painter. He was born at Utica, N. Y., and studied under Dwight Williams at Utica, at the Art Institute, Chicago, and in New York, where he began as an illustrator for the magazines. His paintings first attracted attention at an exhibition held in New York in 1899, and after that time, avoiding the customary annual exhibitions, he held other important exhibitions in New York (1901), containing such paintings as "Spring's Renewal" and "The Breath of Light"; at the Pennsylvania Academy of Fine Arts (1908), including "The Girdle of Ares" (acquired by the Metropolitan Museum, New York, 1914), and "Visions of the Sea"; at the Art Institute of Chicago (1911), with subjects like "The Hunter of the Starlands" and "Maya, Mirror of Illusions," which last was purchased by the Institute. In public collections he is best represented in the Brooklyn Museum by four paintings, among which is the charming "Children of Yesteryear." Davies came to be recognized as one of the most original of American painters, and the most prominent representative of those Romanticists who seek to escape from the commonplace into the realm of dreams. He has well been called a realist with the temperament of a mystic. He is a master of tonal effects and excels especially in color. He was the leader of the group of artists who organized the remarkably successful International Exhibition, held in New York in 1913, in which so-called Modernists were for the first time introduced to the American public. In his most recent works in the exhibition of Cubists and Futurists at the Montross Gallery, New York, in 1914, he showed pronounced cubist tendencies in a series of paintings, of which the most important was "The Great Mother." Consult Huneker, "Certain Painters," in *The Pathos of Distance* (New York, 1913).

DA'VIES, Ben (1858–). An English tenor, born in Swansea, Wales. He studied under Randegger at the Royal Academy of Music (1880–83), where he won numerous prizes. Upon leaving the Academy he joined the Carl Rosa Opera Troupe, appearing in *Faust*, *The Bohemian Girl*, etc.; but he is best known as a concert and oratorio singer. He visited the United States in 1893, 1894, and 1905–06.

DAVIES, Charles (1798–1876). An American mathematician, born in Washington, Conn. He early removed to St. Lawrence Co., N. Y., and in 1815 graduated at West Point. In 1848 he took the chair of mathematics and natural philosophy in the University of New York, and in 1857 the chair of higher mathematics in Columbia College. His works include among many: *Surveying* (1832); *Trigonometry* (1840); *Elements of Algebra* (1844; rev. ed., 1901); *Logic of Mathematics* (1850); *Mathematical Dictionary and Cyclopædia of Mathematical Science*, with W. G. Peck (1855); *New Elementary Algebra* (1859); *University Algebra* (2d ed., 1864); *Elements of Analytical Geometry and of the Differential and Integral Calculus* (new ed., 1901); *The Complete Arithmetic* (1877). He also edited, in English, Legendre's *Geometry* (1828), and Bourdon's *Algebra* (1832).

DAVIES, Henry Eugene, Jr. (1836–94). An American soldier, born in New York. He was educated at Harvard, Williams, and Columbia, and was admitted to the bar in 1857. At the outbreak of the Civil War he entered the United States Volunteers as captain, and became brigadier general in September, 1863. He served with distinction in the Cavalry Corps, Army of the Potomac, became one of Sheridan's most trusted lieutenants, and by 1865 had risen to the rank of major general of volunteers. He resigned in 1866 and afterward became a prominent New York lawyer and held several public offices. He was the author of *General Sheridan* (1895), in the "Great Commander Series."

DAVIES, Hubert Henry. A British dramatist, born at Woodley, Cheshire, England. He went to San Francisco in 1893, where he was employed as a journalist and in the production of vaudeville sketches. In 1901 he returned to England. He is author of the following plays: *Cousin Kate* (1903); *Cynthia* (1904); *Captain Drew on Leave* (1905); *The Mollusc* (1907); *Lady Epping's Lawsuit* (1908); *Bevis* (1909); *A Single Man* (1910); *Mrs. Gorringe's Necklace* (1910); *Doormats* (1913).

DAVIES, John, of Hereford (c.1565–1618). An English poet, not to be confounded with Sir John Davies (q.v.). At Oxford and elsewhere he was famous as a writing master. He wrote many curious philosophical poems, epigrams, satires, and sonnets. Among these are: *Microcosmos* (1603); *Triumph of Death* (1605), descriptive of the plague; *Wit's Pilgrimage* (c. 1610), containing sonnets, etc.; *The Scourge of Folly* (c.1611), containing epigrams, etc., one of which is addressed to Shakespeare under the name "our English Terence"; and *The Muse's Sacrifice, or Divine Meditations* (1612). Consult *Complete Works*, ed. by Grosart (2 vols., Blackburn, 1873).

DAVIES, Sir John (1569–1626). An English poet and statesman. He was born at Tisbury, Wiltshire, educated at Oxford, studied law at the Middle Temple, and was called to the bar in 1595. In 1603 he was sent by James I as Solicitor-General to Ireland. Three years later he became Attorney-General and was raised to the rank of sergeant at law. Elected to the Irish Parliament in 1613, he was chosen Speaker of the Lower House. The next year he took his seat in the English Parliament as member for Newcastle-under-Lyme. He died just after being nominated Chief Justice. Davies was a faithful public servant and a man of great talent

and learning. His two works connected with his Irish career are *A Discovery of the True Causes why Ireland was Never Subdued, etc.* (1612), and *Reports of Cases Adjudged in the King's Courts in Ireland* (1615) and several masterly state papers. As a poet, he belonged to a group of late Elizabethans who, in reaction from the earlier love poetry, turned to moral themes. In 1596 he published *Orchestra, or a Poem of Dancing*, in which he fancifully maintains that all motion is music; to him the heavens move in "spondees, solemn, grave, and low." Still more fanciful are his acrostics, called *Hymns to Astræa* (1599). The poem by which he is best known is *Nosce Teipsum* (1599). It is written in the four-line stanza, afterward employed by Davenant, Dryden, and Gray. Consult *Complete Works*, with memoir ed. by Grosart (3 vols., Blackburn, 1869–76).

DAVIES, Sir Louis Henry (1845–1924). A Canadian statesman and jurist. He was born at Charlottetown, Prince Edward Island, was educated at Prince of Wales's College, Charlottetown, and in 1866 was called to the bar. In 1876 he became Premier and Attorney-General of Prince Edward Island, and he was returned as a Liberal to the Dominion House of Commons from 1882 to 1901. Before entering Dominion politics he was one of the British counsel before the International Fisheries Commission at Halifax in 1877. (See Fishing Laws.) As counsel for the tenantry before the Prince Edward Island Land Commission in 1875–76, he did much to settle the land question of that province, and during his provincial premiership the Free Schools Act was passed. In 1896, upon the incoming of the Laurier administration, he was appointed Minister of Marine and Fisheries. The same year he was a delegate to Washington in behalf of trade reciprocity, and in 1897 he was a delegate to London in connection with the Bering Sea seal controversy, internal Canadian fisheries, and the Belgian and German trade treaties. In 1901 he was appointed a judge of the Supreme Court of Canada. In 1897 he was knighted.

DAVIES, Samuel (1724–61). An American clergyman and educator. He was born near Summit Ridge, Newcastle Co., Del.; was educated at the seminary of the Rev. Samuel Blair, Fogg's Manor, Chester Co., Pa., and in 1746 was licensed to preach by the Newcastle Presbytery. In 1747 he was sent as an evangelist to Hanover Co., Va., where by 1748 he was conducting worship in seven churches. He later argued against Peyton Randolph, the Royal Attorney-General, before the General Court at Williamsburg, that the Act of Toleration extended to Virginia. In 1753, with Gilbert Tennent, he visited England to obtain funds for the College of New Jersey (now Princeton University), and at this time secured a ruling that Virginia was under the Act of Toleration. His sermon, "Religion and Patriotism," preached in Hanover County, 1755, refers to the martial spirit aroused by the French and Indian War, and he adds in a footnote: "As a remarkable instance of this, I may point out to the public that heroic youth, Colonel Washington, whom I cannot but hope Providence has hitherto preserved in so signal a manner for some important service to his country." In 1759 he succeeded Jonathan Edwards as president of the College of New Jersey. His collected sermons appeared in London in 1767–71. Consult the memoir by Barnes in the *Complete Works* (New York, 1851). One or two of his hymns are still found in Presbyterian hymnals.

DAVIES, Thomas (c.1712–85). A Scottish bookseller and author. He studied at the University of Edinburgh and was for several years (1736–85) on the stage; but having been ridiculed by Churchill in *The Rosciad* he gave up acting and opened a bookshop in Covent Garden. It was here that in 1763 he introduced Boswell to Dr. Johnson, who was his intimate friend and to whom he dedicated his edition of the works of Massinger. He wrote a *Life of Garrick* (1780), which soon passed through four editions and brought him considerable money and repute, and *Dramatic Miscellanies* (3 vols., 1785).

DAVIES, Thomas Frederick (1872–). An American bishop, born in Philadelphia. He was educated at Yale University and at General Theological Seminary, New York City. Ordained a deacon in 1897 and a priest in 1898 in the Protestant Episcopal church, he served in succession as assistant at the church of the Incarnation, New York (1897–1900), rector of Christ Church, Norwich, Conn. (1901–03), and rector of All Saint's Church, Worcester, Mass. (1903–11). In 1911 he was elected Bishop of Western Massachusetts.

DAVIES, T. Witton (1851–). A British Baptist theologian and Orientalist, born in Nantyglo, Monmouth. He was educated in the Baptist colleges at Pontypool and Regent's Park and at University College, London, and took graduate courses at Berlin, Leipzig, and Strassburg. Subsequently he was pastor of a Baptist church in Merthyr Tydfil (1878–80); taught at Haverfordwest Baptist College until 1891; was principal of Midland College, Nottingham (1892–99); and taught Arabic and Syriac at University College, Nottingham (1897–99). At Bangor he was connected first with the department of Hebrew and Old Testament literature (1899–1906), and then with that of Semitic languages. Besides articles for theological periodicals and for reference books he wrote: *Oriental Studies in Great Britain* (1892); *Magic, Divination, and Demonology among the Hebrews* (1898); *The Scriptures of the Old Testament* (1900); *Heinrich Ewald, Orientalist and Theologian* (1903); commentaries on "Psalms" (1906) and "Ezra, Nehemiah, and Esther" (1909), in the *Century Bible*, and on "Bel and the Dragon" (1913), in the *Oxford Apocrypha*.

DAVIESS, dā'vĭs, Joseph Hamilton (1774–1811). An American lawyer. He was born in Bedford Co., Va.; was taken to Kentucky by his parents when a child, was educated there, and soon became well known in the West for his eccentricities as well as for his skill as a lawyer. He was United States district attorney for Kentucky, and as such attempted to bring Aaron Burr (q.v.) to trial for treason (1806), but was unsuccessful and gained only personal unpopularity. Having entered the army, he fought as major under Gen. W. H. Harrison at Tippecanoe, where he was killed while leading a cavalry charge against the savages. Daviess married a sister of Chief Justice John Marshall.

DÁVILA, dā'vē-lä, or **DE ÁVILA,** Alonso (c.1540–66). A Spanish soldier, born in the city of Mexico. In 1566 he was accused of

complicity in a plot to overturn the government and place Martín Cortés on the throne of New Spain. He was subsequently condemned and executed at Mexico. That he had any share in the plot, if such there were, is now considered extremely doubtful.

DAVILA, dä′vē-lä, Enrico Caterino (1576–1631). An Italian historian, born at Piove di Sacco, near Padua. His father was the constable of Cyprus and after the Turkish victories was obliged to take refuge in France, where Enrico was brought up as page to Henry III. Afterward he fought in the religious wars, distinguishing himself at Honfleur (1594) and Amiens (1597). Returning to Venice in 1599, he served as Governor in Candia, in Friuli, and in Dalmatia, and was murdered as Governor of Crema in 1631. His *Historia delle guerre civili di Francia* (Paris, 1644) has gone through 200 editions; Eng. trans. by Cotterell-Aylesbury (London, 1647). Consult biographies by A. Zeno (Venice, 1733), Ciscato (Vicenza, 1885), the article by Pavanello (Padova, 1892), and the *Discourse on Davila* by President John Adams (1805).

DÁVILA, Gil González. See González Dávila, or de Ávila, Gil.

DÁVILA, Pedrarias. See Pedrarias Dávila.

DÁVILA Y PADILLA, dä′vē-lä ē pä-dē′lyä, Agustín (1562–1604). A Mexican historian. He was born in the city of Mexico, where he entered the Dominican Order in 1579. He was friar of the Convent Puebla de los Ángeles in Tlascala, and lecturer on philosophy and theology at the colleges of Puebla and Mexico. He was one of the chief officers of the highest chapter in his province, and in 1596 was sent as ambassador of the order to Rome and Madrid, where two years later he became court preacher. As a prominent officer of the Inquisition, he caused to be burned several hundred copies of a Spanish translation of the Bible which had been supplied with annotations by Protestants. He was one of the most zealous members of his order and also one of the most learned and eloquent, for which reason the title "Chronicler of the Indies" was bestowed upon him. His principal work, written by order of the government, was published under the respective titles: *Historia de la fondación de la provincia de Santiago de Méjico, de la orden de predicadores* (Madrid, 1596; 2d ed., Brussels, 1625), both these editions in quarto, and *Varia historia de la Nueva España y Florida* (Valladolid, 1634), in folio.

DAVIN, Nicholas Flood (1843–1901). A Canadian journalist and legislator. He was born at Kilfinane, County Limerick, Ireland, and was educated privately and at Queen's (now University) College, Cork. He studied law and was called to the bar at the Middle Temple, London, in 1868. Relinquishing law for journalism, he became a reporter in the House of Commons gallery, and subsequently was war correspondent for the Irish *Times* and the London *Standard* during the Franco-Prussian War, in which he was wounded. In 1872 he went to Toronto, Canada, and was successively an editorial writer on the *Globe* and the *Mail*. He was called to the Ontario bar in 1874 and afterward actively supported the Conservative protectionist policy which was successful in 1878. In 1883 he went to the Northwest and settled at Regina, where he established and became editor of the *Leader*. In 1887 he was elected a member of the House of Commons, and in 1895 he strove unsuccessfully to pass a parliamentary resolution granting the franchise to women. He published: *The Irishman in Canada; Culture and Practical Power; Eos, an Epic of the Dawn; British vs. American Civilization; Ireland and the Empire; The Earl of Beaconsfield.*

DA VINCI, dä-vēn′chē, Leonardo. See Vinci, Leonardo da.

DAVIOUD, dä′vē′o͞o′, Gabriel Jean Antoine (1823–81). A French architect. He was born in Paris and studied at the Ecole des Beaux-Arts where he carried off a number of prizes. He acquired great reputation, as inspector of gardens and public squares, by the important part he took in the embellishment of the Bois de Boulogne, the Champs Elysées, and various public squares (1859–62). He designed the Lyrique and Châtelet theatres, the magnificent Fontaine St. Michel, and, in collaboration with Bourdais, the Palace of the Trocadéro, for the World's Exposition in 1878. He published *Le bois de Boulogne architectural* (1860).

DA'VIS. A town in Tucker Co., W. Va., 83 miles southwest of Cumberland, Md., on the Western Maryland Railroad and on the Black Water River (Map: West Virginia, E 3). It is in a productive timber and coal region and has a large tannery, a box factory, pulp and lumber mills. The water works are owned by the town. Pop., 1900, 2391; 1910, 2615.

DAVIS, Andrew Jackson (1826–1910). An American lecturer and writer on spiritualism, born in Orange Co., N. Y. His first book, *The Principles of Nature*, he dictated in 1845 after a trance of 16 hours, during which time he claimed to have received his inspiration from communion with inhabitants of the spirit world. Some of his other works are: *The Great Harmonia* (6 vols., 1850–61); *The Penetralia* (1856); *The Magic Staff* (1857), an autobiography; *Arabula, or the Divine Guest* (1867); *Mental Diseases and Disorders of the Brain* (1871); *Autobiography* (1885). Most of his books are plentifully supplied with allusions to personal experiences with spirit revelation, which must be received without verification.

DAVIS, Arthur Powell (1861–). An American civil engineer, born at Decatur, Ill. He graduated from the State Normal School at Emporia, Kans., and from Columbian (now George Washington) University in 1888. From 1884 to 1894, as topographer of the United States Geological Survey, he had charge of surveying and exploring expeditions in Arizona, New Mexico, and California; later, as hydrographer, he had charge for two years of all the government stream measurements, and he conducted the hydrographic examination of the Nicaragua and Panama canal routes (1898–1901). In 1906 he was appointed chief engineer of the United States Reclamation Service and in 1909 consulting engineer of the Panama Canal. Besides preparing numerous articles and bulletins, he published *Elevation and Stadia Tables* (1901).

DAVIS, Bradley Moore (1871–). An American botanist, born in Chicago. After graduating from Leland Stanford Junior University, in 1892, he studied at Harvard, Bonn, and Naples. For 11 years he taught at the University of Chicago, from 1902 to 1906 as assistant professor of plant morphology; from

1897 to 1905 he also had charge of the botanical department of the Marine Biological Laboratory, Woods Hole, Mass., and there from 1904 to 1909 he was head of the botanical section of the biological survey of the Bureau of Fisheries. In 1911 he became assistant professor of botany at the University of Pennsylvania. He was secretary of the American Society of Naturalists in 1914. Besides special articles on the morphology and cytology of algæ, fungi, and liverworts, and studies in the Œnothera, he is coauthor with Joseph Young Bergen of *Principles of Botany* (1906) and *Laboratory and Field Manual of Botany* (1907).

DAVIS, Charles Harold (1856–). An American landscape painter, born at Amesbury, Mass. He studied with Grondman in Boston, and afterward under Boulanger and Lefèbvre at the Julian Academy in Paris. He lived 10 years in France and on his return, in 1890, took up his residence at Mystic, Conn. He obtained the Palmer prize for landscape at the Chicago Exposition of 1890, the $2000 prize given by the American Art Association in 1887, and medals at Paris in 1900, at Buffalo in 1901, and at St. Louis in 1904. In 1906 he was elected to the National Academy of Design. Davis paints chiefly evening effects, and his landscapes are characterized by direct vision and simple workmanship. Among the more notable are: "The Brook," in the Philadelphia Academy; "Late Afternoon," at the Union League Club, in New York City; "Evening" and "August," in the Metropolitan Museum, New York; "The Deepening Shadows" (Corcoran Gallery, Washington); "Summer" (National Gallery, Washington); "Close of Day" and "Twilight" (Art Institute, Chicago); "Moonrise at Twilight" (Carnegie Institute, Pittsburgh); "Landscape" (Boston Art Museum).

DAVIS, Charles Henry (1807–77). An American naval officer, born in Boston. He entered the navy in 1823 as midshipman and was stationed on different vessels and on the coast survey until 1861, when, with the rank of captain, he was a member of the board which examined the defenses of Southern ports. In the expedition against Port Royal, S. C. (q.v.), he was fleet captain and chief of staff. He became flag officer of the Mississippi flotilla early in 1862 and on May 10 engaged a Confederate fleet of eight ironclads (four of them rams) off Fort Pillow (q.v.). Later (June 6) he defeated the fleet decisively in an engagement near Memphis, captured or destroyed all but one of the vessels, and received also the surrender of Memphis. He then joined Farragut in the operations at Vicksburg. Davis attained the rank of rear admiral in 1863, and spent most of his remaining service as superintendent of the Naval Observatory at Washington, and commander of the Norfolk Navy Yard. He wrote: *The Law of Deposit of the Flood Tide: Its Geological Action and Office* (1852); *Memoir Upon the Geological Action of Tidal and Other Currents of the Ocean* (1849). He translated Gauss's *Theoria Motus Corporum Cœlestium* (1858), and he was superintendent of the *American Nautical Almanac* in 1849–56 and 1859–61.

DAVIS, Charles Henry (1845–1921). An American naval officer, born in Cambridge, Mass. Graduating from the United States Naval Academy in 1864, he rose through the grades to be captain in 1898 and rear admiral in 1904. Between 1897 and 1902 he was superintendent of the Naval Observatory, and he commanded the auxiliary cruiser *Dixie* in 1898, the *Alabama* in 1902, and was a division commander of the battleship squadron in 1904–05. In 1904–05 also he was United States commissioner to the International Commission of Inquiry on the North Sea Incident. He was retired in 1907. He is author of *Chronometer Rates as Affected by Temperature and Other Causes* (1877), and a biography of his father, *Charles Henry Davis, Rear Admiral, 1807–1877* (1899).

DAVIS, Cushman Kellogg (1838–1900). An American statesman. He was born in Henderson, N. Y., graduated at the University of Michigan in 1857, studied law, and in the Civil War served in the Federal army until 1864. In 1867 he was a member of the Minnesota Legislature and from 1868 to 1873 was United States district attorney. In 1874–76 he was Governor of his State. In 1887 he was elected to the United States Senate. He succeeded John Sherman as chairman of the Committee on Foreign Relations in 1897 and in 1898 was appointed one of the United States commissioners to negotiate the Treaty of Paris terminating the Spanish-American War. His influence was important in securing the consent of the Senate to this treaty. He published *The Law in Shakespeare* (new ed., 1900).

DAVIS, David (1815–86). An American jurist, born in Cecil Co., Md. He graduated at Kenyon College, Ohio, in 1832, and was admitted to the Illinois bar. He was afterward a member of the State Legislature and of the State Constitutional Convention of 1847, was a judge of the State Circuit Court from 1848 to 1862, and was a justice of the United States Supreme Court from 1862 to 1877. In 1872 he accepted the presidential nomination from the National Labor Reform party, but afterward withdrew his name. From 1877 to 1883 he was a United States Senator and succeeded Chester A. Arthur as President of that body, serving until 1883. In politics he was an independent, but usually acted with the Democratic party.

DAVIS, E. F. C. (1847–95). An American mechanical engineer, born at Chestertown, Md. Graduating from Washington College (Md.) in 1866, he served an apprenticeship in the hydraulic works of Brinton and Henderson, and after a few years was made superintendent of the Colliery Iron Works at Pottsville, Pa. Between 1878 and 1890 he was connected with the Philadelphia and Reading Coal and Iron Co., as mechanical draftsman, superintendent of the company's shops at Pottsville, Pa., and mechanical engineer in charge of all the shops and machinery of the corporation. In 1890 he became general manager of the Richmond Locomotive and Machine Works, and at the time of his death he was manager of the C. W. Hunt Company of New York. He was president (1895) of the American Society of Mechanical Engineers.

DAVIS, George Breckenridge (1847–1914). An American soldier, born at Ware, Mass. He served in the Civil War, graduated from the United States Military Academy in 1871, and was appointed major judge advocate in 1888. Continuing in his judicial office he was promoted through the grades to be brigadier general and judge-advocate-general in 1901 and in 1911 he was retired with the rank of major general. He received the degree of LL.B. from Columbian (now George Washington) University. He was a delegate to the Geneva Conference in 1906 and

to the Second Peace Conference at The Hague in 1907. His publications include: *Elements of International Law* (1887; 3d ed., 1908); *Elements of Law* (1897); *Military Law* (1898); *Military Laws of the United States* (1907; 3d ed., 1913); *The Second Peace Conference* (1907).

DAVIS, George Royal (1840–99). An American soldier and politician, born at Three Rivers, Mass., and educated at Williston Seminary. He served throughout the Civil War and rose to be colonel of the Third Rhode Island Volunteer Cavalry. He became a manufacturer in Chicago. From 1879 to 1885 he was a Republican member of Congress from Illinois, and in 1884 and 1888 was a delegate to the Republican National Convention. He was director general of the Columbian Exposition of 1893.

DAVIS, George Whitefield (1839–1918). An American soldier, born at Thompson, Conn. He enlisted in the Eleventh Connecticut Infantry in 1861 and by 1865 had received the brevet rank of major of volunteers. He was commissioned captain in the Fourteenth United States Infantry in 1867 and retired in 1903 with the rank of major general. He became military governor of Porto Rico in 1899, provost marshal general of the Philippines in 1901, and commander of the Division of the Philippines in 1902. In 1900–03 he was manager and vice president of the Nicaragua Canal Construction Company. He was appointed a member of the Isthmian Canal Commission in 1904 and was Governor of the Canal Zone in 1904–05. In 1905–06 he was chairman of the Board of Consulting Engineers on the type of the canal. He wrote reports on the military governments of Porto Rico and Manila, and in 1904–06 was president of the board of publication of the official records of the Civil War.

DAVIS, Henry Gassaway (1823–1916). An American capitalist and Democratic politician, born in Woodstock, Md. Having to become self-supporting in his teens, he worked on a plantation and then on the Baltimore and Ohio Railroad. He soon became largely interested in West Virginia lumber trade and coal mines and built the West Virginia Central and Pittsburgh Railway (which he sold in 1902 to the Wabash) and the Coal and Coke Railway of West Virginia. He was a power in the Democratic party in the State (as was his son-in-law S. B. Elkins in the Republican party) and served in the State Legislature (Lower House, 1865; Senate, 1868–71) and was United States Senator in 1871–83. In 1904 he was the Democratic nominee for the vice presidency of the United States. He gave from his great wealth to local charities and educational institutions.

DAVIS, Henry William Banks (1833–1914). An English animal painter and sculptor. He was born at Finchley and studied at the Royal Academy and later for several years at Boulogne-sur-Mer. Davis is one of the most important British animal painters. The landscapes in his pictures represent either the French coast, central England, north Wales, or the Scottish Highlands. He paints in the style of the Barbizon masters, with much versatility of atmospheric treatment and delicate feeling. Among his best pictures are: "A Panic" (Fonthill House); "Summer Afternoon" (Sheffield Gallery); "Contentment" and "After Sundown" (National Gallery, London); "Return to the Stall" (Tate Gallery, London). He often exhibited on the Continent, and was made a member of the Paris Société Nationale des Beaux-Arts. His sculptures, dating chiefly from his early period, include portrait busts and statues, and a "Galloping Bull," for which he was elected associate of the Royal Academy (1872).

DAVIS, Henry William Carless (1874–). An English historian. He was educated at Weymouth College and at Balliol College, Oxford, of which he was scholar in 1891–95 and became fellow in 1902 (after being fellow of All Souls from 1895 to 1902). Taking as his special field mediæval history, particularly Norman and Angevin England, he contributed to the *English Historical Review*, the *Cambridge Modern History*, the English edition of Helmolt, and Mowbray's *Dictionary of Church History* (1912); and he published a *History of Balliol College* (1899), *Charlemagne* (1900), *England under the Normans and Angevins* (1905), a manual on *Mediæval Europe* (1911), *Regesta Regum Anglo-Normannorum* (1913), and a new edition (1913) of Stubbs's *Select Charters*.

DAVIS, Henry Winter (1817–65). An American legislator. He was born in Annapolis, Md., graduated at Kenyon College in 1837, and studied law at the University of Virginia. In 1850, after practicing for several years in Alexandria, he settled in Baltimore. He was a member of Congress from 1855 to 1861 and again from 1863 to 1865, first as a Whig, then as a Know-Nothing or American, and finally as a Republican, and made himself conspicuous by his devotion to the Union and his advocacy of the emancipation of the slaves. In 1860 he refused the offer of the vice-presidential nomination on the Republican ticket. During his latter term in Congress he was chairman of the Committee on Foreign Affairs. He published *The War of Ormuzd and Ahriman in the Nineteenth Century* (1853), an attack on the tenet that slavery was a divine institution. For the Wade-Davis Manifesto and Davis's attitude on reconstruction, see Wade, Benjamin F. His speeches, edited by Cresswell, were published in New York in 1867.

DAVIS, James. See Hall, Owen.

DAVIS, Jeff (1862–1913). An American lawyer and legislator, born in Little River Co., Ark. He graduated from the law department of Vanderbilt University in 1884, served as prosecuting attorney of the fifth judicial district of Arkansas (1892) and as attorney-general of Arkansas (1898), and made a record by being elected Governor of his native State for three consecutive terms (1901–1907). He served in the United States Senate from 1907 to 1913 and was reëlected, but died at the beginning of his second term. Consult L. S. Dunaway, *Jeff Davis, Governor of Arkansas and United States Senator: His Life and Speeches, with Personal Reminiscences* (Little Rock, Ark., 1913).

DAVIS, Jefferson (1808–89). A soldier, statesman, and the President of the Confederate States of America. He was born in Christian, now Todd, Co., Ky., June 3, 1808, the chief strains in his blood being Welsh and Scottish-Irish. His family removed during his infancy to Mississippi, with which State his fame has always been connected. He received a gentle rearing, although his education was at first limited, owing to the conditions of the country. After a year or two at a Roman Catholic school in Kentucky, and a short period at a college in

Mississippi, he entered Transylvania University at Lexington, Ky., an institution which seems to have done good work for those times. Here he received the elements of a classical education; but in 1824, before graduation, he was transferred to West Point. He graduated rather low in his class, but he had given evidence of soldierly qualities and had won the regard of his classmates. Entering the army at once, in 1828, with the usual brevet of second lieutenant, he served seven years on the northwestern frontier, manifesting capacity to command, to perform arduous duties, and to win confidence and affection. In 1835, falling ill, he resigned from the army, in which he had risen to the rank of first lieutenant, and in the same year married a daughter of Zachary Taylor. The young wife died, however, in a few months, and Davis sought restoration for his shattered health in Cuba. After a short stay in Washington, where he began his friendship with Franklin Pierce, he returned to Mississippi and devoted himself to planting and study. This period from 1837 to 1845 was spent in an almost hermit-like seclusion, and Davis, who as early as 1833, when the Nullification controversy was at its height, had made up his mind that it was unconstitutional to coerce a State, now gained fluency and logical consistency in advocating the States' rights doctrines held by Calhoun. In 1844 he was chosen as a presidential elector on the Polk and Dallas ticket. After some little participation in local politics he was elected to Congress in 1845, where he favored the annexation of Texas. He was a ready and dignified speaker and an ardent but by no means servile follower of Calhoun. The next year, on the outbreak of the Mexican War, he was elected colonel of the First Mississippi Volunteers and distinguished himself at Monterey and Buena Vista, his famous formation of the reëntering angle at the latter engagement being a gallant exploit. On his retirement from the war with a severe wound the Governor of Mississippi in 1847 appointed him to fill a vacancy in the United States Senate, and in 1848 the Legislature elected him for the remainder of the term; in 1850 he was reelected for a full term of six years. In the debates relative to the introduction of slavery into the Territories Davis was zealous for the institution and for a strict construction of the Constitution. He strongly opposed the Compromise Measure of 1850. In 1851 he resigned in order to make the contest for the governorship against the Unionist candidate. Davis made a vigorous canvass, but was defeated by a small majority. In March, 1853, he became Secretary of War under President Pierce and made an efficient official, improving the service in various ways. He sent out surveying parties to find and survey a practicable railroad route from the Mississippi to the Pacific, having previously advocated in the Senate the construction of a transcontinental railroad. In the matter of the Kansas-Nebraska legislation he proved a bad adviser to the President, but he was thoroughly conscientious. When he reentered the Senate in 1857, he was the acknowledged leader of the Southerners, becoming the most determined, though not the most radical, of the States' rights men in the stormy days just before the war. In 1860 he offered in the Senate a series of resolutions which were adopted, to the effect that the States had formally accepted the Constitution as independent sovereigns, delegating to the general government a portion of their power for the sake of security; that the intermeddling on the part of any one of them with the domestic institutions of another was not only insulting, but dangerous to the domestic peace and tending to destroy the Union; that negro slavery was legal, and that neither Congress nor territorial legislation had the right to interfere with it. In a speech delivered in the Senate, Jan. 10, 1861, he maintained the constitutional right of secession and declared the South could no longer remain in the Union without being degraded. Yet Davis was devoted to the Union, and when on the secession of Mississippi in 1861 he left the Senate, it was with real sadness that he set forth his principles in a farewell speech to which a crowded audience listened with deep attention.

On Feb. 9, 1861, Davis was elected President of the provisional government of the Confederacy by the Congress assembled at Montgomery, Ala. He was chosen because his course throughout had been marked by consistency and moderation in comparison with the other secession leaders. The choice was made without intriguing and was eminently popular. The inauguration took place Feb. 18, 1861. At the expiration of the first year of the provisional government a new Congress was elected, and on Feb. 22, 1862, Davis was again inaugurated, entering upon a term which was set for six years by the Constitution. His career as President takes in nearly all of Confederate history, his side of the matter being given ably and fully in his *Rise and Fall of the Confederate Government* (2 vols., 1881). The military training which he had had made him desire a close control over his generals, and he seems in consequence to have made not a few mistakes. The unanimity with which he and General Lee worked would have been impossible had not the latter been so void of selfish ambition. Davis's statesmanship was rather doctrinaire, and when he had actually to assume almost a dictatorship as the war progressed, he was not found well fitted for the eminently executive task of financing and controlling the Confederacy. He was not a great manager of men, and he often acted without tact. He strove earnestly to inspirit his people; he set his face against barbarity in the conduct of the war; he tried to alleviate the sufferings of prisoners; and, on the whole, he maintained his dignity and self-respect under ordeals that would have crushed a man less resolute or less sincere.

After the surrender of Lee and of Johnston, Davis, with a few friends who volunteered as an escort, started for Washington, Ga., for the purpose of making his way to the trans-Mississippi region. A report that his wife was in danger led him to change his course to join her, and on May 10, 1865, he was captured at Irwinville, Ga. The story of his assuming woman's dress as a disguise has been shown to be untrue. He was confined in Fortress Monroe and subjected to the useless degradation of manacles. He earnestly desired a public trial and feared that he would die before refuting the charge of complicity in the assassination of Lincoln. An indictment was found against him for treason, but he was admitted to bail in May, 1867, Horace Greeley, Gerrit Smith, and other prominent Northerners going on his bond. An attempt made by his counsel to quash the indictment on

which he was brought to trial failed. He was released by an order of *nolle prosequi* in February, 1869. After his release he visited Canada and England and went into business at Memphis, Tenn. In 1879 he finally retired to Beauvoir, near Biloxi in Mississippi, resisting all inducements to reënter politics and devoting his time to writing and study. He retained the confidence of most of the Southern people, and his conduct during his retirement was dignified and consistent. He died of a congestive chill on Dec. 6, 1889, and was buried with imposing ceremonies at New Orleans. In 1893 the body was removed to Richmond. A full and valuable biography of Mr. Davis was written by his second wife, a Miss Howell, whom he married in 1845. She died in 1906. Consult also a brief autobiographical article published in *Belford's Magazine* for January, 1890, and W. P. Trent's *Southern Statesmen of the Old Régime* (1897). The earlier biographies by Alfriend and Pollard are respectively eulogistic and condemnatory. For full accounts of Davis's period, consult Rhodes, *History of the United States from the Compromise of 1850* (New York, 1892 et seq.), and Dodd, *Jefferson Davis* (Philadelphia, 1905).

DAVIS, Jefferson C. (1828–79). An American soldier, born in Indiana. He served as a volunteer in the Mexican War, subsequently becoming lieutenant in the regular army, and was stationed at Fort Sumter during the bombardment of April 12–13, 1861. During the Civil War he commanded a brigade, played an important part in the battle of Pea Ridge, the siege of Corinth, the battle of Stone River, and Sherman's Atlanta campaign, and was made brigadier general of volunteers in 1861. He was brevetted major general United States army in 1865 and became a colonel in the regular service in the following year. In 1873, after the murder of General Canby, he suppressed the Modoc uprising in northern California.

DAVIS, or **DAVYS,** John (c.1550–1605). An English navigator, born at Sandridge, near Dartmouth. He is distinguished for having, between 1585 and 1588, undertaken three voyages to the northern seas in search of a northwest passage. In the first of these he discovered the strait which bears his name; in the last he sailed up this strait as far as 72° 12′ N. His voyages extended along the West Greenland coast as far as what is now Upernavik, and along the coast of the American side of the strait from Cape Dyer to southern Labrador. He afterward made five voyages to the East Indies, in the last of which he was killed in a fight with Japanese pirates off Bintang, near Sumatra. He wrote *The World's Hydrographical Description* (1595) and *The Seaman's Secrets* (1594), which were republished by the Hakluyt Society in 1880. He is often confounded with John Davis of Limehouse, another navigator and author.

DAVIS, John Chandler Bancroft (1822–1907). An American diplomatist. He was born in Worcester, Mass., graduated at Harvard in 1840, studied law, and practiced in New York. He was secretary of the United States Legation in London from 1849 to 1852, was the American correspondent of the London *Times* from 1854 to 1861, was Assistant Secretary of State in 1869–71 and again in 1873–74 after being secretary of the commission which concluded the Treaty of Washington, and United States agent at the Geneva Court of Arbitration. (See Alabama Claims.) From 1874 to 1877 he was United States Minister to Germany, and from 1878 to 1881 was a judge in the United States Court of Claims. He became reporter of the United States Supreme Court in 1883. Among his publications, in addition to the reports of Supreme Court decisions, are: *The Massachusetts Justice* (1847); *The Case of the United States Laid before the Tribunal of Arbitration at Geneva* (1871); *Treaties of the United States, with Notes* (new ed., 1873).

DAVIS, John D. (1854–1926). An American Orientalist and biblical scholar. He was born at Pittsburgh, Pa., and was educated at the College of New Jersey and at the Universities of Bonn and Leipzig, afterward becoming professor of Oriental and Old Testament literature at Princeton Theological Seminary. In addition to frequent contributions to theological magazines, he published *Genesis and Semitic Tradition* (1894) and *A Dictionary of the Bible* (1898).

DAVIS, Sir John Francis (1795–1890). An English diplomat and Sinologist, born in London. He was a son of Samuel Davis, director of the East India Company from 1810 to 1819. He accompanied Lord Amherst to Peking in 1816, and rose rapidly in the service of the East India Company, in the employ of which he had been since his boyhood. After serving for two years as the chief representative of the company at Canton, he was appointed joint commissioner in China with Lord Napier in 1834 and in 1844 became British plenipotentiary in China. In his capacity as Governor of the British colony at Hongkong he contributed greatly to the development of British trade at that centre. It was under his administration that the Bogue forts were reduced, and the annoyances to which British residents had been subjected at the hands of the mandarins were ended. Although he may in some respects be said to have laid the basis of British power at Hongkong, the treaty whereby the city was to be opened to foreigners, which Davis had arranged with the Chinese government, was disapproved by England, and, mortified at his lack of recognition, he resigned his position in 1848. Of his works relating to China and Chinese life, the following are especially noteworthy: *Chinese Novels Translated from the Originals* (1822); *Hien Wun Shoo, Chinese Moral Maxims, with a Free and Verbal Translation* (1823); *The Fortunate Union* (trans. from the Chinese, 1829); *The Chinese: A General Description of China and its Inhabitants* (2 vols., 1836); *Chinese Miscellanies* (1865).

DAVIS, Katharine Bement (1861–). An American penologist and public official, born in Buffalo, N. Y. She graduated from Vassar College in 1892 and studied also at the University of Chicago, where she received the degree of Ph.D. in 1900. Mt. Holyoke College conferred on her the degree of LL.D. in 1912. In 1892–97 she had charge of the college settlement in Philadelphia, and from 1901 to 1913 she was superintendent of the Bedford Reformatory, which she opened with one girl inmate, and which under her direction became famous among penologists. Miss Davis applied laboratory methods in studying the causes of delinquency among girls and women. In 1914 Mayor John Purroy Mitchel of New York City appointed her commissioner of correction, she being the

first woman to head a department of government in that city.

DAVIS, Matthew L. (1766–1850). An American author, born in New York. He was long the Washington correspondent of the New York *Courier and Enquirer*, over the pen name "The Spy in Washington." He also wrote under the names "The Genevese Traveler," "Marcus," and "Philo-Cato." In 1797 he conducted a short-lived literary enterprise at New York, known as the *Timepiece and Literary Companion*. As the friend of Aaron Burr during a period of 40 years, he published the *Memoirs of Aaron Burr, with Miscellaneous Selections from his Correspondence* (2 vols., 1836–37), and also edited *The Private Journal of Aaron Burr during his Residence in Europe* (1838).

DAVIS, Nathan (1812–82). An English traveler and archæologist. He edited the *Hebrew Christian Magazine* in 1852, subsequently was a Nonconformist clergyman, and in 1856–58 conducted at Utica and Carthage excavations for the British Museum: at Carthage the excavations were made on the supposed site of the Odeum. In 1858 he sent to the museum 51 cases of antiquities. Other cases were sent in 1857 and 1860. He published, besides other works, *Tunis* (1841); *Arabic Reading Lessons* (with B. Davidson, 1854); *Evenings in my Tent* (2 vols., 1854); *Carthage and her Remains* (1861); *Ruined Cities within Numidian and Carthaginian Territories* (1862).

DAVIS, Nathan Smith (1817–1904). An American physician. He was born at Greene, N. Y., and was educated in Cazenovia Seminary and in the College of Physicians and Surgeons of the western district of New York, from which he graduated in 1837. He helped to found the American Medical Association, of which he was president in 1864–65. He practiced at Binghamton, N. Y., 1837–47; New York City, 1847–49, during which time he was editor of the *Annalist*. He was professor of physiology and pathology, Rush Medical College, Chicago, 1849–59, and professor of practice of medicine, 1850–59. He organized the *Northwestern Medical Journal* in 1855 and was its editor till 1875; organized the *Medical Examiner* in 1860 and edited it till 1873. He was professor of principles and practice of medicine, Chicago Medical College, from 1859 to 1886, when he became emeritus professor. He organized the *Journal of the American Medical Association* in 1883 and edited it till 1889. He was a founder of the Northwestern University, of the Chicago Academy of Sciences, the Chicago Historical Society, the Illinois State Microscopical Society, the Union College of Law (in which he was for many years professor of medical jurisprudence), and the Washington Home for Inebriates. He published, among other books: *A Textbook on Agricultural Chemistry* (1848); *History of Medical Education and Institutions in the United States* (1851); *Effects of Alcoholic Drinks* (1854); *History of the American Medical Association* (1897); *Clinical Lectures* (1884); *Progress of Medical Education in the United States* (1876).

DAVIS, Noah (1818–1902). An American lawyer and judge of distinction. He was born in Haverhill, N. H., removed to Albion, N. Y., with his parents in 1825, was admitted to the New York bar in 1841, and practiced in Buffalo and other western cities in that State. In 1857 he was elected a judge of the New York Supreme Court but resigned in 1868 to run for Congress. He served only one term in the House of Representatives (1869–70), when he was appointed United States district attorney for the southern district of New York. In 1872 he again became a justice of the State Supreme Court. The famous trials of Edward Stokes and W. M. Tweed were held before him, and he sentenced Tweed to 12 years' imprisonment—a cumulative sentence, which was later disallowed by the Court of Appeals. He was Chief Justice from 1874 until 1887, when he resigned to resume the practice of law. He published *Intemperance and Crime* (1879).

DAVIS, Rebecca Harding (1831–1910). An American novelist and miscellaneous writer, born at Washington, Pa. She was married to L. Clarke Davis, a Philadelphia journalist, in 1863. Her sons, Richard Harding Davis and Charles Belmont Davis, made their mark in contemporary literature while their mother was still an active writer. She wrote, notably: *Dallas Galbraith* (1868); *A Law unto Herself* (1878); *Kent Hampden* (1892); *Dr. Warrick's Daughters* (1896); *Frances Waldeaux* (1897); *Bits of Gossip* (1904).

DAVIS, Richard Harding (1864–1916). An American journalist and popular novelist. He was born in Philadelphia, Pa., a son of Rebecca Harding Davis, and was educated at Lehigh and Johns Hopkins universities. He began his writing as a reporter in Philadelphia. In 1888 he went to New York and gained distinction for noteworthy stories, first printed in the New York *Evening Sun*. For a short time he was managing editor of *Harper's Weekly* (1890). In 1914 he was correspondent for the New York *Tribune* in Mexico during the hostilities between that country and the United States. His novels and short stories are breezy and stirring, full of incident and adventure, and marked by clever and striking, if not deep or subtle, characterization. His sketches and books of travel and description have in generous measure the qualities proper to excellent journalism. Among his books are: *Gallegher and Other Stories* (1891); *Stories for Boys* (1891); *Van Bibber and Others* (1892); *Our English Cousins* (1894); *About Paris* (1895); *The Rulers of the Mediterranean* (1894); *The Exiles* (1895); *Three Gringos in Venezuela and Central America* (1896); *Cuba in War Time* (1898); *The Cuban and Porto Rican Campaign* (1898); *With Both Armies in South Africa* (1900); *The Princess Aline* (1896); *The King's Jackal* (1899); *Soldiers of Fortune* (1897), dramatized and presented with great success in 1902; *Captain Macklin: His Memoirs* (1902); *The Bar Sinister* (1904); *Kits and Outfits* (1905); *Real Soldiers of Fortune* (1907); *The Man Who Could Not Lose* (1911); *The Lost Road* (1913). *The Taming of Helen* (1903), *Ranson's Folly* (1904), *The Dictator* (1904), *The Galloper, The Yankee Tourist, Vera the Medium*, and *Blackmail*—all plays—appeared between 1903 and 1913.

DAVIS, Thomas Osborne (1814–45). An Irish poet. He was born at Mallow, County Cork, was educated at Trinity College, Dublin, and called to the bar in 1838. In 1841 he became associate editor of the Dublin *Morning Register*, and in the following year, in collaboration with Duffy and Dillon, he founded the *Nation*, an organ of Nationalist tendencies, which acquired an immense popularity—due largely to the patriotic ballads contributed to it

by Davis. Notwithstanding his Protestant faith and early Tory affiliations, Davis earnestly endeavored to allay the discords between the Catholic and Protestant elements. He was gifted with a remarkable capacity for work and was universally respected for his sterling integrity and the fidelity with which he adhered to his convictions. One of his noteworthy achievements was his founding of the party known as "Young Ireland." His *Poems* (1846), which include the fine verses entitled "Máire Bhán a Stoír," "The Sack of Baltimore," and "The Flower of Finea," were collected and published after his death in *Duffy's Library of Ireland;* and his *Literary and Historical Essays* appeared in the same year as the poems. Consult Sir C. G. Duffy, *Young Ireland* (London, 1880), and *Treasury of Irish Poetry* (London and New York, 1907), ed. by Brooke and Rolleston.

DAVIS, VARINA ANNE JEFFERSON, known as "The Daughter of the Confederacy" (1864–98). An American writer born in Richmond, Va. Her father was President Jefferson Davis of the Confederate States of America. She was educated abroad and was known as a musician, a painter, and as author of a *Sketch of the Life of Robert Emmet* (1888); *The Veiled Doctor* (1895); *A Romance of Summer Seas* (1898).

DAVIS, WILLIAM MORRIS (1850–). An American geographer and geologist. He was born in Philadelphia and was educated at the Lawrence Scientific School of Harvard University. In 1866 he made an observation of a new star, *T Coronæ Borealis,* of which at the time only one other astronomical observation was made in the United States. He also rendered valuable service as assistant astronomer in the Argentine National Observatory at Córdoba from 1870 to 1873. He taught astronomy and geology at Harvard for 14 years, in 1890 became professor of physical geography there, and in 1899 was made Sturgis-Hooper professor of geology. His lectures and writings on the development of the physical features of the earth have given him high rank in that branch of study which is known as physiography. In 1911 he was president of the Geological Society of America. His numerous shorter articles have been published in the *American Journal of Science* and other periodicals. Besides these, his works include: *Elementary Meteorology* (1894); *Physical Geography* (1899); *Whirlwinds, Cyclones, and Tornadoes* (1884); "Journey Across Turkestan," in Pampelly's *Explorations in Turkestan* (1905).

DAVIS, WILLIAM STEARNS (1877–). An American university professor and writer, born at Amherst, Mass. He graduated at Harvard University in 1900 and took postgraduate work until 1905. He was lecturer at Radcliffe College (1904–05), instructor at Beloit (Wis.) College (1906–07), and associate professor of mediæval and modern European history at Oberlin College (1907–09). In 1909 he became professor of history at the University of Minnesota. His publications, history and historical fiction, include: *A Friend of Cæsar* (1900; 2d ed., 1913); *"God Wills It"* (1901); *Belshazzar,* 1902); *The Saint of the Dragon's Dale* (1903); *Falaise of the Blessed Voice* (1904); *A Victor of Salamis* (1907), by which he is most popularly known; *An Outline History of the Roman Empire* (1909); *The Influence of Wealth in Imperial Rome* (1910); *The Friar of Wittenberg* (1913); *A History of Mediæval and Modern Europe* (1914).

DAVIS STRAIT. The sheet of water separating Greenland on the east from Baffin Land on the west, and connecting Baffin's Bay with the Atlantic (Map: America, North, N 3). It is from 180 to 500 miles wide and was discovered in 1585 by John Davis, whence its name. The northern half is navigable only in late summer, when the southerly drifting ice fields, known as the *middle pack,* leave a large open space which is called the *north water.* It has soundings exceeding 5000 feet in the north and south portions, but not reaching 2500 feet in the intervening region. It has two powerful currents—one (of drift ice) on the west, towards the south, and one on the east, towards the north. Consult *Meddelelser om Gronland,* vols. iv, vi, vii.

DAVIT (formerly *davitt, david,* from *David,* the custom of giving implements proper names being a frequent one). A derrick of various forms, depending upon the use to which it is put. *Boat davits* are used in hoisting boats, the *cat davit* in catting the anchor, and the *fish davit* in fishing it. In modern ships of large size all anchor davits are being done away with, the anchor being pulled up into the hawse pipe. Removable davits are frequently placed at small hatches for handling stores, at the sides to support the gangway ladder, etc. On many passenger steamers whose boats are stowed inboard on the boat deck, the Welin davit is used. This consists of a straight steel arm or davit with the lower end bolted to a steel semicircular arc, cogged on its circumference. The cogs of the arc work in a flat rack on the deck as the boats are swung in or out.

DAVITT, MICHAEL (1846–1906). An Irish journalist and political leader, the founder of the Irish Land League. He was born in Straid, County Mayo, where his parents, poor peasants, were evicted from their farm when Davitt was four years of age. While engaged as a boy in a cotton factory at Haslinden, Lancashire, he lost his right arm in the machinery. From the age of 15 to 22 he worked in a printing office and educated himself. He joined the Irish revolutionary movement in 1867 and was present at the attack on Chester Castle. Detected transporting arms into Ireland in 1870, he was sentenced to 15 years' penal servitude, but after serving half the sentence was released on a ticket of leave in 1877 and visited the United States on a lecturing tour. He obtained funds to carry on a crusade against Irish landlordism and on Oct. 21, 1879, at his birthplace, organized the Land League, which spread over Ireland. He again visited America in 1880, to superintend the organization of an American branch of the Land League, but hurried back to England on account of the prosecution of the Land League executive. He was arrested under the Coercion Act and reimprisoned to finish his old sentence. He was leniently treated during 15 months and again released on a ticket of leave. He revisited America to advocate the revival of the Land League and on his return to Ireland organized the National League. In 1883 he was imprisoned for three months for a seditious speech. In 1882, while in prison, he had been elected member of Parliament for Meath, but was disqualified on the grounds of his unexpired ticket of leave. Elected in 1892 to the House of Commons for Westmeath and unseated, he was re-

turned unopposed for North East Cork, but shortly afterward was compelled to vacate through bankruptcy. In 1895 he was returned unopposed for East Kerry and South Mayo, but resigned in 1899. In 1889 he was implicated in the "Parnellism and Crime" prosecution instigated by the London *Times*, and conducted his own defense in an effective speech which received the commendation of the presiding judge. Although a strong Home Ruler, he was opposed to Parnell's land nationalization scheme, and at that leader's deposition in 1890 Davitt became a prominent Anti-Parnellite. After a visit to Australia he published his *Impressions of Australasian Democracy*, in 1898, and the same year wrote letters to the *Times* contending that the dominating English-speaking race in America is largely of Celtic origin and therefore anti-Saxon in feeling. He visited South Africa during the Boer War and investigated the massacre of Kishineff in 1903. Besides a vast number of journalistic articles, including "Prisons Revisited" in the *Daily Chronicle* (1889), his works include: *Leaves from a Prison Diary* (1884); *Defense of the Land League* (1891); *The Boer Fight for Freedom* (1902); *Within the Pale* (1903); *The Fall of Feudalism in Ireland* (1904); *Pageant of London* (1905). Consult Cashman, *Life of Michael Davitt* (Boston, 1881).

DA VOLTERRA, Daniele Ricciarelli. See Volterra.

DAVOS, dä'vôs. A Rhætian-Alpine valley in the Canton of Grisons, Switzerland, 5115 feet above sea level; surrounded by five tall peaks, the Schiahorn, the Jakobshorn, Jatzhorn, Talihorn, and Sechorn (Map: Switzerland, D 2). Stretching about 20 miles from east to southwest, it is traversed by the Davos Landwasser, which flows from Lake Davos; the lake has an area of one-fifth of a square mile and a depth of 175 feet. The sheltered situation and pure, dry air of the valley have made it a favorite winter and summer resort for invalids, especially consumptives. Davos Platz and Davos Dorf, its former villages, are now thriving and fully equipped health resorts, with hotels, sanatoriums, etc. An international skating competition is held in January of each year. Davos Platz (pop., 1900, 8334; 1910, 11,730) is the chief town of the district and in the fifteenth century was the capital of a confederation of ten Grison republics. John Addington Symonds lived and wrote most of his works here. Consult Symonds, *Our Life in the Swiss Highlands* (London, 1892).

DAVOUT, dä'vōō', Louis Nicolas, Duke of Auerstädt and Prince of Eckmühl (1770–1823). One of Napoleon's most celebrated marshals. He was born, May 10, 1770, at Annoux, in Burgundy, of a noble provincial family. After being educated at Brienne he entered the army as lieutenant of cavalry in 1788, but his revolutionary leanings led to his dismissal in 1790. He soon reappeared, however, in the Army of National Defense, and during the Revolutionary wars served with distinction under Dumouriez, and after 1793 as brigadier general under Pichegru and Moreau. In 1798, having accompanied his chief, Desaix, to Egypt, he soon attracted the attention of Bonaparte by the skillful way in which he handled his troops at Abukir. On returning to France in 1800 Davout was made a general of division and commanded the cavalry in the Italian campaign of that year. Shortly afterward he became inspector general of cavalry and commander of the Consular Guard. Soon after the Empire was proclaimed he became a marshal of France (1804), a member of the Legion of Honor (1805), and commander of the Third Army Corps. In all of Napoleon's campaigns Marshal Davout distinguished himself. At Auerstädt (1806) his generalship won the day against superior forces. After the Peace of Tilsit Davout was left as Governor of the Grand Duchy of Warsaw. His harsh administration provoked numerous complaints on the part of the inhabitants; but he appears merely to have carried out the instructions of Napoleon, who in 1808 created him Duke of Auerstädt. The brilliant victory won at Eckmühl in 1809 earned for him the further title of Prince. At Wagram (q.v.) he practically won the battle by turning the enemy's left. As commander of the Imperial forces in Germany after 1810 he supported the rigorous enforcement of the continental system along the North Sea littoral, and prepared the army for the Russian campaign of 1812. In this campaign he took a prominent part, gaining a victory at Mohilev and being wounded at Borodino. After the retreat he was made commandant of the Thirty-second Military District, with headquarters at Hamburg; but after defending the city for several months against 80,000 Germans, he surrendered and made his submission to Louis XVIII. His loyalty, however, was not proof against the return of Napoleon, and during the Hundred Days he acted as Minister of War and showed remarkable genius in organizing troops and procuring supplies. After Waterloo he was forced to surrender the command he had assumed under the walls of Paris and for a time was in deep disgrace and deprived of his titles and estates. Nevertheless he protested vigorously against the proscription of 1815 and made praiseworthy efforts to save Ney's life. In 1817 his rank was restored to him, and in 1819 he took a seat in the House of Peers, where he frequently protested his loyalty to the Bourbon line. He died in Paris, June 1, 1823. Consult: Blocqueville, *Le maréchal Davout* (Paris, 1879–80); *Correspondance du maréchal Davout*, ed. Mazade (4 vols., Paris, 1885); Jomini, *Life of Napoleon*, trans. by Halleck (5 vols., New York, 1864); Montégut, *Le Maréchal Davout* (Paris, 1882); Holzhausen, *Davout in Hamburg* (Mülheim-on-the-Ruhr, 1892); Comte Vigier, *Davout, Maréchale d'Empire* (2 vols., Paris, 1898).

DA'VUS (Lat., a Dacian). The name of the conventional slave in Latin comedy.

DA'VY, Sir Humphry (1778–1829). A celebrated English chemist. He was born at Penzance, in Cornwall, where his father was a carver in wood. At the school of Truro, where he was educated until he was 15, he showed little relish for classical learning, but was distinguished for a highly retentive memory and an early passion for poetry, which never forsook him. In 1795 he became apprenticed to a surgeon and apothecary at Penzance. At the same time he entered upon a course of study all but universal: a system of mathematical study, skeptical philosophy, Scotch metaphysics, and German transcendentalism successively engaged his attention. The study of natural philosophy brought him nearer to that department which was to be his own; but it was not till he had reached his nineteenth year that he entered seriously upon the study of chemistry. He now made the acquaintance of Dr. Beddoes, who

had established a pneumatic institution at Bristol and who took him as his assistant. Here Davy carried out a course of experiments on the curative effects of different gases, in which he had more than once nearly sacrificed his life. He thus discovered the singular exhilarating effect of nitrous oxide (laughing gas). The account which he published of his researches established his reputation and led to his appointment, at the age of 22, as lecturer at the Royal Institution of London. He delivered his first lecture in 1801, and his eloquence and the novelty and variety of experiments soon attracted large and brilliant audiences. In 1802 he was made professor of chemistry at the Royal Institution. In 1803 he began researches connected with agriculture and during 10 years lectured before the Board of Agriculture on agricultural chemistry. His lectures were published in 1813, under the title *Elements of Agricultural Chemistry*. The discoveries, however, on which Davy's fame as a chemist chiefly rests took their origin in the views which he developed in 1806 in the Bakerian lecture, *On Some Chemical Agencies of Electricity*. This essay was universally regarded as one of the most valuable contributions ever made to chemical science and obtained the prize of the French Institute. A remarkable view first advanced in this essay is that chemical affinity is nothing but the mutual electrical attraction of the ultimate particles of matter. Davy's electrolytic experiments led to the establishment on a firm scientific basis of Lavoisier's idea that bases are compounds of oxygen with metals, and to the extension of this idea to caustic potash and soda, which Lavoisier had regarded as elements. In 1807 Davy succeeded in decomposing potash. When he first saw the globules of the new metal potassium, his delight is said to have been so ecstatic that it required some time for him to control himself before he was able to continue the experiments. In the following year he decomposed soda, lime, baryta, and strontia, obtaining the metal sodium in the isolated state and the metals calcium, barium, and strontium in the form of alloys with mercury (amalgams). Owing to a delay in Davy's work caused by a severe illness, calcium and barium were independently isolated in 1808 by Berzeling and Pontin. In 1809 Davy demonstrated the elementary nature of chlorine and proved that hydrochloric acid is a compound of chlorine and hydrogen. It thus became clear that oxygen was not by any means an essential constituent of acids.

In 1812 Davy was knighted, married a lady of considerable wealth, and resigned the chemical chair of the Royal Institution. That he might investigate his new theory of volcanic action, he received permission from the French government—though the two countries were then at war—to visit the Continent and was received with the greatest distinction by the scientific men of France. On this visit he was accompanied by his assistant, Michael Faraday. Returning to England, in 1815, Davy entered on the investigation of the nature of fire damp, which is the cause of explosions in coal mines. This resulted in the invention of the safety lamp (q.v.), one of the most valuable presents ever made by science to humanity. On the death of Sir Joseph Banks, in 1820, Sir Humphry Davy was elected president of the Royal Society. His attention was shortly after called to the important problem of preserving the copper sheathing of vessels from corrosion by the action of sea water. This he effected by means of bands of zinc; but the bottoms of the vessels became so foul from the adhesion of weeds, shells, etc., that the plan had to be abandoned.

Early in 1825 Sir Humphry Davy had begun to complain of the loss of strength, and in 1826 he had a paralytic attack affecting his right side. He made two journeys to the Continent for the recovery of his health, and died at Geneva on May 29, 1829, at the early age of 51. The Genevese government evinced their respect by a public funeral. So widely spread was the reputation of Sir Humphry Davy that he was a member of almost all the scientific institutions in the world. Cuvier, in his *Eloge*, says: "Mr. Davy, not yet 52 years of age, occupied, in the opinion of all that could judge of such labors, the first rank among the chemists of this or of any other age." Besides works already mentioned, and a great number of contributions to the *Philosophical Transactions*, Davy published: *Elements of Chemical Philosophy* (1812), and *Salmonia, or Days of Fly Fishing* (1827). His *Consolations in Travel, or the Last Days of a Philosopher* (3d ed., 1831), appeared after his death. Consult *Memoirs of the Life of Sir Humphry Davy*, by his brother (2 vols., London, 1836), and *The Life of Sir Humphry Davy*, by Dr. Paris (ib., 1831). See also CHEMISTRY; CHEMISTRY, AGRICULTURAL.

DAVY JONES'S LOCKER. A common phrase applied to the ocean as the grave of men drowned at sea. Davy Jones is a sailor's familiar name for a malignant sea spirit or for the devil.

DAVY SAFETY LAMP. A lamp made especially for use in gaseous coal mines. The flame is completely enveloped in wire gauze to prevent exploding the gas in the mine. See SAFETY LAMP.

DAW. See JACKDAW.

DAWAL'LA. A catfish (*Ageneiosus dawalla*) found in the rivers of Guiana and highly esteemed as food. It is sometimes 2½ feet long and has a snout somewhat like that of a pike, but the mouth is furnished only with very minute teeth. The skin is destitute of scales, and the colors have that brightness so often seen in tropical fishes—green, brown, and carmine.

DAWANT, dȧ'vän', ALBERT PIERRE (1852–). A French painter and illustrator, born in Paris. He was a pupil of Laurens (q.v.) and both in color and composition resembles his master. His pictures include "Departure of Emigrants from Havre" (Metropolitan Museum, New York); "A Choir of Boys" (1888, Luxembourg); "The End of the Mass" (1891, Nantes Museum). One of his best historical pictures is "The Emperor Henry IV of Germany before Pope Gregory VII" (1880, Agen Museum). He received a first-class medal at the Paris Exposition in 1889 and was made Officer of the Legion of Honor in 1900. His later works include "Distress" and "Death: Sebastopol" (1904) and "The Review at Bethany" (1905, Versailles Gallery). After 1908 he painted chiefly portraits. His illustrations of the works of Victor Hugo, Alphonse Daudet, and Alfred de Vigny deserve mention.

DAWES, dąz, CHARLES GATES (1865–). An American civil engineer, lawyer, and politi-

cian, born at Marietta, Ohio. He graduated in 1884 at Marietta College and in 1886 at the Cincinnati Law School, became chief engineer of an Ohio railway, and practiced law at Lincoln, Neb., in 1887–94. He was a leader in the McKinley movement in Illinois which resulted in instructions for McKinley at the Springfield (Ill.) Convention of April, 1896. He was Comptroller of the Currency from 1897 to 1902. About 1894 he became interested in the gas business and built plants at Evanston, Ill., La Crosse, Wis., Seattle, Wash., and other cities. In 1902 he became president of the Central Trust Company of Illinois. He published *The Banking System of the United States* (1892).

DAWES, Henry Laurens (1816–1903). An American politician, born in Cummington, Mass. He graduated at Yale in 1839, engaged in newspaper work for a time, studied law, and in 1842 was admitted to the bar. He was a member of the Lower House of the Massachusetts Legislature from 1848 to 1852 and was United States district attorney for the western district from 1853 to 1857. He served in Congress from 1857 to 1873 and in the Senate from 1875 to 1893, being active on several committees, particularly on that of Indian Affairs. For the last 10 years of his life he was chairman of the "Dawes" Indian Commission to the Five Civilized Tribes.

DAWES, Richard (1708–66). An English classical scholar, educated at Cambridge. In 1738–48 he was master of the grammar school at Newcastle-on-Tyne. In 1749 he resigned and retired to Heworth, where he died, in 1766. His last years were clouded by incipient insanity. Dawes is best known for his *Miscellanea Critica* (1745). This is a work of genuine worth, but contains some unfortunate attacks on Bentley. It embraces emendations of Terentianus Maurus, Aristophanes, and the Greek tragedians; discussions of the correct pronunciation of Greek, the use of the subjunctive and optative moods, the digamma, ictus, etc. For "Dawes's Canon," for which he is most famous, see pp. 415–416 of the work by Sandys, named below. Consult: Luard, in *Dictionary of National Biography*, vol. xiv (London, 1888); Hodgson, *Archæologia Æliana*, vol. ii (Newcastle, 1832), and *An Account of the Life and Writings of Richard Dawes* (1828); Sandys, *A History of Classical Scholarship*, vol. ii (Cambridge, 1908).

DAWISON, dä'vē-zŏn, Bogumil (1818–72). A German actor, born at Warsaw, of Jewish parents. He began his career on the Polish stage in his native city and afterward played at Lemberg. Inspired there by the acting of two distinguished members of the Vienna Court Theatre, he resolved to identify himself henceforth with the German stage, applied himself assiduously to the study of the German language, and soon appeared with success in principal parts of standard dramas. In 1847 he played for the first time in Germany at Hamburg, was invited to Vienna in 1849, and there won great applause, especially in Shakespearean parts. In 1852 he became connected with the Court Theatre at Dresden, where he remained until 1864, interrupting his engagement only by traveling tours to the principal cities of Germany. Through his great talent and by his own exertions he had attained such eminence on the German stage as to be deemed by many the greatest actor of his time. His best-known rôles were Mephistopheles, Hamlet, Richard III, and King Lear. In 1866 he came to America, where he appeared with great success during two years. Soon after his return to Dresden in 1869 he became insane and never recovered.

DAW'KINS, John. See Artful Dodger, The.

DAWKINS, William Boyd (1838–). An English geologist and paleontologist. He was born at Welshpool, Montgomeryshire, Wales, and after graduating at Jesus College, Oxford (1860), became assistant geologist (1862), and later geologist (1867), to the Geological Survey of Great Britain. He became a lecturer in Owens College in 1870 and a professor in 1872. He was a member of the Channel Tunnel Committee (1882) and, after making a geological survey of the French and English coasts, laid down the line for a tunnel under the Humber (1883–84). He was made examiner at the University of London in 1885. His principal scientific work relates to the investigations of cave faunas. In addition to his papers on fossil mammalia contributed to the *Proceedings* of the Geological, Anthropological, and Royal societies, he published: *Cave-Hunting* (1874); *Researches on the Evidences of Caves Respecting the Early Inhabitants of Europe* (1874); *Early Man in Britain* (1880); *British Pleistocene Mammalia* (1866–87).

DAW'LEY, Thomas Robinson, Jr. (1862–). An American journalist, born in New York City. He traveled much; in 1896 he was sent by *Harper's Weekly* to Cuba, and he was again there a year later; during the Spanish-American War he was a volunteer aid to General Miles and later to General Shafter, and after the fall of Santiago he tried to publish the *Times of Cuba*, but was forced to return to the United States. Thereafter he represented the Century Company in Spain and the *Outlook* at the Pan-American Congress in Mexico in 1901, traveled (1904) in Santo Domingo and reported to the President on political and social conditions in that island, and in 1907–09 investigated Southern industrial conditions for the United States Bureau of Labor. Besides magazine articles on Spanish-American countries and on Spain, he wrote *The Child that Toileth Not, the Story of a Government Investigation* (1912).

DAW'LISH. An attractive and popular seaside resort in Devonshire, England, 12 miles nearly due south of Exeter (Map: England, C 6). It is situated on a cove sheltered by two headlands (one of them, Great Haldon, is 821 feet high) which project into the English Channel and create perfect conditions for sea bathing. Pop., 1901, 4003; 1911, 4099.

DAW'SON. A city and the county seat of Terrell Co., Ga., 98 miles southwest of Macon, on the Central of Georgia and the Sea Board Air Line systems (Map: Georgia, B 4). It is in a cotton and fruit growing district and has cotton-oil, lumber, and grist mills. The city contains a Carnegie library. Settled about 1855, it was incorporated the following year. Under a revised charter of 1891 the city is governed by a mayor, elected for a term of two years, and a board of aldermen. Dawson owns its electric-light plant and water works. Pop., 1900, 2926; 1910, 3827.

DAWSON. A river port, the capital of Yukon Territory, in the northwestern part of Canada. It is situated on the right bank of the Yukon River, at its confluence with the Klon-

dike, in about lat. 64° 5′ N., long. 139° 30′ W., 360 miles direct north-northwest of Skagway, and about 1500 miles above the mouth of the Yukon River. It lies at an elevation of about 1400 feet above sea level, and near the site of old Fort Reliance (Map: Canada, C 4). It is the distributing and receiving centre of the Klondike gold-mining region and has a United States consulate. There is a railway to Bonanza, 12 miles away. The town dates from shortly after the discovery of gold on Bonanza Creek, Aug. 16, 1896. It is now a busy and well-established business centre. Since 1904 its government has been administered by the Territory. It is connected between June 1 and October 15 by a fleet of river steamers with the posts and stations on both the lower and upper Yukon and with telegraph lines to the coast. In winter the traffic is carried on four-horse sleighs. The industries include electric light and power, sheet-metal making, saw mills, brewing and malting, gold mining, coal mining, garden truck farming. There is a quartz mill. Big game can be had in the vicinity. Perfect order is maintained by the Royal Northwest Mounted Police. Pop., 1901, 9142; 1911, 3015.

DAWSON, Alec John (1872–). An English novelist. He was born at Wandsworth, London, S. W. After three years at sea he ran away while in Australia and began a life of adventure, traveling in the South Sea Islands, New Zealand, India, Mauritius, South America, West Africa, Morocco, Portugal, California, Canada, and all parts of Europe. He won attention with a collection of West Africa stories entitled *In the Bight of Benin* (1897), which was followed by *African Nights' Entertainments* (1900), a series of fiery stories of love and adventure in northern Africa. Among his other novels are: *Mere Sentiment* (1897); *Middle Greyness* (1897); *Bismillah, a Romance* (1898); *God's Foundling* (1897); *Story of Ronald Kestrel* (1899); *The Half Caste* (1901); *Evolution and its Bearing on Religions* (1901); *Hidden Manna* (1902); *Things Seen in Morocco* (1904); *The Message* (1907). From 1898 to 1913 he was editor of what he described as "the first British Empire newspaper," the *Standard of Empire.*

DAWSON, Coningsby (William) (1883–). An Anglo-American author, born at High Wycombe, Buckinghamshire, Eng. He graduated at Merton College, Oxford, in 1905 and in the same year went to America, where he did special work for English newspapers on Canadian subjects, traveling widely during this period. He lived at Taunton, Mass., from 1906 to 1910, when he became literary adviser to the George H. Doran Publishing Company. Besides helping his father, William James Dawson, to edit *The Reader's Library,* he is author of *The Worker and Other Poems* (1906); *The House of Weeping Women* (1908); *Murder Point* (1910); *The Road to Avalon* (1911); *The Garden Without Walls* (1913); *Florence on a Certain Night and Other Poems* (1914).

DAWSON, George (1821–76). A British Nonconformist clergyman, born in London, and educated at Marischal College, Aberdeen, and at the University of Glasgow. He preached in Baptist churches at Rickmansworth and Birmingham in 1843–45, but differences as to creeds led him to separate from all traditional church affiliations. His followers built the church of the Saviour, Birmingham, where, free of all doctrinal restrictions, he preached from 1847 until his death. His *Sermons* (4 vols., 1878–82); *Prayers* (2 vols., 1878–83), and *Biographical Lectures* (2 vols., 1886–87) were published posthumously. Consult H. W. Crosskey, *Memoir of George Dawson* (1876).

DAWSON, George Mercer (1849–1901). A Canadian geologist, son of Sir John William Dawson. He was born in Truro, Nova Scotia, and educated at McGill University and at the Royal School of Mines in London. In 1873 he received the appointment of geologist and botanist to the North American Boundary Commission, and subsequently he was on the staff of the Geological Survey of Canada. He was a member of the Bering Sea Commission in 1891. From 1895 until his death he filled the office of director of the Geological Survey of Canada, in which connection he rendered important services to his country. He was president of the Geological Society of America in 1900. His numerous scientific papers were published mostly in the reports of the survey. He was the author of *Descriptive Sketch of the Physical Geography and Geology of Canada* (1884) and of *The Physical and Geological Features of Part of the Rocky Mountains* (1885).

DAWSON, Sir John William (1820–99). A Canadian geologist and educator, born in Pictou, Nova Scotia. He entered the University of Edinburgh, where for some time he pursued the study of science and, upon returning to Nova Scotia, began active work in geology. In 1841 he assisted Sir Charles Lyell in exploring the geological formations of Nova Scotia, as a result of which he collected much new and valuable material in paleontology. The results of his early investigations were published in *Acadian Geology* (3d ed., 1880) and in American and foreign periodicals. In 1850 he became superintendent of education in Nova Scotia, and in 1855 he was called to McGill University as professor of natural history, afterward becoming vice chancellor. Dawson was recognized as an authority on Canadian geology, a subject to which he gave much study and contributed many valuable works. His name has been associated particularly with the controversy over the supposed fossil "Eozoön," which was found among the earliest rocks in the North American continent. He was also known as one of the ablest opponents of the application of the Darwinian theory to the origin of life forms. Among his important works are the following: *Acadia* (1851); *The Story of the Earth and Man* (1872); *The Dawn of Life* (1875); *The Origin of the World* (1877); *The Change of Life in Geological Time* (1880); *Egypt and Syria* (1885); *Modern Ideas of Evolution* (1890); *Some Salient Points in the Science of the Earth* (1894); *The Meeting Place of Geology and History* (1894). In 1882 he received the Lyell medal of the Geological Society of London, and the same year he was elected president of the American Association for the Advancement of Science. In 1884 he was knighted. In 1886 he was president of the British Association for the Advancement of Science, and in 1893 he was president of the Geological Society of America. He was also an honorary member of many American and European scientific societies.

DAWSON, Miles Menander (1863–). An American actuary, born at Viroqua, Wis. He was educated at Kentucky (now Transyl-

vania) University and the New York University Law School. He took up general practice as an insurance lawyer and consulting actuary and in this capacity was called on to serve the Armstrong Investigating Committee in New York and the Canadian Royal Commission on Life Insurance. Later he became expert special agent of the United States Census Bureau and actuary-in-charge of the investigation of fraternal mortality experience. His publications include: *Elements of Life Insurance* (1892; 3d ed., 1911); *American Life Insurance Methods* (1893); *The Effect of Free Surrender and Loan Privileges in Life Insurance* (1894); *Principles of Insurance Legislation* (1896); *Practical Lessons in Actuarial Science* (1897; 1905); *The Function of Insurance in Modern Society* (1898); *Things Agents Should Know* (1900); *Comparative Reserve Tables* (1905, 1908); *Survivorship Annuity Tables* (1910).

DAWSON, Samuel Edward (1833–). A Canadian author. He was born at Halifax, Nova Scotia, and was educated in Montreal, where he graduated from the Royal Military School in 1865. For many years he was head of a publishing and bookselling house, and he contributed frequently to newspapers and magazines. Worthy of special note were a series of papers in the Toronto *Week* in 1889–90 on "The English Minority in the Province of Quebec," and "Problems of Greater Britain." From 1891 until 1909 he was King's printer at Ottawa. In 1881 he was a delegate to Washington on the question of international copyright and in 1888 vice president of the Canadian Copyright League. In 1893 he was elected fellow, and in 1907 president, of the Royal Society of Canada. In 1906 he was created C.M.G. His principal publications are: *A Study of Lord Tennyson's Poem, The Princess* (1884); *Voyages of the Cabots in 1497 and 1498* (1895–97); *Canada and Newfoundland* (1897); *The St. Lawrence Basin and its Border Lands* (1905); *A Plea for Literature* (1908).

DAWSON, Thomas Cleland (1865–1912). An American lawyer and diplomat, born in Hudson, Wis. He graduated at Hanover College, Ind., and, being admitted to the Iowa bar in 1886, practiced law in Des Moines and Council Bluffs. He was from 1891 to 1897 Assistant Attorney-General of Iowa and from 1897 to 1904 Secretary of the United States Legation to Brazil; held high diplomatic posts in Santo Domingo in 1904–07; was Minister to Colombia (1907–09), to Chile (1909–10), and—after serving as Chief of the Division of Latin-American Affairs in the State Department—to Panama (1910). Following special service to Nicaragua, Honduras, and the Venezuelan centennial (1911), he became resident diplomatic officer of the Department of State. He wrote *South American Republics* (2 vols., 1903–04).

DAWSON, William Bell (1854–). A Canadian civil engineer. He was born at Pictou, Nova Scotia, and was educated at McGill University, Montreal (where he graduated with high honors in 1874) and at the Ecole des Ponts et Chaussées, Paris. He was engaged for some years in railway and other surveys, in 1881 making a partial survey of the Nova Scotia gold fields. Shortly afterward he designed the cantilever bridge over the St. John River; and between 1884 and 1893 he designed many bridges for the Canadian Pacific Railway and its branch lines. For the arbitrators of the Canadian Pacific-British Columbia dispute regarding the quality of certain sections of railway construction he spent about three years in investigation. In 1894 he entered the service of the Marine and Fisheries' Department, Ottawa, and he did important work as head of the Tidal and Current Survey. He was awarded the Watt gold medal by the Institute of Civil Engineers, London, England (1902), and the Gay prize of 1500 francs by the Academy of Science, Paris (1905).

DAWSON, William Harbutt (1860–). An English publicist, educated at Skipton School, Ermistead, and at Berlin University. He married a German wife and is best known for his sympathetic studies of German economic and industrial life. Dawson was appointed principal clerk of the English National Insurance Commission in 1912. Among his works are: *Social Insurance in Germany* (1883; 1911; 1912); *German Socialism and Ferdinand Lassalle* (1888; 1891); *Prince Bismarck and State Socialism* (1890); *Germany and the Germans* (1894); *Social Switzerland* (1897); *German Life in Town and Country* (1901); *Matthew Arnold and his Relation to the Thought of his Time* (1903); *Protection in Germany* (1904); *The German Workman: A Study in National Efficiency* (1906); *School Doctors in Germany* (1906); *The Unearned Increment* (3d ed., 1910); *Evolution of Modern Germany* (1909); *The Vagrancy Problem* (1910); *Social Insurance in Germany, 1883–1911* (1912); *Industrial Germany* (1913).

DAWSON, William James (1854–). An English clergyman and author. He was born at Towchester, Northamptonshire, was educated at Didsbury College, Manchester, and entered the Wesleyan ministry in 1875. He resigned from the Wesleyan ministry and entered the Congregational in 1892. In 1904 he resigned his charge in London to devote himself to evangelistic work. He wrote, notably: *A Vision of Souls* (1884), poems; *Quest and Vision, Essays on Life and Literature* (1886; enlarged, 1892); *The Makers of Modern Poetry* (1890); *The Redemption of Edward Strahan: A Social Story* (1891); *London Idyls* (1895); *The Story of Hannah* (1896); *The House of Dreams* (1897); *Judith Boldero: A Tragic Romance* (1898); *Makers of Modern Prose* (1899); *Savonarola: A Drama* (1900); *The Man Christ Jesus* (1901); *Makers of English Fiction* (1905); *The Forgotten Secret* (1906); *The Book of Courage* (1911); *The American Hymnal* (1913).

DAWSON, William Wirt (1828–93). An American surgeon, born at Dawson's Mills, Berkeley Co., W. Va., and educated at Louisville University and at the Medical College of Ohio, from which he graduated in 1850. He served as professor of anatomy in the Cincinnati College of Medicine and Surgery (1853–56) and in the Medical College of Ohio (1860–64) and as surgeon and clinical lecturer at the Commercial (now Cincinnati) Hospital from 1864 to 1870, when he was appointed to the chair of surgery at the Medical College of Ohio. He was president of the American Medical Association in 1889. He is author of papers on carcinoma, hernia, Graves' disease, and abdominal tumors.

DAX, dáks. The capital of an arrondisse-

ment in the Department of Landes, southwestern France, on the Adour, 32 miles northeast of Bayonne by rail (Map: France, S., C 5). The principal building is the former cathedral, rebuilt by Louis XIV in the seventeenth century. The site of the ancient Roman walls and moat is now occupied by the Promenade des Ramparts, and the mud baths of St. Pierre. Dax is famous as a health resort, owing to its thermal springs and baths of every description. It manufactures liquor, faïence ware, chronometers, leather, and has a considerable trade in agricultural produce and timber. The scientist Charles Borda was born here in 1733. The ancient capital of the Tarbelli, Dax was known to the Romans as Aquæ Tarbellicæ, afterward as Civitas Aquensium. It was held by the English from the twelfth to the fifteenth century. Pop., 1901, 10,329; 1911, 11,387.

DAY (AS. *dæg*, Icel. *dagr*, Goth. *dags*, OHG. *tac*, Ger. *Tag;* probably connected with Skt. *dah*, Lith. *dègti*, to burn, OPruss. *dagas*, summer). Originally the space of time during which it is light, in contrast to the space of darkness or night. It now more usually denotes a complete alternation of light and darkness. It is the earth's rotation that causes these changes of light and darkness. The earth being a globe, only one-half of it can be in the sun's light at once; that half enjoys daylight, while the other half is in its own shadow, or in night; and by the earth's rotation the several portions of the surface have each their turn of light and of darkness.

Astronomers recognize more than one kind of day. If the time is noted when a particular fixed star is exactly south or on the meridian, when the same star comes again to the meridian the next day, the earth has made exactly one rotation, and the time that has elapsed is called a *sidereal day*. This portion of time is always of the same length; for the motion of the earth on its axis is strictly uniform and is perhaps the only strictly uniform motion that nature presents to us. Sidereal time, or star time, from its unvarying uniformity, is much used by astronomers. But the passage of a star across the meridian is not a conspicuous enough event for regulating the movements of men in general. It is not a complete rotation of the earth, but a complete alternation of light and darkness, that constitutes their day. This, which is called the *civil* or the *solar* day, is measured between two meridian passages of the sun. On account of the apparent eastward motion of the sun relative to the fixed stars, it is found that when the earth has made one complete turn, so as to bring the meridian of the place to the same position among the stars as at noon the day before, the sun is still nearly one degree east of the meridian, and it takes the earth about four minutes more to move round so as to overtake it. Consequently the solar day is about four minutes longer than the sidereal day. If this eastward motion of the sun were uniform, the length of the solar day would be as simple and as easily determined as that of the sidereal. But the ecliptic or sun's path crosses the earth's equator, and is therefore more oblique to the direction of the earth's rotation at one time than another; and besides, as the earth moves in its orbit with varying speed, the rate of the sun's apparent motion in the ecliptic, which is caused by that of the earth, must also vary. In consequence, the length of the solar day is constantly fluctuating; and, to get a fixed measure of solar time, astronomers have to imagine a sun moving uniformly in the celestial equator and completing its circuit in the same time as the real sun. The time marked by this imaginary sun is called *mean solar time;* when the imaginary sun is on the meridian, it is *mean noon;* when the real sun is on the meridian, it is *apparent* noon. It is obvious that a sundial must show apparent time, while clocks and watches keep mean time. Only on four days of the year do these two kinds of solar time coincide. In the intervals the sun is always either too fast or too slow; and the difference is called the *equation of time* (q.v.), because, when added to or subtracted from apparent time, it makes it equal to mean time. The mean solar day is divided into 24 hours, each of which is further divided into 60 minutes of 60 seconds each. A sidereal day, we have seen, is shorter; its exact length is 23 hours, 56 minutes, 4 seconds of mean solar or common time. Astronomers divide the sidereal day also into 24 hours, which are of course shorter than common hours. In the course of a civil year of 365 days the earth turns on its axis 366 times, or there are 366 sidereal days. Astronomers reckon the solar day as beginning at noon and count the hours from 0 to 23. The civil day begins at midnight, and the hours are counted in two divisions of 12 each. The ecclesiastical day was formerly reckoned from sunset to sunset. See INTERNATIONAL DATE LINE; TIME.

To find the day of the week for any date, past or future, there are several methods, but the simplest and most easily understood is as follows: First, there is a "constant" for the *style* —for new style it is 6, for old style 4. (In English chronology new style begins 1752, September 14.) Then there is a "constant" for each month—for January, 1 (in leap years, 0); for February, 4 (in leap years, 3); for March, 4; for April, 0; for May, 2; for June, 5; for July, 0; for August, 3; for September, 6; for October, 1; for November, 4; for December, 6. The month constants are the same in both styles. Now (for new style), multiply the number representing the century by 5, and add one-fourth to the product (omitting fractions). Next take the number of the odd years (i.e., the last two figures of the year number), and add one-fourth (omitting fractions); also the day of the month. Then add all these numbers together and finally divide the sum by 7; the remainder will give the day of the week, the remainder 1 showing the first day of the week, or Sunday; the remainder 2, Monday, etc.; no remainder showing the seventh day of the week, or Saturday. Example: What is the day of the week for January 1, 1901?

Constant for new style	6
Constant for the month (Jan.)	1
Century number (19) multiplied by 5	95
Add one-fourth of 19	4
Odd years	1
Add one-fourth of 1	0
Day of the month	1
Total	108

Divide 108 by 7, and the remainder is 3; so the year 1901 must begin on the third day of the week, or Tuesday.

For old style the constant is 4, and the number of the century is multiplied by 6, without addi-

tion of the one-fourth. The other numbers are taken as in new style. Example for old style: On what day of the week did Columbus land on his voyage of discovery (Oct. 12, 1492)?

Constant for old style	4
Constant for October	1
Century number (14) multiplied by 6	84
Odd years (92) one-fourth added	115
Day of the month	12
Total	216

Divide by 7, and the remainder is 6; i.e., the required day is the sixth day of the week, or Friday.

For leap years care must be taken in both old and new style to reduce the constants for January and February by one. See CALENDAR.

DAY. In law, the period of time between midnight and midnight within which a specified legal act may be performed. This entire period of 24 hours is the "natural" day. The "artificial" or conventional day (*dies artificialis*), or the "legal" day, as it is sometimes called, varies according to the nature of the act to be performed. Coke, referring to the day of the appearance of parties in a suit, described it as extending from sunrise to sunset. For many purposes the legal day is limited to the usual business hours, as of a bank or other business house, and its length is often determined by the hours observed by the community, or artificially determined by the usage of a particular calling. Thus, the day of the stock exchange means the hours (say from 10 A.M. to 3 P.M.) within which deliveries of stock and settlements must be made, in order to avoid forfeiture or other penalty. Usually the legal day is coextensive with the natural day.

Court days are those days of the year in which courts may lawfully sit and process issue, though in some parts of the United States the expression is used to describe the days on which the courts actually sit. In England and the United States Sundays and certain holidays are generally not court days (*dies non juridici*), excepting for such acts as are necessary to the preservation of the peace. By a legal fiction a day is for many purposes regarded as a point of time, and a fraction of a day disregarded. See DIES NON; TIME, STANDARD.

Law day. The last day in which a mortgage is redeemable at law as distinguished from equity. The date of payment of a mortgage debt is usually fixed, and at common law, if not paid on the day, the mortgage was forfeited and the title of the mortgagee became absolute. In order to avoid the harshness of this rule the courts of equity interposed by permitting the mortgagor to redeem after such forfeiture on paying the amount of the mortgage debt with interest. See EQUITY OF REDEMPTION; MORTGAGE.

Days of Grace. The time at which a note is actually *due*, or *at maturity*, is in general by mercantile custom three days after the time expressed on the face of it, the additional days being called days of grace. If the third day of grace fall on a Sunday, the note is payable the day before, excepting where by statute it is provided that it shall be payable on Monday. If it fall on a holiday, the note is payable the day after. The uniform Negotiable Instruments Law in force in most of the States abolishes days of grace. See GRACE, DAYS OF.

DAY, ARTHUR LOUIS (1869–). An American physicist, born at Brookfield, Mass. In 1892 he graduated from Yale University, where he afterward served as instructor in physics (1894–97). From 1897 to 1900 he was a member of the staff of the Physikalisch-Technische Reichsanstalt at Charlottenburg, Germany. He then served for six years as physical geologist on the United States Geological Survey and in 1907 became director of the Geophysical Laboratory of the Carnegie Institution at Washington. He published several physical and geophysical researches at high temperatures, including *High Temperature Gas Thermometry*, with Robert B. Sosman (1911).

DAY, BENJAMIN FRANKLIN (1841–). An American naval officer, born in Plymouth, Ohio. He attended the United States Naval Academy in 1858–61, during the Civil War served with the West Gulf (1862–64) and North Atlantic (1864–65) blockading squadrons, and attained the rank of lieutenant commander in 1866. In 1876 he became commander, in 1891 captain, in 1899 rear admiral, and in 1900 was retired from the service. From 1897 to 1900 he was a member of the Naval Examining and Retiring boards.

DAY, CLIVE (1871–). An American university professor and writer on economic history, born at Hartford, Conn. After graduating from Yale University in 1892 he took postgraduate studies there and at the universities of Berlin and Paris, taught history and economics at the University of California for three years and economics at Sheffield Scientific School (Yale) for two years, and in 1907 was appointed professor of economic history in Yale University. He is author of *Policy and Administration of the Dutch in Java* (1904) and *History of Commerce* (1907).

DAY, GEORGE EDWARD (1815–1905). An American theologian. He was born in Pittsfield, Mass., graduated at Yale in 1833 and in 1838 at the Yale Divinity School, where he became assistant instructor in sacred literature. From 1840 to 1851 he was pastor of churches in Marlboro and Northampton, Mass.; from 1851 to 1866 he occupied the chair of biblical literature in Lane Theological Seminary; and then that of Hebrew language and biblical theology in Yale Divinity School, where he founded in 1891 the Historical Library of Foreign Missions. From 1863 to 1871 he was editor of the *Theological Eclectic* (afterward merged in the *Bibliotheca Sacra*) and, besides contributions to periodicals, published a translation (1871) of the *Theology of the New Testament* of Van Oosterzee; an American edition (1883) of Oehler's *Theology of the Old Testament;* and other works.

DAY, HENRY NOBLE (1808–90). An American author and educator. He was born at Washington, Conn.; graduated at Yale College in 1828, at the Yale Divinity School in 1834, and was ordained to the Congregational ministry. He became professor of sacred rhetoric in Western Reserve College in 1840 and was president of the Ohio Female College from 1858 to 1864. Besides numerous contributions to periodical literature, his works include: *The Art of Elocution* (1844); *The Art of Rhetoric* (1850); *Elements of Logic* (1867); *The Art of Discourse* (1867; 1868); *The Science of Esthetics* (1872); *The Science of Thought* (1886); *Elements of Mental Science* (1889); *Science of Education* (1889).

DAY. HOLMAN FRANCIS (1865–). An

American author, born at Vassalboro, Me., and a graduate of Colby College (class of 1887). In 1889–90 he was managing editor of the publications of the Union Publishing Company, Bangor, Me. He was also editor and proprietor of the Dexter (Me.) *Gazette*, a special writer for the Lewiston (Me.) *Journal*, Maine representative of the Boston *Herald*, and managing editor of the Lewiston *Daily Sun*. In 1901–04 he was military secretary to Gov. John F. Hill of Maine. His writings include: *Up in Maine* (1901), verse; *Pine Tree Ballads* (1902); *Kin O'Ktaadn* (1904); *Squire Phin* (1905; 1913), a novel dramatized as *The Circus Man* and produced in Chicago in 1909; *Rainy Day Railroad War* (1906; 1913); *The Eagle Badge* (1908); *King Spruce* (1908); *The Ramrodders* (1910); *The Skipper and the Skipped* (1911); *The Red Lane: A Romance of the Border* (1912).

DAY, James Roscoe (1845–1923). An American educator, born at Whitneyville, Me. He studied at Bowdoin, and was in 1872 ordained a minister of the Methodist Episcopal church. He was pastor at Bath, Me., 1872–74; Portland, Me., 1876–78; Boston, 1881–82; New York, 1883–85 and 1889–93; and in 1893 became chancellor of Syracuse University. He was elected Bishop in 1904, but resigned. He is the author of *The Raid on Prosperity* (1907).

DAY, Jeremiah (1773–1867). An American educator, born in New Preston, Conn. He graduated at Yale in 1795, was made professor of mathematics and natural philosophy there in 1801, and was president of the college from 1817 to 1846. He published *An Introduction to Algebra* (1814; 7th ed., 1866); *Navigation and Surveying* (1817); and several works on philosophy.

DAY, John (1574–c.1640). An English dramatist. He was born at Cowston, and in 1592 was admitted to Caius College, Cambridge, which he left the next year without a degree—expelled for stealing a book. Between 1598 and 1603, as a playwright, he collaborated with Dekker, Chettle, and others on at least 22 plays, of which only *The Blind Beggar* (acted 1600, published 1609) seems to have been printed. Day is best known for a vivacious comedy, *The Isle of Gulls* (1606), which draws its plot from Sir Philip Sidney's *Arcadia;* and for a dainty masque, *The Parliament of Bees* (1641, but probably written much earlier), upon which he can base his best claim to long remembrance. Consult: *Works*, ed. by Bullen (London, 1881); Swinburne's enthusiastic study in the *Nineteenth Century* (October, 1897); Ward, *History of English Dramatic Literature* (London, 1899), and *Cambridge History of English Literature* vol. vi (Cambridge and New York, 1907–13).

DAY, Stephen. See Daye, Stephen.

DAY, Thomas (1748–89). An English author. He was born in London and was educated at Corpus Christi College, Oxford. He strongly sympathized with the Americans at the time of the Revolutionary War and expressed his views in *The Devoted Legions* (1776) and *The Desolation of America* (1777); but he also strongly denounced American negro slavery in *Reflections on the Present State of England and the Independence of America* (1762) and in his famous poem, *The Dying Negro*. He will be remembered, however, chiefly as the author of the famous *History of Sandford and Merton* (3 vols., 1783–89) and the *History of Little Jack* (1788). He was a character of remarkable nobility and expended almost his entire fortune in philanthropy. His eccentricities, due to his refusal to compromise with worldliness, and his adherence to the doctrines of Rousseau, led him into many extraordinary experiences. He was killed by being thrown from a fractious colt, while testing a theory that all animals could be managed by kindness. His *Poems* may be found in vol. lviii (1822) of the *British Poets*. Consult his *Life* by Keir (London, 1791) and that by Blackman (ib., 1862).

DAY, William A. An American lawyer and capitalist, born at Wilmington, Del. He was Auditor of the United States Treasury Department from 1885 to 1889. As special assistant to the Attorney-General of the United States (1901–03) and as Assistant Attorney-General of the United States (1903–05) he aided and had charge of the prosecution of trust cases under the interstate commerce and antitrust laws. He served as vice president of the Equitable Life Assurance Society of the United States from 1906 to 1911 and thereafter as president. He was also chosen a director of the Mercantile Trust Company, the Lawyer's Title Insurance and Trust Company, and the Equitable Trust Company.

DAY, William Rufus (1849–1923). An American statesman and jurist. He was born at Ravenna, Ohio, graduated at the University of Michigan in 1870, studied law there, and in 1872 was admitted to the Ohio bar. He was a judge of the Court of Common Pleas from 1886 to 1890. In 1897 he was appointed Assistant Secretary of State and in 1898 Secretary of State, serving from April to September, when he was named chairman of the United States Peace Commission which arranged terms of peace with Spain. From 1899 to 1903 he was judge of the United States Circuit Court (6th circuit) and in February, 1903, was appointed an associate justice of the United States Supreme Court.

DAYAK. See Dyak.

DAYAL, dī'ăl. See Dhyal Bird.

DAY BLINDNESS, or Hemeralopia. See Sight, Defects of.

DAYE, dā, or **DAY,** Stephen (c.1610–68). The first printer in the English colonies in America. He was born in London, was there a printer's apprentice, and in 1639 assumed charge at Cambridge, Mass., of the printing apparatus which the Rev. Jesse Glover had succeeded in obtaining for the Colony. He continued in this post until 1649, when for reasons not ascertainable he was superseded. In 1641 the General Court ordered that he, "being the first that sett upon printing, is graunted three hundred acres of land." His presswork is tolerable, according to Thomas (*History of Printing in America*, 1810), but his composition exceedingly deficient. His first production was a broadside, *The Freeman's Oath*, followed by an *Almanack*. The next was the first book printed in America, *The Whole Book of Psalmes, faithfully translated into English Metre* (1640). For a list of his other publications, consult Thomas, *The History of Printing in America* (Worcester, 1810), and Timperley, *A Dictionary of Printers and Printing* (Manchester, 1839).

DAYFLY. See May Fly.

DAY LILY (so called because the flowers usually last one day), *Hemerocallis*. A genus of plants of the family Liliaceæ, with bell-shaped flowers. Several species are cultivated

in flower gardens, especially the fragrant yellow day lily, or lemon lily (*Hemerocallis flava*), a native of Hungary, Siberia, and the north of China. *Hemerocallis fulva*, a native of Europe and temperate Asia, produces more abundant foliage and orange-colored flowers without fragrance. Both species are fibrous-rooted perennials, with linear leaves. Five or six other species are met with in cultivation, forming a group of fine, hardy perennial ornamentals. *Hemerocallis aurantiaca* is said to be the finest of all the day lilies. *Funkia subcordata*, a common Japanese species extensively cultivated, is also known as day lily. It has broad leaves and panicles of white flowers which have an orange-like odor.

DAY NURSERY. See NURSERY, *Day Nursery*.

DAY OF ATONEMENT or **EXPIATION.** See ATONEMENT.

DAY OF BARRICADES. The name given to an insurrection of the Parisians on May 12, 1588, during the War of the Three Henrys. Henry III had fortified himself in the Louvre, against Henry, Duke of Guise. The city guards failed him, the populace pushed forward barricades, and the Swiss Guards were saved from massacre only by the intervention of the Duke of Guise, and the King had to flee. The insurrection against Mazarin, Aug. 27, 1648, is also known as the Day of the Barricades. Consult Lavisse, *Histoire de France*, vol. vi, part i; vol. vii, part i (Paris, 1904; 1906).

DAY OF SECTIONS. The name sometimes given to the insurrection of 13 Vendémiaire, an attempted assault on the Tuileries by the National Guard, on Oct. 4, 1795, in order to compel the Convention to change its measures. The uprising was overcome by Napoleon, who on that occasion received its first appointment. After the first encounter the forces of the Convention disarmed the various sections.

DAY OWL. An owl often seen abroad during the day. See HAWK OWL.

DAYSMAN. An arbitrator, umpire, or judge. The term is of Anglo-Saxon origin and is still employed in the northern part of England to describe an unofficial judge or arbitrator to whom a matter in dispute is referred. It was in more common use in Wiclif's day, from whom it was taken over into the Authorized Version of the Bible, in the exclamation of Job: "Neither is there any daysman betwixt us, that might lay his hand upon us both" (Job ix. 33). The origin of the term is obscure.

DAY'S WORK. In nautical language, the navigation work done every 24 hours. The term is frequently restricted to the operation of making the dead-reckoning computations. See NAVIGATION.

DAY'TON. A city in Campbell Co., Ky.; on the Ohio River, opposite Cincinnati, Ohio, and on the Chesapeake and Ohio Railroad (Map: Kentucky, F 1). It contains the Speers Memorial Hospital. The city has large plants for the manufacture of watchcases and pianos. Settled in 1849, and incorporated the same year under the name of Jamestown, Dayton is now governed under a charter of 1893, by a mayor, elected every four years, and a city council. Pop., 1900, 6104; 1910, 6979.

DAYTON. A city and the county seat of Montgomery Co., Ohio, situated in the rich and populous Miami valley, on both banks of the Miami River, 50 miles northeast of Cincinnati and 61 miles southwest of Columbus (Map: Ohio, B 6). Its steam railroads are the Erie, the Cincinnati, Hamilton, and Dayton, the Pittsburgh, Cincinnati, Chicago, and St. Louis, and the Dayton and Union. Seven electric traction lines enter the city, giving it quick communication with all parts of the State. The city's area is 17 square miles. The original plat was regularly laid out with broad streets. There are 210 miles of improved streets, of which 75 miles are paved with asphalt, brick, or stone. The city has 105 miles of storm sewers and 195 miles of sanitary sewers. Natural gas is obtained from West Virginia fields and is largely used for domestic and heating purposes. The principal public buildings are the old courthouse, modeled after the Parthenon, the new courthouse, Steele High School, Dayton State Hospital, Miami Valley Hospital, Memorial Hall, Stivers High School, and the Public Library and Museum. The last named, standing in Cooper Park, contains 70,000 volumes and is supplemented by two branch libraries. There are seven national banks, five State banks, two loan and trust companies, and 22 building and loan associations with deposits of over $25,000,000. The park system is composed of Cooper Park, Van Cleve Park, South Park, Robert's Boulevard, McCabe's Park, McKinley Park, and White City, with access to the grounds of the National Military Home and the private estate of Hills and Dales. The National Military Home accommodates 6000 veterans of the Civil and Spanish-American wars. There are three high, two manual-training, and 22 district schools, with an enrollment of about 16,000. The Catholic church maintains a boys' college, a girls' academy, and 11 parochial schools. Dayton ranks third among Ohio cities in invested manufacturing capital, in value of manufactured product, in workmen employed, and in wages paid. Manufactured articles include cash registers, aëroplanes, carriages, wagons, automobiles, sewing machines, computing scales, railway cars, and boilers. The city government is unique. It is administered by a commission of five, who are elected at large on a nonpartisan ticket. They are the policy-determining body of the city, who in addition to these duties select a city manager, who is personally responsible for the administration of the government. The salaries of the commissioners are nominal, but the manager receives $12,500 a year. He appoints his subordinates, the heads of the five departments of law, finance, welfare, service, and safety being the most important. This government is in accordance with a home-rule charter. The schools and courts are controlled by State law. Annual income amounts to $1,125,000 for current operating costs plus $550,000 for debt service. The city has a bonded debt of $5,473,000, contracted for public improvements. The schools have an annual income of about $500,000 and a bonded debt of $630,000. Surrounding territory is thickly settled. Many of the industrial and professional classes live beyond the city limits. The death rate is 14.2. The water supply, furnished by the Holly system of deep wells and under municipal ownership, is pure and abundant. Pop., 1910, 116,577; 1914 (est.), 123,794; 1920, 152,559.

Dayton was settled in 1796 by a party from Cincinnati. The original town plant was laid

out by Daniel Cooper. In 1805 the town was incorporated and named in honor of Gen. Jonathan Dayton, one of the early settlers. The first city charter was granted in 1841. The city was swept by a disastrous flood on March 25, 1913, in which 84 people lost their lives and a property loss of $128,000,000 was sustained. Public-spirited citizens raised a fund of $2,000,000 for flood prevention within two weeks after the waters had receded. A system of vast dry reservoirs costing $17,000,000 is being built. This will entirely eliminate even minor danger in the entire Miami valley. Consult R. W. Steele, *History of Dayton* (1889), and Mary D. Steele, *History of Dayton* (1896).

DAYTON. A city and the county seat of Rhea Co., Tenn., 38 miles northeast of Chattanooga, on the Queen and Crescent Route and on the line of the Tennessee River Navigation Company (Map: Tennessee, F 3). It is in a rich iron and coal mining, cattle-raising, and fruit-growing region, and has manufactories of hosiery, chairs, boxes, brooms, and flour. There are also machine shops, furnaces, brickyards, and canneries. The city has a fine courthouse and owns its water works. Pop., 1890, 2719; 1900, 2004; 1910, 1991.

DAYTON. A city and the county seat of Columbia Co., Wash., 30 miles by rail northeast of Walla Walla, on the Touchet River, on the Northern Pacific Railroad, and on the line of the Oregon-Washington Railroad and Navigation Company (Map: Washington, H 3). It lies in a picturesque mountainous country, rich in agricultural products and live stock. There are large flouring mills and other manufacturing plants. The city has good water power. Pop., 1900, 2216; 1910, 2389.

DAYTON, James Henry (1846–). An American naval officer, born at South Bend, Ind. After graduating from the United States Naval Academy in 1866 he served in the navy in the various grades, becoming captain in 1900 and rear admiral in 1906. He commanded the *Detroit* (1897–99), the naval station at San Juan (1899–1900), and the *Chicago* (1901–03). He was president of the Naval Board of Inspection and Survey in 1904–05. He commanded the Philippine squadron of the Asiatic fleet from 1906 to 1907, when he became commander in chief of the Pacific fleet. He was retired in 1908.

DAYTON, Jonathan (1760–1824). An American soldier and legislator, born in Elizabethtown, N. J. He graduated at Princeton in 1776, was admitted to the bar, was appointed lieutenant in a New Jersey regiment in 1777, served as aid to General Sullivan against the Six Nations, and in 1798 became a brigadier general in the United States army. He was a member of the New Jersey Assembly in 1786–87 and 1790 (being Speaker in 1790) and of the New Jersey Senate in 1789–90, and was a delegate to the Constitutional Convention of 1787. From 1791 to 1799 he was a member of Congress (being Speaker of the House from 1795 to 1799) and from 1799 until 1805 served in the United States Senate. He was accused of conspiracy with Burr, but was not tried. Dayton, Ohio, was named in his honor.

DAYTON, William Lewis (1807–64). An American politician, nephew of Jonathan Dayton. He was born in Somerset Co., N. J., graduated at Princeton in 1825, was admitted to the bar five years later, and began the practice of the law in Trenton. He was a member of the State Council or Senate in 1836–37 and a judge of the State Supreme Court in 1838–41, and in 1842 was appointed to the United States Senate. He was reëlected on the expiration of his term and took an active part with the Whigs in opposing the extension of slavery, the annexation of Texas, and the Fugitive Slave Law. In 1856 he was the Republican candidate for Vice President. He was Attorney-General of New Jersey from 1857 to 1861 and from then until his death was United States Minister to France. He became a regent of the Smithsonian Institution in 1861. His son, William Louis Dayton (died 1897), was Minister to Holland in 1882–85.

DAYTO'NA. A city in Volusia Co., Fla., 110 miles by rail south of Jacksonville, on the Atlantic Ocean, the Halifax River, the Jacksonville-Miami Canal, the Florida East Coast Railroad, and on the line of the Florida Coastal Island Navigation Company (Map: Florida, E 2). It is a popular summer and winter resort, has many fine homes and hotels, a library, and an Elks Home. The chief industries are orange and strawberry culture, gardening, fishing, and celery growing. The water works are owned by the city. Pop., 1900, 1690; 1910, 3082.

D' AZEGLIO. See Azeglio, Marchese d'.

DEA'CON (AS. *dēacon*, from Lat. *diaconus*, from Gk. *διάκονος*, *diakonos*, attendant). A subordinate ecclesiastical officer. In apostolic times, the name was applied to those officials of the Church who had the charge of collecting and distributing the alms of the faithful and taking care of the poor and the sick (Acts vi. 1–8); and these seem to have been considered the characteristic functions of the diaconate as late as the Trullan Council of 692. Thus, we find St. Laurence, Archdeacon of Rome, in the middle of the third century, making the care of the poor and the attendance upon Sixtus, his bishop, at the altar, his principal occupation and his pride, and it was as a deacon that Athanasius attended his bishop at the first general Council of Nicæa (325) and defended the faith against Arius. But that the office was not restricted to these functions may be inferred from the fact that immediately after its institution we find deacons teaching and even baptizing (Acts vi. 10; viii. 5, 38). It evidently included in very early times the duties of guarding the sacred assemblies from the presence of unworthy persons, receiving the oblations and bringing them to the priest, reading the epistle and gospel from the *ambo*, and the names of those who were inscribed on the diptychs for commemoration, and assisting in the administration of the holy Communion. In matters of external ministry they had a very wide range, which the Apostolic Constitutions sum up by saying that the deacon must be the ear, eye, mouth, hand, heart, and soul of the bishop. With the development of the subdiaconate and the minor orders, only the more important and honorable offices in and out of the Church were left to the deacon. Owing to their small number (in early times often not more than seven in one place), and to their immediate relations to the bishop, they began to assume considerable importance, and their pretensions had more than once to be restrained. The office of deacon as it existed in the early Church has been preserved in the Eastern churches with little modification. At the present time in the Roman Catholic church the office is practically of no

importance, as it is really nothing more than a step to the priesthood, which is usually administered almost immediately after ordination to the diaconate. The *Pontificale Romanum*, indeed, defines the duties of a deacon as ministering at the altar, baptizing, and preaching; but all duties specially belonging to the offices of deacon and subdeacon, including their special functions in a solemn mass, are in practice nearly always discharged by priests. The special ceremonies of the ordination of a deacon include the putting on of the dalmatic and stole, and the delivery to him of the book of the Gospels, as well as the laying on of the bishop's hands. In the Anglican church the imposition of hands and the delivery of the book of the Gospels are retained. The deacon, who must be 23 years of age, continues a year in the office except in special cases. Besides pastoral work, preaching, and baptizing, he may read a large part of the service; but in England he is not allowed to hold a benefice. In the Methodist Episcopal church the deacon is a member of an order of the ministry next below the elder. The deacons are elected by the annual conference and ordained by the bishop presiding. They may assist in the administration of the Lord's Supper, may administer the rite of baptism, solemnize marriage, and serve as traveling preachers. In the Congregational and Baptist churches one or more deacons are elected by the members of each church to distribute the elements in the Communion, to act as the advisers of the pastor, and as the almoners of the charities of the church. The nature of the office is the same in the Presbyterian church, where the deacons are elected by the congregation and ordained by the minister to assist the body known as the session of the church in the care of the poor and in the general management of the secular affairs of the church. In the Lutheran churches of the United States the deacon is a layman chosen to attend to the charities and temporalities of the congregation. Of recent years there have been introduced into the statute law of a number of the States provisions by which deacons, by virtue of their office, become legal trustees of church property for the congregation, whether incorporated or unincorporated. Consult: Seidl, *Der Diaconat in der katholischen Kirche* (Regensburg, 1884); Hort, *The Christian Ecclesia* (London, 1897); McGiffert, *The Apostolic Age* (New York, 1897); Lindsay, *The Church and the Ministry in the Early Centuries* (London, 1902).

DEA'CONESS. One of an order of women in the Christian churches. Traces of the order appear in apostolic times (Rom. xvi. 1; 1 Tim. v. 9 et seq.), and deaconesses were generally found in the early Christian communities. Their duties were in general to supplement the work of the deacons and perform for members of their own sex such services as could with less propriety be performed by men. They assisted at the administration of baptism, acted as doorkeepers on the women's side of the congregation, instructed the female catechumens, took charge of the sick and poor women, and were present at the interviews of the clergy with women. They were set apart for their work by laying on of hands and prayer by the bishop. In the earliest times widows were generally chosen, and it was considered seemly that a deaconess should be of mature years. The Council of Trullo (692) fixed the limit at 40. In the Western church it was not introduced till the fourth century and always met with opposition, decrees of councils against the order being found as early as the fifth century, and by the eighth it had entirely disappeared. In the East it lingered longer, but the duties became much restricted. The modern development of the institution in the various Protestant churches of Europe and America dates from the third decade of the nineteenth century. In 1833 Pastor Theodor Fliedner of the United Evangelical Church of Prussia founded a deaconesses' home at Kaiserswerth in Rhenish Prussia, which has served as a model for similar institutions in many parts of the world. The inmates of these houses devote themselves to charitable work, but take no vows and are bound to no fixed term of service. Provision is generally made for their instruction and training, and they are under the supervision of an inspector or superior. In the Church of England much of the normal work of deaconesses is done by the various sisterhoods, though deaconesses have also been in existence since 1861. In America an order of deaconesses was established in St. Andrew's Parish, Baltimore, of the Protestant Episcopal church, in 1855. A canon was adopted by the General Convention in 1889, regulating the order and providing that members should have adequate preparation both technical and religious, which should extend over a period of two years. Training schools meeting this requirement are now maintained in New York and Philadelphia. The General Conference of the Methodist Episcopal church in 1888 made provision for the establishment of the order of deaconesses. There are now many homes belonging to that church in the United States. The Lutheran church also has several homes, the first having been organized in New York in 1852. The Presbyterian General Assembly in 1891 sanctioned the order. Consult: Potter, *Sisterhoods and Deaconesses* (New York, 1873); Robinson, *The Ministry of Deaconesses* (London, 1898); *The Church Quarterly Review*, No. 94, pp. 302 et seq. (ib., 1899); Golder, *History of the Deaconess Movement* (Cincinnati, 1903); *Year Book* of the New York Training School for Deaconesses (New York, 1892–1913). For the modern movement, consult *Addresses, Reports, Statements . . . of of the United States, 1907* (Boston, 1907); Nutting and Dock, *History of Nursing* (New York, 1907). See SISTERHOODS.

DEAD, BOOK OF THE. The name given by Lepsius, and since generally applied, to the collection of magical and religious texts which, according to ancient Egyptian belief, formed a sort of guide and protection for the dead in their wanderings through the Lower World. It was placed in or near the coffin or in the armpits of the mummy. Hundreds of copies exist, some containing only a few chapters, while other rolls are over 100 feet in length. Some of these copies are very elaborately written and (especially in later times) are ornamented with colored pictures. The Egyptians themselves called the collection the book of 'coming forth in the daytime' (*piret em h(r)ou*), from the opening words of the first chapter, which promise the soul of the deceased the power of visiting the Upper World. This title does as little justice to the varied contents of the collection as that erroneously proposed by Champollion and De Rougé ("the funerary ritual"). A better translation of its name would be 'The Book of the

Coming Forth by Day' (or during the day), or, perhaps still better, as Naville suggests (*The Old Egyptian Faith*, p. 164), 'The Book of the Coming out from the Day.' This strange collection is not to be regarded as a handbook of Egyptian theology; its character is chiefly magical, although some hymns to the gods are incorporated in it. The individual chapters date from various periods, although most of them seem to have come down from the time of the pyramids; some, perhaps, even from the prehistoric age. Specimen titles of the chapters are as follows: "The Chapter of the Coming forth from the Day and of Living again after being Dead," and "The Chapter of Going into and Coming out of the Lower World." A few formed part of the earliest collection of magical funerary texts inscribed on the walls inside the royal pyramids of the sixth dynasty; but the majority belong to a different corpus, which can be seen in process of gradual formation under the twelfth dynasty. At that time these texts were written on the sarcophagi; under the eighteenth dynasty they were written in papyri, although the selection and order of the chapters fluctuated. A fixed canonical form, limited to about 165 chapters, was established in the twenty-sixth dynasty, though nothing is known in regard to the origin or the formation of the canon. Papyri of this late date were the first published. (Consult Lepsius, *Das Todtenbuch der Aegypter*, Leipzig, 1849, republished by Davis, 1894, and De Rougé, *Ritual funéraire des anciens Egyptiens*, Paris, 1861–76.) Eventually it became evident that all late manuscripts were very corrupt, and in 1876 E. Naville was appointed by the Congress of Orientalists to prepare a critical edition of the text in use from the eighteenth to the twentieth dynasty. The Prussian government, with characteristic liberality, lent its support to the work. The results of Naville's labor, which appeared in 1886, under the title, *Das ægyptische Todtenbuch der 18ten bis 20ten Dynastie*, show that, even at the period covered by the learned editor's investigations, the texts were hopelessly corrupt and can only be understood by tracing them further back. Many facsimiles of manuscripts with pictures have been published, chiefly by Budge (*Papyrus of Ani*, etc.). The best translation is that of Lepage Renouf, which gives a complete translation, commentary, and notes (London, 1890); those of Birch (ib., 1867), Pierret (Paris, 1882), and Budge (London, 1898; cheaper ed., 1901) are not critical. For a concise statement, consult Naville, *The Old Egyptian Faith*, pp. 159–207 (New York and London, 1909). For a more complete bibliography, consult Steindorff, *Religion of the Ancient Egyptians*, p. 133, note 2.

DEAD, Burning of the. See Cremation of the Dead.

DEAD, Judgment of the (in ancient Egypt). The *Book of the Dead* contains, in chap. 125, which is one of the longest in the book, a picture representing the judgment which the defunct, before entering into the fields of the blessed, will undergo in the Lower World, in the presence of Osiris and 42 judges of monstrous form, who are at hand to devour the guilty and to drink his blood. Anubis, the god of the dead, and Thoth, the god of wisdom, examine the deceased by weighing his heart in the sacred "balance of justice." The famous "negative confession" enumerates 42 capital sins from which the deceased must be free, or at least must claim to be free. Should he fail to pass the ordeal, he is either handed over to be devoured by the 42 judges mentioned above or by the monster, part hippopotamus, part crocodile, and part lion, which represents the Egyptian Cerberus, or is thrown into the fiery lake. This judgment scene is frequently represented. Should the deceased be found to be pure in heart, he is allowed to mingle with the spirits and the gods, and is supplied with "food, offerings, drinks . . . and clothes of fine linen." A very confused passage of Diodorus would seem to state that such a judgment was held on earth at the interment of the deceased and that a well-founded accusation could deprive even a king of his sepulture. The underlying truth seems to be that a ceremony, imitating the judgment, with priests in the mask of gods, and with the reading of the negative confession and the following acquittal, may sometimes have formed part of the funerary ritual.

DEAD COLOR. In painting, any color that has no gloss or reflecting quality.

DEAD-LETTER OFFICE. A division of the Post-Office Department, under the control of the Fourth Assistant Postmaster-General at Washington, D. C., to which unclaimed or undeliverable letters and packages are sent from local post offices. The official record for the year 1913 showed the receipt by this office of 13,214,346 letters and parcels. Nearly 7,000,000 of these letters and parcels were destroyed by the department, either because they did not contain the names of the senders or were of no value. Upward of 945,000 letters, containing money, drafts, checks, notes, money orders, or postage stamps, to the value of $7,584,478, were returned to their senders, and the department derived as revenue from dead mail matter, which could not be returned, nearly $32,000. During the year over 12,000 magazines, illustrated papers, picture cards and the like, which could not be returned to the owners, were distributed among the charitable institutions of the District of Columbia.

In the United Kingdom there are many centres for dealing with unclaimed letters. The principal office is in London. Letters containing nothing of value are at once destroyed. In the year 1905–06 over 1,000,000 letters could neither be delivered to the addressees nor returned to the senders.

DEADLY AG'ARIC. See Fungi, Edible and Poisonous.

DEADLY NIGHTSHADE. See Belladonna.

DEAD NETTLE (*Lamium*). A genus of plants of the mint family. The name "dead nettle"—popularly in some parts of England and Scotland, "dee nettle"—is also often extended to the genus *Galeopsis*, very similar to *Lamium galeopsis*, and sometimes distinguished by botanists as hemp nettle. *Lamium purpureum*, *Lamium album*, and *Galeopsis tetrahit* are very common weeds. The first two are sometimes boiled as potherbs in Sweden. The name is derived from the popular belief that the hairs of the dead nettle, particularly when the plant is dried, as in haymaking, cause irritation in the hands of persons handling them, which, extending through the system, occasionally terminates in death. They do not, however, seem to possess any poisonous property. Several of the species have become naturalized in various parts of the United States.

DEAD RECKONING. The computation of the ship's position from her movements as recorded in the log and without having a recourse to astronomical observations. The chief elements from which the reckoning is made are: the point of departure, i.e., the latitude and longitude sailed from or last determined; the course or direction sailed in (ascertained by the compass); the rate of sailing, measured from time to time by the log (q.v.); and the time elapsed. The various principles or methods followed in arriving at the reckoning from these data are known as *plane sailing, middle-latitude sailing*, etc. (See SAILINGS.) But the data themselves are liable to numerous uncertainties and errors, owing to currents, leeway (q.v.), fluctuations of the wind, changes in the declination of the compass, etc.; and therefore the results arrived at by the dead reckoning have to be corrected as often as is possible by observation of the heavenly bodies. See NAVIGATION; LATITUDE AND LONGITUDE; COMPASS.

DEAD SEA (Heb. *yām*, sea, or *yām hammelach*, salt sea, Gk. *θάλασσα τῶν ἁλῶν, thalassa tōn halōn*, salt sea, *ἀσφαλτίτις λίμνη, asphaltitis limnē*, asphalt lake, *Σοδομῖτις λίμνη, Sodomitis limnē*, lake of Sodom, or *θάλασσα νεκρά, thalassa nekra*, Dead Sea, Lat. *mare mortuum*, Dead Sea, Ar. *Bahr Lūt*, sea of Lot). An inland lake, on the southeastern borders of Palestine (Map: Palestine, C 4), in which the course of the Jordan terminates. It forms a part of the deepest chasm on the earth's surface and has no outlet. The Jordan valley begins to sink below the level of the Mediterranean in the neighborhood of Lake Huleh, about 90 miles north of the Dead Sea. The Lake of Gennesaret is 680 feet below sea level, and the Dead Sea about 1292 feet. On the east the high plateau of Moab rises 3100 feet above the Mediterranean, about 4400 feet above the Dead Sea; on the west the plateau of Judæa rises about 2000 feet above the sea. The shores are abrupt, in many places precipitous; the formation is chiefly limestone, though on the eastern side sandstone also appears, and except in the deltas formed by larger streams, on the peninsula, and at Engedi, where there is water, there is scarcely any vegetation or animal life. The Dead Sea is fed mainly by the Jordan from the north, draining the larger part of Palestine; several smaller streams also empty into it, chiefly from the east. The quantity of water poured into this closed sea by the various streams is estimated at 6,000,000 tons daily, all of which is carried off by evaporation. The most important are the Wady Zerka Ma'in (the stream of Callirrhoe), Wady Mojib (Arnon, q.v.), Wady-el-Dera'a and Wady-el-Hesa on the east; Wady Tufileh on the south; Wady-el-Nar (Kedron) on the west. The length of the Dead Sea is 47 miles, its greatest breadth 9½ miles, and its area 340 square miles. The southern end is a swampy tract covered by water in the rainy season, so that the actual length of the lake varies by 2 or 3 miles according to the time of the year. From the eastern shore a peninsula juts out into the lake and extends towards the north for about 12 miles. De Saulcy, De Luynes, and others have called this peninsula *al Lisan*, 'the tongue,' but it is apparently the southern bay to which the expressions *al lisan*, 'the tongue,' and *lisan al bahr*, 'the tongue of the sea,' refer, just as in the case of the corresponding Hebrew words in Josh. xv. 2, 5, xviii. 19, as Schmidt was told on the peninsula. It is formed of white calcareous marl, salt, and gypsum, and rises 40 to 80 feet above the water, but with a range of hills attaining a height of 300 feet. South of this peninsula the lake is comparatively shallow (10 to 18 feet), while the greatest depth north of it is 1300 feet. In the southwestern corner is Jebel Usdum, or the Mountain of Sodom, over 4 miles in length, ½ mile wide, and from 400 to 600 feet in height. Inside this mountain there is an interesting grotto in the salt. The level of the water varies considerably with the season; during the last 40 years it seems to have been rising, at least in the northern part of the lake. The water contains at the depth of 1000 feet 27 per cent of solid substances—common salt, chloride of magnesium, chloride of calcium, and many other ingredients. From the chloride of magnesium the water receives its bitter taste, from the chloride of calcium its oily appearance and feeling. The specific gravity is 1.166, and the human body easily floats on the surface. The lake contains no life of any kind, with the exception of a few microbes, and sea fish put into its waters soon die. The Dead Sea has presented substantially the same appearance since the beginning of the Quaternary period. As a result of the elevation of the whole region out of the sea, after the close of the Eocene period, a fault or fracture was produced running the whole distance from the Gulf of Akabah to the base of Mount Hermon. During the Pleiocene and Pleistocene epochs the character of the depression was considerably changed. The large rainfall and the melting of the snows of Mount Lebanon, during the subglacial period, added greatly to the volume of water pouring into the Jordan valley and formed a lake that included Lake Huleh, the Lake of Galilee, and the Dead Sea. There is evidence that the water once stood as much as 1180 feet above its present level. At a subsequent stage it seems to have been only 378 feet higher than now. As the rainfall diminished and the climate grew warmer, evaporation increased. Beds of bituminous marl are found near the lake, and bituminous masses float on its surface, particularly at times when there are seismic disturbances. The region is not, as has been supposed, volcanic. The subsidence of the land in the southern part of the lake may have given rise to the story of the four cities that were overthrown, Sodom, Gomorrah, Admah, and Zeboim (Deut. xxix. 23). The name "Bahr Lut," or its equivalent, cannot be traced beyond the period of Moslem occupancy. In the Fourth Book of Ezra (v. 7) the lake is called *mare Sodomiticum*. This name is also found in the Talmud and in Edrisi (iii. 5). There is no passage in the canonical books of the Bible distinctly connecting the Dead Sea with Sodom and Gomorrah. "The vale of Siddim" is explained in Gen. xiv. 3 as "the Salt Sea." It is held by some scholars that this is a gloss coming from a copyist who erroneously supposed that the lake was once in historic times dry land. By others it is maintained that "The Vale of Siddim" refers to what now is the southern end of the sea, below the peninsula, which appears to have been formed in historic times. But the writer of Gen. xix. did not think of an inundation as causing the destruction of Sodom and Gomorrah, but of a rain of fire and brimstone from heaven.

There has never been much navigation on the Dead Sea. Strabo (vi, 2) and Diodorus (xix, 25) tell of the floats on which men fished for

bitumen. The Bordeaux pilgrim saw no boat in 334 A.D.; but on the Madeba map (sixth century) there are two. In 1151 Maurice, Duke of Montreal, permitted the Knights of St. John to navigate on the Dead Sea without paying any customs duties. In the sixteenth century floats are mentioned again. Costigan in 1835, Moore and Beke in 1837, Symonds in 1841, and Molyneux in 1847 ventured out in boats, but did not get so far as the peninsula, and Costigan and Molyneux lost their lives in the attempt. Four scientific expeditions—those of Lynch in 1848, De Luynes in 1864, Schmidt in 1905, and Abel in 1911—have visited all parts of the sea, including the southern bay. In the twelfth and thirteenth centuries there were several centres of the sugar industry at the southern end, on the peninsula, between this and the Arnon, and near Jericho. In one of these, north of the peninsula, an aqueduct and the remains of a building, probably going back to Roman times, were discovered by Schmidt. The most fruitful journeys around the lake on land were those of De Saulcy in 1851 and Tristram in 1871. It is interesting to observe that the desolation and sterility characteristic of the Dead Sea were regarded as something abnormal, and that prophets predicted a future change to fertility and life through a fountain flowing down from the temple in Jerusalem and healing the waters (Ezek. xlvii. 1–12, Zech. xiv. 8, and perhaps also Joel iii. 18). Consult: Reland, *Palæstina*, vol. i, p. 238 (1714); Schubert, *Reise in das Morgenland* (1837); Ritter, *Erdkunde*, vol. ii (1850); Tobler, *Topographie von Jerusalem*, vol. ii, pp. 906 ff. (1854); Fraas, *Das Todte Meer* (1867); Lynch, *Narrative of the United States Expedition to the Dead Sea* (1849); De Saulcy, *Voyage autour de la Mer Morte*, vol. i (1853); De Luynes, *Voyage d'exploration à la Mer Morte* (1874 et seq.); Stoppani, *Il Mare Morto* (1875); Tristram, *The Land of Moab* (2d ed., 1874); Falcucci, *Il Mare Morto e la Pentapoli del Giordano* (1881); Guérin, *Description de la Palestine: Samarie* vol. i (1874); Hull, *Mount Seir* (1889); Gautier, *Autour de la Mer Morte* (1901); Schmidt, *Fifth Annual Report of the Director of the American School for Oriental Study and Research* (1905); id., "The River Arnon," in *Journal of Biblical Literature* (1905), and "The East Coast of the Dead Sea and the Ruins in Wadi Suweil," ib. (1906); Abel, *Une croisière autour de la Mer Morte* (1911); Blanckenhorn, *Das Todte Meer* (1898); id., *Naturwissenschaftliche Studien am Toten Meer und im Jordanthal* (1912).

DEAD'WOOD. A city and the county seat of Lawrence Co., S. Dak., in the extreme western part of the State, about 170 miles (direct) west of Pierre, on the Chicago and Northwestern, and the Chicago, Burlington, and Quincy railroads (Map: South Dakota, A 3). It has a United States assay office, where $8,000,000 in gold is handled annually; the Stilwell Curio Museum; a Carnegie library, and a government building. The city is the distributing and financial centre for the mining region of the Black Hills, yielding gold, lead, silver, and tin. There are smelting and cyanide reduction works, planing mills, machine shops, brewery, a foundry, brick and lime works, and a large sliming plant. Deadwood was settled in 1876. Pop., 1900, 3498; 1910, 3653.

DEAF-MUTE. A person who is deaf and dumb. Those who are born deaf or who lose their hearing at a very early age are also dumb, because they have not learned to speak by hearing others speak. They should not, therefore, be classed with those who cannot articulate words because of defect in the speech centres of the brain or disease of the organs of articulation. Persons who have learned to speak and then become deaf do not become mute, though the quality of voice used is often harsh and unnatural; and if the deprivation of hearing occurred in childhood, the voice often remains childish. Deafness from birth (congenital deafness) is probably due to arrest of development in the embryo. The condition is found in certain instances as a family trait, in families with neurotic inheritances. Alcoholism and insanity are found in such families; and, besides these, parental syphilis is frequently a causal influence in producing congenital deafness. The intermarriage of near relatives who inherit similar disease tendencies has been a large factor in the production of deaf offspring. Boudin, of Paris, asserts that about 25 per cent of the deaf-mutes of France are the offspring of consanguineous marriages. In England Buxton places the figures at 10 per cent in his experience. Bemiss, of Louisville, Ky., records that over 10 per cent of the deaf and dumb throughout the country at large are the offspring of kindred parents. Howe, of Boston, gave similar testimony. Since the educational opportunities and social status of deaf-mutes have been improved, marriages among them are common. Such unions are only slightly less productive than normal marriages. Of 3078 couples 14.1 per cent were without offspring, and the average number of children among them was 2.61 per cent. The principal causes of acquired deafness are noted under DEAFNESS.

In early historical times statesmen, lawyers, and philosophers agreed that deaf-mutes were incapable of being educated. Legally deaf-mutes were then almost everywhere in the same position as idiots and madmen. The Roman law held them to be incapable of consent and consequently unable to enter into a legal obligation or contract. In France deaf-mutes were considered a disgrace to their parents and were kept in seclusion in convents and asylums. Yet examples of considerable capacity on the part of deaf-mutes were not unknown in ancient times and in the Middle Ages. Pliny mentions a successful deaf-mute painter at Rome. The Venerable Bede, about the close of the seventh century, gives an account of a dumb youth who was taught by an early English bishop, St. John of Beverley, to repeat words and sentences after him. Rodolphus Agricola, of Groningen (1442–85), mentions a deaf-mute who had received instruction and could write.

The credit for the first systematic examination of the problem from a philosophical point of view is due to Jerome Cardan (q.v.), whose conclusion was that "written characters and ideas may be connected together without the intervention of sounds." This authoritative declaration had the effect of arousing widespread interest in the problem, and Pedro Ponce de León (1520–84), a Spanish Benedictine monk, undertook to give regular instruction to the deaf and dumb. Pasch, a clergyman of Brandenburg, was the next teacher of note, and he was followed by Juan Pablo Bonet, secretary to the Constable of Castile, Spain, also a Benedictine monk. Bonet published a work in 1620, which is the earliest-known treatise on the sub-

ject and which probably embodied the ideas of Cardan. It contained a manual alphabet differing much from that described by Bede and in the main identical with the single-hand manual in use to-day. The treatise of Dr. John Bulmer, an English physician, followed in 1648; and this was succeeded by the work of Dr. Wallis, an Oxford professor of mathematics. In 1669 Dr. William Holder, rector of Bletchington, published a similar work, and in 1670 George Sibscote put forth another work. A very able and philosophical treatise was published in 1680 by George Dalgarno, of Aberdeen, Scotland, which received high praise from Leibnitz, together with an earlier work, to which Wallis and Wilkins are both said to be indebted. In the first rank among early teachers of deaf-mutes stands John Conrad Amman, a Swiss physician residing in Amsterdam, who in 1692 reduced the methods then known to an exact art, as described in his *Surdus Loquens*. France, late to recognize the possibilities of deaf-mute instruction, furnished many enthusiastic advocates of it, as Père Vanin, Ernaud, Rodriguez Pereira (a Spaniard who settled in France), and the Abbé Deschamps. Preëminent stands the Abbé Charles Michel de l'Epée (1712–89), of Paris, who systematized the instruction of deaf-mutes in France in 1760 in his own school. His successor, Sicard, as well as Itard, followed his methods. It was in 1760, also, that Thomas Braidwood established, at Edinburgh, the first private school for deaf-mutes in the British dominions. This school, in which Wallis's plan of instruction was followed, was the model of the earlier British institutions. In 1783 this school was removed to Hackney, London, and probably led to the establishment of the London Asylum in 1792. Dr. Joseph Watson, a nephew and former assistant of Braidwood, was its first principal.

Institutions. The first public school for deaf-mutes was established at Leipzig in 1778, under the direction of Samuel Heinecke (1720–90). The systematic instruction of the deaf and dumb, and the intelligent organization of institutions in which to educate them, date from the early part of the nineteenth century. An essay on *Teaching the Deaf to Speak*, by Dr. W. Thornton of Philadelphia, was published in 1793, and in 1811 a grandson of Braidwood tried to establish schools in New York and in Virginia, but failed in both instances. The circumstances which led to the opening of the Connecticut asylum at Hartford, April 15, 1817, are as follows: A deaf-mute little girl in the family of Dr. Cogswell, an eminent physician in Hartford, attracting some attention, it was soon afterward found that there were other deaf-mutes in the country. It was decided to send some one abroad to acquire the art of educating them; and to establish a school for this purpose funds were raised, and the Rev. Thomas H. Gallaudet was selected for this work. He left the United States, May 15, 1816, to execute this mission. The institution was incorporated by the Connecticut Legislature in May, 1816, with an appropriation of $5000. Dr. Gallaudet returned to America in August of the same year, accompanied by Laurent Clerc, a deaf-mute pupil of the Abbé Sicard, and they immediately began collecting funds to start the school. The enterprise excited general interest; individuals and churches contributed liberally, and the sum of $12,000 was raised in the course of a few months. Early in 1819 Massachusetts followed the example of Connecticut by providing for the education in the asylum of 20 indigent pupils from that State. The appropriation was afterward enlarged so as to meet the demands of this entire class. New Hampshire made a similar provision in 1821, and Vermont and Maine in 1825. In 1834 South Carolina and Georgia decided to send their indigent deaf-mutes to the asylum, and in 1848 Rhode Island came into the same arrangement. In 1819 Congress made a grant to the institution of 23 sections of wild land, the proceeds of which now form a fund of $339,000. It was owing to this munificent gift that the name of the school was changed to the "American Asylum." Before the school at Hartford was in operation, efforts had been made to establish a similar institution in the city of New York; a society was formed which was incorporated April 15, 1817, as the "New York Institution for Instruction of the Deaf and Dumb." Watson's book was taken as a guide, and articulation was taught in cases where the scholar appeared to possess the necessary aptitude. But this method did not prove very successful; and in 1827 the Legislature, which had provided since 1822 for the support of 32 pupils, authorized an investigation by the superintendent of common schools of the State, who recommended in his report the introduction into the New York school of the improved methods in use at Hartford and Philadelphia. In consequence of that recommendation, the directors finally succeeded in engaging, in 1831, the permanent services of Harvey P. Peet, then one of the most efficient instructors in the American Asylum. He served as principal from 1831 to 1867 and had a worthy successor in his son, Isaac Lewis Peet. Under the management of these two able teachers the institution has taken a place among the most successful schools for deaf-mutes in the world. Its grounds comprise about 26 acres, upon the banks of the Hudson River at Washington Heights, New York City. The institution has a shoe shop, tailor shop, and carpenter shop, a printing office, garden, and sewing rooms connected with the school, in which the pupils receive competent instruction to prepare them for self-support by manual labor, as in all our large asylums. The Pennsylvania institution was organized at Philadelphia in 1820 by Joseph Seixas, a Portuguese Jew. Laurent Clerc was an instructor in it, as was Lewis Weld, its first principal. The Kentucky Asylum for Deaf-Mutes was incorporated at Danville in 1823. The Ohio institution was opened in Columbus in 1829. Virginia, Indiana, Tennessee, Illinois, North Carolina, Georgia, South Carolina, Missouri, Wisconsin, and Michigan followed the example during the succeeding quarter century, and now every State in the Union has an institution in which deaf-mutes receive the privileges of education "as wards of the commonwealth." In most cases the State institutions are supported by annual legislative appropriations. This public provision includes expenses of transportation to and from the institution and all expenses while there. Most of the State institutions have school years corresponding to those of the public schools, and it is expected that friends or relatives will keep the children during the long summer vacation. The average term of attendance is about five years, but the

legal period of instruction in most States is seven years. The average cost to the State is about $325 per year. According to the report of the Commissioner of Education for the year ending June 30, 1912, there were in the United States, in 1911–12, 141 schools (both public and private), with 13,690 pupils. The following table gives details regarding these:

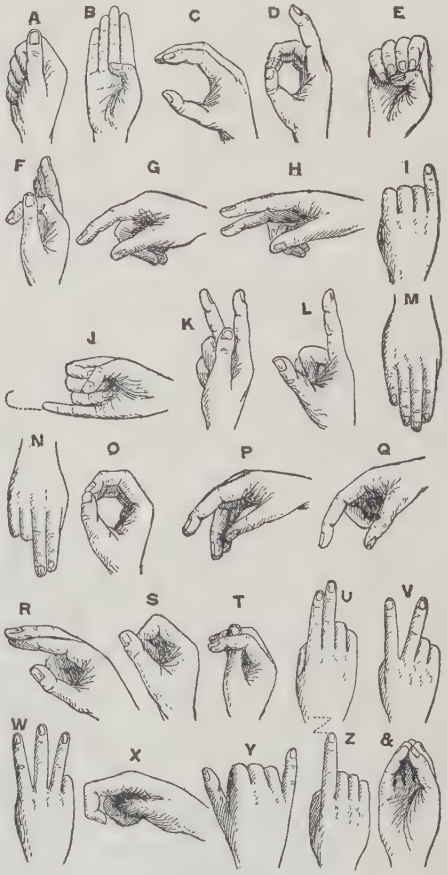
	State institutions	Public day schools for the deaf	Private schools
Number of schools	64	58	19
Male teachers	410	10	15
Female teachers	930	229	69
Total	1,340	239	84
Male pupils	6,057	949	217
Female pupils	5,187	979	301
Total	11,244	1,928	518
Graduates, 1912	130	2	1
Taught by oral method	6,596	1,798	373
Auricular method	340	33	18

Public day schools for the deaf now exist in California (4), Illinois (3), Louisiana (1), Massachusetts (1), Michigan (14), Missouri (1), New Jersey (2), New York (2), Ohio (6), Oregon (1), Washington (2), and Wisconsin (21).

Besides those already mentioned, the names of the following Americans should be recorded as especially associated with the education of deaf-mutes: Dr. F. A. P. Barnard, for many years president of Columbia College, New York City; William W. Turner, of Hartford; Abraham R. Walton, of Philadelphia; John A. Jacobs, of Kentucky; Dr. Samuel G. Howe, of Boston; and Thomas and Edward M. Gallaudet, sons of the Rev. Thomas H. Gallaudet.

Some very remarkable examples of acute perception and great proficiency in deaf-mutes have been recorded, notably the cases of Julia Brace, a pupil of Dr. Thomas H. Gallaudet, of Hartford; Laura Bridgman (q.v.), the celebrated blind deaf-mute, a pupil of Dr. Howe, of Boston; and Helen Keller (q.v.), of Boston, a lady of wide information and great intelligence.

Methods of Instruction. Two methods of instruction are used in teaching the deaf and dumb—by the *sign language* and by *articulation*. By means of the sign language ideas are communicated to the pupil through posture, gesture, facial expression, and mimic acting by the teacher. Nothing is spelled with the hands in this method, as is erroneously supposed. Putting the hand to the head, as if putting on a cap, is the sign for "man," for example. This is an arbitrary sign. An example of a natural sign is raising the hand to the mouth and then chewing, to express "food." The sign language is easily and speedily acquired and is said to be understood and used by the American Indians. The use of an elaborate sign language was carried to such extremes by the Abbé de l'Epée and his followers, Abbé Sicard and Abbé Storck, that their pupils relied entirely upon their memory, without any corresponding ideation. They proved to be incapable of composing sentences voluntarily, but simply memorized the gesture of the master. In some schools, after the pupil has become proficient in the sign manual, the use of the alphabet is introduced. The one-handed and two-handed alphabets are shown in the figures. Almost all pupils find the acquisition of *articulation*, or lip reading, easier than that of the manual alphabet. In teaching by articulation the pupil watches the lips and tongue of the teacher and, by imitation of the motions seen, is able to speak. Consonants are taught first, and then the vowels. During the pronunciation of some sounds the pupil grasps the teacher's throat and imitates the vibration and position of the muscles. This method is very slow, and pupils gain more general knowledge and with greater ease by the use of the *sign language*. In the celebrated Clarke school at Northampton, Mass., the old method of articulation was employed for a considerable time,



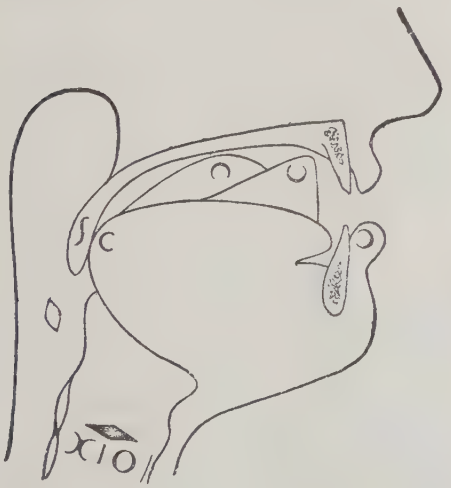
ONE-HANDED ALPHABET.

but has been displaced by the Bell system. The method of teaching articulation by *visible speech* was invented by A. Melville Bell, professor of vocal physiology in Edinburgh, who introduced it in 1848. It was perfected and first used in the schools of Great Britain in 1869. In 1872 it was introduced into the Northampton school

by A. Graham Bell, the son of the inventor of the method. The Bell system consists of a series of phonetic characters based on the position of the vocal organs when in action. The charac-

TWO-HANDED ALPHABET.

ters suggest to the eye the mechanism of speech in the formation of every possible sound that can be uttered. The following explanation of the system and of the characters is taken from Bell's *English Visible Speech in Twelve Lessons* (Washington, D. C., 1895). Dr. Bell adds that



Back of tongue

Top of tongue

Nasal passage open

Glottis, closed

Point of tongue

Glottis, vocalizing

Lips

" open (aspirate)

Throat aspirate (whisper)

A curved line means a consonant.
A straight line means a vowel.
A line within a curve means a vocal consonant.

CONSONANTS

The direction of the curve denotes:

To left — formation by back of tongue.

To right — formation by lips.

Convex above — formation by top of tongue.

Concave above — formation by point of tongue.

The varieties of curves denote:

Primary — central emission of breath.

Divided — side emission of breath.

Mixed — central emission of breath.

Mixed divided — side emission of breath.

(Mixed and Mixed divided: with modification by two parts of the mouth.)

Shut — oral stoppage of breath with emission through the nose.

Nasal — oral stoppage of breath.

VOWELS

A point or a hook on a straight line denotes the vowel positions of the tongue. Thus:

On left side of line, back of mouth.

On right side of line, front of mouth.

On both sides of line, mixed back and front.

At top of line, high.

At bottom of line, low.

At both ends of line, mid elevation.

A cross bar on a line denotes rounding or contraction of the lips. Thus:

The symbols have the same value in all languages. Consequently, when the meaning of the symbols is known, the sound of any language may be deduced with certainty from their visible speech writing.

these explanations are for teachers only, for learners do not require to know the theory of the system.

Statistics. The number of deaf-mutes bears a certain relation to the population, being far greater in countries wherein squalor, privation,

or medical ignorance and unhygienic conditions prevail. The ratio of deaf-mutes to population is as follows, for the different countries named: Sardinia, 1 to 760; Nova Scotia, 1 to 880; Ireland and Norway, 1 to 970; France, 1 to 1200; Prussia, 1 to 1675; England, 1 to 1970; Holland, 1 to 2000; United States, 1 to 2400.

Bibliography. A. Graham Bell, *Deaf Mute Instruction in Relation to the Work of the Public Schools* (Washington, D. C., 1884); Garrett, *Directions to Parents of Deaf Children* (ib., 1886); E. M. Gallaudet, *The Combined System of Educating the Deaf* (ib., 1891). The Volta Bureau, Washington, D. C., issues many publications upon the subject, among which may be noted: Fay, *Marriages of the Deaf in America* (1898); Arnold, *Manual for Teaching the Deaf; Histories of American Schools for the Deaf.* Consult also Horne, *Hereditary Deaf-Mutism* (London, 1909), and Winnie, *History and Handbook of Day Schools for the Deaf and Blind* (New York, 1912).

DEAFNESS, dĕf'nĕs (AS. *dēaf*, OHG. *toup*, Ger. *taub*, Goth. *daubs*, deaf; probably originally dull of sense; cf. MHG. *tump*, stupid, OHG. *tumb*, deaf, dumb, Gk. *τυφλός, typhlos*, blind). Complete or partial imperfection of hearing that may affect both ears or one, may and may not date from birth, and may be either permanent or temporary. Among the numerous possible causes of deafness the following deserve mention here: (1) wax in the ear touching the drum membrane; (2) swelling of the lining membrane of the Eustachian tubes, the canals that lead from the upper part of the throat to the middle ear, one on each side; (3) perforation of the drum membrane; (4) middle-ear disease, during which exudation accompanying inflammation collects behind the drum membrane or about the ossicles (the small bones of the ear), or during which adhesions form between the ossicles, stiffening their joints so that they cannot move freely against each other; (5) internal-ear disease, either labyrinthine trouble or affection of the eighth nerve; (6) diseases of the brain involving some of the auditory centres; (7) mumps, measles, scarlet fever, and some other diseases, are accompanied by middle-ear disease; (8) quinine and the salicylates cause temporary deafness; (9) sudden concussion sometimes ruptures the drum of the ear, and constant noise, like that in a boiler shop, injures the auditory nerve from overexcitation.

The treatment of deafness depends, naturally, upon its cause. Wax should be removed by syringing or the cautious use of the curette. Closure of the Eustachian tubes is treated by catheterization and local applications. In cases of perforation the drum may grow again, after the cure of middle-ear disease, or may be remedied by the application of a disk of thin gutta-percha tissue. Middle-ear diseases may be cured by treatment through the Eustachian tubes, or purulent cases may require the operation of opening the accessory cavities of the ear situated in the mastoid process of the temporal bone through the skull back of the auricle. The ossicles may be removed in part, leaving the foot plate of the stirrup bone in position, closing the oval window in the labyrinth, and clearing out the remains of the drum membrane; in which case the waves of sound strike the stirrup plate in place of the drum membrane and are conducted to the nerve filaments. Internal-ear disease may be relieved by internal medication, but is generally permanent. See EAR; DEAF-MUTE; NERVOUS SYSTEM.

DEÁK, dĕ'äk, FERENCZ (FRANCIS) (1803–76). An Hungarian statesman, born at Söjtör, in the County of Zala. He studied law at Raab, practiced as an advocate in his native county, and soon became noted for his eloquence and enlightened patriotism. Elected in 1832 to the National Diet, Deák, as leader of the Liberal opposition, resisted every attempt of the Imperial government to infringe on the constitutional rights of Hungary. At the same time he labored for its internal improvement, promoting measures for the elevation of the peasantry, and advocated the abolition of exemption from taxes enjoyed by the nobility, of which he was himself a member. His views on the last point displeased a portion of his constituents, and he declined to serve in the Diet of 1843–44, but he continued to direct the policy of the Moderate Liberal party. After the revolution of March, 1848, he became Minister of Justice in the cabinet of Count Batthyányi (q.v.) and formed the project of effecting a general reform in the administration of justice in Hungary, which, however, the revolutionary war rendered impossible. Deák used every effort to ward off the struggle and to arrive at an arrangement with Austria. When the rupture seemed inevitable and the Committee of Defense was formed, with Kossuth at its head, Deák resigned his portfolio. At the close of 1848 he was sent to the camp of the Austrian commander, Windischgrätz, to negotiate for peace, but the attempt failed. Deák was arrested, but was soon released and took up his abode at Pest. Though repeatedly invited to act as mediator between the dynasty and the Hungarian nation, Deák did not return to public life until 1860, when Francis Joseph promised to restore to Hungary its constitutional liberties. Returned by the city of Pest to the Diet in 1861, he became the acknowledged leader in that assembly. In May the Diet appointed him to draw up the address to the Emperor. This address demanded the restoration of the constitution of 1848 and an independent Hungarian ministry. The Emperor thereupon announced the dissolution of the Hungarian Diet. A new effort to reach an agreement was made in 1865, and, after the disastrous issue of the war between Austria and Prussia in 1866, the Emperor found himself compelled to accede to all the demands of Hungary, as formulated by Deák. The Austrian monarchy was reorganized on its present dualistic basis, and Francis Joseph was crowned with great pomp as constitutional King of Hungary in 1867. Deák remained until his death (Jan. 29, 1876) the leader of his party in the Diet. Deák is universally admitted to have been one of the ablest of European statesmen. He was a man of the loftiest character, kindly and simple in his ways. As an orator, he was irresistible by the sheer force of his logic. Consult: Forster, *Francis Deák, Hungarian Statesman* (London, 1880); Laveleye, "Ferencz Deák," in *La Prusse et l'Autriche* (Paris, 1870); Csengery, *Franz Deák*, authorized German translation by Heinrich (Leipzig, 1877–78).

DEA'KIN, ALFRED (1856–1919). An Australian statesman, born in Melbourne. He studied at the university of his native town and was elected to the Victorian Parliament in 1879. In 1883 he was Colonial Minister of Public Works and in 1885 became Solicitor-General. Two years later he represented Victoria in the Imperial

Conference at London and subsequently took active part in the movement for Australian federation. He was Attorney-General in the first Commonwealth ministry (1901–03), and in the latter year succeeded Sir Edmund Barton as Premier and leader of the Protectionist party. His ministry was overthrown in April, 1904, but he formed a new government in July, 1905, serving as Prime Minister in 1905–08 and in 1909–10. He represented Australia at the Imperial Conference (1907), and was leader of the Federal opposition from 1910 to 1913, when he retired from political life. His publications include *Irrigation in Australia* (1893) and *Temple and Tomb* (1894).

DEAL (formerly *Dole*, from Icel. *dalr*, Norw. *dal*, Eng. *dale*). A municipal borough, market town, and sea-bathing place, in Kent, England, on the North Sea, between North and South Foreland, 8 miles north-northeast of Dover (Map: England, H 5). The fine anchorage of the Downs, about 8 miles long by 6 miles wide, formed by the Goodwin Sands, lies off Deal. The town is composed of Lower Deal, on the coast; Middle Deal, and Upper Deal, the original settlement, once on the coast, but now about a mile inland. The chief branches of industry are connected with maritime pursuits, boat building, sail making, "hoveling"—i.e., piloting, the term being perhaps derived from the use of hovels on the shore—victualing, and naval stores. Deal hovelers have long been famous for their skill and fearlessness as seamen and life-savers. Pop., 1901, 10,581; 1911, 11,297. Deal has been one of the Cinque Ports since the thirteenth century. The coast near Deal was formerly defended by four castles: Deal, built by Henry VIII in 1539; Sandown, about a mile to the east, where Colonel Hutchinson, the Puritan soldier, was imprisoned and probably died; Sandgate, and Walmer. Sandown Castle was removed on account of the inroads of the sea. Walmer Castle, in which the Duke of Wellington died in 1852, is now the official residence of the Lord Warden of the Cinque Ports (q.v.). Julius Cæsar, with two legions in 82 ships, is believed by some to have landed at Deal in 55 B.C.

DEAL (Dan. *deel*, Ger. *Diele*, board, plank, AS. *thel*, plank, *thille*, board). The trade name in England for fir boards exceeding 6 feet in length and 7 inches in width. Pieces of smaller section are called battens. Deals are usually 3 inches thick, and when sawed into thinner pieces they are called boards. When a deal is sawed into 12 or more thin planks, they are called leaves. These terms are not used in the United States (except *batten* for a long, narrow, flat strip).

DEALEY, JAMES QUAYLE (1861–). An American university professor and writer on social science. He was born at Manchester, England, but early came to the United States, graduated from Brown University in 1890, and spent five years in advanced work. For several years he taught in Texas and Vermont, but he returned to Brown to be an instructor in Latin from 1893 to 1895, and after that professor of social and political science. His publications include: *Textbook of Sociology* (1905), with Lester F. Ward; *Our State Constitutions* (1907); *The Development of the State* (1909); *Sociology* (1909); *Ethical and Religious Significance of the State* (1910); *The Family in its Sociological Aspects* (1912).

DEALFISH (*deal*, a board, plank; refers to the shape of the fish). A ribbon fish (q.v.), especially of the genus *Trachypterus*.

DEAM'BULATORY (Lat. *deambulatorium*, a gallery for walking, from *deambulare*, to walk abroad, to promenade). The same as AMBULATORY (q.v.).

DE AMICIS, dā ä-mē'chēs, EDMONDO. See AMICIS, EDMONDO DE.

DE AMICITIA, dē ăm'ĭ-sĭsh'ĭ-a, or **LÆ'LIUS.** A treatise by Cicero on friendship, written in 44 B.C., and dedicated to Titus Pomponius Atticus. The time is supposed to be 129 B.C.

DEAN (ME. *deen*, OF. *deien*, Fr. *doyen*, from Lat. *decanus*, one set over ten persons, from Lat. *decem*, Gk. δέκα, *deka*, Skt. *daśa*, ten). The title of certain dignitaries, particularly ecclesiastical and academic. In the ecclesiastical sense the title was originally adapted from the Roman civil administration, in which were officers called deans, mentioned in the codes of Theodosius and Justinian. It was at one time customary in the monasteries to appoint a *decanus* over every 10 monks, to take charge of their discipline. On the introduction of the canonical life (see CANON) among the clergy attached to cathedrals, this title was applied in many places to the head of the chapter (q.v.); but as early as the time of St. Jerome it was customary to have a similar officer attached to the bishop's immediate staff under the title of *archipresbyter*. In modern German cathedrals the dean is frequently subordinate to the provost, and has executive and partly secular functions. He is appointed usually by the bishop, but sometimes by the sovereign or the chapter. The deans of English cathedrals are appointed by the crown and required to reside for eight months in the year. The income of the office varies from £3000 in the case of Christ Church, Oxford, down to £500 at Chichester.

In this sense the title is used in a few dioceses of the American Episcopal church, though the functions connected with it are generally rather vaguely defined. There are also in England *deans of peculiars*, the incumbents of certain churches formerly, though not now, collegiate, as of Battle, in Sussex, founded by William the Conqueror, in memory of his conquest; of Bocking, in Essex; and of Croydon, in Surrey. The deans of Westminster and Windsor are also deans of peculiars, the Abbey and St. George's Chapel being exempt from the jurisdiction of the bishops in whose diocese they are situated. There have been also from very ancient times, both in England and on the Continent, *rural deans*, whose duty it is to visit a certain number of parishes and report on their condition to the bishop; the more important and formal part of their functions has, however, been transferred to the archdeacon. Similar officers in America are known as deans of convocations.

In the universities of Oxford and Cambridge the dean is the officer in each college who superintends its discipline, except in the case of Christ Church, Oxford, which is both cathedral and college, and where the dean is head of the college. The title is still sometimes used in America in its earlier sense as designating the presiding or senior officer of an academic faculty. In German universities each faculty elects a dean annually, who presides over its meetings, represents it in external relations, and supervises both teachers and students.

In a special sense the word is applied to the oldest member in length of service of a body of

persons of equal rank, such as a diplomatic corps, or to the president of an incorporated body of lawyers. It is in the latter sense that the chief judicial officer of the Archbishop of Canterbury is called the Dean of the Court of Arches. The dean of the Sacred College is the senior Cardinal Bishop, who always occupies the see of Ostia. He presides at the meetings of the Sacred College in the absence of the Pope. He has the privilege of wearing the *pallium* in all ceremonies pertaining to his office, of consecrating the newly elected Pope in case he should not be already a bishop, and in any case of presiding at the coronation ceremonies. See CARDINAL.

DEAN (AS. *denn*, valley), FOREST OF. A hilly tract, 22,000 acres in extent, in the west of Gloucestershire, England, between the Severn and the Wye. It is partly crownland. It was formerly a vast source of timber supply for the British navy, and half of it still remains inclosed for that purpose. It contains oak, beech, and other woods, orchards, stone quarries, and coal and iron mines. The iron shafts have been worked since Roman times. A populous mining district, it gives its name to a parliamentary division which includes nearly all of Gloucestershire west of the Severn.

DEAN, AMOS (1803–68). An American lawyer and law writer. He was born in Barnard, Vt., and graduated at Union College in 1822. He soon gained recognition as a lawyer of ability and learning, and his treatises on legal subjects were recognized as authoritative. In 1839 he became professor of medical jurisprudence in the Albany Medical School and in 1851 professor of law in the newly founded law school at Albany. He also served as chancellor and professor of history at the University of Iowa in 1855. His works include: *Lectures on Phrenology* (1835); *Manual of Law* (1838); *Philosophy of Human Life* (1839); *Medical Jurisprudence* (1854); *Bryant and Stratton's Commercial Law* (1861); an unfinished *History of Civilization* (7 vols., 1869–70); *The British Constitution* (1883).

DEAN, BASHFORD (1867–). An American zoölogist, born in New York City and educated at the College of the City of New York, where he graduated in 1886, at Columbia University, and in Munich and Naples. He taught at Columbia after 1891, becoming professor of vertebrate zoölogy in 1904. He also served (1900–01) as biologist of the United States Fish Commission, for which he made special investigations in Europe and Japan. In 1902 he became a member of the advisory board of the New York Aquarium, in 1903 curator of herpetology and ichthyology in the American Museum of Natural History, and in the same year curator of arms and armor in the Metropolitan Museum of Art. Besides papers on paleichthyology and the embryology of fishes, and reports to the United States Fish Commission, he is author of the textbook *Fishes, Living and Fossil* (1895).

DEANE, CHARLES (1813–89). An American author. He was born in Biddeford, Me., was educated at Saco, and in 1832 went to Boston, where he was a merchant for 22 years. He early acquired a taste for American history and at the time of his death had accumulated a valuable collection of rare Americana. Among his publications are: *Some Notices of Samuel Gorton* (1850); *Memoir of George Livermore* (1869); *The Forms in Issuing Letters Patent by the Crown of England* (1870). He also edited Bradford's *History of Plymouth Plantation* (1856); Wingfield's *Discourse of Virginia* (1860), in which was first seriously questioned the authenticity of the famous Pocahontas rescue story; and John Smith's *True Relation* (1866).

DEANE, JAMES (1801–58). An American physician and naturalist, born in Coleraine, Mass. He was the discoverer, in 1835, of the fossil footprints in the red sandstone of the Connecticut valley, later more fully investigated by Professor (afterward President) Edward Hitchcock of Amherst College. On this subject he wrote *Ichnographs from the Sandstone of Connecticut River* (1861). He also published many articles on medical subjects.

DEANE, SILAS (1737–89). An American diplomatist during the Revolutionary War, who passed the latter part of his life in England. He was born in Groton, Conn., graduated at Yale in 1758, was admitted to the bar in 1761, became an active member of the "patriot" party on the approach of the Revolutionary War, and was a delegate from Connecticut to the first and second Continental Congresses. In February, 1776, largely through the influence of Robert Morris, he was appointed by Congress business agent of the United States at Paris, where he entered upon his duties in July of the same year. Until Franklin's arrival he acted virtually as the official delegate of the United States to the French court and, besides securing and transmitting supplies, induced many French officers—sometimes by lavish and ill-advised promises—to take service in the American army. In December he, with Benjamin Franklin and Arthur Lee, went as commissioner from Congress to France. Soon afterward he was charged indirectly by Arthur Lee (q.v.) with having misappropriated part of the public funds, and towards the close of 1777 Congress sent a summons to him to return, ostensibly to communicate information concerning the attitude of European Powers towards the United States. Before this order reached him, he signed, together with the other commissioners, the treaties of commerce and alliance with France early in 1778. Immediately upon his return he was asked to surrender a detailed account of his financial transactions, but failed to satisfy Congress, which persistently refused to authorize a settlement of his accounts. In America he was defended by John Jay and John Adams. "No proof appears that he had been dishonest," says the historian Hildreth, "or had employed the public money in speculations of his own, as his enemies alleged; but he had occupied the unfortunate position of having large sums of public money pass through his hands before any proper system of vouchers and accountability had been established, and he fell before the same spirit of malignant accusation which presently assaulted Wadsworth, Greene, Morris, and even Franklin himself, but which they had better means of warding off" (*History of the United States*, iii, 269). Deane soon returned to France, largely for the purpose of straightening out his accounts, was forced to retire to Holland for a while, and subsequently became convinced that the Revolution was destined to fail and that the United States should again become Colonies of England. Late in 1781 *Rivington's Royal Gazette* (New York) published a series of "intercepted" letters written by him (at the instigation, it has been charged, of George III and Lord North) to prominent Americans, in which he strongly opposed the Declaration of Independence and the French alliance

and urged prompt submission to Great Britain. For this he was considered a traitor by a large element of the patriot party. In 1842 Congress at last adjusted Deane's accounts and paid to his heirs about $37,000. Dean published, in defense of his conduct, *An Address to the Free and Independent Citizens of the United States* (Hartford and London, 1784). A part of his correspondence in 1774–76 is given in the *Papers of the Connecticut Historical Society*, vol. ii (Hartford, 1891), and much of his diplomatic correspondence, together with a biographical sketch, may be found in Wharton (ed.), *The Revolutionary Diplomatic Correspondence of the United States* (6 vols., Washington, 1889). Consult also *The Deane Papers* (5 vols., New York, 1886–90), published by the New York Historical Society, and *Papers in Relation to the Case of Silas Deane* (Philadelphia, 1855), published by the Seventy-six Society.

DEAN OF GUILD. Formerly the head of trade guilds in Scottish towns; now a corporation official.

DEAN OF THE CHAPEL ROYAL. An office held by six (formerly three) clergymen of the Established church of Scotland, to which they are appointed by the crown. The benefice of the chapel royal, which was instituted by James V, was richly endowed. The duties of the office used to be merely nominal; but in 1846, on the foundation of a chair of biblical criticism in the University of Edinburgh, it was endowed with one-third of the revenues, the professor becoming one of the three deans. In 1858 the Universities Commission recommended that, when the requisite vacancies occurred, the revenues should be divided into six parts, attached respectively to the chairs of divinity and biblical criticism in Edinburgh University (the latter receiving two-sixths of the whole), biblical criticism in Aberdeen University, biblical criticism in Glasgow University, and church history in St. Andrews University. As a result of this arrangement, the revenues of the chapel royal are divided among the incumbents of the above-mentioned chairs. Besides these five deans, the dean of the Order of the Thistle bears the title of Dean of the Chapel Royal, but draws none of the revenues.

DEANS, David, Effie, and Jeanie. The family about which centred the plot in Sir Walter Scott's novel *The Heart of Midlothian.*

DEARBORN, Fort. See Fort Dearborn.

DEARBORN, Henry (1751–1829). An American soldier, born in North Hampton, N. H. He studied medicine and became a physician, but left his practice upon receiving the news of Lexington, entered the army as captain in 1775, served throughout the Revolution, and distinguished himself at Quebec (where he was taken prisoner), Saratoga, Monmouth, and Yorktown. After the war he settled in Maine, and was a Democrat Representative in Congress in 1793–97. He was Secretary of War under Jefferson from 1801 to 1809 and at the outbreak of the War of 1812 was appointed senior major general of the army and was assigned to the Northern Department. He captured Toronto (then York) and Fort George, but in July, 1813, was recalled, being charged with political intrigue, and was placed in command at New York. He resigned from the army in 1815. From 1822 to 1824 he was Minister to Portugal. His last years were spent in Roxbury, Mass.

DEARING, John Lincoln (1858–). An American missionary, born at Webster, Me. After graduating from Colby College in 1884 and from the Newton Theological Institution in 1889 he was ordained to the Baptist ministry and was sent by the American Baptist Missionary Union to Japan. He was president and professor of theology and ethics in the Yokohama Baptist Theological Seminary from 1894 until 1908, when he was appointed general missionary superintendent of the American Baptist Missionary Union for Japan, China, and the Philippines. He also lectured in the United States and in 1909–10 was engaged in the Laymen's Missionary movement. Besides contributions to religious periodicals, he is author of *Outline of Theology* (1895) in Japanese.

DEARTH, Henry Golden (1863–). An American landscape painter. He was born at Bristol, R. I., and studied at the Ecole des Beaux-Arts under Aimé Morot in Paris, and made New York his residence. He was elected to the National Academy of Design in 1906 and received medals at Paris in 1900, at Buffalo in 1901, and at Berlin in 1910. There is much charm in his carefully painted evening scenes; the color is rich, and he has the quality of atmosphere that gives every subject touched by him individuality. The scenery of Long Island and Connecticut is the theme of many of Dearth's paintings. Among the most important are: "Boulogne Harbor" (Metropolitan Museum); "An Old Church at Montreuil" (National Gallery, Washington); "In the Gloaming" (Detroit Museum); "Road and Canal" and "Gardenias" (Buffalo Academy); "Dreamland" and "Golden Sunset" (both in the Brooklyn Museum).

DEATH. The ultimate cause of death is stoppage of the heart and consequent arrest of the circulation. The tissues then die from lack of nourishment. Somatic death, or death of the body as a whole, occurs when the heart stops beating, but this can not be said of the various tissues: molecular death is a gradual process. Indeed Carrell has succeeded in keeping a state of suspended animation in tissues and organs of animals for months and then restored them to life by supplying the circulation. Muscles in dying undergo a remarkable change, namely *rigor mortis.* The phenomenon of *rigor mortis* or cadaveric rigidity is marked by several features. The muscle loses the translucency and elasticity possessed by living muscle and becomes firmer and more resistant to pressure. Chemically there is a large increase in carbonic acid, and the reaction of the muscle becomes acid, instead of alkaline, as in life.

It is not always easy to determine the precise moment when life becomes extinct. The phenomena of syncope, asphyxia, and particularly of the trance state, closely resemble those of death. Many signs and tests of death have been proposed. A common but fallible method is to hold a cold polished mirror before the mouth to determine if respiration has ceased. If it has not, the mirror will become cloudy. A cup of water placed on the chest will enable the observer to detect the slightest respiratory movement.

Richardson summarizes the more important tests of death as (1) absence of the pulsation of the heart, (2) absence of the respiratory murmur, (3) pressure on veins (fillet test), (4) electric test for muscular irritability, (5) the ammonia hypodermic test (Monteverde's sign), (6) coagulation of the blood in the veins, (7)

rigor mortis, (8) decomposition. The fillet test consists in applying constriction to the veins in the arm, which if life is present will cause the vein on the distal side to fill. After death no effect is produced. Monteverde's sign is evoked by the injection subcutaneously of a little ammonia solution. In life this will be followed by a port-wine congestion in the surrounding parts, whereas in death no effect is produced.

The more common causes of sudden death, excluding accidents, are cerebral hemorrhage; rupture of a gastric ulcer; valvular disease of the heart; angina pectoris; rupture of an aortic aneurysm; sunstroke; shocks of electricity; mental or physical shocks; diabetic coma; and uremia. See BURIAL; CREMATION; MORTUARY CUSTOMS.

In law, any event which extinguishes the civil rights of a person. This was the ordinary and natural consequence of *natural* death, but at common law it resulted equally from *civil* death. As Blackstone states it, "the civil death commenced if a man was banished or abjured the realm by the process of the common law, or entered into religion; that is, went into a monastery and became there a monk professed; in which cases he was absolutely dead in law, and his next heir should have the estate." A person incurring civil death might, "like other dying men," make his last will and testament and appoint executors to administer his estate. Civil death has been abolished in England and has never in the strict sense of the term been recognized in the United States.

The normal effect of death in law is, as intimated above, to extinguish the civil rights of the deceased. It was, indeed, the right and duty of his personal representative to enforce certain obligations due the deceased, as debts and sums of money due on contract, but tort actions and other actions of a personal nature died with him. Thus while a person injured as the result of another's negligence was entitled to maintain an action therefor, the action abated in the event of the death of the plaintiff; while, if a person died as the result of such an accident, no legal remedy existed. This injustice was remedied by the Act of Parliament, known as Lord Campbell's Act, in 1842 (9 and 10 Vict., c. 93), which gave an action for unlawfully causing the death of a person, to be maintained by the personal representative of the deceased for the benefit of his family. Similar statutes have been enacted in all the United States. See ABATEMENT; CIVIL DEATH; TORT, and the authorities cited under the last-mentioned title.

DEATH, BRETHREN OF. The name given to the hermits of the Order of St. Paul, an order formed in the thirteenth century, but suppressed by Pope Urban VIII about 1630. They dressed in a black habit marked with a skull and saluted each other with the words "Remember that you must die."

DEATH, DANCE OF. A literary or pictorial representation of the power of death over the life of men. The subject was at first presented as a church play, preceded by an exhortation and ending with an appropriate sermon. (See MIRACLE PLAY; MYSTERY; MORALITY.) Probably because of the importance of the Maccabee brothers and their mother in the earlier representations, the French and other Latin peoples call it the *Danse Macabre,* or some equivalent name. The play consisted of a dialogue between Death and representatives of the various classes, churchmen and laymen, from the Pope and the Emperor down. Death invited them to follow him, and each unfortunate representative, after long remonstrances, submitted to the call, invoking God's mercy. At first Death was represented in an earnest and solemn manner, but soon his attitude took the character of a dance. Such plays were given in all countries where the Latin church prevailed, and in Italy we find another version of the same subject, rendered popular by Dante and Petrarch, the "Triumph of Death."

It was soon found more efficacious, however, to have the subject portrayed by painters and sculptors upon the walls of the church or the cemetery. The most famous example of the "Triumph of Death" is the fresco of the Campo Santo of Pisa (fourteenth century), wrongfully ascribed to Andrea Orcagna. Among the oldest French examples of the "Dance of Death" was that in the cemetery of the Innocents, Paris (1425). Others still exist in France, as well as in England, Germany, and Spain. The subject is often pictorially represented in the manuscripts of the fifteenth and sixteenth centuries and in many woodcuts of the fifteenth and following centuries. The most famous of the latter are the two designed by Holbein—the smaller engraved by Lützelburger (1520), while the larger appeared in book form in 1538 (at Lyons) and many times since. Episodes of the subject were also represented in painting, particularly by Hans Baldung Grien (Basel Museum). In the nineteenth century the most famous representation was that of Rethel (1848), directed against the French Republic. It has also been admirably treated in music, especially by Saint-Saëns in his *Danse macabre,* and in literature, as, e.g., in Goethe's ballad *Der Todtentanz.*

Consult: Douce, *The Dance of Death* (London, 1833); Langlois, *Essai sur les danses des morts* (Rouen, 1851); Kastner, *Les danses des morts* (Paris, 1852); Wackernagel, "Der Todtentanz," in *Kleinere Schriften,* i (Leipzig, 1874); Vigo, *Le danze macabre in Italia* (Livorno, 1878); Merino, *La danza macabre* (Madrid, 1884); Seelmann, *Die Todtentänze des Mittelalters* (Norden, 1893); Kurth, *Reigen der Totentänze 15. bis 19. Jahrhundert* (Berlin, 1900); Wessely, *Die Gestallen des Todes in der darstellenden Kunst* (Leipzig, 1876); Goelte, *Holbeins Totentanz und seine Vorbilder* (Strassburg, 1897).

DEATH ADDER. Any of several deadly Elapidæ, Australasian viviparous snakes, especially the spine-tailed *Acanthophis antarcticus,* which is widely distributed from South Australia to the Moluccas and resembles in form and color an American rattlesnake. The end of the tail "is laterally compressed, beset with a few rows of large imbricating scales, and terminates in a thin, horny spine." Dr. Gadow thinks the use of this peculiar tail "very probably consists in attracting or fixing the attention of small animals; the snake, lying coiled up on a dry and sandy spot, slightly raising and vibrating the tip of the tail." It feeds mainly on frogs and young birds. Another species greatly feared is the larger and more cylindrical purplish adder (*Pseudechis porphyriaceus*), or "black snake," which may reach 7 feet in length, and is purplish black, varying in different specimens to dark olive brown, with carmine sides and red belly, specked with black. A third species, especially dangerous, although smaller, because of its resemblance to the harmless serpents, is

the short death adder (*Holocephalus curtus*), also known as the broad-headed, tiger, or brown-banded snake. It is very variable, but the head, which has a peculiarly square outline, is "generally uniform black, the body olive color, with broad brown or black crossbands, the hinder part of the body . . . blackish, and the whole of the under parts light yellow." Its venom is immediately fatal to animals generally, but seems not to be so to itself or other poisonous snakes. Thirty or more young are brought forth annually by a single pair, and the species is common everywhere on the continent. It buries itself in the ground during the cold season. The genus *Holocephalus* has several other species in Australasia and the south seas. One of these, the large-scaled (*Holocephalus superbus*), is the dreaded diamond snake of Tasmania; another is the smaller, broad-headed snake (*Holocephalus variegatus*) of the neighborhood of Sydney; a third (*Holocephalus nigrescens*), of the south-eastern coast of Australia, is remarkable for its white tongue. Consult Kreft, *Snakes of Australia* (Sydney, 1869).

DEATHBED, Law of. A peculiar doctrine of the Scottish law, derived from the later Roman law, whereby, if any man, while suffering from the disease of which he ultimately died, burdened or conveyed away his heritable estate to the prejudice of his lawful heir, he was presumed to have so acted in consequence of his inability to resist importunity in the state of feebleness to which he was reduced, and his heir was entitled to avoid the deed. Two tests were fixed upon by the law as establishing the existence of a requisite degree of capacity—viz., survival of the donor for 60 days and his going unsupported to kirk or market. It was of no consequence that the object of the visit was neither to worship nor to buy and sell, but simply to evade the law of deathbed. If the individual was in a condition to take part in the service of the church or in the trade of the market, that was sufficient. Extreme old age, accompanied by manifest indications of the approach of death, was held equivalent to disease. But the deed of the oldest or most infirm man, or of the man who was laboring under the most mortal sickness, was not voidable if another disease had supervined of which he died, or if he were killed by accident. See Duress; Undue Influence.

DEATH CUP. See Fungi, Edible and Poisonous.

DEATH DUTIES. The comprehensive English term for a variety of specific duties levied under acts of Parliament on the estates of deceased persons. Included under the term are (1) probate duties, (2) account duties, (3) legacy duties, (4) succession duties, (5) estate duties.

The *probate duty* dates back to the year 1694 and was a stamp duty levied as the price of obtaining probate or letters of administration. It has now, since 1894, been superseded by the estate duty. The *account duty* was of later origin and was payable by the beneficiary of a decedent. It has also been superseded by the estate duty. The *legacy duty* was created by Statute 20 Geo. III, c. 28 (1780), and is a stamp tax on receipts given by legatees to executors for their legacies. It varies in amount from 1 to 10 per cent of the legacy, according to the nearness of the relationship of the legatee to the decedent. When the legatee is a lineal descendant or ancestor of the deceased, the duty (1 per cent) need not be paid if an estate or other death duty has been paid. *Succession duty* was created by Act of Parliament in 1853 (16 and 17 Vict., c. 51), and consists of a tax varying from 1½ to 11½ per cent (according to the degree of consanguinity) levied on the beneficiary of real property, or of personal property not subject to legacy duty, passing by descent or otherwise on the death of another. It is not, however, levied on property passing from husband to wife or wife to husband. The *estate duty* is a recent addition to the list of death duties, having been created in 1894 (57 and 58 Vict., c. 30). It is of a more general character than the earlier duties, being levied on all property, whether real or personal, "which, on the death of any person after Aug. 1, 1894, or at a period ascertainable only by reference to such death, passes either immediately or after an interval, either certainly or contingently," to another. Estates not exceeding £100 are exempt. The rates levied are graduated according to the value of the estate, ranging from 1 per cent on estates of £100 to £500, to 8 per cent on estates exceeding £1,000,000 in value. This tax is in some cases additional to other death duties and in other cases in lieu thereof. Taken together, these several duties constitute a most comprehensive system, which is being imitated in many of its features in the United States. (See Inheritance Tax; Succession.) Consult Hanson, *Death Duties*, and *Encyclopædia of the Laws of England* (2d ed., London, 1907).

DEATH OF MAR'LOWE, The. A tragedy by R. H. Horne (1837), founded on the dramatic fate of the Elizabethan playwright.

DEATH RATE. See Vital Statistics.

DEATH'S-HEAD CORPS. See Black Brunswickers.

DEATH'S-HEAD MOTH (*Acherontia atropos*). A species of hawk moth (q.v.), widely distributed over the Old World. It measures almost 5 inches from tip to tip of the extended wings; is dark in color, the body yellow with black markings, the thorax with pale markings which have some resemblance to a skull, and from which it derives its name; the upper wings mottled with brown, black, and yellow. The caterpillar is greenish yellow, the back speckled with black, with transverse lines partly blue and partly white, and feeds on the potato, tomato, and a variety of other plants. This insect is most frequently seen flying about in autumn and only in the mornings and evenings. It is remarkable for emitting a plaintive squeaking sound, which, with its dark color, and the skull-like mark on the thorax, has led to its being regarded with superstitious dislike, the sudden appearance of large numbers being popularly held ominous of evil; while in Mauritius a notion prevails that it casts a dust from its wings which produces blindness in persons on whom it falls, and its entering an apartment is therefore regarded with dread. The sound is produced by the palpi, the inner faces of which are striated and are rubbed against the proboscis; and it is heard strongly and sharply when the insect is confined in the hand. The death's-head moth is interesting upon still another account, as one of those insects which enter and plunder beehives, feeding upon the honey. Representatives of this moth are found in many countries, as *Acherontia styx* in India, and everywhere we find it regarded with superstitious apprehension. Consult Kirby, *A Hand-*

book to the Order Lepidoptera, vol. iv, part ii (London, 1897).

DEATH'S JEST BOOK, or THE FOOL'S TRAGEDY. A drama by T. L. Beddoes, published posthumously in 1850 and founded on the actual stabbing of a thirteenth-century duke by his jester.

DEATH VALLEY. A narrow, elongated north-south desert valley in Inyo Co., Cal., lying between the Panamint Range on the west and the Funeral, Black, and Grapevine mountains of the Amargoso Range on the east (Map: California, H 6). The Panamint Range rises to a maximum altitude of 10,937 feet in Telescope Peak, while the eastern ranges have altitudes of between 7000 and 8000 feet. Much of the valley is below sea level. The lowest point of dry land in the United States occurs here and is 276 feet below sea level. It is interesting to note that Mount Whitney, the highest point in the United States (14,501 feet above sea level), lies at a distance of less than 80 miles from the point of lowest depression. The valley has a length of 150 miles. It varies greatly in breadth, being in few places less than 10 miles wide, and in some places having twice that breadth, while the distance from summit to summit of the bordering ranges is 20 to 30 miles. The valley is the sink of the Amargosa River, a stream which is dry for the greater part of the time throughout much of its course. Water is exceedingly scarce throughout the Death Valley region. Places where ordinarily drinkable water can be obtained in the valley are Saratoga Springs in the southeastern part, Bennett Wells on the west side, and a point near the mouth of Furnace Creek at the north end of the Funeral Range.

Several watercourses enter the valley, among them the Amargosa River from the south and Furnace Creek from the east, but it is only after heavy rains, which are of very rare occurrence, that they contain any water. The valley was formerly the bed of a salt lake along the east side. There is a white salt deposit, with borax appearing in several places. In the western part a salt marsh still exists.

The salty bottom of the valley is destitute of vegetation, but on the west side is bordered by mesquite; the east and west slopes possess a sparse vegetation of cacti and desert shrubs and grasses. A growth of tall coarse grass is found in the salt marsh in the northern section. Animal life is confined to a few species of desert animals, chiefly reptilia, such as snakes, lizards, and horned toads; but flocks of blackbirds have been seen there. The meteorological conditions are very interesting, and during one summer the United States Weather Bureau instituted special observations here. The temperatures in the valley during the summer are excessive, a maximum of 125° F. in the shade having been observed on successive days. They rarely fall below 70°. The air is very dry, and dew never forms, the relative humidity averaging only about 23 per cent. During five summer months not quite an inch and a half of rainfall occurred, and on only nine days was the rainfall sufficient to permit its amount to be measured. The summer rains are of local character. It is probable that 4 or 5 inches of rainfall occur during the year. The prevailing wind is from the south in summer time; the average wind velocity for the season is about 10 miles per hour, which is high for that locality. Sand storms and dust whirlwinds of a few hours' duration are common.

DEATH'WATCH'. Any of a family of small beetles, Ptinidæ, which live on dead animal and vegetable matter. They are usually of a cinnamon-brown color, the trochanters are situated between the femora and the coxæ, and their larvæ are short, have six legs, no eyes, short antennæ, and require one or more years for development. Both the beetles and the larvæ do much damage to furniture, house timbers, ships' stores, drugs, books, etc. A few, such as the often injurious apple-twig borer (*Amphicerus bicaudata*), bore into living, solid wood. Another form, of both Europe and America (*Lasioderma serricorne*), is a serious pest of capsicum and of dried tobacco. Still another species thrives on opium. The "deathwatch" whose rapid ticking is so frequently heard in the quiet of the night is a species (*Sitodrepa panicea*) of world-wide distribution which not infrequently feeds on paper, paste, and leather bindings of books. The rapping is caused by a rapid hammering with the head on some suitable resounding material and is probably a sexual call. It may sometimes be found rapping with remarkable force and agility on furniture where its action is observable. In England the name is sometimes applied to the book lice of the family Psocidæ. See BOOKWORM.

DE AUGMENTIIS SCIENTIARUM, dē ąg-mēn'shī-is sī'ĕn-shī-ā'rŭm (Lat., on the advancement of learning). A treatise by Francis Bacon. It forms the opening chapter of his *Instauratio Magna* and is, after the *Novum Organum*, his most important treatise. A good edition is *The Advancement of Learning* (New York, 1904), ed. by A. S. Cook. See also the bibliography under BACON, FRANCIS.

DE ÁVILA. See DÁVILA.

DÉBÂCLE, dā'bà'kl'. A French word originally applied in that language to the breaking up of the ice in a harbor or river, but introduced into English by geologists to express any sudden flood of water which bears before it opposing obstacles and leaves its path marked with confused and scattered fragments of rocks or other débris.

La Débâcle is the title of an historical novel by Émile Zola—by many regarded as his greatest work—published in 1892 and describing the downfall of the Second Empire in 1870.

DE BARY, dā bä'rē, HEINRICH ANTON (1831–88). A German botanist. He was born at Frankfort-on-the-Main and studied medicine and botany at Heidelberg, Marburg, and Berlin. After filling a professorship at Freiburg (1855–66) and Halle (1867–72), he was appointed rector of the newly established university at Strassburg. He was editor of the *Botanische Zeitung* from 1866 until his death. De Bary established the first botanical laboratory and introduced laboratory methods. His chief work was with the parasitic fungi, and in their study he began the method of securing all stages of development from spore to spore, a method which has extended to the study of the life histories of all plants. He was a notable teacher, and many of the most distinguished botanists are numbered among his students. He published a number of standard works on fungi and kindred subjects, such as *Die Mycetozoen* (1859; 1864); *Beiträge zur Morphologie und Physiologie der Pilze* (5 parts, 1864–82, partly in collaboration with Woronin); *Vergleichende Anatomie der Vegetations organe der Phanerogamen und Farne* (1872); *Vorlesungen über Bakterien* (1885; 1887).

DEBATABLE LAND. A tract of land situated between the Esk and the Sark, on the southwestern part of the border of England and Scotland, and at one time claimed by both kingdoms; hence its name. In 1542 commissioners appointed by the two crowns divided the land by a line drawn from east to west betwixt the two rivers. The upper half was adjudged to Scotland and the southern part to England. The Debatable Land continued long after to be the residence of freebooters and criminals, to whom its dubious state afforded a refuge. See BORDER.

DEBAT-PONSAN, *de-bȧ′-pôn′sän′*, EDOUARD BERNARD (1847–1913). A French historical, genre, and portrait painter, born in Toulouse. He was a pupil at the Beaux-Arts in Paris and then of Cabanel, and won the Prix de Rome in 1873. His pictures include historical subjects, such as the dramatic "Gate of the Louvre on St. Bartholomew's Day" (1880, Clemond-Ferrand Museum); allegorical works, such as the famous "Nec Mergitur" (1898), inspired by the Dreyfus case; and genre paintings, like "The Untamable Mare" (1911), and "Those who Watch" (1912). They are executed in a finished, academic style and show literary rather than pictorial imagination. He was particularly successful with portraits, such as those of Paul de Cassagnac (1882), General Boulanger (1888), and Constans—Minister of the Interior.

DEBAY, *de-bȧ′*. A family of French sculptors.—JEAN BAPTISTE JOSEPH the elder (1779–1863) was born at Malines and studied principally under Chaudet in Paris, where he settled permanently after living 15 years in Nantes. He was made an officer of the Legion of Honor in 1825 and conservator of the department of classical sculpture in the Louvre in 1846. Among his principal works are the marble statues of Charles Martel in the Versailles Museum, an equestrian statue of Louis XIV at Montpellier, two groups in marble of "Mercury and Argus," one in Montpellier and the other in Nantes, "Girl with a Shell" (Antwerp Museum); decorative figures for the hôtel de ville and the bourse at Nantes; two bas-reliefs for the Arc de Triomphe in Paris, and many portrait busts.—His son and pupil, JEAN BAPTISTE JOSEPH the younger (1802–62), usually called JEAN DEBAY, to distinguish him from his father, was born at Nantes and studied also under Bosio in Paris, where he won the Grand Prix de Rome in 1829. For his marble statue of a "Young Girl Slave" (1836, Museum at Valence) he received a first-class medal. Besides the statues of Charles VIII in the Versailles Museum, and of General Cambronne at Nantes, he made many decorative statues for public buildings and churches, but is best known for his portrait busts, which include those of Ampère (Palais de l'Institut, Paris), and Mustapha Ben Ismael and General Debilly, in the Versailles Gallery.—His brother, AUGUSTE HYACINTHE (1804–65), born at Nantes, was equally excellent as a sculptor and painter. He was a pupil of his father and, in painting, of Gros, in Paris, where he won the Grand Prix de Rome in 1823. His finest plastic work is "The First Cradle," which obtained a gold medal at the Universal Exposition of 1855. In the Louvre are his statues of the architect Perrault, and Mademoiselle Desbrosses. The figures of "Ocean" and "The Mediterranean," belonging to the south fountain of the Place de la Concorde in Paris, and "Power" and "Moderation" before the Fontaine Saint-Michel, afford good examples of his style. His most remarkable painting is the so-called "Field of the Cloth of Gold" in the Versailles Museum, a composition on a gigantic scale, representing the meeting of Francis I and Henry VIII in 1520. "An Episode of 1793 at Nantes" and "Lucretia on the Collatine Hill" are in the Museum at Nantes.

DE BAY. See BAJUS, MICHAEL.

DE BEAUCHAMP, RICHARD. See WARWICK.

DE BEAUMONT, *de bō′môn′*. See EON DE BEAUMONT.

DE BEAUMONT. See ELIE DE BEAUMONT.

DE BEAUMONT, FRANÇOIS. See ADRETS.

DE BEAUNE, *de bōn′*, FLORIMOND. See BEAUNE.

DE BELLOY. See BELLOY.

DEBEN'TURE (ME. *debentur*, from Lat. *debentur mihi*, there are owing to me, from *debere*, owe). In the most general sense, a written acknowledgment of indebtedness. The term has long been in use in England to describe various classes of government obligations, as soldier's debentures, exchequer debentures, and custom-house debentures, and it is employed in the same sense in the United States (U. S. Rev. Stat., §§ 3037–3040). Of late years the term "debenture" has come into common use, especially in England, to designate company securities of all sorts, including the corporate bonds, which in the United States comprehend the greater part of such obligations. They need not be bonds, however, though they are usually of that character; and neither is it necessary, to give them the character of debentures, that they shall be issued by corporations, though most of them doubtless are. They may or may not be secured by mortgage or other charge on the property of the company issuing them. They differ from certificates of stock, in that they contain a promise, usually in the form of a covenant, to pay a principal sum, with periodical interest thereon, on a specified date in the future, and they are usually issued in series, and for the purpose of borrowing money thereon. They are commonly transferable and may be so drawn as to be negotiable.

When, as usually is the case, debentures are secured by a charge on the property of the company issuing them, the charge is in the form of a "floating security," as it is called, attaching at any given moment during the life of the debenture to all the property owned by the company at that time. The dissolution of the company causes the debentures to mature, even though the time for which they were given has not expired, and the floating security thereupon becomes fixed and definite, and the property may be reached by the debenture holders in an action for the appointment of a receiver and the enforcement of the security. From this it is evident that such debentures depend for their security upon the condition of the company from time to time.

The matter of issuing debentures and the nature of the security which they afford are largely regulated by general statutes providing for the incorporation of companies and sometimes by private acts for the government of individual corporations. Consult: Palmer, *Company Precedents* (8th ed., London, 1902); Manson, *The Debentures and Debenture Stock of Trading and Other Companies* (ib., 1894); Jones, *Treatise on the Law of Corporate Bonds and Mortgages*

(2d ed., Boston, 1894). See BOND; CORPORATION; SECURITY.

DE BÉTHUNE, MAXIMILIEN. See SULLY, DUKE OF.

DE'BIR. A place in the south of Judah (Josh. x. 38). (See KIRJATH-SEPHER.) In Josh. xv. 7, where Debir has been supposed to be a name of a city, we should probably read *Midbarah,* 'to the wilderness,' and in Josh. xiii. 26 the correct reading seems to be *Lidebir* or *Lodebar* (q.v.).

DEBIT AND CREDIT. See SOLL UND HABEN.

DE BLOIS. See CHARLES DE BLOIS.

DE BOOR FRAGMENT, THE. Part of a manuscript of Philippus Sidetes published by De Boor (*Texte und Untersuchungen,* vol. 2, p. 170). The fragment contains a quotation from Papias, an Asiatic Church father writing about 150 A.D., in which the statement is made that "John and James, his brother, were put to death by the Jews." This quotation has caused much controversy, for, if accepted as true, it invalidates the tradition that John the Evangelist wrote the Fourth Gospel when an old man in Asia Minor. Those critics who believe that Christ's prophecy in reference to James and John, viz., "Ye shall indeed drink of my cup," was fulfilled, naturally accept the validity of Papias' statement. Against the truth of the statement, however, the claim is made that since, from the Epistle to the Galatians, we know that John outlived his brother, the author was incorrect in saying that the two met their death at the same time. On the other hand, it is not clear that the statement as to the death of the brothers is to be taken to mean that they died at the same time. It must nevertheless be admitted that the fragment has caused some confusion because of its use of the term "Theologus," which is usually not applied to John until the fourth or fifth century. In spite of this, however, Bacon contends that, "until some valid reason is advanced why the doubly attested statement of the martyrdom of James and John may not have stood on the pages of Papias writing c.150 A.D., it must be accepted as the simple historical fact."

Consult: *Texte und Untersuchungen zur Geschichte der altchristlichen Litteratur,* vol. 2, p. 170 (1889); against the acceptance of the fragment, Drummond, *The Character and Authorship of the Fourth Gospel* (London, 1903); and, for the acceptance of the fragment, Bacon, *The Fourth Gospel in Research and Debate* (New York, 1910).

DEB'ORAH (Heb., bee). A heroine who helped to deliver the Israelites from the oppression of the Canaanites and who in tradition becomes a prophetess and a "judge." She was the wife of Lapidoth and dwelt in the hill country of Ephraim (Judg. iv. 4–5). For 20 years, the story goes, Israel had been oppressed by the Canaanites, when Deborah stirred up Barak, son of Abinoam of Kedesh in Naphtali, and the two with an army went against Sisera, leader of the force of the Canaanite King Jabin, descended upon him from Mount Tabor, and routed his army (ib., iv. 10–16). Sisera himself, in flight, was slain while asleep by a woman, Jael, wife of Heber the Kenite (ib., iv. 11–22). A forty years' peace followed this success (ib., v. 31), though it should be added that the number 40 is to be regarded as a general term for a generation. The Song of Deborah (ib., v. 2–31) celebrates this victory, but there are some striking discrepancies between the song and the prose narrative in chap. iv. That the song is a contemporary record may be inferred from the archaic language and its general character. It is universally regarded by scholars as one of the oldest bits of literature in the Old Testament, but it makes no mention of Jabin and commemorates the discomfiture of Sisera. The text is obscure in some places and corrupt in others, but there is enough left to give this composition a unique position in the history of ancient poetry among the Semites. There is no valid reason to doubt that the ode was composed and sung by Deborah. In the prose narrative, which is considerably later, many scholars suppose that there is a reference to another event in which Jabin is chiefly involved and that the two occurrences have been welded together by making Sisera the leader of Jabin's army. Consult: Cooke, *The History and Song of Deborah* (1892); G. F. Moore, *Judges* (1895); A. Segond, *Le cantique de Debora* (1900); A. Stephan, *Das Deboralied* (1900); Lagrange, *Le livre des juges* (1903); N. Schmidt, *Messages of the Poets* (1911); G. A. Smith, *Early Poetry of Israel* (1912); H. T. Fowler, *A History of the Literature of Ancient Israel* (1912); E. L. Curtis, *Judges* (1913); E. G. King, *Early Religious Poetry of the Hebrews* (1913).

DE BOUCHERVILLE, de bōō'shēr-vīl', SIR CHARLES EUGENE BOUCHER (1822–1915). A Canadian statesman. He was born at Boucherville, P. Q., and was educated at the College of St. Sulpice, Montreal. He graduated in medicine at Paris in 1843, and on his return to Canada practiced his profession for many years in his native district. He began his political career in 1861 and was a Conservative member of the Canada Legislative Assembly until 1867, in 1865 voting for confederation. In 1867–73 he was Speaker of the Legislative Council of the Province of Quebec, and he was Premier of that province from September, 1874, to Jan. 29, 1876, when his and his colleagues' dismissal by Lieutenant Governor Letellier de St. Just caused a political sensation. In 1879 he was appointed to the Dominion Senate, and in December, 1891, after the dismissal of Premier Honoré Mercier (q.v.) by Lieutenant Governor Angers, he again became Premier of Quebec, and retained that position until Dec. 16, 1892. In 1914 he was created K.C.M.G.

DEBOUCHING, dē-bōōsh'ĭng (Fr. *déboucher,* from *de,* from + *boucher,* to stop up, from *bouche,* mouth, from Lat. *bucca,* cheek). In military usage, the issuing of troops from out a narrow passage, wood, defile, or any other roadway which has compelled them to advance in column or other narrow formation.

DE BOW, JAMES DUNWOODY BROWNSON (1820–67). An American journalist and statistician, born at Charleston, S. C. He was editor of the *Southern Quarterly Review,* to which he contributed an article on the "Oregon Question," which attracted wide attention. In 1845 he left the *Southern Quarterly* and established *De Bow's Commercial Review* in New Orleans (1846), which was at once successful and was for many years an organ of ultrasectional opinion. In 1848 he became professor of political economy in the University of Louisiana and in 1850 head of the State Census Bureau, which he managed

with such distinction that he was appointed superintendent of the United States census (1853–55). He fostered, by lectures and pen, the material and intellectual interests of the South and later of the Confederacy, though he ultimately became a convert to the economy of free labor. He wrote *Industrial Resources of the Southern and Western States* (3 vols., 1853), and the greater part of *The Statistical View of the United States*, a compendium of the seventh census (1854), besides many statistical pamphlets.

DEBRECZEN, dĕ'brĕt-sĕn. A free Imperial city of Hungary, capital of the County of Hajdu, situated on a sandy but fertile plain, about 137 miles east of Budapest by rail (Map: Hungary, G 3). It is called "the Protestant Rome," being the chief Protestant centre in Hungary. The town, with its suburbs, is widely scattered. It possesses a number of handsome modern buildings, among which are the Rathaus, theatre, two old monasteries, and the Protestant church from the pulpit of which in 1849 Kossuth proclaimed the deposition of the Hapsburg dynasty. Its walls and fortifications have given place to broad promenades. Among its numerous educational institutions is the famous Protestant Collegium, with more than 2000 students, founded in 1531, with a library of 151,000 volumes. The manufactures of the town are clay pipes, cigars, machinery, brushes, bricks, vehicles, lumber, sugar, soap, and sausages. Its yearly cattle markets are of considerable importance. The city owns large cattle ranges in the surrounding territory. Pop. (commune), 1900, 75,006; 1910, 92,729, mostly Hungarian Protestants. Debreczen suffered severely during the Turkish War in the sixteenth century, and in the seventeenth century, when it had become a Protestant town, was attacked by the Imperialists. In 1849 the Hungarian Diet and government fled to Debreczen on the fall of Budapest. On July 3, 1849, it was taken by the Russians, and on August 3 it was the scene of a fierce battle between the Hungarians and the Russians.

DEBRY, de-brē', or **DE BRY,** THÉODORE (1528–98). A Flemish engraver, goldsmith, and printer, born at Liége. Forced to emigrate on account of religious persecution, he settled at Frankfort-on-the-Main about 1580, where he worked as printer, engraver, and bookseller until his death. He also visited England, where he engraved the "Procession of the Knights of the Garter under Queen Elizabeth," 12 plates, after Geerarts, and "The Funeral of Sir Philip Sidney," 34 plates, after Thomas Lent (1587). He executed a number of engravings, which are of great value, but rather on account of the invention and originality displayed in them, than as works of art, although many possess the technical perfection of the old Dutch and Flemish masters. His subjects are sometimes grotesque and fanciful, but more often processions or dances with numerous figures. Among his most celebrated plates are 48 for Boissard's *Icones Virorum Illustrium* (1597–99); and those which he engraved for the *Collectiones Peregrinationum in Indiam Orientalem et Occidentalem* (1590–1634), familiarly known to English readers as the "De Bry Collection of Voyages." There were many editions of this work in different languages. An excellent collection of his prints is in the New York Public Library. He was also a medalist and designer for jewelry and plate. —His sons, JOHN THÉODORE (1561–1621) and JOHN ISRAEL (?–1611), assisted him in many of his works. John Théodore had less imagination than his father, but was the better artist.

DEBS, EUGENE VICTOR (1855–1926). An American social agitator and candidate of the Socialist party for President of the United States. He was born Nov. 5, 1855, at Terre Haute, Ind. Between 1871 and 1883 he was a locomotive fireman on the Terre Haute and Indianapolis Railroad, a wholesale grocery salesman, and city clerk of Terre Haute. In 1885 he served as a member of the Indiana Legislature. He was grand secretary and treasurer of the Brotherhood of Locomotive Firemen from 1880 to 1893, when he resigned to organize and be president (for four years) of the American Railway Union. Under his leadership this Union won a large strike on the Great Northern Railway early in 1894, and then in the same year, having espoused the cause of the poorly paid Pullman workers, the Union brought about a great tie-up of the Western roads. This strike was ultimately broken by the interference of the Federal courts and by action of President Cleveland, based upon the right of the Federal government to maintain the uninterrupted transmission of the mails. Debs was arrested first upon a charge of conspiracy to murder, but the charge was never pressed, for want of foundation, although Debs was insistent in his demand that his name be cleared through trial on the charge in open court. In July, 1894, Debs, with the other officers of the Union, was arrested on the charge of violating an injunction issued by Judge Woods, and was sentenced to six months in jail for contempt of court.

Debs's introduction to Socialism began during his imprisonment in the Woodstock jail, where he was visited by Victor Berger and given Marx's *Capital* and other Socialistic works. In 1897–98 he was chairman of the National Council of the Social Democracy, and in 1900 he was the candidate of the Social Democratic party for President of the United States. Thereafter Debs spent most of his time as lecturer and organizer in the Socialist movement. He was the candidate of the Socialist party for President of the United States in 1904, 1908, and 1912. As one of the first "victims" of so-called "government by injunction," and because of his likable personality, Debs has commanded the respect of American unionists and radicals, even of those who do not accept his economic doctrines. Besides his articles published as contributing editor to the *Appeal to Reason* and also occasional magazine articles, his writings include a widely read speech on *Industrial Unionism* (1911). Consult S. M. Reynolds, *Debs: His Life, Writings, and Speeches* (Girard, Kans., 1908). For mention of his imprisonment during the war and subsequent release, see SOCIALISM.

DEBT (OF. *dette, debte,* Lat. *debitum,* that which is owed, from *debere,* to owe, from *de,* from + *habere,* to have). In law, strictly speaking, a sum of money due upon a certain and expressed agreement. This obligation may be founded on simple contract, may be contained in a sealed instrument, or may be established by the judgment of a court. In this meaning a debt is a definite sum due, not merely a claim for damages. In some applications, however, the word has been much more broadly used, and it is probable that most courts would not confine it to the strict definition above given, unless required so to do by the context of a law

or the special circumstances of the case. Thus, it has been held that a debt may be a certain sum of money promised to be paid in the future as well as a sum already actually due and payable; but if the sum be payable upon a contingency at a future time, it cannot properly be called a debt. In its more general sense debt is that due from one person to another, whether money, goods, or service. Under the United States legal-tender statutes the term embraces any obligation by contract, expressed or implied, which may be discharged by money through the voluntary action of the party bound. A bequest of "whatever debts" might be due the testator at the time of his death has been held to include money deposited with his bankers. A tax is not of the nature of a debt, not being founded on contract, but being rather an impost laid by a government.

Under the dual form of government which obtains in this country, an important question in regard to debts was raised as to the provision of the United States Constitution forbidding the several States to pass laws impairing the validity of contracts. It was questioned whether an insolvency law adopted by a single State did not violate this provision, where it allowed a debt already existing to be canceled upon the debtor's complying with the regulations of the Insolvency Act. It has been settled by the courts that the States have the right to legislate in this manner, but subject to the power of the United States to enact a uniform law of bankruptcy (q.v.). Of course a State's insolvency law cannot impair the obligation of a contract existing before its passage. But in all contracts implying a debt entered into after its passage, it will be presumed that the parties to the contract have in mind the provisions of the law.

Formerly the courts, both in England and America, employed the drastic and often inhuman process of imprisonment of the debtor to enforce the payment of debts. But this has generally been done away with by statute. The present tendency of legislation is to afford an easy and simple procedure for the enforcement of debts, so that undisputed debts may be collected quickly and as summarily as is consistent with the right of defense and of appeal. The action of debt, or the simpler substitutes provided therefor by the reformed procedure in England and this country, is a civil suit, resulting in a money judgment and an execution levied on the property of the debtor for its satisfaction. Where the element of fraud, false pretenses, or concealment of property enters into the question, the courts, both in England and the United States, may still restrain and under some conditions imprison the debtor. For a fuller exposition of these principles and of other matters relating to phases of the general subject, see ABSCONDING; ATTACHMENT; BANKRUPTCY; CESSIO BONORUM; CREDITOR; DEBTOR; GARNISHMENT; IMPRISONMENT; INSOLVENCY; SEQUESTRATION; TRUSTEE PROCESS. Consult the authorities referred to under the titles treating of specific subjects, such as CONTRACT; BOND; ATTACHMENT; BANKRUPTCY; ETC., and also Bell, *Commentaries on the Statutes Relative to Diligence, or Execution Against the Movable Estate; Imprisonment, etc.* (Edinburgh, 1890), where a history of imprisonment for debt will be found, and the general treatises such as the Commentaries of Kent, Blackstone, Stephen, Bell, Erskine. etc.. referred to under LAW.

DEBT, ACTION OF. An old form of personal action in common-law pleading, employed to recover a sum certain, or capable of being ascertained by computation only. Formerly the declaration alleged the *debet et detinet,* on the theory that the defendant owed the money and was guilty of an unjust detention of the goods or whatever happened to be the consideration, but this fell into disuse and is no longer proper. Where the obligation is founded on a simple contract the declaration must allege the consideration, and if on a specialty or on a record it must be set out in full. Debt differs from assumpsit (q.v.), where a special promise is necessary. The action is still retained in some of the United States where common-law pleading is retained, but has been abolished by statute in England, where it originated, as well as in most of our States under the reformed-code procedure. See COMMON COUNTS; COMMON FORMS; FORMS OF ACTION; also PLEADING, and consult the authorities there referred to.

DEBT, PUBLIC. National debt has become a marked feature in the finances of modern states. In any strict sense the public debt designates all of the outstanding obligations of the government. These are of many kinds. Among them, e.g., in those states which conduct government savings banks must be included the sums due depositors. In countries which, like France, require the collectors of taxes to make payments at specified times, advancing if need be from their own resources the amount required, such advances must for the time being be regarded as part of the national debt. But it is not with these informal obligations, which correspond somewhat with the book debts of merchants, that the phrase "public debt" is generally concerned. It refers rather to the more formal obligations undertaken by governments and represented by formal instruments of indebtedness.

This formal debt may be divided into short-term and long-term obligations. To the former is frequently applied the expression "floating debt," and the analogy which this suggests with the transactions of corporations indicates the general nature of such indebtedness. These short-term obligations are normally used to anticipate revenues, and resemble the promissory notes issued by merchants in the course of their business transactions. As the latter frequently have a certain aggregate of outstanding notes, though individual notes be promptly paid when due, so the floating debt of the state may readily become a permanent feature in its finances by the creation of new debts running parallel to the payment of the old. When such debts become too numerous, and the obligation of repayment a source of embarrassment, it is not infrequent for them to be converted into funded or permanent debt.

The funded debt consists in obligations which mature at a more or less distant date or which are payable at the option of the government. Bonds maturing within a fixed period are familiar in American finance, e.g., the so-called ten-forties of the Act of March 3, 1863. But more commonly no time is set for the ultimate redemption of public obligations. In the national finance of European states it is usually understood that the government will not soon avail itself of the privilege of repayment. So much is this the case that on the continent of Europe the debts are spoken of as *rentes,* the emphasis being thereby wholly laid upon the

fact that the payment of interest alone is expected, while in England the greater part of the public debt is regarded as a series of perpetual annuities. A further form of public debt consists in irredeemable paper money. In essence it is a debt without interest, payable at the option of the government. See MONEY.

The public debt, in the sense in which it is known to-day, is essentially a creation of modern times. Emergencies in the mediæval state were met by enforced contributions from the people and in part by contraction of debt by the monarch. But the debt so contracted was a debt of the crown, and not of the state, and rested upon the personal credit of the ruler. With the growth of parliamentary power and the control of supplies by representatives of the people, state debts appeared. They were originally confined to states like Holland and England, where loanable capital was plentiful, and where the commercial classes were sufficiently influential with the government to insure against repudiation. Later they were extended even to states under despotic and irresponsible rule. In the beginning public debts frequently assumed the form of life annuities; but as these varied of necessity with the age of the persons who advanced money to the state, the complications of accounting were excessive; moreover, the amount of the advances which could be obtained in this way was necessarily limited. It was a simplification to issue so-called perpetual annuities with a definite annual payment, and the computation of life annuities gave way to the simple operations of interest. In Great Britain terminable annuities are still common; but they form a comparatively insignificant proportion of the total indebtedness of the government. The term "public debt" usually refers to the national debt alone. In its widest sense, however, it includes local indebtedness also. It is only within the past century that the municipalities have become debtors to any considerable extent; but at the close of the nineteenth century the aggregate of municipal debts in the United States exceeded the national debt in magnitude. See FINANCE.

Causes of Debt. Public debt arises under three distinct sets of circumstances: 1. War expenditure. A modern war demands the expenditure of an enormous sum of money, and this sum is usually raised through loans. Debts of this class are naturally borne by the national government. 2. Public works. The increase in commercial intercourse and the rise in standards of national and civic life have required a great development of public improvements. The cost of these has been met partly by taxation, partly by the raising of loans. The debts incurred are borne sometimes by the national government, sometimes by the localities. Practice differs in the various states—a fact which must be taken into account in comparing the national debts of different countries. 3. The funding of floating indebtedness. The presence of a large volume of demand obligations embarrasses the workings of the treasury and impairs the credit of a government. When it is not convenient to pay them out of revenue, it is customary to change them into funded debt.

Theory of Public Debts. In the eighteenth century it was held by many writers on finance that a public debt increased a nation's wealth. Public bonds were regarded as a net addition to capital. The claim was also advanced that a public debt was a matter of indifference to the state, since it merely represented money owed by one set of citizens to another. Adam Smith and his followers, on the other hand, were inclined to regard public debt as an unqualified evil. Modern opinion recognizes that the debts of a state, like those of an individual, are necessary or unnecessary, wise or foolish, according to the circumstances under which they are contracted. The expenses of a state are incapable of sudden contraction; its revenues, however, fluctuate to a considerable extent. Unless a large surplus is put by in favorable times, a deficit is inevitable at times when revenues fall off. Since the accumulation of a surplus seriously disturbs commerce and industry, the creation of floating indebtedness is frequently expedient. In time of war, when the honor and possibly the very existence of a nation are at stake, it is imperative that immense sums of money should be raised to meet the expenditures attendant upon mobilizing and equipping armies, building fleets, and preparing defenses. At such a time the ordinary sources of revenue fail; taxation sufficient to cover the abnormal expenditures would amount to a virtual confiscation of property and would so derange industry as to impair the capacity of a state to withstand a long-continued struggle. The raising of a loan shifts the burden to a period when industry will be better prepared to endure it. In the peaceful competition for commercial ascendancy great advantages are gained by those states or communities which are first to develop their resources. It is, therefore, often expedient to undertake public improvements which would be too costly to be paid for out of increased taxation. Such improvements, moreover, create new sources of revenue, and therefore may impose merely a nominal burden upon posterity. Certain classes of public works, e.g., state railways and telegraphs, yield a direct revenue which may be sufficient to cover depreciation and interest on the capital invested in them. It would be manifestly unreasonable to pay for such works out of taxation. To do so would unjustly burden the present taxpayer for the advantage of future generations.

While there are circumstances, then, under which the creation of public debt is abundantly justified, it remains true that in practice debts are often contracted to national detriment. The ease with which money is raised by loans leads often to reckless financiering. Useless wars are undertaken, premature and unproductive public works are entered upon. The expediency of particular loans, however, is a matter to be decided by practical politics, not by financial theory.

The effect upon industry of the creation of a public debt has received thorough discussion from economists. When the government enters the market as a bidder for money, capital is drawn away from productive enterprises, and industry is in so far hampered. It may, however, happen that the demand for more capital will encourage saving, so that the loss to industry will not be measured by the whole extent of the public loan. If the loan is for productive purposes which would otherwise be undertaken by private enterprise, industry is not necessarily deranged. It makes some difference whether the loan is made at home or abroad. Owing to friction in the international flow of capital, a foreign loan may have far less effect upon national industry than a domestic loan.

Important political consequences frequently

result from the creation of a public debt. When the creditors of a state are its own citizens, a party vitally interested in the stability of the government is created. When a weak state incurs a large debt to foreigners, it may endanger its own autonomy. Egypt is a classical example of a state which has fallen under foreign control in this way.

Conversion or Refunding of Public Debt. Public debts are frequently created at a time of low national credit. To attract investors, it is necessary to issue bonds paying a high rate of interest. When national credit improves, it is possible to exchange high-interest obligations which are payable at the option of the government for others bearing a lower rate of interest. The exchange may be a direct one, in which case the government retains its former creditors; or a new loan may be issued to pay off the old obligations.

Almost every country which has a public debt has refunded it at various times. The refunding operations of the British Treasury extend through two centuries. Conversion has been frequent in the United States in both national and local finance.

The investor in public funds is naturally opposed to conversion. Part of the inducement for investing in bonds consists in the expectation that they will continue to bear a high rate of interest and so rise above par value after normal conditions return. In the United States the investor is usually insured against early conversion by the provisions of the loan; in other countries the same end is reached by the adoption of a settled policy of converting only after a considerable lapse of time. One method of insuring the investor against conversion is to issue low-interest bonds below par. Redemption of such obligations entails a heavy cost. This practice is generally regarded, however, as bad finance, and is not resorted to in the United States.

Repayment of Public Debt. Some parts of the public debt are so constituted as to be automatically extinguished. Such are the terminable annuities of British finance. Each payment includes, besides interest, a partial repayment of the principal. It would obviously be inconvenient to pay a large part of the public debt in this way, since payments would have to be made whether revenues were plentiful or not. Most frequently debt is paid by redeeming obligations which are due, or which are payable at the option of government, or by purchasing bonds in the open market and canceling them.

The policy of repaying public debts has often been called into question. In order to redeem a debt, a sum equal to the principal of the debt must be taken from the people by taxation; and it is the last portion of the taxes which is hardest to collect and which causes the greatest distress. Almost all modern states are growing in wealth and population; consequently it is to be expected that a debt which at present would be very difficult to pay will in the future be relatively insignificant. So long as gold depreciates in value, the burden of debt automatically grows less.

When a state is insufficiently provided with capital, its bonds are likely to be held by foreign capitalists. In repaying the debt the state may diminish the scanty supply of capital and so injure its own industries.

There are, however, cogent reasons for the redemption of public debts. A future generation may indeed be more able to pay a given sum than the present generation; but the future will doubtless have correspondingly heavy obligations of its own. Gold may indeed depreciate, but it may also appreciate. The payment of debt may derange industry, but it unquestionably strengthens the credit of a nation and places it in a condition to meet emergencies. On these grounds the weight of modern authority favors the gradual redemption of public debts.

Debts of Leading Nations Before the War. The debt of England is dated generally from 1693, with the loan to the government of the entire capital of the Bank of England, amounting to £1,200,000. In return for this loan the Bank received its charter and privileges. The needs of the government were pressing, and the debt, once started, grew rapidly, as the result of the vigorous foreign policy of William III. At the accession of the house of Hanover, in 1714, it had reached £50,000,000, and it grew throughout the following century, as a result of the several wars in which England found herself engaged. When, in 1793, the great struggle with France began, the debt was £260,000,000, and when it terminated with the Treaty of Vienna, in 1815, it had reached the sum of £885,000,000. The example set by England was followed by the other European countries, although before the closing years of the eighteenth century few of the states had contracted debts upon any considerable scale. The Napoleonic struggle, which involved all Europe, inaugurated an era of debt for modern states, and the nineteenth century witnessed a rapid growth of national indebtedness. The following table compiled from the reports of the Bureau of Statistics of the Department of Commerce and Labor gives the indebtedness of some of the principal nations, and of all the nations of the world combined, since 1800. The table shows that the progress of debt in most countries has been constantly forward, and that, with the exception of the United Kingdom and the United States, there has been no conspicuous reduction of the debt. The debt of the United Kingdom reached its maximum in 1815, when it amounted to £902,000,000.

American National Debt. The public debt of the United States was first reported, 1791, two years after the organization of the government, as $75,463,476.52. In 1812, at the commencement of the second war with England, it had fallen to $45,209,737.90. That war brought it up to a total of $127,334,933.74. After peace was restored, the reduction was from $3,000,000 to $10,000,000 per year, until in 1835 it reached its lowest point, being only $37,513.05. Thenceforward it increased, with fluctuations, until in 1860—the year before the Civil War—it was $64,842,287.88 and the annual interest was $3,443,687. This was a rate per capita on the whole population of $1.91 debt and 11 cents interest. The outbreak of the Civil War made the raising of enormous sums of money imperative. Two small loans had been made just before—in 1858, $20,000,000 in 5 per cents, and in 1860, $21,000,000 in 6 per cents—the first to run 15 and the last 20 years. Of the last loan only $7,022,000 was issued. Of the loans made necessary by the Civil War, the first was Feb. 8, 1861, $25,000,000 at 6 per cent, to run 20 years, of which $18,415,000 was reissued. On March 2, 1861, 6 per cent treasury notes were authorized

and $35,364,450 issued. On the same date, $1,095,850 was reissued to pay the Oregon war debt. On July 17, 1861, $250,000,000 was authorized at 7 per cent, to run 20 years, with authority to issue any part in the form of treasury notes running three years at 7.3 per cent interest, or in notes not bearing interest, but payable on demand, or in treasury certificates for one year bearing 3.65 per cent interest; the whole amount of demand notes not to exceed $50,000,000. An Act of Aug. 5, 1861, authorized the issue of 6 per cent bonds, running 20 years, to exchange for the one and three year notes just mentioned, with accumulated interest, at any time before their maturity; and the demand notes were made receivable for all dues to the government. Before the close of the year the demand notes, at first repected by the banks, claims, running one year at 6 per cent. There were $561,753,241 issued, all redeemed before 1866. In July, 1862, postage stamps were issued for currency and made a legal tender for sums less than $5. In March, 1863, fractional currency was authorized in place of postage stamps, the amount limited to $50,000,000. In March, 1863, a loan of $900,000,000 was authorized, principal and interest payable in coin; but only $75,000,000 was issued. The same act authorized $400,000,000, in one, two, and three year treasury notes, interest not over 6 per cent, payable in ordinary money, and to be a legal tender for their face value. The actual issues were: of one-year notes, at 5 per cent, $44,520,000; two-year notes, at 5 per cent, $166,480,000; three-year notes, at 6 per cent, $266,595,440; making the whole issue $477,595,400; all canceled or exchanged before

DEBTS OF PRINCIPAL NATIONS, AND AGGREGATE FOR ALL NATIONS OF THE WORLD AT VARIOUS DATES FROM 1800 to 1912

DATES	Austria	Belgium	France	Germany [1]	Italy
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1800	[2]170,327,500	.....	.....	25,549,125	.....
1820	480,323,550	.....	[6]689,923,705	150,861,500	.....
1850	[9]608,312,500	.....	[10]1,192,292,500	.....	[11]194,660,000
1870	[16]1,464,816,500	[17]133,147,440	2,676,575,000	[18]115,948,000	[17]1,386,952,500
1880	.....	[21]246,994,341	[24]4,065,946,151	.....	[22]2,218,861,209
1900	[29]1,697,255,140	[30]504,460,000	5,800,691,814	557,626,622	2,583,983,780
1905	[31]1,107,464,025	[32]544,052,979	[31]5,856,706,403	[32]698,849,400	[32]2,560,605,000
1912	1,433,511,000	741,044,000	6,283,675,000	1,219,430,000	[33]2,669,748,000

DATES	Netherlands	Russia	United Kingdom	United States	[34] World
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1800	[3]486,650,000	.....	[4]2,616,488,363	82,976,294	[5]2,433,250,000
1820	[7]700,776,000	.....	[8]4,381,975,906	91,015,566	7,299,750,000
1850	[12]498,621,590	[14]608,312,500	[15]4,082,596,603	63,452,774	[13]8,419,045,000
1870	[17]392,434,560	[17]1,459,950,000	3,896,606,550	[19]2,331,169,956	[20]22,410,232,000
1880	[21]390,823,749	[23]2,238,872,257	3,778,858,366	[19]1,919,326,748	[26]26,249,901,000
1900	466,419,294	3,167,320,000	3,060,926,304	[19]1,107,711,257	31,201,759,000
1905	[31]463,150,904	[31]3,414,061,734	[31]3,885,166,333	989,866,772	43,698,029,541
1912	467,709,000	4,604,945,000	3,527,270,000	1,027,575,000	41,736,701,000

[1] Prussia prior to 1870; figures for 1900 are exclusive of state debts, which in 1899–1900 amounted to $2,015,958,000. [2] 1789. [3] 1810. [4] 1802. [5] 1793. [6] 1830. [7] 1814. [8] 1815. [9] 1848. [10] 1852. [11] 1847 (figures for Sardinia). [12] 1851. [14] 1853. [15] 1857. [16] 1868. [17] 1869. [18] Chiefly former debt of North German Confederation. [19] Total debt less cash in the Treasury. [20] 1872. [21] 1879. [22] 1883. [23] 1885. [24] 1876. [25] 1882. [29] 1898. [30] 1899. [31] 1903. [32] 1902. [33] 1911. [34] The figures of aggregate national debts of the world are subject to slight revision by reason of the fact that for certain of the minor countries the latest available figures represent a year earlier than that represented by the chief countries included in the aggregate. There are also a few minor countries for which no satisfactory debt statement can be had.

were at a premium, and the interest-bearing notes were readily convertible into permanent 6 per cent bonds. On Feb. 12, 1862, $10,000,000 more of demand notes were issued. In the same month a great war loan was authorized—$500,000,000 of 6 per cent bonds, redeemable after 5 and payable after 20 years. The loan was readily taken, and the full amount was issued. In 1864–65, $15,000,000 more was authorized of the same loan. In February, 1862, $150,000,000 of legal-tender notes were authorized, of which $50,000,000 were to take the place of demand notes. In July, 1862, $150,000,000 more were authorized, and an equal amount in addition in March, 1863, making $450,000,000 in all. These issues formed the currency known as "greenbacks," from the color of the paper. An Act in February, 1862, authorized the acceptance of $25,000,000 of deposits, increased in March to $100,000,000, on which 5 per cent interest was paid. In June, 1864, $50,000,000 more was authorized at 6 per cent. This was a temporary loan, to be repaid on 10 days' notice, and was all redeemed before the close of 1866. In March, 1862, Congress authorized the issue of certificates of indebtedness to public creditors in the adjustment of May 15, 1868. In March, 1864, a loan of $200,000,000 was authorized at 5 or 6 per cent, principal and interest payable in coin; $196,117,300 were issued at 5 per cent, to run 40 years (the 10-40s of 1864); and $3,882,500 at 6 per cent. Most of the 5 per cents brought premiums from 1 to 7 per cent. In June, 1864, a loan of $400,000,000 was authorized at 6 per cent (the 5-20s of 1864), of which $121,561,300 was issued. In June, 1864, Congress authorized the issue of $200,000,000 in 7-30 treasury notes, and in March, 1865, the sum was increased by $600,000,000 more. The whole issue was $829,992,500 of 7-30 interest-bearing notes, and the whole loan was redeemed by the middle of July, 1868. In March, 1865, a loan was authorized of $600,000,000 in 6 per cent 5-20 bonds, to be used only for the payment of treasury notes or other obligations of the nation. Two issues were made: July 1, $322,988,950 and $379,616,050, and in July, 1868, $42,539,350; all to redeem treasury notes and other obligations, but in no case to increase the public debt. In March, 1867, and July, 1868, there were issued $85,150,000 of temporary loan certificates of deposit, bearing interest at 3 per cent, to redeem com-

pound-interest notes. In July, 1870, the great Refunding Act was passed. The Secretary of the Treasury was authorized to issue $200,000,000 at 5 per cent, $300,000,000 at 4½ per cent, and $1,000,000,000 at 4 per cent, of 30-year bonds, principal and interest payable in coin, to be used only to redeem the 6 per cent or other early bonds. Besides these issues, there were guarantee bonds issued to the Pacific and other railroads, secured by mortgage on the roads. In January, 1871, the 5 per cent bonds were increased to $500,000,000.

These enormous financial transactions had, at the time, no parallel in the world's history. Yet for a time there was much fear that such loans could not be floated; but when they were proved possible without recourse to the capitalists of foreign countries, the loyal people of the Union had abundant cause for congratulation. The loan of 1862 ($515,000,000) was the greatest in amount and the most successful thus far attempted. Afterward, however, loans were not easily made, and the government was compelled to resort to currency and treasury notes and also compound-interest notes and certificates of indebtedness. The greatest test of the financial strength of the nation fiercely struggling to maintain its political existence was in 1864. On July 11, in that year, gold touched its highest point, $2.85, and a paper dollar was worth in gold only about 38 cents.

From the period of the Civil War the surplus of revenue was applied to the public debt. As the bonds bearing the higher rates of interest were first extinguished, the interest burden diminished even more rapidly than the principal. Thus, while in 1865 the total interest-bearing debt amounted to $2,381,000,000, and the annual interest charge to $151,000,000, at its lowest point, in 1892, of $585,000,000 principal, the interest charge was, in round numbers, but $23,000,000. As the population had increased rapidly during the interval, the interest per capita had declined from 4.39 to 39 cents. After 1893 the amount of public debt was increased by the issue of bonds for the purpose of securing the Treasury against the drain upon its gold reserve. This issue of 5 per cent bonds was followed in 1898 by a further issue of 3 per cent bonds for the purpose of meeting the expenses of the Spanish War. By the Act of March 14, 1900, the 3, 4, and 5 per cent bonds were made convertible into 2 per cent bonds, which resulted in a considerable diminution of the annual interest charge. The interest-bearing debt of the United States on July 1, 1912, was made up of the following:

2% Bonds	$730,882,130
2½% "	459,280
3% "	113,945,460
4% "	118,489,900
Total	$963,776,770

The following table presents the principal data relating to the development of the interest-bearing debt of the United States from 1791 to 1913:

TOTAL INTEREST BEARING DEBT

1791, Jan. 1	$75,463,476.52
1800, July 1	82,976,294.35
1810 "	53,173,217.52
1820 "	91,015,566.15
1830 "	48,565,406.50
1840 "	3,873,344.00
1850 "	63,452,773.55
1860 July 1	$64,842,287.88
1861 "	90,580,873.95
1862 "	365,304,826.92
1863 "	707,531,634.47
1864 "	1,359,930,763.50
1865 "	2,221,311,918.29
1866 "	2,332,331,208.00
1870 "	2,046,455,722.39
1880 "	1,723,993,100.00
1890 "	725,313,110.00
1898 "	847,367,470.00
1900 "	1,023,478,860.00
1910 "	913,317,490.00
1912 "	963,776,770.00
1913 "	965,706,610.00

Public Debts During and After the War. The public debts of all nations started upon a new period of development with the opening of the European War. During the continuance of the struggle an unprecedented enlargement in most forms of national and international indebtedness occurred. Two reasons may be assigned for this exceptional growth: the first, the belief that the war would not last long, and that, therefore, it would not be wise to finance it largely upon a short-time basis; the second, the enormously increased cost of conducting war and the consequent difficulty or impossibility of gathering a sufficient amount of regular income to bear the cost of it. In the United States the growth of public debt did not begin until the entry of this country into the European War, but from that time forward advance in its volume continued very rapidly. In neutral countries which did not participate in the war there was a tendency to the enlargement of public debt not specifically for war expenditures, but for outlays which, nevertheless, grew out of war conditions. Certain countries like Switzerland and Holland were obliged to keep a large force on the frontier in order to prevent infringement of their territorial rights, while in other cases war disturbances of trade practically necessitated the finding of new sources of revenue. As these were not always ready to hand borrowing was the natural consequence. The result has been to make the years 1914–22 years of wholly unexampled expansion in public obligations of all descriptions. The debt situation as developed subsequent to 1914 may be briefly reviewed in the table on page 570a.

Methods of Public Borrowing. A feature which distinguishes the financial experience of the war period from periods of similar trial in the past relates to methods of public borrowing. During the war a probably unprecedented use was made of the short-time obligation while at the same time the plan of funding the short-time obligations thus developed into long-term debt was carried to a higher point of development than ever before. The use of this method was practically identical in all of the belligerent countries, but naturally was carried on with far greater success in certain of them owing to the fact that a greater degree of responsiveness on the part of the public was achieved in some than in others. This method of borrowing as developed most successfully in England and the United States was substantially as follows: 'A given quantity of revenue having been estimated as necessary within a specified period, funds were then obtained direct from the banks through the issue of certificates of indebtedness or treasury bills, or the equivalent. These short-term obligations usually ran for only about three months. The intent of every issue was to obtain steadily from the community a proportionate part of its current earnings and thus to make

sure of the drawing off from the general fund of commercial income of a sufficient amount to provide for public necessities. In placing these certificates with holders use was usually made of the central banking mechanism as an intermediary. The practice of the United States may be taken as an example, although it ran closely parallel to the methods earlier developed in Great Britain during the first two or three years of the war. Certificates of indebtedness, having been issued by the Treasury Department, were placed in the hands of the Federal Reserve Banks for distribution and the banks thereupon communicated with the rank and file of the commercial banks of the country, or as they are called in the United States, the "member" banks. These member banks were at first asked to subscribe voluntarily for the certificates of indebtedness, but as the war advanced and as its requirements became more and more urgent, the practice was resorted to in many countries of loans thus obtained were used for the purpose of reimbursing to the banks the amount of the treasury certificates of indebtedness as they fell due at their 90-day maturity or otherwise. The theory of the operation was that as the public subscribed for long-term bonds it automatically deprived itself of the right to draw upon the banks in corresponding amount and the transfers thus made were used in repaying to the banks what they had already advanced in the form of certificate issues. This method of borrowing was supposed to provide a continuous funding of short-term into long-term debt and would have done so upon two conditions: the first, that the buyers of the bonds did not borrow at their banks for the purpose of making the purchase, but paid for them in cash or bank credit; the second, that no overlapping issues of certificates were made, that is to say, that no issues of certificates were ever paid off by the use of the proceeds of other issues made for that

Debts of Principal Nations.

Approximate Value in Millions of Dollars -- Conversion at Par.

Dates	Austria	Belgium	France	Germany	Italy
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1913	2,100	900	6,300	1,200	2,921
1918	15,807	1,902	34,200	39,200	11,900
1919	16,910	1,902	42,700	48,500	15,900
1921	15,800	4,900	55,000	80,000	21,200

Dates	Netherlands	Russia	United Kingdom	United States	World
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1913	462	4,500	3,500	1,000	43,362
1918	652	22,800	28,600	12,200	205,396
1919	981	22,800	36,400	25,200	295,070
1921	1,046	22,800	37,000	23,400	382,634

practically assigning the certificates to the banks in sums proportionate to their capital stock or deposits, or in some similar way. These banks thereupon assigned on their books a corresponding amount of credit to the government, or in other words, they paid for their certificates of indebtedness in the form of actual bank credit. It was understood that these "deposits" would not be called sooner than necessary, but that the banks would be allowed to hold them as long as practicable. The immediate result, therefore, of an issue of certificates of indebtedness was to add to the bank deposits of the country an amount equal to the volume of certificates thus issued. As the government found it necessary to do so, it thereupon drew upon the banks for the funds which they had thus rendered themselves liable to pay, making its drafts in the form, so far as practicable, of checks payable to contractors and others who had furnished services or supplies to the government. When these were put through the banks and were paid, the effect was to transfer the "deposits" at first written up by the banks on their books in favor of the government to the government's creditors. Thus the ownership of these deposits became widely diffused among the rank and file of the public. After what was considered a reasonable period had elapsed, a general loan for sale to the public would be announced. These loans in the United States were issued from two to three times a year and effort was made to have the public at large purchase long-term bonds paying for them in checks on their banks. The proceeds of the purpose. As a matter of fact, neither of these requirements was ever rigidly observed and at times the effort to observe them was either nonexistent or wholly ineffectual, so that the plan resulted in a very great development of what was called inflation. This inflation consisted in essence of the conversion of government obligations into immediate means of payment marked up in the form of deposit accounts on the books of the bank. Borrowers, in fact, came to rely, especially during the latter part of the war, very largely upon bank borrowing as a means of paying their bond subscriptions. In this they were sustained by the governmental policy, which, both in the United States and in Europe, encouraged banks to make loans to individuals with government securities as collateral at a rate practically equal to the coupon rate on the bonds themselves, so that it was possible for an individual to purchase bonds without incurring any considerable cost, although in most cases he was requested to make a small preliminary payment, at least, upon the face of the bonds. Having made such payment, and having undertaken the obligation to pay off his loan within a reasonable period, he was enabled to "carry" his bonds without cost to himself. This policy has been described by some as "fiat credit" in contradistinction to the so-called "fiat money" which has been employed in former wars as a means of carrying public expenditure. Fiat money, however, was not wanting in all countries during the European War for issues of government currency practically constituting an

addition to the public debt took place in many of them. In others, although the issue of government currency was technically avoided, the expansion of bank note currency was in effect equivalent to an enlargement of public obligations, since without redemption or suspension as the chief protection or collateral behind the bank notes was the obligation of the government. Upon the close of the war every effort was made by the stronger governments to secure the early funding of the floating or unfunded debt into long term or bonded securities and thus to eliminate the debt from the banks and to put an end to inflation. The attempt proved to be difficult and very uneven progress was made in this funding process. By about two years after the close of the war the only countries which had made real progress were the United States and Great Britain. Germany had actually increased her unfunded or floating indebtedness. The following table shows the situation existing at about the end of 1920 (except as dates are otherwise indicated):

FUNDED AND FLOATING DEBT
(000,000 omitted)

	Funded	Unfunded	Total
United States	$21,355 [1]	$2,083 [1]	$23,438 [1]
United Kingdom	29,485	8,035	37,520
Australia	1,651	309	1,960
Canada	2,444	89	2,533 [2]
Germany	20,440	50,960	71,500
France	29,268	18,937	48,205
Italy	15,760 [1]	6,620 [1]	22,380 [1]

[1] Dec. 31, 1921. [2] 1920.

Internal and External Loans. At the opening of the war controversy arose in most countries with respect to the question whether they should depend chiefly upon internal loans or would also employ external or foreign loans. In the case of some, this question was promptly decided by circumstances. Although Germany succeeded in placing a small issue of bonds in the United States early in the war, she was soon so closely hemmed in by her opponents that it was out of the question to borrow abroad and her operations during the war were confined entirely to loans placed among her own people. In others, borrowing abroad turned out to be difficult or impossible, on account of the restrictions upon foreign borrowing which were imposed by countries in whose markets the loans might have been placed. Belligerent countries naturally felt that their home lending power should be retained for their own use and that their markets ought not to be flooded with foreign bonds. Hence arose, especially during the latter part of the war, the practice of obtaining permission of foreign governments whenever a loan was to be offered in their markets even though these governments were really in some cases cobelligerents. The increasing intensity and severity of the financial demands of the war, moreover, rendered it impossible for many countries which might ordinarily have borrowed abroad to place their loans at all in other countries. Hence, before the war had advanced very far, it became necessary for borrowing governments to negotiate for their accommodation not with investors of foreign countries, but with the governments of those countries. In this way, during the comparatively early part of the struggle, Russia had been heavily accommodated by both England and France, while Great Britain soon found it necessary to lend largely both to France, Italy, and many of the smaller European states. This policy of financing had been carried almost to the limit of practicability at the time when the United States entered the war on April 6, 1917. Prior to that time, with the practical assent of the United States government, considerable loans had been floated in this country either directly on behalf of the belligerent governments of France, England, and others, or indirectly through banking houses in the United States acting for them and regularly disposing of quantities of short-time securities. The American market had become very nearly saturated at the time referred to and the entry of the United States into the war was the signal for a general declaration on the part of the Allied governments that they could not finance the war without the direct assistance of the government of the United States. Hence the development of an extensive system of foreign lending under the Acts of 1917 in which Congress authorized the executive department to make advances to those foreign governments which in its judgment required such aid. The United States government, in most cases, required the expenditure of funds thus loaned for commodities in the American market, so that in ultimate effect the practice simply resulted in the shipment on long-term credit of products purchased in the United States at prices then existing. The outcome was to develop a large series of claims against the various allied governments and others which thus received assistance, while as already seen, these governments had themselves previously developed an interlacing network of foreign loans among themselves, the central powers, however, being compelled to depend upon home finances for their resources. The table reviews the situ-

EXTERNAL AND INTERNAL DEBT [1]
Approximate Value in Millions of Dollars — Conversion at Par

	External	Internal	Total	Prewar Wealth	Ratio of debt to national wealth on prewar basis
United States	....	$23,400	$23,400 [2]	$204,400	12%
United Kingdom	5,650	31,850	37,500	70,500	53
Australia	552	1,408	1,960	7,400	27
Canada	243	2,074	2,317	11,100	21
Germany	([3])	71,500	71,500	80,500	89
France	6,000	42,200	48,200	58,500	113
Russia	4,500	20,900	25,400	60,000	42
Italy	4,200	17,000	21,200	21,800	87
Japan	710	902	1,612	11,200	14

[1] Debts for which figures are given vary somewhat but are approximately representative of conditions at beginning of 1921. [2] End of 1921. [3] For Germany's external debt, see terms of the reparations.

ation at about the opening of 1921 as regards the division of public debts between internal and external obligations.

Inter-Governmental Debts. When the United States entered the European War it found nearly all of the Allied Powers approaching exhaustion. England had previously made large war loans to the Allies, but could no longer continue them. Advances were accordingly authorized by Congress, in 1917, from the Treasury of the United States and were steadily made during the remainder of the war and until some eight months after the conclusion of the struggle. Thus a total sum of about $9,500,000,000 was loaned, the proceeds being used in large measure in buying in the United States commodities that were needed for export. The debts thus contracted were represented by temporary certificates evidencing the obligation in question and assigned by the representatives of the various countries. Eventually the question of "funding," or providing for their definite payment and for the rate of interest they should bear meanwhile became a pressing question. No interest on that had been paid from the time of their issue and Congress eventually passed, on Feb. 9, 1922, the so-called Debt Funding Commission Act in which a commission of five, headed by the Secretary of the Treasury, was directed to make arrangements for settling the obligations of the various countries. These obligations consisted of the following at the time of the adoption of the Act:

NET OBLIGATIONS OF FOREIGN GOVERNMENTS, UNDER AUTHORITY OF ACTS APPROVED APRIL 24, 1917, AND SEPTEMBER 24, 1917, AS AMENDED (ON BASIS OF CASH ADVANCES)

Belgium	$347,691,566.23
Cuba	8,147,000.00
Czecho Slovakia	61,256,206.74
France	2,950,762,938.19
Great Britain	4,166,318,358.44
Greece	15,000,000.00
Italy	1,648,034,050.90
Liberia	26,000.00
Rumania	23,205,819.52
Russia	187,729,750.00
Serbia	26,175,139.22
Total	$9,434,346,829.24

Accrued interest on this total was also due, beside some $573,000,000 for surplus war supplies sold to various foreign nations. Great Britain, meanwhile, had advanced to Continental countries sums amounting in the aggregate to about $8,500,000,000, a sum nearly as great as that lent by the government of the United States. Some relatively small loans had likewise been made by sundry of the Continental Powers to one another, France advancing near $2,509,000,000. Out of this situation arose in 1919–22 the demand for international debt cancellation.

German Indemnity. The most troublesome phase of the debt situation produced by the war grew out of the establishment of an indemnity or "reparation" to be paid by Germany. This had unfortunately not been fixed in 1919 by the Treaty of Versailles; and lengthy discussion was devoted to the subject during the years 1919 and 1920. A tentative decision fixing the amount to be paid in cash at 132,000,000,000 marks (gold) was announced on May 6, 1921, and after considerable controversy regarding Germany's capacity to pay such a sum was unwillingly accepted by that country. Payments have been continued (July, 1922) at fixed intervals from the date of the original establishment of the indemnity, but apparently with an increasing degree of difficulty on the part of the Germans. The indemnity payments were apportioned among the Allied nations in proportion to their war losses as estimated, France and Belgium thus becoming principal claimants to cash reimbursement, while a different distribution of payments "in kind";—coal shipping, etc. was agreed upon. The outcome of the German arrangement from the international standpoint was to constitute Germany the outstanding debtor of the world, just as the United States had become the world's chief creditor, Great Britain, France, and other countries being both debtors and creditors and depending (France particularly) upon the ability of Germany to settle, as a source from which to draw funds with which to liquidate their own obligations, especially to the United States. Largely because of the delay and difficulty in inducing the Germans to begin actual payments, European countries were able to make out a case for postponing their interest on debt owed to the United States; and from the time this debt was contracted to the middle of 1922 no interest payments had been made to the United States, save through the technical method of borrowing more funds and giving new obligations in settlement. The German indemnity question thus came to be recognized as the basis of all further negotiation for debt adjustment.

Brussels and Genoa Conferences. Partly because of recognition that existing international indebtedness could never be settled without some general and joint action, partly because of belief that private borrowing could not be returned so long as public finance continued in a chaotic condition, the League of Nations, which had been formed as a result of the Versailles Treaty of 1919, determined to bring about a financial conference of the chief nations. This took place at Brussels in September, 1920, but was shared in only unofficially by the United States. It reviewed general conditions of taxation and of finance, both public and private, and outlined various methods of promoting and protecting private international borrowing. It found, however, that no effective resumption of normal debtor and creditor relationships could reasonably be expected until exchange and currency conditions had been restored to stability, and that this could hardly come to pass until a balance of expenditures and revenues had been restored. A chief obstacle to such restoration was found in the debt situation. Practically no progress either in applying the temporary expedients of the Brussels conference or in working out a better treatment of public debt was made during 1920–21 and accordingly Premier Lloyd George determined to convene a "reconstruction" conference. This body met at Genoa in April, 1922, and included not only League of Nations members, but also Germany and Russia. The United States, although invited, was not represented. The Genoa Conference, like its predecessor at Brussels, found that the chief economic evils of the time largely went back to debt difficulties. A Financial Commission, appointed by the conference, reasserted the conclusions of the Brussels Conference declaring that "until . . . the problem[s] of intergovernmental indebtedness have been resolutely tackled, there can be no hope of restoring the currencies

or the economic welfare of Europe." Inasmuch, however, as discussion of the German reparations question had been excluded from the scope of the Genoa Conference no real progress could be made there. A meeting of the nations at the Hague, held in June and July, 1922, had to do largely with the development of some plan for settling Russian indebtedness but had no success.

Proportion of Loans to Taxation. Authorities on public finance prior to the war had laid it down as a general principle that no public loans should ever be floated without the enactment of taxation in an amount sufficient to provide for interest on the principal thus created, and for an amortization or sinking fund sufficient eventually to extinguish the debt. A less widely accepted, but nevertheless generally regarded, maxim of public finance was to the effect that in war financing as large a proportion as possible of funds to be raised should be raised through taxation. At the time that the United States entered the war a considerable body of economic writers and teachers, in a memorial to Congress, requested that 50 per cent of all war expenditures should be obtained through direct taxation and not over 50 per cent through loans. In England somewhat the same point of view, although in a less extreme form, had been advocated quite early in the war and had given rise to the heavy income and excess-profits taxes elsewhere referred to. Continental countries, on the other hand, had found their population restive under taxation and while taxes have been enormously increased the government authorities wherever possible have been disposed to rely very largely upon borrowing either from the citizens at large or from the banks, or as already seen, from foreign countries. It cannot be said, therefore, that any uniform or identical principle of financing was observed by all countries during the European contest, as regards the relation between loans and taxation.

Debts, Prices, and Exchange. A striking feature of the history of national debts during the war and postwar period is seen in their growing proportion to national wealth and the corresponding absorption of national income in meeting debt charges. The difficulty of ever paying these enormous debts is seen in the fact that whereas they are stated in units of currency (sterling, francs, marks, etc.) which have a real value only by reference to a specified quantity of gold (their prewar "parity"), the possibility of settling them on that basis would involve the transfer of a large proportion of the entire wealth of the country from present holders or owners to holders of debt representatives. Alternative to such a course would be the liquidation of the debts upon a new currency basis, the local unit being reduced in nominal gold value to an extent corresponding to the depreciation which existed at the time the bulk of the debt was contracted. Some such measure would probably be necessary if any of the heavily indebted countries were to attempt a return to the gold standard. It is customary to say, therefore, that present public debts constitute one of the chief obstacles to the restoration of a sound banking and currency system in the chief European countries. The difficulty in the situation is especially marked in the case of those countries which have heavy foreign debts because these must pay their interest in terms (usually) of gold currency, so that as their own standards depreciate the debt-burden resting upon them becomes more severe.

Consult: Adams, *Public Debts* (New York, 1890); Bastable, *Public Finance* (London, 1895); Fenn, *The Public Funds* (ib., 1898); Hollander, *War Borrowing* (New York, 1919); Keynes, *Economic Consequences of the Peace* (London, 1920); *Currencies After the War* (League of Nations, London, 1921); *Publications of Bankers Statistics Corporation* (New York, 1920–21); *Statistical Abstract of the United States* (annual, Washington); *Statesman's Year Book* (annual, London); *Reports of Secretary of the Treasury*, 1914–1921; *Reports of Federal Reserve Board*, 1914–21; *Proceedings of Brussels Financial Conference* (Brussels, 1919).
See FINANCE; BANK, BANKING; ANNUITY; REFUNDING; MONEY.

DEBT'OR. One who owes a debt or obligation to another. Strictly speaking, the relation of debtor and creditor arises only out of voluntary transactions between the parties and not as the result of a duty or obligation imposed by law. The position of the debtor and the rights of the creditor over him have varied greatly in the various stages of human, and especially of commercial, development. In primitive society the arrangements for borrowing and lending are rarely such as to enable the citizen to avail himself with security of his resources, or to assign such limits to the powers of the creditor as either the claims of humanity or his own true interests demand. On the one hand, lending is confounded with almsgiving, and the exaction of interest, and even of capital, is regarded as an act of inhumanity towards the poor. On the other hand, no sooner do the creditor's rights come to be recognized in anything like a legal sense than there seem to be no logical grounds on which any limits can be set to them. If he is entitled to exact the debt at all, he is entitled to seize the goods of the debtor; and if the debtor has no goods, he is entitled to his services, which also implies the possession of his person and even of power over his life. Moreover, from the theories of the domestic relations which usually prevail in early times, the person of the individual, where he is the father of a family, brings with it his wife, his children, and his slaves. The creditor thus becomes the master of the life and liberty of his debtor, and of all those who are dependent upon him. The provisions of the Mosaic law are an illustration of the manner in which, in the ruder forms of society, the laws of debt combine a degree of lenity with a severity which is equally alien to modern views. In this as in many other respects they are typical of the state of society to which they belong rather than a system peculiar to the Jews. If an Israelite became poor, it was a duty to lend to him, and no interest was to be exacted either in money or in produce. When the sabbatical year arrived, i.e., at the end of every seven years, there was a general remission of debts as between Israelites, and the near approach of the year of remission was not recognized as an excuse for declining to lend to an indigent brother (Deut. xv. 1–11). Pledges, it is true, might be taken, but even here the same humane principles prevailed. The upper millstone was sacred, for to take it would be to deprive the debtor of the means of subsistence. If raiment was the pledge, it must be returned before nightfall, when it might be required for a

covering; and the widow's garment could not be taken in pledge (Ex. xxii. 26, 27). In strange contrast to this is the provision (Lev. xxv. 39) that a poor Israelite may be sold to one possessed of substance, even when modified by the special provision that he shall serve as a hired servant, not as a bond servant, and shall be set at liberty when the year of jubilee arrives. Children were often given in pledge (Job xxiv. 9), and ultimately into slavery, in payment of debt (2 Kings iv. 1).

Both in Greece and in Rome the creditor had a claim to the person of the debtor. Previous to the time of Solon this arrangement had produced consequences at Athens closely analogous to those which afterward led to the struggles between the patricians and plebeians at Rome; and his abolition of it forms one of Solon's many claims to the character of an enlightened legislator. By the Twelve Tables it was enacted at Rome that if the debtor admitted the debt, or had had judgment pronounced against him for it, 30 days should be allowed him for payment. At the expiration of that period he was liable to be given into the hands of his creditor, who kept him 60 days in chains, exposing him from time to time publicly and proclaiming his debt. If no one stepped in to release him, the debtor at the end of that time might be sold as a slave or put to death. If there were several creditors, the letter of the law permitted them to cut their debtor in pieces, sharing him in proportion to their claims; but Gellius tells us that no Shylock ever was found in Rome. To treat him as a slave, however, and make him work out the debt, was the common practice; and his children followed his condition. The Lex Pœtelia (326 B.C.) alleviated the condition of debtors to the extent, at least, of preventing summary imprisonment and of relieving all debtors for the future from being put in chains. There do not seem to have been any public prisons for debtors at Rome, and each creditor consequently was the jailer of his own debtor. In this circumstance we probably see the reason of the prominence which was given by the plebeians to a change in the laws of debtor and creditor, on the occasion of their first secession, in 494 B.C., and subsequently during the whole course of the struggles between the two orders.

During the feudal period the person in general was not attachable for debt, imprisonment being inconsistent with the duties of warlike service, to which every man was bound; and it was for the encouragement of commerce and in consideration of the merchant having to deal with strangers and foreigners that it was first introduced in the mercantile communities of Europe. By the Statute of Merchants it was enacted by the English Parliament, in 1282, that in lending money a merchant might bring the borrower before the Lord Mayor of London, or the chief warden of another good town, and cause him to acknowledge his debt and the day of payment. A recognizance (q.v.) was then enrolled, and an obligation written by the clerk and sealed with the King's seal and the debtor's. Failing payment, the creditor was entitled to produce this obligation and to demand a warrant to seize the person of his debtor and to commit him to the Tower. This barbarous practice of punishing misfortune as a crime flourished in England for 600 years, until the humanitarian sentiment of our own time, stirred into action by the efforts of Samuel Romilly and other reformers, forced the abandonment of the practice. An impression of the extent of the hardship which it involved may be gained from the fact that, in the 18 months subsequent to the commercial panic of 1825, 101,000 writs for debt were issued from the English courts. In the year ending Jan. 5, 1830, there were 7114 debtors sent to prison in London, and on that day 1545 of these were still in confinement. In general it may be said that, up to the time of the reform legislation referred to, the prisons of England were crowded with debtors. The first statute affording partial relief to these unfortunates was passed in 1838, but it was not until 1868 that the system was finally abolished (Statutes 32 and 33 Vict., c. 62).

The practice of imprisonment for debt has also prevailed, though to a much more limited extent, in the United States. It was abolished in New York in 1831 and shortly after that date by the other States in which it had been permitted. In many of the States it has never been recognized. Both in England and the United States, however, a limited right of coercing a dishonest debtor by arrest in civil process is permitted by statute. It is generally allowed in actions for injury to the person or character, or for injury to or the wrongful taking of property, embezzlement by public officers or persons acting in a private fiduciary capacity as trustees; for misconduct in office or in any professional employment; in actions to recover possession of personal property, where it is concealed or kept out of the reach of the sheriff; and where the defendant has been guilty of fraud in contracting the debt or in avoiding payment. Women are generally exempt from arrest in all cases except actions for willful injury to person, character, or property.

As to the manner in which the position of the debtor has been mitigated by the general adoption of the principle of the bankruptcy and insolvency laws, see those titles. See also DEBT, and the titles there referred to.

DE BUEIL, HONORAT. See RACAN.

DEBUSSY, de-bụ'sē', CLAUDE ACHILLE (1862–1918). A prominent French composer, the acknowledged leader of the new French school. He was born Aug. 22, 1862, at Saint-Germain-en-Laye. When only 11 years of age he entered the Paris Conservatory, where his teachers were Lavignac in solfège, Marmontel in piano, and Guiraud in composition. After having carried off several prizes, he won the Grand Prix de Rome in 1884 with his cantata *L'Enfant prodigue*, a work of striking beauty and originality of expression (produced as an opera in Boston in 1910). The result of the first year of his sojourn in Italy was a symphonic suite, *Printemps*, which the Academy pronounced too advanced and unduly modern. Nothing daunted by this verdict, Debussy continued in his own characteristic style, and as the fruit of the second year sent the still more advanced *La Demoiselle élue* for female voices and orchestra on a text by Gabriel Sarrazin after Rossetti's "Blessed Damozel." This was followed by the exquisite *Petite Suite* for piano (four hands), *Suite Bergamesque*, three nocturnes for orchestra (*Nuages*, *Fêtes*, *Sirènes*), a string quartet. In 1902 he attracted wide attention with the symphonic poem *L'Après-midi d'un faune*, which elicited much critical discussion and many conflicting opinions, but also gained many friends for the new master. The same year witnessed

the first production, on April 30, in Paris, of Debussy's first dramatic work *Pelléas et Mélisande*. This immediately placed its author at the head of the new French school. In 1907 it was brought out in Germany and Belgium, in 1908 in Italy and the United States (New York, February 19), in 1909 in England. Since the death of Wagner no other musicodramatic work, with the exception of Strauss's *Salome* and *Elektra*, has caused such animated discussion as *Pelléas et Mélisande*. Even its detractors must admit its importance in the history of dramatic music. The next important work, three symphonic sketches, *La Mer*, appeared in 1905. The list of larger works is completed by the enumeration of a rhapsody for clarinet and orchestra (1911), a ballet, *Jeux* (1913); a second ballet, *Crimen Amoris* (1914). In 1913 Debussy published an expanded orchestral version of his earlier suite, *Printemps*. Four other dramatic works—*Chimène, Histoire de Tristan, Le diable au Beffroi, La chute de la maison Usher*—are still in manuscript. Debussy has also written a number of exquisitely graceful pieces for piano and songs of striking originality. His texts are selected chiefly from the works of Baudelaire, Bourget, Louy, Mallarmé, and Verlaine; and he favors such poems as are eminently suited to be wedded to his vague, intangible, and elusive musical strains.

Debussy's originality consists in the conscious employment of the higher overtones, by means of which the field of harmony has been considerably widened and enriched. By a skillful combination of this principle with the older church modes and the whole-tone scale—which latter is rather unduly favored—many new and interesting effects are obtained. The themes rarely assume a well-defined shape; they generally defy searching analysis because of their vagueness. The instrumentation is always fascinating, discreet, and exquisitely refined. In all Debussy's music not a bar can be found that even remotely suggests the commonplace. His whole art, in fact, is sublimated refinement. And for this very reason it never strikes deep, never grips the soul with that elemental force which is the peculiar attribute of the highest genius. Yet, in spite of all limitations, Debussy has exerted a marked and widespread influence not only upon contemporary French composers, but upon the younger composers of Spain, England, and the United States. Consult: F. Liebich, *Claude-Achille Debussy* (London, 1908); C. Caillard and J. de Bérys, *Le cas Debussy* (Paris, 1910); G. Setaccioli, *Debussy è un innovatore?* (Rome, 1910); J. Rievière, *Etudes* (Paris, 1911); C. Paglia, *Strauss, Debussy e compagnia bella* (Bologna, 1913).

DÉBUT, dā-bu′ (Fr.). A word which signifies generally a "beginning" or "entrance," but especially applied to the first appearance of an actor or actress on the stage or to a first appearance in a particular theatre. In these circumstances the actor is called a *débutant;* the actress, a *débutante*. The word is used also for "entry into society."

DECA (Gk. *δέκα, deka*, ten). A common prefix or combining form meaning "ten," as in *decapolis*, a union of 10 cities; *decalogue*, the Ten Commandments; *décamètre*, a measure of 10 meters, etc. From *deca* is formed:

Decade. A collection or group of ten. In its most common application it signifies a period of 10 years. The word was used in the calendar of the French Republic to designate the week of 10 days. Each month of 30 days was divided into three decades. The days of each decade were named *primidi, duodi, tridi, quartidi, quintidi, sextidi, septidi, octidi, nonidi*, and *decadi*. The tenth, or *decadi*, was the day of rest, which, as the Republic subscribed to no definite religion, was devoted to the practice of and exhortation to virtue. The Republican year numbered 36 decades. The remaining five (in leap years, six) days were not numbered and were set apart as holidays at the end of the year.

DEC'ACHORD (Gk. *δεκάχορδος, dekachordos*, ten-stringed, from *δέκα, deka*, Lat. *decem*, Eng. *ten* + *χορδή, chordē*, string, chord). A kind of guitar with 10 strings, similar to the common guitar, but larger in the body, and provided with a broader finger board. The lower strings have no frets, being used only as open notes.

DECADENCE (Fr. *décadence*, through ML. *decadentia*, from *de*, from + *cadere*, to fall). A term used with reference to works of art belonging to a school, nation, or race artistically in decline. In Greece art in all its forms reached its acme in c.450 B.C.; and though there are many exquisite works which were produced at a later period, they all belong, more or less conspicuously, to the decadence of Greek art. The century and a half beginning with Augustus (until about 150 A.D.) was the golden age of Roman art; after which there is a decadence which soon becomes very obvious and rapid. The art of the Italian Renaissance attained its highest development in the early sixteenth century, in the work of such masters as Michelangelo, Raphael, Leonardo, Titian, Correggio, after whom (except in Venice) came its decadence, to which even such artists as the Carracci and Caravaggio belong.

DÉCADENTS, dā'kā'dänʹ (It., Sp., Portug. *decadente*, from Lat. *de*, from + *cadere*, to fall). See SYMBOLISTS.

DECAEN, de-känʹ, CHARLES MATTHIEU ISIDORE, COUNT (1769–1832). A French general, who, having risen to the rank of general of division because of his services in the Rhenish campaigns of the war of the Revolution, won fame because of his share in the victory of Hohenlinden in 1800. In 1802 he was sent to India as captain general of the French possessions there, in connection with Napoleon's schemes for building up a new French colonial empire. Finding conditions in India hopeless for such plans, he made Mauritius the centre for some eight years of the destructive warfares which with the aid of Admiral Sinois he waged against British trade in the East. However, he was obliged to surrender to the English in 1810 and, having returned in 1811, was placed in command of the army in Catalonia. He compelled the English to raise the siege of Tarragona and was created Count in 1812. When Napoleon abdicated, Decaen entered the service of Louis XVIII, but on the Emperor's return from Elba again accepted a command under him. After the battle of Waterloo he lived in retirement. Consult M. L. E. Gautier, *Biographie du général Decaen* (Caen, 1850).

DEC'AGON (Gk. *δέκα, deka*, ten + *γωνία, gōnia*, angle). A geometric plane figure of 10 sides and 10 angles. When the sides are equal and the angles are equal, the figure is called a regular decagon. This figure is obtained from a regular pentagon (q.v.) by describing a circle around the latter, bisecting the arcs between its

vertices, and drawing lines from these vertices to the points of section. See POLYGON.

DECAISNE, de-kân', JOSEPH (1807–82). A French botanist, born in Brussels. He studied medicine and natural science in Paris and in 1830 became connected with the Museum of Natural History, in which he was made professor of botany in 1848. Three years later he was appointed to a similar post at the Jardin des Plantes. His published works include the following: *Herbarii Timoriensis Descriptio* (1835); *Plantes de l'Arabie heureuse recueillies par Botta* (1841); *Histoire de la maladie des pommes de terre* (1845); *Recherches anatomiques et physiologiques sur la garance* (1847); *Flore élémentaire des jardins et des champs*, jointly with Lemaout (1855; 1865); *Traité général de botanique descriptive et analytique*, jointly with Lemaout (1867); *Le jardin fruitier du Muséum* (9 vols., 1858–78); *Manuel de l'amateur des jardins*, jointly with Naudin (4 vols., 1862–72).

DEC'ALOGUE (Gk. δεκάλογος, *dekalogos*, ten sayings, from δέκα, *deka*, ten + λόγος, *logos*, word). The term usually applied by the Greek fathers to the law of the two "tables of testimony" given, according to the Book of Exodus, by Yahwe to Moses on Mount Sinai (Ex. xx. 1–17). According to the narrative, these tables were made of stone, and the commandments inscribed thereon were "written with the finger of God" (Ex. xxxi. 18). Afterward, when the tables were broken by Moses (Ex. xxxii. 19), he was commanded to hew others, on which Yahwe again wrote the words of the covenant (Ex. xxxiv. 28). These are said to be "the 10 words" (verse 28 b). The commandments are not numerically divided in the Pentateuch, and it has been supposed by some that the number 10 was chosen because 10 was considered the most perfect number. As, however, there are 10 distinct injunctions, it is superfluous to allege any other reason for the division than the simple fact that this is the correct enumeration. Philo divides them into two pentads, the first ending with "honor thy father and thy mother," etc.; but the general opinion among Christians is that the first table contained those commandments which enjoin upon us our duty to God (comprising the first four), and the second those which enjoin upon us our duty to our fellow creatures (comprising the last six). The Talmudists make the introductory words, "I am the Lord thy God, which have brought thee out of the land of Egypt, out of the house of bondage," to be the first commandment, and, in consequence, to keep the number 10, they make the next two (verses 3–6) into one. But the words quoted obviously contain no command at all, and merely express the general reason why the Israelites should yield implicit obedience to the injunctions which follow. Hence Origen commences the Decalogue with, "Thou shalt have no other gods before me." His division is that in use in the Greek, and in all the Protestant churches except the Lutheran; while from the writings of Philo and Josephus it appears that such was also the division received in the Jewish synagogue. The Roman Catholic and Lutheran churches also make verses 3–6 one commandment. To preserve the number 10 they divide verse 17 into two commandments, the first being "Thou shalt not covet thy neighbor's house," and the second, "Thou shalt not covet thy neighbor's wife, nor his manservant," etc., to the end. The two tables are said to have been placed in the ark of the tabernacle as a testimony of Yahwe's revelation (Ex. xxv. 16).

Modern scholars have called attention to the fact that there are two texts of the Decalogue—(1) Ex. xx. 2–17, and (2) Deut. v. 6–21—which present some striking differences. The commands in both are the same, viz., (1) prohibition of any worship besides that of Yahwe; (2) prohibition of graven images; (3) prohibition of the use of the name Yahwe for vain purposes; (4) the Sabbath command; (5) command to honor father and mother; (6) prohibition of murder; (7) prohibition of adultery; (8) prohibition of stealing; (9) prohibition of bearing false witness; (10) prohibition of coveting one's neighbor's property. But the text in Deuteronomy is believed to contain various amplifications, notably in the case of the fourth, fifth, and tenth commandments; and, moreover, while in Exodus the reason for hallowing every seventh day is as a memorial of the creation of the world in six days and of God's resting on the seventh, in Deuteronomy the observance of the Sabbath is enjoined as a reminiscence of the Exodus from Egypt. Of the two versions that in Exodus is regarded as the older form, though even in this amplifications are supposed to have been introduced which did not belong to it in its original form. In regard to the age of the Decalogue in its earliest form scholars differ. Many regard the moral rather than ritual tone, the prohibition of images, the Sabbath commandment, and the condemnation of the evil desire as evidences of a date later than the appearance of the great prophets. On the other hand, it has been urged that neither monotheism nor monolatry may have been originally intended, but only abstinence from worship of other gods and from placing their images in the presence of Yahwe, i.e., near him, that the Sabbath contemplated may have been the full moon, and that, in the tenth commandment, appropriation of that which has no owner is meant by the word translated 'coveting.' Traces of another Decalogue were discovered in Ex. xxxiv. already by Goethe. Here we find (verses 10–26) chiefly ritualistic ordinances: (1) not to worship any other god but Yahwe; (2) not to make any molten images; (3) to keep the feast of unleavened bread; (4) to give the firstlings to Yahwe; (5) to observe the feast of weeks; (6) to keep the feast of ingathering; (7) not to mix the blood of the sacrifice with leaven; (8) not to leave the fat of the paschal sacrifice till morning; (9) to bring the first fruits to Yahwe; (10) not to seethe the kid in the mother's milk. This decalogue, to which the phrase "the 10 words" in Ex. xxxiv. 28, if they are a genuine part of the text, would seem to refer, puts the emphasis upon the religious ceremonies. It has therefore been regarded by many scholars as older than the other. If the latter, with its stress upon moral duties, was earlier and enjoyed Mosaic authority, they find it difficult to understand how the former could have claimed to take its place, while the reverse can be more readily comprehended.

Consult: Procksch, *Die Elohimquellen* (1906); Volz, *Mose* (1907); Eerdmans, "The Covenant Code and the Decalogue," in *The Expositor* (1909); Sellin, *Einleitung ins Alte Testament* (1910); Gressmann, *Mose und seine Zeit* (Leipzig, 1912); Bade, *The Decalogue: A Problem in Ethical Development* (1914).

DECAM'ERON (It. *Il Decamerone*, from Gk. *δέκα, deka*, ten + *ἡμέρα, hēmera*, day). A famous collection of stories by Boccaccio (q.v.). See GALEOTTO, PRINCIPE.

DE CAMP, JOHN (1812–75). An American naval officer, born in New Jersey. He entered the service in 1827, became commander in 1855, and commanded the *Iroquois* at the capture of New Orleans in 1862. Afterward he played a gallant part in various actions on the Mississippi, especially under Farragut at Vicksburg. He was raised to the rank of commodore in 1866 and retired in 1870 as rear admiral.

DECAMP', JOSEPH RODEFER (1858–1923). An American figure and landscape painter. He was born in Cincinnati, Ohio; studied there under Duveneck, and at the Munich Academy. He established himself in Boston in 1893, and became an instructor in the school of the Boston Museum of Fine Arts. He was elected to the Society of American Artists in 1888. Impressionism, modified by a realistic treatment and sureness and solidity of execution characterizes his paintings. He received the Temple gold medal from the Pennsylvania Academy of Fine Arts in 1899, honorable mention at the Paris Exposition of 1900 for a "Woman Drying her Hair" (now in the Cincinnati Museum), and a gold medal at the St. Louis Exposition in 1904. He aroused great enthusiasm in Berlin in 1910 with "An Interior" and a "Lady Playing a Lute." Other fine paintings by him are: "The New Gown" (Wilstach Gallery, Philadelphia); "Sally" (Worcester Museum); a portrait of Dr. Horace Howard Furness and "Little Hotel" (Pennsylvania Academy, Philadelphia).

DECAMPS, *de-kän'*, ALEXANDRE-GABRIEL (1803–60). A French genre and landscape painter. He was born in Paris, March 3, 1803, and studied with Abel de Pujol, but was in no way restricted by the traditions of the conventional and classic in art. Of early instruction he had received little, regarding lessons "monotonous." He preferred to grope his way alone, but in later years acknowledged himself handicapped for lack of early training. Once, visiting the studio of Millet, he exclaimed, "Ah! you are a lucky fellow; you can do all you wish to do." "The sting of his artistic conscience" was always with him, making him discontented and restless even over his best work. Decamps's genius finally expressed itself in landscape and genre, and in Oriental subjects which introduced both. His subjects were chiefly found in the streets, on the quays, and in the fields. He reveled in color and in effects of atmosphere and light, and he managed these qualities in his pictures in a fascinating manner. Before he visited the East, in 1827, he had painted suggestions of the Orient, and five years before Delacroix he laid the foundation of the French school of Orientalism. His first paintings of genre subjects, exhibited in 1831, were so popular that it was difficult for him to depart from that style of work, yet he aspired to the historical in his nine sketches of the history of Samson (Musée des Arts Decoratifs, Paris) and made various unsuccessful attempts at monumental compositions. As a landscape painter, he sympathized with Constable and was lofty and dignified in his interpretation of nature. Light and atmosphere dominated his works—the modern note that was handed on to the school of impressionists. Decamps liked to indulge in satirical work, and "The Monkey Experts" and his travesties of Charles X display his skill in that direction. He touched the high-water mark of his popularity in 1839, in his exhibits at the Salon, where his "Café in Asia," "Street of a Roman Village," "Children Playing Near a Fountain," and other examples of his figure subjects and landscapes made him chevalier of the Legion of Honor. But the authority of the classic school and lack of official recognition made Decamps uncertain of himself and discouraged with his profession. In this mood, and suffering besides from a nervous illness, he burned many of his works and retired to the country, neglecting art for many years. He lost his life, Aug. 22, 1860, as the result of an accident while riding to the hunt. Decamps has been worthily represented in the Louvre since 1903; the Wallace collection, London, possesses 28 of his pictures, and others are in the Metropolitan Museum, New York, the Brooklyn Institute, and many other European and American galleries. He left about 100 lithographs and 20 etchings. Consult the monographs by Chaumelin (Marseilles, 1861); Moreau (Paris, 1869); Clément, in *Les artistes célèbres* (ib., 1886); Hédiard, in *Les maîtres de la lithographie* (Le Mans, 1892); Im-Thurn, *Scheffer et Decamps* (Nîmes, 1876); Chesneau, *Movement moderne en peinture: Decamps* (Paris, 1861); Stranahan, *Modern French Painters* (New York, 1888).

DE CANDOLLE, *de kän'dôl'*, ALPHONSE LOUIS PIERRE PYRAME (1806–93). A celebrated botanist, son of Augustin Pyrame de Candolle. He was born in Paris. His early education, like that of his father, was obtained in Geneva, where the greater part of his life was spent. Besides making botanical investigations of his own, he continued his father's monumental work, the *Prodromus Systematis Regni Vegetabilis*. His most important botanical writings are: *Introduction à l'étude de la botanique* (Paris, 1835); *Géographie botanique* (ib., 1855); *Lois de la nomenclature botanique* (ib., 1867); *La phytographie ou l'art de décrire les végétaux* (ib., 1880); *Origine des plantes cultivées* (ib., 1883). Besides these works he wrote a history of the sciences and scientists of the last two centuries (Geneva, 1872) and edited the memoirs and souvenirs of his father (ib., 1862).

DE CANDOLLE, AUGUSTIN PYRAME (1778–1841). A celebrated Swiss botanist. He was born in Geneva, Switzerland, where he obtained his early education. While still a youth, his ability to study and his attainments in literature were in marked contrast to his weak constitution. The gracefulness of his verse led Florian to predict a future for him as a poet. Law and medicine at first attracted him, but his love of plants, which had been aroused in 1792, while he was living with his mother in a village during the siege of Geneva, and which had been growing, through the influence of Saussure and especially of Vaucher, led him to adopt the study of botany as his life work. In 1796 he removed to Paris, where his first works, *Historia Plantarum Succulentarum* (Paris, 1799) and *Astragalogia* (ib., 1802), attracted the attention and gained him the friendship of scientists, among whom were Cuvier, to whose chair in the Collège de France he was elected in 1802; and Lamarck, who intrusted to him the publication of *Flore Française* (ib., 1803–15), in the introduction of which work he elaborates

and enforces Jussieu's natural system of plant classification as opposed to the Linnæan or artificial system. In 1804 the medical faculty of Paris awarded him the degree of M.D. Beginning with 1806, he spent six summers in the service of the government making a botanical and agricultural survey of the entire country, a report of which appeared in 1813. In 1807 he became botanist and director of the botanical garden in the medical faculty of the University of Montpellier, and three years later was transferred to the newly created chair of botany in the science faculty. During this incumbency he published *Théorie élémentaire de la botanique* (Montpellier, 1813; 2d ed., 1819; reprint, 1844)—a work that greatly extended his reputation and the popularity of the natural method of plant classification. In 1816 he accepted the newly founded chair of natural science and, conjointly with his son, the directorship of the botanical garden at Geneva, which offices he held until 1834, when his son succeeded him. He spent the remainder of his life in Geneva. In 1824 he commenced the *Prodromus Systematis Regni Vegetabilis* (Paris, 1824–74), based upon a former work (*Regni Vegetabilis Systema Naturale*), which had been planned upon too prodigious a scale for one man to complete, and of which only two volumes were published, in 1819 and 1821 respectively. Even of this more condensed work he was able to complete only seven volumes; the remaining 14 are the work of his son. He published other books and pamphlets, whose value, though considerable, is eclipsed by the works already mentioned. As a lecturer he exerted a wide influence and as a citizen was highly esteemed. Among the numerous honors awarded him was the cross of the Legion of Honor, which he received from Louis Philippe.

DECAP'ODA (Neo-Lat. nom. pl., from Gk. δεκάπους, *dekapous*, from δέκα, *deka*, ten + πούς, *pous*, foot). 1. The largest and most important order of malacostracan crustaceans, distinguished by the fact that the carapace is firmly grown to the dorsal side of all the thoracic segments, and that the last five pairs of thoracic appendages serve as walking feet, while the first three pairs are mouth organs. All of the crustaceans ordinarily used for food (crabs, lobsters, shrimps, and prawns) are decapods. Many hundred species are known, and they are found in all parts of the world, on land and in fresh water, but chiefly in the sea. The decapods contain three groups—the long-tailed (Macrura), the short-tailed (Brachyura), and the peculiar-tailed (Anomura). The first has the abdomen long and covered by a hard shell, and the lobster, crayfish, prawn, etc., are good illustrations; the second suborder has the abdomen very short and weak (this group is made up of the crabs); while the third includes the hermit crabs, which seem to be intermediate between the others. See CRAB; CRUSTACEA; LOBSTER.

2. A suborder of dibranchiate cephalopods, having 10 arms, the squids. See CEPHALOPODA; SQUID; and Colored Plate of OCTOPODS AND DECAPODS.

DECAP'OLIS (Lat., from Gk. Δεκάπολις, *Dekapolis* = δέκα, ten, πόλις, a city). A geographical term used in Josephus (e.g., *Wars*, iii, ix, 7), the New Testament (Matt. iv. 25; Mark v. 20; vii. 31), and other ancient writings to designate certain districts in and near Palestine, situated mainly east of the Jordan. The Decapolis was a confederacy, or league, originally of 10 cities, though the number was not constant, apparently having been increased in the second century. The details of the history of the confederation are somewhat obscure. Its outlines can be recovered, however, with a good degree of certainty.

When Alexander the Great conquered the East (331 B.C.), the ancient Semitic world was at once opened to the influences of Greek civilization. Many of Alexander's veterans either settled in cities already founded or established new ones for themselves. Palestine, outside of Judæa proper, was not exempt from this movement, and soon here and there throughout the ancient Hebrew territory numerous Greek cities came into existence. These cities, all constituted after the same general idea of the Greek *polis*, were centres of Greek culture. During the Maccabean War of Independence (167–141 B.C.), waged by the Jews against the Greek-Syrian Kingdom, the sympathies of these cities were with Syria. Consequently, with the triumph of the Jews, and especially during the reigns of the Asmonean princes, John Hyrcanus (135–105 B.C.) and Alexander Jannæus (104–78 B.C.), they suffered great hardship, in many cases being deprived of their independence. In 63 B.C., when Pompey took charge of affairs in Syria and Palestine in the name of Rome, he freed them from the Jewish yoke. It was probably at this time that 10 of these cities formed the league known as the Decapolis. The charter members seem to have been Scythopolis (*Beisân*, the only one west of the Jordan), Dion, Pella (*Fahil*), Gadara (*Umm Keis*), Hippos (*Susieh*), Gerasa (*Jerâch*), Philadelphia (*'Amman*), Damascus, Raphana, and Kanatha (*Kanawât*). Such, at least, is the list given by our earliest authority, Pliny the Elder (*Hist. Nat.* v, 18), in the first century; though it must be remembered that this list represents only the cities which belonged to the confederation in Pliny's time. There is strong reason to believe that Damascus was not one of the original group, lying too far to the north, but that in its place was Abila, generally reckoned as a later addition. It is also debated whether Raphana or Samaria is to be considered as one of the primary number. (Consult Hölscher, pp. 97 f.) The geographer Ptolemy, in the second century, omits Raphana, but adds nine other names, most of them of cities belonging to the district just south of Damascus, making 18 in all constituting the league in his time. The purpose of the confederation was in part to secure better protection against enemies, such as the Jews and the Arabian tribes, who were naturally hostile to Roman and Greek influences. Another equally powerful motive was the desire to obtain better trade advantages. The members of the league were all situated on trade routes, and the influence they exerted is seen in the passing over from Greek into Hebrew of many commercial terms and names. Each one of these cities covered with its jurisdiction a large adjacent district. Yet the Decapolis was not one solid territory, but between the districts belonging to the respective cities were large tracts governed by the various tetrarchies, or other forms of government permitted by Rome to exist under her general supervision. The most compact part of the Decapolis lay just south and east of the Sea of

Galilee. Here the regions of Scythopolis, west of the Jordan and on the main line of communication with the East-Jordan territory, of Hippos, east of the Sea of Galilee, and of Gadara, south of Hippos, on the Hieromax (the ancient *Yarmûk*), were contiguous, each possessing a section of the shore of the lake. South of Gadara, bordering on the Jordan valley, were Pella and Dion, which, from their Macedonian names, were both probably founded by Alexander's veterans. East of these were the districts belonging to Abila, on the Hieromax; Gerasa, farther south and very extensive; and Philadelphia, the ancient *Rabbah-Ammon* (Deut. iii. 11), the most southern member of the league. To the northeast were the cities Kanatha, the ancient *Kenath* (Num. xxxii. 42), both on the western slope of the Haurân Hills, and Damascus. Other members, such as Edrei and Bosra, though old cities, were late additions and carried the influence of the league eastward, south of the Haurân.

As to their political constitution, it seems to have been of an uncertain character. The independence to which they were restored by Pompey gave them the right to elect communal councils, to coin money, to offer asylum, to hold and administer property in the surrounding territory, and to associate together for defense and trade. At the same time the administration of their affairs was subject to review by the Governor of Syria; their coins bore the Imperial image; they were subject to taxation by Rome and to service in her military system; and even their political connections were determinable by the Emperor, as when, in 30 B.C., Augustus transferred some of them from the Province of Syria to the direct control of Herod.

From the organization of the league until the third century—a period of nearly 300 years—the Decapolitan country was exceedingly prosperous. When Trajan organized the Province of Arabia (106 B.C.), the security of the region was assured, commerce expanded, literature and art flourished, and in all conditions this was one of the most favored regions of the Empire. Of the cities making up the league, some were of more than ordinary size and importance. The ruins of Gerasa are very extensive; the amphitheatre of Philadelphia had a seating capacity of more than 7000; Gerasa had a *naumachia*. Greater than any of these, in Josephus' day, was Scythopolis, the ancient *Beth-Shean* (Josh. xvii. 11), west of the Jordan, famous for its linen manufactures. The confederation seems to have dissolved gradually. Some of the cities became incorporated with the Province of Arabia; others maintained their independent position until the break-up of the Roman Empire.

Consult: Schürer, *History of the Jewish People in the Times of Jesus Christ* (5 vols., New York, 1885); G. A. Smith, *The Historical Geography of the Holy Land* (11th ed., 1904); Hölscher, *Palästina in der persischen und hellenistischen Zeit* (Berlin, 1903); Schumacher, *Across the Jordan* (London, 1899).

DE CASSAGNAC, *de kà-sà'nyàk'*, PAUL GRANIER. See GRANIER.

DECA'TUR. A city and the county seat of Morgan Co., Ala., on the south bank of the Tennessee River, about 18 miles above the Muscle Shoals, and on the Louisville and Nashville and the Southern railroads (Map: Alabama, B 1). It has repair shops of the Louisville and Nashville, car works, engine works, tannery, bottling plants, and manufactures of lumber, sashes and blinds, fertilizers, cigars, flour, cottonseed oil, and various other products. There are two infirmaries, a hospital, and a Federal building. Pop., 1890, 2765; 1900, 3114; 1910, 4228.

DECATUR. A town and the county seat of De Kalb Co., Ga., 6 miles east-northeast of Atlanta, on the Georgia Railroad (Map: Georgia, B 2). It is a popular residential place and contains the Agnes Scott College (Presbyterian) for women, the Donald Frazer (Presbyterian) High School for boys, and a Carnegie library. Here, on July 20, 1864, the battle of Peachtree Creek (q.v.) was fought, the Confederates, under General Hood, attacking unsuccessfully part of Sherman's army under Generals Thomas and Schofield. Decatur, named after Commodore Stephen Decatur, was settled and incorporated in 1823. The water works are owned by the town. Pop., 1900, 1418; 1910, 2466.

DECA'TUR. A city and the county seat of Macon Co., Ill., 38 miles east of Springfield and 173 southwest of Chicago, on the Sangamon River, and on the Illinois Central, the Wabash, the Cincinnati, Hamilton, and Dayton, and the Vandalia railroads (Map: Illinois, D 4). It contains a Carnegie library, Fairview, Lincoln, Nelson, and Torrence parks, a hospital, a home for aged and orphans, and James Millikin University, founded in 1901. The city is in a fertile agricultural region and, owing to its exceptional railroad facilities, has large trade and shipping interests, particularly in grain. It is also an important industrial centre, manufacturing iron, soda fountains, corn shellers, starch, corn flour, meal, hominy, plumbing, water-works equipment, electric-light fixtures, coffins, etc. Decatur adopted the commission form of government in 1911, consisting of a mayor and four commissioners elected every four years. The water works and electric-light plant are owned and operated by the municipality. Decatur was settled in 1830 and incorporated six years later. Lincoln received his first indorsement as presidential candidate at the Illinois Republican Convention, held here on May 6, 1860. Decatur is also the birthplace of the Grand Army of the Republic, Post 1 having been organized here on April 6, 1866. Pop., 1900, 20,754; 1910, 31,140; 1914 (est.), 37,525; 1920, 43,818.

DECA'TUR. A city and the county seat of Adams Co., Ind., 21 miles southeast of Fort Wayne, on St. Mary's River, and on the Toledo, St. Louis, and Western, the Erie, and the Grand Rapids and Indiana railroads (Map: Indiana, E 2). It has several fine stone quarries, heading, handle, and hoop factories, and manufactures of lumber in various products, machinery, tiles, sugar, saddlery, fences, furnaces, and gloves. There is a Carnegie library and a Knights of Pythias home. Decatur was settled in 1840 and incorporated in 1882. The government is administered by a mayor, elected every four years, and a city council. The city owns and operates its water works and electric-light plant. Pop., 1900, 4142; 1910, 4471.

DECATUR. A city and the county seat of Wise Co., Tex., 40 miles north by west of Fort Worth, on the Fort Worth and Denver City

Railroad (Map: Texas, D 3). It is the seat of the Decatur Baptist College and contains a park and fine courthouse. The city is the centre of a corn and cotton-growing region and has cotton gins, a cottonseed-oil mill, a rolling mill, a canning factory, a flour mill, and an ice plant. Limestone is extensively quarried in the vicinity. Decatur owns its water works and electric-light plant. Pop., 1900, 1562; 1910, 1651.

DECATUR, Stephen (1751–1808). An American naval officer, born in Newport, R. I., of French ancestry. He early went to sea on a merchantman and during the Revolution commanded privateers. In 1798 he became a captain and was put in charge of the *Delaware*, 20 guns, with which he captured two French privateers. In 1801 he left the navy and went into business in Philadelphia. His son Stephen attained great distinction in the navy.

DECATUR, Stephen (1779–1820). An American naval officer, born in Sinnepuxent, Md., Jan. 5, 1779. He entered the navy as midshipman on board the *United States* in 1798. In November, 1803, he had command of the *Norfolk* and afterward of the *Enterprise*. On Feb. 16, 1804, at the head of a small party, he made a dash into the harbor of Tripoli and burned the frigate *Philadelphia*, which had fallen into the hands of the Tripolitans. In recognition of this act, which Admiral Nelson pronounced "the most daring of the age," he was made captain and was presented with a sword. Decatur had much more hard fighting in the harbor and neighborhood of Tripoli and in all cases showed the utmost daring and bravery. In 1812 he was in command, as commodore, of a squadron off the Atlantic coast and on October 25, in the *United States*, captured the English frigate *Macedonian*. From 1813 till the summer of 1814 he was forced by a British blockading squadron much superior to his own to remain in the harbor of New London. In January, 1815, he attempted to get to sea from New York with a small squadron. His flagship, the *President*, was injured by striking on the bar at Sandy Hook. He had not proceeded far when he was pursued and forced to engage in an unequal fight. He was finally overpowered and compelled to surrender and was taken to Bermuda with his frigate. He was soon paroled and in May, 1815, sailed from New York as commander of three frigates, one sloop, and six brigs and schooners, to operate against Algiers. He captured two important vessels; but the war was soon concluded by a treaty abolishing the demand upon the United States for tribute and giving up all prisoners. He made similar arrangements with the rulers of Tunis and Tripoli and thus put an end to the enslaving of the Americans by the corsairs of those countries. In November, 1815, he was made navy commissioner, with Commodore Rodgers and Porter, holding the office until his death, March 22, 1820, in a duel at Bladensburg, near Washington, with Commodore James Barron (q.v.). Consult the *Life* by Mackenzie (Boston, 1846), and Brady, *Stephen Decatur* (ib., 1900). His nephew, Stephen (1815–76), was commodore in the United States navy.

DECAZES, *de-kȧz'*, Elie, Duc (1780–1860). A French statesman. He began his career as a lawyer, became a judge in Paris, and in 1806 was called to Holland by King Louis, who esteemed him highly as his trusted counselor. Afterward he became secretary to Napoleon's mother, Letizia Bonaparte, and the same year Counsel to the Court of Appeals. He joined the Bourbons after the restoration and won the favor of Louis XVIII, who made him Prefect of Police, Minister of Police, and in 1818 Prime Minister. He carried out a number of liberal measures, but did not succeed in pleasing the radicals, and at the same time incurred the enmity of the ultraroyalists, who availed themselves of the murder of the Duc de Berry in 1820 to accuse Decazes of complicity in the crime, alleging that his revolutionary policy had instigated the assassin to his deed. The King accepted his minister's resignation with great reluctance, made him a duke, and sent him as Ambassador to England. Having returned in 1821, Decazes took part in all important debates in the Chamber of Peers, opposing the government, and after the revolution of 1830 supported the Orléans dynasty. He retired from public life in 1848 and thereafter devoted himself to the administration of his estates. Consult E. Daudet, *Louis XVIII et le duc Decazes* (Paris, 1899).

DECAZES, Louis Charles Elie Amanieu, Duc de Glücksberg (1819–86). A French diplomat, born in Paris. His father was the statesman Elie Decazes, and through his influence Decazes became Secretary to the Embassy in London, and afterward Minister Plenipotentiary to Spain and Portugal. The revolution of 1848 forced him to retire to private life, but he remained a devoted Orleanist and always hoped for a restoration of the dynasty. In 1871 he was elected a deputy to the Assembly, and in 1873, after being for a short time Ambassador at London, he was given the portfolio of Foreign Affairs. He was retired in 1877 and failed in subsequent efforts to return to political life.

DEC'CAN (Hind. *dakhan*, Prak. *dakkhana*, Skt. *dakṣiṇa*, southern, pertaining to the right hand, from *dakṣa*, right hand; connected with Gk. *δεξιός*, *dexios*, Lat. *dexter*, right). A term sometimes applied to the peninsula of India (Map: Asia, J 7), south of the river Nerbudda, but now generally restricted to the portion bounded on the north by the Nerbudda and on the south by the river Kistna or Krishna. The name is also applied to the entire triangular plateau which forms the larger part of the Asiatic peninsula of India and is the official designation of a division of the Bombay Province.

DECCAN HEMP. See Hibiscus.

DECEASED WIFE'S SISTER. See Affinity; Consanguinity; Marriage.

DECEBALUS, *dē-sĕb'ȧ-lŭs* (Lat., from Gk. *Δεκέβαλος*, *Dekebalos;* perhaps a title of honor, equivalent to *king*). A king of Dacia, a military leader of much ability, for years a formidable enemy of Rome. He crossed the Danube during Domitian's reign, overran Mœsia, and defeated the Imperial army under Cornelius Fuscus. Later he forced Domitian to conclude a treaty by which Domitian was to pay an annual tribute. He was completely overthrown by Trajan in 105 A.D., and his territories were reduced to a Roman province. He committed suicide to escape capture by the conquerors, about 106. See Dacia; Trajan.

DECE'DENT (Lat. *decedens*, from *decedere*, to depart, die). Strictly, a dying person; in

English and American law, a deceased person—the term being employed only in connection with the passing of the estate of such person, or the administration thereof. When the estate in question is disposed of by will, the decedent is properly described as "testator," or "devisor," and thus the term "decedent" has come to be commonly appropriated to a person dying intestate. As thus restricted, decedents' estates come under the operation of two distinct sets of rules, which, though now usually embodied in statute form, do not depart in essential particulars from the common-law doctrines in which they originated. These rules are, first, that the real estate of a decedent shall descend to his heir, and, second, that his personal property shall pass to his personal representative for purposes of administration and distribution. This personal representative may or may not be a person entitled to share in the ultimate distribution of the property, and under some circumstances the duty of administration is undertaken by the state. In the early history of the law in England it devolved upon the church, the right of administering upon the estate of a decedent being vested in the bishop of the diocese in which he died, such administration, together with the probate of wills, constituting an important part of the ordinary jurisdiction of the ecclesiastical courts. This jurisdiction has now been assumed by the High Court of Justice in England. In the United States it is commonly exercised by local tribunals of the rank of county courts, known, variously, as surrogates' courts, probate courts, orphans' courts, and the like. See those titles; also DESCENT; DISTRIBUTION; HEIR; PERSONAL REPRESENTATIVE; EXECUTOR; ADMINISTRATION.

DECEIT. In law, a misrepresentation or other device or contrivance by which one man intentionally deceives another to the legal injury or damage of the latter. The deceit need not be accomplished by any spoken or written words or by any positive statement or representation; but the concealment of any fact or circumstance which the deceiver is under a legal obligation to disclose, or his mere silence concerning it when the circumstances are such as to put upon him an obligation to speak, amount to deceit as fully as if positive misrepresentation was made. But mere silence concerning matter which there is no obligation to disclose is not generally deceit, even though the party misled may be known to be acting upon a false idea as to those facts. Deceit involves as a necessary element the *intention* to deceive in a matter in which the deceived party has a right to know the truth and rely upon it. Without this intent a misrepresentation might amount to a legal mistake, but would not be a basis for an allegation of the tort of fraud.

If the party deceived be in a position such that by the exercise of due caution or diligence, or by duly taking advantage of matters open to his knowledge, he would not have been deceived, there is no legal deceit, even though his reason for failing to take reasonable care was due to his confidence in the honesty of the party by whom he is deceived. If, however, he is dissuaded from the exercise of his caution by the actions of the other party intended so to dissuade him, there is deceit. The misrepresentation or misleading must be in respect of matters material to the transaction concerned, and must be relied upon to the deceived party's prejudice in the same transaction in order to lay a basis for an action. Misrepresentations as to matters of law are not generally sufficient to lay a basis for an action, although the circumstances may be such as to make them so. Reckless statements, made without any regard to whether they are true or not, or false statements, made in the belief that they are true when the party making them is legally bound to know and state the true facts, are legally deceitful. But mere expressions of opinion, or of anticipation as to what will happen in the future, is not deceit.

Deceit is a necessary element of a fraud, and no exact or absolute definition or statement can be given of what is deceit, except in a general way, as above. See FRAUD.

DE CELLES, *de sĕl′*, ALFRED DUCLOS (1843–). A Canadian author. He was born at St. Laurent, P. Q., and was educated at Quebec Seminary and Laval University, where he graduated in 1867. He was called to the bar in 1873, but left law for journalism and successively edited three conservative newspapers, *Le Journal de Québec*, *La Minerve*, and *L'Opinion Publique*. In 1880–85 he was assistant librarian, and after 1885 librarian, of the Dominion Parliament. He was elected a fellow of the Royal Society of Canada, was appointed by the French government an officer of Public Instruction (1896), and a chevalier of the Legion of Honor (1903), and in 1907 was created C.M.G. His principal publications are: *La crise du régime parlementaire* (1888); *A la conquête de la liberté en France et au Canada* (1890); *Les constitutions du Canada* (1890); *Les Etats Unis: origine, institutions, développement* (1896), crowned by the French Academy of Political and Moral Sciences; *Papineau, Cartier* (1905); *Cartier et son temps* (1907); *Lafontaine et son temps* (1907).

DECEM′BER. See MONTH.

DECEM′VIRI (Lat., board of ten men, from *decem*, ten + *vir*, man). The most famous body with this title were the 10 persons appointed at Rome (451 B.C.) to draw up a code of laws. The basis of their work was the information collected by three commissioners who were sent for that purpose to Greece (455–452). On the return of the commissioners a violent dispute arose between the patricians and the plebeians as to which of the orders should be intrusted with the revision of the laws. The dispute ended in favor of the patricians, and 10 patrician lawgivers were consequently appointed, to whom, moreover, the whole government of the state was intrusted during the year for which they were to hold office (451). The work of legislation was carried on with zeal and success, and the state was governed with prudence and moderation. Ten "Tables" of laws were adopted in 451. Their labors not being quite finished, a new body of decemviri was appointed, only one of whom, the notorious Appius Claudius Crassus (q.v.), had belonged to the previous commission. Two more "Tables" were adopted. In their magisterial and executive capacities, however, the new decemviri acted in the most tyrannical manner. In place of the fasces (q.v.) without the axe being carried only before the decemvir who presided for the day, as in the previous year, each decemvir was now attended by 12 lictors, who carried not only the rods, but the axe, which was the emblem of power over

life and death. When the term of their appointment expired, the decemviri refused either to resign or to allow successors to be appointed to them. At length the action of Appius Claudius in the matter of Virginia brought affairs to a climax. A popular insurrection broke forth, the decemviri were driven from their office, and the tribunes and other ordinary magistrates of the Republic were reappointed. The "Twelve Tables," however, remained in force. (See TWELVE TABLES, LAW OF THE.) Consult Mommsen, *History of Rome*, Eng. trans. by Dickson (New York, 1883), and Greenridge, *Roman Public Life* (London, 1901).

The *Decemviri Sacris Faciundis*, 'Commissioners for the Performance of Sacred Rites,' first appointed in 367 B.C., had the charge of the Sibylline Books (see SIBYL) and of the celebration of certain games in honor of Apollo and of the Secular Games (q.v.), which Augustus did most to make famous.

DECENNA'LIA. See DECENNIAL GAMES.

DECEN'NIAL GAMES (Lat. *Decennia* or *Decennalia*, nom. pl., from *decem*, ten + *annus*, year). The games celebrated in ancient Rome, every 10 years, to commemorate the nominal refusal of Augustus to be Emperor for life and his preference for reëlection once in 10 years. They were maintained as a popular amusement until the last days of the Empire.

DECEPTION. See FRAUD; DECEIT.

DECEPTION ISLAND. One of the South Shetland Islands in the Antarctic Ocean, situated in lat. 62° 55′ S. and long. 60° 35′ W. It was formed from a volcano whose cone rises about 1800 feet above sea level. On the southeast side the cone wall is broken by an opening about 600 feet wide, through which the sea has flooded the crater, forming a lake harbor (called Port Foster) which is approximately circular, about 5 miles in diameter, and about 95 fathoms deep.

DE CESARE, dâ chā′zà-râ, CARLO (1824–). An Italian political economist and legislator. He was born at Spinnazola, Province of Bari, and studied at Naples. He became Secretary General of the Neapolitan Finances in 1860 and of Agriculture, Industry, and Commerce in 1868. His works include: *Il mondo civile ed industriale nel XIX secolo* (1857); *Del potere temporale del Papa* (2d ed., 1861); *Il primo unitario italiano* (2d ed., 1861); *La Germania moderna* (2d ed., 1874).

DECHAMPS, de-shäN′, ADOLPHE (1807–75). A Belgian statesman, born at Melle, East Flanders. He became Governor of the Province of Luxembourg in 1842, Minister of Public Works in 1843, and Minister of Foreign Affairs in 1845. He was the foremost promoter of railroad communication in Belgium and, in association with De Decker, was the founder of the *Revue de Bruxelles*, a Catholic organ which exerted a marked influence from 1837 to 1850. From 1847 to 1864 he was leader of the Catholic minority, when, after an attempt to organize a Liberal ministry, he retired from politics. He had considerable ability as a writer, and a thorough familiarity with the political conditions of his time, as evidenced by his works, which include: *La Second Empire* (1859); *L'Empire et l'Angleterre* (1860); *La France et l'Allemagne* (1865); *Le Prince de Bismarck et l'entrevue des trois empereurs* (1873).

DE CHAVANNES, PUVIS. See PUVIS DE CHAVANNES.

DECHEN, dā′ken, HEINRICH VON (1800–89). A German geologist and engineer, born in Berlin. He studied for some time at the university of that city, but soon devoted himself to practical mining, and subsequently held a number of important government offices. In 1834 he was made professor of mining engineering in Berlin and in 1841 director of mines at Bonn. Besides a number of valuable geological maps, Dechen's published works include: *Geognostische Umrisse der Rheinlande zwischen Basel und Mainz* (2 vols., 1825); *Geognostische Beschreibung des Siebengebirges* (1852); *Die nutzbaren Mineralien und Gebirgsarten im Deutschen Reich, nebst einer physiographischen und geognostischen Uebersicht des Gebietes* (1873). He was also for many years editor of the *Archiv für Mineralogie, Geognosie, Bergbau- und Hüttenkunde*, and he published a geological map of Rhenish Prussia and Westphalia in 1855–82. His investigations of the geological structure of these regions formed his chief contribution to science.

DECHY, dā′kē, MORITZ VON (1851–). A Hungarian explorer. He was born in Budapest and was educated there and in Vienna, where he studied law; but he devoted himself to geography and mountaineering. In 1875 he was Hungarian commissioner to the International Geographical Congress in Paris. In 1878 with a Swiss guide he made an attempt to get to Tibet. In 1884, with Swiss and Tirol guides and a party of geologists and botanists, he made a remarkable tour of the Caucasus, which was followed by several other journeys in which his party made a thorough study of the mountains and climbed many high peaks. He wrote an elaborate book on the Caucasus in three volumes, which was published in German and in Hungarian (1905–07).

DECID'UOUS PLANTS (Lat. *deciduus*, falling down or off, from *de*, away + *cadere*, to fall). Plants which have organs that are shed periodically. The term "deciduous" is applied in particular to those trees and shrubs that shed their leaves at the approach of a season of cold or drought. See DURATION; FOREST; TREE.

DECIDUOUS TEETH. See TEETH.

DECIMA. See DESHIMA.

DEC'IMAL FRACTION. See FRACTION.

DECIMAL NOTATION. See NOTATION.

DECIMALS, REPEATING. See CIRCULATING DECIMALS.

DECIMAL SYSTEM (from Lat. *decimus*, tenth). A name applied to a system of numeration or to a system of measures such as weights, money, etc., in which the standard unit is divided into tenths, hundredths, etc., for the denominations below it, and multiplied by 10, 100, etc., for those above it. An excellent example is that of the international metric system of measures. The meter (approximately 39.37 inches in length) is the unit of linear measure and serves as a foundation for the measures of length, surface, volume, capacity, and weight. For the higher denominations the Greek *deka*, *hekto*, *kilo*, *myria*, are prefixed to signify the multiples 10, 100, 1000, 10,000, respectively. Thus, 1 dekameter = 10 meters; 1 hektometer = 100 meters, and so on. On the other hand, the Latin prefixes *deci*, *centi*, *milli*, are used to express divisions by 10, 100, etc., and thus furnish names for the lower denom-

inations; e.g., 1 decimeter = $\frac{1}{10}$ of a meter; 1 centimeter = $\frac{1}{100}$ of a meter. Similarly with money; the franc being the unit, a decime is the tenth part of a franc, and a centime the hundredth part. The monetary system of the United States of America, like that of nearly every civilized country except England, is decimal. Indeed, the numerical system in general use the world over is the most notable example of a decimal arrangement. It is based upon the 10 fingers used in primitive counting. See METRIC SYSTEM; NUMERALS; NOTATION; FRACTION.

DEC'IMA'TION (Fr. *décimation*, Lat. *decimatio*, from *decimare*, to decimate, from *decem*, ten). A punishment sometimes inflicted in the armies of ancient Rome. In instances where a crime had been committed by soldiers en masse, which would merit death in the individual, one-tenth of the whole number would be put to death. The individuals were selected by lot.

DE CISNEROS, de sĭs-nā'rôs, ELEONORA, COUNTESS (1878–). An American prima donna, born in New York City. She studied singing under Mme. Murio Celli in New York, and made her début at the Metropolitan Opera House in 1899. In the following year she was married to Count François G. de Cisneros. Between 1900 and 1906 she sang in more than 40 operatic rôles in Rome, Milan, Madrid, Lisbon, Vienna, St. Petersburg, London, and Rio de Janeiro. In 1907 she was Oscar Hammerstein's leading mezzo soprano at the Manhattan Opera House, New York.

DECIUS, dē'shĭ-ŭs, GAIUS MESSIUS QUINTUS TRAIANUS. A Roman Emperor (201–251 A.D.). He was a native of Pannonia, of Illyrian stock. He commanded the troops of the Emperor Philippus on the Danube. In 249, his soldiers in Mœsia revolted and forced him, against his will, to proclaim himself Emperor and lead them into Italy. Philippus marched against him, but was slain in battle near Verona. In 250 Decius ordered all Christians to renounce their faith, and a cruel persecution ensued, notably at Rome, Carthage, Alexandria, Jerusalem, and Antioch. Fabianus, Bishop of Rome, was martyred on January 20, Cyprian, Bishop of Carthage, was forced to leave his see, and the bishops of Alexandria and Antioch perished in prison. The great Origen also was cast into prison and tortured in Cæsarea. In the following year (251) Decius was called to Thrace to check a great invasion of the Goths, but was abandoned by his general, Trebonianus Gallus, who sought the throne for himself, and Decius, together with his son, perished in battle. Consult Gibbon, *Decline and Fall of the Roman Empire*, chap. x.

DE'CIUS MUS, PUBLIUS. Father, son, and grandson, famous consuls and generals of the Roman Republic. The first commanded the Roman army in the Latin War (340 B.C.). Just before a battle was fought at Veseris, near Vesuvius, he was told in a vision that the army of one side and the general of the other were devoted to the gods of the dead. Accordingly Decius exposed himself to the attack of the enemy and lost his own life that the hostile army might be destroyed. The son found himself in a similar position at the battle of Sentinum (295 B.C.), when his heroic death gave the victory to the Romans over the Gauls, the Samnites, and the Etruscans. The grandson is said by Cicero, *Tusculanæ Disputationes*, i, 89, to have sacrificed himself similarly at the battle of Asculum (279 B.C.), in the war with Pyrrhus, but the statement is challenged on good grounds.

DE CIVITATE DEI, dē sĭv'ĭ-tā'tē dē'ī. See AUGUSTINE, SAINT.

DECK. The flooring or platform formed by covering the deck beams with steel or planking. The term is sometimes used to express the space above a deck to the under side of the next higher deck. In old-type-rigged men-of-war the upper deck was called the *spar deck;* the next deck, the *gun deck*—if guns were carried on it—if not, it was called the *berth deck;* the next deck below the berth deck was the *orlop deck.* In old three-deckers (i.e., wooden line-of-battle ships carrying guns on *three covered* decks) these were called the *main, middle,* and *lower decks.* The *half deck,* in vessels having one or more covered gun decks, was that portion of the next deck below the spar deck extending from the mainmast to the cabin bulkheads. The *quarter-deck* was the part of the upper deck which was abaft the mainmast. These terms, *quarter* and *half,* were derived from the character of the decks in the days of high castle-like poops and forecastles. The *half deck* then extended half the length of the ship or less, the quarter-deck being still shorter. The after partial decks were connected with similar partial ones forward by gangways or narrow walks inside the ship's rail. As time went on, the forecastle and poop were reduced in height, and the partial decks became fewer in number, but the quarter-deck was only a partial one until after the beginning of the nineteenth century. For a long time the only partial decks above the upper, or spar, deck were those of the poop and topgallant forecastle, but the advent of the modern ship with its high central superstructure changed this together with the entire deck nomenclature. In ships of the United States navy the highest deck which extends the full length of the ship is called the *main deck;* a partial deck above this is called the *upper deck;* above this are the *bridge decks,* bridges, etc. The first deck below the main is called the *gun deck* if any of the main battery guns are mounted on it; the next deck below the gun deck is the *berth deck;* if there is no gun deck, it is the next one below the main deck; the *orlop deck* is the next below the berth deck; and then the *platform decks.* The *topgallant forecastle deck* is the deck over a raised, or topgallant, forecastle; the *poop deck* is the deck over the poop. The deck over superstructures is called the *superstructure deck, hurricane deck, boat deck, texas,* etc., according to the character of the vessel. In passenger steamers the deck below the *boat deck* is frequently called the *shelter deck.* A *flush deck* is one that extends from bow to stern without a break, or a superstructure rising above it. A *protective deck* (fitted in men-of-war only) is one designed to protect the vitals of a ship from being struck by a shell or injured by fragments of one which bursts on board. If flat and laid over the upper edges of an armor belt, it is frequently called the *armor deck.* The ordinary type of protective decks consists of a flat portion amidships and sloping parts at the sides. The side slope may be a curve, a straight slope, or two short straight slopes; the inclination downward is at an angle

of 30° to 45° from the horizontal, and the lower edge of the deck where it meets the ship's side is several feet under water, in order that a projectile shall not get underneath it when the ship is rolling. Behind the belt armor of battleships sloping protective decks are now usually fitted to deflect any shell which may get through the belt. Both the flat and sloping parts of protective decks are armored, the latter much more heavily, reaching a thickness of six inches in large protected and armored cruisers.

DECK, Théodore (1823–91). A French ceramist, born at Gebweiler, Alsace. After three years' apprenticeship in a porcelain stove factory at Strassburg, he made an extensive tour through central Europe and subsequently became director of a factory of faïence ware in Paris, where he conducted independent experiments in ceramics. His specialty was faïence wainscoting and decorative architectural ceramics, but he also succeeded in reproducing not only some of the famous faïence of the Renaissance but also imitations of Persian and Chinese ware, and created several colors for porcelain, such as the pale green, called céladon, and the turquoise blue, or bleu de Deck. During the last three years of his life he was director of the factory at Sèvres. He is the author of *La faïence* (Paris, 1887). Consult his biography by Gerspach (ib., 1883).

DECK'EN, Auguste von der (1828–1908). A German novelist, known under the pen name of Auguste von der Elbe. She was born at Bleckede. Her novels, several of which enjoy great popularity, include: *Chronika eines fahrenden Schülers* (a continuation of Klemens Brentano's works of the same name), which has passed through seven editions; *Onkel Wilhelms Gäste* (1899); *Seekönigs Töchter* (1900); *Ehrgeiz* (1903); *Ein frisches Reis* (1905); *In Banden* (1907); *Eiken von Eikenheede* (1908).

DECKEN, Karl Klaus von der (1833–65). A German African explorer, born at Kotzen, Brandenburg. He was for a time in the military service of Hanover and in 1861, in company with Thornton, an English geologist, undertook a journey of African exploration from Mombasa to the volcanic mountain of Kilimanjaro. In 1862 he ascended the mountain to a height of more than 14,000 feet and in the following year made an extended voyage about the African coast. His final explorations were begun in February, 1865. With a large and well-equipped expedition he attempted the ascent of the Juba River, but by reason of unnavigable rapids was forced to take the land, and on October 2 was murdered by the Somali at Berbera. Despite the hostility of the natives, most of his companions succeeded in reaching Zanzibar. The scientific collections of the expedition were presented to the University of Berlin, and its results were described by Kersten and others in *Karl Klaus von der Deckens Reisen in Ostafrika 1859–65* (4 vols., 1869–79).

DECK'ER, Karl von (1784–1844). A Prussian general and author, born in Berlin. He took a leading part in the campaigns of 1813–15. He was a director in the Prussian Topographical Bureau and for many years a lecturer at the General Military Academy. By his incessant activity and his works he greatly stimulated the interest in, and the extension of, a scientific military education, and this he accomplished in the face of serious opposition. His theories on artillery were attacked by his countrymen, but the principle of the offensive which he strongly advocated found effective illustration in the campaign of 1870–71. His works include *Der kleine Krieg* (1822; 4th ed., 1844) and *Taktik der drei Waffen* (2 parts, 1833–34; 3d ed., 1851–54).

DECKER, Sir Matthew (1679–1749). A political economist and free trader, born in Amsterdam, Holland. He went to London in 1702, was naturalized as an English subject in the following year, and having embarked in commerce attained the greatest success; received a baronetcy in 1716, and three years afterward took his seat in Parliament as member for Bishop's Castle. He sat in the House, however, only four years. His death took place March 18, 1749; the baronetcy then became extinct, and his daughters succeeded to his estates.

Decker was the reputed author of two pamphlets which appeared anonymously during his lifetime, and which ran through several editions and provoked much acrimonious controversy. In one he proposed to raise all the public supplies from one single tax, viz., a tax upon houses. According to Decker's calculation, there were then in England, exclusive of Wales, 1,200,000 houses; of these he meant to tax only one-half, counting off 500,000 as inhabited by the working classes and 100,000 as being uninhabited. By this means he proposed to raise an annual revenue of £6,000,000, which sum was £1,000,000 more than the expenses of the government of that day required. The surplus was to be applied as a sinking fund for the purpose of discharging debt. The same idea is found in the second essay, which discussed England's foreign trade and the means of improving it.

DEC'LAMA'TION (Fr. *déclamation*, Lat. *declamatio*, declamation, from *declamare*, to declaim, from *de*, down + *clamare*, to shout). The art of speaking according to rules, whereby the sense of the words, as well as the feeling and sentiment, is naturally and characteristically represented. Recitation, therefore, whether spoken or sung, is subject to the laws of declamation, from which it derives its value and significance. Perfect declamation implies correctness of speech, distinctness and clearness of enunciation, and a well-toned voice. Declamation is therefore clearly of a musical nature. Declamation in music, however, differs from the declamation of speaking in that the singer must adhere to what the composer has written. The composer fixes the whole of the intonation, modulation, and phrasing, and also the *tempi* and expression, and not infrequently sacrifices the correctness of the declamation to the charm of some peculiar melodic phrase or pleasing rhythm or a vocal musical embellishment. The truth and beauty of correct musical declamation are always endangered by a translation of the original words into another language—a work which, with the greatest care and ability, it is in many cases almost impossible to accomplish word for word, or syllable for syllable, so as to fit accurately to the accent of the music. The masterworks of many great composers thus suffer much from careless translation. In earlier times attempts were made to establish declamation as a science. The ancients had a kind of note, or sign of intonation, which they placed over or under the words, possibly to decide whether the accent should be given by a high or by a low tone and thus to regulate the modula-

tion of the voice. That the theatrical declamation of the ancients resembled the musical recitative of the present day is generally admitted.

DE CLAPIERS, Luc. See Vauvenargues, Marquis de.

DEC'LARA'TION (OF., Lat. *declaratio,* from *declarare,* to make clear, from *de* + *clarus,* clear). Under the common-law practice of England and the United States, the first pleading in an action corresponding to the bill in equity in chancery practice and the libel in admiralty. It must consist of a sufficient statement, in legal form, of all the material facts constituting the plaintiff's cause of action, together with a demand for relief. The facts alleged must be sufficient to give the plaintiff a right to recover if he establishes them; otherwise the defendant may demur and have the declaration dismissed. Originally, in England, the term was used only of the first pleading in a personal action, the first pleading in actions for the recovery of real property being called a *count;* but this distinction is no longer maintained either in England or in the United States.

The declaration is made up of the following general parts, viz., the *title,* being the name of the court; the *venue,* or county in which the cause of action is brought; the *commencement,* containing the names of the parties and the capacities in which they are joined in the action, together with a statement that the defendant has been summoned; the *body,* a statement of the facts constituting the cause of action; and a *conclusion,* or formal demand for relief at the end. The *body* must conform to the particular common form which is adapted to the nature of the action, but the other characteristics remain the same in all forms of action. The declaration is still in use in most of the United States, where the common-law system of pleading obtains, but under the reformed procedure in England it has been superseded by a pleading known as the *statement of claim* and in the "code States" of America (i.e., those which have adopted codes of civil procedure) by the *complaint* (q.v.). See Bill in Equity; Code; Common Forms; Forms of Action; Original Writ; Pleading.

In the criminal law of Scotland the statement made by the prisoner on the preliminary examination before the examining magistrates is known as the *declaration* of the accused. It is the duty of the magistrate to take this declaration immediately on the prisoner being brought before him. The magistrate must previously inform him that it is entirely at his own option to declare or not, but that, if he chooses to do so, the declaration may be used in evidence against him on his trial. The declaration ought to contain the name, age, and designation of the prisoner, the parish and county in which the crime was committed, and all similar particulars. When completed, it must be read over to the prisoner, who, if he is able to write, signs every page of it along with the magistrate. This practice of the Scottish committing magistrates is identical with that which obtains in England and America, the term "statement" being here employed for the prisoner's declaration. See Arraignment; Confession; and consult the statutes of the various States regulating the examination of persons under arrest for crime.

DECLARATION, Dying. A statement as to the cause of his death, made by a person who has been physically injured at the hands of another, and who has given up all hope of recovery and who subsequently dies of such injury. Such statements are in English and American law permitted to be given in evidence as an exception to the rule excluding hearsay evidence from the consideration of the jury. The exception is based on the assumption that statements made by a dying person in the apprehension of death are as trustworthy as those made in open court under the sanction of an oath. To be admissible, however, dying declarations must have been made by the victim of the homicide and must relate to the circumstances of the crime; they can be used only on the trial of the person charged with the death of the declarant and are equally admissible whether favorable or unfavorable to the accused. As appears from the foregoing statement, dying declarations made by others than the victim of a homicide are inadmissible, either in civil or in criminal cases. Thus, a confession of guilt made by a person *in articulo mortis* will not be received in favor of a person accused of the crime. This narrow scope of the rule has been much criticized, but is almost universally maintained. Only such of the statements of the deceased as he could have testified to if he had lived to go on the witness stand are allowable. The substance of what was said by the dying person may be given by a witness if he cannot remember the exact words. As these statements must be repeated by one who was present and heard them, the character of the testifying witness enters into the weight of the evidence, and it is for the jury to determine whether he repeats what was said accurately. The jury may also give such credence to the deceased's story as in their judgment it deserves. It is for the court to rule in the first instance on the question whether the statement is admissible as a dying declaration. See Evidence; Hearsay Rule.

DECLARATION in Lieu of an Oath. A solemn statement in court or before a judicial or legislative body, by a witness, that he will tell the whole truth in such testimony as he may be called upon to give in the matter pending. Any one who objects to taking an oath, for religious or other reasons, may, in nearly all jurisdictions to-day, thus declare or affirm that he will tell the truth, but usually an oath is administered unless the witness objects. This practice was adopted generally because at common law no witness who did not believe in a Supreme Being and who, therefore, had no sense of the obligation of an oath from that standpoint, was allowed to testify, which rule excluded much valuable testimony. Violation of such declaration or affirmation is legal perjury, and the witness may be punished as if he had taken an oath. See Affirmation; Oath.

DECLARATION OF INDEPENDENCE, American. A document proclaiming the independence of the 13 English Colonies in America, and finally agreed upon by the Continental Congress, July 4, 1776. Early in 1776 several delegates in Congress were directed by their constituencies to vote for independence. Such a vote would be, in some particulars, no more than a recognition of the existing state of affairs, for already there existed in several provinces a complete independence of England so far as the administrative system was concerned. As a result of advice given by the Continental Congress, Massachusetts, New Hampshire, and South Carolina had early established commonwealth

IN CONGRESS, JULY 4, 1776.

The unanimous Declaration of the thirteen united States of America,

When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another and to assume among the powers of the earth the separate and equal station to which the laws of nature and of nature's god entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness — That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, — That whenever any form of government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence indeed will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security. — Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world. —

He has refused his Assent to Laws, the most wholesome and necessary for the public good. — He has forbidden his Governors to pass Laws of immediate and pressing importance, unless suspended in their operation till his Assent should be obtained; and when so suspended, he has utterly neglected to attend to them. — He has refused to pass other Laws for the accommodation of large districts of people, unless those people would relinquish the right of Representation in the Legislature, a right inestimable to them and formidable to tyrants only. — He has called together Legislative bodies at places unusual, uncomfortable, and distant from the depository of their Public Records, for the sole purpose of fatiguing them into compliance with his measures. — He has dissolved Representative Houses repeatedly, for opposing with manly firmness his invasions on the rights of the people. — He has refused for a long time after such dissolutions, to cause others to be elected; whereby the Legislative powers, incapable of Annihilation, have returned to the People at large for their exercise, the State remaining in the mean time exposed to all the dangers of invasion from without and convulsions within. — He has endeavoured to prevent the population of these States; for that purpose obstructing the Laws for Naturalization of Foreigners, refusing to pass others to encourage their migrations hither, and raising the conditions of new Appropriations of Lands. — He has obstructed the Administration of Justice by refusing his Assent to Laws for establishing Judiciary Powers. — He has made Judges dependent on his Will alone, for the tenure of their offices, and the amount and payment of their salaries. — He has erected a multitude of New Offices, and sent hither swarms of Officers to harass our People, and eat out their substance. — He has kept among us, in times of peace, Standing Armies without the Consent of our Legislatures. — He has affected to render the Military independent of and superior to the Civil power. — He has combined with others to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his Assent to their Acts of pretended Legislation: — For quartering large bodies of armed troops among us: — For protecting them, by a mock Trial, from punishment for any Murders which they should commit on the Inhabitants of these States: — For cutting off our Trade with all parts of the world: — For imposing Taxes on us without our Consent: — For depriving us in many cases, of the benefits of Trial by Jury: — For transporting us beyond Seas to be tried for pretended offences — For abolishing the free System of English Laws in a neighbouring Province, establishing therein an Arbitrary government, and enlarging its Boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies — For taking away our Charters, abolishing our most valuable Laws and altering fundamentally the Forms of our Governments — For suspending our own Legislatures, and declaring themselves invested with Power to legislate for us in all cases whatsoever. —

He has abdicated Government here, by declaring us out of his Protection and waging War against us. — He has plundered our Seas, ravaged our Coasts, burnt our Towns, and destroyed the Lives of our People. — He is at this time transporting large Armies of foreign Mercenaries to compleat the works of death, desolation and tyranny, already begun with circumstances of Cruelty & perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the Head of a civilized nation. — He has constrained our fellow Citizens taken Captive on the high Seas to bear Arms against their Country, to become the executioners of their friends and Brethren, or to fall themselves by their Hands. — He has excited domestic insurrections amongst us, and has endeavoured to bring on the inhabitants of our frontiers, the merciless Indian Savages, whose known rule of warfare, is an undistinguished destruction of all ages, sexes and conditions. In every stage of these Oppressions We have Petitioned for Redress in the most humble terms: Our repeated Petitions have been answered only by repeated injury. A Prince, whose character is thus marked by every act which may define a Tyrant, is unfit to be the ruler of a free People. Nor have We been wanting in attentions to our British brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which, would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity, which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends. —

We, therefore the Representatives of the united States of America in General Congress, Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the Name, and by authority of the good People of these Colonies, solemnly publish and declare, That these United Colonies are, and of Right ought to be Free and Independent States; that they are absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Great Britain, is and ought to be totally dissolved; and that as Free and Independent States, they have full Power to levy War, conclude Peace, contract Alliances, establish Commerce, and to do all other Acts and Things which Independent States may of right do. — And for the support of this Declaration, with a firm reliance on the protection of divine Providence we mutually pledge to each other our Lives, our Fortunes and our sacred Honor.

John Hancock

Josiah Bartlett
Wm Whipple
Saml Adams
John Adams
Robt Treat Paine
Elbridge Gerry

Stephen Hopkins
William Ellery

Roger Sherman
Sam'el Huntington
Wm Williams
Oliver Wolcott

Matthew Thornton

Button Gwinnett
Lyman Hall
Geo Walton

Edward Rutledge
Thos Heyward Junr
Thomas Lynch Junr
Arthur Middleton

George Wythe
Richard Henry Lee
Th Jefferson
Benja Harrison
Thos Nelson jr
Francis Lightfoot Lee
Carter Braxton

Robt Morris
Benjamin Rush
Benja Franklin
John Morton
Geo Clymer
Jas Smith
Geo Taylor
James Wilson
Geo Ross

Caesar Rodney
Geo Read
Tho M:Kean

Wm Floyd
Phil Livingston
Frans Lewis
Lewis Morris

Richd Stockton
Jno Witherspoon
Fras Hopkinson
John Hart
Abra Clark

Josiah Bartlett
Wm Whipple
Saml Adams
John Adams
Robt Treat Paine
Elbridge Gerry

Step Hopkins
William Ellery

Roger Sherman
Sam'el Huntington
Wm Williams
Oliver Wolcott

Matthew Thornton

organizations entirely regardless of any connection with England. This organization of commonwealth governments on a permanent basis was strongly urged by John Adams, largely as a result of whose work the Continental Congress passed the resolutions of May 10 and 15, 1776, recommending to all the Colonies the formation of independent governments. This action was generally indorsed; and gradually the various States placed themselves on record as favoring the step which had now indeed become virtually inevitable—the declaration of their absolute independence. On June 7, 1776, Richard Henry Lee moved in Congress that "these united Colonies are and of right ought to be free and independent States, that they are absolved from all allegiance to the British Crown, and that all political connection between them and the State of Great Britain is and ought to be totally dissolved." This motion was seconded by John Adams, but action thereon was deferred until July 1, and the resolution was passed on the following day. Two committees were appointed (on June 10)—one to prepare a declaration, and the other to draw up a plan of confederation. On the Declaration committee were Jefferson, Franklin, John Adams, Roger Sherman, and R. R. Livingston. They reported June 28, but action was delayed for several days. When the Declaration finally came up for consideration, it was passed unanimously on July 4, by the delegates of 12 Colonies, those representing New York not voting, since they had not as yet been authorized to support the movement for independence. The document was signed on the same day by John Hancock as President of the Congress. On July 9, however, a New York convention formally pledged that State to support the Declaration. The document was engrossed on parchment in accordance with a resolution passed by Congress on July 19, and on August 2 was signed by the 53 members then present. Congress directed that copies be sent "to the Assemblies, Conventions, and Committees or Councils of Safety, and to the several commanding officers of the continental troops; that it be proclaimed in each of the United States and at the head of the army." Subsequently Matthew Thornton, Elbridge Gerry, and Thomas McKean also affixed their signatures. The Declaration of Independence was drafted by Thomas Jefferson and was but very slightly changed from his copy. The document itself was assigned for safekeeping to the Department of State upon the organization of the national government; was deposited in the Patent Office in 1841, when that office was a bureau in the Department of State; was returned to the Department of State in 1877; and in 1894, owing to the rapid fading of the text and the deterioration of the parchment, was withdrawn from exhibition and was carefully put away out of the light and air. A facsimile was made in 1823, by order of John Quincy Adams, then Secretary of State, for the original signers and their families, and it is from a copy struck from the copperplate then made that the reproduction here given was obtained.

The text of the Declaration is as follows:

The Unanimous Declaration of the Thirteen United States of America

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and of nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident—that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and, accordingly, all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these Colonies, and such is now the necessity which constrains them to alter their former systems of government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having, in direct object, the establishment of an absolute tyranny over these States. To prove this, let facts be submitted to a candid world:

He has refused his assent to laws the most wholesome and necessary for the public good.

He has forbidden his Governors to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and, when so suspended, he has utterly neglected to attend to them.

He has refused to pass other laws for the accommodation of large districts of people, unless those people would relinquish the right of representation in the Legislature; a right inestimable to them, and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved Representative Houses repeatedly for opposing with manly firmness his invasions on the rights of the people.

He has refused, for a long time after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise; the State remaining, in the meantime, exposed to all the danger of invasion from without and convulsions within.

He has endeavored to prevent the population of these States; for that purpose obstructing the laws for the naturalization of foreigners; refusing to pass others to encourage their migration hither, and raising the conditions of new appropriations of lands.

He has obstructed the administration of justice by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers to harass our people and eat out their substance.

He has kept among us, in times of peace, standing armies, without the consent of our legislatures.

He has affected to render the military independent of, and superior to, the civil power.

He has combined, with others, to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws, giving his assent to their acts of pretended legislation:

For quartering large bodies of armed troops among us:

For protecting them, by a mock trial, from punishment, for any murders which they should commit on the inhabitants of these States:

For cutting off our trade with all parts of the world:

For imposing taxes on us without our consent:

For depriving us, in many cases, of the benefits of trial by jury:

For transporting us beyond seas to be tried for pretended offenses:

For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries, so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies:

For taking away our charters, abolishing our most valuable laws, and altering, fundamentally, the powers of our governments:

For suspending our own legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection, and waging war against us.

He has plundered our seas, ravaged our coasts, burnt our towns, and destroyed the lives of our people.

He is, at this time, transporting large armies of foreign mercenaries to complete the works of death, desolation, and tyranny, already begun, with circumstances of cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow-citizens, taken captive on the high seas, to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrections among us, and has endeavored to bring on the inhabitants of our frontiers, the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes, and conditions.

In every stage of these oppressions we have petitioned for redress in the most humble terms; our repeated petitions have been answered only by repeated injury. A prince whose character is thus marked by every act which may define a tyrant, is unfit to be the ruler of a free people.

Nor have we been wanting in attention to our British brethren. We have warned them from time to time of attempts made by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them, by the ties of our common kindred, to disavow these usurpations, which would inevitably interrupt our connection and correspondence. They, too, have been deaf to the voice of justice and consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them, as we hold the rest of mankind, enemies in war, in peace, friends.

We, therefore, the Representatives of the United States of America, in General Congress assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the name and by the authority of the good people of these Colonies, solemnly publish and declare, That these United Colonies are, and of right ought to be, *free and independent States;* that they are absolved from all allegiance to the British Crown, and that all political connection between them and the State of Great Britain is, and ought to be, totally dissolved; and that, as *free and independent States,* they have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which *independent States* may of right do. And, for the support of this Declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other, our lives, our fortunes, and our sacred honor.

The 56 signers of the Declaration were as follows: Roger Sherman, Samuel Huntington, William Williams, and Oliver Wolcott, of Connecticut; Cæsar Rodney, George Read, and Thomas McKean, of Delaware; Button Gwinnett, Lyman Hall, and George Walton, of Georgia; Samuel Chase, William Paca, Thomas Stone, and Charles Carroll of Carrollton, of Maryland; John Hancock, Samuel Adams, John Adams, Robert Treat Paine, and Elbridge Gerry, of Massachusetts; Josiah Bartlett, William Whipple, and Matthew Thornton, of New Hampshire; Richard Stockton, John Witherspoon, Francis Hopkinson, John Hart, and Abraham Clark, of New Jersey; William Floyd, Philip Livingston, Francis Lewis, and Lewis Morris, of New York; William Hooper, Joseph Hewes, and John Penn, of North Carolina; Robert Morris, Benjamin Rush, Benjamin Franklin, John Morton, George Clymer, James Smith, George Taylor, James Wilson, and George Ross, of Pennsylvania; Stephen Hopkins and William Ellery, of Rhode Island; Edward Rutledge, Thomas Heyward, Jr., Thomas Lynch, Jr., and Arthur Middleton, of South Carolina; and George Wythe, Richard Henry Lee, Thomas Jefferson, Benjamin Harrison, Thomas Nelson, Jr., Francis Lightfoot Lee, and Carter Braxton, of Virginia.

Bibliography. Much useful material may be found in Emmet, *History of the Inception and Drafting of the Declaration of Independence; with a Collection of Autographs of the Signers, and Other Documents* (New York, 1876), which, however, is not generally accessible. Consult also: *Rise of the Republic of the United States* (Boston, 1872); Greene, *Historical View of the American Revolution* (ib., 1865); Ellis, "The Sentiment of Independence: Its Growth and Consummation," in Winsor, *Narrative and Critical History of America*, vol. vi (ib., 1888); Tyler, *Literary History of the American Revolution*, vol. i (New York, 1897); Randall, *Life*

of Thomas Jefferson (ib., 1858); Bancroft, *History of the United States*, vol. iv (last ed., ib., 1891); Stillé, "Pennsylvania and the Declaration of Independence," in the *Pennsylvania Magazine of History and Biography*, vol. xiii (Philadelphia, 1889); Hays, "A Contribution to the Bibliography of the Declaration of Independence," in the *Proceedings of the American Philosophical Society*, vol. xxxix (Philadelphia, 1900); a chapter, "The Authentication of the Declaration of Independence," in Chamberlain, *John Adams, with Other Essays and Addresses* (Boston, 1898); Friedenwald, "The Declaration of Independence," in the *International Monthly*, vol. iv (Burlington, Vt., 1901); Dana, "The Declaration of Independence," in the *Harvard Law Review*, vol. xiii (Cambridge, 1900); Hazelton, *Declaration of Independence: Its History* (New York, 1905). For biographies of the signers, consult: Sanderson, *Biography of the Signers of the Declaration of Independence* (9 vols., Philadelphia, 1823–27); Brotherhead, *Book of the Signers* (ib., 1861; new ed., 1875); Lossing, *Biographical Sketches of the Signers of the American Declaration of Independence* (New York, 1860); Dwight, *Signers of the Declaration of Independence* (last ed., ib., 1895). See also the biographical notices of the individual signers.

DECLARATION OF INDEPENDENCE, MECKLENBURG. See MECKLENBURG DECLARATION OF INDEPENDENCE.

DECLARATION OF INDULGENCE. This name is applied to several acts of the last two Stuart kings, but particularly to the proclamation of James II, in 1687, suspending the operation of the penal statutes directed against the Roman Catholics and the Protestant Nonconformists, and of all acts imposing a test as a qualification for holding lay or ecclesiastical office. In this way James hoped to gain, in favor of his Catholic policy, the adherence of the Protestant dissenters, many of whom were suffering severe persecution under those laws. Several hundred addresses of thanks were presented to the King, but the majority of the dissenting clergy would not accept toleration on such terms. The great leaders, Baxter, Howe, and Bunyan, declined the indulgence at the price of a breach of the law and the encouragement of Romanism.

The clergy generally refused to read the proclamation in their churches, as commanded by a royal order of May, 1688. The seven bishops, with Archbishop Sancroft at their head, signed a firm but moderate petition to the King, refusing to publish a declaration which they knew to be illegal. James commanded the ecclesiastical commissioners to deprive these bishops of their sees, but this was going too far, even for that body; and on the suggestion of Jeffreys, a prosecution before the King's Bench for seditious libel was substituted. So threatening was the popular indignation that the accused prelates were acquitted, although the jury was packed and the judges were mere tools of the crown. The declaration cost James the allegiance of the Anglican church and precipitated the Revolution of 1688. Consult: Howell, *State Trials*, vol. xii (London, 1809–28); D'Oyly, *Life of William Sancroft* (ib., 1840); Macaulay, *History of England*, vol. ii (ib., 1849). See SANCROFT.

DECLARATION OF LONDON. See LONDON, DECLARATION OF.

DECLARATION OF PARIS. An agreement defining the rules of maritime law, to be applied in time of war, signed by the plenipotentiaries of Great Britain, Austria, France, Prussia, Russia, Sardinia, and Turkey, at Paris, April 16, 1856, where they had met in convention to settle the questions involved in the Crimean War, just closed. England had always claimed and had exercised the right to seize an enemy's goods on the high seas, though conveyed in a neutral vessel, which included the right to stop and search neutral merchant vessels for this purpose. The exercise of this right had aroused against England the Northern Maritime League of 1800 and was condemned generally by the civilized world. Nothing short of absolute command of the seas made it safe for a single power to maintain a practice which threatened in moments of danger to turn the whole body of neutral states into enemies. Besides, while it was profitable for England to seize an enemy's goods in neutral ships when she was at war, it reacted upon England when she remained at peace during hostilities between other states. Likewise, while her privateers might inflict severe injuries upon an enemy's commerce, her own commerce in time of war offered a rich field for hostile privateers. So, in return for the abolition of privateering, Great Britain consented to a rule permitting the products of a belligerent state to find a market in time of war.

The following rules were adopted by the convention: 1. Privateering is, and remains, abolished. 2. The neutral flag covers enemy's goods, with the exception of contraband of war. 3. Neutral goods, with the exception of contraband of war, are not liable to capture under the enemy's flag. 4. Blockades, in order to be binding, must be effective, i.e., maintained by a force sufficient really to prevent access to the coast of the enemy. This declaration was subsequently accepted by the civilized nations, with the exception of the United States, Spain, Mexico, and several South American republics. The United States urged the substitution of a more advanced provision, excepting from capture all private property, even of citizens of belligerents, either by privateers or national vessels. This was the situation at the opening of the Civil War. On the issuance by the Confederate President, Jefferson Davis, of letters to privateers, Secretary of State Seward addressed a note to the Powers, requesting to be allowed to accede to the Declaration of Paris without modification. Great Britain and France, who had recognized the South as belligerents and were anxious not to invalidate the letters of marque issued by the Confederate government, stipulated that the accession of the United States should not "have any bearing, direct or indirect, on the internal differences now prevailing." As this placed no restriction upon Confederate privateers, the negotiations were dropped. In the war between the United States and Spain, in 1898, both belligerents formally announced their intention to adhere to the principles of the Declaration. It may be said that the second, third, and fourth principles are a recognized part of the body of international law. The question of privateering has thus far been regarded rather as one of national policy. With the development of modern navies, however, it has become of minor significance. Consult the authorities referred to under MARITIME LAW; INTERNATIONAL LAW.

DECLARATION OF RIGHTS. See RIGHTS, DECLARATION AND BILL OF.

DECLARATION OF ST. PETERSBURG. See ST. PETERSBURG, DECLARATION OF.

DECLARATION OF WAR. A formal announcement of hostile intentions by one state to another. It is a survival of the feudal custom of sending heralds to give the enemy warning of impending hostilities. The doctrine that notice must be given an enemy before entering upon war has never grown into an obligation, and since the middle of the eighteenth century the practice has so largely decreased that it may be concluded that a formal declaration is not required by morality or international law. The later custom of publication by a belligerent in its own territory, at the outbreak of war, of a manifesto discussing the questions at issue and justifying its position, which should be communicated to neutrals, never has assumed the weight of an obligation, though useful both to subjects of the state and to those of neutrals.

Under conditions of modern intercourse a state can never be taken by surprise. A period of negotiation is followed by an ultimatum in the form of a demand, refusal of which involves war. Thus, the United States demanded of Spain her withdrawal from Cuba in April, 1898, on condition of war. A later act of declaration was passed by Congress on April 25, fixing the date of hostilities as April 21. This was important, as determining the date for legal purposes. On Jan. 13, 1904, the Japanese minister delivered to the Russian government a note containing proposals relative to the matters in dispute between the two Powers, a prompt reply to which was requested, the implication being that, in the event of unreasonable delay, Japan would take hostile action. Formal declarations of war were issued by both governments on February 10, two days after the commencement of hostilities. When not fixed by direct notice, war is held to date from the first act of hostilities by either party. The United States began the War of 1812 by invading Canada and seizing British vessels in port; and in 1854 the British fleet entered the Black Sea to compel the Russian fleet to return to Sebastopol before the ambassadors had withdrawn. On the other hand, the French chargé d'affaires handed a formal notice to Bismarck in 1870, and Russia declared war upon Turkey in 1877 by a formal dispatch.

DECLARATOR, ACTION OF. A form of action peculiar to the law of Scotland, the object of which is judicially to ascertain a fact, leaving its legal consequences to follow as a matter of course. The declaratory conclusions of such actions are generally followed by petitory or possessory actions, for the purpose of giving effect to the right declared. A substantial interest on the part of the pursuer, or plaintiff, must be shown in all cases, as it is not competent to ask the court to declare a mere abstract fact or right. The existence of this special form of action has contributed to diffuse in Scotland a false view as to the nature of actions and judicial proceedings generally.

DECLE, dā'k'l, LIONEL (1859–1907). A French explorer, born in Saint-Quentin, France. Between 1881 and 1885 he traveled through most of Asia and in America, in 1891–94 he crossed Africa from the Cape to Zanzibar by the way of Uganda, and he then served as Russian correspondent for the *Pall Mall Gazette*, the editor of which, H. J. C. Cust, he accompanied (1896–97) through East and South Africa. He organized the native transports in the Madagascar expedition in 1895, and during the Spanish-American War was correspondent for the London *Daily Telegraph*. For that paper also he headed an expedition from Cape Town to Cairo (1899–1901). He wrote: *Three Years in Savage Africa* (1898), with an introduction by Henry M. Stanley; *Trooper 3809* (1899), an attack upon French army management; *The New Russia* (1906).

DECLEN'SION (Fr. *déclinaison*, Lat. *declinatio*, from *declinare*, to bend, from *de*, down + **clinare*, Gk. *κλίνειν*, *klinein*, to bend, Lith. *szlýti*, to incline, Skt. *śri*, to lean). A grammatical term applied to the system of modifications called *cases*, which nouns, pronouns, and adjectives undergo in many languages. How the word "declension" (Lat. *declinatio*, a declining, or leaning away) and "case" (Lat. *casus*, a fall) came to be applied to this species of inflection has never been made altogether clear. The relations in which one thing stands to other things may be expressed in either of two ways. Some languages make use of separate words, called prepositions, or postpositions; in others the relations are expressed by changes in the termination of the name of the thing. Thus, in Latin, *reg* being the root or crude form of the word for "king," *regs*, or *rex*, is the word in the nominative case, signifying "a king" as subject or agent; *regis*, in the genitive case, "of a king"; *regi*, in the dative, "to a king"; etc. An adjective joined to a noun usually takes a corresponding change. The number of cases is very different in different languages. The further we go back in the history of the Indo-European languages, the richer do we generally find them in these modifications. Sanskrit had eight cases, old Slavonic seven, Latin six, and Greek five. The names of the Latin cases, which are often used also in regard to the English language, are the nominative, which names the subject or actor; the genitive, expressing the source whence something proceeds, or to which it belongs—it is sometimes called the adjective case; the dative, that to which something is given, or for which it is done; the accusative, the object towards which an action is directed—it completes the meaning of a transitive verb; the vocative, the person addressed or called; and the ablative, that from which something is taken. The Greek has no ablative case. The Sanskrit, in addition to the Latin cases, has an instrumental and a locative case. The grammar of the inflective languages is complicated by the circumstance that all nouns do not form their cases in the same way. This makes it necessary to distribute nouns into various classes, called *declensions*. In Latin, as many as five declensions are usually given. (See INFLECTION.) As we descend, the case endings become rubbed off, as it were, and prepositions are used in their stead. The languages descended from the Latin (French, Italian, etc.) have lost all the cases of nouns and adjectives. The Teutonic languages in their early periods had cases almost as numerous and perplexing as those of the Latin. German is still to a great extent incumbered with them. Modern English has only one case in nouns different from the nominative, viz., the genitive, or possessive. (See NOUN.) The declension of pronouns (q.v.) has been more persistent than that of nouns and adjectives. Languages of the agglutinative

TABLE OF MAGNETIC DECLINATIONS AND ANNUAL CHANGES IN THE UNITED STATES FOR JANUARY 1, 1910

STATE OR TERRITORY	Station	Approximate latitude	Approximate longitude	Mag. decl. Jan. 1, 1910	An. change Jan. 1, 1910
Alabama	Montgomery	32° 22′	86° 18′	2° 45′ E	0′.7 decr.
Arizona (East)	Holbrook	34° 55′	110° 10′	14° 05′ E	4′.3 incr.
Arizona (West)	Prescott	34° 34′	112° 30′	14° 25′ E	4′.6 "
Arkansas	Little Rock	34° 47′	92° 18′	6° 49′ E	1′.4 "
Calif. (South)	Los Angeles	34° 04′	118° 15′	15° 35′ E	5′.0 "
Calif. (Middle)	San Jose	37° 18′	121° 52′	18° 32′ E	4′.5 "
Calif. (North)	Redding	40° 36′	122° 24′	19° 22′ E	4′.5 "
Colorado (East)	Pueblo	38° 14′	104° 38′	13° 19′ E	3′.0 "
Colorado (West)	Glenwood	39° 32′	107° 20′	16° 10′ E	3′.7 "
Connecticut	Hartford	41° 45′	72° 40′	11° 11′ W	5′.8 "
Delaware	Dover	39° 09′	75° 31′	7° 13′ W	4′.8 "
Dist. Columbia	Washington	38° 55′	77° 02′	4° 51′ W	4′.5 "
Florida (East)	Jacksonville	30° 20′	81° 39′	1° 05′ E	2′.0 decr.
Florida (West)	Marianna	30° 47′	85° 13′	3° 37′ E	0′.8 "
Florida (South)	Tampa	27° 58′	82° 28′	2° 06′ E	0′.8 "
Georgia	Macon	32° 51′	83° 37′	1° 52′ E	2′.0 "
Idaho (East)	Pocatello	42° 51′	112° 26′	18° 26′ E	4′.0 incr.
Idaho (West)	Boise	43° 37′	116° 12′	19° 31′ E	4′.5 "
Illinois	Bloomington	40° 31′	88° 59′	3° 25′ E	0′.8 decr.
Indiana	Indianapolis	39° 47′	86° 12′	1° 08′ E	1′.8 "
Iowa	Des Moines	41° 36′	93° 36′	7° 57′ E	1′.0 incr.
Kansas (East)	Emporia	38° 25′	96° 12′	10° 08′ E	1′.8 "
Kansas (West)	Ness City	38° 28′	99° 54′	11° 27′ E	2′.4 "
Kentucky (East)	Lexington	38° 04′	84° 30′	0° 19′ E	2′.0 decr.
Kentucky (West)	Princeton	37° 07′	87° 53′	3° 36′ E	1′.0 "
Louisiana	Alexandria	31° 21′	92° 25′	6° 50′ E	1′.8 incr.
Maine (N. E.)	Eastport	44° 55′	67° 00′	20° 01′ W	6′.0 "
Maine (S. W.)	Portland	43° 39′	70° 17′	15° 13′ W	6′.0 "
Maryland	Baltimore	39° 18′	76° 35′	6° 15′ W	4′.5 "
Mass. (East)	Boston	42° 20′	71° 01′	13° 21′ W	6′.0 "
Mass. (West)	Pittsfield	42° 27′	73° 17′	11° 42′ W	5′.8 "
Michigan (N.)	Marquette	46° 33′	87° 22′	2° 05′ E	1′.6 decr.
Michigan (S.)	Lansing	42° 44′	84° 32′	0° 27′ W	2′.4 incr.
Minnesota (N.)	Northome	47° 53′	94° 17′	8° 03′ E	1′.0 "
Minnesota (S.)	Mankato	44° 11′	93° 59′	9° 00′ E	1′.2 "
Mississippi	Jackson	32° 20′	90° 11′	6° 08′ E	1′.0 "
Missouri	Sedalia	38° 43′	93° 14′	70° 46′ E	1′.2 "
Montana (East)	Forsyth	46° 15′	106° 39′	18° 17′ E	3′.0 "
Montana (West	Helena	46° 37′	112° 02′	20° 02′ E	3′.7 "
Nebraska (East)	Hastings	40° 37′	98° 24′	10° 28′ E	2′.0 "
Nebraska (West)	Alliance	42° 06′	102° 51′	14° 31′ E	2′.6 "
Nevada (East)	Elko	40° 51′	115° 46′	18° 27′ E	4′.6 "
Nevada (West)	Hawthorne	38° 32′	118° 38′	17° 58′ E	5′.0 "
New Hampshire	Hanover	43° 43′	72° 17′	13° 16′ W	6′.0 "
New Jersey	Trenton	40° 14′	74° 48′	8° 33′ W	5′.2 "
New Mexico (E.)	Santa Rosa	34° 56′	104° 41′	12° 29′ E	3′.6 "
New Mexico (W.)	Laguna	35° 03′	107° 24′	13° 36′ E	4′.0 "
New York (E.)	Albany	42° 40′	73° 45′	11° 31′ W	5′.6 "
New York (W.)	Elmira	42° 07′	76° 50′	8° 12′ W	4′.5 "
N. Carolina (E.)	Newbern	35° 07′	77° 03′	3° 25′ W	3′.4 "
N. Carolina (W.)	Salisbury	35° 40′	80° 30′	0° 47′ W	2′.8 "
N. Dakota (E.)	Jamestown	46° 54′	98° 43′	12° 24′ E	1′.8 "
N. Dakota (W.)	Dickinson	46° 53′	102° 46′	16° 43′ E	2′.4 "
Ohio	Columbus	39° 59′	83° 01′	1° 10′ W	2′.8 "
Oklahoma (E.)	Okmulgee	35° 38′	95° 56′	8° 55′ E	2′.0 "
Oklahoma (W.)	Enid	36° 24′	97° 55′	10° 06′ E	2′.6 "
Oregon (East)	Sumpter	44° 45′	118° 13′	21° 07′ E	4′.6 "
Oregon (West)	Detroit	44° 43′	122° 08′	21° 33′ E	4′.8 "
Pennsylvania (E.)	Philadelphia	39° 57′	75° 12′	8° 07′ W	5′.0 "
Pennsylvania (W.)	Altoona	40° 31′	78° 23′	5° 45′ W	4′.0 "
Rhode Island	Newport	41° 30′	71° 20′	12° 40′ W	6′.0 "
South Carolina	Columbia	34° 00′	81° 02′	0° 12′ W	2′.6 "
South Dakota (E.)	Huron	44° 21′	98° 14′	11° 28′ E	1′.8 "
South Dakota (W.)	Rapid City	44° 05′	103° 12′	15° 27′ E	2′.5 "
Tennessee (East)	Chattanooga	35° 01′	85° 18′	1° 12′ E	2′.0 decr.
Tennessee (West)	Huntingdon	36° 00′	88° 23′	4° 18′ E	0′.5 "
Texas (East)	Houston	29° 47′	95° 21′	8° 05′ E	2′.5 incr.
Texas (Middle)	San Antonio	29° 29′	98° 32′	9° 09′ E	3′.0 "
Texas (West)	Pecos	31° 26′	103° 33′	10° 50′ E	3′.6 "
Texas (N.W.)	Floydada	33° 59′	101° 15′	10° 44′ E	3′.1 "
Utah	Salt Lake	40° 46′	111° 54′	17° 03′ E	4′ 2 "
Vermont	Rutland	43° 37′	72° 58′	12° 57′ W	6′.0 "
Virginia (East)	Richmond	37° 33′	77° 28′	4° 13′ W	4′.0 "
Virginia (West)	Lynchburg	37° 25′	79° 09′	2° 53′ W	3′.4 "
Washington (E.)	Wilson Creek	47° 26′	119° 00′	23° 00′ E	4′.5 "
Washington (W.)	Seattle	47° 40′	122° 18′	23° 40′ E	5′.0 "
West Virginia	Charleston	38° 21′	81° 38′	2° 39′ W	3′.4 "
Wisconsin	Madison	43° 04′	89° 25′	4° 51′ E	1′.0 decr.
Wyoming (East)	Douglas	42° 44′	105° 22′	15° 43′ E	3′.2 incr.
Wyoming (West)	Green River	41° 32′	109° 28′	17° 08′ E	3′.6 "

The use of the tables may best be explained by a few examples: (1) What was the change in declination at Mobile, Ala., between Aug. 25, 1805, and June 15, 1911? In the table for Alabama the values for 1800 and 1810 are 5° 24′ E. and 5° 39′ E., showing an average annual increase of 1′.5. Hence the value for Aug. 25, 1805, would be 5° 24′ E. + (1′.5 × 5.6) = 5° 32′ E. Similarly the table gives for 1910 the value 2° 45′ E. with an annual decrease of 0′.7. Hence the value for June 15, 1911, would be 2° 45′ E. − (0′.7 × 1.5) = 2° 44′ E. Therefore the north end of the compass needle pointed 2° 48′ less to the east on June 15, 1911, than it did on Aug. 25, 1805. (2) A rectangular piece of land at Santa Barbara, Cal., was surveyed by compass in May, 1832, and the bearings recorded as follows: N. 20° 15′ W., N. 75° 30′ E., S. 18° 45′ E., and S. 78° 00′ W. What bearings should be used in order to retrace the lines in March, 1912? From the table for southern California the value for May 1832, is 13° 16′ E., and for March, 1912, 15° 46′ E., showing a change of 2° 30′ in the interval. The desired bearings are, therefore, N. 22° 45′ W., N. 73° 00′ E., S. 21° 15′ E., and S. 75° 30′ W.

order have, in general, a great abundance of cases. In Finnish nouns have 15 cases, if by case is understood an inflectional form produced by joining on a suffix which takes the place of a preposition. Thus, *karhu*, a bear; *karhun*, of a bear; *karhuna*, as a bear; *karhutta*, without bear; *karhussa*, in the bear; *karhusta*, out of the bear; etc. In the Magyar 20 cases may be reckoned; and the languages of the North American Indians are richer still—perhaps we should say more embarrassed. Semitic speech originally had at least four cases, but only a few traces of them remain in the modern Semitic tongues. In Basque each noun may belong to two different declensions—*definite* and *indefinite*—each of which has 13 different case forms. What case endings and other inflectional terminations were in their origin, as well as the comparative merits of the highly inflected and the analytic languages, will be considered under INFLECTION.

DEC'LINA'TION (Lat. *declinatio*, a bending aside, from *de*, away, from + **clinare*, to incline, bend), in astronomy. If a great circle be drawn through the pole of the heavens and any star, the declination of the star is its angular distance from the celestial equator, measured along this circle. The declination is positive or negative according as the star is to the north or south of the equator; or the position of the star relative to the equator may be indicated by the letter N. or S., as the case may be. The place of a point in the heavens is determined by its right ascension (see ASCENSION, RIGHT) and declination, just as a point in the earth's surface is determined by its latitude and longitude, the right ascension corresponding to the longitude, and the declination to the latitude.

DECLINATION. In magnetism, the angle which the direction pointed out by a compass needle makes with the true meridian or astronomical north-and-south line; the marines and the surveyor call this angle the "variation of the compass." The declination, which may be either to the east or west of the true north and south, varies from time to time and from point to point on the earth's surface, as do the other magnetic phenomena which are discussed under TERRESTRIAL MAGNETISM, and under COMPASS. At some places the magnetic and astronomical meridians may coincide, while at others the difference is most marked. The table on page 587, compiled from a report on *The Distribution of the Magnetic Declination in the United States for January 1, 1910*, of the United States Coast and Geodetic Survey, gives the declination or variation for January, 1910, with the amount of annual change at that date, for a number of points throughout the United States:

See COMPASS; DIP CIRCLE; TERRESTRIAL MAGNETISM. Under the latter will be found charts showing the isogonic, the isoclinic, and other lines. Consult the Reports, Bulletins, and Charts published from time to time by the United States Coast and Geodetic Survey and the Division of Terrestrial Magnetism of the Carnegie Institution of Washington.

DECLINATION NEEDLE. See DECLINOMETER.

DECLINE AND FALL OF THE ROMAN EMPIRE. A celebrated work by Edward Gibbon (1776–88), the first real attempt at scientific history in English. It contains an account of the growth of Christianity and subjected the author to fierce attacks by the leading churchmen of his day.

DEC'LINOM'ETER. An instrument for determining the magnetic declination. Two things are essential—the means of ascertaining the astronomical meridian and a magnetic needle to show the magnetic meridian. The most accurate method of determining declination is with the magnetometer (q.v.) and theodolite. This instrument is employed by the Division of Terrestrial Magnetism of the United States Coast and Geodetic Survey, and the apparatus and results are described in its reports. Various types of magnetic instruments have received thorough test and application both on land and sea by the Division of Terrestrial Magnetism of the Carnegie Institution of Washington, to whose various publications reference may be made. The declination of the needle may be also ascertained approximately by the dipping needle. The ordinary surveyor's compass, which may be used by making allowance for declination, is a declination compass. See COMPASS; ENGINEERING INSTRUMENTS; TERRESTRIAL MAGNETISM: MAGNETOMETER.

DECOC'TION (Lat. *decoctio*, a boiling down, decoction, from *de*, down + *coquere*, to cook, boil). The term applied in pharmacy to a solution procured by boiling an organic drug in water. One hundred cubic centimeters of a decoction usually contain five grams of drug.

DECOM'POSI'TION (Fr. *décomposition*, from Lat. *de*, down, away + *componere*, to put together, join, unite). A term employed to signify the breaking up of compounds into simpler compounds or altogether into their chemical elements. The number of substances that are being decomposed is, as a rule, smaller, of course, than the number of substances produced by the decomposition. However, in the class of chemical transformations known as "double decompositions," the number remains unchanged. Thus, AB and CD, two compounds, made up each of two elements, may, on being brought into contact, undergo decomposition, the result of which would be again only two compounds, AC and BD. Examples of this class of reactions are very numerous in chemistry. But the term "decomposition," unqualified, is generally applied, as stated above, to transformations involving an increase in the number of substances. Such decompositions are usually caused by the influence of some physical factor, such as heat, electricity, etc. *Heat* is one of the most common of decomposing agents; mercuric oxide (HgO), when heated, breaks up into the invisible gas oxygen (O_2) and the liquid metal mercury (Hg); limestone ($CaCO_3$) decomposes into quicklime (oxide of calcium, CaO) and carbon dioxide (CO_2); coal and wood decompose into a great variety of useful materials, including coke or charcoal, illuminating gas, and tar. *Electricity* (the galvanic current) is a potent decomposing agent; under its influence water (H_2O) is broken up into oxygen (O_2) and hydrogen (H_2), and metallic salts are broken up into their constituent metals and acids, electrolytic processes being consequently much used both for scientific and industrial purposes. *Light* effects many decompositions, as of the silver salts used in photography, of nitric acid, of hydrogen peroxide, and a number of other substances. *Percussion* explodes nitroglycerin, and even a touch causes iodide of nitrogen to decompose violently. *Ferments* (minute vege-

table and animal organisms) cause many decompositions, such as the breaking up of dextrose ($C_6H_{12}O_6$), in the presence of yeast, into alcohol (C_2H_5OH) and carbon dioxide (CO_2), and the common decompositions known as putrefaction and decay.

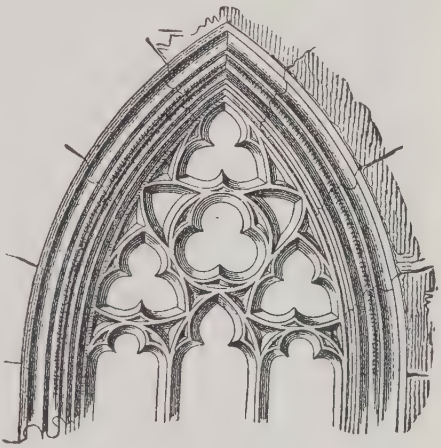
It has been customary to class a number of decompositions separately as *dissociations*. For example, when sal ammoniac (ammonium chloride) containing at least a trace of moisture is heated in a closed vessel, it partly breaks up into ammonia gas and hydrochloric acid and partly remains unchanged. On the other hand, if equal volumes of ammonia gas and hydrochloric acid (with a trace of moisture again) were confined in a closed vessel at the same temperature as in the first experiment, the two substances would partly combine chemically into ammonium chloride and partly remain in a state of mechanical mixture. Quantitative investigation would show that the ratio of the combined to the uncombined products is the same in both experiments, i.e., the final state is the same, whether we start with sal ammoniac or with ammonia and hydrochloric acid. The decomposition of sal ammoniac is classed as a chemical *dissociation*, because, as we have just seen, it is *reversible*. Dissociation might thus be defined as reversible decomposition. It must, however, be borne in mind that the principles of thermodynamics—scientific principles of the most indubitable reliability—teach that reversibility is by no means an attribute of certain reactions only; that *all* reactions must be reversible, or else perpetual motion would result. In other words, while a given reaction may proceed almost to completion and therefore appear to be nonreversible, in reality no reaction can proceed *entirely* to completion. But then the customary distinction between dissociation and decomposition proper can have but little real significance. An excellent illustration of this conclusion is presented by the case of ammonia. At high temperatures, and especially under the influence of electric sparks, ammonia rapidly breaks up into its elements, hydrogen and nitrogen. The process appears to be complete and until a few years ago was often mentioned as a typical case of decomposition proper as distinguished from dissociation. Then Haber and his collaborators, encouraged by the thermodynamic principle that no reaction can be entirely complete or nonreversible, succeeded in showing experimentally that hydrogen and nitrogen do recombine to form ammonia, that the decomposition of ammonia is as much a dissociation as, e.g., the dissociation of sal ammoniac, and at the present time ammonia is actually made on an industrial scale by the direct synthesis of hydrogen and nitrogen. See AMMONIA.

Nevertheless, the term "dissociation" is a convenient one and may well be retained in the current language of chemistry, with the understanding that it denotes decomposition that is obviously or readily reversible. See DISSOCIATION; REACTION.

DE CONSOLATIONE PHILOSOPHIÆ, de kŏn'sō-lā'shĭ-ō'nē fĭl'ō-sō'fĭ-ē (Lat., on the consolation of philosophy). A philosophical work interspersed with verse by Boëthius, written about 525, in prison. Alfred the Great translated it into Anglo-Saxon, and Chaucer translated it into English before 1382. Caxton printed it in 1480. Its influence in spreading Platonic thought in the Middle Ages is almost incalculable. It was one of Dante's great thought sources.

DECO'RAH. A city and the county seat of Winneshiek Co., Iowa, 110 miles northwest of Dubuque, on the upper Iowa River, and on the Chicago, Milwaukee, and St. Paul and the Chicago, Rock Island, and Pacific railroads (Map: Iowa, F 1). It is the seat of Luther College and Valder College and contains a hospital. The city has stock-raising, farming, and milling interests and manufactures of valves, wagons, patent medicines, toilet preparations, metal boats, etc. Settled in 1849, Decorah was incorporated as a town in 1857 and was chartered as a city in 1871. Its government is administered under a general law by a mayor elected biennially and a city council. The city owns and operates its water works. Pop., 1900, 3246; 1910, 3592.

DEC'ORATED STYLE OF GOTHIC AR'CHITEC'TURE. The second of the three period styles into which the history of English Gothic architecture is usually divided. This system of style division and nomenclature was invented by Thomas Rickman and has been in use ever since his time; but it is unscientific,



GEOMETRIC TRACERY.

for style development cannot be sliced into precise period styles. The name designates the style of the century approximately covered by the reigns of the first three Edwards (1280–1380), during which the vigorous simplicity and Norman elements of the Early English style developed into the more elaborate and ornate architecture which characterizes the churches and cathedrals of the fourteenth century, although exemplified also in some of the chapter houses of the end of the thirteenth. It is distinguished primarily by its bar tracery of geometric patterns with cusping, by the fineness and overrichness of its moldings and shaft clusterings, by its naturalistic carving and the progressively increasing richness and complexity of its vault ribbing. Sharpe divides the style and period into two, the Geometric and the Curvilinear, named from their tracery forms. The interior of Lichfield Cathedral, the presbytery and octagon of Ely, the choir of Wells, are among the prominent examples of the Decorated style, which passed into the Perpendicular (q.v.), the most distinctively English phase of Gothic architecture. See ARCHITECTURE; EARLY ENGLISH; GOTHIC ARCHITECTURE.

DEC'ORA'TION DAY, or MEMORIAL DAY. A day (May 30) set apart each year by the various Northern States for the purpose of decorating the graves in the national cemeteries and of commemorating the soldiers who during the Civil War lost their lives for the Union cause. It is a legal holiday in all the States and Territories of the Union except Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas. Some of the Southern States have also set apart a day for the commemoration of the Confederate soldiers who fell during the war.

DEC'ORATIVE ART. While perfection in the imitative arts depends largely upon the fidelity with which they portray persons and things seen or imagined, in the decorative arts beauty comes first. It is abstract beauty that determines the artistic excellence of a building, a chair, a rug, a vase, or a door knob. But in most of the decorative arts use value is also important. No amount of abstract beauty will save the reputation of a house that is uncomfortable or inconvenient to live in. To design a chair that cannot be sat upon is stupid. A lock that will not work is fit only for the ash heap. In the decorative arts we just as naturally expect use value as picture value in the arts imitative.

It is a serious error to assume that the beauty of the decorative arts is due entirely to ornament. A table may be very beautiful, though innocent of paint or carving. The beauty of a rug depends more on texture than on pattern. Some of the most beautiful vases in the world are the simplest.

It is an equally serious error to assume that lack of ornament is necessarily a virtue. Much Mission furniture is hopelessly bad. Many simple gowns are ugly. The happiest results come from the judicious application of appropriate ornament upon structural forms that have beauty of proportion. For the historic styles, and the historic development of decorative art as a whole, see ARCHITECTURE; FURNITURE; ORNAMENT; INTERIOR DECORATION.

In the first half of the nineteenth century the decorative arts were decadent. The artistic point of view of the whole civilized world had become perverted, and bad taste was the rule rather than the exception. Even the beautiful objects produced by the generations that went before were unappreciated.

The first important evidence of a revival of interest in the decorative arts was the opening in London of the South Kensington Museum, in 1857, closely following and inspired by the World's Exhibition of 1851. In 1899 the corner stone of a new building was laid by Queen Victoria, and by her command the name of the institution was changed to the Victoria and Albert Museum. To-day this museum is the decorative art centre of the world. Its library outclasses all other art libraries, containing over 120,000 bound volumes and over 200,000 photographs. It is especially rich in ancient books and manuscripts on the decorative arts. In the Department of Engraving, Illustration, and Design there are over 130,000 prints and drawings.

The collections are arranged as follows: (1) architecture and sculpture; (2) ceramics, glass, and enamels; (3) metal work; (4) paintings; (5) textiles; (6) woodwork, furniture, and leather.

The subdivisions are: (*a*) technical subdivisions of the craft; (*b*) historical by date; (*c*) local by country of manufacture.

Important special collections are those bearing the names of Salting, Jones, and Murray. All of these are described in the illustrated General Guide to the Collections, from which a comprehensive idea can be gained of their scope and arrangement. The guide contains not only a descriptive list of the 150 rooms and galleries, but also an alphabetical list of objects, showing where each is to be found, e.g., fans in room 112; furniture, English, in rooms, 6, 7; etc. Of the Refreshment Rooms, a special interest attaches to the Green Dining Room because it was decorated by William Morris and his associates.

To the inspiration of the Exhibition of 1851, and to the example set by the South Kensington Museum, was due the French Musée des Arts Décoratifs. In 1863, 13 French designers and manufacturers established a society for "applying the fine arts to manufactures," giving as their reason that, "since the London Exposition of 1851, an immense advance in the art of manufacture has taken place throughout Europe, and while France has not lagged behind, we cannot conceal from ourselves that our supremacy has not been maintained. . . . English manufactures especially, which before that date were very much behind from the point of view of art, have made prodigious strides, and if they continue to advance at the same rate will soon distance us." Loan exhibitions were held, a library was founded, and finally with the 6,000,000 francs produced by the lottery of 1882, a museum was established in the Palais de l'Industrie, afterward transferred to the Pavilion de Marsan, a wing of the Louvre, where it now is. The collections are grouped mainly by periods, but with ceramics by themselves, as are also textiles other than tapestries.

Upon this Musée des Arts Décoratifs of Paris was modeled the Cooper Union Museum for the Arts of Decoration, established in New York City in 1896, through the efforts of the granddaughters of Peter Cooper. "There are no catalogues, as every object is labeled distinctly, stating its nature, origin, and history." The exhibits are supplemented by elaborate encyclopædic scrapbooks of photographs, engravings, and drawings. The chart or descriptive outlines of the arrangement by subjects of these scrapbooks shows succinctly but clearly the relation of the decorative arts to one another and the territory that each covers.

However, the decorative centre of the United States is the Metropolitan Museum of Art in New York City, with its Wing of Decorative Arts opened to the public in March, 1910, supplemented by many important collections in other parts of the Museum. The groupings in the Wing of Decorative Arts are primarily by periods and most intelligently made. There are 25 rooms devoted to Gothic, Italian Renaissance, Baroque, Louis XIV, etc., on two floors, surrounding a long rectangular hall that is lighted through 10 semicircular windows in the clerestory. The plan of the building was suggested to the architect, Charles F. McKim, by that of the Musée des Arts Décoratifs in Paris. The backbone of these collections in the Metropolitan Museum is the Hoentschel collection of the French decorative arts of the Middle Ages and of the Louis periods—the Gothic part lent, and the rest given, to the museum by the late J.

POMPEIAN MURAL DECORATION

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Pierpont Morgan. Of the objects displayed in the three rooms devoted to American Colonial, a majority came from the Bolles collection, presented to the museum by Mrs. Russell Sage.

Of what decorative art is, these four museums form an excellent definition. They illustrate not only the arts that are primarily decorative, but also the arts of painting and sculpture as employed decoratively.

The classification of the collections of the Musée des Arts Décoratifs is particularly worthy of attention for its simplicity and clarity. The two main divisions are the Decoration of Man and the Decoration of Building. The Decoration of Man is subdivided into (1) costume; (2) arms and armor; (3) instruments and tools; (4) means of instruction (books, engravings, photographs, etc.).

The Decoration of Buildings is divided into Exterior Decoration and Interior Decoration. Exterior Decoration is subdivided into (1) architecture; (2) sculpture applied to architecture; (3) painting applied to architecture, including mosaic and stained glass.

Of Interior Decoration the main subdivisions are (1) painting; (2) woodwork; (3) furniture; (4) textiles; (5) pottery; (6) metal work; (7) miscellaneous objects.

Of painting, stained glass, mosaic, sculpture, and tapestry, etc., as used in the decoration of buildings, there are two main types: (1) pictorial; (2) ornamental.

To the first class belongs mural painting (q.v.), that not only decorates the surface of walls, ceilings, and vaults, but also presents allegorical, historical, religious, or other scenes. In ancient Egypt walls and columns, internal and external, were covered with pictures deeply incised by the chisel and richly painted. The Romans covered the walls of their chambers, courts, and banquet rooms with painted decorations in which pictures of mythological beings and of familiar scenes were mingled with landscape and fantastic architecture. (See Pompeii.) The Byzantine artists adorned the walls and apses of their churches with highly decorative pictures on a gold ground, executed often in glass mosaic; in these the drawing and coloring, forsaking the pursuit of natural realism, were controlled by purely decorative considerations. The greatest schools of decorative painting were those which grew up in Italy in the fourteenth and sixteenth centuries—the earlier having its chief centre in Florence, with Giotto as its greatest master; the second reaching its highest development in Rome under Raphael and Michelangelo, and a little later in Venice, where Titian, Tintoretto, and Paolo Veronese attained an extraordinary pitch of sensuous splendor of color. But no decorative painter of any age ever equaled the sublimity of conception and grandeur of execution of Michelangelo's compositions for the vault of the Sistine Chapel in the Vatican at Rome.

The work of the sculptor has in all ages been considered an essential adjunct to noble architecture. In Egypt he coöperated with the painter in producing the pictures mentioned above and carved the effigies of the King and the god Osiris against the pylons and piers of the temples. It was, however, the Greeks who lifted decorative sculpture out of the trammels of sacerdotal tradition and exalted it into one of the highest and noblest of all forms of expression of religious and national aspirations. The friezes, metopes, and pediment groups of their temples were not merely unequaled as sculpture, but superb as decorations for the architecture to which they were affixed. In creating them the sculptor, while he sought to embody the poetic and patriotic ideals of the Greek mythology which inspired him, was at the same time solicitous so to dispose the masses of light and shade, so to combine and arrange every outline and detail of the composition, that they should harmonize with the dominant lines of the architecture and produce that pleasing effect of harmony, rhythm, balance, and contrast which is the chief source of an enjoyment of all decorative design. The Romans made far less use of pictorial sculpture in architecture than the Greeks, but developed a remarkable system of ornamental carving in relief, in which symbolic figures, grotesque, and conventional foliage were blended in a manner to enrich with a wonderful play of light and shade the friezes, pilasters, and panels to which they were applied. In the Middle Ages the builders of abbeys and cathedrals in Europe, especially in France, adorned their buildings with sculpture, both of serious figures and of gargoyles, everywhere pervaded with religious meaning, but marvelously adapted to the exigencies of the architecture.

Beautiful as are many of the French fourteenth-century statues of saints, martyrs, and apostles, and the ranges of seated angel choirs in the cathedral porches, considered as pictorial sculpture, they are perfect only when seen in the architectural setting for which they were designed, whose lines they emphasize and whose beauty they enhance. The French and Italians may be said to vie with each other for the supremacy in sculpture during the Renaissance; but while the French produced no one to equal Michelangelo in pure sculpture, the Italians never equaled Jean Goujon in the perfect mastery of decorative effect in figure sculpture applied to architecture.

However, the decoration of architecture and furniture with nonpictorial painting and sculpture is quite as important and vastly more necessary. The capitals and moldings of ancient Greek temples are reproduced over and over again in our modern buildings. The painting of the average house is apt to interest the owner more than any other part of the decoration except perhaps the wall paper. Of furniture, carving is the most usual ornament.

Magazines in English that print many interesting articles about the different decorative arts are the *Burlington Magazine* (London); *International Studio* (New York); *Arts and Decoration* (ib.); *Connoisseur* (London). There are also important decorative magazines in France and Germany. But on the history of decorative art, as a whole, there is no adequate book, and most of the histories of the individual decorative arts are unsatisfactory. Consult: Ward, *Historic Ornament: A Treatise on Decorative Art and Architectural Ornament* (London, 1897); Speltz, *Styles of Ornament* (trans., Berlin, 1906); Molinier, *Les arts appliqués à l'industrie* (6 vols., Paris, 1896–1902); the guide books and descriptive pamphlets of the four decorative art museums mentioned above. See Ornament; Architecture; Interior Decoration; Furniture; Tapestry; Stained Glass; Painting; Mural Decoration; Sculpture; Pottery; Jewelry; Light-

ING; MUSICAL INSTRUMENTS; COSTUME; ARMOR; TEXTILE; CARPETS AND RUGS.

DECORATIVE NEEDLEWORK. See EMBROIDERY.

DE CORO'NA (Lat., On the Crown). The most famous speech of Demosthenes and the most perfect specimen of the world's oratory. It was delivered in 330 B.C. as a reply to the famous speech of Æschines against Ctesiphon, who had secured the passage of a law authorizing the crowning of Demosthenes for his services to the state.

DECORT', FRANS. See CORT, FRANS DE.

DE COS'TA, BENJAMIN FRANKLIN (1831–1904). An American clergyman and historian. He was born in Charlestown, Mass., graduated at the Concord (N. H.) Biblical Institute in 1856, and was rector at North Adams, Mass., from 1857 to 1858, and at Newton Lower Falls from 1858 to 1860. He was chaplain in the Federal army from 1861 to 1863, when he settled in New York. Here he was editor successively of the *Christian Times*, the *Episcopalian*, and the *Magazine of American History*. In 1884 he founded the American White Cross Society, of which he was president until 1899, and afterward helped organize the Church Temperance Society. He was rector of the church of St. John the Evangelist in New York from 1863 to 1899, when he became a Roman Catholic. He contributed to Winsor's *Narrative and Critical History* and published valuable monographs and essays on early American history and on local history, including: *The Pre-Columbian Discovery of America by the Northmen* (1868); *Narrative of Events at Lake George* (1868); *The Northmen in Maine* (1870); *Columbus and the Geographers of the North* (1872); *The Fight at Diamond Island* (1872); *Hiawatha: The Story of the Iroquois Sage in Prose and Verse* (1873); *The Lost City of New England* (1877); *Verrazzano the Explorer* (1880); *Cabo de Baxos, or the Place of Cape Cod in the Old Cartology* (1891); *Cabo de Arenas, or the Place of Sandy Hook in the Old Cartology* (1885); *Whither Goest Thou?* (1902). He wrote a novel, *The Rector of Roxburgh* (1873), under the pseudonym of William Hickling; and he edited White's *Memoirs of the Protestant Episcopal Church* (1881).

DE COS'TER, CHARLES THÉODORE HENRI (1827–79). A Belgian author, born in Munich. For many years he occupied the chair of French literature at the military academy in Brussels. His work has been compared to that of Rabelais and Montaigne. His prose epic, *La légende de Tiel Uylenspiegel* (1867), is a masterly description of Flemish life during the reign of Philip II and the days of the Inquisition. His works also include: *Légendes flamandes* (1857; 2d ed., 1861); *Contes brabançons* (1861); *Voyage de noce* (1872). Consult Potvin, *Histoire de lettres en Belgique* (1882).

DE COVERLEY, SIR ROGER. See COVERLEY.

DECOY' (from *de-*, Fr., Lat. *de-*, down + *coy*, OF. *coi*, quiet, from Lat. *quietus*, still, from *quies*, repose). A contrivance for luring game into a snare or within the range of a weapon. In England for centuries decoys have been contrivances for capturing as well as alluring ducks, by driving them into tunnel nets, or by catching them in a cage built on a platform on the water, into which they were enticed by feeding. To-day both these especial methods are obsolete; but the principle of the tunnel net remains in the decoys built in the fresh-water pools near the coast, which attract the birds on their arrival from over sea. At the corners of the pool curved ditches are cut and covered with wide arched hoop nets, gradually diminishing in size. The wild ducks are enticed to the mouth of the tunnel by live, tame ducks, which retreat up the tunnel, the wild birds following to the end of the pipe, which by this time is on land, after which they are all easily caught.

In America the decoys are painted wooden, cork, or canvas imitations of ducks (or other birds, as the case may be) anchored on the water in a lifelike way, within range of a blind or boat concealed in the reeds. Waterfowl and shore birds often stool well to such decoys.

Consult: Grinnell, *American Duck Shooting* (New York, 1901); Folkard, *Wild Fowler* (London, 1859–64–75–97); Payne-Gallwey, *The Book of Duck Decoys* (ib., 1886).

DECREE' (Lat. *decretum*, judgment, from *decernere*, to separate one thing from another, to decide). In the civil law, an Imperial judgment in causes brought before the Emperor on appeal, or otherwise. These judgments were promulgated as law, and the principles enunciated in them were binding on all the courts of the Empire. See CIVIL LAW; CORPUS JURIS; DECRETAL.

In English and American law, the judgment, or order, of a court of equity, the term "judgment" being properly restricted to the adjudication of a matter by the courts of common law. The difference between a judgment and a decree is fundamental and springs out of the radical difference in the character of the jurisdiction exercised by the two classes of tribunals. The function of the law court is merely to decide the bare question in controversy between the litigating parties, awarding an unconditional judgment to one or the other of them. The court of equity, on the other hand, undertakes to do substantial justice between the parties as to the whole matter submitted by them, and it may make such decree, or order, as justice may require, without being confined to the award or denial of the particular remedy sought by the complainant. Accordingly it may, before the final adjudication of the case, grant an "interlocutory" decree, which may or may not become the "final" decree of the court, or it may issue a conditional order, which shall become absolute or void, according as the condition is or is not complied with.

A *decree nisi* ('unless') is a conditional order, to become absolute unless, before the date fixed therein, good cause shall be shown to the court for vacating it. A decree for a temporary injunction, if drawn to become permanent, unless cause to the contrary be shown, is of this character. The phrase is not in common use in the United States, however, and in England it has come to be appropriated to a particular case in which a decree nisi is commonly employed, viz., in decrees for divorce not to take effect for a probationary period of six months or more, during which time any person may show cause why the decree should be vacated, and the parties reinstated in their conjugal rights.

In jurisdictions in which the law and equity systems have been merged, or in which they are administered by the same tribunals, the

term "judgment" is often employed in a comprehensive sense to include decree; and when the law permits both legal and equitable remedies to be afforded in the same action, the judgment rendered may be both a judgment and a decree. See DIVORCE; CHANCERY; EQUITY; JUDGMENT; and the authorities there referred to.

DE'CRESCEN'DO, *Ital. pron.* dā'krā-shĕn'dō (It., decreasing). In music, the reverse of crescendo (q.v.), viz., a gradual diminishing of the sound. Like the crescendo, it is also sometimes combined with a slight ritardando, especially in descending passages. It is frequently marked thus, .

DECRE'TAL (ML. *decretalis,* from Lat. *decretum,* a decree, from *decernere,* to decide). Generally, an authoritative order or decree; more specifically in ecclesiology, a letter or decision of the popes, determining some question of ecclesiastical law referred to them. For detailed classification of various collections of these decretals, see CANON LAW; and for a famous collection, now universally admitted to be largely forged, PSEUDO-ISIDORIAN DECRETALS.

DECRE'TALISTS. Commentators on the *Decretum,* or the Decretals. See CANON LAW.

DECRE'TUM OF GRA'TIAN. See CANON LAW.

DECUMATES AGRI, dĕk'ū-mā'tēz ā'grī (Lat., tithe lands). A term applied by the Romans to their possessions north of the upper Danube and east of the Rhine, corresponding in large part to modern Baden and Württemberg. This district was guarded by the famous *limes,* or line of fortifications, which was begun by Domitian and finished by his successors and served as a bulwark against the Germans. The name would seem to signify tithe lands and to imply that at some time settlers had been allowed to occupy these lands in return for the payment of a tenth of all produce won from them, but we have no evidence to show that this was actually the case. Another view derives the name from that of a hypothetical town, *Decuma* or *Ad Decuman* (*Lapidem*). Consult Furneaux, in his edition of Tacitus' *Germania,* note on chap. xxix (Oxford, 1894).

DECU'RION (Lat. *decurio,* from *decuria,* company of ten, from *decem,* ten). The chief of a body of 10 men. This name was applied especially, in the Roman cavalry service, to the commander of a troop of 10 (afterward more) horsemen. In the free municipalities of Italy and in the provinces the chief citizens were often called *decuriones;* they corresponded to the senators at Rome. They had extensive powers of control over the magistrates, sometimes heard appeals from judicial sentences passed by the magistrates, and enjoyed certain special privileges. Consult: Greenidge, *Roman Public Life* (London, 1901); Friedlaender-Waters, *Town Life in Ancient Italy* (Boston, (1902); Reid, *The Municipalities of the Roman Empire* (Cambridge, 1913).

DE'CUSSA'TION (Lat. *decussatio,* an intersecting of two lines crosswise, from *decussis,* the number 10, X, on account of its shape). In anatomy, the crossing of nervous filaments. Certain fibres of the anterior pyramids and lateral columns of the medulla oblongata are thus crossed freely from side to side, so that disease on one side of the brain often leads to paralysis on the other side of the body.

DEDEAGATCH, dā'dā-ä-gäch'. A seaport town of Bulgaria, on the Ægean Sea, northwest of the mouth of the Maritza. Its harbor is small, but its trade is considerable (Map: Balkan Peninsula, E 4). Dedeagatch has supplanted Enos (q.v.) as the port for the Maritza valley. It is connected by rail with Constantinople, Burgas, and Saloniki, and has steam communication with Greece. Pop., about 9000. For over four centuries the town belonged to Turkey, but in 1913, as a result of the Balkan War (q.v.), it was ceded to Bulgaria.

DEDHAM, dĕd'am. A town, including three villages, and the county seat of Norfolk Co., Mass., 10 miles southwest of Boston, on the Charles River, and on the New York, New Haven, and Hartford Railroad (Map: Massachusetts, E 3). It is principally a residential suburb of Boston, but has manufactures of cotton and woolen goods, carpets, handkerchiefs, and pottery. The town contains the county courthouse, jail, and house of correction, a memorial hall, public library, and an Historical Society building. Water power is obtained from Mother Brook, a canal connecting the Charles and Neponset Rivers, built in 1641. The government is administered by town meetings. Dedham was settled in 1636 and was called Contentment. It was incorporated as a town under its present name on September 10 of that year. The first free school in America supported by a general tax of the people was established here in 1645. Dedham is the mother town of a large number of other towns in Norfolk County. Pop., 1900, 7457; 1910, 9284; 1914 (est.), 10,063; 1920, 10,792. Consult Mann, *Historical Annals of Dedham from 1635 to 1847* (Dedham, 1847), and Erastus Worthington, *History of Dedham from September, 1635, to May, 1827* (1827). Eight volumes of town records (1635–1890) have been published.

DED'ICA'TION (Lat. *dedicatio,* from *dedicare,* to dedicate, from *de,* down + *dicare,* to say). In literature, the address of a book, or any literary work, to a particular person; *vide* Shakespeare's note to the Right Honorable Henry Wriothesly prefaced to *Venus and Adonis.* The custom, practiced by the ancients—*vide* Horace and Vergil—was adopted by the modern nations. In the seventeenth and eighteenth centuries books were usually dedicated to a patron, whose influence was sought by the author. They are now dedicated to relatives and friends, or, if learned, to scholars to whom the authors are indebted. An elaborately laudatory dedication is Tennyson's poem to the memory of Prince Albert, prefixed to the *Idylls of the King.* For models of the lighter forms, see the volumes of the *Spectator.* Stevenson was particularly graceful in his inscriptions. The fulsome epistle of former times has been cut down to a brief formula, and many books are without dedications.

DEDICATION FEAST (Heb. *chanukkā,* Gk. *τὰ ἐγκαίνια, ta enkainia,* from *ἐν, en,* in + *καινός, kainos,* new, Lat. *encœnia*). An annual festival among the Jews, which originated in the Maccabæan period. On the 25th of December, 168 B.C., the Yahwe temple in Jerusalem was dedicated to the worship of Zeus Olympius by order of Antiochus IV Epiphanes, the ruler of the land. An altar to Zeus was set up on the altar of burnt offerings. This smaller altar is called an "abomination of desolation" in 1 Macc. i. 54, 59, which is a translation of *shikkuz shomem* in Dan. xi. 31; xii. 11. Originally the "Baal of Heaven" may have been intended by

this phrase. According to 2 Macc. vi. 2, the sanctuary was called after Zeus Olympius; and it has been thought that a statue of this god was placed upon the altar. When Judas Maccabæus recovered Jerusalem in 165 B.C., he purged the temple, removed the pagan altar, and put up a new one. The temple was then rededicated to Yahwe with festivities that lasted eight days. According to 1 Macc. iv. 52–54, it was on the 25th of Chislev (December) that the dedication took place, on "the same day the heathen had profaned it"; the Greek manuscripts in 1 Macc. i. 54 give the 15th of Chislev as the day when the pagan altar was set up, but here also the Syriac Codex Ambrosianus has the 25th, which seems to have been the original text. It is indeed highly probable that both events took place on the 25th, a day that may have been kept by both nations as a celebration of the winter solstice. This is further suggested by the manner in which the dedication feast has since been kept. Josephus (*Ant.*, xii, 7, 7) calls it "the feast of lights," and the custom of placing lights at the entrance of synagogues and private houses is mentioned in Talmudic literature. The observation of the feast in memory of the deliverance of Jerusalem is enjoined upon the Egyptian Jews in the letters prefixed to 2 Maccabees. Psalm xxx was the dedication hymn. Consult: Marti, *Das Buch Daniel* (1901); Benzinger, *Hebräische Archäologie* (2d ed., 1907); Bouché-Leclercq, *Histoire des Séleucides* (1913); Oesterley, "1 Maccabees," in Charles, *O. T. Apocrypha and Pseudepigrapha* (1913); Wellhausen, *Israelitische und jüdische Geschichte* (7th ed., 1914).

DED'LOCK, LADY. The mother of Esther Summerson in Dickens's *Bleak House.*

DEDUC'TION (Lat. *deducere,* to draw out). A process of reasoning from the general to a particular subsumed under it; its counterpart is induction (q.v.). Formal logic regards deduction and induction as opposed operations. Deduction is the application of a principle, assumed to be accepted, to some specific case, and a judgment, on this case, controlled by this accepted principle. For instance, when heat is recognized as a mode of motion, the judgment that therefore the laws of motion prevail in the phenomena of heat is a deduction. Induction is the recognition of a group of phenomena as involving a general principle. For instance, when the study of the phenomena of heat leads to the recognition and judgment that they are regulated by the laws of motion, an induction is made. The difference is one of point of departure in the reasoning process. If we begin with the knowledge of the law and apply this law to a particular instance, we deduce; if we begin with particular instances and from them arrive at a knowledge of the law, we induce. The explicit analysis and statement of the presuppositions implied in a process of deduction is a syllogism (q.v.), whose major premise is the assertion of the law or principle; the minor premise is the assertion that the case in point comes under the law; the conclusion is the judgment on this case in accordance with the law. But our thought movements are usually very elliptical, when compared with the expression that formal logic gives to them in syllogisms, and it is pedantry to demand that in our ordinary thinking we should cultivate the syllogistic habit. The value of the syllogism is found in the fact that we have therein in explicit detail the various interrelated judgments to which we commit ourselves in the deduction and can thus examine and criticize them in the open. The syllogism is an instrument of criticism and is not to be regarded as "good form" in reasoning which is to be adopted on all occasions.

Transcendental deduction is a technical term in Kant's (q.v.) philosophy, designating the justification which a theory of knowledge gives to a claim a priori conceptions make of being applicable to any possible object of knowledge.

See LOGIC (where a bibliography is given); SYLLOGISM.

DEE (Lat. *Deva,* OWelsh, *Dubr-Duin,* water of the goddess, Ir. *dé,* goddess, Corn. *duy,* Bret. *doe;* connected with Lat. *deus,* Lith. *dëvas,* OPruss. *deiwas,* Skt. *dëva,* god). A river in England and Wales, draining parts of the counties of Merioneth, Denbigh, Flint, and Shropshire, and the west of Chester (Map: Wales, C 3). It ends in a tidal estuary of the Irish Sea, 13 miles long, and 3 to 6 miles broad. From the city of Chester, which it almost encircles, the river flows to the estuary in a straight artificial channel which is the only navigable portion. Its course is 80 miles long, and among its chief tributaries are the Treveryn and Alwyn. Canals connect the Dee with the rivers of central England. The ancient Britons held its waters sacred.

DEE. The name of two rivers in Scotland. The larger rises in five wells, 4000 feet above sea level, in the neighborhood of Ben Macdhui (Map: Scotland, F 2). After flowing 12 miles south-southeast, it is joined by the Geauley, 1294 feet above sea level, tumbles through a narrow chasm, called the Linn of Dee, runs east-northeast through Aberdeenshire and a small part of Kincardineshire, and ends in the North Sea at the harbor of Aberdeen. The river is not navigable except near the mouth, where it has been altered in order to increase the dockage at Aberdeen. In its course of 90 miles it receives the Lun, Muick, Feugh, etc. On its banks is Balmoral Castle. The river is remarkable for the clearness of its waters and is noted for its salmon. The smaller Dee rises near the northern boundary of Kirkcudbrightshire (Map: Scotland, D 5). For the first 40 miles it flows southeasterly, then westerly, falling into the Solway Firth at Kirkcudbright Bay. It is about 50 miles long and navigable for the last 7 miles.

DEE, JOHN (1527–1608). An English astrologer and mathematician. He was born in London, was educated at St. John's College, Cambridge, lived for some time at the University of Louvain, and in 1550 he lectured at the College of Rheims on the *Elements* of Euclid with great success. In 1551 he returned to England, was introduced to Edward VI, and was pensioned; but during the next reign he was falsely accused of attempting Queen Mary's life and came very near being executed. Queen Elizabeth received him kindly and promised him an appointment. This promise was not fulfilled, and Dee again set out for the Continent in 1564, ostensibly for the purpose of presenting to Emperor Maximilian a book, *Monas Hieroglyphica,* which he had previously dedicated to him. Lilly, however, in his *Memoirs,* affirms that he acted as Queen Elizabeth's "intelligencer," or spy. In 1594 he was made chancellor of St. Paul's Cathedral and in the next

year warden of Manchester College. He died very poor. Dee's writings, mostly on the occult sciences, were published in London in 1659.

DEED (an act, Lat. *factum*, something done). A written instrument, sealed and delivered, whereby a legal right is created or transferred. Though the term is popularly employed only in connection with instruments for the conveyance of land, it is not, in the legal sense, thus restricted, being equally applicable to a considerable variety of other legal transactions effected by the same solemn form. A contract, an appointment to office, the surrender of a right of action, may be effected by deed, as well as the transfer of title to land or goods. In other words, it is not the event, or transaction, but the manner in which it is performed, which constitutes the deed. So, too, it is in a popular rather than a strictly legal sense that a sealed writing, in and by itself considered, is described as a deed. Until delivered to the party who is to have the benefit of it, it is still a mere writing, an escrow (*écrit, scriptum*), an inchoate deed. The perfected deed is compounded of three distinct things—the writing, the act of sealing, and the act of delivery.

The superior validity of a transaction effected by deed, as compared with one consummated by spoken words or by ordinary writings, is a matter of history. Blackstone declares that a deed derives its name (deed, *factum*) from the circumstance that "it is the most solemn and authentic act that a man can possibly perform with relation to the disposal of his property; and therefore a man shall always be estopped by his own deed, or not permitted to aver or prove anything in contradiction to what he has once so solemnly and deliberately avowed" (2 Bl. Com. 295). In fact, the deed is the one form in which the formal or ceremonial mode of incurring an obligation or transferring a legal right survives among us, corresponding in that respect to the *mancipatio* and the *stipulatio* of the Roman law, the latter of which still appears in the usual ceremony of marriage. Recent investigations into early legal procedure show conclusively that in primitive society a peculiar importance and validity attaches to legal transactions of the formal sort, and, though the tendency of advancing civilization is to reduce or eliminate the distinction between formal and informal obligations, this has never been completely accomplished. The conclusive effect of a deed is probably due to the fact that it originated at a time when writing was a rare accomplishment, confined to those who had taken holy orders, and that its character, as a solemn form of engagement, had become established before the art of writing became more general. Its superior validity still consists in the fact mentioned by Blackstone, in the passage quoted above, that he who makes a deed is conclusively bound by the statements which it contains, and that, in contracts and other transactions which ordinarily require a consideration to support them, no consideration is necessary if the transaction be consummated by deed. Technically a contract in the form of a deed is known as a specialty.

Deeds are of two kinds, deeds poll and indentures—the former being of only one part, i.e., binding only one person or group of persons, in the same way and to the same effect; and the latter having two or more parties, who become bound to one another. Thus, the ordinary deed of conveyance, whereby A, or A and B, convey land to C, the latter entering into no engagement with reference to the transaction, and the grantor or grantors, only, executing it, is a deed poll; whereas articles of association or of partnership, or any other bilateral contract, under seal, whereby several parties become mutually bound to one another, is an indenture. The names are derived from the circumstance that deeds of the latter sort were formerly written in duplicate, etc., on the same piece of parchment, which was then cut so as to separate them by an indented and irregular line, whereby their identity could afterward be established. The deed poll, on the other hand, only one copy being required, was polled, i.e., shaved or cut off smooth. This difference in the form of deeds having disappeared, the term "indenture" is often carelessly employed in deeds which are really deeds poll. The distinction between them has not, however, been obliterated by their assimilation in form, and a deed purporting to bind only one party, or, whatever it may purport, executed by only one, is still a deed poll and binds only the giver thereof and not the person to whom it is delivered.

Deeds have from an early period been employed for the transfer of certain interests in land, but their general and almost exclusive use for this purpose is quite modern. Formerly, at common law, freehold interests in land were created or conveyed by the formal ceremony known as livery of seisin, while all estates less than freehold were subject to alienation by parol, deeds being required only to convey the class of interests known as incorporeal, such as easements, profits, future interests in land, and the like. But deeds have now, under the technical description of grants, almost entirely superseded other modes of conveyance of interests in land. Only estates for years or tenancies at will are still capable of arising by parol or by writing not under seal, and in England even leaseholds, for three years and upward, can be created or transferred only by deed. In Great Britain and most of the United States the general use of deeds for purposes of conveyance is a matter of regulation by statute.

In form, however, the deed remains substantially the same as at common law. The writing must still be on paper or parchment, though it may to-day be done by the typewriting machine or the printing press. The old requirement of a seal is also generally adhered to, though in a few of the Western States it has been abolished, and in most others a scroll, or similar mark made with the pen, may be substituted for the more usual wafer or sealing wax. But, whatever its form, the important thing is not the adhesion to the paper of something called a seal, but the sealing of the instrument by the party to be bound by it. It must be "his own act and seal." At the present time, also, it is generally considered that the instrument must contain the name of the maker in his own handwriting, although prior to the Statute of Frauds, in 1648, signing was not necessary to the validity of deeds, and it is not clear that the statute contemplated any addition to the formalities with which they were already surrounded.

Delivery is properly accomplished by the obligated party handing over the sealed writing

in person to the party to be benefited thereby. Either party may, however, be represented by an agent, and a delivery to an unauthorized third person is good if subsequently ratified by the benefited party. Indeed, it has been held that any unequivocal act on the part of the obligated party, showing an intention to vest the possession of the document in the benefited party, is sufficient to constitute a delivery, even without a manual transfer of possession to any one—as where the former, at or after the time of sealing, utters the words "I deliver this as my act and deed," or where he incloses the sealed writing in an envelope, addressed to the benefited party, though retaining it in his own possession. There is some conflict of authority, however, as to whether a delivery of the latter sort, or to a third person, which, in fact, never comes to the knowledge of the party intended to be benefited, will be sustained by the courts. There may also be a conditional delivery, which is made to a third person, as an escrow, or mere writing, to be delivered over to the benefited party on the performance of some act or the happening of some event. An escrow does not take effect as a deed until the delivery over, when it takes effect, by relation back, as of the time of its first delivery. See ESCROW, and the titles of the various kinds of deeds, as COVENANT; GRANT; LEASE AND RELEASE. Consult: Coke *on Littleton;* Blackstone, *Commentaries on the Laws of England;* Kent, *Commentaries on American Law;* Pollock and Maitland, *History of English Law* (2d ed., Cambridge and Boston, 1899); Holmes, *The Common Law* (Boston, 1881); and the authorities referred to under REAL PROPERTY.

DEEMS, CHARLES FORCE (1820–93). An American clergyman. He was born in Baltimore, graduated at Dickinson College in 1839, and was agent in North Carolina for the American Bible Society. He was professor of logic and rhetoric in the University of North Carolina from 1842 to 1847, and of natural sciences in Randolph Macon College (then in Boydton, Va.) in 1847–48. He then became a Methodist preacher at Newbern, N. C., and in 1850–54 was principal of the Greensboro (N. C.) Female College. In 1865, after holding several charges in North Carolina, he went to New York, where he helped found (1868) the Church of the Strangers (undenominational), of which he was pastor until his death. The Mercer Street Presbyterian Church building was given to this church by Cornelius Vanderbilt, whose gifts for Vanderbilt University, Nashville, Tenn., were secured through Dr. Deems. In 1881 he founded the American Institute of Christian Philosophy, and he edited for several years its organ, *Christian Thought.* The Institute founded in his honor a lectureship in philosophy (1905) at New York University. Among his many publications are: *Life of Dr. Adam Clarke* (1840); *The Home Altar* (1850); *Annals of Southern Methodism* (1856); *Life of Jesus* (1872); *A Scotch Verdict in Evolution* (1886); *The Gospel of Common Sense as Contained in the Canonical Epistle of James* (1889); *The Gospel of Spiritual Insight, and Studies in the Gospel of John* (1891). He edited several hymnals. Consult his *Autobiography* (New York, 1897), with memoir for the years after 1847 by his sons.

DEEM'STER, DEMPSTER, *or* DOOMSTER (AS. *dōm, doom,* judgment, as in Domesday Book; hence *doomster* or *deemster,* a judge). The name of an officer formerly attached to the High Court of Justiciary in Scotland, who pronounced the doom or sentence of condemned persons. The office was held along with that of executioner. At the conclusion of a trial this dread official was produced in open court, in presence of the criminal, as is graphically described by Scott in his tale of *Old Mortality.* See notes to that work and also notes to *Heart of Midlothian.* The office of deemster has been long abolished.

In the Isle of Man and in Jersey deemsters are judges, the office as well as the title being of great antiquity and dignity. The highest judicial authority in the Isle of Man is divided between two deemsters, one for the northern and the other for the southern half of the island.

DEEP'ING, (GEORGE) WARWICK (1877–). An English novelist, born in Southend, Essex. He was educated at Merchant Taylors' School and at Trinity College, Cambridge (B.A., 1898), studied medicine at Middlesex Hospital, practiced for a year, and then adopted literature as a profession. His popular romances, not unlike Maurice Hewlett's in manner and subject, include: *Uther and Igraine* (1904), *Slanderers* (1905), *Bess of the Woods* (1906), *A Woman's War* (1907), *Bertrand of Brittany* (1908), *Mad Barbara* (1909), *The Rust of Rome* (1910), *The Lame Englishman* (1911), *Joan of the Tower* (1911), *Strong Hand* (1912), *House of Spies* (1913), and *The White Gate* (1914), a story of contemporary England.

DEEP RIVER. A river rising in Guilford Co., N. C. (Map: North Carolina, C 2). It flows southeast and then east and, joining the Haw River (q.v.) in Chatham County, forms the Cape Fear River (q.v.). About 120 miles long, the stream drains an area of 1350 square miles. Large coal and copper deposits are found in its valley. It furnishes considerable water power at Lockville and is navigable to Carbonton.

DEEP-SEA EXPLORA'TION. The depths of the sea have been explored with precision only during comparatively recent years. Deep-sea investigations began in the necessity for accurate soundings for submarine cables, and this is still the main reason for sounding, but much more has been accomplished in this field by dredging for purely scientific purposes.

The most important part of our knowledge of deep-sea conditions has been gained since 1870. The *Challenger* expedition sent out by the British government from 1873 to 1876 (see CHALLENGER) engaged in pelagic investigations for nearly four years, sounding and dredging in the oceanic basins at more than 350 different places. This vessel was well equipped and carried a scientific staff under the direction of Sir Wyville Thomson. A great amount of deep-sea work was accomplished, and the large series of *Reports* form the most important contribution ever made to the literature of this subject. Other extensive deep-sea investigations have been conducted at various times by most of the European governments, while vessels of the United States Coast Survey or of the Fish Commission have been engaged in them more or less regularly since 1870. The Prince of Monaco has made very important contributions to this department of knowledge, as

he has for many years employed his yachts almost entirely in deep-sea work, and has devoted much time to the improvement of the appliances for investigation.

The methods employed by the earlier investigators for measuring the depths were slow and uncertain, for their soundings were made with hemp rope, which was greatly drifted by currents and gave inaccurate depths. The soundings and dredgings conducted on the *Challenger* were so made and often under great difficulties. At the present time such investigations are made by means of wire, the first successful employment of which was by Sir William Thomson in 1872. Wire sinks rapidly, presents the least frictional surface, and is but little affected by currents; and the machinery is now so perfect that soundings may be made with accuracy in the greatest depths. The improved methods show that the early soundings by the *Herald*, *Congress*, and other vessels with rope, supposed to have reached over 7000 fathoms, were erroneous, and that there are probably no such depths in the ocean.

The *greatest depth known* was discovered by the United States cable-survey ship *Nero* in 1900, near the island of Guam, where a sounding was made of 5269 fathoms, or nearly 6 statute miles, a depth sufficient to submerge the highest mountains. It is probable that future soundings will reveal slightly greater depths. For four years prior to the voyage of the *Nero* the deepest water known was north of New Zealand, where the British ship *Penguin* sounded in 5155 fathoms. Off the coast of Japan, in 1874, the United States ship *Tuscarora* found a depth of 4655 fathoms; and in 1900 the United States Fish Commission steamship *Albatross* made a sounding in the western Pacific of 4813 fathoms. Many great depths have been discovered in the Atlantic, the deepest (4561 fathoms) off Porto Rico, by the United States Coast Survey steamer *Blake*. More than 40 "deeps," or depressions ranging from 3000 to 5200 fathoms, are now known, some of them mere holes, others of vast extent. The deeps are well distributed over the seas, but none have been found north of the fifty-fifth degree of latitude. The average depth of the sea is probably not less than 2200 fathoms.

Method of Sounding. In the operation of sounding several instruments are sent down with the wire. A thermometer takes the temperature at the bottom; a closing cylinder brings up a specimen of the bottom water for analysis, and the sounding cylinder at the end of the line brings up a specimen of the bottom mud or ooze, for examination as to the character of the bottom. These instruments are all self-acting at the bottom and are not affected in rising to the surface.

To the sounding cylinder is attached the sinker—a 60-pound iron shot—which detaches itself on striking the bottom. An indicator attached to the reel on deck shows the number of fathoms of wire that have run out. After sounding the wire is reeled in by steam. It takes about one hour to make a sounding 3 miles deep and get the instruments back on board.

Deep-Sea Dredging. The methods employed on board the United States Fish Commission steamship *Albatross*, doubtless the best-equipped deep-sea dredger in existence, may be taken as illustrative. The *Albatross* has brought together larger deep-sea collections than have been made on any other vessel. She has made nearly 6000 hydrographic soundings and nearly 2000 hauls of the dredge or beam trawl. The investigations of this vessel cover areas extending from the Banks of Newfoundland along both coasts of North and South America to Bering Sea, and also limited areas in the tropical Pacific, and in the regions between Japan and Kamchatka. Her work has carried dredging into deeper waters than ever before, animal life having been obtained near the Tonga Islands at a depth of 4173 fathoms, while the dredge on one occasion in Bering Sea brought up from a depth of 1771 fathoms more than 800 deep-sea fishes at a single haul.

The creatures of the deep sea are brought up by means of a dredge or beam trawl towed by a wire rope, operated by a powerful engine on deck. The first operation in dredging is to ascertain the depth by sounding, after which the trawl is put overboard and allowed to sink to the bottom as the dredge rope is let out. The dredge, or beam trawl, is simply an iron frame to which is attached a strong bag-shaped net about 20 feet long. The mouth of the dredge, as formed by the iron frame, is about 11 feet wide and 2 feet high. Dragged along the bottom, it quickly fills with animals. Sometimes it settles into mud or ooze and is very hard to lift. The dredge rope is connected with a large spring, or accumulator, attached to the foremast, which often shows the dredge to be pulling thousands of pounds. Before the dredge reaches the surface, most of the oozy mud washes away, so that the dredge haul is usually light enough to be hoisted from the water and landed on deck with safety. Sometimes it is filled with fishes; sometimes with sea urchins, starfishes, crinoids or corals; sometimes with squids and devilfish. It often brings up a varied collection, in which many classes of marine animals are represented. The time required by the *Albatross* in making her deepest dredge haul—that from 4173 fathoms—was 10 hours, the engine reeling in the great weight of line very slowly. In depths of 1000 to 1500 fathoms hauls can be made in three or four hours, according to conditions.

In addition to the dredge, another collecting machine, very useful on rough bottom, is the "tangle." This consists of bunches of shredded rope attached to iron bars, and when dragged over the bottom it frequently brings up sea urchins, starfish, and crinoids in abundance. A deep-sea fishtrap has been devised by the Prince of Monaco, in which fishes have been taken as deep as 2 miles. The *Albatross*, in 1897, succeeded in setting ordinary gill nets a mile deep and catching *Macrurus* and other deep-water fishes. Deep-water exploration by means of gill nets, traps, and trawl lines promises to yield interesting results.

Deep-Sea Life. The surface of the sea nearly everywhere bears an abundance of minute animal and plant life. In this surface life, or "plankton," as it is called collectively, many groups of invertebrates are represented. The phosphorescence often seen upon the surface of the sea is due entirely to their presence. These almost microscopic creatures are constantly dying and falling to the bottom. They constitute the principal food of the smaller animals dwelling there, and their remains form

a large part of the deep-sea oozes. The most important forms among them, considered with reference to abysmal deposits, are the Globigerinidæ and the radiolarians, which are enormously abundant.

The *marine deposits on the ocean floor* are generally referred to three groups. Those of the continental slopes are called Terrigenous Deposits, derived from the land through the wearing action of rivers, tides, and currents. These coastwise deposits are the blue, green, coral, or volcanic muds, and are characteristic of the adjacent land slopes from which they are derived. Farther off shore, generally about 200 miles, occur the Pelagic Deposits, made up of dead marine organisms from the surface —the minute surface life already referred to. Here we find oozes, such as diatom, radiolarian, or globerina oozes which depend respectively upon the character of the surface life prevailing above them. Beyond these, in the deeper parts of the ocean, are the Red Clay Deposits, which cover about half the ocean floor. This region is not affected by matter from the land and receives little pelagic matter from the surface. It lies so deep that the shells of surface organisms falling down are removed through the solvent action of the deep water. The red clay is believed to have formed very slowly, not more than a few feet of matter having accumulated since the Tertiary period.

Intermediate Depths. The question as to the existence of life at intermediate depths has been given general reconsideration since the perfecting of closing townets for the exploration of such depths. The experience gained with the various intermediate nets used on board the *Albatross* has shown no mingling of surface and bottom forms. The latter occur, of course, at all depths along the continental slopes. See DISTRIBUTION OF ANIMALS.

From the evidence now at hand with respect to light in the sea, it seems certain that the sunlight does not extend below a couple of hundred fathoms and even there becomes very dim. Below this the vast body of the ocean is absolutely dark, being illuminated only where phosphorescent creatures may shed a certain amount of steady or intermittent radiance (see below).

Conditions and Life at Great Depths. It is always cold at the bottom of the sea, the influence of the warm surface waters not extending below a few hundred feet. In the great depths the temperature is always close to the freezing point. In warm equatorial seas, where the depths exceed 400 fathoms, the difference between surface and bottom temperatures usually ranges from 40° to 49° F. It has been found that from 100 fathoms down, or throughout the waters beyond the influence of the sun, temperatures remain practically constant. At the surface of the sea the lines of equal temperatures are parallel with the equator, although subject to deflections by currents, while at the bottom they follow the general trend of the continents. The cold water of the depths comes from regions far to the north and south of the tropics, the coldness being due to the water in polar or subpolar regions sinking and gradually spreading itself over the ocean floor. If for any reason the cold polar waters should cease to flow downward towards the deep tropical basins, the deep-sea water would rise in temperature, and deep-sea life would perish from lack of the air which the polar currents absorb at the surface and carry down with them. So far as is known, the bottom currents are extremely slow, and, as the water is not affected by storms, it is likely that the lower part of the deep sea is a place of calm repose.

There is a tremendous pressure of water in the depths—so great, in fact, that it will crush all objects that are not constructed to resist it. All deep-sea instruments are made to withstand a pressure increasing about a ton to the square inch with each 1000 fathoms of depth. At the greatest depth known there would therefore be a pressure of nearly six tons to each square inch of surface. The tissues of deep-sea animals are so permeated by fluids, however, that a balance is maintained, and at the bottom they may be as firm as animals of the shallow waters. Most of these creatures are so soft that, when withdrawn from the pressure which keeps them in a firm condition at the bottom and brought to the surface, they must be treated carefully to prevent their going to pieces. The bones of abysmal fishes are especially cartilaginous. When deep-sea creatures are dragged to the surface from deep water, they are always dead, and doubtless die during an early stage of their upward journey.

Phosphorescence and Color. It has been mentioned that no light reaches the abyssal regions, which are absolutely dark so far as sunlight is concerned; hence plant life is unknown there, and all the animals of the depths are carnivorous.

Deep-sea dredging, however, has brought up so many phosphorescent animals that there can be little doubt of considerable phosphorescent light in the depths. The amount of such light given off at the surface is no measure of that produced under normal conditions at the bottom. Phosphorescent organs take many forms in the depths and occur in both fishes and invertebrates.

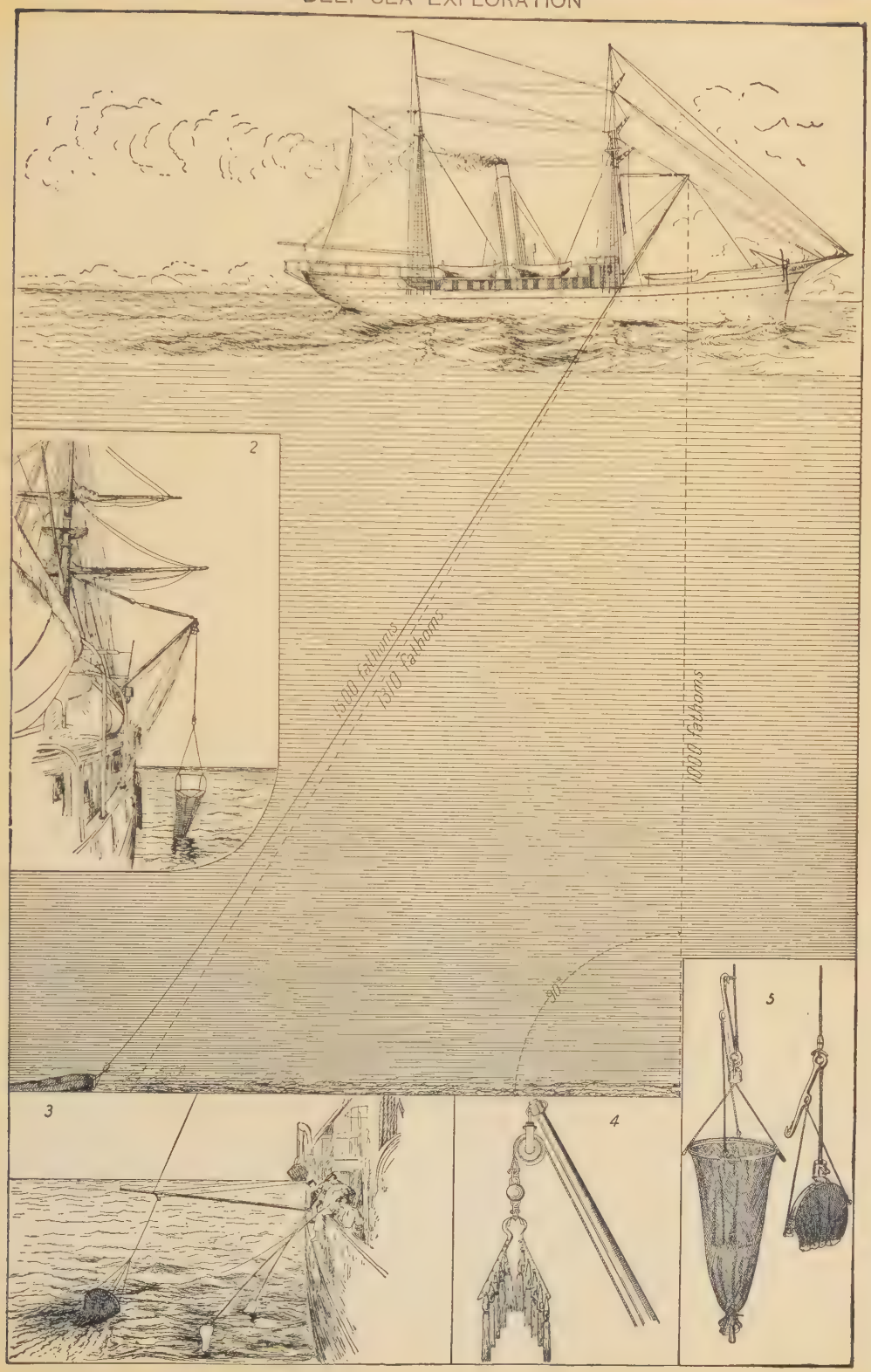
The colors of deep-sea animals are usually as brilliant as those of animals living under the influence of light, although not so varied. The reds, yellows, purples, and greens predominate, and the colors, when they occur at all, are apt to be in solid masses, in striking contrast, or the whole animal is of a uniform brilliant coloration. There is a conspicuous absence of blue. The fishes, as a rule, are dark-colored, but many of the crustaceans, holothurians, and starfish are brilliant.

Some of the deep-sea animals are blind. Those that have eyes probably capture their prey by the phosphorescent light shed from their own bodies and the bodies of the vast number of other creatures that are constantly flashing their faint lamps over the ocean floor. Fishes of the greatest depths have the smallest eyes, while those of moderate depths have very large eyes, as, for instance, those of the *Macrurus* type.

EXPLANATION OF PLATE

1. Method and theory of deep-sea dredging, as practiced on the U. S. S. *Albatross*. 2. The deep-sea dredge and its derrick. 3. Gathering the surface life, by hand nets, and by a towing net rigged to the port boom. 4. The tangles, showing its rigging. 5. The Townsend intermediate net, open and closed. Having been sunk to the depth desired, it is towed for a time, and then a sliding weight is allowed to run down the line; striking the ring which holds upright the iron arm hooked to the towrope, it dislodges the ring and releases the arm, which falls, permitting a weight beneath it to slide down and pinch together the folding rim of the netting bag, which may then be drawn up without loss of contents.

DEEP-SEA EXPLORATION



1. U.S.S. ALBATROSS dredging.
2. THE DREDGE AND ITS RIGGING.
3. SURFACE NETTING.
4. TANGLES.
5. INTERMEDIATE SELF-CLOSING TOW-NET.

Many of them have highly developed organs of touch. Some of the fishes have enormous jaws, much larger proportionately than are found among shallow-water forms. Their teeth also are more formidable. See MACRURUS, and Plate of CODFISH AND ALLIES.

Size. All the animals that have so far been brought up from deep water have been taken in dredges of moderate size—so small, in fact, that they are only capable of taking small animals, the largest specimens of fishes seldom exceeding 4 or 5 feet in length. It is quite possible that by using larger dredges larger animals could be taken.

Conclusion and Bibliography. It will be seen from the foregoing that the fauna of the depths lives under such extraordinary conditions as temperature close to the freezing point, pressure amounting to a ton to the square inch for each 1000 fathoms of depth, and darkness except for light due to phosphorescence.

Consult: Thomson, *Depths of the Sea* (London, 1873); Wild, *Thalassa* (ib., 1874); *Reports* and *Narratives* of the *Challenger* Expedition (see CHALLENGER EXPEDITION); A. Agassiz, *Three Cruises of the "Blake"* (Boston, 1888); annual *Reports, Bulletins*, etc., of the United States Fish Commission (Washington, 1872 onward); *Bulletins* and *Memoirs* of the Museum of Comparative Zoölogy (Cambridge, 1875 onward); Tanner, *Deep-Sea Exploration* (Washington, 1897); Townsend, *Records and Bibliography of the "Albatross"* (ib., 1901); Murray, *The Depths of the Ocean* (London, 1912); and the 40-odd quarto volumes in which the Prince of Monaco publishes his studies, *Résultats des campagnes scientifiques.*

DEEP-SEA FLOUN'DER. A name given locally in the North Atlantic States to both the plaice and the pole flounder (qq.v.).

DEEP-WATER SCUL'PIN. See SEA RAVEN.

DEEP-WATER TROUT. See SQUETEAGUE.

DEEP-WATER WHIT'ING. See WHITING.

DEER (AS. *dēor*, wild beast, animal, Ger. *Thier*, animal, Goth. *dius*, wild beast; cf. AS. *dēor*, bold, OHG. *tiorlīh*, wild). The popular name for even-toed, hoofed mammals of the family Cervidæ and subfamily Cervinæ. The musk (q.v.), usually called musk deer, forms a distinct subfamily, which is sometimes accorded full family rank. More than 50 species of deer are known, occurring in all parts of the world except Australia and southern Africa. Southeastern Asia especially abounds with them, some of the largest as well as many of the smallest living there. Only two species of deer dwell in the whole continent of Africa, and both of these are near relatives of European species and occur only in the northern parts of the continent. In North America there are perhaps 8 or 10 species of deer, while Central and South America possess a much larger number.

Deer are characterized by the absence of a gall bladder and the possession of upper canines, lateral digits on both fore and hind feet, a remarkable suborbital sinus or tear pit below each eye, and antlers. Antlers are the most noticeable of these characters, though they are usually present only in the male. The female reindeer has antlers, and individual females of other species sometimes have small ones. Antlers (q.v.) are outgrowths of bone, which are covered with a thin, highly vascular hairy skin during their growth, but when this is completed the blood supply is cut off, and the skin, or "velvet," as it is called, dries up and is peeled off, leaving the bone bare. Antlers are renewed annually, the fully formed pair becoming detached from the "pedicels" on which they were developed, and a new pair arising at the same place. Antlers are usually shed soon after the close of the breeding season. An antler may be straight and unbranched, but usually there are branches, called *tines* or *snags*. The number of these increase with age, so that the most handsomely developed antlers are found only on fully matured males. The antler and its branches are generally more or less cylindrical or terete, but in some cases they are very much expanded and flattened, and the antler is then called "palmated."

Deer are animals of very graceful form, combining compactness and strength with slenderness of limb and fleetness. They have for many centuries been renowned as objects of the chase, and the flesh of many species is highly esteemed for food, under the name "venison." The best-known species, which may serve as an example of the group, is the European red deer (*Cervus elaphus*), the adult male of which is the "stag," and the female is the "hind." The former is sometimes nearly 7 feet long and over 4 feet in height, but the hind is much smaller. The body is covered by a double coat of fine wool and longer, coarse hairs, the latter longest on throat and chest. The wool is brownish gray, and as it is longest and most abundant in winter, the summer coat is brighter-colored and smoother. The young are spotted with white. The antlers are at first unbranched and show only the number of tines characteristic of the adult in the fifth year, and it is not until then that the young male is dignified with the name "stag." An old stag is called a "hart." The hinds and young stags are usually found together in large herds, but the older stags occur in smaller groups, while harts are generally found alone. The feeding time is during the evening and at night. The food varies with the season; in winter it is chiefly lichens, moss, bark, and buds, while in summer leaves and herbs form most of the diet. Stags are said to eat only fungi during the breeding season. The red deer occurs in all parts of Europe and in northern and western Asia. It is exterminated as a wild animal in populous districts, but is preserved as an object of the chase, or as a semi-domesticated pet, in all parts of western Europe, though not so common in Great Britain as the fallow deer. It is exceptionally swift of foot and an excellent swimmer, and all of the senses are marvelously acute. The hinds and fawns are gentle and can be tamed as pets, but the stags are untrustworthy and become quite dangerous during the breeding season.

The *American deer* (*Cariacus* or *Odocoileus virginianus*) is considerably smaller than the stag, but resembles it in many of its habits. It is found throughout the eastern United States, ranging northward into southern Canada, west to the Missouri, and south to Florida and Texas. West of the Missouri it is replaced by the very similar white-tailed deer (*Cariacus leucurus*), and south of the United States by the Mexican deer (*Cariacus mexicanus*). The American deer are very fond of water, especially in the summer, and at that season feed very largely on water lilies, in seeking which they often go far out into shallow ponds and lakes. They are fine swimmers, and often enter the water during the

day to escape from flies and other insects, but they feed chiefly at night. Owing to this habit, a method of hunting known as "jacking" is often practiced, by means of boats. A brilliant light, known as a "jack light," is placed at the bow, while the hunter is stationed in the shadow behind. The boat is then pushed quietly through the lily pads until a deer is heard or seen; attracted by the bright light, the animal turns full towards it, and the hunter, seeing the reflection of the light in the deer's eyes, can make his aim sure. Under similar circumstances George Shiras, 3d, of Pittsburgh, Pa., secured a series of fine photographs of deer beside lakes in northern Wisconsin, by using a flash-light apparatus, operated by a trigger and instantaneous plates. In color the American deer is somewhat variable, there being a marked seasonal change as well as much individual and geographical diversity. In summer the upper parts are more or less chestnut red, and become more cinnamon-colored along the sides; the under parts are white. In winter the upper parts become more gray, so that there is a general slaty-blue cast, and the deer is then said to be "in the blue." Deer no longer occur commonly south of Vermont, New York, and Michigan, except in some of the less-settled portions of the Southern States. Protective legislation has led to a marked increase in the number of deer in Vermont and some other States, but excessive hunting during the open season is reducing the numbers elsewhere.

Besides the North American deer above mentioned, the Western mule deer (*Cariacus macrotis*) demands a word, on account of its remarkable ears. These are 8 inches long and well covered with hair.

Classification. The classification of deer is now based largely upon the structure of the feet and the antlers. There are two main groups of deer, the Plesiometacarpalia and the Telemetacarpalia. The former are all Old World deer, except the wapiti (q.v.), and have the proximal portions of the lateral metacarpals present, and the vomer never divides the posterior osseous nares into two distinct passages. This group comprises the genera *Cervulus*, the muntjacs (q.v.); *Elaphodus*, with a single small Chinese species and *Cervus*. This last genus includes many species and is subdivided, chiefly according to the form of the antlers, into seven groups, as follows: (1) Rusine, in which the antlers have no tine (known as the *bez*) just above the lowest or brown tine, the beam is upright and simply forked at the tip, the brow tine rises close to the base, and the angle formed with the beam is acute; (2) Recervine, beam somewhat flattened, and bifurcates into two branches, which again divide, and the brow tine is given off at an obtuse angle and curves upward; (3) Elaphurine, beam straight, erect, with a long, straight back tine; (4) Axine, antlers rusine, but body of adult marked with rows of white spots; (5) Pseudaxine, similar to axine, but the antlers have a forked beam, of which the posterior tine is the smaller; (6) Elaphine, a bez tine is present, and the rounded beam splits up into a number of small tines often arranged in a cup-like manner; (7) Damine, the antlers are palmated near the tip. See ANTLER, where illustrations of various forms are given.

Of these seven groups the Elaphine is the most important, including the red deer and wapiti, but the well-known sambur (*Cervus aristotelis*) of India is rusine, the swamp deer (*Cervus duvaucelli*) of the same country is recervine, the axis is axine, the Japanese deer (*Cervus sika*) is pseudaxine, while the fallow deer (*Cervus dama*) is damine.

The Telemetacarpalia include all the American deer except the wapiti, and several Old World species also. The distal extremities of the lateral metacarpals are present, and the vomer usually divides the posterior nares into two distinct orifices. The genus *Rangifer* contains the reindeer and caribou; *Alces*, the elk, or moose; and *Capreolus* includes the roe deer of Europe and Asia. The Chinese water deer is a remarkable little species without antlers and is the sole representative of the genus *Hydropotes*. The genus *Cariacus* includes, besides the three species already mentioned, a number of others found in the western United States and in Central and South America. They may be grouped in four sections, known as the Cariacine, Blastocerine, Furciferine, and Coassine. The North American deer all belong in the first section, while the last one includes the small South American deer known as brockets. The genus *Pudua* includes only a single diminutive species, the pudu, which is less than 18 inches high and lives in the Andes of Chile.

Fossil Deer. The earliest fossil remains of deer are found in the Middle Miocene strata, where the group is represented by several species of *Palæmeryx*, at least one of which had antlers. Remains of other genera occur in the Pliocene and Pleistocene. *Cervus* proper appears in the Pliocene. The notable giant deer, or "Irish elk" (*Cervus giganteus*), possessed enormous palmated antlers, 11 feet from tip to tip. It represents a distinct section of the genus, called megacerotine. The remains are found in Pleistocene deposits over a large part of Europe, but are especially common in the peat bogs of Ireland, where they were first discovered. See ELK.

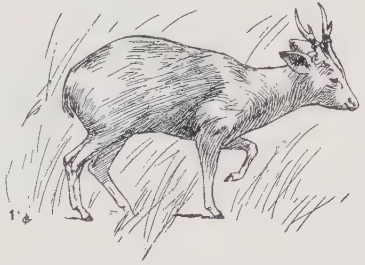
Consult: Hamilton-Smith (ed.), *Griffith's Animal Kingdom* (London, 1827); Caton, *Antelope and Deer of America* (New York, 1877); Lydekker, *Deer of All Lands* (London, 1898), colored quarto plates, with descriptions of all species; Roosevelt (and others), *The Deer Family* (New York, 1902); Scrope, *Days of Deer Stalking* [red deer] *in the Scottish Highlands* (London, 1883); St. John, *Sportsman and Naturalist in Sutherlandshire* (ib., 1891); Jeffries, *Red Deer* (ib., 2d ed., 1892); *Deer Stalking* ("Fur and Feather Series," ib., 1896); Lantz, "Deer Farming in the United States," in *Farmers' Bulletin 330*, United States Department of Agriculture (Washington, D. C., 1908); id., "Raising Deer and Other Large Game Animals in the United States," in *United States Biological Survey, Bulletin 36* (Washington, D. C., 1910). Consult also the authorities mentioned under STILL-HUNTING.

DEER'FIELD. A town including four villages, in Franklin Co., Mass., 33 miles north of Springfield, on the Connecticut River, and on the Boston and Maine and the New York, New Haven, and Hartford railroads (Map: Massachusetts, B 2). It has agricultural interests and manufactures of pocket books and art novelties. The town contains a public library, Dickinson High School, and Deerfield Academy. The government is administered by annual town meetings. The water works are owned by the municipality. Pop., 1900, 1969; 1910, 2209. A

DEER OF NORTH AMERICA

1. MOOSE OR EUROPEAN ELK.
2. ELK-LIKE ANTLERS OF EXTINCT IRISH DEER.
3. WOODLAND CARIBOU OR AMERICAN REINDEER.
4. WAPITI; the "elk" of the Western United States.
5. MULE DEER OR BLACKTAIL.
6. EASTERN, VIRGINIAN, OR WHITE-TAILED DEER.

FALLOW DEER, MUSK, ETC.



1. INDIAN MUNTJAC (Cervulus muntjac).
2. CHILEAN PUDU DEER (Pudua humulis).
3. MUSK (Moschus moschiferus).
4. PAMPAS DEER (Cervus campestris).
5. FALLOW DEER (Cervus dama).
6. MALAYAN CHEVROTAIN (Traqulus javanicus).

part of the town was annexed to Greenfield in 1890.

Deerfield was founded in 1671 and incorporated in 1673. Near here, on Sept. 19, 1675, the Indians caught Captain Lothrop and 84 men in an ambuscade. The latter were reinforced, and the Indians driven off, but the colonists had suffered a loss of 63 killed and 7 wounded. On Feb. 29, 1704, the French and Indians surprised the place, killing 49 and capturing 100 of the inhabitants, while many of the buildings were destroyed. The captives were taken to Canada, a number being murdered on the way. Some of the survivors were liberated in 1706. Consult Sheldon, *A History of Deerfield, Mass.* (Deerfield, 1895–96), and Powell, *Historic Towns of New England* (New York, 1898).

DEERFIELD RIVER. A river rising in Windham Co., southern Vermont (Map: Vermont, C 8). It flows south into Massachusetts, where, after forming the boundary between Franklin County and the northeast corner of Berkshire County, it flows in a generally southeasterly direction nearly across Franklin County and empties into the Connecticut River near Deerfield. It is about 60 miles long in a general direction and drains an area of 650 square miles. The stream has a fall of 1028 feet from Readsboro, Vt., and furnishes extensive water power there and at Hoosac Tunnel and Shelburne Falls. Its valley is famed for its beauty.

DEER FLY. A gadfly which attacks deer; especially, in North America, the small green or yellow tabanids of the genus *Chrysops*.

DEERHOUND. See GREYHOUND.

DEER'ING, CHARLES (1852–1927). An American manufacturer, born at Paris, Me. He graduated from the United States Naval Academy in 1873 and served as an officer in the navy until 1881, when he resigned to become secretary of the Deering Harvester Company. After this firm was merged with others in the International Harvester Company he became chairman of the latter's board of directors.

DEERING, WILLIAM (1826–1913). An American manufacturer, father of Charles Deering, born at Paris, Me. He was educated at the Readfield Seminary. Engaging in the woolen mill and dry-goods business, he became a member of the commission and wholesale dry-goods firm of Deering, Milliken & Co., of Portland, Me., and New York City. In 1873 he established, at Plano, Ill., the harvester business which bears his name, and until his retirement he was president of the Deering Harvester Company and of the William Deering & Co.

DEER LODGE. A city and the county seat of Powell Co., Mont., 40 miles north of Butte, on the Northern Pacific and the Chicago, Milwaukee, and St. Paul railroads, and on the Deer Lodge River (Map: Montana, D 3). It contains the State penitentiary, the College of Montana (Presbyterian), St. Mary's Academy, St. Joseph's Hospital, and a public library. Farming and cattle and sheep raising are the principal industries, and there are railroad repair shops and creameries. Gold mining is also carried on. Pop., 1900, 1324; 1910, 2570.

DEER MOUSE. Any of several wild mice, which resemble a deer in colors and movement. The name is most properly applied in North America to the jumping mouse (*Zapus hudsonius*), but is also given to the white-footed mouse (*Peromyscus leucopus*). See MOUSE, and accompanying Plate of MICE AND JERBOAS.

DEER'S HAIR. See SCIRPUS.

DEER'SLAY'ER, THE. One of Cooper's *Leatherstocking Tales*, the first of the series written, but the last published (1841). The title is the sobriquet of the leading character, Natty Bumppo.

DEERSTALKING. See STILL-HUNTING.

DEER'STEAL'ING. In English law, the statutory offense of hunting, killing, or carrying off any deer in any forest, chase, or park, whether private and inclosed or public and uninclosed. By the common law deer at large are *ferœ naturœ* ('wild animals'), but the penchant of the Norman kings and their immediate followers for the hunting of deer caused that animal to be invested with a peculiar sacredness, and led at a very early period to the enactment of stringent forest and game laws for their protection. The matter is now regulated by a series of game laws, beginning with 16 Geo. III, c. 30. See FOREST; GAME LAWS; POACHING.

DÉES MAGYAROS. See DÉS MAGYAROS.

DE FACTO (Lat.). A legal phrase, signifying "actual, based on fact"; as distinguished from "de jure," which means "based on law." It is commonly employed of the occupancy of public office or the exercise of political or other authority without legal warrant or by one whose legal title thereto is defective. Under a government of law a merely de facto authority may always be impeached, the proper legal remedy in England and in the United States being by the common-law writ of quo warranto, issued by a court of competent jurisdiction, to bring the offender into court and inquire "by what warrant" he has presumed to exercise the office or authority in question.

Used in this general sense, as opposed to a de jure, or lawful, authority, the exercise of de facto authority is always a usurpation, and it maintains this character so long as it continues, or until it is legalized by proper legislative or other authority. Any public office, administrative, legislative, or judicial, may be usurped and its powers exercised by de facto authority; but the phrase has no application to the case of an excessive or other illegal exercise of power by a duly constituted authority, which does not amount to an assumption of any other office than that which it possesses. Nor does mere usurpation of an office without the actual exercise of its functions constitute the usurper an officer de facto. The authority claimed must be effective and actually exercised in order to give it the de facto character.

It is in this general sense of a power actually exercised, but without legal authority, that the term "de facto" is employed in international and constitutional law. It is thus applied to a revolutionary government, as the Continental Congress—whose acts gained legal sanction through the success of the Colonies and the recognition of their independence by Great Britain—or the President and Congress of the Confederate States—whose de facto exercise of authority gained for them a certain measure of international recognition, but remained to the end, in point of law, an illegal usurpation. Acts performed by such an authority are wholly void and may be impeached in any proceeding, direct or collateral.

In administrative law, however, the term "de facto" is commonly used in a narrower sense, to describe the exercise of illegal authority, but with apparent right and under color of legal

authority. The acts of an officer thus acting have a certain validity, so far as the interests of the public and of third persons are concerned, and cannot be questioned in any collateral proceeding. But they may be directly impeached—as by a refusal to recognize the de facto authority, or by instituting proceedings to test the usurper's title to the office exercised by him, or, at the common law, by a civil suit for the wrongful intrusion into office or for the profits thereof taken by the usurping official. But the mere possession of an office is prima facie evidence of a valid title thereto, and de facto authority is presumed to be de jure also, until the contrary is made to appear in an appropriate proceeding instituted for that purpose. Where an office has been exercised de facto in good faith, as by one believing himself to be rightfully entitled to it, or where in cases of public danger an official commits unwarranted acts of authority, it is usual for the legislature by a subsequent act of indemnity (q.v.) to legalize the unlawful acts so committed. See ADMINISTRATIVE LAW; OFFICE; and consult the authorities there referred to.

DEF'AMA'TION (Lat. *diffamare*, from *dis-*, priv. + *fama*, report). The infringement of the right of reputation; specifically, the publishing of any matter concerning an individual which is untrue in fact, and which has a tendency to impair his public reputation. The right of every man to the good name which he has earned by a long course of good conduct is recognized by every developed system of law. It is regarded as a species of property, a valuable asset, of which no one can deprive him with impunity. Its violation is a legal wrong, or tort, and it may under some circumstances be a public wrong, or crime.

As reputation is the estimation in which a man is held by the community in which he lives, the gist of the injury lies in the publication of the imputation upon his character. If communicated to him privately or written out for the purpose of publication, but not actually communicated to a third party, it is no violation of the right of reputation, no matter how unjust it may be. Furthermore, the law will protect reputation only in so far as it is fairly earned. A truthful imputation upon character is no violation of the right. But even the publication of derogatory matter which is in fact untrue may not amount to defamation in the legal sense. The imputation may be too vague and general, or too trivial to be regarded, or, although definite and harmful, it may be uttered under such circumstances of privilege as to justify and excuse it.

In general it may be said that an action will lie for defamation in those cases, and in those cases only, (1) in which the charge or accusation is shown to have caused special pecuniary damage to the plaintiff; (2) in which the plaintiff is charged with the commission of a crime; (3) in which the present existence of an offensive contagious disease is imputed to him; (4) in which the conduct of his profession or trade, or of an office of public trust held by him, or his fitness therefor, is impugned; (5) in which unchastity is imputed to a woman. In all these cases but the first, the words or acts charged are defamatory per se, and are actionable without proof of special damage resulting therefrom, and in all of them the action will lie whether the derogatory words were spoken or written. In the case of a written imputation, however, which is technically called a libel, special damage need never be shown, but it is enough to satisfy the jury that the words complained of were such as to bring the plaintiff into ridicule, odium, or contempt.

The most important and comprehensive ground of justification for imputations upon character is the privilege of fair criticism and comment on public men and affairs. This exists only in communities, like England and the United States, in which the government is of a free and popular character, and the liberty of the press and of public discussion has reached a high point. This privilege does not cover mere abuse, nor the malicious imputation of dishonesty and incapacity, nor the invasion of the private and domestic life of the person accused, unless this has some bearing on public affairs. But every citizen is protected in the honest expression of opinion, however severe and unjust it may be, concerning matters of public interest and general concern, whether political or not, so long as the limits of fair criticism are not exceeded. Privilege may also exist in matters of private concern, under special circumstances, as in comments on character made by a judge, advocate, or witness in the course of a judicial proceeding, such statements being privileged unless made maliciously or recklessly.

Reference has been made to the fact that the publication of defamatory matter may, under some circumstances, be a violation of the criminal law. This is never true of mere slander, or spoken defamation, but only of libel; and it is theoretically justified on the ground that written or printed attacks on character are likely to lead to breaches of the peace or to prove subversive of the good order and morals of the community. It seems more probable, however, that the criminal proceedings in libel cases are a survival of the primitive right of private vengeance for injuries of this character, which has, in process of time, been taken over by the state. See TORT; LIBEL; SLANDER; PRIVILEGED COMMUNICATION; and consult the authorities there referred to.

DEFARGE, *de-färzh'*, THÉRÈSE. The wife of the keeper of the wine shop in Dickens's *Tale of Two Cities;* a type of the remorseless virago of the French Revolution.

DEFAULT' (OF. *defaulte*, It. *diffalta*, from Lat. *de*, away + *fallere*, to fail). In law, the failure of a party to a suit to take the next step in the process of litigation incumbent upon him, within the time limited by the practice of the court. Originally the term was limited to the nonappearance of a party in court on the day assigned in the writ or summons, but it is now employed of a similar failure at any stage of the cause. In general, the effect of a default on the part of the plaintiff is to entitle the opposing party to a nonsuit, and the default of the defendant renders him liable to a judgment in accordance with the demand of the declaration or complaint. Formerly, in suits at law, these results were final, but the procedure of the equity tribunals permitted the opening of defaults for cause shown, and this is now the general practice, at law as well as in equity, in the courts of England and the United States. Usually, however, the default can be reopened and the cause reinstated on the calendar of the court only on the payment of moderate costs by the party in default. See PROCEDURE.

DEFEA'SANCE (OF. *defeisance*, from *défaire*, Fr. *défaire*, to make void). A proviso annexed to a conveyance of land or goods, whereby the latter shall become void in some specified event. At common law the term was confined to such a proviso contained in a separate instrument from the act or deed of conveyance, the term "condition" being proper to describe a similar term or provision contained in or forming a part of the conveyance itself. At the present time, however, the latter is often referred to as a clause of defeasance. It is commonly employed to effect a mortgage, which is, properly speaking, a conveyance of property with a defeasance reinstating the title of the mortgagor upon the payment of the mortgage debt. In the United States the defeasance is usually incorporated in the mortgage deed, but in England a mortgage often takes on the form of an absolute deed with a separate deed of defeasance, made by the mortgagee to the mortgagor, specifying the condition on which the conveyance of the property is to become void. Ordinarily a separate instrument of defeasance must be delivered at the same time as the deed of conveyance which it is intended to affect, so as to form part of the same transaction. If given subsequently, it may have the effect of a covenant, enforceable in a separate action by the grantor of the property, but it will not in that event convert the grant into a mortgage.

At common law it is also necessary that a separate defeasance, in order to have the intended operation, should be "of as high a nature" as the conveyance itself, i.e., should also be in the form of a deed. But the courts of equity have always admitted parol evidence of the agreement, understanding, and purpose with which a conveyance was made, and have given effect to such a proviso, even though it was not embodied in a deed or other written form. Accordingly an absolute deed conveying a parcel of land for the real purpose of securing the payment of a debt is, in practical effect, a mortgage and may be redeemed as such. See CONDITION; MORTGAGE; and consult the authorities there referred to.

DEFEND'ANT. The person who is sued in an action at law or in equity. Blackstone says: "In every court there must be at least three constituent parts—the *actor*, or plaintiff, who complains of an injury done; the *reus*, or defendant, who is called upon to make satisfaction for it; and the *judex*, or judicial power, which is to examine the truth of the fact, to determine the law arising upon that fact, and, if any injury appears to have been done, to ascertain, and, by its officer, to apply the remedy" (3 Bl. Com. 25).

The term was originally limited to the person sued in a *personal* action at common law, the one against whom a *real* action was brought being described as "the tenant," the complaining party in that case being known as "the demandant," and these expressions are still employed to distinguish the contending claimants to real property in several of the United States. But in most States, as well as in England, the term "defendant" has come to designate the party used in any form of action and in any court. See PARTIES.

DEFEND'ER OF THE FAITH (trans. of the Latin, *Fidei Defensor*). A title conferred on Henry VIII by Pope Leo X in recognition of his treatise, *Assertio Septem Sacramentorum*, directed against Martin Luther in 1521. When Henry suppressed the religious houses at the Reformation, Pope Clement VII recalled the title and deposed him. In 1544 Parliament confirmed the title, which has ever since been used by the sovereigns of Great Britain.

DEFENDER OF THE MARRIAGE TIE (*Defensor Matrimonii*). An office created by Pope Benedict XIV in the year 1741. Its object is, in all cases of actions for the annulment of marriage, to defend the marriage bond in its integrity. Marriage, being a sacrament in the Catholic church, is, like the other sacraments, most jealously guarded. The "defender" is clothed by ecclesiastical authority with the same or similar powers that the prosecuting attorney in civil law, in criminal procedure, is endowed with. He usually acts as a referee in civil-court proceedings. The office was instituted in America by the Third Plenary Council of Baltimore in 1884, and is now extended until each Catholic diocese has its "defender" ecclesiastically appointed, ready to defend the integrity of the marriage agreement before any court of proper jurisdiction, and to carry an appeal to a higher court, if needed. Consult Taunton, *The Law of the Church* (London, 1906).

DEFENSE' (Lat. *defendere*, to ward off). In criminal law, the right of forcible resistance to an attack by force on person or property. The exercise of this right may be a justification of the charge of assault or homicide. It is restricted to the employment of so much force as is reasonably necessary for the protection of one's self, his wife, children, and other members of his household, his personal property, and, where a felony is threatened, as burglary or arson, his real property. He may also resist by force a violent attempt to commit a trespass, even without felonious intent, upon the premises constituting his dwelling. For the limitations upon the exercise of the right of defense, see ASSAULT; HOMICIDE.

In the law of civil and criminal procedure, the answer of the defendant in a suit to the cause of action set up by the plaintiff. As commonly employed under the reformed procedure in England and many of the United States, the defense includes the *demurrer*, in which the facts alleged by the plaintiff are admitted, but their legal effect is denied, and the justification by the defendant of the acts of which the plaintiff complains, as well as the bare denial of the allegations of the complaint or statement of claim. It does not, however, cover a counterclaim (q.v.), or separate cause of action, set up by the defendant.

Under the highly technical procedure of the common law, defense (from French *defender*, to deny) was only the first step in the defendant's answer to the plaintiff's cause of action, and was limited to a denial of the truth or validity of the complaint. This was followed by the *plea*, under which the jurisdiction of the court and the legal validity of the facts alleged in the complaint might be questioned, and the justification of the defendant set forth. This system of pleading still obtains in several of the American States, but the term "defense" has generally come to have the wider meaning assigned to it above, which includes the plea and demurrer of the defendant as well as his technical defense. Formerly, also, the term had no reference to the answer interposed by a defendant to the charges contained in a bill or information filed in an equity proceeding, being restricted to

actions at law. Under the reformed procedure, however, this distinction no longer obtains, and the term "defense" may be employed in either forum.

In general, it may be said that the defense must contain a specific denial or justification of each and every allegation of the complaint, together with a statement of any facts relied upon by the defendant to relieve him from the plaintiff's claim of liability. It must usually be verified by the defendant or his solicitor or attorney and served upon the plaintiff or his legal representative within a limited time—usually 20 days—after the service of the complaint. The defense once made, the cause is at issue and may usually proceed to trial without further pleading. See ANSWER; DEMURRER; PLEA; PLEADING; and consult the authorities there referred to.

DEFENSE OF POESIE, THE. The name under which Sir Philip Sidney's *Apologie for Poesie* was reprinted in 1598, with the third edition of the *Arcadia*.

DEF'ERENT (Lat. part. *deferens*, bearing away). An old term in astronomy, signifying a circle on which the centre of another circle moves, while a body is supposed to be moving on the latter itself. If we suppose the sun to be moving round a centre in space, while the earth moves, say, in a circle round the sun, then the sun is moving in the deferent. The term originated in the Ptolemaic system (q.v.).

DEFFAND, dâ'fän', MARIE ANNE DE VICHY-CHAMROND, MARQUISE DU (1697–1780). A Frenchwoman, celebrated in her day for her caustic wit and remarkable beauty, and still so to-day for the soundness of her judgment. The style of her letters is ranked by Sainte-Beuve with that of Voltaire, the model of French prose writers. She was a conspicuous figure in the brilliant salons and gay suppers of the period. Later on, her own aristocratic salon at the Convent of St. Joseph was frequented by Voltaire, Montesquieu, D'Alembert, the famous *encyclopédistes;* D'Alembert, however, abandoned her for the young Mademoiselle de Lespinasse, her protégée and former reader. At 68 the now blind Marquise conceived a violent passion, in spite of her cynical nature, for Horace Walpole, the famous English Premier, who would have more openly reciprocated her love had he not feared the ridicule of his contemporaries. Among her clever sayings the following bon mot furnishes the best keynote to her character: "I was bored, which accounts for all my follies." Her works exist as *Correspondance complète publiée par de Lescure (excepté lettres à la duchesse de Choiseul)* (1865); several *Letters to Horace Walpole* were collected by Miss Berry (London, 1810). Consult Sainte-Beuve, *Causeries du Lundi,* vols. i, xiv, and De Ségur, *Esquisses et récits: Mme. du Deffand d' après des documents inédits* (Paris, 1908).

DEFI'ANCE. A city and the county seat of Defiance Co., Ohio, 51 miles west by south of Toledo, on the Maumee River, at the junction of the Auglaize, on the Miami and Erie Canal, and on the Wabash, the Baltimore and Ohio, and the Ohio Electric railroads (Map: Ohio, B 3). It is the seat of Defiance College, opened in 1885, and contains a Carnegie library and Fort Defiance. There are several flour mills, extensive machine shops, wagon works, pressed-steel factories, etc., and the city has a large trade in agricultural products and live stock. Pop., 1900, 7579; 1910, 7327.

DEFIANCE COLLEGE. An institution for higher education, organized under its present name in 1902 at Defiance, Ohio. It is the successor to the Defiance Female Academy, chartered in 1850 and opened for students in 1885. The college is under the control of the Christians. The grounds consist of 28 acres, on which are four large, modern, fully equipped buildings and a residence for the president. Connected with the college is the Christian Biblical Institute, which has a separate board of trustees but the same president. The college includes a college department, a department of music, a normal department, and a commercial department. The total enrollment in all departments in 1912–13 was 456, of whom 186 were in the college department. The total number of instructors was 28. The total assets of the institution at the end of the year 1913 amounted to $520,480; of this $312,358 was endowment. The total income from all sources for the year 1912–13 was $41,398. The library contains about 7000 volumes. The president of the college since its foundation has been P. W. McReynolds, D.D.

DEFIC'IENT NUMBER. An integer whose divisors added together make a sum less than the number itself; e.g., 16 is a deficient number, since the sum of its divisors, $1 + 2 + 4 + 8 = 15$, is less than 16. The term goes back to the Greek theory of numbers. See PERFECT NUMBER.

DEF'ILA'DING. Determining the direction and height of a parapet which will give protection from hostile fire; or, selecting a natural screen which affords concealment from hostile observation. In the latter sense positions for field-artillery batteries are designated as follows: if the guns are posted so that through the sights the hostile position can just be seen over the mask or screen, the battery has *sight defilade;* if a dismounted man can just see the hostile position, the guns have *dismounted defilade;* if mounted, *mounted defilade;* if the flashes of the guns are concealed, *flash defilade.* Consult *Field Artillery Drill Regulations, U. S. A.* (1911). See FORTIFICATION.

DEFILE' (noun, Fr. *défilé*, pass). Any passage which compels troops to advance in column formation. DEFILE, verb intransitive, not in common use, means "to march with narrow fronts," as in column of *files*, i.e., one behind the other, as in *Indian file.* See DEBOUCHING.

DE FILIPPI, FILIPPO. See FILIPPI, FILIPPO DE.

DE FIN'IBUS BONO'RUM ET MALO'RUM (Lat., On the Limits of Good and Evil). A philosophical treatise by Cicero.

DEF'INI'TION (Lat. *definitio*, from *definire*, to bound, from *de* + *finire*, to fix a limit). The act of making clear one's meaning in the use of a term. This may be accomplished by giving a synonym whose meaning is beyond doubt, as is often done in dictionaries. But traditional logic calls for something more explicit than this. It demands that the *definiendum* (i.e., the term to be defined) shall be assigned to a class including other terms with the same general meaning. This class is called the *genus*, and the term that names this class is called a generic term. There is a second requirement which is met by stating the attribute or combination of attributes which marks off the objects denoted by the definiendum from the other objects within the same genus. This differentiating attribute or combination of attributes is

called the specific difference, or the *differentia*. A logic definition is thus the designation of genus and specific difference.

But there are many terms which cannot be defined in accordance with the above requirements. Formal logic recognized one such term in the *summum genus*, the class to which all things belong, and which therefore does not itself belong to a higher class, from which it may be differentiated by some specific attribute. This class is usually identified as "being." But logical definition presupposes the possession of a number of terms whose meanings are already known, and it gives a meaning to a definiendum by correlating it generically and specifically with these other terms. When, however, we come to define these other terms, we enter upon a movement which is either circular or which ends in something which can be defined only by identification, i.e., by directing attention to it in some manner, such as pointing. Such terms as space, time, similarity, and relation cannot be defined logically without what is technically known as a *circulus in definiendo*. Here, as elsewhere, the requirements of formal logic should not be regarded as absolute, but as subserving the purpose of criticism.

DEFLEC'TION OF THE PLUMB LINE. If the materials which compose the earth had the same density throughout, and if the materials were perfectly plastic, at least to long-continued stresses, then the visible surface of the earth would define a geometrical figure represented by an ellipsoid of revolution with the shorter axis joining the poles. This condition would also obtain if the earth were composed of concentric (or nearly concentric) layers of material with each layer having the same density throughout. Under the ideal condition the plumb line would always be normal to the surface of the ellipsoid. But the earth's surface shows materials of very different densities, and the recent investigations carried on by the United States Coast and Geodetic Survey prove that the materials in the earth's crust to a depth of about 76 miles below the surface have different densities under different places. They show that the material under the sea is heavier than that under the mountains. They also indicate that the earth's crust has only a small effective rigidity, and therefore the mountain range is floated by the lighter material under it, and the sea bottom is depressed by reason of the denser material in the crust blow. The water surface over the oceans and along canals projected, in imagination, through the continents would define an irregular surface called the geoid, which deviates somewhat from the ideal ellipsoid of revolution. This deviation is due to the variations in the direction and force of gravity resulting from depressed ocean beds and projecting mountains and to the heterogeneous densities in the earth's crust. The plumb line will be, at each point, perpendicular to the geoid surface rather than to the mean surface of the earth, the ellipsoid of revolution. The angle between the normals to the geoid and the ellipsoid at any point is called the deflection of the plumb line or of the vertical. The deflection is given in two components—one in the plane of the meridian and the other in that of the prime vertical. Usually the deflections of the vertical are spoken of as the differences between the geographic positions, as computed on the ellipsoid of revolution, and the astronomic positions, as determined from observations on the stars. This is not strictly true, because of inaccuracies in the dimensions of the adopted ellipsoid of revolution, also to some error (possibly only slight) in the assumed longitude and latitude of the initial station from which all the other geographic positions are computed.

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DEFOE', DANIEL (c.1660–1731). An English journalist, novelist, and miscellaneous writer, author of *Robinson Crusoe*. He was born in London late in 1659 or early in 1660, the son of James Foe, a dissenting butcher of Northamptonshire stock, and he retained the family name Foe until after he was 40 years old. Comparatively little is known of his life until he reached middle age. He was educated for the Presbyterian ministry, but abandoned it, probably going to Spain as apprentice in a commission business and then doing some traveling. Before January, 1684, when he married Mary Tuffley, who bore him several children and survived him, he had become a wholesale hosier in Cornhill. He took an obscure part in Monmouth's Rebellion; supported William of Orange heartily in 1688–89, having at that time a good standing in the city; engaged in speculative commerce, and failed about 1692 for a rather large sum. Meanwhile he had done some studying and writing, his earliest identified publication being a verse satire, *A New Discovery of an Old Intreague* (1691). Friends helped him to his feet, and in a few years he had established a manufacture of bricks and pantiles and was paying off his debts. In 1697 he became a prolific pamphleteer in political and ecclesiastical controversies and issued the most important of his early books, *An Essay upon Projects*, in which he put forward many plans for social betterment, his discussion of banking, insurance, road making, and the education of women being surprisingly modern in tone. In 1701 he gained a national reputation through his poem "The True-Born Englishman," which defended King William from attacks made on him as a foreigner, and through his bold "Legion's Address," which demanded from the Commons the release of certain political prisoners known as the Kentish Petitioners. He was now at the zenith of his career so far as regards popularity with his contemporaries. He was introduced to the King and served him politically in some unascertained way, and he was recognized as one of the ablest exponents of Whig views. In the latter capacity he is seen at his best in the tract entitled *The Original Power of the Collective Body of the People of England* (1701).

The death of William in 1702 marked a great

change in Defoe's fortunes. Queen Anne was a strong churchwoman, and the High-Churchmen were encouraged to attack the dissenters in violent sermons, to which Defoe replied in far from mild pamphlets, such as *A New Test of the Church of England's Loyalty* and *The Shortest Way with the Dissenters* (1702). The second of these, a monologue hoax, which represented a high-flyer as advocating a drastic rooting out of dissent, was taken seriously by all parties and construed as a libel by the government. On the appearance of an advertisement for his arrest Defoe went into hiding and escaped detection for nearly five months, until the end of May, 1703. He was tried in July, found guilty, and given a very severe sentence, which included three exposures in the pillory. When he underwent this punishment, the fickle mob treated him like a hero, and his spirited "Hymn to the Pillory" (1703) was hawked about the crowd. But his business was ruined, he felt himself to be forever disgraced, the injustice rankled, and his character steadily deteriorated. He might, while in prison, collect his Whiggish tracts and poems and issue new ones, but he was soon to become an unscrupulous journalist, a wily political agent, a pamphleteer capable of writing on any or all sides of any cause.

Defoe's stay in Newgate was much shorter than his early biographers believed. He was released in October or November, 1703, through the good offices of Robert Harley (q.v.), who wished to utilize his serviceable pen. With Harley's approbation he not only wrote many tracts and made journeys as an election agent in the interest of the Whigs, but he established his famous newspaper, *The Review*, as an organ of political moderation and of liberal commercial views. This journal—which was not first issued from Newgate, as is often stated—ran, mainly as a triweekly, through eight yearly volumes and a supplementary ninth (1704–13) and marked an important stage in the evolution of British journalism. It was written by Defoe single-handed, and it appeared with surprising regularity despite his protracted absences from London. Between 1706 and 1710 these absences were mainly due to his services in Scotland as a secret agent. Under Harley's directions he was indefatigable in urging by pen and voice the union of England and Scotland, and later (1708–10), under Godolphin, he labored to allay Scottish discontent and to thwart Jacobite intrigues. His success was striking and his reward inadequate; hence he rapidly became less trustworthy. Meanwhile he displayed remarkable fecundity as a writer, issuing, besides his newspaper and many tracts, his prose political allegory, *The Consolidator* (1705), his mammoth political satire in verse, *Jure Divino* (1706), and his dull but accurate and valuable *History of the Union* (1709). Probably his only important contribution to literature proper during these years is his extraordinarily realistic *True Relation of the Apparition of one Mrs. Veal* (1706).

From the fall of 1710 to the fall of 1714 Defoe was once more in the employ of Harley (Lord Oxford) and was in consequence forced to do much of his writing as a semi-Tory. During the Sacheverell agitation he had been pronouncedly Whig, but late in 1711 he adroitly shifted the policy of the *Review* in order to support peace with France, he wrote many tracts with the same end in view, and he secretly attacked Marlborough and the Dutch. There is strong evidence, however, that he also wrote on the Whig side, and it is clear that in two particulars he remained stanch to his old principles. He opposed all measures against the dissenters—e.g., the Schism Bill (1714)—and he did not waver in supporting the Hanoverian succession. Perhaps his most important writings of this period belong to political economy, a subject in which he had already displayed competence, as in his famous *Giving Alms No Charity* (1704). Numerous tracts on the South Sea Scheme, *An Essay upon Publick Credit* (1710), *A General History of Trade* (1713), and the important journal, *Mercator* (1713–14), issued to support Bolingbroke's abortive plans for freer trade with France, made up a body of economic literature well worth study. His political pamphlets, however, have attracted most attention, since some of them, notably the ironical *Reasons against the Succession of the House of Hanover* (1713), almost led, through the intrigues of Whigs angry at his deserting them, to his trial for high treason. In this connection he reflected in the *Review* on Chief Justice Parker, and in May, 1713, he was imprisoned a few days for contempt.

The fall of Oxford and the death of Queen Anne (1714) led to another crisis in Defoe's affairs. He lost the pension the Prime Minister had paid him, on which he had managed to establish his family comfortably at Stoke Newington. He lost also Oxford's favor through indiscreet revelations in *The Secret History of the White Staff* (3 parts, 1714–15), written in support of that statesman. An article reflecting on Lord Anglesey led furthermore to a prosecution for criminal libel. To crown all, he seems somewhat to have broken down in health in the fall of 1714. The story of how he extricated himself from his difficulties and at the age of 55 entered upon the most important stage of his career is too complicated to be told here. He began to display redoubled energy as a writer, composing histories, popular manuals such as *The Family Instructor* (1715–18) and the like, and issuing numerous pamphlets in support of King George, particularly at the time of the rebellion of 1715. He was convicted of the libel on Lord Anglesey, but he escaped punishment by working on the feelings of Chief Justice Parker, and by showing that worthy and the Secretary of State, Lord Townshend, that he would be very useful to the Whig interest as a spy and journalist. The public still regarded him as a Tory; so it was arranged that he should edit mildly Tory journals and secure employment on Jacobite papers like the weekly published by Nathaniel Mist, toning down disaffected articles and reporting to the governments facts about disloyal writers. This disgraceful employment may have lasted 10 years, but it dates mainly from 1716 to 1720, and is chiefly connected with *Mist's Weekly* and a monthly political compilation, *Mercurius Politicus*. Defoe kept his labors so secret that for nearly a century and a half it was generally supposed that after the death of Queen Anne he had touched politics only in an occasional tract, such as his plausible account of his own career, *An Appeal to Honour and Justice* (1715). The effect of such conduct on

his standing as a man needs no comment; but it should be noted that his "Letters Introductory" in *Mist's* were important precursors of the "leading editorial" in modern journalism.

Need of a large income for an expensive family, which included several marriageable daughters, now led Defoe to increase his output of books, but he remained no less active as pamphleteer and journalist. Such volumes as *Memoirs of the Church of Scotland* (1717), the forged *Minutes* of the French diplomat Mesnager (1717), and the *Continuation* of the *Letters of a Turkish Spy* (1718) gave him needed practice in the art of narration, and led, more naturally than critics have noted, to his masterpiece based on the experiences of Selkirk (q.v.), *The Life and Strange Surprizing Adventures of Robinson Crusoe of York, Mariner* (April 25, 1719). The unexampled success of this story—at least eight genuine and pirated printings of 1719 are known—not only led to a new era in the fiction of adventure, but stimulated Defoe's genius to the utmost. The *Farther Adventures* of Crusoe immediately followed, his *Serious Reflections* in 1720, and for about five years, despite the fact that he founded new newspapers and wrote many pamphlets on the South Sea Bubble and other topics, Defoe supplied readers with a mass of fiction extraordinary for quantity and for realistic power. The *Life* of the deaf-and-dumb fortune teller Duncan Campbell (1720), *Memoirs of a Cavalier* (1720), *Captain Singleton* (1720), *Moll Flanders* (1722), *Due Preparations for the Plague* (1722), the better-known and masterly *Journal of the Plague Year* (1722), *Colonel Jack* (1722), *The Fortunate Mistress* ("Roxana," 1724)—these abbreviated titles and their dates constitute a remarkable record. The fiction also includes *A New Voyage Round the World* (1724), and Defoe later had at least a share in such books as *The Four Years' Voyages of Capt. George Roberts* (1726), *Memoirs* of Capt. George Carleton (1728), and *Madagascar; or Robert Drury's Journal* (1729). He was writing, with a slight intermission, almost to the day of his death, in London, April 26, 1731, and, remarkable to relate, when his vein of fiction began to dry up, he developed, although nearing 70, new resources as a miscellaneous writer. He wrote numerous lives of criminals—Jack Sheppard, Jonathan Wild, etc.—manuals of conduct and instruction, such as *Religious Courtship* and the equally popular and more interesting *Complete English Tradesman* (1725–27), contributions to topography, economics, and sociology, such as his valuable *Tour Thro' the Whole Island of Great Britain* (3 vols., 1724–27), *A Plan of the English Commerce* (1728), *Augusta Triumphans* (1728), and, last but not least, a series of works on occult subjects, the often reprinted *Political History of the Devil* (1726), *A System of Magic* (1726), etc. He may fairly be designated "The Old Man Marvelous," and there is the evidence of lawsuits and letters to show that he was still trying to make his fortune by manufacturing bricks, and that he was canny in negotiations with regard to the marriage portion of one of his daughters. There is also proof that he was philanthropical and that he had lived down much of his bad reputation as a bankrupt and a political turncoat and hireling. The notion of the early biographers that, after leaving unfinished in the autumn of 1729 his *Compleat English Gentleman* (first published, 1890), he went into a state of mental decline, can be shown, through unimpeachable proof of his literary activity at the time, to be almost without foundation. In the last year of his life (1730) he was apparently connected in an important capacity with that well-known periodical, *The Political State*, founded by Abel Boyer. Much in his varied career and puzzling character remains obscure, but it is becoming clear that in versatility and copiousness of genius, though not in quality, he has very few rivals. In fiction no one has surpassed him in the use of minute details in order to produce the effect of lifelikeness, and he is a master of the homely vernacular.

As most of Defoe's writing was anonymous, no complete list of his works is obtainable. The latest (W. P. Trent, 1912) includes more than 375 titles; the addition of plausible attributions would swell it to 500. No edition contains a twentieth part of the ascertained writings. The fullest is that printed at Oxford in 20 vols. (1840–41); the best for the fiction is G. A. Aitken's in 16 vols. (1895–96). The chief biographers are Walter Wilson (3 vols., London, 1830), William Lee (3 vols.—two of newly discovered writings—London, 1869), William Minto (London, 1879, *English Men of Letters*), and Thomas Wright (London, 1894). The latest research is represented in vol. ix, chap. i of *The Cambridge History of English Literature*, contributed by Professor Trent.

DEFORCE'MENT (OF., from *deforcer*, from ML. *difforcaire*, to deprive by force). In English law, an ouster or deprivation of the freehold (q.v.). In the more general sense, in which the term is often employed, it includes any means by which the rightful owner of the freehold estate is put or kept out of possession, such as the wrongs of abatement, intrusion, disseisin, or discontinuance. But in its strict sense it is only a detainer of the freehold from him that has the right of property, but never had any possession under that right. The party thus wrongfully retaining possession was called the *deforciant* and was deemed to have an apparent right of possession. There was this difference between a party retaining possession of the freehold by means of deforcement and one who occupied by any of the other modes of ouster, that in the former case the party ousted had no right of entry (q.v.). This, previous to the reign of William IV, was a matter of some importance, inasmuch as the claimant was thereby debarred from recovering possession by means of entry or ejectment, and was driven to the more tedious process of asserting his right by a real action (q.v.). But by 3 and 4 Wm. IV, c. 27, all real actions, except four, having been abolished, this distinction between deforcement and the other means of ouster has ceased to have any practical importance. See DISSEISIN; SEISIN.

DEFOR'EST, JOHN WILLIAM (1826–1906). An American author and soldier, born at Humphreysville (now Seymour), Conn. He was educated in Europe and spent some years in the Levant. Before the Civil War he wrote *Oriental Acquaintance* (1856); *European Acquaintance* (1858); and *Seacliff* (1859), a novel. He served throughout the Civil War and emerged with the brevet of major. After the

war he took up the life of a voluminous writer and frequent traveler. Between 1870 and 1880 he published no fewer than nine novels, among them: *The Wetherell Affair* (1873); *Honest John Vane* (1875); *Justine's Lovers* (1878). He wrote also *The DeForests of Avesnes and of New Netherlands* (1900) and *Poems: Medley and Palestrina* (1902).

DE FOREST, Lee (1873–). An American inventor, born at Council Bluffs, Iowa. He graduated at Sheffield Scientific School (Yale) in 1896 and spent three years in postgraduate work at Yale. He became known as one of the pioneers in the development of wireless telegraphy in the United States. In 1902–06 he was vice president of the American De Forest Wireless Telegraph Company (now the United Wireless Telegraph Company), and in 1907 he became vice president of the Radio Telephone Company and also of the De Forest Radio Telephone Company. In 1904 he was awarded a gold medal at the St. Louis Exposition for his achievements in wireless telegraphy.

DE FOREST, Robert Weeks (1848–). An American lawyer and publicist. He was born in New York City and was educated at Yale (A.B., 1870), Columbia (LL.B., 1872), and Bonn. When first admitted to the bar, he joined his father and uncle; later the firm included his brother and sons. After 1874 he was general counsel, and after 1902 vice president, of the Central Railroad of New Jersey, and he came to hold offices or directorships in a number of other corporations. Actively identifying himself with a variety of public interests, he served as president of the Charity Organization Society (New York City) after 1888; trustee after 1889, and president beginning in 1913, of the Metropolitan Museum of Art; president of the Municipal Art Commission (1905); chairman of the State Tenement House Commission (1900), and New York City's first tenement house commissioner; president of the National Conference of Charities and Correction (1903); vice president of the American Red Cross, and vice president of the Russell Sage Foundation. From 1905 to 1912 he was a vice president of the American Academy of Political and Social Science.

DEFORMED' TRANSFORMED', The. A drama by Lord Byron (1824), based partly on an old story, *The Three Brothers*, and partly on Goethe's *Faust*.

DEFORM'ITIES (Lat. *deformitas*, ugliness, deformity, from *de*, away, off + *forma*, form, shape). Varieties of form which mar the external appearance. Deformities may be divided into congenital and acquired, according as they occur before or after birth. The former class were considered by the ancients to carry some important meaning in their mysterious shapes and to show the anger of the gods; hence they termed them monsters, from *monstrare*, to show; and even in later times they were popularly believed to be the result of the most hideously unnatural combinations. Modern scientific writers have, however, made them a subject of special study under the name "teratology" (Gk. *τέρας, teras*, monster, and *λόγος, logos*, science), and their researches have shown that deformities generally depend on some arrest of development of the fœtus, or some accidental position it has assumed, or some inflammatory disease which has caused unnatural adhesion of parts. It has been found that in Paris one monster occurs in about 3000 births. Deformities are more common among domestic than wild animals, among mammalia than birds, and are very rare among fishes and the invertebrata.

It is a common belief that the mind of the mother has an influence over the shape of her infant; but although some singular coincidences have occurred, there is no scientific proof that such is really the case. Yet the theory was universally adhered to in the Middle Ages; it was, in fact, often appealed to in the interest of mercy, as a loophole of escape for pregnant women who, by the barbarous ignorance of the time, might be condemned to torture. Even at the present day no scientific demonstration to the contrary has proved sufficient to undermine the absurd belief. That deformities are in many cases hereditary may be seen in the instances of additional fingers and toes and of harelips. It seems uncertain whether the male or female parent chiefly influences the occurrence of deformity in the offspring. Cases are reported of a family of three with harelips whose father alone is similarly deformed; and another family of three with perfectly formed mouths whose mother has an uncorrected and extremely unsightly harelip. The chief congenital deformities may be classed under the following heads: 1. *Deformity as regards the number of parts.*—The Sirens, for instance, have apparently but a single inferior extremity, which tapers to a point, and the Cyclopes have but one eye. In some cases the head itself or some organ, as the brain, may be absent. Such deformities, from a deficiency of part, may also result from amputation of portions of the limbs of the fœtus, when still within the uterus, by the pressure of the umbilical cord. Curiously enough, however, it often happens that this intrauterine amputation of parts leads indirectly to an exactly opposite condition, viz., a multiplication of parts arising from the stumps left by these uterine amputations, the fœtus in the early stages of its growth appearing to possess something of the power of reproduction of parts observed in many of the lower orders of animals. The parts most commonly reproduced are fingers and toes or, most commonly of all, only abortive portions of these, as little projections from the stump of the limb, with traces of nail, and sometimes a single joint with an imperfect bony development. We see a new growth of little fingers or toes according to the member lost, and this power shows itself sometimes without being preceded by such an injury, in additional fingers, toes, etc. These parts are generally close to the similar natural ones, but not always, as, e.g., an ear in the neck. 2. *Deformity with regard to size or volume.*—This may involve the whole body, as in dwarfs, of whom there have been some remarkable peripatetic specimens: the Corsican fairy was only 2 feet 7½ inches high; Mademoiselle Crachami, the smallest child that ever lived, died at 10 years of age, only 20 inches in height. This kind of deformity is not necessarily hereditary; the father of Borowlaski, who was only 39 inches when 30 years old, had six children alternately short and tall, and dwarf women have brought forth infants as long, when extended, as their mothers. In some cases one limb only is diminutive. Of course, deformities the opposite of these exist, such as giants, or instances

of premature or excessive local growth. O'Byrne, the Irish giant, measured 8 feet 4 inches when he died at the age of 22. Such individuals are generally subject to premature decay. 3. *Deformity as regards shape.*—This results generally from retarded growth, the parts of the embryo not consolidating as growth advances, as in harelip, or from irregular muscular contractions, as in clubfoot (q.v.); or by two or more parts coalescing, as two fingers; or in cyclopy, when both eyes run into one. 4. *Deformities of color* are frequently coexistent with a tendency to, or the presence of, some disease. There may be a deficiency of coloring matter, as in albinos; or an apparent increase, as in cyanosis (q.v.), or "blue disease," arising from the partition between the right and left sides of the heart not being completed; or from pigment abnormally placed in the body, as in the mottled individuals shown in the side shows of circuses. 5. *Deformities of continuity* occur from the lateral halves of the embryo not completely closing, as seen in clefts of the back, the palate, etc. Acquired deformities will be noticed under their special names. Consult Hirsh and Piersol, *Human Monstrosities* (Philadelphia, 1892).

DEFREGGER, dā'frĕg-ĕr, FRANZ VON (1835–1921). An Austrian genre and historical painter, widely popular through his delineations of Tyrolese everyday life and of many stirring episodes in the history of his native land. He was born at Stronach, Tirol, April 30, 1835, the son of a peasant, and showed early a talent for drawing and wood carving, which he practiced untutored while tending his father's cattle. His career began late, for he lacked instruction till, in 1860, he went to Innsbruck to study sculpture under Michael Stolz, who, discovering his greater talent for painting, sent him to Munich, where he studied at the Academy under Anschütz. After 18 months spent in Paris (1863–64), with little if any benefit to his art, he returned to Munich in 1866, and in the spring following became the pupil of Piloty, to whose influence he is indebted for his technique. He now also found the sphere in which he was soon to score success after success, such subjects as "Joseph Speckbacher and his Son" (1869, Ferdinandeum, Innsbruck), a patriotic scene of soulful conception, and "Wrestling Match in Tirol" (1870), a spirited representation of this popular sport of his countrymen, being received with great favor, and most of his subsequent efforts finding their way into the principal galleries of Germany. The most noteworthy among these are: "The Last Summons" (1874, Vienna Museum), a stirring episode from the rising of the Tyrolese in 1809; "Return of the Tyrolese Riflemen in 1809" (1876, National Gallery, Berlin); "Andreas Hofer on his Way to Execution" (1878, Königsberg Museum); "Storming the Red Tower at Munich in 1705" (1881, Pinakothek, Munich). But he appears to even greater advantage in his village genre scenes, such as "The Prize Horse" (1872); "The Zither Player" (1876, Vienna Museum); the cleverly ironical "Fashionable Tyrolese" (1882, National Gallery, Berlin); "The Fortune Teller" (1891); "Before the Dance" (1892); and many others that have become widely known through reproductions. In technique they are less attractive, the color being thin and dry, the drawing lacking in naturalistic truth. Keen insight into character and quaint humor are the main features of his compositions. He passed most of his life in Munich, where he was appointed professor at the Academy in 1878 and was ennobled in 1883. A "Defregger Album," with text by Rosegger, was published in Vienna (2d ed. in 1889–92), and "Vom Land Tirol," a collection of pictures with text by Haushofer, in Munich, 1895. Consult Rosenberg, "Defregger," in Knackfuss, *Künstler Monographien* (Bielefeld, 1897 and 1900), and Meissner, *Franz von Defregger* (Berlin, 1900).

DEFTERDAR, dĕf'tĕr-där' (Turk. *defterdār*, from Pers. *daftar*, book + *dār*, keeping, holding). A title of the chief treasurer of a Turkish province, as formerly of the Turkish Minister of Finance, who has a seat in the divan (q.v.) and disburses the public money.

DE FU'NIAK SPRINGS. A city and the county seat of Walton Co., Fla., 79 miles east by north of Pensacola, on the Louisville and Nashville Railroad (Map: Florida, B 6). It is in an agricultural and fruit-growing region which produces cotton, rice, sugar cane, grapes, and peaches, manufactures turpentine, and has also important lumber, poultry, and stock-raising interests. It is the seat of a Presbyterian college, the Thomas Industrial School, and of the Florida Chautauqua Assembly. The water works and electric-light plant are owned by the city. Pop., 1900, 1661; 1910, 2017.

DE GAMBOA, P. S. See SARMIENTO DE GAMBOA.

DE GAR'MO, CHARLES (1849–). An American educator, born at Mukwonago, Wis., and educated at the State Normal University, Normal, Ill., and at Halle, Germany. He was professor of modern languages in the Illinois State Normal University (1886–90), professor of psychology at the University of Illinois (1890–91), president of Swarthmore College from 1891 to 1898, and thereafter professor of science and the art of education at Cornell University. He was elected president of the National Herbart Society in 1892 and is considered the leader of the Herbartian school in the United States. Among his published works are: *Herbart and the Herbartians* (1896); *Language Series* (1897); a translation of Lindner's *Manual of Empirical Psychology as an Inductive Science* (1889); *Essentials of Method* (1889, 1907); *Interest and Education* (1902); *Principles of Secondary Education* (1907–10); *Laboratory Exercises in the Art of Appreciation* (1907); *Æsthetic Education* (1913).

DEGAS, de-gäs', EDGAR HILAIRE GERMAIN (1834–1917). A French genre and portrait painter. He was born in Paris, July 19, 1834, and was a pupil of Lamothe in the Ecole des Beaux-Arts, but learned more from the old masters in the Louvre and in Italy. Though usually classed as an Impressionist, he is in reality an independent, his art having been subjected to several different influences and being, above all else, personal. He at first painted in the manner of Ingres, and was also a great admirer of Delacroix, less for that artist's coloring than for the noble action in his pictures. His softness and fluency of modeling resembled the modeling of Manet, and from the Japanese he learned his absolute freedom of composition, fantastic decoration, and peculiar emphasis. His first works were etchings, portraits, and historical paintings, but he soon turned to genre pictures of modern life. Among

the large variety of subjects which he treated, the best known are his "Race Horses" and numerous "Ballet Girls." The former are distinguished for their fine movement, while the latter were his favorite subject after the seventies. He scoured the slums of Paris in search of picturesque subjects, but still continued, however, to paint portraits, many of which are masterpieces. His color and brushwork are fine. His later work is almost entirely pastel. His composition is daring and original; he does not hesitate to bisect figures, his stage pictures often showing nothing but the heads of the orchestra and the legs of the dancers. Nevertheless his work is very popular in America, where he paid a lengthy visit in 1873, as well as in France. The Luxembourg acquired, as a legacy from the painter Caillebotte, a number of his paintings, including the celebrated "Dancer on the Stage." Degas's pictures now command enormous prices. At the sale of the Rouart collection in 1912 his "Danseuses à la barre" was sold for 435,000 francs, the highest price ever paid in France for the work of a living master. Although Mary Cassatt was his only actual pupil, his influence on the younger generation has been very strong. For his life and works, consult: Liebermann (Berlin, 1899); Moore, in the *Magazine of Art* (London, 1900); Grappe, in *Kunst der Gegenwart* (Berlin, 1908); Lemoisné, in *L'Art de notre temps* (Paris, 1912); Meier-Graefe (Berlin, 1913).

DE GASPÉ, *de gâs'pā'*, Philippe Aubert (1786–1871). A Canadian author. He was born in Quebec, was educated at the Seminary of that city, studied law, and was admitted to the bar. He became sheriff of Quebec, but fell into debt, for which he was for four years in prison. After his release he went to live on his inherited seignorial lands at Saint-Jean-Port-Joli. In advanced years he wrote *Les anciens canadiens* (1862), a series of historical pictures (in the form of fiction) of the life and manners of the old régime in the Province of Quebec. His *Mémoires* (1866) narrate his personal recollections of contemporary persons and events with rare fidelity, skill, and discretion. See Canadian Literature.

DEGEER, *de-gār'*, Karl Baron (1720–78). A Swedish entomologist, born at Farspang. He was marshal of the household to the Swedish King and was chosen member of the Academy of Sciences at Stockholm. He is known as the author of a great work on the history of insects, entitled *Mémoires pour servir à l'histoire des insectes* (7 vols., 1752–78).

DE GEER AF FINSPÅNG, *fēn'spång*. See Geer af Finspång, Louis Gerhard, Baron de.

DEGEN'ERACY (from *degenerate*, Lat. *degeneratus*, p.p. of *degenerare*, to degenerate, from *de*, down + *genus*, race). The definition given in 1857 by Morel is: "The clearest notion we can form of degeneracy is to regard it as a morbid deviation from an original type. This deviation, even if at the outset it was ever so slight, contained transmissible elements of such a nature that any one having in himself the germs becomes more and more incapable of fulfilling his functions in the world, and mental progress, already checked in his own person, finds itself menaced in his descendants." Morel uses the term to denote the congenital defectives, mental and physical. Degeneracy manifests itself in almost innumerable forms, among which are deformed skulls, paralysis of members, atrophy of various organs, epilepsy, feeble-mindedness, idiocy. Anatomically speaking, the causes of these are certain lesions of the cerebrospinal axis.

The word "normal" should be understood as having a relative significance. The man is normal who is best adapted to his environment. The normal savage would soon find his way to the almshouse if suddenly transported to civilized life. In primitive life great variations from the normal are soon weeded out by the ruthless action of natural laws. The feeble-minded soon perish without opportunity of propagating their kind. In advanced society, with its higher regard for life, the defective has a chance to live and, if society is sufficiently careless, an opportunity to reproduce. Thus the Jukes, a notorious New York family, might have attracted no attention in a hunting society, but, living in New York in the nineteenth century, they cost the taxpayers millions of dollars besides the indirect harm of their presence and influence of their example. The individual loses power of adapting himself to changed conditions and sinks lower and lower. The question of degeneracy thus becomes of vital importance to society.

Certain forms of degeneracy are relatively of less social importance, as, e.g., minor physical defects, or those monomanias that find expression in strange beliefs, grotesque obsessions, great anguish concerning impossible conditions. Indeed, great deviations from the normal may be accompanied by unusual power in some line, as, e.g., the musical gifts of "Blind Tom." But these may vary, from such incoördinated motor reactions as persistent movements of limbs or face to kleptomania, impulsion to suicide, and homicide. Here the public welfare is again at stake.

The greater degrees of degeneracy are represented by the idiot who merely vegetates. The higher centres are inoperative, the individual totally irresponsible. Among those whose mental functions are in evidence there are still certain physical stigmata. "The cunning look" of the criminal is proverbial. Lombroso and his followers have sought to classify criminals on this basis. The attempt has not wholly succeeded, but Z. R. Brockway, long superintendent of the Elmira Reformatory, has lately stated his growing conviction that criminals are not normal men physically. Society must in some way discover the line between the normal and responsible and the degenerate and irresponsible. It has become clear that there are born criminals, moral imbeciles. There is a difference between the erotic and the immoral man, the kleptomaniac and the thief, the homicide and the assassin. Not until these facts are understood will there be a scientific treatment of the individual who errs.

It is a great misfortune that a man should be born deaf, epileptic, or feeble-minded. It is something more than a misfortune if he is allowed to grow up and transmit his defects. When it is found that children of deaf parents are likely to be deaf, those of the epileptic to have epilepsy, and the offspring of the feeble-minded to resemble their parents, society must call a halt. Without any greater knowledge of the field than we now have, it is plain that this is the first step to take.

The immediate cause of degeneracy may be

either individual or social, though the final causes are often beyond our ken. In present society sexual immorality is a fruitful source of degeneracy. All attempts to regulate it have been futile. Of the effect of this vice there has been far too little study. In the best study extant, "The Jukes," Dugdale says: "Fornication, either consanguineous or not, is the backbone of their habits, flanked on the one side by pauperism, on the other by crime. The secondary features are prostitution with its complement, bastardy, and its resultant, neglected and miseducated childhood; exhaustion with its complement, intemperance, and its resultant, unbalanced minds; and disease with its complement, extinction." Another great cause is intemperance, though the extent of this is often overstated. "It is at once an effect and cause, a symptom and a source of degeneration." Laziness with its complement, idleness, is likewise a potent factor. Among social causes are enforced idleness, accident with its resultant loss of employment, dangerous employments, unhealthful housing conditions, producing weakness tending to dissipation and vice. These causes are perceptible,, can be got at, and to a large measure be destroyed. The attempts of Nordau and others to class the genius with the degenerate have not succeeded. See DEGENERATION AS A FACTOR IN EVOLUTION; EUGENICS.

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DEGEN'ERA'TION (Fr. *dégénération*, from Lat. *degenerare*, to depart from one's race, to degenerate, from *de*, away + *genus*, stock, race, family). In pathology, a term applied to certain tissue changes of a retrogressive character, which are associated with various conditions resulting from age, malnutrition, infectious diseases, poisons, etc. The degenerative process may assume several forms, which have been named from their special characteristics. Parenchymatous degeneration, or albuminous degeneration, is the type which most often accompanies the infectious diseases. While any of the cells of the body may be affected, those of the liver, kidney, and the epithelial cells of the mucous membranes suffer most frequently; the cells become swollen, more granular than normal, and may go on to disintegration. Fatty degeneration is the term used to designate a process by which the protoplasm of the cells of various organs is converted into fat droplets. Under certain conditions tissues, especially those in the walls of blood vessels, are converted into a homogeneous transparent substance; this form of degeneration is called either hyaline degeneration or amyloid degeneration, according to the microchemical reaction of the substance. Amyloid degeneration is also known as waxy or lardaceous degeneration. The term "mucoid degeneration" is used to designate a form affecting both cells and intercellular substance, and in which the protoplasm is transformed into a translucent substance containing mucin. A similar condition in which the new material is more dense and firm is known as colloid degeneration. Under certain conditions granules of lime cells are deposited in the tissues and may be so abundant as to make the tissue hard and brittle or even bony; the condition thus produced is known as calcareous degeneration, or infiltration.

DEGENERATION AS A FACTOR IN EVOLUTION. The progressive development of organic forms is from the beginning attended by the modification of organs or of the organism, through lack of nutrition or disuse, resulting in physical degeneracy. We see everywhere throughout the plant and animal kingdoms this process of degeneration, this loss or reduction of parts of organs or entire organs. This is proved by the occurrence of so many vestigil organs or structures in the higher or more specialized plants, and especially animals, as compared with the stem forms, i.e., the ancestral or generalized forms from which they have apparently descended.

Indeed, there can be no specialization of form and structure without a corresponding reduction of the less useful neighboring parts by partial or total atrophy. To illustrate: The foot of the horse, so wonderfully adapted to the animal's mode of life, consists of a single digit, the other four having disappeared, with the exception of the two splint bones, which are the relics of two digits. Morphology and paleontology declare in unmistakable terms that the ancestral form from which the horse family has descended was a generalized form provided with five functional toes on each foot. See HORSE; DISUSE.

In groups of animals with a metamorphosis there are exceptional forms in which development is direct, the stages of development being abbreviated or suppressed; the organism may then be said to take a "short cut" to attain a growth on a level with its allies, who have traveled the long road of development by metamorphosis.

The evolution of almost every type, as well as the process of development of the embryo of most organisms, particularly of the more specialized animals, is a process of development of one part at the expense of another, its hypertrophy, due to accelerated development, resulting from use or exercise and consequent increased nutrition; while adjoining parts, or less desirable or useful parts or organs, are allowed to remain stationary or lapse by atrophy. Adaptation seems not only to involve progressive evolution, but also degeneration. Thus there appears to be in the growth of the individual as well as in the development or evolution of the race or class, a competition or struggle for existence, at first between the cells and afterward between the different organs, especially those most concerned with the outer world or with competitive organic forms. The result is that the successful structures receive the most nourishment, while the less useful or favored languish and dwindle, becoming so many vestiges to tell the tale of defeat and death by atrophy.

This is exemplified in the case of such an animal as the lobster. In this animal and

throughout the class of Crustacea, of which it is a type, the wonderful diversity of form in the segments of which the body and limbs are composed, as well as the marvelous degree of specialization of body and limbs characterizing the thousands of species of the class, are due to the excess of development of one over adjoining parts. Thus the huge carapace or shield of the lobster is due to the excessive development of the upper or dorsal portion of two head segments, the corresponding parts or arches of 11 other segments of the cephalothorax having during the growth of the animal become completely lost or atrophied by the continuous pressure of the growing carapace.

The wonderful differences between the mouth parts of the caterpillar and the butterfly are due to the normal or, in some cases, excessive development of one pair of organs at the expense of others. Thus the mandibles of the caterpillar undergo atrophy in the changes of the chrysalis to the butterfly; the latter, taking no solid food, has entirely lost its mandibles, while the maxillæ forming the tongue are, by exercise in taking nectar, greatly developed, as in the butterfly and especially in the hawk moth.

So it is with man. As regards his brain and hands he is the most specialized of mammals, but as concerns his feet he is plantigrade, showing a tendency to loss of his little toe by atrophy, while already in the higher race he loses his wisdom teeth soon after they appear. Besides this he bears the vestiges of nearly 70 useless structures, among them the vermiform appendix, the most useless and positively dangerous of these relics pointing to his origin from some more generalized mammal.

The case is similar with the paddles of the ichthyosaurus, the plesiosaurus, and the whales. They are, at least in the last named, the result of modification by degeneration, resulting in adaptation to the medium inhabited. And so it is with the process of evolution of the birds, pterosaurs, and bats, and the modifications in the feet of the mole, and in the burrowing insects, climbing lizards, mammals, particularly the lemurs, and the thumbless monkeys.

There are four chief forms of degeneration: (1) degeneration during the growth of the individual, and the phylogeny of the race or class; (2) degeneration of the individual, more or less total; (3) social and institutional degeneration, often affecting whole peoples, due to slavery, and to mental, moral, and pathological causes; and (4) individual moral degeneration in the human races, resulting in the production of mental degenerates and criminals. It is worthy of observation that the occurrence of atrophy, of degeneracy in man, is nearly everywhere foreshadowed in the rest of the organic world, where it is a normal process, and the necessary complement of progressive evolution.

The death or elimination of the individual member which has become useless or out of harmony with its physical and social environment is also in the course of nature. When once lapsed by atrophy, an organ or part of an organ can never, as a rule, be restored; there are a few exceptions, e.g., that of the pigment of a blind *Proteus* subjected to light, and the organs of certain plants. The process of degeneration may at an early stage be arrested, but after a certain stage resumption of the original normal structure becomes impossible. Were it not so, evolution would be vastly less progressive than it has been, and the world would be crowded more densely than now with degenerates.

The immediate causes of degeneration are lack of nutrition, disuse, and change of habit and instincts, so that an organ or set of organs are thrown out of use. Atrophy, also, as stated by Demoor, may arise from lack of space, as seen in the reduction in the number of teeth in man compared with lemurs and platyrrhine monkeys, these having six grinding teeth, while man has but five, due to a reduction in the size of the jaw.

Not only do we observe sporadic cases of degeneration, but also species and genera, as well as families, are made up of forms in different stages of degeneration. All parasites, entire classes, as that of sponges, and two classes of worms, as the Trematoda and Cestoida, the crustacean class Cirripedia or barnacles, and the parasitic fish lice, as well as the parasitic isopods (Bopyridæ), and many insects owe their characteristics to degeneration, while the great order of Diptera are all highly modified by the atrophy of certain parts, their most obvious features being the reduction of the second pair of wings so as to form the "balancers." (See FLY.) The forerunners of the true vertebrates, the tunicates, afford a notable instance of the retrogressive development of an entire class.

Enough has been said to show how very general throughout the animal kingdom is modification by partial or total atrophy. The study of animals thus affected throws a flood of light on the factors and causes of progressive evolution.

In mankind degeneration on a wholesale scale is observed in the effects of slavery and of the slave trade in Africa, where it has been carried on for centuries, and on the master races. The result is that the white race is in a degree pulled down or deteriorated. A parallel is observable in ant societies, where the service rendered by the enslaved tends to disuse and atrophy in the masters.

In the social evolution of man the joint work of Demoor, Massart, and Vanderville gives a multitude of facts proving that, as among organisms in general, so in human societies, evolution is at once progressive and retrogressive. Existing social forms have during the process of change and modification lost some parts of their structure, and this process of degeneration cannot be regarded as a return to the primitive condition of man. Thus, (1) an institution which has once disappeared in the course of human development never reappears; also, (2) an institution once reduced to the condition of a vestige cannot be reëstablished and resume its former functions; (3) neither can it assume fresh functions. While in the organisms below man degenerative evolution is brought about by a limitation of nutriment, in sociology the cause is a limitation in capital or labor. An institution which has ceased to be functional or useful may survive. These survivals exist here and there, and, as Houzeau has said, "it is to be expected that living and superior civilizations drag behind them a trail of débris from dead civilizations." All this has the most significant bearing on human degeneracy and the study of criminology, especially as to the existence of those pathological, mental, and moral degenerates that appear to live only to afflict struggling humanity.

There are degenerate races, as the Australians, a probable branch of the Dravidian stock of India; the Gypsies, a broken down low-caste Indian people; the Fuegians, a tribe segregated from the American Indian race. There are also scattered through the most highly developed civilizations physical, mental, and moral degenerates, of which families like that of the James brothers of Missouri, the Jukes of the State of New York, or assassins like Booth, Guiteau, and certain Nihilists are examples.

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DEGER, dā'gĕr, ERNST (1809–85). A German religious painter. He was born at Bockenem, near Hildesheim; studied first at the Berlin Academy under Wach, and then under Schadow at Düsseldorf. Deger was the leader of the Düsseldorf religious painters, who imitated the so-called Nazarenes (see PRE-RAPHAELITES). He showed more true feeling for beauty and color and less affectation than the contemporaries of his school. In 1837 Count Fürstenberg intrusted him with the decoration of the newly built church of St. Apollinaris, near Remagen on the Rhine, of which he painted the frescoes in the choir, considered the greatest achievement of the Düsseldorf school in that field. They include the "Crucifixion," the colossal figure of the Redeemer, with the Madonna and John the Baptist on either side, and scenes from the life of Christ. Deger was next commissioned by King Frederick William IV to decorate the chapel in the castle of Stolzenfels, near Coblenz, where he painted 12 frescoes, representing the fall of man and the redemption. After 1869 he was professor at the Düsseldorf Academy. His last important work was "The Resurrection," in the Maximilianeum, Munich.

DEGÉRANDO, de-zhâ'rän'dô', JOSEPH MARIE, BARON (1772–1842). A French philosopher, born in Lyons. In 1797 he went to Paris, whence after the 18th Fructidor he fled to Germany. After his return he was Secretary General in the Ministry of the Interior in 1804, and a Councilor of State in 1811. His *De la génération des connaissances humaines* (1802) was crowned by the Academy of Berlin, and his *Histoire comparée des systèmes de philosophie* (2 vols., 1806–07) remains one of the most important of French works on the subject. His *De la bienfaisance publique* (4 vols., 1839) should also be mentioned as among the most elaborate treatises on poor relief.

DEG'GENDORF. A town of Lower Bavaria, Germany, situated on the Danube, 30 miles northwest of Passau (Map: Germany, E 4). It is a manufacturing town with woolen mills, breweries, tanneries, and corn mills, and is a busy corn and cattle market. Its chief points of interest are the church of the Holy Sepulchre, built 1337, a pilgrim resort, the scene of reputed miraculous cures, and a Gothic rathhaus built in 1535. Pop., 1900, 6843; 1910, 7478.

DE GOEJE, dâ gōō'ye, MICHAEL JAN (1836–1909). A Dutch Arabist. He was born at Dronryp, Friesland, and was a pupil of the distinguished Arabic scholar Dozy at the University of Leyden (1854–60). In 1866 he was appointed to the professorship of Arabic at the University of Leyden, and from 1862 to 1878 was prominently engaged as an inspector of schools and promoter of education in Holland. He was editor of a new edition of *Tabari*, and continued the catalogue of Oriental manuscripts begun by Reinhart Dozy. De Goeje was generally regarded as the greatest Arabic scholar of his generation in the western world. Among his numerous publications are the following: *Jakubi*, a description of Africa and Spain; *Beladhori*, a history of the conquest of Syria; the geographical works of Istakhri, Ibn Haukal, Mokaddasi, Ibn al-Fakih, Ibn Khordadbeh, Ibn Rosteh, and al-Masudi (in the *Bibliotheca Geographorum Arabicorum*, 1870–94); the *Divan* of the poet Moslem Ibn al-Walid; *Biographie de Reinhart Dozy* (trans. by Chauvin, 1883); "A Contribution to the History of the Gypsies," in proceedings of *Koninklijke Akademie van Wetenschappen*, Eng. trans. by Snyders (London, 1886). Consult Untersweg, *Michael Jan de Goeje* (Graz, 1909), and Snouck Hurgronje, *Levensbericht van Michael Jan de Goeje* (Amsterdam, 1910).

DÉGRAS, dâ grâ'. A wool grease obtained in the process of oil tanning of skins and hides and also from the waters used in wool scouring. See LEATHER.

DE GRASSE, de grâs', COUNT. See GRASSE, COUNT DE.

DEGREE' (in mathematics). See ANGLE; CIRCLE.

DEGREE. An academic rank or title, originating in the mediæval universities. Scholastic distinctions of an analogous nature seem to have existed in ancient times. The ancient Greek doctors or teachers of the law (*nomodidaskaloi*) and the scribes of the Jews were products of an organized educational scheme and possessed privileges similar to those conferred by the degree of a teaching doctor in the Middle Ages. In the latter part of the classical Greek period education was well organized into inferior and superior courses, and there evidently existed some recognized proof that such courses had been completed. Greek educational institutions and practices were imitated by the Romans, and Constantinople, Alexandria, and Rome vied with Athens in the support of schools offering elaborate and definite courses of study, the completion of which carried certain distinctions comparable to the modern degree. Historically, however, there is no connection between them. The degree as a university distinction originated at Bologna and Paris during the twelfth century, and, as the titles "master" and "doctor" imply, signified at first nothing more than a license to teach. Thus, at the University of Paris in its earliest days, the instructors taught by virtue of a *licentia docendi* issued by the chancellor of the cathedral on the Ile de la Cité. This gave them the right to the title of master, the advance from their previous academic rank of bachelor being symbolized by the ceremony of placing the *biretta*, or cap of office, upon their heads by their former instructors.

Of the different university degrees, that of master came first in point of time, being conferred in the twelfth century by the various faculties of the universities in both France and

Italy. The title "doctor," as an honorary distinction, is not infrequent at this time, usually coupled with some qualifying word: e.g., Thomas Aquinas, Doctor Angelicus. For some time, however, the titles of master, doctor, and professor were used indiscriminately. In the fifteenth century the doctor's degree had quite generally replaced the master's in the faculties of law, medicine, and theology, while the master's degree still held its own in the faculty of arts. In the fourteenth century, when many universities began to be founded by virtue of special *privilegia* granted by pope or emperor, the right to bestow the doctor's degree was often specifically granted and in some cases was withheld. Usually, however, the founding of a university implied the right to confer degrees. Both the Pope and the Emperor had the power to confer the honorary title of doctor, or to delegate this power to others, and the doctors thus created were known as *doctores bullati*, in distinction from the *doctores rite promoti*, those who had successfully undergone the test of the disputation. A candidate for a degree was required to prepare and read a Latin thesis, which he had to defend against a doctor of the faculty, three opponents specially appointed, and, as the phrase ran, "against all comers." Disputations, which formed one of the most brilliant and picturesque features of mediæval university life, continued down to a comparatively late period. In England they were not wholly done away with until 1860. The degree of bachelor was first brought into use in the thirteenth century, at the University of Paris and elsewhere, to designate students who had passed certain preliminary tests. In the faculty of arts, where the term of study was shortest, it was of comparatively little importance. In Paris, in the fifteenth century, the required period was four years in the faculty of arts, seven years in law, eight in medicine, and 14 in theology; and in these longer courses the preliminary degree conferred certain valuable privileges. The later history of degrees varies somewhat in different countries. Thus, in Germany the doctorate is practically the only degree conferred by universities and has been extended to other faculties than philosophy, which is the most common. In France the *baccalauréat* in letters and science is not a degree conferred by the university in the technical sense, but is obtained on completing a course corresponding largely to that of secondary schools elsewhere. In Scotland the first university degree is the M.A., the ancient tradition thus being retained. In the English universities the three degrees—bachelor, master, and doctor —are found. The doctor's degree is, however, not frequently obtained in course, the majority of those holding it being in the field of medicine, science, music, or theology.

Degrees in the United States. At the present time there is a regrettable lack of uniformity throughout the whole system of degrees granted by institutions of learning in the United States. Institutions claiming the right to confer university degrees have multiplied so rapidly within recent years, and there is frequently so wide a disparity in their standards, that the value of a degree is a highly variable quantity. To some extent, however, there is a tendency towards uniformity of standards, a movement fostered by numerous college and university associations and by such bodies as the Carnegie Foundation (q.v.). In general, it may be said that the lowest, or bachelor's degree, stands for four years of college work; that the second, or master's degree, is granted after not less than one year of specialized study in a graduate department; and that the doctor's degree is bestowed after two or three years of specialized study and the preparation of a thesis upon some subject approved by the faculty. Even among the older universities and those of the highest standards there is considerable divergence in the significance of the several degrees. That of A.B., for instance, no longer stands, as it once did, for a definite amount of Latin and Greek and mathematics. The steady growth of the elective system and the tendency to substitute modern languages for the classics have forced upon the universities the alternative of either changing the requirements for the degree or else conferring a different degree in place of it. Latin and Greek are still required subjects for the A.B. degree at Ohio University, University of Vermont, Princeton, Rochester, Syracuse, Amherst, Franklin and Marshall, and Lafayette, while Latin is still required in many of the Southern colleges and universities, and Western Reserve, Mount Holyoke, Bates, Williams, Pennsylvania, and a few others. The tendency is more and more to extend the elective system, to recognize the value of new subjects, and, if any subject is to be prescribed, to select English. Most American colleges offer several parallel courses, leading to the degrees of A.B., B.L., B.P., and B.S.; and in these institutions there are usually corresponding master's degrees— M.A., M.Lit., M.Ph., and M.S. In the faculties of medicine, law, and theology there is not the variety of degrees found in the faculties of philosophy and science. The medical schools regularly grant the doctor's degree alone; while the divinity and law schools usually give only the bachelor's degree. The higher legal degrees, however, are granted by just a few law schools, such as Yale, which confers the degrees of LL.M. and D.C.L. as the result of certain required studies, and the University of Chicago, which already confers the degree of J.D. The indiscriminate and ill-advised bestowal of honorary degrees is another cause that contributes to lessen the value of American degrees. Not only those degrees which are properly honorary, such as the D.D. and LL.D., are often bestowed by smaller colleges upon insufficient grounds, but other degrees which should regularly be won only by a definite course of study are conferred as honorary degrees, such as the Ph.D., the M.A., and even the bachelor's degree. Recently, however, a reaction has set in, and steps are being taken to check the granting of degrees out of course excepting such as are generally recognized as honorary degrees. See BACHELOR'S DEGREE; DOCTOR; DOCTORS OF THE CHURCH; ELECTIVE STUDIES; MASTERS OF ARTS; UNIVERSITY.

LIST OF THE MORE USUAL DEGREES

A.A., Associate of Arts.
A.B. or B.A., Bachelor of Arts.
A.M. or M.A. (*Artium Magister*), Master of Arts.
B.C.L., Bachelor of Civil Law.
B.D., Bachelor of Divinity.
B.L. or Litt.B., Bachelor of Letters.
B.LL. or LL.B. (*Legum Baccalaureus*), Bachelor of Laws.
B.P., B.Ph., or Ph.B., Bachelor of Philosophy.
B.S. or B.Sc., Bachelor of Science.
C.E., Civil Engineer.
C.M. (*Chirurgiæ Magister*), Master in Surgery.
D.C.L., Doctor of Civil Law.
D.D., Doctor of Divinity.
D.Litt. or Litt.D., Doctor of Literature.
D.M., Doctor of Medicine (Oxford).

D.M.D. (*Dentariæ Medicinæ Doctor*), Doctor of Medical Dentistry.
D.V.M., Doctor of Veterinary Medicine.
D.S. or D.Sc., Doctor of Science.
E.E., Electrical Engineer.
J.D. (*Juris Doctor*), Doctor of Law.
J.U.D. (*Juris Utriusque Doctor*), Doctor of Civil and Canon Law.
L.H.D., Doctor of Letters, or Humanities.
LL.B. (*Legum Baccalaureus*), Bachelor of Laws.
LL.D. (*Legum Doctor*), Doctor of Laws.
LL.M. or M.L. (*Legum Magister*), Master of Laws.
M.B. (*Medicinæ Baccalaureus*), Bachelor of Medicine.
M.C.E., Master of Civil Engineering.
M.D. (*Medicinæ Doctor*), Doctor of Medicine.
M.M.E., Master of Mining Engineering.
Mus.B., Bachelor of Music.
Mus.D., Doctor of Music.
Ph.D. (*Philosophiæ Doctor*), Doctor of Philosophy.
Ph.G., Graduate in Pharmacy.
V.S., Veterinary Surgeon.

The origin of a special costume to designate members and graduates of universities is obscure and probably was not in the first instance at all formal or conscious, but a mere adaptation of monastic costume. In the days when it was first used long and flowing robes were commonly worn by all classes of people; the university, like the Church, only preserved a tradition which died out in the world. The advantages of a distinctive costume were probably recognized at an early date. Two of the most obvious are the equalization of rich and poor under a simple uniform gown, and the provision of a means of identifying students. This latter view probably counts for something in the rule still in force at Oxford and Cambridge, which forbids undergraduates to appear in the streets without academic costume in the morning or evening. Gowns were at first all black, but distinctions of social rank were later expressed by them, and the sons of noblemen in England were permitted in the thirteenth century to wear gowns of any color. A skullcap was allowed to ecclesiastics to protect the tonsured head, and, except the hood, this is the only headdress recognized by early university statutes. This *pileus* soon assumed a pointed shape, and in this form was recognized as one of the insignia of the doctorate. The central point developed afterward into the modern tassel. Bachelors wore no official headdress. The hood, which was worn by undergraduates until the sixteenth century, was originally attached to the gown, like the cowl of the monastic habit. Later it became a separate article of dress, which by its shape or color denoted the academic rank of the wearer. The English and Scottish universities have long maintained a definite system of hoods, which differ in each institution. Thus the bachelor's hood in Oxford and Cambridge is trimmed with white fur: the M.A. hood of Oxford is lined with crimson, and at Cambridge with white silk; the Oxford D.D. is of scarlet cloth lined with black, the Cambridge of scarlet lined with pink; the Oxford D.C.L. of scarlet cloth lined with crimson silk, the Cambridge LL.D. with pink silk. Clergymen who are literates—i.e., ordained without an academic degree—are allowed to wear a hood or tippet of plain black silk over their surplices. Gowns are not worn by undergraduates in the German universities—in fact, they are practically appropriated to the rector and deans of faculties and by them worn only on the most solemn occasions.

The wearing of cap and gown in America was comparatively rare until the last quarter of the nineteenth century. A movement towards a general adoption of a uniform system resulted in the calling of an intercollegiate commission, which met in 1894 at Columbia College, under the chairmanship of President Low, Yale, Princeton, and New York University being also represented. Their report, made a year later, was adopted by many colleges, as offering a simple, adaptable, and intelligible system. It provides for three types of gowns and of hoods —for bachelors, masters, and doctors. The bachelor's gown has long pointed sleeves; the master's a long closed sleeve, square at the end, falling below the knee; the doctor's resembles the familiar pulpit or judge's gown, with full, round, open sleeves, and is faced with velvet, of which it also bears three bars on the sleeves. The two latter are of silk, the bachelor's of worsted stuff. These distinctions in gowns follow closely the English usage; the system of hoods is a piece of original constructive legislation, there being three distinct forms for bachelor, master, and doctor, lined with silk of the official colors of the institution granting the degree, and trimmed with velvet of the color that represents the department of learning in which it is conferred. The following are the colors used for this purpose: arts and letters, white; theology, scarlet; laws, purple; philosophy, blue; science, gold yellow; fine arts, brown; medicine, green; music, pink; pharmacy, olive; dentistry, lilac; forestry, russet; veterinary science, gray; and library science, lemon. In connection with this system it is customary for those who hold degrees from German universities to line their hoods with the colors of the university granting them, upon which is laid a German tri-chevron of black, white, and red. Consult: H. Rashdall, *Universities of Europe in the Middle Ages* (Oxford, 1895); A. O. Norton, *Medieval Universities* (Cambridge, Mass., 1909); J. Wells, *The Oxford Degree Ceremony* (Oxford, 1906). See Colored Plate with article UNIVERSITY.

DEGREE OF LAT'ITUDE. The distance along a meridian (q.v.) through which an observer must pass to alter his latitude (q.v.) by 1°, i.e., in order to see a star in the meridian 1° nearer to or farther from the zenith. The length of a degree must be calculated from data found by actual measurements on the earth's surface; and, owing to the earth being an oblate spheroid and not a sphere, it varies with the place of observation, the degrees being longer towards the poles, where the earth is flatter, and shorter at the equator, where the earth is more curved. If the earth were a sphere, a degree would have a constant length. As it is, a degree at the equator contains 362,756.5 feet, while at lat. 40° it is increased to 364,283.7 feet. From a variety of observations conducted at various times and places, from as far back as the time of Eratosthenes (about 225 B.C.), tables have been constructed showing the length of degrees at different latitudes. The length of "the middle degree," as it is called, or that of places in lat. 45°, is 364,606.0 feet. The ascertained difference between degrees of latitude is one of the proofs of the earth's spheroidicity. See GEODESY.

DEGREE OF LON'GITUDE. The distance between two meridians of longitude that make an angle of 1° at the poles, measured on the arc of a circle parallel to the equator. It is clear that this distance is greatest at the equator and becomes zero at the poles; and it can be shown that it varies with the cosine of the latitude,

if the earth be regarded as a sphere. The annexed table shows the lengths of a degree of longitude for every tenth degree of latitude from 0° to 70° and takes account of the earth's divergence from a spherical form.

Latitude	Length of degree in feet	Latitude	Length of degree in feet
0°	365,228.6	40°	281,173.5
10°	359,716.7	50°	235,232.3
20°	343,338.5	60°	183,079.8
30°	316,565.3	70°	125,290.4

DEGREES, LAMBETH. By Act of Parliament in the twenty-fifth year of Henry VIII sundry powers formerly belonging to the Pope were conferred upon the Archbishop of Canterbury, among which was the right of granting all the degrees taken in the universities of Oxford and Cambridge, and to this day he occasionally grants them, *honoris causa.* They are known as Lambeth degrees, from Lambeth Palace, London, his official residence.

DE GROOT. See HOFSTEDE DE GROOT.

DE HAAS, *de* häs, MAURICE FREDERICK HENDRICK (1832–95). A Dutch marine painter. He was born in Rotterdam and studied at the Academy there and later under Louis Meyer at The Hague. In 1859 he emigrated to New York, where he soon gained a high reputation. He was one of the original members of the American Society of Painters in Water Colors, in 1866, and in 1867 became an academician. His best-known American picture is "Farragut Passing the Forts." Some of his other pictures are "Storm Off the Isle of Jersey," "After the Wreck," "White Island Lighthouse," and "The Rapids Above Niagara." His treatment is vigorous though formal, and his effects are often brilliant.—His brother, WILLIAM FREDERICK (1830–80), settled in New York in 1854 and also distinguished himself as a marine painter. He painted "Sunrise on the Susquehanna," "Fishing-Boats off Mount Desert," "Evening at Halifax," and "Narragansett Pier."

DEHIS'CENCE IN PLANTS. The opening of structures to discharge their contents; as, e.g., the opening of anthers to discharge pollen, the opening of spore cases to discharge spores, or the opening of fruits to discharge seeds.

DEHLI. See DELHI.

DEHMEL, dā'mel, RICHARD (1863–1920). A German poet, born in Wendisch-Hermsdorf, the son of a forester. He studied at the University of Berlin, where he edited student journals and took his doctor's degree in 1887 for a thesis on insurance. For the next eight years he was employed by the German Association of Fire Insurance Companies. He traveled in different parts of Europe in 1899–1902 and 1908. He wrote a novel, *Lebensblätter* (1895; 4th ed., 1909), some essays, *Betrachtungen* (3d ed., 1909), but his most distinctive work was in poetry, especially lyric, of the school of Liliencron. He has been styled a hedonistic Nietzschean. His writings were collected in a ten-volume edition (1906–09) and in a "popular" three-volume edition (1913); and a volume of selections appeared in 1905. The more important titles are: the symbolical *Erlösungen* (1891; 4th ed., 1906); *Aber die Liebe* (1893, 1896); *Der Mitmensch,* a drama (1895); *Weib und Welt* (1897; 4th ed., 1907); *Lucifer,* a pantomime (1899); *Fitzebutze,* a juvenile written with his wife, Paula (1900; 15th ed., 1901); *Zwei Menschen,* i.e., man and woman (1903; 10th ed., 1908), an epic, in form derived apparently from French *vers libre; Der Kindergarten* (3d ed., 1909) and, also juvenile *Der Buntscheck* (5th ed., 1906); the erotic *Verwandlungen der Venus* (3d ed., 1907); *Michel Michael* (1911), a comedy which has been styled an attempt at a German *Peer Gynt; Schöne, wilde Welt* (1913), new poems and proverbs. Consult chap. iii of O. E. Lessing's *Masters in Modern German Literature* (Dresden, 1912) and Kunze, "R. Dehmel," in *Westermanns Monatshefte,* December, 1913.

DEHN, dān, SIEGFRIED WILHELM (1799–1858). A German musical theorist, born at Altona. He became favorably known through his editions of the works of Orlando Lasso (*Seven Penitential Psalms,* 1838) and other early composers. He was custodian of the musical department of the Royal Library, Berlin, after 1842 and in 1849 was appointed professor. Among his numerous distinguished pupils in musical theory were Kiel, Glinka, Rubinstein, Cornelius and Theodor Kullak. His principal publication is the *Theoretisch-praktische Harmonielehre* (2d ed., 1858).

DEHODENCQ, dā'ō'dänk', EDME ALFRED ALEXIS (1822–82). A French genre, portrait, and historical painter, born in Paris. He studied at the Ecole des Beaux-Arts under Léon Cogniet and spent ten years in the East. His reputation rests principally upon his Spanish and Oriental pictures, and he is one of the most original of the group of French painters who treat such subjects. His pictures are notable for ethnographical accuracy, vivacity, and glowing color. In this genre are: "A Bull Fight in Spain" (1850, Pau Museum); "Gypsies on the Road" (1853); "A Jewish Fête at Tangiers" (1865, Poitiers Museum); "A Story-Teller of Morocco" (1878). After his return to France he painted his "October Morning" (1872), an attempt to treat a Parisian scene with the brush of an Orientalist. He also painted a number of portraits, including the painter Debras and Théodore de Banville, and scenes from French history, such as the intensely dramatic "Arrest of Charlotte Corday" (Louvre). Consult his *Biography* by Séailles (Paris, 1885).

DE HOND, PIETER. See CANISIUS.

DEHORN'ING (a word of hybrid formation, from Lat. *de,* away from + Eng. *horn*). The practice of dehorning cattle has been in vogue in Europe and the United States for many years. From time to time there has been much controversy as to the advisability and alleged cruelty of the operation. Dehorning is quite generally advocated by all who have tried it. Special dehorning shears or clippers have been devised which enable the operator to remove the horns quickly and with a minimum amount of pain. The animals recover from the operation in a few days without serious loss of flesh or decrease in milk production. Dehorned animals are much less liable to injure one another, especially in transportation. Cattle with quarrelsome or vicious disposition are rendered docile and gentle. The operation should be performed in mild weather and not during periods of extreme cold or in fly time.

The growth of horn may be entirely prevented by the application of caustic potash to the horn button as soon as it can be discovered on the

calf's head, or about three or four days after birth. In applying caustic potash the hair should be clipped from the head so as to expose the developing horn. The latter may be moistened with ammonia, so as to dissolve the oily skin secretion. A stick of caustic potash should then be moistened in water and rubbed on the horn. The operation should be repeated until the horn becomes somewhat sensitive. The process requires only a few minutes. A scab forms over the treated surface, and falls off after a period of about one month, leaving a smooth poll on which the horns never develop.

DEHRA, dē'râ. The capital of a district of the same name in the United Provinces, British India, 75 miles east of Ambala (Map: India, C 2). It is picturesquely situated in a mountain valley at an altitude of 2300 feet. Its principal buildings are the seventeenth-century temple of Guru Ram Rai, founder of the town and also of a sect of Ascetics called Udasi; an Anglican church, and an American Presbyterian mission establishment. The town is the seat of district staff officers, of a government survey, and of a forestry school. It is also headquarters for the Imperial Cadet Corps. The city has no manufactures, but is a trade centre. Pop., 1901, 28,095; 1911, 38,610.

DE'IANI'RA (Gk. *Δηϊάνειρα, Dēianeira*). In Greek mythology, the daughter of Œneus, King of Calydon in Ætolia, and of Althæa. She became the wife of Hercules (q.v.), who was victorious over Achelous in a contest for her possession, and bore him a son, Hyllus. She unintentionally caused Hercules' death.

DEI GRATIA, dē'ī grā'shī-â (Lat., by the grace of God). A formula found a number of times in the epistles of the New Testament. Pope Felix II, in 356, is said to have used *per gratiam dei episcopus.* It was formally used by the bishops at the Council of Ephesus in 431. Later it was commonly used by archbishops, bishops, abbots, and others in their correspondence. After the middle of the thirteenth century, when the sanction of the Pope was considered important for an ecclesiastical appointment, the higher clergy wrote *Dei et Apostolicæ Sedis Gratia* ('by the grace of God and of the apostolic see'). Other expressions were also used, as *Christi nomine, miseratione divina, permissione divina,* etc. In England the usage was largely dropped about the time of the Reformation. Occasionally, however, the archbishops of Canterbury and York used the form until the seventeenth century. The expression is said to have been used by temporal princes as early as the seventh century, but most of the documents with this formula have been proved to be forgeries. From the time of Charles the Great the form was commonly used by the Frankish kings. It was used by all the French kings, except Louis Philippe, from Louis VII to Napoleon III. Charles VII of France regarded the use of *Dei Gratia* as a royal prerogative and forbade its use by the Count d'Armagnac. The phrase is used on coins of many nationalities.

Consult Giry, *Manuel de Diplomatique* (Paris, 1894).

DE IM'ITATIO'NE CHRIS'TI. See KEMPIS, THOMAS À.

DEINHARDSTEIN, dīn'härt-shtīn, JOHANN LUDWIG (1794–1859). A German dramatist, born and educated in Vienna. He was vice director of the Hofburg Theatre, Vienna, from 1832 to 1841, and editor of the *Jahrbücher der Litteratur* from 1829 to 1851, during which period this publication counted among its contributors men like W. von Humboldt, A. W. Schlegel, Rückert, and Hebbel. His *Künstlerdramen* (2 vols., Leipzig, 1845), treating of the dramatic episodes in the lives of artists and actors, may be said to have established in some respects a new dramatic genre in Germany. Among his best plays may be mentioned *Hans Sachs, Floretta,* and *Garrick in Bristol.* His collected works were published in Leipzig (7 vols., 1848–57), under the title *Gesammelte dramatische Werke.*

DEI'NOTHE'RIUM. See DINOTHERIUM.

DEĬ'OCES (Lat., from Gk. *Δηϊόκης, Dēiokēs*). According to Herodotus, i. 96 ff., the first ruler of the Empire of the Medes. After the Median revolt from Assyria he rose to be judge of his own village. The justness of his decisions won surrounding villages to him. Presently the Medes combined and made Deioces King. For a criticism of this story, for the most part unhistorical, see the editors of Herodotus, e.g., How and Wells, vol. i, pp. 104, 383–384 (Oxford, 1912). He built Ecbatana and, changing his ways, ruled, in true Eastern style, by means of informers and spies.

DE'IOT'ARUS (*Δηϊόταρος, Dēiotaros*). A tetrarch of Galatia in the first century B.C. He formed an alliance with the Romans against Mithridates, and so was made King by Pompey, 63 or 62 B.C.; Armenia Minor was added to his domain. With several hundred horsemen he fought for Pompey at Pharsalus, in 48 B.C., and afterward fled with the latter. In 47 Julius Cæsar, then moving against Pharnaces (q.v.), pardoned Deiotarus, who had come to him as a suppliant. Several years later he was accused by his grandson Castor of aiding Cæcilius Bassus and of conspiring against Cæsar. He was defended by Cicero in the oration entitled *Pro Rege Deiotaro,* still extant. The result of the trial is not known. Deiotarus aided Brutus at the battle of Philippi and afterward sided with Octavius against Antony.

DEIPH'OBE. According to Vergil (*Æneid,* vi, especially 35–36), daughter of Glaucus and priestess of Apollo and Artemis, and the Sibyl at Cumæ who conducted Æneas to his father, Anchises, in the underworld.

DEIPH'OBUS (Gk. *Δηίφοβος, Dēiphobos*). In Greek legend, the son of Priam and Hecuba and one of the bravest of the Trojan heroes. After the death of Paris he married Helen, and she, after the fall of Troy, gave him up to Menelaus, her former husband, by whom he was killed and mutilated.

DE'IRA. An ancient kingdom of Britain, corresponding closely to the modern Yorkshire. It formed a part of Roman Britain, and the town of York was the capital and seat of the Roman prefect. Ælla, a chief of the Angles, took possession of Deira about the middle of the sixth century. There was constant strife between Deira and its northern neighbor, Bernicia, which delayed the full conquest of northern Britain. Æthelfrith of Bernicia drove out Ælla's son in 588 and united the two kingdoms under the name Northumbria. In 603 the forces of the North Britons were annihilated at the Dægestan, and the rule of Northumbria was established from the Humber to the Forth. In 627 Christianity was accepted. Bernicia and Deira became separate kingdoms about 633, but were reunited in 651. Later Deira was a sepa-

rate kingdom under the Danes. It was a number of native prisoners of Deira, exposed for sale in the slave market at Rome, that attracted the attention of Gregory I and led to the Christianizing of Britain, according to the old legend.

DEIR-EL-BAHRI, dār *el*-bä′rē (northern convent). The modern Arabic name of a famous Egyptian temple near the site of the ancient Thebes (q.v.). It was built by Queen Hatshepsut (Hatasu), the sister and wife of Thothmes II, but was never completed. In Christian times it became a monastery, whence its modern name; and the reliefs adorning the walls were badly mutilated by zealous monks, who regarded them as remnants of heathenism. The temple was dedicated to the god Ammon of Thebes, and also contained chapels for the deities Athor and Anubis, as well as a funerary chapel for Queen Hatshepsut. It is built upon three terraces rising in successive steps from the plain, each containing a court with columned porticoes and other buildings. The principal buildings surround the upper court, at the rear of which is the sanctuary. The walls of the various halls and chapels are magnificently decorated with sculptures and paintings. In one of the halls is depicted the fleet sent by Queen Hatsheput to Punt on the Somali coast. (See EGYPT, *History.*)

The site was examined by Mariette, and later Naville, acting under the auspices of the Egyptian Exploration Fund, cleared the whole temple of rubbish and explored it systematically. In 1881 no fewer than 39 mummies and coffins of kings and members of the royal house were found in a deep, rocky pit near Deir-el-Bahri and removed to the Bulak Museum. Among the mummies found were those of Seqenen-Rê, Amasis I, Amenophis I, Thothmes II, Thothmes III, Seti I, Rameses I, and Rameses II. In 1906, the year which marked the completion of the excavations of the eleventh dynasty temple on this site, a fine statue of a Hathor cow was found *in situ* in its shrine (consult *Egyptian Exploration Fund Memoirs*, 1907, frontispiece) and the fine temple of Mentuhetep was cleared out. In 1913 the expedition of the Metropolitan Museum of Art discovered the causeway to the latter temple. Consult: Mariette, *Deir-el-Bahri* (Leipzig, 1877); Dümichen, *Flotte einer ägyptischen Königin* (ib., 1868); *Egypt Exploration Fund Memoirs*, vols. xii–xiv, xvi, xix, xxvii, xxix, xxx, xxxii (London, 1894–1913); *Guide to the Temple of Deir-el-Bahr*, published by the Egyptian Exploration Fund (ib.).

DEIR-EL-KAMAR, *el*-kä′mẽr, or DER-EL-KAMAR (Ar., monastery of the moon). A town of Syria and once the seat of Emir Beshir, the chief sheik of the Druses. It is built in terraces on the side of a steep hill in the glen of Mount Lebanon, at an altitude of over 2800 feet, about 13 miles from Beirut. The slope is devoted to cultivation of the vine and the raising of grain. The chief industry is the production of silk stuffs and embroideries. Pop., about 8000, chiefly Maronites. Deir-el-Kamar has been the centre of many conflicts between the Maronites and the Druses.

DE′ISM (Fr. *déisme*, from Lat. *deus*, god), or THEISM (Fr. *théisme*, from Gk. *θεός*, *theos*, god). A term which properly means belief in a god, or opposed to atheism. In common language, however, deism is the belief in the existence and providence of God, grounded on the evidence afforded by reason and nature, rather than on testimony of a supernatural revelation.

The term "deists," or "freethinkers," is especially used to designate a school or series of writers who appeared in England in the seventeenth and eighteenth centuries, and who aimed to establish natural religion upon the basis of reason and free inquiry and to bring all positive or revealed religion to the test of this. The leading names in this school are: Lord Herbert of Cherbury (died 1648); John Toland, whose *Christianity Not Mysterious* (London, 1696) gave exact expression to the tendency of the deists; the third Earl of Shaftesbury; Anthony Collins (died 1729), the friend of Locke; Thomas Woolston; Matthew Tindal, the author of *Christianity as Old as the Creation, or the Gospel a Republication of the Religion of Nature* (ib., 1730); Viscount Bolingbroke. Consult: A. S. Farrar, *History of Free Thought* (ib., 1863); Leslie Stephen, *History of English Thought in the Eighteenth Century* (ib., 1881); Robertson, *Short History of Free Thought* (ib., 1906); Flint, *Anti-Theistic Theories* (Edinburgh, 1879).

DEISSMANN, dīs′män, GUSTAV ADOLF (1866–). A German New Testament scholar, born in Langenscheid, Nassau, and educated at the University of Berlin and the Herborn Theological Seminary. He entered the ministry in 1890, became a teacher at Marburg in 1892 and at Herborn in 1895, and was made professor at Heidelberg in 1897 and at Berlin in 1908. He lectured in Cambridge (England) in 1907 and at Upsala in 1910, and received the honorary degree of D.D. from Aberdeen (1906), St. Andrews (1911), and Manchester (1912). Among his valuable publications are: *Die neutestamentliche Formel "in Christo Jesu"* (1892); *Bibelstudien* (1895; 2d series, 1897; Eng. trans., 1901–03); *Theologie und Kirche* (1900); *The Epistle of Psenosiris* (1902); *Die Hellenisierung des semitischen Monotheismus* (1903); *Evangelium und Urchristentum* (1905); *New Light on the New Testament* (1907); *Philology of the Greek Bible* (Cambridge Lectures, 1908); *Light from the Ancient East* (1910); *Urgeschichte des Christentums in Lichte der Sprachforschung* (1910); *St. Paul* (1912, in English; also in German and Swedish).

DEITERS, dī′tẽrs, HERMANN (1833–1907). A German philologist and writer on music. He was born in Bonn. At first he studied law and for a short time followed it as a profession in Berlin, but returned to Bonn to study philology. He received the degree of Ph.D. in 1858. As a writer on music, he soon attracted attention, especially with his excellent essays on Brahms. In 1880 he published the first authoritative biography of the master, which was completed, after Brahms's death, in 1898. His most important work is the translation into German of A. W. Thayer's monumental biography of Beethoven (never published in the English original). Only the first three volumes were completed by Thayer; the fourth and fifth volumes were written by Deiters on the basis of the materials collected by Thayer.

DÉJAZET, dā′zhä′zā′, PAULINE VIRGINIE (1797–1875). A celebrated French actress. She was born in Paris, Aug. 30, 1797 (some accounts say 1798). From the time she was five years old, when she began playing children's parts with marvelous precocity of intelligence and grace, till she was over 70, her career upon the stage was an almost uninterrupted success. After experience in several Parisian theatres

she went to Lyons and Bordeaux, where she won great popularity in soubrette rôles. Returning to Paris (1820), she played successively at the Gymnase, the Nouveautés, the Gaîté, and the Palais Royal, where she made some of her greatest hits in young men's parts. These, called *rôles travestis*, were so distinctive that they, together with her quick-witted soubrette rôles, came to be known as a class by themselves, *Déjazets*. Famous especially were her impersonations in *Les écoliers en vacances, La petite sœur, Le plus beau jour de la vie, Le fils de l'homme, Sophie Arnould, Frétillon*, and numerous others. After 1845 she played for a time at the Variétés and made successful tours abroad. In 1859, with her son Eugène, she undertook the management of the Folies-Nouvelles, then known as the Théâtre Déjazet. Here she brought out several of Sardou's earlier pieces, among them *Monsieur Garat* and *Les prés Saint-Gervais*. She retired from the stage in 1868, but appeared again even within a year of her death, which occurred Dec. 1, 1875. Countless stories are told of her brilliant wit and personal charm. Consult: Duval, *Virginie Déjazet, 1797–1875* (Paris, 1876); Lecomte, *Virginie Déjazet: étude biographique* (ib., 1866); Mirecourt, "Déjazet," in *Les contemporains* (ib., 1854).

DEJEAN, de-zhän′, Jean François Aimé, Count (1749–1824). A French general and statesman, born at Castelnaudary. He fought with distinction in the wars of the Revolution, rising successively to the rank of brigadier general and general of division. He was Minister of War from 1802 to 1809 and, after the first Restoration, was appointed governor of the Polytechnic School. Upon the return of Napoleon from Elba he rendered valuable services until after the battle of Waterloo. He was also at that time grand chancellor of the Legion of Honor and aid-de-camp of Napoleon.

DEJEAN, Pierre François Aimé Auguste, Count (1780–1845). A French general and entomologist, son of the preceding. He was born at Amiens and took up the study of medicine, but soon entered Napoleon's army, with which he went to Spain and to Russia. In the army he attained the rank of a general of division and at Waterloo acted as adjutant to the Emperor. From 1815 to 1819 he was kept in exile by the Bourbons. Devoting all his leisure to science, Dejean made extensive collections of insects and contributed much to our knowledge of Coleoptera (beetles). He is the author of the following works: *Iconographie des coléoptères d'Europe* (1829–36); *Espèces générales des coléoptères* (1825–37); *Histoire naturelle et iconographie des coléoptères d'Europe*. The last-named work is still a standard on the subject of Coleoptera. The works were written by Dejean in conjunction with Boisduval and Aubé.

DEJERINE, dĕ′zhe-rēn′, Jules (1849–1917). A French alienist, educated at Paris. In 1879 he became head of the medical clinic at the Charité Hospital, in 1893 took charge of the course in clinical medicine at the Necker Hospital, in 1895 became physician at the Salpêtrière, and in 1910 was appointed professor of the clinic of nervous diseases. He wrote on aphasia, especially attacking Pierre Marie's theory of the origin of this disease, and on many other topics connected with nervous diseases, and published: *L'Hérédité dans les maladies du système nerveux* (1886); *Anatomie des centres nerveux* (1894), in collaboration with his wife, *née* Klumpke, herself a well-known neurologist; *Sémeiologie du système nerveux* (1900); *Traité des maladies de la moëlle épinière* (1902, with Thomas).

DE KALB. A city in De Kalb Co., Ill., 58 miles west of Chicago, on the Chicago and Northwestern, the Chicago, Aurora, and De Kalb, the Chicago Great Western, and the Chicago, Milwaukee, and Gary railroads (Map: Illinois, D 2). It is the seat of the Northern Illinois State Normal School and contains barbed-wire factories, wire-drawing and woven-wire mills, agricultural-implement works, piano, shoe, glove, mitten, nail, and creamery-package factories, etc. The government is administered by a mayor, biennially elected, and a municipal council. The city owns and operates its water works. Settled about 1838, De Kalb was incorporated in 1877. Pop., 1890, 2579; 1900, 5904; 1910, 8102; 1914 (est.), 9036. De Kalb was the scene of an engagement in the Black Hawk War. Here, after the battle, Lincoln, Davis, and Zachary Taylor held a conference.

DE KALB, Baron. See Kalb, Johann, Baron de.

DE KAY, Charles (1848–). An American author and critic. He was born in Washington and graduated at Yale University in 1868. He was associated with the New York *Times* as literary and art editor from 1876 to 1906 and with the New York *Evening Post* in 1907. In 1894 he was appointed Consul General of the United States at Berlin, where he remained until 1897. During his sojourn abroad he established the Berliner Fechtklub, after previously founding a similar society (the Fencers' Club) in New York (1882). Among the literary and art societies which he took part in founding are the Authors' Club (1882), the National Sculpture Society (New York, 1892), the National Arts Club (New York, 1899), and the Circle of Friends of the Medallion (1907). Of the National Arts Club he became the managing director. Among his numerous publications are the following: *Hesperus and Other Poems* (1880); *Vision of Nimrod*, a dramatic poem (1881); *Love Poems of Louis Barnevel* (pen name, 1883); *Life and Works of Barye, Sculptor* (1889); *Bird Gods* (1898); and translations of Heinrich Heine's *Letters* and of several works from the French.

DEKEN, dā′kĕn, Agathe (1741–1804). A Dutch poet and novelist, born at Amstelveen. Many of her works were written in collaboration with her friend Elizabeth Bekker. These joint productions include the novels: *Historie van Sara Burgerhart* (1782); *Historie van Willem Levend* (1875); *Brieven von Abraham Blankaart* (1787); *Historie van Cornelia Wildschut* (1793). Her religious songs show her to have been possessed of a truly pious nature, while her descriptive poems are fine characterizations of the folk life of Holland. Especially noteworthy are the collections entitled *Liederen voor den boerenstand* (1804) and *Liederen voor Kinderen*.

DEK'KER, Eduard Douwes (1820–87). A Dutch writer, the author of *Max Havelaar* (1860), the Dutch *Uncle Tom's Cabin*. He was born in Amsterdam, March 2, 1820. He went in 1838 to the Dutch Indian colonies and remained 18 years in government employ, endeavoring to

mitigate the evils of native government, and resigning in 1856 because his zeal clashed with government interest in Java. Then he made his appeal to the public conscience in *Max Havelaar*, revealing conditions of outrageous and inhuman extortion and making a great hit as a novel, but getting little sympathy and no redress for the victims. In 1866 he withdrew to Germany, where he published (in Dutch) a popular drama, *Vorstenschool* ('The School for Princes'); a novel, *La Sainte Vierge;* and several studies in political and social economy. He is well known by his pseudonym, Multatuli (Lat. *multa tuli*). The posthumous *Geschiedenis van Wouterje Pieterse* (1888), incomplete, was followed in 1892 by *Letters* and *Works*, ed. by his widow. Consult the biographies of Busken (in Ten Brink's *Hedendaagsche Letterkundigen*, 1885); Meerkesk (1900); also T. S. Abrahamsz, *Eduard Douwes Dekker: Eene ziekkegeschiedenis* (1888).

DEKKER, Thomas (c.1570–c.1641). An English dramatist and pamphleteer. Little is known of him. He was born in London. His dramatic career began as early as 1597, and before his death he wrote, single-handed or in collaboration, more than 40 plays, most of them for Henslowe. In 1600 were printed two of his best comedies, *The Shoemaker's Holiday* and *Old Fortunatus*. The former is a sprightly play and acts well. The latter contains scenes and passages of very great beauty. Dekker had been writing the previous year in conjunction with Ben Jonson, but the two dramatists had now fallen out. In 1601 Jonson ridiculed Dekker in *The Poetaster*. Dekker replied with *Satiromastix, or the Untrussing of the Humourous Poet* (1602). Of the plays that Dekker wrote after that, the most powerful is *The Honest Whore* (two parts, 1st part printed 1604; 2d part, 1630), in the composition of which he was aided by Middleton. Other plays in which Dekker bore a hand are: *Black Bateman of the North* (1598); *The Roaring Girl* (1611); *The Virgin Martyr* (1622); *The Witch of Edmonton* (first published 1658). He wrought with a realistic aim, describing the middle and lower strata of London life. He also wrote several noteworthy pamphlets, of which *The Gull's Hornbook* (1609) is the best extant account of the London gallants. Other pamphlets deal with thieves and vagabonds; another, *The Wonderful Year* (1603), describes London suffering from the plague. Consult: *Dramatic Works*, ed. by Shepherd (4 vols., London, 1873); *Plays* (selected), ed. by Rhys (ib., 1887); *Nondramatic Works*, ed. by Grosart (5 vols., ib., 1884–86); the "Life" by Bullen, in the *Dictionary of National Biography;* Penniman, *The War of the Theatres* (Boston, 1897); Pierce, *The Collaboration of Webster and Dekker* (New York, 1909); Hunt, *Thomas Dekker* (ib., 1911).

DE KO'VEN, (Henry Louis) Reginald (1861–1920). An American composer of songs and light operas, born in Middletown, Conn. When 11 years old, he was taken to Europe, where he received his education. He graduated from St. John's College, Oxford, in 1879. After he had been instructed in the usual musical grounding branches by Speidel, Lebert, and Pruckner, in Stuttgart, and by Hauff in Frankfort, he took a course in vocalization with Vanuccini in Florence and courses in light-opera composition with Genée, Von Suppé, and Delibes. On his return from Europe in 1882 he took up his residence in Chicago, but subsequently moved to New York. From 1902 to 1904 he lived in Washington as conductor of the Washington Symphony Orchestra. He then returned to New York as musical critic of the *World*. His scores are melodious and show refinement of instrumental coloring and harmony. His greatest success has been *Robin Hood* (1890), a thoroughly delightful work of its kind. Others among his light operas are: *The Begum* (1887); *The Fencing Master* (1892); *Rob Roy* (1894); *The Highwayman* (1897); *The Three Dragoons* (1899); *Foxy Quiller* (1900); *Maid Marian* (1901); *The Student King* (1906). He also composed many songs, several of which have become well known.

DELABARRE, dĕl'ȧ-bär', Edmund Burke (1863–). An American psychologist, born at Dover, Me. He was educated at Brown University, Amherst College, Harvard, and Freiburg, and, beginning in 1891, was associate professor and then (after 1896) professor of psychology at Brown. In 1896–97 he was also director of the Harvard Psychological Laboratory during the absence of Professor Münsterberg. He was elected a fellow of the American Association for the Advancement of Science. He is author of *Ueber Bewegungsempfindungen* (1891) and *Report of Brown-Harvard Expedition to Nachvak, Labrador, in 1900* (1902).

DELABARRE-DUPARCQ', dė-lȧ'bär' dụ'-pärk', Nicolas Edouard (1819–93). A French military critic and historian, born at Saint-Cloud, Seine-et-Oise. He studied at the Ecole Polytechnique and in 1849 was appointed professor of military history at the College of Saint-Cyr. Having entered the engineers in 1841, he rose in 1871 to the rank of colonel and was retired in 1879. He wrote, in addition to memoirs for the Academy of Moral and Political Sciences, *Biographie et maximes de Maurice de Saxe* (1851); *Portraits militaires, Esquisses historiques et stratégiques* (2 vols., 1853–55); *Les chiens de guerre* (1867); *Histoire de Henri IV, roi de France et de Navarre* (1884).

DE LA BÈCHE, dė lȧ bāsh, Sir Henry Thomas (1796–1855). A distinguished British geologist. He was born near London and educated at the military school at Great Marlowe. He entered the army in 1814, but soon retired from public service to take up the study of science. For several years he traveled through England, France, and Switzerland, examining the geological formations and gaining a knowledge of mineralogy and petrography. His researches were the bases of frequent contributions to the *Transactions of the Geological Society*, in which he displayed great scientific ability. He was the first to conceive the plan of making a detailed geological map of England, a task he commenced upon his own responsibility; in 1832 the expense of this work was assumed by the government, and De la Bèche was appointed director. He labored for many years to establish the survey on a successful basis, and he was also concerned in founding a geological museum and a school of mines in London. The list of his publications includes many books recognized as standard works of reference and numerous papers contributed to scientific journals; among the more important are the following: *Manual of Geology* (1831); *Researches in Theoretical Geology* (1834); *Report on the*

Geology of Cornwall, Devon, and West Somerset (1839); *On the Formation of the Rocks of South Wales* (1846); *Geological Observer* (1853). De la Bèche was elected president of the Geological Society of London in 1847, and in 1855 he received the Wollaston medal from the same society. His distinguished services were also awarded by the bestowal of knighthood and by numerous marks of honor from foreign societies.

DELABORDE, de-là'bôrd', HENRI, COUNT (1811–99). A French art critic and historical painter, born in Rennes, son of Count Henri François Delaborde. He studied for some time in Paris with Delaroche and afterward produced historical pictures of a rather conventional classical type. Among them are: "Hagar in the Desert" (1836, Dijon Museum); "St. Augustine" (1837); "The Knights of St. John of Jerusalem" (1845), at Versailles. He also painted frescoes in the church of St. Clotilde, Paris. But he is known principally as a critic of art. Besides his writings, as perpetual secretary of the Académie des Beaux-Arts, he contributed to the *Revue des Deux Mondes* and other periodicals. These articles have been collected as *Mélanges sur l'art contemporain* (1866) and *Etudes sur les beaux-arts en France et en Italie* (1864). He published, among other volumes, *Ingres, sa vie, ses travaux, sa doctrine* (1870); *Lettres et pensées d'Hippolyte Flandrin* (1865); *Gérard Edelinck* (1886); *La gravure* (1882); *La gravure en Italie* (1883); *Marc Antoine Raimondi* (1887); *Les maîtres florentins du XV siècle* (1889); *L'Académie des Beaux-Arts depuis la fondation de l'Institut de France* (1891). He was elected to the Institute in 1868 and was conservator of the department of prints in the National Library, Paris, from 1855 to 1885.

DELABORDE, HENRI FRANÇOIS, COUNT (1764–1830). A French soldier, born in Paris. He successively became a brigadier general, chief of staff, and commander in Corsica. As a general of division, he conducted the campaigns in the Pyrenees (1794) and on the Rhine. In 1812 he was a general of division in Mortier's "Jeune Garde," which fought so gallantly in the Russian campaign. Upon the return of Napoleon from Elba he again espoused the cause of the Emperor. With the advent of the Restoration he was brought before a military tribunal (September, 1816), but was acquitted.

DELACROIX, de-là'krwä', (FERDINAND VICTOR) EUGÈNE (1798–1863). One of the most important French painters of the nineteenth century, the chief leader of the Romantic school; also a lithographer and etcher. He was born at Charenton-Saint-Maurice, near Paris, April 26, 1798. Under the Directory his father had been Minister of Foreign Affairs and had held other offices of honor. He mismanaged the family property, and the son had to struggle hard for an existence. At 18 he entered the studio of Guérin, and there became the friend of Géricault, who greatly influenced him; but his chief teachers were the old masters of the Louvre, whom he diligently copied. Joining Géricault in the new Romantic movement, he became, after the latter's death, its recognized leader. He first exhibited in 1822 the "Bark of Dante," which, although fiercely attacked by the critics, made a great impression, was purchased for the Luxembourg Gallery, and is now in the Louvre. His "Massacre of Chios," exhibited in 1824 and now in the Louvre, caused an even greater sensation. Indeed, it may be termed a manifesto of the new Romantic school. The types were individual and characteristic instead of general and typical, as in the Classic school. The old ideas of composition were altogether disregarded, and the scene portrayed was one of gloomy horror and pathos. The painter was accused of worshiping the hideous instead of the beautiful, and his picture was dubbed "The Massacre of Painting." Its sale, however, enabled him to visit England in 1825 and further to increase his knowledge of the English colorists, by whom he had already been influenced. During this visit he acquired his lifelong fondness for English literature, especially for Byron, Scott, and Shakespeare, whom along with Goethe he preferred to the classic authors of his own country. In 1832 he was sent as a member of an embassy to Morocco, and he also visited Spain and Algiers. These travels enriched his palette with bright colors, and his Oriental subjects brought him great popularity. Nevertheless he was unfortunate in selling his pictures and would have been in uncomfortable circumstances had he not received frequent commissions from the government after the revolution of 1830. He was selected to execute mural paintings in a number of public buildings and distinguished himself as much in this task as he had previously done in his canvases. A member of the Academy in 1857, he exhibited his last picture in 1859 and died in Paris on Aug. 13, 1863. His life was solitary and nearly all spent in his studio. He suffered much from ill health, which only urged him to greater exertions. He was of a refined and sensitive disposition and was deeply wounded by the bitter controversies which his pictures provoked.

Delacroix was one of the greatest painters of the nineteenth century and one of the greatest colorists of all times. His work has often been compared with that of Rubens, who exercised great influence upon him. His coloring is bright, but simple, the primary colors being chiefly used, and he is fond of obtaining color effects by placing complementary colors together. He has been criticized as being deficient in drawing, perhaps justly; although his surviving drawings reveal an excellent draftsman, and, when he sacrificed the distinctness of outline to color, he did it knowingly, as the greatest colorists have done before him. His art is impetuous and intensely dramatic, and he delights in passion and in motion. His activity extended over an immense variety of subjects; he painted everything—saints, warriors, lovers, animals, flowers, the ocean—and all equally well. He ransacked history and literature for subjects, but always rendered them as a painter in his own great language of color.

In his long career he produced some 853 oil paintings and 1525 water colors and pastels. Among his chief historical works, besides those mentioned above, are: "Hellas Mourning over the Ruins of Missolonghi"; "Milton and his Daughters"; the "Death of the Bishop of Liége," after Scott's *Quentin Durward* (Louvre); the "Entry of the Crusaders into Constantinople"; "The Barricade," a scene from the July Revolution (Louvre), which secured him the cross of the Legion of Honor; "The Abduction of Rebecca" (Metropolitan Museum). Among his Oriental subjects are: "Algerian Women" (Louvre); the "Convulsionaries of Tangier"; the "Jewish Wedding in Morocco." He also

represented religious and classical subjects, but in a personal and modern way, examples being "Justice of Trajan" (Rouen Museum) and "Medea" (Lille Museum). His biblical subjects are also conceived in a thoroughly modern way as expressions of dramatic and passionate movement. Good examples are "Christ on the Cross" (Walters Gallery, Baltimore) and "Christ on Lake Gennesaret" (Van Horne collection, Montreal). His decorative paintings are the boldest and most original of his day. In 1835 he decorated the interior of the Chamber of Deputies in the Palais Bourbon, and in 1838 the library of the same with 22 compositions illustrating the spiritual development of the ancient world—his most extensive work. On the ceiling of the Gallery of Apollo in the Louvre he painted a magnificent "Triumph of Apollo," but the god is a Titan rather than an Olympian. He decorated the library of the Luxembourg with subjects from the *Divina Commedia*, and in the last years of his life he was engaged in painting in the church of St. Sulpice in Paris. Besides his many paintings, he found time to illustrate Scott's novels, Goethe's *Faust*, and Shakespeare's *Hamlet*, and to write able articles on artistic subjects.

Since the acquisition of several important private collections, including the Chauchard (1910) by the Louvre, Delacroix has been there worthily represented. The Musée Fabre in Montpellier, the Musée Condé in Chantilly, the Musée Bonnat in Bayonne, and the museums of Bourdeaux, Lille, Lyons, and Nice are also rich in his works. He is well represented in the collections of other lands, such as The Hague, Amsterdam, South Kensington Museum, Wallace collection, London, and the Metropolitan Museum, New York.

Bibliography. An interesting autobiographical account, based upon Delacroix's letters, writings, and conversations, is that of Dargenty, *Eugène Delacroix par lui-même* (Paris, 1885). His letters were published by Burty (Paris, 1880) and his journal by Flat (ib., 1893–95). The most complete and authentic catalogue of his works is by Robaut and Chesneau, *L'Œuvre complet d'Eugène Delacroix* (Paris, 1885). Other monographs on Delacroix's life and works are by Moreau (ib., 1873), Véron (ib., 1886), Rosenberg (Berlin, 1886), Tourneaux (Paris, 1907), Meier-Graefe (Berlin, 1907), and Mauclair (Paris, 1909). An illustrated catalogue of his etchings and lithographs was published by Delteil in the *Peintre-graveur illustré*, vol. iii (ib., 1908). Very interesting also are the facsimiles of the Louvre album of studies published as *Le voyage de Eugène Delacroix au Maroc* (ib., 1909), and those in the Musée Condé, Chantilly (ib., 1913).

DEL'AFIELD, Francis (1841–1915). An American physician, born in New York City. He graduated at Yale (1860) and at the College of Physicians and Surgeons, Columbia University (1863), and after further study abroad practiced medicine in New York. He was appointed to the staff of Bellevue Hospital (1874), and to the chair of pathology and the practice of medicine in the College of Physicians and Surgeons (1875–82). In 1886 he was the first president of the Association of American Physicians. He published: *Handbook of Post-Mortem Examinations and Morbid Anatomy; Lectures on Practical Medicine and Pathology* (1872; new ed., 1903); and, with Prudden, a *Handbook of Pathological Anatomy and Histology* (1885; new ed., 1904); *Textbook of Pathology* (1911).

DELAFIELD, Richard (1798–1873). An eminent American military engineer. He was born in New York City; graduated at West Point, at the head of his class, in 1818; was assigned to the engineer corps and served successively as assistant engineer for the construction of the defenses of Hampton Roads, as engineer in charge of the improvement of the Ohio and Mississippi rivers, and as superintending engineer of the division of the Cumberland Road (q.v.) east of the Ohio. From 1838 to 1845 and again from 1856 to 1861 he was superintendent of the United States Military Academy at West Point. He was superintending engineer of the defenses of New York harbor from 1846 to 1855 (building Fort Wadsworth on Staten Island) and of the improvement of the Hudson River from 1852 to 1855 and acted also as chief engineer of the department of Texas in 1853 and 1854. In 1855–56 he was president of the commission of three sent by the United States government to observe the military operations of the Crimean War and prepared the commission's elaborate report, which was published by the government under the title *Report on the Art of War in Europe in 1854, 1855, and 1856* (1860). During the Civil War he acted from 1861 to 1863 on the staff of Governor Morgan of New York, organizing and equipping the forces from that State; was superintending engineer of the defenses about New York City from 1861 to 1864, became a colonel in 1863, and a brigadier general in 1864; and from April, 1864, to August, 1866, when he retired from the service, was chief of engineers of the United States army, with headquarters at Washington. In March, 1865, he was brevetted major general for "faithful, meritorious, and distinguished services in the engineer department during the Rebellion." After his retirement in 1866 he served as a member of the commission for the improvement of Boston harbor, and as a regent of the Smithsonian Institution (1865–67).

DE LA GARDIE, Magnus Gabriel. See Gardie.

DELAGE, de-läzh', (Marie) Yves (1854–). A French zoölogist. He was born in Avignon, was educated there, in 1874 became an instructor at the *lycée* of La Rochelle, in 1880 took charge of the conferences on zoölogy at the Sorbonne, in 1883 went to Caen and became director of the Luc-sur-Mer zoölogical station, and in 1885 returned to Paris. There in 1886 he became professor of zoölogy and comparative anatomy. In 1901 he was chosen a member of the Institute and was appointed director of the important laboratory of marine biology at Roscoff, Finistère. He made valuable experiments in parthenogenesis, especially after 1900; and with Héroüard classified the Hydromedusæ. In 1897–1908 he edited *L'Année biologique*. Besides many special studies, Delage published *L'Hérédité et les grands problèmes de la biologie générale* (1895), *Traité de zoölogie concrète* (6 vols., 1896–1902), and, with Goldsmith, *The Theories of Evolution* (1912).

DEL'AGO'A BAY (Portug., bay of water). An inlet of the Indian Ocean, on the southeast coast of Africa, in lat. 26° S., in the Portuguese colony of Mozambique, of which Lourenço Marques is the capital and principal port (Map: Africa, H 7). It has a length of about 70 miles and a breadth of from 15 to 35 miles. Its lower

EUGENE DELACROIX

"THE BARK OF DON JUAN," FROM THE PAINTING IN THE LOUVRE, PARIS

portion is protected by the Inyack peninsula and island and forms there a safe and ample anchorage. Delagoa Bay receives the waters of several rivers—the Maputu, the Umbelosi, the Crocodile, the Umfusi. The coasts are low and covered with mangrove forests. The commercial importance of Delagoa Bay is very considerable, owing to the fact that it contains the port of Lourenço Marques, which is connected by rail with Pretoria (since 1895), thus affording an outlet for the output of the gold fields of the Transvaal. The imports of Lourenço Marques amount to approximately 5 million dollars annually, chiefly foodstuffs, manufactures, and machinery, of which a large part pass thence to Pretoria. The railway from Lourenço Marques to Pretoria was constructed by a company of American and English capitalists and seized by the Portuguese government after the death of the concessioner. After 10 years of litigation the case was decided, in 1900, in favor of the United States and Great Britain, although the Portuguese government was made to pay an indemnity of only about $3,000,000. Several short railway lines penetrate the adjacent territory. The Delagoa Bay Railway has a length of 57 miles in the colony and is continued 290 miles to Pretoria. The Beira Railway with about 200 miles of line in the colony is continued from the British frontier to Bulawayo. During the South African War the port of Lourenço Marques was used for smuggling supplies to the scene of action. The British government, in order to prevent further violation of neutrality, blockaded the port and seized several vessels, proceedings which led to some international complications. Consult Tesset, *The Key to South Africa, Delagoa Bay* (London, 1899).

DELAGRANGE, de-là'gränzh', Léon (1872–1910). A French aviator; also a sculptor. He was born at Orléans and studied at the Ecole des Beaux-Arts, Paris. As a sculptor, he is known for several notable works, especially "Florentine Page," "A Templar," "Love and Youth," "A Huguenot," and "Girl Dancers." In September, 1908, a year after his first flight in an aëroplane, he established a record of 15.2 miles in 29 minutes, 53 seconds, and in 1909 he received the Lagatiner prize at Juvisy (3.6 miles in 10 minutes, 18 seconds), made a sensational flight in a storm at Doncaster, England, on October 17 established a world record (6 miles in 7 minutes, 36 seconds), and in December made a new monoplane record. In 1910 he was killed in an accident with his monoplane at Pau. He was president of the Aëro Club of France in 1907, in 1909 was decorated with the order of the Legion of Honor, and in 1910 received a medal from the Paris Academy of Sciences.

DE LA HIRE, de là ēr, Philippe (1640–1718). A French writer of considerable prominence on the theory of curves. He was born in Paris and was professor of mathematics in the Collège Royal and at the Académie d'Architecture. The following are his most important works: *Nouvelle méthode de géométrie* (1673); *Sectiones Conicæ* (1685); a treatise on epicycloids and roulettes (1694–1706). He was a pupil of Desargues and founded his researches in conic sections and roulettes on the works of his master.

DELAMBRE, de-läN'br', Jean Baptiste Joseph (1749–1822). A French astronomer, born at Amiens. He studied first under Delisle and afterward under Lalande, with both of whom he formed a close friendship. When, in 1781, the planet Uranus was discovered by William Herschel, Delambre worked out tables of its motion that obtained for him the annual prize of the Academy and attracted to him the attention of the learned world in general. Soon after he commenced the construction of new solar tables, and at a still later period tables of the motions of Jupiter and Saturn. Along with Méchain, he was appointed by the French government, in 1792, to measure the arc of the meridian between Dunkirk and Barcelona, which was completed in 1799. Afterward he was elected a member of the Academy. In 1802 he was appointed inspector general of education and in 1803 perpetual secretary of the mathematical section of the Institute. The result of his measurements appeared in his great work, *Base du système métrique décimal* (3 vols., 1806–10), for which he was awarded the decennial prize of the Institute in 1810. In 1807 he obtained the chair of astronomy at the Collège de France, rendered vacant by the death of Lalande, his master and friend. In 1814 he was appointed a member of the Council of Public Instruction. Delambre received a multitude of honors during his lifetime. He was a member of most of the learned bodies in Europe and an officer of the Legion of Honor. His writings are very numerous. The principal are: *Astronomie théorique* (3 vols., 1814); *Histoire de l'astronomie ancienne* (2 vols., 1817); *Histoire de l'astronomie au moyen âge* (1819); *Histoire de l'astronomie moderne* (2 vols. 1821); *Histoire de l'astronomie au dix-huitième siècle* (1823–27), published under the care of Matthieu. Besides these, Delambre is the author of several excellent *Mémoires.*

DE LA MOTTE-GUYON. See Guyon.

DE LAN'CEY, Edward Floyd (1821–1905). An American lawyer and author, born at Mamaroneck, N. Y., and educated at Hobart University and at the Harvard Law School. He was associated with various historical societies and was president of the New York Genealogical and Biographical Society from 1873 to 1877. Among his contributions to the history of New York State are the following: *Documentary History of New York* (1851); *The Capture of Fort Washington the Result of Treason* (1877); *History of Mamaroneck, New York* (1886); *The Origin and History of Manors in the Province of New York* (1886).

DE LANCEY, James (1703–60). An American jurist. He was born in New York, the son of a French Huguenot, was educated at Cambridge, England, and was admitted to the English bar. He returned to New York in 1729 and became a leader in the affairs of the city and province. In 1731 he was appointed a judge of the Supreme Court of the province and from 1733 until his death he was Chief Justice. In 1747–55 and 1757–60 he was Lieutenant Governor. He was one of the founders of King's College, now Columbia University, and presided over the Albany Convention of 1754 (q.v.).

DE LANCEY, Oliver (1708–85). A British soldier, born in New York City. He was the youngest son of Etienne, and the brother of James De Lancey, the Lieutenant Governor of New York. He fought in the French War, was colonel in chief under General Abercrombie, and was present at the attack on Fort Ticon-

deroga. From 1760 to 1766 he was a member of the Provincial Council of New York. During the Revolution he occupied responsible positions on the Loyalist side and was commissioned brigadier general to raise 1500 troops for the defense of Long Island. He commanded one of three battalions raised, which occupied Long Island. His estates being confiscated, he went to England. His losses were estimated at $390,000, and he received $125,000 in compensation.

DE LANCEY, Oliver (1749–1822). An American soldier. The son of Oliver De Lancey (1708–85), he was born in Edinburgh, Scotland. He entered the British army in 1766, served in the Seventeenth Light Dragoons (of which he eventually became colonel), and was sent to America to prepare accommodations for the regiment. He was present at Bunker Hill and with his regiment participated in the victory of the British at the battle of Long Island. After the capture of General Woodhull and his forces at Jamaica, L. I., it was De Lancey who rescued the wounded general from British sentries when Woodhull tried to escape. The charge that De Lancey struck Woodhull after he had surrendered was not sustained. He occupied important positions in the Loyalist army and was made adjutant general as successor to Major André (1780). At the close of the war De Lancey returned to England, was appointed to settle military claims of the Loyalists, and sat in Parliament from 1796 to 1802. In 1804 his barrack accounts were discovered to be in bad condition, but his apparent defalcations did not result in prosecution; and in 1812 he was promoted general.

DE LANCEY, William Heathcote (1797–1865). An American clergyman. He was born in Mamaroneck, N. Y., graduated at Yale in 1817, and studied theology under Bishop Hobart. After being assistant to Bishop White, of Philadelphia, and secretary to the House of Bishops in the General Convention of the Episcopal Church in the United States, in 1828 he became provost of the University of Pennsylvania, and in 1833 assistant minister, and in 1836 rector, in St. Peter's Church, Philadelphia. He was chosen Bishop of the diocese of Western New York in 1838, and in 1852 was a delegate from the Episcopal bishops of the United States to England.

DE LAND. A city and the county seat of Volusia Co., Fla., 60 miles south of St. Augustine, on the Atlantic Coast Line Railroad (Map: Florida, E 2). It is a health and winter resort known for its sulphur springs and its fine shell-paved and shaded streets, contains Carnegie and Sampson libraries, and is the seat of the John B. Stetson University (Baptist), opened in 1887. The city shipped 350,000 boxes of oranges in the year 1913–14. De Land owns its water works. Pop., 1900, 1449; 1910, 2812.

DELAND', Margaret Wade (Campbell) (1857–). An American novelist, born at Allegheny, Pa. She was educated at New Rochelle, N. Y. She married L. F. Deland, of Boston, in 1880. She commended herself most strongly, perhaps, by those of her stories of which Dr. Lavendar, with his keen yet kindly insight, is the centre, and in which appear a varied group of village characters faithfully and graphically portrayed. In 1886 *The Old Garden and Other Verses* appeared. Her first novel, *John Ward, Preacher,* was published in 1888. She wrote also *Sidney,* a novel (1889); *Story of a Child* (1892); *Mr. Tommy Dove and Other Stories* (1893); *Philip and his Wife* (1895); *Old Chester Tales* (1899); *Dr. Lavendar's People* (1904); *The Common Way* (1904); *The Awakening of Helena Richie* (1906); *The Way to Peace* (1910); *The Iron Woman* (1911); *Partners* (1913).

DELANE, dē-lān', John Thaddeus (1817–79). An English journalist, editor of the London *Times.* He was born in London, Oct. 11, 1817, was educated at Oxford, and called to the bar at the Middle Temple. At the age of 23 he became editor of the *Times,* of which his father was financial manager. Under his editorship the newspaper exerted an influence unparalleled in the history of journalism. He exposed the railway mania (1845), took an active part in the repeal of the corn laws, and led public opinion during the Crimean War. He retired in 1877, and died Nov. 22, 1879. Consult A. I. Dasent, *John Thaddeus Delane: Life and Correspondence* (2 vols., New York and London, 1908).

DEL'ANO, Columbus (1809–96). An American lawyer, born in Shoreham, Vt. He was taken as a child to Ohio where he was educated at the common schools, and was admitted to the bar in 1831, and became known as a criminal lawyer. He was commissary general of Ohio in 1861, served three terms in Congress (1845–47, 1865–69), and in 1869 was appointed Commissioner of Internal Revenue, in which capacity he increased the receipts more than 100 per cent in eight months. In October, 1870, he resigned and from then until 1875 was Secretary of the Interior. He endowed the preparatory school at Gambier, Ohio, which bears his name.

DELANO, Frederic Adrian (1863–). An American railroad president, born in Hongkong, China. After graduating from Harvard University in 1885 he was employed by the Chicago, Burlington, and Quincy Railroad in various capacities, rising from the position of civil engineer to be general manager at Chicago. For a time he was consulting engineer to the United States War Department in respect to the railroads of the Philippine Islands. In 1905 he became president of the Wheeling and Lake Erie, of the Wabash-Pittsburgh Terminal, and of the Wabash railroads. He was appointed one of the receivers for the Wabash in 1911, and in 1913 he was elected president of the Monon Railroad. He was vice president of the American Unitarian Association in 1907. His addresses were published under the titles *Questions of the Hour* (1911) and *Are Our Railroads Fairly Treated?* (1913).

DELA'NY, Mary (Granville) (1700–88). An English author, born at Coulston, Wiltshire. She was a friend of the Duchess of Portland, Miss Burney, George III, and Dean Swift. In her own day she became noted for her "flower work"—an arrangement of bits of colored paper in a kind of mosaic, some of which are now in the British Museum. Her *Autobiography and Correspondence* (ed. by Lady Hanover, 1st series, 3 vols., 1861; 2d series, 3 vols., 1862) contains many anecdotes of Pope, Swift, and other literary folk of the time. Consult the *Diary* of Madame D'Arblay (Fanny Burney) (London, 1842–46), and E. M. Symonds, *Mrs. Delany, Mary Granville: A Memoir* (New York, 1900).

DELANY, Patrick Bernard (1845–1924).

An American electrician and inventor, born in County Kings, Ireland. He early came to the United States and learned telegraphy at Hartford, Conn.; gradually he worked up from office boy to be superintendent of lines. Later he was also a newspaper correspondent, editor, and writer. His inventions include more than 150 patents, covering anti-induction cables, synchronous multiplex telegraphy by means of which six messages may be sent simultaneously over one wire, automatic ocean-cable systems, and rapid-machine telegraphy for land lines. His automatic telegraph system is capable of transmitting and recording 3000 words a minute over a single wire. He was awarded gold medals at the International Invention Exhibition in London (1885), at the Pan-American Exposition (1901), and at the St. Louis Exposition (1904), the Elliott-Cresson gold medal twice, and the John Scott medal of the Franklin Institute. From 1893 to 1895 he was a vice president of the American Institute of Electrical Engineers.

DE LA PASTURE, *de* lăp′pȧ-tûr, MRS. HENRY (LADY CLIFFORD). An English novelist and dramatist, daughter of Edward Bonham, British Consul at Calais. She married in 1887 Henry de la Pasture (who was a son of the Marquis de la Pasture and who died in 1908), and in 1910 Sir Hugh Clifford (q.v.). She writes of everyday life with grace and with sentiment and with a humor that has been compared to that of Jane Austen. Among her novels are: *The Little Squire* (1894, dramatized); *Deborah of Tod's* (1897); *Adam Grigson* (1899); *Catherine of Calais* (1901); *Cornelius* (1903); *Peter's Mother* (1905); *The Man from America* (1906); *The Toy Tragedy* (1906, a juvenile); *The Lonely Lady of Grosvenor Square* (1907); *Catherine's Child* (1908); *Grey Knight* (1908); *Unlucky Family* (1908); *The Tyrant* (1909); *Master Christopher* (1911); *The Honorable Mrs. Garry* (1912; in England, called *Ericæ*); *Michael Ferrys* (1913). Her more successful plays were: *Peter's Mother*, which had a long run in 1906 and was revived in 1909; *Deborah*, played in Boston in 1909–10; and *Erica* (1912).

DELAPLANCHE, *de*-lȧ′plänsh′, EUGÈNE (1836–91). A French sculptor, born at Belleville (Seine). He was a pupil of Duret, gained the *Prix de Rome* in 1864, and the medal of honor in 1878. His "Messenger of Love" (1874), "Aurora (1878), and the "Virgin of the Lilies" (1884), are in the Luxembourg. Other works by him are "Music" (1878, Paris Opera House), called his masterpiece; "Eve After the Fall" (1870); "Maternal Instruction" (1875, Square of Sainte-Clothilde, Paris); and the statues of "Security" and "Commerce" (1884) in the Hôtel de Ville, Paris (replicas in the Chicago Art Institute). He is also noted for his decorations in relief on vases of Haviland faïence. His best work is naturalistic, but at the same time dignified and simple in line, and shows sound mastery of technique. He is represented by 15 works in the Glyptothek, Copenhagen, and in many French museums and in churches.

DE LA RAMÉE, *de* lȧ rȧ′mȧ′, LOUISE (pseud. OUIDA). See RAMÉE.

DE LA REY, *de* lȧ rā′ê, JACOBUS HENDRICK (1847–1914). A famous Boer military leader of French Huguenot descent. He was born in the Lichtenburg District of the Western Transvaal, whither his father had moved after Sir Harry Smith and the British troops had driven them from the Orange Free State, in consequence of their participation with Pretorius in the driving out of the British from Bloemfontein in 1848. His early life was marked by a severe training in the art of warfare, through numerous campaigns against hostile Kaffir tribes. His first experience as a commanding officer was against the Basutos in the early 60's, during which he distinguished himself so conspicuously that when the Boer-British War of 1899–1902 broke out, he was unanimously elected to the command of the Lichtenburg burghers, who afterward formed part of Cronje's western column. Like Cronje, he rarely carried weapons on the field, but was never seen without his field glass, pipe, and Bible. Previous to the war he had represented his district for some years in the Volksraad and was a consistent supporter of Joubert as against Kruger. He was not among the Boers who were anxious to begin war and was one of the few leading members of the Transvaal Volksraad who protested against the ultimatum of President Kruger. Hostilities once begun, however, he rapidly became one of the most determined leaders of his people and in the first stages of the war greatly distinguished himself by the skill with which he laid out the lines of the battle of Magersfontein and other smaller encounters. Later, he conducted a well-ordered retreat before the British advance under Lord Roberts and at Nooitgedacht, in 1900, captured 500 British troops. In the second or guerrilla stage of the war he was equally distinguished by his successful tactics, his most important success being the capture of the British general, Lord Methuen, on March 7, 1902, together with a number of British troops. His lack of hospital accommodations and the necessity he was under of making forced and sudden marches precluded his detention of the wounded Lord Methuen, whom he accordingly had to release. His entire career throughout the war was marked by great personal gallantry and by the humane treatment accorded to his enemies. With the Boers he was one of the most popular leaders of the two republics, and he gained from his foes the reputation of being a leader of unerring military judgment and remarkable resourcefulness. In 1902 he took part in the peace negotiations with Great Britain and was one of the deputation appointed to visit Europe and the United States for the purpose of raising funds for the distressed Boers. In December, 1903, he went to India in order to induce the Boer prisoners of war at Ahmednagar to take the oath of allegiance to England. After the formation, in 1907, of the new Transvaal Parliament he became a member of the Legislative Assembly.

DE LA RIVE, *de* lȧ rēv′, AUGUSTE ARTHUR (1801–73). A Swiss physicist who devoted much attention to researches in electricity. He was born in Geneva and at the age of 22 was appointed to the chair of natural philosophy in the Geneva Academy. He was one of the first to investigate the temperature of the earth's crust and made observations in an artesian well 700 feet in depth. He discovered the process of electrogilding, and in 1842 received for it a prize of 3000 francs from the French Academy of Sciences, of which in 1864 he was made a foreign associate. He made original discoveries in connection with magnetism, electrodynamics,

the connection of magnetism with electricity, the properties of the voltaic arc, and the passage of electricity through extremely rarefied media. He published a complete treatise on electricity (1853–58), which was for many years considered a standard work.

DELAROCHE, *de-là'rôsh'*, PAUL (1797–1856). A French historical and portrait painter. He was born in Paris, July 17, 1797, and was a pupil of Watelet and of Baron Gros. He soon became one of the most representative painters of his time, for he was an eclectic, who endeavored to unite the excellences of the Classic and Romantic schools, the line of the one with the color of the other. In his "Joan of Arc" (Wallace collection, London) and the "Death of Queen Elizabeth" (Louvre) he essayed to follow the Romantic school, but early turned to historical painting. His "Death of the Duke of Guise" (1835, Chantilly Museum) and "Cromwell Opening the Coffin of Charles I" (1831, Nîmes Museum) are executed with technical power and fine dramatic effect. His "Children of Edward IV in the Tower" (Louvre) appeared in 1831. Among other historical subjects are the "Execution of Lady Jane Grey" (1834) and "Lord Strafford on the Way to Execution" (1837). His most ambitious work, finished in 1841, is the hemicycle in the Theatre of the Ecole des Beaux-Arts in Paris. In it the arts of different nations are depicted, and the 70 life-size figures that occupy the canvas are portraits of the artists of the times and countries represented. The figure that represents Gothic architecture is said to be a portrait of the painter's wife, who was a daughter of Horace Vernet. After her death, in 1845, he produced "Christian Martyr" (1855, Louvre), the "Crown of Thorns," and the "Return from Golgotha." These pictures show a spontaneity and freedom of treatment not always apparent in the works of Delaroche and express a new impulse born of love and sorrow. Among his later historical works are: "Napoleon at Fontainebleau," painted in 1845 (Leipzig Museum); "Bonaparte at St. Bernard" (1850); "Marie Antoinette Before the Revolutionary Tribunal" (1851). From 1840 until his death he was the most popular portrait painter in France. In the historical accuracy of his compositions Delaroche surpassed all other painters of his day. But he painted without impetuosity and consequently with little feeling. Although he had the pictorial sense in a high degree, he often bordered on the melodramatic. His large and sumptuous picture of the "Death of Queen Elizabeth" is an instance of this. He painted rich stuffs with great skill, but never touched high sentiment or deep feeling. S. W. Reynolds, Desclaux, and others have engraved his principal works. Delaroche was a member of the Institute and a professor in the Ecole des Beaux-Arts; he was an officer of the Legion of Honor and received many medals. He died in Paris, Nov. 4, 1856. Consult the monographs by Loménie (Paris, 1844); Mirécourt (ib., 1856); Halévy, *Notice sur la vie et les ouvrages de Paul Delaroche* (ib., 1858); Rees, *Horace Vernei and Paul Delaroche* (London, 1880); Lalaing, *Les Vernet, Gericault, et Delaroche* (Paris, 1888); Muther, *History of Modern Painting* (London, 1907).

DE LA ROQUE, SIEUR. See ROBERVAL.

DE LA RUE, *dĕl'a-rōō'*, WARREN (1815–89). An English scientist. He was born in Guernsey, educated in Paris, and devoted his leisure hours to scientific research, especially in the fields of chemistry and electricity. Between 1836 and 1848 he published several articles on these subjects, and in 1850 he constructed a large reflecting telescope at Canonbury, moving it later to Cranford, Middlesex. He introduced important improvements in oil-refining, color-printing, and envelope-folding machines, but his importance is due chiefly to pioneer work in photographing the heavenly bodies. He was president of the Royal Astronomical Society from 1864 to 1866. He published: *On Celestial Photography in England* (1859); *Researches on Solar Physics*, with Balfour Stewart and B. Loewy; and a number of papers and lectures on astronomy and physics.

DE LA TORRE, DUKE. See SERRANO Y DOMINGUEZ.

DE LA TOUR, *de là tōōr*, MAURICE QUENTIN. See LA TOUR, MAURICE QUENTIN DE.

DELATTRE, *de-là'tr'*, ALFRED LOUIS (1850–). A French archæologist, born at Déville-les-Rouen. Sent as a missionary to Algeria, he became chaplain of the church of St. Louis of Carthage (q.v.) and conservator of the archæological museum at Algiers. His investigations among the ruins of ancient Carthage have been very valuable. He became director of the Musée Lavigerie de Saint-Louis de Carthage, founded through his efforts in 1875. His works include: *Carthage et la Tunisie au point de vue archéologique* (1883); *Inscriptions de Carthage* (1884–85); *Souvenirs de la croisade de Saint Louis trouvés à Carthage* (1888); *Les tombeaux puniques de Carthage* (1890); *Souvenirs de l'ancienne église d'Afrique* (1893); *Musée Lavigerie de Saint-Louis de Carthage* (3 vols., 1899–1900). For his articles in periodicals, consult Marquis d'Anselme de Puisaye, *Etude sur les divèrses publications du Révérend Père Delattre* (Paris, 1895).

DELATTRE, ROLAND. See LASSO, ORLANDO DI.

DELAUNAY, *de-lō'nā'*, CHARLES EUGÈNE (1816–72). A French astronomer and mathematician. He was professor of mechanics in Paris and a member of the Academy and succeeded Leverrier as director of the Observatory in 1870. He published: *Sur une nouvelle théorie analytique du mouvement de la lune* (1846); *Ralentissement de la notation de la terre* (1866); *Rapport sur les progrès de l'astronomie* (1867); *Cours élémentaire d'astronomie* (6th ed., 1876); *Traité de mécanique rationelle* (7th ed., 1883). His *Théorie de la lune* (2 vols., 1860–67) was left unfinished at his death. Consult Thevenot, *Biographie de C. E. Delaunay* (Paris, 1878).

DELAUNAY, (JULES) ELIE (1828–91). A French mural and portrait painter. He was born in Nantes and was the pupil of Lamothe and Flandrin in the Ecole des Beaux-Arts. He is known chiefly for his mural paintings in the foyer of the Opera House, the Hôtel de Ville, the church of La Trinité, and the Panthéon, in Paris. The paintings in the Panthéon, representing scenes from the life of Saint-Genevieve, he did not live to complete. Among his best works are: "The Last Supper" (1861); "The Plague at Rome" (1869), a water color called his masterpiece; "The Communion of the Apostles"; "Diana," a fine nude—all in the Luxembourg; "The Death of the Centaur Nessus" (Nantes Museum). His later years were devoted almost entirely to portrait painting. Of

this kind his "Mother" (Luxembourg) and "Mademoiselle Toulmouche" are among his best canvases. His work is characterized by great attention to form, firm modeling, and a noble, rather severe style of composition. His color was at first hard, but later showed fantastic yet harmonious effects. He was awarded a first-class medal at the Paris Exposition of 1878 and the medal of honor in 1889. In 1878 he became an officer of the Legion of Honor and the following year was made a member of the Institute.

DE LAUNAY, Emanuel L. H. See Antraigues.

DELAUNAY, Louis Arsène (1826–1903). A French actor, born in Paris. He made his first appearance at the Odéon in 1846 and for two years was engaged there as leading juvenile. In 1848 he appeared as Dorante in *Le Menteur* at the Théâtre Français and in 1850 became a regular member of that theatre. In 1877 he was appointed professor of dramatic declamation at the Conservatoire. He received the decoration of the Legion of Honor in 1883 and retired from the stage in 1887. He was one of the most accomplished of French actors, finding his parts in the plays of Augier, De Musset, Victor Hugo, and Pailleron.

DELAUNAY, Marguerite Jeanne. See Staal.

DE LAUNE, *de lôn*, Etienne. See Laune, or Laulne, Etienne de.

DE LAVAL, *dâ lå-vål'*, Carl Gustaf Patrik (1845–). A Swedish inventor and engineer, born at Blåsenborgs, Dalarna, Sweden. In 1866 he graduated from the Institute of Technology at Upsala, where he took his doctor's degree in philosophy in 1872. For the next five years he was occupied with various building operations, such as constructing sulphur refineries, copper smelters, glass works, and other industrial plants, but after 1877 he devoted himself exclusively to inventions. In 1878 he patented a cream skimmer, and in the following year he put on the market his continuous centrifugal cream separator. For the manufacture of this machine a large factory was built at Stockholm, and the contrivance was soon known all over the world. In 1883 he made the first successful steam turbine (see Steam Turbine), and after further experiments with his invention he constructed in 1892 a steam motor that made 30,000 revolutions a minute. His flexible shaft, which overcame the greatest obstacle in the use of the high-speed turbines, constitutes one of the most original and daring inventions in the field of mechanical science. He also invented a steam boiler that was able to withstand more than 100 atmospheres' pressure. His lactator, a perfected milk separator, was not received into practical use. In 1894 he was chosen as representative for Kopparsbergs in the First Chamber. In 1886 he became a member of the Academy of Sciences (whose gold medal he received in 1892) and in 1896 an honorary member of the Agricultural Academy.

DEL'AVAN. A city in Walworth Co., Wis., 62 miles southwest of Milwaukee, on the Chicago, Milwaukee, and St. Paul Railroad, and on Rock River (Map: Wisconsin, E 6). It is the seat of the State School for the Deaf and contains a public library. The city is noted for its mineral springs and, with Delavan Lake in the vicinity, is a popular place of resort. There are some manufactures of knit goods. The water works are owned by the city. Pop., 1900, 2244; 1910, 2450.

DELAVIGNE, *de-lå'vē'ny'*, Jean François Casimir (1793–1843). A French lyric poet and dramatist, born in Havre, April 4, 1793. His first important writings were dithyrambic poems, *Les messéniennes* (1818), antique in form, but present and direct in their allusions to the disasters of the last Napoleonic years. These gave stirring expression to popular emotions, especially to the rancor and fears of the Liberals at the reactionary rule of the restored Bourbons. They achieved sensational success. In 1819 he turned the same talent to celebrate Joan of Arc, thus appealing to a universal patriotic sentiment before either Hugo or Lamartine had begun to touch the French heart with their Napoleonic verses. The forerunner should not be forgotten in the greatness of his successors, and in drama Delavigne is important to the continuity of historic development. He stands between Beaumarchais and Emile Augier, almost the sole talented representative of dignified comedy, and his dramatic work, taken chronologically, represents almost every phase of the conversion of a strict Classicist into a moderate Romanticist. However, his lack of genuine, forceful inspiration and enthusiasm caused his works to be relegated to the second rank, especially when compared with those of the more buoyant geniuses of the Romantic school. His *L'Ecole des vieillards* (1823) still holds the boards by its lively dialogue, graceful style, and ingenious invention. *Marino Falieri* (1829) anticipates the Hugoesque mingling of tragic and comic elements, preserving an academic correctness of form without following the classic rules. Other plays still occasionally acted and often read are: *Les vêpres siciliennes* (1819); *Louis XI* (1832); *Les enfants d'Edouard* (1833); and *La fille du Cid* (1839). Delavigne was elected to the Academy in 1825 and in 1830 rose to the political occasion, as he had done after Waterloo. His song, "La Parisienne," set to music by Auber, rivaled for a time the "Marseillaise" itself, and "La Varsovienne" was sung as a battle march by the rebelling Poles. Indeed, it is as a poet of politics, a man of the hour, that Delavigne is at his best. At times very popular, he needed striking occasions to evoke his genius. When he became contemplative, he was commonplace, but in direct appeal he wrote with terse vigor. His private life was above reproach. He died in Lyons, Dec. 11, 1843. His complete works were published in 1870 in four volumes. Consult Ed. Sambuc, *Casimir Delavigne* (Paris, 1893), and N. M. Bernadin, *Devant le Rideau, conférences dramatiques* (ib., 1901).

DEL'AWARE. One of the thirteen original States of the United States, constituting one of the Middle Atlantic States (Map: United States, L 3). It lies between lat. 38° 30′ and 39° 45′ N. and long. 75° and 75° 50′ W. It is bounded on the north by Pennsylvania; on the east by the estuary of the Delaware River and by Delaware Bay, which separate it from New Jersey, and by the Atlantic Ocean; on the south and west by Maryland. It has a total area of 2370 square miles, of which 1965 square miles is land and 405 square miles is water surface. It has a length of about 96 miles from north to south, with a greatest width of 35 miles and a least width of 9 miles.

At the entrance to Delaware Bay is Cape Henlopen, opposite Cape May, N. J.

The State of Delaware forms a portion of the Middle Atlantic slope, being embraced largely within the physiographic province of the coastal plain, although somewhat over 100 square miles in the northern part of the State fall within the piedmont plateau province. This latter area, which consists of rolling country, reaches an elevation of 438 feet at Centerville, near the northern border of the State. The streams flow with rapid currents until they pass the "fall line," where they continue with sluggish courses or empty into tidal estuaries. The coastal plain consists of a broad terrace upland of low elevation, known as the Wicomico terrace, which rises from about 60 feet in the southern part of the State to somewhat over 100 feet in the northern part and constitutes the divide between the streams. This is followed by a low terrace, known as the Talbot terrace, which surrounds the shores of the Delaware River and Bay and extends up the various stream channels, reaching an elevation along the landward margin of about 40 feet, from whence it slopes gradually to tide level at most points. The streams of Delaware, while numerous, are all small. In the northern part of the State the streams flow in an easterly or southeasterly direction across it from Pennsylvania and Maryland and empty into the Delaware. Nearly all the State, however, lies on the peninsula between Delaware and Chesapeake bays, and the divide between their waters traverses the States from north to south, keeping at a uniform distance from the east coast. Thus, as Delaware broadens southward, a relatively greater part of it lies west of the divide in the south than in the north. None of these rivers are navigable, although the estuary-like mouth of Christiana Creek permits the ascent of vessels to Wilmington. The Delaware coast of Delaware Bay and the estuary of Delaware River offer few advantages in the way of harbors. Portions of the shore are marshy, and the only good harbors are at Lewes, Wilmington, and New Castle. The Delaware Breakwater has been constructed at great expense near the mouth of the bay, in order to remedy somewhat this deficiency of safe harbors. On the southern border of the State there is an area of swamp land covering 70 square miles.

On the Atlantic coast there are a number of shallow bays or lagoons separated from the ocean by sandy reefs; the shallowness of their entrances, however, limits their usefulness. The largest bays are Rehoboth and Indian River bays, which have a common outlet known as Indian River Inlet, which permits navigation by vessels drawing less than six feet of water.

Climate and Soil. Situated on the east coast of the continent, Delaware has a temperate climate, with a considerable range of temperature and an ample rainfall.

The average annual temperature is about 55° F., varying from 56° at the extreme south to about 52° at the extreme north. The average daily range of temperature, or difference between the highest and lowest temperatures during 24 hours, is from 16° F. to 20° F. The highest summer temperature on record is 103° F. and the lowest winter temperature —17° F.; even in midsummer the temperature has descended to 50° F. On the average August day the temperature rises to about 85° F., and on the average January day the temperature descends to 25° F. In the fall frosts seldom occur before October 10 and may not occur until about November 1, while in the spring they may occur as late as the latter part of April. The advent of spring (i.e., the awakening of plant life) occurs on the average about the end of March.

The annual rainfall is, on the average, from 40 to 45 inches over the State as a whole, but is slightly greater on the coast than inland. The rainfall is rather evenly distributed over the whole year, although there seems to be somewhat less precipitation in late fall and early winter than at other seasons of the year. Damaging droughts are not infrequent, but killing droughts are unknown. Heavy rainfalls take place, sometimes an average month's rainfall occurs in a single day, but damaging rainstorms are rare. Thunderstorms and hailstorms are most frequent from May to August. The prevailing winds are from the northwest from October to May, from the southwest in June and July, and variable during the intervening spring and fall months.

The soils of Delaware are dependent on the underlying geological formations from which they are derived, those of the north in the piedmont plateau belt coming from the underlying crystalline rocks and presenting considerable variation on account of the diversity of their mineral constituents. They possess much less importance from an agricultural standpoint than those farther south derived from the sedimentary deposits comprising the coastal plain. Several well-marked types have been described, the most important being the Sassafras loam, which occupies the high levels of the Wicomico terrace, this soil being well adapted for wheat, corn, and tomatoes, and also affording largely the soil on which the famous peach orchards of Delaware and Maryland are located. Another important soil is the Norfolk sand, covering large areas on both the Wicomico and Talbot terraces and being chiefly employed for the production of early truck crops, including vegetables and small fruits not only in Delaware but throughout the coastal plain district from Long Island to Cape Hatteras. The Portsmouth sand, formed under similar conditions but where the country is less well drained, is well adapted for late truck crops. Many other soil types, including the Elkton clay, Susquehanna clay, and gravel, occupy smaller areas, but are of much less importance from an agricultural standpoint. The important soils described above are derived directly from the underlying Pleistocene formations, while the latter are in part derived from the subjacent Cretaceous beds.

Geology and Mineralogy. The northern part of the State has been already described as falling within the area of the piedmont plateau, this district being underlain by crystalline rocks of various kinds, both of sedimentary and eruptive origin; the former consisting of gneiss, mica schist, and limestone, and the latter of granite, aporhyolite, serpentine, and gabbro with dikes of pegmatite and diabase. Overlying this piedmont plateau complex of crystalline rocks are the coastal-plain formations which comprise representatives of the Cretaceous and Pleistocene periods. The strata are for the most part unconsolidated and consist of marls, clays, sands, and gravels, the total thickness of the deposits in cer-

MARYLAND AND DELAWARE

WASHINGTON AND VICINITY

SCALE OF MILES

0 ½ 1 2

L.L.POATES ENGR'G CO., N.Y.

SCALE OF STATUTE MILES

0 5 10 20 30 40

SCALE OF KILOMETERS

0 10 20 30 40 50 60

Places of 75,000 and over ---- Baltimore

" " 5,000 to 75,000 ---- Cumberland

" " 2,000 to 5,000 ---- Salisbury

County Towns ⊙ Railroads Canals

E Longitude 77° West from 76°30′ Greenwich

tain parts of the area being less than 1000 feet. Clays suitable for the manufacture of brick and terra cotta, and kaolin, are found in the vicinity of Wilmington. A small area of granite occurs near this city, from which building stone and road material are quarried, and some feldspar has been extracted. Glass sand, marls, and bog-iron ore are known to form extensive deposits.

Mining. The mineral resources of the State are limited to its quarries, its clay, sand, and gravel pits, and its mineral waters. All of these are of little importance compared with those of other States. The total mineral production of Delaware in 1912 was valued at $425,360, of which $193,074 was represented by the output of the stone quarries and $162,216 by the clay products.

Agriculture. Delaware ranks forty-seventh in both area and population among the States. Although a considerable portion of its population lives in a manufacturing centre, it is a distinctly agricultural State. As most of it is part of the Atlantic coastal plain, as a whole it is level and easily tilled. Between 1900 and 1910 there was an increase of 9.5 per cent in population, while the number of farms increased 11.9 per cent. In the same period there was a decrease of over 2.6 per cent in the acreage of farm land and a decrease of 5.4 per cent in the improved land in farms. The total number of farms in the State in 1910 was 10,836, compared with 9687 in 1900. Of an approximate area of 1,257,600 acres, there were in farms, in 1910, 1,038,866 acres, compared with 1,066,228 in 1900. The improved land in farms in 1910 amounted to 713,538 acres, compared with 754,010 acres in 1900, a decrease of 40,472 acres in the decade. The average acres per farm decreased from 110.1 in 1900 to 95.9 in 1910. The total value of farm property which includes land, buildings, implements and machinery, domestic animals, poultry and bees, was $63,179,201, in 1910, compared with the value in 1900 of $40,697,654, an increase in the decade of $22,481,547, or 55.2 per cent. The average value of all property per farm in 1910 was $5830, compared with $4201 in 1900; while the average value of land per acre increased from $22.29 in 1900 to $33.63 in 1910.

Of all the farms in the State in 1910 (10,836), 6301 were operated by owners and managers and 4535 by tenants. About 42 out of each 100 farms were operated by tenants. In 1890 and in 1900 the proportion was even higher; in the latter year it amounted to slightly more than 50. The fluctuations in the number and proportion of farmers who are tenants arise mainly from the changes among the share tenants. The number of cash tenants has increased slowly since 1880. Share and share-cash tenancy, on the other hand, increased rather rapidly for 20 years, but decreased considerably during the decade 1900–10, and among colored farmers the proportion increased slightly.

Of the owned farms in 1910, numbering 6178, 3817 were free from mortgage, while 2264 were mortgaged. The total amount of the mortgage debt was $3,068,721, while the value of the land and buildings mortgaged was $8,801,976. The average debt per farm was $1518 in 1910, compared with $2147 in 1890, while the average equity per farm in 1910 was $2837 in 1910 and $2728 in 1890.

Over half the farms in the State are between 50 and 174 acres in size, and nearly three-fourths are between 20 and 174 acres. Slightly over nine-tenths of the farm operators in 1910 were whites and nearly one-tenth colored. The total number of native white farmers was 9504, and of negro and other non-white, 922. The foreign-born white farmers numbered 410, of whom nearly one-third were born in Germany.

The total value of the crops in 1909 was $9,121,809, against $6,275,360 in 1899. Combined acreage of crops was 438,522, representing 61.5 per cent of the total improved land in farms (713,538 acres). The general character of the agricultural products is indicated by the fact that about one-half, or 51.4 per cent of the total value, in 1909 was contributed by the cereals; about one-fifth by potatoes and other vegetables, and about one-eighth by hay and forage; the remainder, representing 15.6 per cent of the total, consisted chiefly of small fruits, forest products, orchard fruits, and nuts. The following table gives the acreage, production, and value of the principal crops in 1913 and in 1909. The figures for 1913 are estimates by the United States Department of Agriculture, while those for 1909 are from the thirteenth census.

		Acreage	Prod. bu.	Value
Corn	1913	197,000	6,206,000	$3,662,000
	1909	188,755	4,839,548	2,903,442
Wheat	1913	133,000	1,638,000	1,441,000
	1909	111,215	1,643,572	1,697,539
Oats	1913	4,000	122,000	62,000
	1909	4,226	98,239	51,022
Rye	1913	1,000	14,000	11,000
	1909	1,017	11,423	8,169
Potatoes	1913	11,000	957,000	718,000
	1909	9,703	880,360	453,400
Sweet potatoes and yams	1913	5,000	675,000	405,000
	1909	5,229	733,746	276,679
Hay	1913	72,000	94,000*	1,476,000
	1909	80,669	103,575	1,174,473

* Tons.

The leading crops in the order of their importance are corn, wheat, hay and forage, potatoes, and sweet potatoes and yams. Potatoes, sweet potatoes and yams, and dry peas are the only crops outside of cereals and hay and forage which have any considerable acreage. There has been a considerable fluctuation in the acreage of corn. In the last 30 years the decrease in the acreage of oats has been marked. The acreage of wheat, on the other hand, has made a considerable gain since 1879, though it decreased slightly during the decade 1900–10. The acreage of hay and forage nearly doubled in the same period, and that of sweet potatoes and yams more than doubled. The State is an important producer of orchard and tropical fruits. The total value of these in 1909 was $199,766, and the quantity produced was 309,274 bushels. The production of orchard fruits greatly decreased in the decade 1899–1909, while the production of grapes increased. The value of all orchard fruits in 1899 was $263,000, while the value of grapes increased from $31,701 in 1899 to $43,967 in 1909. The most important of the orchard fruits is apples, of which there were grown 183,004 bushels in

1909, with a value of $115,371. Pears ranked next in value, with 105,357 bushels, valued at $52,022; peaches and nectarines, 16,722 bushels, valued at $21,402. Other fruits of less importance are plums, prunes, and quinces. Of much greater value than the orchard fruits are small fruits. There were produced of these, in 1909, 14,425,209 quarts, valued at $649,732. Strawberries are by far the most important of the small fruits. The production in 1909 was 12,730,265 quarts, valued at $569,354. Blackberries and dewberries rank next in value. The total acreage of small fruits in 1909 was 8687, a decrease from 10,599 in 1899. The value of all vegetables other than potatoes and sweet potatoes and yams in 1909 was $1,102,620. The raising of flowers and plants and nursery products is of the same importance. The total output in 1909 was valued at $110,486.

Live Stock and Dairy Products. The total value of the live stock on the farms of the State in 1910 was $6,817,000. This includes domestic animals, poultry, and bees. The cattle numbered 54,986, with a value of $1,648,333; horses, 33,065, valued at $3,451,791; mules, 5935, valued at $764,133; swine, 49,260, valued at $337,910; sheep, 7806, valued at $36,898. The total number of fowls of all kinds was 876,081, valued at $560,146. The estimates of live stock on Jan. 1, 1914, as given by the United States Department of Agriculture, was as follows: cattle, other than milch cows, 19,000, valued at $555,000; milch cows, 39,000, valued at $2,028,000; sheep, 8000, valued at $41,000; swine, 58,000, valued at $597,000; horses, 35,000, valued at $3,710,000; mules, 6000, valued at $756,000. The number of dairy cows on April 15, 1910, was 35,708. The milk sold in 1910 was 4,425,909 gallons, valued at $665,953. The butter sold amounted to 1,024,945 pounds, valued at $277,202. The total value of milk, cream, and butter fat sold, and butter and cheese made, in 1909 was $1,089,497.

Forest Products.—There were 5429 farms in the State in 1909 which reported forest products, the total value of such products being $346,062, as compared with $250,481 in 1899. Of the value in 1909, $180,061 was reported as that of products used or to be used on the farms themselves, $101,814 as that of products sold or for sale, and $64,187 as the amount received for standing timber. Forest products not produced on farms are not included in these figures.

Manufactures. Although, as noted above, the chief industry of the State is agriculture, its manufacturing interests are important. The transportation facilities of Delaware are excellent, as no part of the State is removed from navigable water, and its location gives it direct railroad connection with the large railway systems in the East. There is but one city having a population of over 10,000, Wilmington, with a population of 87,411. The following table gives the most important facts relative to manufactures in the State in 1909, compared with 1904. Only such industries as had a product valued at $1,000,000 or over in 1909 are

COMPARATIVE SUMMARY FOR 1909 AND 1904

THE STATE — ALL INDUSTRIES COMBINED AND SELECTED INDUSTRIES

INDUSTRY	Census	Number of establishments	PERSONS ENGAGED IN INDUSTRY: Total	Proprietors and firm members	Salaried employees	Wage earners (average number)	Primary horse power	Capital	Salaries	Wages	Cost of materials	Value of products	Value added by manufacture
								Expressed in thousands					
STATE — All industries	**1909**	**726**	**23,984**	**722**	**2,024**	**21,238**	**52,779**	**$69,906**	**$2,322**	**$10,296**	**$30,938**	**$52,840**	**$21,902**
	1904	**631**	**20,567**	**641**	**1,451**	**18,475**	**49,499**	**50,926**	**1,629**	**8,158**	**24,884**	**41,160**	**16,276**
Canning and preserving	1909	77	1,556	103	84	1,369	1,725	1,520	41	273	1,553	2,106	553
	1904	59*	1,122	86	37	999	1,274	1,005	18	187	1,031	1,456	425
Cars and general shop construction and repairs by steam-railroad companies	1909	3	1,629	. . .	104	1,525	1,835	1,635	99	1,147	1,943	3,251	1,308
	1904	5	1,430	. . .	89	1,341	1,345	1,010	82	815	649	1,558	909
Cars, steam-railroad, not including operations of railroad companies	1909	3	1,837	. . .	158	1,679	3,388	3,497	185	1,131	1,913	3,628	1,715
	1904	3	1,661	. . .	102	1,559	1,717	2,707	112	1,031	1,942	3,600	1,658
Flour-mill and gristmill products	1909	65	244	86	19	139	3,349	672	14	57	1,500	1,752	252
	1904	47	214	65	12	137	2,827	484	8	58	1,315	1,537	222
Foundry and machine-shop products	1909	37	2,538	21	307	2,210	4,270	7,401	394	1,247	2,402	4,781	2,379
	1904	33	2,630	16	286	2,328	3,635	7,163	327	1,195	2,246	4,484	2,238
Iron and steel, steel works and rolling mills	1909	5	785	. . .	75	710	4,912	2,107	92	416	1,059	1,715	656
	1904	5	1,146	. . .	91	1,055	10,310	6,280	103	412	940	1,597	657
Leather, tanned, curried, and finished	1909	16	3,241	12	184	3,045	4,417	8,249	351	1,367	8,147	12,079	3,932
	1904	20	3,046	18	192	2,836	5,377	6,646	251	1,176	7,911	10,251	2,340
Lumber and timber products	1909	116	1,369	148	47	1,174	3,767	1,048	23	330	608	1,312	704
	1904	94	786	113	18	655	3,037	551	9	196	405	857	452
Paper and wood pulp	1909	6	599	4	49	546	4,318	3,314	61	310	1,587	2,292	705
	1904	6	575	6	22	547	5,115	3,176	70	252	1,270	1,905	635
Shipbuilding, including boatbuilding	1909	10	1,411	8	164	1,239	3,582	2,888	181	697	981	1,990	1,009
	1904	10	1,193	11	60	1,122	1,512	2,630	92	563	895	1,781	886

* Excluding statistics for one establishment, to avoid disclosure of individual operations.

included. From this table it will be noted that there were, in 1909, 726 manufacturing establishments which gave employment to an average of 23,984 persons during the year and paid out $12,618,000 in salaries and wages. The products of these establishments were valued at $52,840,000, to produce which materials costing $30,938,000 were utilized. The value added by manufacture was thus $21,902,000, which figure best represents the net wealth created by manufacturing operations during the year.

In general, this table brings out the fact that the manufacturing industries as a whole showed a considerable increase in the period 1904–09. During this period the number of establishments increased 15.1 per cent, and the average number of wage earners 15 per cent, while the value of products increased 28.4 per cent and the value added by manufacture 34.6 per cent. The most important industries, in the order of their importance, are those connected with the manufacture of leather, those relating to foundry and machine-shop products, cars and steam railroads, paper and wood pulp, canning and preserving, shipbuilding, flour and gristmill products, iron and steel, steel works and rolling mills, and lumber and timber products. The leather industry showed a greater rate of increase from 1904 to 1909 in the value added by manufacture than any other of the specified industries. The steam-railroad repair shops and the canning and preserving industry also showed remarkable increases both in value of products and in value added by manufacture. The total number of persons engaged in the manufacturing industries in 1909 was 23,984. Of these, 21,238 were wage earners. The male wage earners numbered 17,505, and the female 3733. There were 529 wage earners under 16 years of age, of whom 300 were male and 229 female. Nearly all the women and children are employed in canning and preserving. For the great majority of wage earners the prevailing hours of labor range from 54 to 60 hours a week, or from 9 to 10 hours a day, only 8 per cent of the total employed in establishments working less than 9 hours a day and only 4.5 per cent in establishments working more than 10 hours a day.

The manufacturing industries are largely centralized in the city of Wilmington. In 1909, 72 per cent of the total value of products was reported from this city, and 69 per cent of the average number of wage earners were employed there. Between 1899 and 1909 the districts outside of Wilmington gained slightly more in the value of manufactures than did the city itself. This is due to the fact that two of the largest and most important industries—canning and preserving and lumber and timber products—are conducted entirely outside of Wilmington.

Fisheries. The fisheries of Delaware are not important. The value of the products for the year ending Dec. 31, 1908, was only $541,200. Of this the largest in point of value and amount was menhaden. The value of this fish taken was $151,790, and the amount 59,815,400 pounds. Next in order of importance were oysters, of which 154,600 bushels with a value of $111,990 were taken. Of oysters for seeding purposes, 193,200 bushels, valued at $56,620, were caught. Following in order of importance were shad, 869,800 pounds, valued at $67,860; squeteague, or sea trout, 2,590,000 pounds, valued at $29,190; crabs, 3,178,300 pounds, valued at $13,390. Among other fish caught are striped bass and catfish. In 1908 there were 65 vessels employed in the fisheries of the State, and these were valued at $679,565. The number of independent fishermen were 853, and the wage-earning fishermen employed numbered 903.

Transportation. The State has good facilities for transportation, both by land and by water. Two important railroads pass through it, the Pennsylvania and the Baltimore and Ohio. The Wilmington and Northern Railroad is leased by the Philadelphia and Reading Railway Company. The longest mileage is that of the Pennsylvania road, which has 275 miles. The total railway mileage in 1913 was about 400. There is no State railway commission. The Chesapeake and Delaware bays are connected by a canal 13½ miles long, 66 feet wide, and 10 feet deep. This work was completed in 1889 at a cost of $2,253,000. Wilmington has considerable coastwise traffic, and it is a customs district. The city is connected with New York by a line of steamers. In recent years the government has made appropriations for improving Wilmington harbor and for dredging a channel in several of the larger streams of the State. A massive breakwater at Lewes was begun in 1837 and was completed in 1869 at a cost of over $2,000,000. The mileage of electric railways on Dec. 31, 1912, was 110.37.

Banks. There were on June 14, 1913, 25 national banks in Delaware. These had a capital of $1,689,000, deposits subject to check of $8,224,000. There were also four State banks with a capital of $520,000, deposits subject to check of $1,514,083, and savings deposits amounting to $625,345. On June 4, 1912, there were two savings banks with 33,575 depositors and deposits amounting to $10,800,113. In addition there were 16 loan and trust companies with deposits subject to check amounting to $7,705,193 and savings deposits amounting to $957,408.

Population. The population of Delaware from 1790 is as follows: 1790, 59,000; 1820, 72,700; 1850, 91,500; 1860, 112,200; 1870, 125,600; 1880, 146,600; 1890, 168,500; 1900, 184,700; 1910, 202,322; 1920, 223,003. The estimated population in 1914 was 209,817. The ratio of increase in the decade 1900–10 was 9.5 per cent, as compared with 21 per cent for the entire country. The white population in 1910 was 171,102, compared with 153,977 in 1900. The negro population in 1910 was 31,181, compared with 30,697 in 1900. The native-born population in 1910 was 184,830 and the foreign-born 17,492. Of the white population, 127,809 were of native parentage, 17,566 of foreign parentage, and 8307 of mixed parentage. Wilmington is the only city in the State having over 25,000 inhabitants. Its population in 1910 was 87,411, compared with 76,508 in 1900. Other cities with their populations in 1910 and 1900 are Dover (the capital), 3720, 3229; Milford, 2603, 2500; New Castle, 3351, 3380.

Education. Educational conditions in the State are far from satisfactory, but the people and the Legislature have evidenced a determination to remedy them. The Legislature of 1907 passed a compulsory education law by which all children between the ages of 7 and 14 are re-

quired to be sent to school. This law was amended in 1909. The Legislature of 1911 abolished the existing State Board of Education and established a new State board with wider powers. This board is composed of seven members, who serve without compensation. The Legislature of 1913 gave the Governor the power to appoint a State Commissioner of Education who would also be the secretary of the State Board of Education. The term of this officer is for two years, and the first appointment made was on May 1, 1913. The present law under which the public schools are administered dates from 1898. Successive legislatures since that time have amended these laws. Provision has been made for the establishment of free public libraries in schools and for moral and humane education. Measures have also been passed providing for the improvement of schoolhouses for colored children and for the consolidation and uniting of school districts for colored people. Although there are no normal schools in the State, provision is made for the attendance of a certain number of persons at normal schools in other States.

Authoritative statistics in regard to school enrollment, attendance, etc., are not available for a date later than 1910. In that year the total school population between the ages of 6 and 20 was 57,932. The total number of persons attending school in the same year was 35,304. Of these 23,789 were of native white parentage, 5103 of foreign-born or mixed parentage, and 5815 negroes.

Out of a population of 163,080 of 10 years of age or over, in 1910, 13,240, or 8.1 per cent, were illiterate. In 1900 the number was 17,531 and the percentage 12. Among persons of native parentage there were 3362, or 3.3 per cent, illiterates in 1910, while for the negro population the total number of illiterates in 1910 was 6345, or 25.6 per cent. The illiterates among the negroes in 1900 numbered 8967, or 38.1 per cent, of the colored population. In 1912 there were 23 public high schools, with total enrollment of 1928 white and 177 colored students. The average length of the school term in 1910 was 172.5. In the same year there were 993 teachers employed, of whom 857 were women and 136 men. The average monthly salary of men teachers in 1910 was $78.40, and for women teachers $38.76. The total amount expended for schools in the same year was about $600,000. The only institutions for higher education are Delaware College for men at Newark, St. Joseph's Industrial School (Roman Catholic) at Clayton, and a State College for Colored Students at Dover. The last-named institutions are both for colored students.

Charities and Corrections. The State has no board in direct supervision of charitable and correctional institutions. The list of such institutions which are partially supported by appropriations by the State or county are as follows: State Hospital for the Insane, Farnhurst; New Castle County Hospital, Farnhurst; Ferris Industrial School, Marshallton; Delaware Industrial School for Girls, Wilmington; Delaware Orphans' Home for Colored Children, State Road. There are in addition several private institutions which receive appropriations from county or State. These include the Home for Aged Women at Wilmington, the Crittenton Home at Wilmington, and the Home for Friendless Children at Wilmington. Supervision of the blind in the State is in the hands of the Delaware Commission for the Blind. There are, in addition to these, private hospitals and other institutions. A large part of the supervision of the public and semipublic institutions is in the hands of the Associated Charities at Wilmington. The Legislature of 1911 provided for the appointment by judges of the Superior Court of a probation officer to act for the whole State and for a juvenile court at Wilmington. Commissions were appointed by the same Legislature to report on child labor. This report was made to the Legislature of 1913, and a measure was enacted regulating the hours of labor for females, making a maximum of 10 hours per day or 55 hours per week in certain employments.

Militia. The organized militia comprises one regiment of infantry and one detachment of sanitary troops. The enlisted men on Jan. 1, 1913, numbered 441, and the officers 41. The designation is the Organized Militia of Delaware.

Finance. The report of the State Treasurer for the fiscal year 1913 shows receipts from all sources for that year of $676,953. The disbursements for the same period were $707,158. At the beginning of the fiscal year there was a balance of $92,347, leaving a balance at the end of the fiscal year 1913 of $61,749. The chief sources of revenue are licenses and fees from clerks of the peace, insurance and banking department, railroads, State corporation and franchise taxes, and the collateral inheritance tax. The chief expenditures are for education, charities, State institutions, highways, executive and judicial departments, public health, agriculture, legislature, and public defense. The bonded debt of the State at the end of the fiscal year 1913 was $826,785. The Legislature of 1911 appointed a revenue and tax commission which was to report to the Legislature of 1913. A revenue law passed in the same session requires manufacturers to pay for an annual license and make an annual report.

Religion. The leading religious denominations are the Methodist Episcopal, Roman Catholic, Presbyterian, Protestant Episcopal, and Baptist. Wilmington is the see of the Protestant Episcopal diocese of Delaware and of the Roman Catholic diocese of Wilmington.

Government. Delaware has been governed under four constitutions. The first was adopted in 1776, the second in 1792, the third in 1831, and the present in 1897. The last named has been several times amended, but the amendments are not of great importance. Amendments may be proposed in the Senate or House of Representatives, and if two-thirds of each House vote for such amendment it must be published three months before the next general election. If the General Assembly next held after this election agrees to the amendment by a two-thirds vote, it becomes a part of the constitution. The General Assembly by a two-thirds vote has the power to provide for the submission to the electors at the general election next thereafter the question "Shall there be a convention to revise the constitution and amend the same?" If a majority of electors voting on the question shall decide in favor of a convention, the General Assembly at its next session shall provide for the election of delegates to such a convention at the next general election.

Legislative.—The legislative power of the State is vested in the General Assembly, consisting of the Senate and House of Representa-

tives. The House of Representatives is composed of 35 members chosen for two years. The Senate is composed of 17 members who are chosen for four years. The Legislature meets biennially.

Executive.—Executive officers include Governor, Lieutenant Governor, Attorney-General, Insurance Commissioner, State Treasurer, and Auditor of Accounts. The terms of the Governor and Lieutenant Governor, Attorney-General, and Insurance Commissioner are four years, and those of the State Treasurer and Auditor of Accounts are two years. The Governor may not be a candidate a third time for office.

Local and Municipal Government.—The hundred, or township, is the unit of local government. The city of Wilmington is governed by a modified-commission form of government, including the initiative and referendum. This was authorized by the Legislature of 1907. Sheriffs are elected for a term of four years and are not eligible for a second term.

Prior to 1913 there was a primary law which applied only to New Castle County. The Legislature of that year extended this law to Kent and Sussex counties, thereby covering the entire State. This primary law provides for the nominations of county officials, members of the General Assembly, and the election of delegates to the respective party nominating conventions.

Judiciary.—The judicial powers of the State are vested in a supreme court, a superior court, a court of chancery, an orphans' court, a court of oyer and terminer, a court of general sessions, and a registers' court. There are six State judges, one of whom is chancellor, one chief justice, and the other four associate justices. The chancellor, chief justice, and associate justices are appointed by the Governor and confirmed by the Senate. The term of service is 12 years. By an amendment adopted in 1913 the chief justice and the four associate justices compose the supreme court, the court of general sessions, and the court of oyer and terminer. The chancellor presides over the court of chancery. The orphans' court in each county consists of a chancellor and a resident associate judge of the county.

Suffrage and Elections.—Every male citizen of the age of 21 years and over who has been a resident for one year next preceding an election and for the last three months a resident of the county and for the last 30 days a resident of the hundred, or election district, in which he may offer to vote and in which he shall have been registered, is entitled to vote. Each voter, however, is required to be able to read the constitution of the State in the English language and to write his name. Prior to 1907 each voter at the time of his registration was required to pay a fee of $1 for the use of the county wherein the registration was made. The Legislature in the year noted passed an amendment abolishing this provision.

General elections are held biennially on the Tuesday next after the first Monday in the month of November. The Legislature has passed several measures providing for the secrecy and purity of the ballot. The constitution contains strong provisions against giving or receiving bribes for voting.

History. The aboriginal inhabitants of the region belonged to the Lenni Lenape family, but Iroquois hunting parties frequently traversed the country. The name "Delaware" was first applied to the bay which Lord de la Warr entered in 1611. Mey, a Dutch explorer, built Fort Nassau near the site of Philadelphia in 1623, and in 1631 a Dutch company, headed by De Vries, established a colony on Lewes Creek, near Cape Henlopen, which the Indians destroyed. In 1638 Swedes erected a fort on Christiana Creek, named the country New Sweden, and subsequently established a military post on the island of Tinnicum, below Philadelphia. The Dutch considered this an invasion of their territory and set up Fort Casimir, near the site of the present New Castle. A settlement on the Delaware, made in 1641 near the present site of Salem, N. J., by a colony from New Haven, existed for only two years. After 1642 the Swedes and the Dutch came into open conflict. The Swedes took Fort Casimir in 1654, but were driven out in the following year by the Dutch, who seized the whole country. When New Netherlands came into the possession of the English, the settlements on the Delaware were claimed both by the Duke of York and by Lord Baltimore. In 1683 William Penn received the territory in fee from the Duke of York and effected a compromise with Lord Baltimore, and for 20 years Delaware was governed as a part of Pennsylvania under the name of the "Territories or Three Lower Counties on the Delaware," each county sending six representatives to the General Assembly. In 1703 Delaware established a separate legislature, but continued to acknowledge the authority of the Governor of Pennsylvania till the Revolution. In the War of Independence the "Blue Hen's Chickens," as the Delaware volunteers were called, rendered efficient service. The State was the first to ratify the Federal Constitution, Dec. 7, 1787.

Though a slaveholding State, Delaware remained faithful to the Union in 1861 and contributed nearly 14,000 troops to the Federal armies. In the southern part of the State, however, the Confederate sentiment was strong, and large numbers went to join the forces of the South. The Fourteenth Amendment was denounced by the Legislature, and though no forcible attempts were made, as in the South, to hamper the negroes in the exercise of their newly acquired civil and political rights, the feeling of race hatred prevailed for a long time after the war.

The period since 1865 has witnessed a remarkable growth of the railway system, the development of the fruit industry, and the rise of Wilmington as a shipbuilding and manufacturing centre. The rapid growth of Wilmington in population since 1873 has created great opposition to the prevailing system of representation in the Legislature as being unfair to the inhabitants of that city. This is owing to the fact that the State representatives are apportioned arbitrarily among the three counties, with the result that New Castle County, containing the city of Wilmington, with an industrial population one and a half times that of the agricultural counties of Sussex and Kent, has always been in a hopeless minority. From 1788 to 1852 Delaware was a Federal or Whig State in national elections excepting in 1820, when it cast its vote for Monroe. Since 1852 it has been a Democratic State with the exception of the years 1872, 1896, 1900, 1904, and 1908. In State politics it was consistently Democratic from 1865 to 1869. The Republican party in the latter

year won a majority in the State Legislature, and from that time, with the exception of short periods, was in political control of the State until 1913. The period from 1893 to 1906 was marked by one of the most remarkable instances of the domination of a political party by one man that has occurred in the history of the United States. In consequence of the political ambitions of J. Edward Addicks (q.v.), the Republican party in the State was disrupted and corruption of the Legislature and electorate became notorious throughout the country. In the struggle between Addicks and the opposing faction the Legislature was several times deadlocked, and from 1901 to 1903 the State was without representation in the United States Senate. Not until June 13, 1906, when Henry A. Du Pont, representing the Regular Republicans, was elected to the Senate, did Addicks abandon the attempt to control the politics of the State and to have himself elected to the Senate. On the expiration of the term of Senator Allee in 1907, Harry A. Richardson was elected Senator.

In the presidential election of 1908 Taft received 25,014 votes and Bryan 22,071. In the presidential election of 1912 Wilson received 22,631 votes, Taft 15,997, and Roosevelt 8886. The Democrats elected all State officers except Governor, and elected also a majority of the Legislature, which insured the election of a Democrat as Senator in 1913 to succeed Senator Richardson. Willard Saulsbury was elected on Jan. 29, 1913, for the term expiring March 3, 1919.

The question of liquor regulation has been a troublesome one. The local-option law divides the State into four districts, one of which includes the city of Wilmington, another the rural part of New Castle County (in which is Wilmington), and the others Kent and Sussex Counties. In an election held in 1907 two of these districts voted for no license, and the other two for license. In the city of Wilmington and in rural New Castle County license was successful; while Kent and Sussex counties gave large majorities to no license. This resulted in the prohibition in these counties of all liquors except for sacramental and medicinal purposes. Suits brought to test the validity of the law under which these elections were held resulted in a decision of the Supreme Court sustaining them in 1908. The Legislature of 1909 passed a measure providing for a resubmission of the question of licensing the sale of liquors in rural New Castle County, which, with Wilmington, voted in 1907 for license. At an election held in November, 1910, voters of the rural portion of New Castle County again voted for license by a majority of 748; thus all New Castle County remained license, while Kent and Sussex counties continued no license. The State has one Representative in Congress, and three votes in the Electoral College.

Following is a list of the governors of the State from its first settlement to 1915:

COLONIAL GOVERNORS

(Swedish)

Peter Minuit	1638–40
Peter Hollander	1640–43
Johan Printz	1643–53
Johan Papegoga (acting)	1653–54
Johan Claudius Rising	1654–55

From 1655 to 1682 Delaware was under the rule of the Dutch and English governors of New York, and from 1682 to 1776 its governors were those of Pennsylvania.

PRESIDENTS UNDER THE CONSTITUTION OF 1776

John McKinly	1777
Thomas McKean (acting)	1777
George Read (acting)	1777–78
Cæsar Rodney	1778–81
John Dickinson	1781–82
John Cook (acting)	1782–83
Nicholas Van Dyke	1783–86
Thomas Collins	1786–89
John Davis (acting)	1789
Joshua Clayton	1789–93

STATE GOVERNORS

Joshua Clayton	Federalist	1793–96
Gunning Bedford	"	1796–97
Daniel Rogers (acting)	"	1797–99
Richard Bassett	"	1799–1801
James Sykes (acting)	"	1801 02
David Hall	"	1802 05
Nathaniel Mitchell	"	1805–08
George Truitt	"	1808–11
Joseph Haslett	"	1811–14
Daniel Rodney	"	1814 17
John Clark	"	1817–20
Jacob Stout (acting)	"	1820–21
John Collins	Dem.-Rep.	1821 22
Caleb Rodney (acting)	"	1822–23
Joseph Haslett	"	1823–
Charles Thomas (acting)	"	1823–24
Samuel Paynter	Federalist	1824–27
Charles Polk	"	1827–30
David Hazzard	"	1830–33
Caleb P. Bennett	Amer.-Rep.	1833–36
Charles Polk (acting)	"	1836–37
Cornelius P. Comegys	Whig	1837–41
William B. Cooper	"	1841–45
Thomas Stockton	"	1845–46
Joseph Maull (acting)		1846–
William Temple (acting)		1846–47
William Tharp	Democrat	1847–51
William H. Ross	"	1851–55
Peter F. Causey	Whig-Know-Nothing	1855–59
William Burton	Democrat	1859–63
William Cannon	Republican	1863–65
Gove Saulsbury (acting)	Democrat	1865–67
Gove Saulsbury	"	1867–71
James Ponder	"	1871 75
John Cochran	"	1875 79
John W. Hall	"	1879–83
Charles C. Stockley	"	1883–87
Benjamin T. Biggs	"	1887 91
Robert J. Reynolds	"	1891–95
Joshua H. Marvel	Republican	1895–
William T. Watson (acting)	Democrat	1895 97
Ebe W. Tunnell	"	1897–1901
John Hunn	Republican	1901 05
Preston Lea	"	1905–09
Simeon S. Pennewill	"	1909–13
Charles R. Miller	"	1913–17
J. G. Townsend	"	1917–21
William D. Denney	"	1921–

Consult: Scharf, *History of Delaware* (2 vols., Philadelphia, 1888); Conrad, *History of the State of Delaware* (Wilmington, 1910); Messersmith, *Government of Delaware* (New York, 1910); Hassee, *Index of Economic Material in the Documents of the United States: Delaware* (Washington, 1910); Pyle, *Once Upon a Time in Delaware* (Wilmington, 1912).

DELAWARE. A city and the county seat of Delaware Co., Ohio, 24 miles north of Columbus, on the Whetstone (Olentangy) River, and on the Cleveland, Cincinnati, Chicago, and St. Louis, the Pennsylvania Company, and the Hocking Valley railroads (Map: Ohio, E 5). It is the seat of the Ohio Wesleyan University (q.v.) (Methodist Episcopal), opened in 1844, and contains the University and Carnegie libraries and was the birthplace of Rutherford B. Hayes. There are mineral springs noted for medicinal properties. The city is in a rich agricultural and stock-raising region, carries on a considerable trade, and has foundries, railroad repair shops, clay works, and manufactures chairs, carriages, building material, gloves, flour, woolens, lumber, shoes, gasoline engines, cigars,

etc. Delaware, incorporated in 1827, is governed by a mayor, elected every two years, and a municipal council. Pop., 1900, 7940; 1910, 9076; 1914 (U. S. est.), 9500.

DELAWARE (from the Delaware River). One of the most important tribes of Algonquian stock, originally occupying what is now New Jersey and the Delaware River basin, eastern Pennsylvania, and southeastern New York. They call themselves *Lenni Lenape*, 'true men,' and claimed and were accorded precedence over nearly all the other tribes of Algonquian kinship. They had a number of subtribes in three principal divisions, of which the Munsee (q.v.) or Wolf tribe differed considerably from the others. They were friendly with the Dutch and Swedish colonists, and in 1682 made the celebrated treaty with William Penn, which was faithfully kept on both sides for over half a century. German Moravian missionaries, among whom were the devoted Zinzendorf, Zeisberger, and Heckewelder, labored among them with great success. Through the aggression of the later settlers, backed by the powerful Iroquois, they were finally compelled to retire to the Susquehanna and upper Ohio region, in consequence of which they became embittered against the English colonists and threw their whole strength with the French side in the French and Indian War of 1754–63. In the Revolution they joined with the British against the Americans and, with other tribes of the Ohio valley, continued the struggle until crushed by Wayne and compelled to accept the Treaty of Greenville, by which, in 1795, the allied tribes ceded nearly all their ancient claims in what is now Pennsylvania and Ohio. During this struggle occurred the massacre of the peaceful Christian Delawares at Gnadenhuetten, Ohio, in consequence of which the remaining converts fled to Canada. By successive removals the larger portion of the tribe drifted from Indiana to Missouri and Kansas, a considerable band settling by Spanish permission in eastern Texas. The main body removed in 1867 from Kansas to the Indian Territory (Oklahoma) and became incorporated with the Cherokee Nation. Of the Delaware there are now but 914 and of the Munsee, 71, residing chiefly in Oklahoma. Consult Harrington, in *American Anthropologist* (1913), and Skinner, *Report Archæological Survey of New Jersey* (1913).

DELAWARE BAY. A bay on the Atlantic coast of the United States, between the States of Delaware and New Jersey (Map: New Jersey, B 5). It receives the Delaware River, whose estuary gradually merges into the bay. It is about 50 miles long to where it contracts to a width of 4 miles. Its greatest width is about 28 miles, and the width at the entrance, between Cape May, in New Jersey, and Cape Henlopen, in Delaware, is about 12 miles. The depth of the channel varies from 30 to 60 feet, but much of the bay has less than 30 feet of water. A breakwater at Cape Henlopen, constructed by the United States government, forms a large and safe harbor from 24 to 35 feet deep. Government lighthouses are maintained at the entrance to the bay and also at a number of places within the bay, not only to mark points on the shore, but also shoal places in the channel. A large tonnage of coast and foreign shipping passes through the bay to and from Wilmington, Chester, and Philadelphia.

DELAWARE COLLEGE. An educational institution founded at Newark, Del., in 1833. In 1859 the college was closed and was not reopened until 1870, when it was made beneficiary of the Congressional Act of 1862 granting public lands to the several States for the purpose of establishing colleges of agriculture and the mechanic arts. Under a further congressional act known as the Hatch Bill, an Agricultural Experiment Station was established at the college in 1887. A second bill, known as the Adams Bill, was passed, and the college derives from these two funds, for experimentation, the annual sum of $30,000. In 1890 a supplementary bill, known as the Morrill Bill, was passed and in 1897 a bill known as the Nelson Bill, giving the college an annual appropriation of $40,000. The charter which heretofore had been renewable every 20 years, was at the session of the Legislature in 1913 made permanent; at the same time the State Legislature appropriated $30,000 annually for five years for the purpose of putting up buildings suitable for opening a college for women in connection with Delaware College, to be opened in September, 1914. It is entirely distinct from Delaware College, having separate classrooms, libraries, and buildings, and is a coördinate college rather than a coeducational one. At the beginning of 1914 the college had property valued at $400,000 and a total annual income of $97,480. The library contains 18,000 volumes. The president in 1914 was George A. Harter, M.A., Ph.D.

DELAWARE RIVER. A river of the eastern United States. The source of the main, or west, branch, is a small lake in Schoharie Co., N. Y., very near the Delaware County line, on the west slope of the Catskill Mountains, 1886 feet above sea level (Map: New Jersey, C 1). It flows in a southwesterly course to Deposit, a distance of about 100 miles, where it receives the Oquaga Creek, an important tributary, and turns sharply to the southeast and soon forms the boundary between Pennsylvania and New York, receiving at Hancock the waters of the eastern branch, which also rises in the Catskills. At Port Jervis, N. Y., where it becomes the boundary between Pennsylvania and New Jersey, it turns to the southwest and flows 40 miles along the base of the Shawangunk Range to Delaware Water Gap (q.v.), thence generally southward to Easton, Pa., thence southeast to a point just below Trenton, thence southwest again past Philadelphia and Chester, Pa., where it begins to broaden into an estuary, which gradually widens into Delaware Bay. In its lower course it separates New Jersey from Delaware. Its length is about 360 miles to the head of Delaware Bay, or about 410 miles including the bay, and it drains an area of 12,012 square miles, of which one-fourth is in New York, over one-half in Pennsylvania, and about one-fifth in New Jersey. Its mean discharge at Lambertville has been estimated at 18,600 cubic feet per second. It has a considerable fall and furnishes extensive power at Trenton, where it crosses the Fall Line (10 to 15 feet fall), at Lambertville (Welles's Falls, 14 feet), at Belvidere (Foul Rift, 23 feet), and at Port Jervis (30 feet). Its chief tributaries are the Schuylkill (q.v.), the Lehigh (q.v.), and the Lackawaxen, from Pennsylvania, the Mongaup and the Neversink from New York, and the Musconetcong and Maurice from New Jersey. It is navigable for large ships to Philadelphia and for steamboats to the head of tidewater at Trenton. It is sel-

dom that navigation is closed by ice below Philadelphia. A canal parallels the left bank of the river from Easton, Pa., to Morrisville (opposite Trenton), and then cuts across a bend to Bristol. A canal also connects Trenton with New Brunswick (on the Raritan River), and another crosses New Jersey from near Phillipsburg to Jersey City on the Hudson River. A fourth canal parallels the Lehigh River and connects Mauch Chunk with Easton, while a fifth parallels the Lackawaxen River from Honesdale, Pa., to Lackawaxen on the Delaware, and parallels the Delaware to Port Jervis.

DELAWARE WATER GAP. A low gap and narrow gorge in the Kittatinny Range of the Appalachian Mountains on the borders of Pennsylvania and New Jersey, near Stroudsburg, Pa. (Map: Pennsylvania, L 5). The Delaware River flows through the gap. The steep mountain sides rise to a height of 1400 feet above the stream, forming very picturesque scenery, which makes the region a popular summer resort. It is reached by rail from Philadelphia (108 miles) and New York (88 miles).

DE LA WARR, or **DELAWARE,** Thomas West, Lord (1577–1618). A Colonial governor of Virginia. He succeeded his father as Baron De la Warr and became a member of Queen Elizabeth's Privy Council in 1602. In 1609 he became a member of the Council of Virginia and in February, 1610, was appointed first Governor and captain-general of Virginia, arriving at Jamestown just in time to prevent the original colonists from abandoning the settlement. Though he lived with ridiculous pomp, he was an able and energetic officer and infused new life into the previously mismanaged colony. He planted a small settlement on the site of the present Hampton and built two forts, Henry and Charles, named in honor of King James's sons. In March, 1611, he sailed for the West Indies for the purpose of recovering his health, but was driven by a storm into the river which now bears his name. He never returned to Jamestown, though he remained the nominal Governor, and contributed large sums of money to the enterprise. In 1618, in answer to the urgent request of the colonists, then smarting under Argall's oppression, he sailed again for America, but died on the voyage. His *The Relation of . . . Lord De La Warr . . . to the Council of Virginia*, originally published in 1611, was republished in 1858. Consult Neill, *The Early Settlement of Virginia* (1878).

DELBŒUF, dĕl'bĕf, Joseph Remi Léopold (1831–96). A Belgian philosopher, born in Liége. In 1860 he became an instructor in the normal school of his native town, in 1863–66 was professor of philosophy in Ghent and from 1866 in Liége. He is perhaps best known for his contribution to psychophysics, in his method of mean gradations, whereby he sought to establish an accurate scale of intensities in sensation capable of mathematical expression. His works include: *De la moralité en littérature* (1861); *De la psychologie comme science naturelle, son présent et son avenir* (1875); *Examen critique de la loi psychophysique* (1833); *Le sommeil et les rêves* (1885); *La matière brute et la matière vivante* (1887). For a criticism of his psychophysical work, consult Bergson, *Time and Free Will* (1910).

DELBRÜCK, dĕl'brŭk, Berthold (1842–1922). A German comparative philologist and Sanskrit scholar, born in Putbus. He studied at the universities of Halle and Berlin and was appointed professor of comparative philology and Sanskrit in Jena in 1869. His works include: *Einleitung in das Sprachstudium* (1880; 4th ed., 1904; Eng. trans., 1882); *Syntaktische Forschungen*, with E. Windisch, vols. i–v (1871–88); and *Vergleichende Syntax der indogermanischen Sprachen*, which forms volumes iii, iv, and v of Brugmann and Delbrück's *Grundriss der indogermanischen Sprachen* (Strassburg, 1897–1913) and *Grundfragen der Sprachforschung* (1901); *Einleitung in das Studium der indogermanischen Sprachen* (1904; 1908); *Synkretismus, ein Beitrag zur germanischen Kasuslehre* (Strassburg, 1907); *Germanische Syntax* (Leipzig, 1909–11); *The Classical Quarterly*, vol. vii, p. 216 (London, 1913).

DELBRÜCK, Hans (1848–). A German historian of the art of war. He was born in Bergen, on the island of Rügen, and was educated in Heidelberg, Greifswald, and Bonn. He served as officer in the Franco-German War. In 1874 he became preceptor of Prince Waldemar of Prussia, a brother of Emperor William II, and for a time was Von Ranke's secretary. He was a deputy in the Reichstag in 1882–83 and 1884–90. In 1883 he became an editor of the *Preussiche Jahrbücher*, assuming charge in 1899. In 1885 he became professor of modern history at the University of Berlin. His works include: *Die Perserkriege und die Burgunderkriege* (1887); *Die Strategie des Perikles erläutert durch die Strategie Friedrichs des Grossen* (1890); *Friedrich, Napoleon, Moltke, Aeltere und neuere Strategie* (1892); *Geschichte der Kriegskunst im Rahmen der politischen Geschichte* (3 vols.; *Das Altertum*, 1900; *Römer und Germanen*, 1902; *Das Mittelalter*, 1907), his most important work; *Erinnerungen, Aufsätze, und Reden* (1902). *Numbers in History* appeared in 1914. He published an edition of Schulnhess's *Europäischer Geschichts-Kalendar*. Consult the introduction to *Delbrück-Festschrift* (Berlin, 1908).

DELBRÜCK, Martin Friedrich Rudolf von (1817–1903). A Prussian statesman, born in Berlin. He came of a distinguished family, his father, Johann Friedrich Gottlieb Delbrück (died, 1830), having been preceptor of the two Prussian princes afterward respectively known as King William IV and Emperor William I. He studied in Halle, Bonn, and Berlin. After an association of 15 years with the Prussian Bureau of Commerce (organized as the Ministry of Commerce in 1848), he became in 1859 Director of the Department of Commerce and Industry, in which capacity he skillfully consolidated the German Zollverein and negotiated important treaties with France (1862) and subsequently with England, Belgium, Italy, and other European states. In August, 1867, through the aid of Bismarck, he was advanced to the presidency of the Chancery of the North-German Confederation. He also became a Prussian minister of state in 1868, and in both positions, in which he was virtually the representative of the "Iron Chancellor," he displayed a strict adherence to constitutional principles, notwithstanding the great difficulties frequently encountered in the defense of the measures advocated by Bismarck. In October, 1870, he was sent on diplomatic missions to the various courts of south Germany, in order to promote the unification of the country, and the ultimate con-

clusion of the treaties at Versailles (Nov. 15, 23, and 25, 1870) was directly due to the skill and tact with which Delbrück had discharged this important mission. He was President of the Imperial Chancellery until 1876, when Bismarck began to inaugurate that programme of protective tariffs and of state railway ownership which Delbrück as the representative of free trade had ever strenuously opposed. His literary productions include the anonymous monograph *Der Zollverein und das Tabaksmonopol* (1857) and the legal treatise entitled *Der Artikel 46 der Reichsverfassung*. After vainly endeavoring from 1879 to 1881 to defeat the new policies, he retired to private life. He was honored by the Emperor in 1896 with the Order of the Black Eagle.

DELBRÜCK, Max Emil Julius (1850–). A German chemist, born in Bergen. He studied chemistry in Berlin and in Greifswald. In 1872 he was made assistant at the Academy of Trades in Berlin and in 1881, after several years of connection with various experiment stations, he was appointed instructor at the Agricultural College (also in Berlin); he was given a professorship in 1899. His researches resulted in technical contributions of the highest value to the fermentation industries. He was one of the editors of the *Zeitschrift für Spiritusindustrie* (1867) and of the *Wochenschrift für Brauerei*.

DELCASSÉ, dĕl'kȧ'sȧ', Théophile (1852–1923). A French statesman, born at Pamiers and educated at Toulouse. He wrote able articles on foreign politics contributed to various journals, notably Gambetta's *La République Française* and *Paris*, and in 1889 was elected to the Chamber of Deputies. He was Undersecretary of State for the Colonies in 1893, and in 1894–95 Colonial Minister in the second Dupuy cabinet. In the Brisson cabinet of June, 1898, he received the portfolio of Foreign Affairs and retained office for seven years. He brought about the alliance with Russia, established relations of amity with Italy, drew into closer touch with Spain, entered into relations of intimate friendship with Great Britain, and negotiated a settlement of the difficulties connected with the French occupation of Fashoda (q.v.). The Agreement with Great Britain of April 8, 1904, embodied a series of mutual concessions. The German government regarded M. Delcassé's policy of alliances as aiming at Germany's isolation in Europe. Confronted by the threat of war over the French policy in Morocco (q.v.), the Premier, M. Rouvier, apparently demanded the resignation of M. Delcassé, June 6, 1905, and took the portfolio of Foreign Affairs himself. In May, 1906, Delcassé was reëlected to the Chamber of Deputies. In 1909 he was president of a committee to inquire into naval affairs; the report it made angered Clemenceau into an attack on Delcassé, but the Chamber refused a vote of confidence, and Clemenceau's ministry had to resign. In 1910 Delcassé's elaborate programme for naval improvement was adopted. In March–June, 1911, he was Minister of Marine in Monis's cabinet; and he held this portfolio in the Caillaux and Poincaré ministries of 1911 and 1912; and succeeded De Selves as Minister of Foreign Affairs in January, 1912. In 1913, while still holding his seat in the Chamber, he was in St. Petersburg on a temporary mission as French Ambassador.

DEL CRED'ERE (It., upon faith or credit, from Lat. *credere*, to believe). A phrase of the law merchant, which has been adopted into the commercial codes of Europe as well as into the common-law system of England and America. A *del credere* agent is one who, in consideration of an additional compensation, undertakes to become personally responsible to his principal for the payments and other obligations which accrue to him as the result of his dealings. His undertaking is in the nature of a continuing guarantee that his principal shall suffer no loss through the default of those to whom he has extended credit on the principal's account. The class of agents known as factors are commonly employed on this basis. The agent is said to be acting under a *del credere* commission or authority. See Factor; Principal and Agent.

DEL'EB PALM. See Palmyra Palm.

DELÉCLUZE, de-lā-klụz', Etienne Jean (1781–1863). A French art critic, painter, and novelist. He was born in Paris, studied in the atelier of David, and obtained a gold medal in 1808 with "The Rape of Europa," but after 1816 devoted himself to literature. In his art criticism, contributed to the *Journal des Débats* and other papers and magazines, he championed exclusively the classical style of David and attacked the new Romantic school, especially the painter Delacroix. He wrote: *Précis d'un traité de la peinture* (1828); *Louis David, son école et son temps* (1855); *Souvenirs de soixante années* (1862). Among his romances are *Mademoiselle Justine de Liron* (1832) and others, collected as *Romans, contes et nouvelles* (1843).

DELEC'TABLE MOUN'TAINS, The. The pastures of "the chosen," in *Pilgrim's Progress*.

DELED'DA, Grazia (1873–). An Italian novelist, born at Nuoro, Sardinia. Her numerous books reflect realistically the peasant life of Sardinia, of which she is the best modern interpreter. She is inclined to depict characters of virtue and idealism in tragic conflict with sad conditions of life. Typical works are: *Racconti sardi; Il vecchio della montagna; Canne al vento;* trans. of *Dopo il divorzio* (London, 1905). Consult the *Fortnightly Review*, vols. lxxxii, lxxxiii, lxxxiv.

DEL'EGATE, Apostolic. See Legate.

DELEGATES, High Court of. In England, the supreme court of appeal in ecclesiastical causes. Before the time of Henry VIII the practice had become established of taking ecclesiastical causes on appeal from the "ordinary," or bishops', courts to the court of Rome. By 24 Hen. VIII, c. 12, this practice was prohibited, and appeals were directed to be heard by the archbishops of the several provinces. By 25 Hen. VIII, c. 19, it was directed that appeals should finally be referred to the King in council, and his Majesty was by the same statement empowered to issue a commission under the great seal to hear the appeals. The court established in pursuance of this act was known as the High Court of Delegates. It consisted, in ordinary causes, of a puisne judge from each of the three superior courts of common law (King's Bench, Common Pleas, and Exchequer) and of three or more doctors of the civil law. After sentence had been pronounced by the court of delegates it was competent for the King to grant a commission of review, but this power was rarely exercised. By 2 and 3 Wm. IV, c. 92, the court of delegates was abolished, and its jurisdiction

transferred to the King in council, and by 3 and 4 Wm. IV, c. 41, and 6 and 7 Vict., c. 38, all appeals from ecclesiastical courts go to the judicial committee of the Privy Council. See ADMIRALTY; ECCLESIASTICAL COURTS; PRIVY COUNCIL.

DEL'EGA'TION (Fr. *délégation*, Lat. *delegatio*, from *de*, away, from + *legare*, to send with a commission). The term formerly applied in Lombardy, Venetia, and the Papal States, both to the governing court of a province and to the province itself. There were nine delegations in Lombardy and eight in Venetia, each of which was presided over by a delegate, a vice delegate, and various subordinates. In the States of the Church there were 17 delegations originally established, but this number was not strictly adhered to. The delegate was always a prelate and directly appointed by the Pope. If he was a cardinal, he was called a legate, and his province a legation. In Austria-Hungary the Austrian and Hungarian delegations constitute the deliberative assembly for the dual monarchy. See AUSTRIA-HUNGARY.

DELEHAYE, dĕ'le-ĕ', HIPPOLYTE (1859–). A Belgian Catholic scholar, born in Antwerp. He entered the Society of Jesus in 1876, studied at Louvain and Innsbruck, was ordained a priest in 1890, and in 1891 became a member of the association of Bollandists. He was one of the editors of the *Acta Sanctorum* and of the *Analecta Bollandiana* and wrote important separate volumes on hagiology. Mrs. V. M. Crawford published (1907) an English version of one of his works under the title *Legends of the Saints: an Introduction to Hagiography.*

DE LE'ON, EDWIN (1828–91). An American journalist, diplomatist, and author, born in Columbia, S. C. In 1862 he became diplomatic agent in Europe during the Civil War and afterward Consul General of the United States at Cairo. He wrote: *Thirty Years of my Life on Three Continents; The Khedive's Egypt* (1878); *Askaros Kassis, the Copt* (1870); and *Under the Stars and Under the Crescent* (1887).—His younger brother, THOMAS COOPER DE LEON (1839–), also born in Columbia, is the author of *Creole and Puritan* (1889); *The Puritan's Daughter* (1891); *Four Years in Rebel Capitals* (1892), historical reminiscences; *The Rending of the Solid South* (1895); *Crag-Nest* (1910).

DELEPIERRE, dĕl'pē-âr', JOSEPH OCTAVE (1802–79). A Belgian author. He was born in Bruges and studied in Ghent. In 1849 he was appointed Belgian Consul to London and filled that position until 1877. Besides editions of older works, such as *Aventures de Tiel Ulenspiegel* (2d ed., 1840) and *Macaronéana* (1852), he published: *Les traditions et légendes des Flamands* (1834); *Histoire littéraire des fous* (1860); *La parodie* (1871); *Tableau de la littérature du centon* (2 vols., 1875); *L'Enfer: Essai philosophique et historique* (1876).

DELESCLUZE, de-lā kluz', LOUIS CHARLES (1809–71). A French politician and journalist, who took a prominent part in revolutionary conspiracies in the time of Louis Philippe, of the Republic of 1848, of the Second Empire, and the Third Republic. He was many times imprisoned and in 1857 was deported to Cayenne, whence he returned in 1859 under the amnesty. In 1868 he started the *Réveil*, a most radical paper, advocating the ideas of the *Association internationale des travailleurs*, known as the *Internationale*. After the collapse of the Empire he organized the revolt against the Government of National Defense, and for this was arrested, but was soon released. Elected to the National Assembly (1871), he resigned from that body on being chosen a member of the Commune, of which he was a conspicuously desperate and reckless leader during the seige of Paris. Seeing the collapse of the Commune, he sought and found death on the last barricade held by the revolutionists in the Rue d'Angoulême. His sufferings while a prisoner he has described in *De Paris à Cayenne, journal d'un transporté* (1869).

DE LESSEPS. See LESSEPS.

DELFT (Dutch, ditched; connected with AS. *dælf*, ditch, from *delfan*, Dutch *delven*, to dig, OHG. *bi-telban*, to bury, Eng. *delve*). A quaint old town of the Netherlands, situated on the Schie, about 6 miles southeast of The Hague and 8 miles northwest of Rotterdam (Map: Netherlands, C 2). It is intersected by many canals lined with trees and contains a number of interesting buildings. In the Prinsenhof, now converted into a museum with many fine paintings, William I of Orange was assassinated on July 10, 1584. The Oude Kerk, a Gothic structure, dating from the fifteenth century, contains monuments of famous Dutchmen, including one of Admiral Tromp, and the Gothic Nieuwe Kerk, dating from the fourteenth century, is surmounted by a tower 375 feet high, containing a famous set of chimes. The church contains the family vault of the house of Nassau, the mausoleum of William I, and the remains of Hugo Grotius, the statesman and scholar, a native of Delft, who has also been commemorated by a bronze statue. The town hall dates from 1618 and contains interesting paintings. The town's educational institutions include a polytechnical school, with over 1100 students, and a training school for colonial officials; it also has a powder magazine and arsenal. In former times Delft was especially famous for its earthenware, known as Delftware, and made in imitation of Chinese and Japanese porcelains. This industry, after a period of complete decline, has been revived of late. There are also arms and ammunition factories, and other manufactures comprise carpets, cloths, cigars, soap, oil, mathematical instruments, and leather. The town was founded in the eleventh century, received a charter in 1246, and was almost destroyed in 1536 by a fire and in 1654 by the explosion of a powder magazine. Pop., 1900, 31,582; 1910, 34,485.

DELFTSHAVEN, dĕlfts'hä'ven. An old town on the river Meuse, in South Holland, since 1886 a suburb of Rotterdam (q.v.). The Pilgrim Fathers embarked at Delftshaven for Southampton, July 22, 1620.

DELGADA, dĕl-gä'dȧ. See PONTA DELGADA.

DELHI, dĕl'ē. The name of a former division of the Punjab, British India (Map: India, C 3). Out of the Delhi division was erected, Oct. 1, 1912, the new Province of Delhi, and the remainder took the name of Ambala division. Ambala is the southeastern division of the Punjab, being separated from Agra on the east by the Jumna River; it lies entirely in the plains, with the exception of the small district of Simla and the hill station of Kasauli. The area is 14,838 square miles, and the population (1911 census) 3,784,408. The detached Province of

Delhi has 557 square miles, with 391,828 inhabitants. The Delhi division therefore had an area of 15,395 square miles and a population of 4,176,236 against 4,587,150 in 1901 and 4,434,751 in 1891. In 1901 about 71 per cent of the population was Hindu and about 26 per cent Mohammedan; Christians numbered 12,108, of whom less than 4000 were natives. The division is mainly agricultural and comprises 7 districts. The capital is Ambala (pop., 1911, 80,131). Other towns of importance are Bhiwani, Rewari, Panipat, Karnal, Rohtak, and Simla.

DELHI. The smallest province of British India. It was constituted, Oct. 1, 1912, as a result of the removal of the seat of the Indian government from Calcutta to the city of Delhi. The province, which is administered by a chief commissioner, consists of the city of Delhi and outlying districts with an aggregate area of 557 square miles, detached from the old Delhi division of the Punjab. Pop., 1911, 391,828.

DELHI, also DEHLI or DILLI. The former capital of the Mogul Empire, now the capital of Delhi Province and of British India (Map: India, C 3). It is situated on the west bank of the Jumna River, in lat. 28° 39′ N. and long. 77° 15′ E., distant by rail 956 miles from Calcutta, 982 miles from Bombay, and 907 miles from Karachi. The city, which extends over 2 miles along the river, is inclosed on three sides by a stone wall 3¼ miles long; it was built by Shah Jehan and reconstructed, early in the nineteenth century, by the British. In the eastern part of the city and directly on the river lies the old Mogul palace, inclosed on three sides by a wall of red sandstone; it is now called the Fort. To the northeast is the Salimgahr outwork, where the East Indian Railway enters the city by a fine bridge across the Jumna. To the northwest of the Fort is an open space containing official buildings and the Protestant church of St. James. South of this space and of the railway are the public gardens. The cantonment is in the southeast part of the city. The territory comprising these sections, and constituting nearly half the city, contrasts sharply with the native, or southwestern, portion, whose streets for the most part are narrow, crooked, and densely populated. The native part of Delhi, though largely a mass of mean houses, is interspersed with splendid mosques.

Delhi was rebuilt on its present site by Shah Jehan (whence it is called Shahjehanabad) at a time when the glory of Mogul architecture was at its zenith. It was Shah Jehan who built that pearl of all architecture, the Taj Mahal, at Agra, and it was he who built the splendid Imperial palace, or group, at Delhi (1638–48). This palace, or group walled on three sides, is an oblong, 3202 feet north and south (along the river), and 1600 feet east and west. It now contains the ugly British barracks, and much of its former splendor has been lost. Entrance is through a magnificent portal to a vaulted hall, 375 feet long, facing which is the music hall; beyond is the great court, in which stands the hall of public audience; and beyond this is the painted chamber. It was in the hall of public audience that the peacock throne, which bore a fully expanded peacock's tail done in gems, used to stand, in a recess of the back wall; it is estimated that the throne was worth some £6,000,000. The buildings just mentioned constitute a central range; north of it is the private audience hall. The latter, which is close to the river, has been called the most ornamented of all Shah Jehan's buildings. It abounds with delicate inlaid work and bears the inscription, in Persian characters, "If there is a heaven on earth, it is this—it is this!" The harem and private apartments of the palace lay south of the central range, covering a space about 1000 feet square.

Near the Chandni Chauk (Silver Street) is the Jama Masjid (Great Mosque), begun by Shah Jehan in the fourth year of his reign and finished six years later; it is one of the most noteworthy buildings of its kind in India on account of both its dimensions and its architecture. It stands on elevated ground, so that its front courtyard, which is 450 feet square and surrounded by a fine open cloister, commands a view of the city. The mosque, 261 feet long, has two graceful minarets at the front corners and three white marble domes; white marble also forms the interior paving as well as the lining of walls and roof. Mention should be made also of the Kali Masjid (Black Mosque), built, it is supposed, by an early Afghan ruler, the small Moti Masjid (Pearl Mosque), built by Aurangzeb, and the mosque of Roshan-ud-daula.

The principal street of Delhi is the Chandni Chauk, ¾ mile long and 74 feet wide. This street is lined with warehouses and with shops (notably those of dealers in gold and silver embroidery). Among its buildings of special note are the high clock tower and the city hall; the latter has a picture gallery, a public library, and a museum. The old palaces of the nobles have in large part disappeared. Beyond the city walls is a considerable population which is included in the municipality. Outside of the walls also are the Imperial tombs. The tomb of Humayun is about 3½ miles from the Delhi Gate (south wall). It is an imposing square building of pink sandstone, surmounted by a white marble dome; it stands on a platform, 200 feet square, supported by cloisters, which is surrounded by a terraced garden and this by a battlemented wall. About a mile to the west are the tombs of the Imperial Mogul family, each inclosed by latticework of white marble. Here, too, are numerous small mosques, notably the one in memory of the saint Nizam-ud-din.

The Delhi College, founded in 1792, was the principal educational institution until 1877, when, in order to concentrate higher education, its endowment was transferred to the Punjab University at Lahore. The principal school now is the municipal high school (which occupies the old Residency), with six branch schools; there are several other high schools, a municipal industrial school, a normal school for vernacular teachers, and other educational establishments.

The industries of Delhi include the making of jewelry (for which the city has long been famous), gold and silver embroidery, articles of silver, brass, and copper ware, etc. In recent years western manufacturing has made considerable progress; there are cotton mills, flour mills, sugar mills, etc. The city carries on an extensive trade, especially in piece goods and grain. The municipality was created in 1850. Delhi has a drainage system, a good lighting system, and an ample water supply; of late its sanitary conditions have greatly improved. Pop., 1891, 192,579; 1901, 208,575; 1911, 232,837 (the increase being 11.6 per cent). In 1901

about 55 per cent of the inhabitants were Hindus and about 42 per cent Mohammedans; Christians numbered 2164.

The city of Indraprastha (ancient Delhi), unrivaled in its splendor among the cities of India, was situated on the opposite bank of the river. Its original foundations are supposed to date from the fifteenth century B.C. Its remains cover an area of about 30 miles in circumference. The authentic history of Delhi begins in 1193, when the city was taken by the Mohammedans. Thereafter under the first dynasties of its Afghan conquerors it was the centre of a mighty Mohammedan empire, reaching its highest power in the early fourteenth century. Although captured and sacked by Timur in 1398, Delhi remained under its Afghan emperors until 1526, when it was taken by Sultan Baber, who removed the capital to Agra, but under his son Delhi regained its former rank. In the latter part of the sixteenth century the city fell almost into utter decay, as the capital of the state was either at Agra or Lahore. Shah Jehan began the building of the modern city in 1638, and some of the finest edifices of Delhi belong to that period. At the beginning of the eighteenth century the decline of the Mogul Empire affected also the city of Delhi. In 1739 it was captured by the Persians, and, as a result of an attack by the natives on the invading army, many of the inhabitants were massacred and the city was despoiled of some of its finest treasures, including the peacock throne and the Koh-i-Nur diamond. In 1789 Delhi was captured by the Mahrattas, in whose possession it remained until 1803, when it was taken by Lord Lake, and has since remained in the possession of the British. The uprising of 1857 and the subsequent siege of the city form some of the most stirring events in the history of the British occupation of India. The invasion of the city by a handful of rebels from the cantonment of Meerut on May 10, 1857, was a signal for a general uprising in the city, as well as in northwestern India, and the rebels were soon joined by the native troops. The Europeans were mercilessly cut down, and the large powder magazine was exploded by the British officers, who were unable to defend it against the attacks of the natives. Europeans and friendly native troops began to arrive at the beginning of June, but it was not before September that the army of relief was strong enough for an assault on the city. On September 14 Delhi was entered by the British, but it was only after six days' fighting within the walls that the city was retaken. The British losses during the siege amounted to over 1000 killed and nearly 4000 wounded. The old Bahadur Shah, who was proclaimed Emperor by the mutineers, was exiled to Rangoon, and his death in 1862 marked the end of the Mogul dynasty. The city subsequently settled down into a prosperous railway and commercial centre. Because of its Imperial traditions, however, Delhi was selected as the scene of the Imperial Proclamation of Jan. 1, 1877, and of the Durbar in 1903, at which King Edward VII was proclaimed Emperor of India. The growing native unrest led King George V and his consort to visit India for their Imperial coronation. At the brilliant Durbar held at Delhi on Dec. 12, 1911, unexpected changes were announced for the administration of India, involving the transference of the capital from Calcutta to Delhi. On Oct. 1, 1912, the Punjab division of Delhi was reconstituted as a new province. In 1913 Imperial and native endowments were announced for making Delhi the educational as well as the political centre of India.

Consult: Brown, *The Punjab and Delhi in 1857* (London, 1861); Chambers, *History of the Indian Revolt* (Edinburgh, 1859); Fanshawe, *Delhi, Past and Present* (London, 1902); Wheeler, *History of the Delhi Coronation Durbar* (ib., 1904); Festing, *When Kings Rode to Delhi* (ib., 1912).

DELHI, dĕl'hī. A town and the county seat of Delaware Co., N. Y., 66 miles (direct) west by south of Albany, on the Delaware River, and on the New York, Ontario, and Western Railroad (Map: New York, F 6). It is the seat of a State agricultural school and has silk mills and creameries. The water works are owned by the town. Pop., 1910, 1736.

DE'LIA. See Delos; Greek Festivals.

DELIAN LEAGUE. See Delos; Greece, *History* (Ancient History).

DE'LIAN PROBLEM. See Cube.

DELIBES, de-lêb', Clément Philibert Léo (1836–91). A French composer, born at Saint-Germain du Val, Sarthe. He studied at the Paris Conservatory, where he won many prizes, and in 1853 became accompanist at the Théâtre Lyrique and organist at Saint-Jean et Saint-François. In 1865 he became second chorus master at the Opéra and in 1880 was made professor of composition in the Conservatory. In 1884 he became a member of the Institute, succeeding Victor Massé. Delibes became popular with his first operetta, *Deux sacs de charbon* (1855), and then wrote a number of comic operas and ballets, of which the most famous are: *Le roi l'a dit* (1873) and *Lakmé* (1883), operas; *Coppélia* (1870) and *Sylvia* (1876), ballets. They are famous for delicacy and brilliant, fairy-like orchestral effects. Consult A. Pougin, *Musiciens du XIXe siècle* (Paris, 1911).

DELIGHT' OF MANKIND' (Lat. *amor ac deliciæ generis humani*). A title given to the Roman Emperor Titus, in admiration of his mildness and virtues. Consult Suetonius, *Titus*, i.

DELI'LAH (Heb., delicate). The name of a Philistine woman whom Samson loved. Her home was in the valley of Sorek. By her flattering blandishments she obtained from him the secret that his great strength lay in his locks, and, having cut these off while he lay asleep, she then treacherously betrayed the warrior, shorn of his strength, into the hands of his enemies (Judg. xvi. 4–31). See Samson.

DELILLE, de-lêl', Jacques (1738–1813). A French didactic poet and translator, born at Aigueperse, June 22, 1738. He achieved extraordinary popularity in the eighteenth century, but is now hardly read or thought readable. He mistook his prolix habit of periphrasing for poetical expression; he would enumerate various characteristics and leave it to the reader's imagination to supply the name of the object described. His translation of Vergil's *Georgics* (1769) was esteemed at least equal to the original, and *Les jardins ou l'art d'embellir les paysages* (1782; enlarged ed., 1801) was deemed immortal. After the outbreak of the Revolution he followed the Emigration. He lived for a time in Switzerland, where he published *L'Homme des champs, ou les Géorgiques françaises* (1800). In 1801 he went to England, where he translated *Paradise Lost*. That same

year he returned to his seat in the Academy and his professorship of Latin and belles-lettres in the University of Paris and the Collège de France, which he held till blindness intervened. This, however, did not check the stream of his poetic production, which in these last years included *La pitié*, in four cantos (1803); Vergil's *Enéide* (1805); *L'Imagination*, in eight cantos (1806); *Les trois règnes de la nature* (1809); *La conversation* (1812). He died in Paris, May 1, 1813. Consult Sainte-Beuve, *Portraits littéraires*, vol. ii (Paris, 1864), and L. Audiat, *Un poète oublié: J. Delille* (ib., 1902).

DEL'IQUES'CENCE (Lat. *deliquescere*, to melt away, dissolve, from *de*, down, away + *liquere*, to be fluid, liquid). The term applied to the property which certain substances have of absorbing moisture from the air and becoming damp and even running into liquid. The substances possessing this property are said to be deliquescent. Caustic potash and the chlorides of calcium and magnesium are examples of deliquescent substances.

DELIR'IUM (Lat., literally, being off the straight line, or furrow, from *de*, off, away + *lira*, furrow). A derangement of mind during illness, in which the intellect and the judgment are perverted or lost, while the imagination and the passions are often excited or at least left without control. The result is an incoherent or totally disordered course of action and speech, frequently attended by delusions or unreasoning beliefs, which the sound mind at once perceives to have no foundation in fact. Two types of delirium are recognized: *active* or *wild delirium*, in which the sufferer shouts, struggles, tries to escape from imaginary enemies, and has to be forcibly restrained; *low* or *muttering delirium*, in which the patient lies still, but is constantly engaged in incoherent and disjointed converse with himself or imaginary persons. Active delirium is the form most frequently observed in delirium tremens. Muttering delirium is characteristic of the later stages of typhoid fever. Delirium may occur during the invasion of pneumonia, scarlet fever, smallpox, bubonic plague, or during uræmia, chorea, hysteria, epilepsy, etc. *Delirium tremens* (Lat., shaking delirium) is the result of long-continued alcoholic intoxication and may attack a "moderate drinker" during a single excessive indulgence. Delirium tremens is characterized by a restless, irritable state of the nervous system rather than by furious paroxysms of excitement (though these are not rare); by constant though ill-regulated and ineffectual attempts of the patient to occupy himself; by spectral illusions of horrible, terrifying, or very rarely amusing objects, such as animals, snakes, goblins, etc., or hallucinations of vision and hearing; by tremors of the hands and tongue; by loss of appetite, nausea, and vomiting; and by great wakefulness, the want of sleep being often protracted over many days and nights, with constant excitement of the senses, and the prostration of the vital powers from deficient nourishment. In treating delirium tremens bromides, chloral, rarely opium, strychnine, and other powerful drugs are used, with purgatives. Stimulants other than alcohol are frequently needed. The condition is very dangerous, as about 17 per cent of the patients die; and the use of drugs, of restraint when the patients are furious, and the direction of nourishment must be under the administration of a physician. See ALCOHOL; MANIA.

DELIRIUM E'BRIO'SUM (Lat. *ebriosus* addicted to drink, from *ebrius*, drunk). An obsolete term, used to denote either the delirium accompanying acute alcoholism or delirium tremens. In the former there are exaltation, garrulity, boastfulness, delusions of a grandiose character, followed by violent verbal abuse, passion, and often fierce anger without cause, which prompts the inebriated individual to break furniture, glassware, panes of glass in windows, etc. Delirium tremens is described under DELIRIUM (q.v.).

DELIRIUM NERVO'SUM, or **TRAUMAT'ICUM** (Lat. *nervosus*, nervous; *traumaticus*, from Gk. τραυματικός, *traumatikos*, of wounds, from τραῦμα, *trauma*, wound). A term employed by Dupuytren to designate an attack of delirium with tremors, which frequently supervenes on severe bodily injuries, such as gunshot wounds, burns, and fractures—chiefly met with in large hospitals—in the case of persons of weakly constitution, and who are irritable and nervous and have been intemperate in their habits. Delirium nervosum is an obsolescent term. It is really a form of delirium tremens, manifesting itself in alcoholics with pneumonia, or after operations or injuries, and is the forerunner of death in some operative cases.

DELIRIUM TRE'MENS. See DELIRIUM.

DELISLE, de-lêl'. See LISLE, GUILLAUME DE.

DELISLE, LÉOPOLD VICTOR (1826–1910). A French historian and bibliographer, born at Valognes. For many years he was connected with the Bibliothèque Nationale. In 1871 he was made director of the department of manuscripts and in 1874 general director of the great library. His works include: *Rouleaux des morts du IXème au XVème siècle* (1866); *Le cabinet des manuscrits de la Bibliothèque Nationale* (3 vols., 1868–81); *Inventaire général et méthodique des manuscrits français* (2 vols., 1876–78); *Les Bibles de Gutenberg* (1894); *Catalogue des livres imprimés ou publiés à Caen avant le milieu du XVIe siècle* (2 vols., 1903–04); *Les heures de Blanche de France* (1905); *Recherches sur la librairie de Charles V* (1907); *Les heures dites de Jean Pucelle* (1910); *Instructions élémentaires et techniques pour la mise et le maintien en ordre des livres d'un bibliothèque* (4th ed., 1910). For a fuller list of his early works, consult Oursel, *Nouvelle biographie normande* (Paris, 1885).

DELITZSCH, dā'lich. A town and important railway junction of the Prussian Province of Saxony, 15 miles north of Leipzig, on the right bank of the Lober (Map: German Empire, E 3). It is an old but well-built town, still partially surrounded by walls. The castle of the fourteenth century, rebuilt in 1690, is now used as a female penitentiary. The manufactures include cigars, beer, cereals, sugar, sirup, shoes, and hosiery. In the neighborhood are rich coal mines. The town is the birthplace of the famous naturalist Christian Gottfried Ehrenberg and the economist Schulze-Delitzsch. Pop., 1900, 10,500; 1905, 10,940; 1910, 13,031. Delitzsch was incorporated with Prussia in 1815. Consult Lehman, *Chronik der Stadt Delitzsch* (Delitzsch, 1852).

DELITZSCH. See SCHULZE-DELITZSCH.

DELITZSCH, FRANZ (1813–90). A German Lutheran theologian, born and educated in Leip-

zig. He became professor of theology at Rostock in 1846, at Erlangen in 1850, and at Leipzig in 1867. He was one of the strongest exponents of what is called the Erlangen school, or the strictest orthodox theology. He interested himself in the conversion of the Jews—he was of Hebrew descent—and for this purpose used his great knowledge of Hebrew and the Talmud and founded a training school (1886), now called the Institutum Delitzschianum. His translation of the New Testament into Hebrew (1877) was widely circulated in Galatia and Russia. His earlier works were intensely conservative and strictly Lutheran, but later he approached the position of the radical higher critics. He aided Baer in editing the Massoretic text of the Old Testament (1869–95). Besides commentaries on *Habakkuk* (1843), *Genesis* (1852; 1887; English, 1888), *Psalms* (1859–60; English, 1873), *Job* (1864; English, 1866), *Isaiah* (English, 1875), *Proverbs* (1873; English, 1874–75), *The Epistle to the Hebrews* (1857; English, 1865), *Song of Songs and Ecclesiastes* (English, 1877)—the English versions being in "Clark's Foreign Theological Library"—and other theological works, he published some popular devotional writings, among which the following had a wide circulation: *Das Sakrament des wahren Leibes und Blutes Jesu Christi* (1844); *Vier Bücher von der Kirche* (1847); *Philemon, oder von der christlichen Freundschaft* (2d ed., 1858); *Handwerkerleben zur Zeit Jesu* (1868; Eng. trans., 1877; 1902); *Ein Tag in Kapernaum* (1871); *Durch Krankheit zur Genesung* (1873). Consult Curtiss, *F. Delitzsch* (London, 1891).

DELITZSCH, FRIEDRICH (1850–). A German Assyriologist, a son of Franz Delitzsch. He was appointed extraordinary professor at Leipzig in 1877, ordinary professor at Breslau in 1893, and in 1899 professor of Assyriology in the University of Berlin. His lectures attained a wide popularity, and one of them, entitled *Der babylonische Ursprung hebräischer Ideen*, delivered in 1901, was attended by Emperor William II, who also gave a large sum towards the researches to be made in the territory of ancient Babylonia. In 1906 he lectured in the United States. He wrote: *Assyrische Lesestücke* (4th ed., 1900); *Wo lag das Paradies?* (1881); *Studien über indogermanische Wurzelverwandtschaft* (2d ed., 1884); *Assyrisches Wörterbuch zur gesamten bisher veröffentlichten Keilschriftlitteratur* (1887 et seq.); *Assyrische Grammatik* (1889); *Assyrisches Handwörterbuch* (4 vols., 1894–96); *Das babylonische Weltschöpfungsepos* (1896); *Babel und Bibel* (1902; Eng. trans., 1903); *Asurbanipal und die Assyrische Kultur seiner Zeit* (1909); *Handel und Wandel in Altbabylonien* (1910); numerous articles in *Mitteilunger der Deutschen Orient-Gesellschaft* (1899–1913); *Kleine sumerische Sprachlehre* (1914); *Sumerisches Glossar* (1914).

DE'LIUS (Lat., from Gk. Δήλιος, *Dēlios*). A name given to Apollo, who was fabled to have been born on the island of Delos.

DELIUS, FREDERICK (1863–). An English composer. He was born in Bradford, Yorkshire, of German parents. In 1883 he went to Florida as manager of an orange plantation, and there he began the study of composition by himself. From 1886 to 1888 he studied at the Leipzig Conservatory under Reinecke and Jadassohn. In 1890 he took up his residence in Paris. His compositions show decided talent and originality and have been received with marked favor. His works include the operas *Koanga* (1904), *Romeo and Juliet in the Village* (1907), *Margot la Rouge* and *Fennimore* (1914); for orchestra, an overture *Over the Hills*, a *Norwegian Suite*, *Paris*, *Lebenstanz*, a *Legend* for violin and orchestra, a piano concerto in C m.; and the choral works with orchestra *Appalachia*, *Sea-Drift*, *A Mass of Life*. Consult M. Chop, "Frederick Delius" in vol. ii, *Monographien Moderner Musiker* (Leipzig, 1907).

DELIUS, dā'lē͞o͞os, NIKOLAUS (1813–88). A German philologist and Shakespearean scholar, born in Bremen. He studied at the universities of Bonn and Berlin, visited England and France, and settled in 1841 in Berlin. In 1846 he removed to Bonn, where he was professor from 1855 to 1880. Among his writings those concerned with the criticism and interpretation of Shakespeare's works are the most important; above all, the great edition of the complete works, with a critical preface and explanatory notes, published 1854–61, and repeatedly thereafter. Besides this must be mentioned *Die Tiecksche Shakespeare-Kritik* (1846); *Der Mythus von William Shakespeare* (1851); *Ueber das englische Theaterwesen zu Shakespeares Zeit* (1853); *Shakespeare-Lexikon* (1851); *Pseudo-Shakespearische Dramen* (1856–74).

DELIV'ERY (OF. *delivrer*, Lat. *deliberare*, to free, from *de* + *liber*, free). The physical transfer of possession. The term is commonly employed in the law to characterize such an act when performed with the purpose of creating or transferring a legal right. Its significance springs from the importance of physical possession as an element of ownership. In primitive society it is the principal, and in its earlier stages the controlling, element in the conception of property. The metaphysical notion of ownership, dissevered from possession and even from the right of possession, belongs to a comparatively advanced stage in the evolution of legal ideas. At first possession, if not theoretically identical with ownership, is at least attended with its legal effects and always tends in practice to supersede the more abstract right, a fact which finds expression in the maxims *beati possidentes*, "Possession is nine points of the law," etc. Under such a conception of ownership there is only one way in which the title to property can be transferred, and that is by the actual transfer of the physical control over the property, and hence delivery of possession becomes the important fact in the assignment of legal rights over physical objects.

It is easy to see how this simple process, so convenient and appropriate in the case of chattels, came to be transferred to the conveyance of interests in lands. There was no way in which these interests, however temporary and limited in character, could be vested in another but by putting him into possession of the land itself, and thus we find the early method of conveyancing to be the transfer of the land by delivery. See FEOFFMENT; LIVERY OF SEISIN; SEISIN.

Though this method of conveying real property has been superseded on both sides of the Atlantic by more convenient methods, the notion of the significance of delivery has been transferred to the written instrument by which lands

are now universally conveyed, and has even been extended to other transactions in which similar instruments are employed; while in the case of chattels delivery of possession is still the usual, and in many cases the essential, mode of transfer. See DEED; GIFT; SALE.

While delivery usually contemplates the actual handing over of the subject matter of the transaction by the transferror, or party to be bound, to the transferee, or party to be benefited, it may equally be effected by any appropriate and manifest act whereby the deliveree is put in the same position of control over the thing as that which the deliveror held prior to the act. The possession thus assumed may be immediate and personal or it may be by an agent or servant. The transfer of title to a house may, if so intended, carry with it the possession of the chattels therein, and the actual physical delivery of a key may constitute a delivery of securities in a strong box or of a horse in a stable. So there may be a symbolical delivery, as of goods, by the transfer of the bill of lading or warehouse receipt describing them, or of money on deposit in a savings bank, by passing over the bank book. There is also what is called a "constructive" delivery, as where a part of a bill of goods is delivered for the whole, or where, a thing having been placed by the owner in the custody of a third person, the custodian agrees to hold it for the deliveree.

It will be noticed, however, that in no case is there a legal delivery by mere words indicating an intention to transfer the title, without some overt and significant act on the part of the donor or vendor, whereby he surrenders his control over the article. The nearest approach to such a case is that referred to in the article on DEED, where such a declaration of intention accompanies and explains an equivocal act, such as the laying down of an instrument on the desk of the deliverer or his inclosing it in an envelope addressed to the deliveree. See POSSESSION.

Consult Pollock and Wright, *An Essay on Possession in the Common Law* (Oxford, 1888), and the authorities referred to under such titles as SALE; POSSESSION; TITLE; ETC.

DELIVERY. See OBSTETRICS.

DEL'LA CRUS'CAN SCHOOL. About the year 1785 a number of English residents in Florence sought to beguile their leisure hours by writing verses, which they published under the title of *The Florence Miscellany.* The insipidity, affectation, and fantastic silliness of these productions transcend belief; yet, such was the poetic destitution of the period that they soon found admirers and imitators. Taking the name of an academy in Florence (see ACADEMY), the Della Cruscans presently began to print their lucubrations in England, chiefly in two daily newspapers called the *World* and the *Oracle.* "While the epidemic malady was spreading from fool to fool," says Gifford pungently, "one of the brotherhood, a Mr. Robert Merry, came over from Florence and immediately announced himself by a sonnet to Love." It was answered by a certain Anna Matilda, who (as was the custom) praised it immoderately in language even more absurd than Merry's own. "The fever now turned to a frenzy," Gifford continues; Laura, Maria, Carlos, Orlando, Adelaide, and a thousand other nameless names caught the infection; and from one end of the kingdom to the other all was nonsense and Della Crusca." Retribution came, however, for in 1794 Gifford produced his *Baviad* and in 1796 his *Mæviad.* Rarely has literature witnessed such an excoriation. It quickly and completely killed the "school," and, indeed, it is only in these two poems that the memory of most of the unhappy Della Cruscan songsters has been preserved at all.

DELLA ROBBIA. See ROBBIA.

DELLENBAUGH, dĕl'*e*n-bą, FREDERICK SAMUEL (1853–). An American explorer, born at McConnelsville, Ohio. He was educated in Buffalo, New York City, Munich, and Paris. In 1871–73 he was artist and assistant topographer with Major Powell's second expedition down the Colorado River, and in 1899 he was a member of the Harriman expedition to Alaska and Siberia. He served as librarian of the American Geographical Society from 1909 to 1911 and became a fellow of the American Ethnological Society. Besides contributions to Sturgis's *Dictionary of Architecture,* to the second edition (1914–15) of the NEW INTERNATIONAL ENCYCLOPÆDIA, and to magazines, his writings include: *The North Americans of Yesterday* (1900); *The Romance of the Colorado River* (1902; 3d ed., 1909); *Breaking the Wilderness* (1905); *A Canyon Voyage* (1908); *Frémont and '49* (1913; 2d ed., 1914).

DELLYS, dĕl-lēz' (Kabyle *Tedles,* Lat. *Rusucurrus*). A seaport town and important military post of Algeria, situated 49 miles east of Algiers, with which it is connected by rail. It is divided into a European and a native port and has a good roadstead. It contains a mosque and an industrial school and carries on a considerable trade in grain, olives, and wine. Pop. (commune), 1901, 13,977; 1911, 13,626, including 960 French residents. The city has been successively Roman, Arab, Spanish, and Turkish, and is now under French control.

DEL MAR, ALEXANDER (1836–1926). An American economist, born in New York City and educated at New York University. He founded the *Social Science Review* and was its editor in 1864 to 1866, and in the latter year organized and was director of the United States Bureau of Statistics. In 1876 he was appointed mining commissioner of the United States Monetary Commission. His publications comprise: *The National Banking System* (1865); *The History of Precious Metals* (1880); *The History of Money in Ancient Countries* (1884); *The Science of Money* (1885); *Money and Civilization* (1886); *The History of Money in America* (1899); *Ancient Britain* (1900); *Worship of Augustus Cæsar* (1900); *Middle Ages Revisited* (1900); *History of Money in the Netherlands* (1903); *Messiah, a History of the Colonization of Asia Minor, Egypt, and Europe from the Orient* (1907).

DEL'MENHORST. A town in the Grand Duchy of Oldenburg, on the Delme, 10 miles southwest of Bremen (Map: Germany, C 2). Wool carding, yarn spinning, jute spinning, and the manufacture of cigars, ironware, linoleum, bricks, and lumber constitute the principal industries. There are also important cattle and horse markets. Pop., 1890, 6828; 1900, 16,573; 1910, 22,516.

DELMONTE Y TEJADA, dâl-mōn'tā ē tā-hä'dä, ANTONIO (1783–1861). A Spanish-American historian, jurisconsult, and statesman. He was born at Santiago de los Caballeros (Santo

Domingo) and studied law at the University of Santo Domingo. He participated in the campaign against Toussaint l'Ouverture, but in 1804 was compelled to seek refuge in Cuba and ultimately settled at Havana as an official of the government. He wrote a *Historia de Santo Domingo desde su descubrimiento hasta nuestros dias* (Havana, 1853). The first volume was all he succeeded in publishing, but he left two more completed, and notes to bring the account down to his time.

DE LOACH, Robert John Henderson (1873–). An American botanist, born at Statesboro, Ga., and a graduate of the University of Georgia (class of 1898). He was superintendent of Swainsboro (Ga.) schools (1900), teacher in the United States Indian School at Fort Sill, Okla. (1900–02), and principal of the Statesboro high school (1903–05). After serving as botanist at the Georgia Experiment Station (1906–08), he became professor of the cotton industry at the State College of Agriculture (Georgia) in 1908. In the summer of 1911 he was collaborator at the Bureau of Plant Industry. Besides bulletins on plant diseases and breeding, and magazine articles, he is author of *Rambles with John Burroughs* (1912).

DELOCHE, de-lôsh′, Jules Edouard Maximin (1817–1900). A French historian and archæologist. He was born at Tulle and, after having studied law at Bordeaux, entered the government service in 1840, and held various offices in the Ministry of Public Works. In recognition of his works in the field of history, archæology, and numismatics, he was elected a member of the Academy of Inscriptions in 1871. He died in Paris. Among his publications are: *Etienne Baluze, sa vie et ses œuvres* (1858); *Cartulaires de l'abbaye de Beaulieu* (1859); *Etudes sur la géographie historique de la Gaule, etc.* (1861–64); *La Trustis et l'antrustion royal sous les deux premières races* (1873); *Des monnaies d'or au nom du roi Théodebert* (1886–88); *Etudes de numismatique mérovingienne* (1890); *Les Archiprêtrés de l'ancien diocèse de Limoges, etc.* (1899).

DELOLME, de-lôlm′, Jean Louis (1740–1806). A Swiss jurist, born in Geneva, where he practiced law. Having given offense to the authorities by his publication, *Examen des trois points des droits,* he was obliged to take refuge in England, where, in spite of his literary activity, he lived for several years in great poverty. He returned to his native country in 1775. His principal work is *Constitution de l'Angleterre* (1771), which was translated into English by himself and passed through several editions. He also published, in English, *Parallel between the English Government and the Former Government of Sweden* (1772); *History of the Flagellants* (1777); *Essay Containing Strictures on the Union of Scotland with England* (1787).

DE LONG, George Washington (1844–81). An American naval officer and Arctic explorer. He was born in New York City, graduated at the United States Naval Academy in 1865, and by 1873 had risen to be navigating officer of the *Juniata,* in which search was being made for the lost *Polaris,* the Arctic exploring steamer in which Captain Hall had sailed. To his enthusiasm for polar research thus kindled was due the *Jeannette* expedition, subsidized by James Gordon Bennett, which set out from San Francisco in 1879 with a company of 33, commanded by Lieutenant Commander De Long. The *Jeannette* was crushed in the ice north of Siberia, and the party, after traversing the ice on sledges, set out for the land in three boats, of which one was lost at sea. The one containing De Long reached the Lena River; but (except two seamen, who succeeded in reaching a settlement) her crew, including De Long, died of starvation in Siberia. The third, which contained George W. Melville and Lieutenant Danenhower (qq.v.), arrived at the Lena in October, 1881, and after months of search found the bodies of De Long and his companions (March, 1882), which were brought to New York and buried with honor. Consult: De Long, *The Voyage of the Jeannette,* comprising his journals, edited by his widow, Mrs. Emma J. (Wotton) De Long (1883); Danenhower, *The Narrative of the Jeannette* (Boston, 1882); Melville, *In the Lena Delta* (ib., 1885). See Polar Research.

DELOO′. See Duiker.

DELORD, de-lôr′, Taxile (1815–77). A French publicist, born at Avignon. He began his career as a journalist in Marseilles and in 1837 settled in Paris, where he became a contributor to several journals, notably the *Charivari,* of which he was editor in chief from 1848 to 1858. Afterward he was connected with the *Siècle* as literary editor. Elected to the National Assembly (1871–76), he voted steadily with the extreme Radical party. He published *Physiologie de la Parisienne* (1841); *Les Matinées littéraires* (1860); *Histoire du second Empire* (1868–75), his principal work.

DELORME, de-lôrm′, Marion (1611–50). A notorious French courtesan. At an early period of her life she went to Paris, where her great beauty would easily have secured for her a good match had she not been inclined to a life of licentious intrigue. Almost all the distinguished men of the age were her lovers, among them Cinq-Mars, the great Condé, his brother the Prince de Conti, the Duke of Buckingham, and Cardinal Richelieu. During the first disturbances of the Frondeurs her house was the rallying point of the chiefs of that party, and, in consequence, Mazarin was about to imprison her, when she suddenly died in 1650. A curious tradition sprang up in France during the next century, to the effect that Marion had not died, but had escaped to London; that she had returned to Paris in 1682; that she meanwhile had been twice married; and, finally, that she died in 1706 or, according to others, even as late as 1741. Victor Hugo has made her the subject of a drama, and Alfred de Vigny described her fate in his novel *Cinq-Mars.* Consult J. Peladan, *Histoire et légende de Marion Delorme* (Paris, 1882).

DE L'ORME, Philibert (c.1515–70). The earliest of French Renaissance architects in the modern sense; the first, i.e., who practiced architecture as a profession after a special training for it. He belonged to a family of architects and went to Rome in 1534 to study the ancient monuments. After a number of years spent on the works of the palace at Fontainebleau he was appointed architect to the King in 1546. He built the great hall on the bridge at the Château of Chenonceaux, for which he planned a vast extension, which was never carried out. His chef-d'œuvre is the Château d'Anet (1552–59), which he built for Diana of Poitiers, a fine design displaying the new classical tendency

which he acquired in Rome, though still far from the rigidity of the Palladian type. After a period of disgrace Catharine de' Medici employed him to design the palace of the Tuileries (1563), the construction of which he continued until his death. This was a vast project, of which but a small fragment was built, and this by no means worthy of De l'Orme's talent. The lower story was adorned with banded Ionic columns, which De l'Orme's vanity claimed as a new or "French" order. (See TUILERIES.) De l'Orme—or Delorme, as his name is also written—was the author of the earliest French treatise on architecture, *Nouvelles inventions pour bien bastir et à petits frais* (Paris, 1561). Consult: Pattison, *The Renaissance of Art in France*, vol. i (London, 1879); Palustre, *La renaissance en France*, vols. i, ii (Paris, 1879–81); Vachon, *Philibert de l'Orme* (ib., 1887).

DELORME, PIERRE CLAUDE FRANÇOIS (1783–1859). A French historical painter and lithographer, born in Paris. He was a pupil of Girodet, whose manner he imitated. His art embodies the classical tendencies of the school of David (q.v.). His most important canvases are: "The Death of Abel" (1810), in the Montpellier Museum; "Hero and Leander" (1814); "Raising of the Daughter of Jairus" (1817), in the church of Saint-Roch, Paris; "Descent of Christ into Limbo" (1819), in Notre Dame de Paris; "Cephalus Carried off by Aurora" (1822), in the Museum of Cens; "Foundation of the Collège Royal by Francis I," Versailles Gallery. He also executed mural paintings in the churches of Saint-Eustache, Saint-Gervais, and Notre Dame de Lorette, in Paris.

DE'LOS (Gk. Δῆλος). The smallest but most famous of the Cyclades, called in ancient times Asteria, Ortygia, and Cynthus (Map: Greece, G 4). It is situated between the islands Rhenea and Myconos. It is about 3½ miles from north to south, and ¾ of a mile from east to west. Near the centre rises the rocky hill Cynthus, about 380 feet high; to the west and north of this hill is almost the only level ground of the island, and here were situated the sanctuary of Apollo and the ancient town. According to the myth, Delos was at first a floating island, but was fastened by chains to the bottom of the sea, or to Myconos and Gyaros by Poseidon or by Zeus, that it might afford a refuge from the jealous Hera for Leto, who there brought forth Apollo and Artemis. Vergil (*Æneid*, iii, 75–77) makes Apollo bind Delos to Myconos, in gratitude for his birth on Delos. From very early times Delos was a sacred island, the centre of the Ionian cult of Apollo, and the scene of a great festival, the Delia, celebrated by the Ionians in the month Thargelion (May–June), and mentioned in the Homeric Hymn to Apollo. Even the Persian general Datis (q.v.), when on his way to attack Athens, spared this island and made a rich offering to the god. After the Persian wars Delos became the centre and treasury of the new league under the presidency of Athens, and when the league was transformed into the Athenian Empire the temples of Delos seem to have passed under Athenian control. See ATHENS, *History;* GREECE, *History* (Ancient History). In 426 B.C. the island was purified by the Athenians, who removed all the dead bodies to the neighboring island of Rhenea and ordered that hereafter no birth or death should occur on this sacred spot. In 422 B.C. they even expelled all the secular inhabitants, but allowed them to return in the following year. After the fall of Athens, in 404 B.C., Delos seems, thanks to the Spartans, to have regained its independence for a time; but the Athenians soon recovered the suzerainty and seem to have retained it until about 322 B.C., when Delos became a free community, a position which it maintained until about 166 B.C. During this period the island prospered greatly. The successors of Alexander vied with one another in gifts to Apollo, while its central position made Delos a natural centre of commerce. Nor did this prosperity decrease when the Romans once more placed Delos under Athenian rule (166 B.C.), for at the same time all imports and exports were freed from taxation, and during the second and first centuries B.C. Delos was the seat of a large colony of merchants, Italian, Greek, and Eastern. It was a centre of the slave trade, but had few local industries, except the manufacture of a variety of bronze. Sacked during the Mithridatic wars (c.87 B.C.), it never fully recovered, and by the middle of the second century A.D. was deserted by all except those connected with the temple. With the fall of heathendom the island was deserted except by those who visited it to collect building material or to burn its marbles into lime. Today the island is deserted, except by the few shepherds who in the summer cross with their flocks from Myconos or Rhenea.

During the fifteenth and sixteenth centuries the island was plundered for the benefit of European collections, but scientific exploration began only in 1829 with the French scientific expedition under the direction of Blouet. In 1873 Lebègue explored the ancient shrine and grotto on Mount Cynthus, and in 1877 Homolle began excavations in the sanctuary of Apollo. Since then the French School at Athens has conducted numerous and successful campaigns, which have brought to light not only the sacred precinct with its temples, porticos, and altars, but also the wharves and warehouses, the bazars of the merchants, the theatre, the gymnasium, and a number of private houses, belonging apparently to the prosperous period of the second century B.C. In sculpture the island has yielded some important archaic statues of the sixth century B.C., such as the "Nike" of Archermos, the statue dedicated by Nicandra, and some female figures similar to those found on the Acropolis of Athens, and, of later art, a fighting warrior and a fine copy of the "Diadumenos" of Polyclitus (q.v.), as well as many other works, often, unfortunately, in very poor preservation. The chief harvest has been in the inscriptions, many of which are still unpublished. In addition to the decrees and dedications always common in sanctuaries, these include long lists of the treasures of the temple and also an important series of accounts, showing the receipts and expenditures of the temple, carefully itemized, and throwing a flood of light on the financial administration of a Greek shrine. Consult: Lebègue, *Recherches sur Délos* (Paris, 1876); Von Schoeffer, *De Deli Insulæ Rebus* (Berlin, 1889); Homolle, *De Antiquissimis Dianæ Simulacris* (Paris, 1885) and *Les archives de l'intendance sacrée de Délos* (ib., 1886)—this work gives a plan of the excavations; *Bulletin de correspondance hellénique*, vol. i et seq. (ib., 1877 et seq.); Frank, "Commercialism and Roman Territorial Expansion," in the *Classical Journal*, vol v, pp. 99–110 (1909); this article

throws much light on the relation of the Romans to Delos. Good summaries of the history and antiquities are to be found in Jebb, *Journal of Hellenic Studies*, i (London, 1881); Diehl, *Excursions in Greece*, Eng. trans. by Perkins (New York, 1893); *Guide Joanne, Grèce*, vol. ii. Consult also: Schoeffer, in Pauly-Wissowa, *Realencyclopädie der klassischen Altertumswissenschaft*, vol. iv (Stuttgart, 1901); Homolle and Holleaux, *Exploration archéologique de Délos* (parts i–iii, Paris, 1910–11); Larfeld, *Griechische Epigraphik* (Munich, 1913); Ferguson, *Hellenistic Athens* (New York, 1911). For the theatre, consult Haigh, *The Attic Theatre* (3d ed., Oxford, 1907); for works of art found at Delos, consult Gardner, *A Handbook of Greek Sculpture* (London, 1911) and *Principles of Greek Art* (ib., 1913). Consult, finally, Baedeker, *Greece*, 4th Eng. ed. (Leipzig, 1909).

DELOS, Confederacy of. See Delos; Greece, *History* (Ancient History).

DELPHI, dĕl'fī (Gk. Δελφοί, *Delphoi*). An ancient town of Phocis, Greece, celebrated for its oracle of Apollo (q.v.). It was situated 2130 feet above sea level, about 6 miles inland, north of an indentation in the northern shore of the Corinthian Gulf (Map: Greece, Ancient, C 2). In the Homeric poems it is always called Pytho. It was situated on the southern slope of Mount Parnassus (q.v.), where above the steep and narrow valley of the Pleistos rise the twin cliffs of the Phædriadæ, the 'Shining Rocks.' These precipices are separated only by a narrow chasm, from which issues the famous fountain of Castalia (q.v.). The temple, theatre, and stadium were situated at the foot of the western cliff, and about them the town must have gathered, though the gymnasium and a sanctuary of Athena lay to the east. Below the terrace on which the town lay, the land slopes abruptly to the bed of the Pleistos. The natural surroundings are full of wild grandeur; from underground caverns streamed cold vapors, and the region was liable to violent shocks from earthquakes.

The place seems early to have become the seat of a worship of the earth shaker, Poseidon, and the earth mother, Gæa. Somewhat later, but still at a very early date, the worship of Apollo was introduced and took the place of these cults. Since Apollo was a prophetic god, Delphi became the seat of an oracle, which soon attained great fame. At first the responses seem to have been given from the rustlings of the laurel, as at Dodona (q.v.) from the oak. Later, the Pythia—at first a maiden, subsequently a woman over 50 years old, garbed as a maiden—after drinking from the holy spring and chewing laurel leaves, took her seat upon a tripod in the *adytum*, or inner shrine. Her utterances were taken down and put into hexameters by poets attached to the temple. During the greatest prosperity of the oracle three women relieved one another in this exhausting task. At the head of the temple service stood two priests, holding office for life and seemingly in charge of the oracle. The oracle was consulted by states and kings in matters of national policy, and also by private persons on all manner of personal matters, such as voyages, business ventures, marriages, and other details of daily life. Its fame brought it great wealth and many splendid offerings, among which those of Crœsus and Gelon of Syracuse were especially famous. In the earliest source, the Homeric hymn to Apollo, Delphi appears in dependence upon the Phocian city of Crisa, near the Corinthian Gulf, which controlled access from the sea, and through the later political history of the place this early claim of the Phocians to the control of the oracle keeps recurring until the conquest of Philip of Macedon. The acts of Crisa led to the first of the Sacred Wars (q.v.), in which the Amphictyonic Council (q.v.) of Thermopylæ first appears as a guardian of the oracle. In 590–589 B.C. Crisa fell, and the first celebration of the Pythian games occurred; in 582–581 B.C. the fort was captured, the harbor filled up, and the whole plain placed under a curse. On this occasion another celebration of the games occurred, and from this time they were celebrated every four years. In 548 B.C. the stone temple, said to have been built by Trophonius and Agamedes, was burned, and the priests at once collected subscriptions from all Greece, and even from foreign parts, for its reconstruction. The work of reconstruction was undertaken by the Alcmæonidæ (q.v.), then exiles from Athens, who did more than they were required to do, by employing Parian marble for the east front instead of the *poros*, or limestone, specified in the contract. Some fragments of sculpture found by the French seem to belong to this building. During the Persian wars the oracle showed a pro-Persian spirit, though later the priests declared that supernatural aid had turned to flight a Persian plundering expedition (480 B.C.). In spite of its prophecies of defeat Delphi was richly rewarded by the Greeks from the Persian booty. During the fifth century Delphi was adorned by the Greek states with treasuries to contain their offerings, as well as with many works of art commemorative of victories over their enemies. About 373 B.C. the temple suffered severely, and once more collections were invited from the Greek states for its restoration, which does not seem to have been completed till 328 B.C. Before that time, however, an attempt of the Phocians to reassert their control of the oracle led to the third Sacred War (357–346 B.C.), which ended in the triumph of Philip II of Macedon (q.v.). About 300 B.C. Delphi passed into the power of the Ætolian League, and when (278 B.C.) the Gallic invasion was repelled (see Brennus, 2), we hear once more of the supernatural powers that drove back the robbers from the temple of Apollo.

During the years that followed Delphi seems to have lost much of its old importance, though the inscriptions show that offerings were still made there, and honors were bestowed on benefactors of the community. Under the Romans it enjoyed only spasmodic prosperity; one Pythia sufficed for the inquirers of the oracle. Though some of the emperors endeavored to restore some of the fallen splendor, others found in the mass of statues and works of art a convenient source for the decoration of Rome. Nero is said to have carried off 500 statues, while Constantine, along with many other treasures, removed to Constantinople the serpent column which had formed part of the offering after the victory at Platæa (q.v.), and still bears the names of those Greek states which fought against the Persians (it stands now in the Hippodrome at Constantinople). Later Delphi became the site of a Christian church, but the ruins finally vanished, and until 1892 the site was occupied by the village of Castri (q.v.). In 1880–82 Haussoullier, and, in 1887, Pomtow had conducted excavations at Delphi. In 1892

the French School at Athens, under the direction of Homolle, began excavations, which have resulted in laying bare the entire sacred precinct, including many treasuries and other buildings, as well as the altar, temple, theatre, and stadium; the theatre and the stadium in particular are well preserved. The inscriptions found number over 4150, many of them documents of great importance for the history of Greece, especially for the history of the Delphic Amphictyony. The sculpture also has thrown much light upon the history of art during the later sixth and early fifth century B.C., while it seems almost certain that in a marble statue we have a contemporary copy of a bronze by the great Lysippus. Consult E. A. Gardner, *Six Greek Sculptors*, pp. 217–223 (London, 1910). Another wonderful work of art from Delphi is the "Bronze Charioteer" figured and described by Gardner in the work just named (pp. 49–53). The reports of these excavations are to be found in the *Bulletin de correspondance hellénique*, vols. xvii et seq. (Paris, 1893 et seq.; for plans, see vols. xvi, xvii), and the *Comptes rendus de l'Académie des Inscriptions et Belles Lettres* (ib., 1893 et seq.). Consult also: Mommsen, *Delphika* (Leipzig, 1878); Pomtow, *Beiträge zur Topographie von Delphi* (Berlin, 1889); Hiller von Gaertringen and Pomtow, in Pauly-Wissowa, *Realencyclopädie der klassischen Altertumswissenschaft*, vol. iv (Stuttgart, 1901); Frazer, *Pausanias*, vol. v (2d ed., London, 1913); Baedeker, *Greece* (4th Eng. ed., Leipzig, 1909); Larfeld, *Griechische Epigraphik* (Munich, 1913).

DELPHI. A city and the county seat of Carroll Co., Ind., 60 miles north by west of Indianapolis, on the Wabash River, and on the Wabash, and the Chicago, Indianapolis and Louisville railroads (Map: Indiana, C 2). It has good water power and contains lime works, planing and flour mills, canning factory, carriage and wagon works, paper mills, button factory, stone crushers, etc. There are municipal water works and a public library. Pop., 1890, 1923; 1900, 2135; 1910, 2161.

DEL'PHIN CLASSICS (Lat. *delphinus*, dolphin, from Gk. δελφίς, *delphis*, δελφίν, *delphin*, dolphin). A famous edition of the Latin classics, published in France in the seventeenth century. It was prepared by 39 of the best scholars of the time, under the editorship of Pierre Daniel Huet (q.v.), tutor to the Dauphin (q.v.), son of Louis XIV. The title-pages bear the words *In usum Serenissimi Delphini*, hence the name; all the volumes of the original edition have an engraving of Arion (q.v.) and the dolphin. The Delphin Classics comprise 64 volumes (1674–1730). They possess little value now. Consult Sandys, *A History of Classical Scholarship*, vol. ii (Cambridge, 1908).

DELPHIN'IA. See GREEK FESTIVALS.

DELPHIN'IUM. See LARKSPUR.

DEL'PHOS. A city and railroad centre in Allen and Van Wert counties, Ohio, 15 miles northwest of Lima, on the Miami and Erie Canal, and on the Pennsylvania Company, the Toledo, St. Louis, and Western, the Northern Ohio, the Ohio Electric, and the Cincinnati, Hamilton, and Dayton railroads (Map: Ohio, B 4). It has railroad repair shops, marble and granite works, paper and flour mills, brewery, and manufactories of galvanized iron products, oil cans, printing presses, furniture, pipe, etc. Settled in 1834, Delphos was incorporated in 1851 as a village and became a city in 1913. Its government is administered by a mayor, elected every two years, and a municipal council. The city owns and operates its water works and contains a Carnegie library. Pop., 1900, 4517; 1910, 5038.

DELPINO, dâl-pē'nō, FEDERIGO (1833–1905). An Italian botanist, born at Chiavari (Genoa). He studied at the University of Genoa, became an official in the customs department, and in 1871 was appointed professor of natural history in the School of Forestry at Vallombrosa. In 1875 he was called to the chair of botany at the University of Genoa and in 1894 to a similar chair and the curatorship of the botanical gardens at the University of Naples. His publications, which have contributed much to the study of plant biology, include *Sulla darwiniana teoria della pangenesi* (1869); *Teoria generale della fillotassi* (1883); *Funzione mirmeofila nel regno vegetale* (2 parts, 1886–88); *Fiori doppii* (1887).

DELPIT, dĕl'pē', ALBERT (1849–93). A French novelist and dramatist. He was born in New Orleans, the son of a wealthy tobacco merchant, and at an early age was sent to France to complete his studies. Devoting himself to literature, he first became a contributor to newspapers founded by the elder Dumas towards the end of the Second Empire. Several poetic productions were honored with prizes by the Academy. These were *L'Apothéose de Lamartine* (1869); *L'Invasion* (1871), a volume of verse; and *Le repentir, ou récit d'un curé de campagne* (1878). His earlier dramatic efforts did not meet with success, but *Le fils de Coralie* (1879), dramatized from his novel of the same title, was received with great favor, and several of his subsequent dramatizations held the stage for some time, especially *Le père de Martial* (1881). He was, however, at his best as a novelist. Among his productions in this field, for the most part descriptive of life in fashionable society, and many of which appeared first in the *Revue des Deux Mondes*, are: *La vengeresse* (1874); *Les fils de joie* (1877); *Le mariage d'Odette* (1880); *La marquise* (1882); *Les amours cruelles* (1884); *Solange de Croix-Saint-Luc* (1885); *Mademoiselle de Bressier* (1886); *Thérésine* (1888); *Disparu* (1888); *Comme dans la vie* (1890); *Belle madame* (1892). A collection of poems appeared under the title *Les dieux qu'on brise* (1881). During the Franco-German War he entered the army and, serving with distinction, was decorated with the Legion of Honor (1871). He died in Paris.

DELPIT, EDOUARD (1844–1900). A French author and journalist, born in New Orleans, U. S. A. He studied in France, where he was naturalized in 1868, and in 1873 became subprefect of Nérac. Subsequently he assumed control of the *Union Nationale*, a newspaper of Montpellier. He published a volume of poems, *Les mosaïques* (1871), and *Paule de Brussange* (1887), *La vengeance de Pierre* (1888), *Chaîne brisée* (1890), *Marcienne* (1894), *Sans merci* (1898), *La talion* (1899) — all works of fiction.

DEL POLLAJUOLO, dĕl pôl'lâ-hwô'lô, SIMONE. See POLLAIUOLO.

DEL RIO, dĕl rē'ô (Sp., of the river). A city and the county seat of Val Verde Co., Tex., 170 miles west of San Antonio, on the Galveston, Harrisburg, and San Antonio Railroad (Map: Texas, B 5). Notable features of the city are the San Felipe springs, a hospital, two convents,

and the Federal building. It has cotton gins and other industrial establishments, and is the centre of a truck-farming and cattle-raising region. Pecans, wool, hides, live stock, fruit, and vegetables constitute important exports. Del Rio has adopted the commission form of government. Pop., 1914 (local est.), 9000; 1920, 10,589.

DELSARTE, dĕl-särt′, François Alexandre Nicolas Chéri (1811–71). A French-American musician, born in Solesmes, France. He was a pupil of the Conservatoire, was for a time a tenor singer in the Opéra Comique, composed a few melodies, and wrote several romances, but is chiefly known as a teacher in singing and declamation. He sought by an elaborate system to present the art of expression as a complete science. His theories have been widely adopted, and are handed down mainly by tradition, as Delsarte wrote very little about them.

DELSARTE SYSTEM. See Gymnastics.

DEL'TA (Lat., from Gk. Δέλτα, fourth letter of the alphabet, anything shaped like the letter Δ, from Heb. *daleth*, door, name of the fourth letter of the alphabet). An alluvial plain occurring at the mouth of a river. The name was applied originally by the Greeks to the land area at the mouth of the Nile, from the resemblance in shape to their letter Δ. All rivers carry finely divided sand and mud in suspension, and, as their currents are checked upon entering quieter waters, the solid particles are deposited upon the bottom of the channels near the river mouths. The deposit gradually increases in area and also in thickness until it reaches the surface, and then by floods and by growth of vegetation it is raised beyond the limits of high water. At the head of each land area thus built up, the river divides into diverging branches, forming a triangle the base of which fronts upon the sea. A delta may occur at the junction of two rivers or at the entrance of a river into sea or lake; a fan-shaped deposit resembling a delta is sometimes found, also, where a river debouches from a mountainous region upon a plain. The large deltas are found at the mouths of great rivers which discharge into comparatively quiet seas. Coastal currents and strong tidal action remove the river deposits before they accumulate to any considerable thickness. The area of a delta varies with the size of the river, the amount of sediment carried and the length of time it has been deposited, and the relative quietude of the sea. The combined delta of the Ganges and Brahmaputra in India occupies more than 50,000 square miles, and the deposit has been found in places to be nearly 500 feet thick; that of the Nile is 200 miles wide at the base of the Mediterranean Sea and 100 miles long. The Mississippi delta is irregular in form, but it affords a fine illustration of the manner in which a river extends its channel seaward. Its area is about 12,300 square miles, and it is advancing into the Gulf of Mexico at the rate of about 260 feet a year. In Italy the Po has constructed a delta so rapidly that the city Adria, which in ancient times was a port of sufficient importance to have given its name to the Adriatic Sea, is now about 15 miles inland. Delta lands are usually fertile, but by reason of their low elevation they are often unhealthful, and their cultivation is hindered by inundations during storms and floods. Consult Geikie, *Text-Book of Geology* (London, 1903). See River; Shore.

DEL'TOID MUSCLE. See Muscle.

DELUC, de-lŭk′, Jean André (1727–1817). A Swiss geologist and meteorologist. He was engaged in mercantile pursuits until nearly 50 years of age; but within that time, assisted by his brother, he assembled a fine museum of mineralogy and natural history. He removed to England in 1773, was made a fellow of the Royal Society, and appointed reader to Queen Charlotte, a position which he held for many years, and which afforded him ample time for study. He invented a hygrometer, a portable barometer, etc., and carried out many interesting experiments in physics and meteorology. His principal geological work is *Lettres physiques et morales sur les montagnes et sur l'histoire de la terre et de l'homme* (1778). In this work he endeavors to reconcile the Mosaic account of creation with the data of science by extending the six days of Genesis to so many geological epochs. In 1809 he described the dry pile or electric column in a paper sent to the Royal Society. He also published *Recherches sur les modifications de l'atmosphere* (2 vols., 1772; 2d ed., 4 vols., 1784); *Traité élémentaire de géologie* (1809); *Voyages géologiques en France, en Suisse, et en Allemagne* (2 vols., 1813).

DELUGE (OF., from Lat. *diluvium*, flood, from *diluere*, to wash away, from *di-*, away + *luere*, to wash). A flood of waters supposed by many peoples to have submerged the whole earth, or a large part of it, in primeval times, involving the destruction of all, or nearly all, life upon the planet. The most unmistakable evidence of a belief in such a flood is found in the literary remains, not only of the ancient Hebrews, but also of India, Persia, Babylonia, Syria, Asia Minor, and Greece. In one form or another it also seems to have existed among the aborigines of America and Polynesia, according to the testimony of Christian missionaries, whose accounts, however, cannot always be accepted without caution. On the other hand, there is practically no trace of a flood story in Africa, not even among the ancient Egyptians, though an earlier form of one may have been familiar in the Nile valley. Aside from Greece, and possibly Lithuania, there is none in Europe.

Of course the most obvious way to account for this widespread story is to suppose that there really was a flood. The fact that the Bible gives a detailed and intelligible account of one was formerly generally regarded by Jews and Christians as unquestionable evidence that it occurred; and the story of it in other nations was considered remarkable confirmation of the Bible narrative. The organic remains found everywhere in the rocks of the earth's surface were also held to prove that the waters had covered every known country and risen over the highest hills. With the progress of geology it became evident that most of the stratified rocks demanded an earlier origin than a few thousand years, and the influence of the deluge was consequently restricted to the slightly altered superficial deposits. But many of these were found to belong to a period vastly anterior to any historical epoch and to have been produced by a long-continued action under uniform conditions, viz., regional glaciation, which was most active during that portion of geological times known as the Glacial period. Consequently there arose a tendency to regard a Noachian deluge as having been of merely local extent, and this explanation was adopted by

certain commentators on the narrative of Genesis. At the present time the most important discussion of the subject belongs to the department of comparative religion and mythology.

By far the earliest and most important of all deluge stories outside of the Bible is the Babylonian. Through the excerpts from Berosus (c.330–260 B.C.), made by Alexander Polyhistor (died c.40 B.C.), and preserved by Josephus, Eusebius, and Georgius Syncellus, one version of the Babylonian story has long been familiar. It relates how, in order to escape the flood, the Babylonian King, Xisuthrus, was commanded to enter a vessel with wife, children, friends, and a pilot, and to steer "towards the gods"; and how, when the waters had subsided, he sent out birds three times, grounded on a Kordyanian mountain in Armenia, disembarked, sacrificed to the gods and was translated. In 1872 George Smith discovered another version, forming the eleventh tablet of the Gilgamesh epic. According to this story, Anu, Ellil, Ninip, and Ennugi sent out a destroying flood (*abubu*), but Ea, determined to save Ut-napishtim of Shurippak, advised him to "build a house, to construct a ship," and to take with him into it "seeds of life of all kinds." He accordingly constructed his house, or boat, coated it within and without with bitumen (*kupru*), and made apartments in it. His possessions, family, relatives, laborers, the cattle and the beasts of the field, Ut-napishtim brought into the house. Then the rain fell, the storm arose, and darkness covered the earth. All living beings were destroyed, except those in the house. On the seventh day Ut-napishtim opened the window, and soon the ship grounded on the mountain of Nizir. Seven days later he sent out a dove, a swallow, and a raven. The dove and the swallow returned, the raven did not. Ut-napishtim offered a sacrifice on the mountain, and the gods "smelt the pleasant odor." Ea rebuked Ellil for ordering such a deluge, when he might have punished men by beasts, famine, or pestilence; and Ishtar, who had already during the deluge expressed her sympathy with mankind, now lifted up her gems made by Anu (probably the rainbow), which would remind her forever of the flood. Ea pacified Ellil's disappointment at the deliverance of Ut-napishtim, and Ellil himself went on board the ship and announced that Ut-napishtim and his wife were thenceforth to be gods and live "afar off, at the mouth of the rivers." These tablets containing the Gilgamesh epic were found in the library of Asurbanipal (668–625 B.C.) at Kuyunjik; but they were only copies of originals found in turn by Asurbanipal's scribes in the temple archives at Uruk (modern Warka). Several fragments have since been found, giving the dimensions of the ark, and directions concerning food, treasures, men, and animals to be taken into it. Especially interesting is a tablet published by Peiser (*Zeitschrift für Assyriologie*, Leipzig, 1889), giving a map of Babylonia, surrounded by the ocean at the time of Ut-napishtim "in the year of the great serpent," and probably dating from the ninth century B.C. An earlier reference to the flood is in a fragment published by Scheil (*Receuil de travaux*, Paris, 1878), dated the 28th of Shebat of the year when Ammi-zadugga (1973 B.C.) built the fortress of Ammi-zadugga. The hero of the flood (*abubu*) is here called Atra-hasis, which, reversed (Hasis-atra), is evidently Berosus' Xisuthrus. A fragment likewise referring to Atra-hasis was published by Jensen in *Keilinschriftliche Bibliothek*, vol. vi (Berlin, 1900). Another fragment has more recently been published by Hilprecht, *Der Neue Fund zur Sintflutgeschichte* (Leipzig, 1910). While he assigns it to the Isin period, other Assyriologists are inclined to date it in the Kassite period (1761–1185 B.C.). Finally, Poebel in 1913 discovered a Sumerian original coming from Nippur. The hero's name is here Ziugiddu. There are references to Ea's advice, the seven days of storm, the great boat, the sacrifice, and the deification of Ziugiddu.

The narrative in Genesis (chaps. vi.–ix) is regarded by many modern critics as made up of two versions interwoven. This was recognized by Jean Astruc (q.v.) as early as 1753. Using as a clue the divine names Yahwe and Elohim, he roughly outlined the two accounts. At the present day his intuition has been widely accepted, and scholars proceed to rearrange the material and assert that the Yahwistic narrative is found in Gen. vi. 5–8; vii. 1–5, 7–10, 12, 16 b, 17, 22, 23; viii. 26, 3 a, 6–12, 13 b, 20–22. The flood is represented as sent because of man's wickedness. It is occasioned by a rain lasting 40 days. Noah is saved with his family in an ark, or house. With him are a pair of all unclean animals, and seven pairs of all clean animals. The flood comes after seven days and destroys all living things on the earth. At the end of 40 days Noah sends out a raven, which does not return; then a dove, which returns with an olive twig; and, after seven days the dove is again sent out, and this time does not return. Seven days later Noah disembarks, builds an altar, and offers a sacrifice of which Yahwe smells the "rest-giving odor" and promises not to destroy the world again. Portions of another narrative are found in Gen. vi. 9–22; vii. 6, 11, 13–16 a, 18–21, 24; viii. 4, 5, 13, 14–19; ix. 1–17. Noah is represented as a just and perfect man whom Elohim desires to save and therefore commands to build an ark, giving its exact measurements. Noah is to take into it his family and of all living beings a pair. The flood is brought about by the subterranean waters of the great abyss breaking through the openings in the earth's crust and the windows of heaven being opened. It begins in the six hundredth year of Noah's life, on the seventeenth (or more probably, according to the Greek version, the twenty-seventh) day of the second month. It increases during 150 days, or five months of a solar year, and begins to decrease in the seventh month. The ark then grounds on one of the mountains of Ararat (Urartu; see CHALDIANS). The waters decrease until the tenth month, when, on the first day, the tops of the mountains are seen. On the first day of the first month in the six hundred and first year of Noah's life the ground is dry, and on the twenty-seventh of the second month, consequently after a full solar year, Noah leaves the ark and is blessed by Elohim, who points to the bow in the sky as a guarantee that a flood shall not again occur.

The striking similarity between the Genesis narrative and the Babylonian account is manifest, and has been explained in two ways. Both records have been thought to be independent developments of an old Semitic tradition; and the one has been said to be copied from the other. Some scholars who, in view of the uncertainty of the textual transmission, are not inclined

to attach so much weight to the alteration of the divine names in the Masoretic text admit the probability of redactional additions due to a different tradition. The fact that the story has now been found in the Sumerian renders the second alternative more probable. Those who believe that the Hebrew narrative is taken from the Babylonian differ as to the time when this is likely to have taken place. In Genesis iv the history of existing tribes seems to be traced back to their earliest progenitors without the interruption of a flood. This has given rise to the theory that one of the Pentateuchal sources did not contain this story originally, but that it was interpolated either after contact with the Assyrians in the eighth century, or, since the waters of Noah are first quoted by Deutero Isaiah, not long before 540 B.C. by a Babylonian Jew possibly at Uruk, and that the story was afterward supplemented by Ezra, who was familiar with a version having greater affinity to the Sippara recension. On the other hand, it is held by some scholars that the story found its way into Syria before the Hebrew invasion, as was the case with other myths (see BABYLONIA), and that it was presented in different recensions in Palestine. Absence of polytheism in the Hebrew is an unquestionable advance in thought, but it was not made without a sacrifice. Instead of a divided council of gods in which, through Ishtar and Ea, sympathy with the whole human race found fine expression, and mercy won the day over justice unmollified by kindness, the one all-powerful God became responsible for the ruthless destruction of life, and His partiality to those finding favor in His eyes became accentuated.

As to the origin of the Babylonian story, and also of the Hebrew narrative, if it be independent of the former, it has been maintained by some scholars that an actual occurrence, such as the incursion of a tidal wave through an earthquake, the destruction of a single city through a rainstorm, the flooding of some district from a system of canals not properly protected, or the annually recurring inundation of a river, may have given rise to it. But it is far more probable that the Babylonian account, at any rate, originated in a myth describing the passage of the sun god in his boat through the heavenly ocean. When the present order of the world was regarded as the creation of the sun god, after a successful conflict with the earth-encircling ocean, it is natural that this myth should, in course of time, take the form of a deluge story relating the escape of a solar hero in the year of the great serpent. This conclusion is also indicated by the fact that the story of the flood is told on the eleventh tablet of a series manifestly representing the course of a solar personage through the signs of the zodiac. In the great cosmic year the sun god meets the cataclysm of waters in Aquarius, as in the solar year he encounters in Shebat, the eleventh month, the inundation of the river.

This mythical origin is believed to be confirmed by the flood stories of Greece, India, and Persia, as well as by the American and Polynesian accounts. The story of Deucalion's flood is known to us through Pindar (died c.440 B.C.), *Olymp.*, ix, 37 et seq.; and Ovid, *Metamorphoses* I, 240; that of Ogyges through Nonnus (c.400 A.D.), *Dionysiaca*, iii, 96; that of Dardanus also through Nonnus, ib., iii, 215 et seq. Deucalion means "the little Zeus," and this young sun god steers in his ship for Parnassus, the mountain of the gods. The Phrygian myth, of which the bronze coins of Apamea bear witness, in the third century A.D., has evidently been influenced by the Jewish account, as the name "Noe" shows; and the same is true of the Syrian story in Lucian's *De Dea Syria*, xii. On the other hand, the Indian flood story is quite independent of the Semitic. It is found in its earliest form in *Sátapathabrāhmana* (c.600 B.C.); then in the *Mahābhārata* and *Bhagavata Purāna*. Manu, son of Vivisvat, is a solar hero. His divine character is shown by the fact that after the flood he creates not only a new human race, but even gods. Brahma in the form of a fish carries him through the waters. The Iranian story (*Vendidad*, ii, 46 et seq.) is in too fragmentary a condition to permit a conclusion. It is uncertain whether the flood is in the past or in the future. Yima seems to be identical with Mimer; if so, the myth belongs to a different order. The medium through which the Mexican, Peruvian, and Cuban flood stories have come to us renders it difficult to determine their original form; but the somewhat better authenticated Polynesian stories seem beyond a doubt to have their origin in a sea myth. Consult: Usener, *Die Sintflutsagen* (2d ed., Bonn, 1911); Andree, *Die Flutsagen ethnographisch betrachtet* (Brunswick, 1891); Winternitz, in *Mitteilungen der Anthropologischen Gesellschaft in Wien*, vol. xxxi, pp. 212 ff. (1901); Murad, *Ararat und Masis* (Heidelberg, 1901); Vail, *The Deluge and its Causes* (Chicago, 1905); Haupt, *Das Babylonische Nimrodepos* (Leipzig, 1891); Jensen, *Das Gilgamesh Epos* (1906); Gordon, *Early Traditions of Genesis* (1907); Hilprecht, *The Earliest Version of the Babylonian Deluge Story* (Philadelphia, 1910); Ungnad, in Gressmann, *Altorientalische Texte und Bilder* (Tübingen, 1909); Gunkel, *Genesis* (3d ed., Göttingen, 1910); Fiske, *The Great Epic of Israel* (1911); Rogers, *Cuneiform Parallels to the Old Testament* (New York, 1912); Poebel, in *Babylonian Publications of the Museum of Archæology of the University of Pennsylvania*, vol. vi, p. 1 (Philadelphia, 1913); Jastrow, *Hebrew and Babylonian Traditions* (New York, 1914).

DELU'SION. See INSANITY.

DELVAU, dĕl'vō', ALFRED (1825–67). A French author. He was born in Paris, the son of a tanner, and after having been secretary to Ledru-Rollin in 1848, while the latter was Minister of the Interior, he devoted himself entirely to literary pursuits. He became a prolific writer and produced works of the most varied description, among which his skillful delineations of Parisian customs and curious phases of life are the most interesting and may lay claim to some merit as contributions to the local history of civilization. Of these may be quoted: *Grandeur et décadence des grisettes* (1848); *Les dessous de Paris* (1860); *Histoire anecdotique des cafés et des cabarets de Paris* (1862); *Les Cythères parisiennes* (1864); *Les heures parisiennes* (1866); *Les lions du jour* (1867). He also published: *Histoire de la révolution de Février* (1850); *Les murailles révolutionnaires* (1851), a curious collection of decrees and proclamations, placarded during the Second Republic; *Au bord de la Bièvre, impressions et souvenirs* (1854); *Gérard de Nerval, sa vie et ses œuvres* (1865); *Henri*

Murger et la Bohème (1866); *Les sonneurs de sonnets, 1640–1866* (1867). Under the pen name of "Junius" he contributed a lively series of letters to the *Figaro* in 1861.

DELVAUX, dĕl'vô', LAURENT (1695–1778). A Flemish sculptor. He was born in Ghent and studied his art under Gery Heldenberg and Dieudonné Plumier in Brussels. In 1717 he went to London, where he spent nine years and executed numerous works for Westminster Abbey and other churches and for palaces, partly in conjunction with the sculptor Pieter Scheemaecker, of Antwerp. From 1727 to 1733 he studied antique art in Italy and, after his return to Brussels, was appointed court sculptor to the Regent Maria Elizabeth and later to Duke Charles of Lorraine, for whom he modeled busts of Maria Theresa and Louis XV. He afterward settled at Nivelles and there practiced his art until his death. His productions, characterized by vigorous treatment, show the influence of classic art, and his religious works also that of Bernini. They include a colossal statue of Hercules in the New Museum of Brussels; the mausoleum of Leonhard van der Noot in the Carmelite Church, Brussels; a pulpit, representing the "Tree of Life," in the cathedral in Ghent—the best specimen of Flemish sculpture in the eighteenth century; a statue of St. Livin in the Museum in Ghent.

DELVIGNE, dĕl'vē'ny', HENRI GUSTAVE (1799–1876). A French soldier and inventor, born in Hamburg. He became a captain in the French infantry service, from which he resigned on the outbreak of the revolution of July (1830). In 1826 he invented a rifle known by his name. In this rifle the chamber was smaller than the bore, with which it was connected by a spherical surface equal in radius to the ball used. The powder was poured from the muzzle into the chamber, upon which the ball rested when dropped into the bore. The ball was then made to take the rifling grooves by ramming. This invention marks an important step in the improvement of the rifle. Delvigne also devised some life-saving apparatus, particularly life rockets. His publications include *Exposé d'un nouveau système d'armement pour l'infanterie* (1836).

DELYAN'NIS, or **DELIJANNIS,** THEODOROS (1826–1905). A Greek statesman, born at Kalavryta, in the Peloponnesus. He studied at Athens and entered the government service (Department of the Interior) in 1843, and was rapidly promoted. He was Minister of Foreign Affairs in the provisional government of 1862–63 and Minister to France in 1867. In the cabinets from 1868 to 1878 he held office, either as Minister of Foreign Affairs, or of Finances, or of Worship and Instruction. He represented Greece at the Berlin Congress in 1878 and obtained an extension of territory for his country. In 1885 he formed a new ministry, but his policy led to a blockade of the Greek coast by a fleet of the Great Powers, and he resigned in 1886. He was Prime Minister again in 1890–92, but his mismanagement of finances led to his dismissal. He held the office a third time from 1895 to 1897, when he involved Greece in the war with Turkey and was obliged to resign. He was Premier again in 1902–03 and 1904–05. On June 13, 1905, he was assassinated by a gambler whose class interests he had antagonized. His political history was for the most part nothing but opposition to Trikoupis (q.v.), than whom he was more popular, but not a greater statesman.

DEMADES, dĕm-ā'dēz (Gk. Δημάδης, *Dēmadēs*). A gifted Athenian orator and unscrupulous politician of the fourth century B.C. For the 12 years preceding Alexander's death he was a leader in Athens with Phocion (q.v.), and so was the enemy of Demosthenes. Though friendly to the Macedonians, he accepted bribes from the other side; for this he was fined several times and at last deprived of his civil rights. When Antipater was advancing on Athens in 322 B.C., Demades was restored to full standing as a citizen, and he and Phocion were sent as ambassadors to him. Their acceptance of the terms offered, terms which were unfavorable to Athens, was made the basis of a charge that they had been bribed. Some years later Antipater discovered that Demades had been false to him, and he put him to death (c.318 B.C.). None of his speeches is extant; in antiquity 14 orations were current under his name, but they were all recognized to be spurious. Extracts from one of these (Περὶ Δωδεκαετίας, *Peri Dōdekaetias*) are edited by Haupt in *Hermes*, vol. xiii, pp. 498 et seq. We have also a collection of sayings attributed to him, *Demadea*. Consult Blass, *Attische Beredsamkeit*, iii (Leipzig, 1887–93).

DEMAIN. See DEMESNE.

DEMAND. A technical term of the common law, signifying a legal claim or obligation. It is defined by Lord Coke as "a term of law, of an extent greater in its signification than any other word except claim" (*Co. Lit.*, 291). In addition to the claims enforceable by actions, such as contracts, debts, obligations, etc., it includes, as well, all rights enforceable by entry, by seizure of goods, or by any other act. A release of all demands, therefore, is the most comprehensive release that can be given. The usual form of "general release," as it is called, is to release "all claims and demands whatsoever." See RELEASE.

The term "demand" is also employed in law in a narrower sense, derived from its general signification of a request, or summons, addressed to another in legal form, calling upon him to perform a legal duty which he owes to the demandant. Such a demand is frequently necessary to fix an inchoate legal obligation and to entitle the claimant to bring an action for its enforcement. Thus, under ordinary circumstances, no right of action arises for a breach of promise to marry unless a previous demand can be shown, and the same is true of all contract obligations in which the time of performance is not definitely fixed, as well as of others in which the time is not a material element. So, in other classes of rights, a demand and its refusal are frequently necessary to give to a wrongful act the sharpness and definiteness requisite to make a legal remedy available. For example, where goods are wrongfully detained by a finder, or by any other person whose original possession thereof was lawfully acquired, he must refuse a demand for them before he becomes liable in trover for a conversion; and so, before abating a nuisance, either personally or by action, a demand must usually be made upon the person maintaining it.

There are other cases in which, though a definite default has been made, entitling the injured party to sue without further notice, a demand for performance may yet be necessary

to enable him to avail himself of some more drastic remedy; as in the case of a failure to pay rent at the stipulated time, though an action will lie for the breach of contract, the landlord cannot enter for breach of condition and put an end to the lease without previous demand. It should be added that, in all cases in which a demand is requisite to fix a legal liability, the requirement is dispensed with if the party in default has put it out of his power to comply with it, and in some jurisdictions the courts have gone so far as to hold a demand unnecessary in all cases in which it would probably have been unavailing. See BREACH; CONVERSION; LIABILITY; QUASI CONTRACT; and consult the authorities referred to under these titles.

DEMAND AND SUPPLY. In political economy demand signifies the amount of a commodity that will be taken at a given price; supply the amount that will be offered at a given price. In the case of most commodities appearing on the market, the volume of demand increases and the volume of supply diminishes with every decline in price, and vice versa. There must be some price at which the volume of demand just equals that of supply; and this is the price that tends to rule in the market. Hence the axiom of political economy that price is determined by the equation of demand and supply.

While classical political economy explained prices current on the market by the equation of demand and supply and had no other formula even for the permanent prices of objects not reproducible, for goods that could be produced by labor another law governed prices in the long run: cost of production. If market prices, fixed by demand and supply, exceeded cost of production, supply would increase until prices were forced to a lower level; if market prices were inferior to cost, supply would diminish until prices rose. It is to be noted that the law of costs operates only through the mechanism of demand and supply.

In recent economic theory the law of demand and supply is accepted as a preliminary step in reasoning, but chief interest is held to centre in the forces underlying demand and supply. See POLITICAL ECONOMY.

DEMARA'TUS (Lat., from Gk. *Δημάρατος*, Dēmaratus). A Spartan king (c.510 to 491 B.C.). By the machinations of his colleague, Cleomenes (q.v.), he was deposed. He subsequently repaired to the Persian court and accompanied Xerxes as a councilor on that monarch's expedition against Greece.

DE'MARCA'TION (Fr. *démarcation*, from Lat. *de*, off, away, ML. *marca*, boundary, limit, mark), LINE OF. The historical and cartographical name given to an imaginary line running due north and south 100 leagues west of the Azores, established by a papal bull of Alexander VI on May 4, 1493, delimiting the spheres of Spanish and Portuguese possession in the New World. All new lands discovered east of this line were to belong to Portugal and all to the west to Spain. Dissatisfaction with this arrangement on the part of Portugal led to the conclusion of the Convention of Tordesillas between Spain and Portugal, June 7, 1494, sanctioned by a bull granted by Pope Julius II, Jan. 24, 1506, in which the line of demarcation was shifted 370 leagues west of the Cape Verde Islands, so that Brazil, as yet undiscovered, subsequently fell to the share of Portugal. As between the two Iberian Powers, the terms of the convention were respected in fair measure, though disputes as to the exact determination of the line were frequent. The chief disputes were over the ownership of the Moluccas and Philippines, settled by the Treaty of Saragossa in 1529; and over the southwestern boundary of Brazil, which resulted in the abrogation of the line of demarcation and all agreements based thereon by a treaty of 1750. This treaty, however, was also abrogated in 1761 and all disputes involved were at length settled in 1779 by a new treaty. The other nations of Europe paid little regard to the papal bull. Consult Harrisse, *Diplomatic History of America* (New York, 1898), and Edward G. Bourne, *Essays in Historical Criticism* (ib., 1901).

DEM'AREST', WILLIAM HENRY STEELE (1863–). An American college president, born at Hudson, N. Y. After graduating from Rutgers College in 1883 and from New Brunswick (N. J.) Theological Seminary in 1888, he was ordained to the ministry of the Reformed church in America. He was pastor at Walden, N. Y. (1888–97) and at Catskill, N. Y. (1897–1901). In 1901–06 he was professor of church history at New Brunswick Theological Seminary, and in 1906 he became president of Rutgers College. He received the degree of LL.D. from Columbia University and Union College.

DEMARTEAU, dē'mär'tō', GILLES (1722–76). A French line engraver. He was born in Liége, but studied and practiced his art in Paris. He is one of the most eminent exponents of the style of engraving in imitation of crayon drawing. He brought that process to great perfection, but was not, as is frequently stated, the inventor of it. For his services he received from Louis XV a pension of 600 livres, and in 1769 he was elected a member of the Paris Academy. His work comprises some 729 plates, for the most part after French masters, especially Boucher, including models for students, of which he seems to have created the typical academic style of drawing. Among the best are: "The Wounded Lycurgus," after Cochin; "Justice Protecting the Arts," after Cochin; Entombment of Christ," after Stellaert; "The Education of Cupid" and "Venus Crowned," after Boucher; and some excellent portraits, especially that of the painter Charles Vanloo.

DEM'AVEND', MOUNT. An extinct volcano of Persia, in lat. 36° N., and long. 52° E., about 50 miles northeast of Teheran (Map: Persia, D 3). It has an altitude estimated at 18,500 feet and forms the loftiest peak of the Elburz chain, which separates the low shores of the Caspian Sea from the high table-land of Persia. Although no longer subject to eruptions, Demavend bears traces of comparatively recent activity. Its summit is conical and the crater still intact. At its base hot springs give evidence of the continued existence of volcanic heat at no great distance beneath the surface. A great deposit of sulphur covers the summit of Demavend and is brought down to the plains in bags as an article of commerce. The first European to make the ascent of Demavend was William T. Thomson, in 1837. Demavend towers high above the neighboring mountains, the adjacent summits not exceeding two-thirds of its elevation. At all times it has been a

conspicuous object from the great trade route between India and the West, along the edge of the Persian table-land. Zohak, a personification of the bad principle, was supposed by the Persians to be buried under Demavend.

DEMBEA, dĕm'bē-â *or* dĕm-bē'â. See TZANA.

DEMBIN'SKI, dĕm-bēn'skē, HENRYK (1791–1864). A Polish and Hungarian general, born near Cracow, in Poland. He entered the Polish army in 1809, took part in the invasion of Russia by the French in 1812, and was made captain by Napoleon himself on the battlefield of Smolensk. He subsequently distinguished himself at Leipzig. After the fall of the Empire he returned to his native country and lived in comparative obscurity for some time. The Polish Revolution of 1830 called him again to arms. He obtained the command of a brigade of cavalry and exhibited heroic courage at the battles of Kuslev and Ostrolenka. Afterward he was engaged in the campaign in Lithuania and, returning to Warsaw, was made commander in chief of the national army, holding the post, however, for only three days. After the surrender of Warsaw to the Russians Dembinski went to France. In 1833 he proceeded to Egypt and entered the service of Mehemet Ali, but returned to Paris in 1835. Some months after the outbreak of the Hungarian insurrection Kossuth appointed him commander in chief of the main Hungarian army (Feb. 5, 1849). He drew up a line of campaign, but could not obtain the concurrence of Görgei, whose tardy arrival caused the loss of the battle of Kápolna (Feb. 26–27, 1849). Forced to retreat behind the Theiss, Dembinski resigned his command, but subsequently consented to act under Mészaros. He was appointed to the command of the Northern Hungarian army and strongly urged the necessity of uniting the cause of Hungary with that of Poland, proposing to lead an army into Galicia; but his advice was not taken. After the resignation of Kossuth, and the capitulation signed by Görgei at Világos (Aug. 13, 1849), Dembinski fled to Turkey. In 1850 he returned to France and began to write his *Mémoires* on the Hungarian war. He died in Paris in 1864. Consult Danzer, *Dembinski in Ungarn* (Vienna, 1873).

DEME, dēm (Gk. *δῆμος, dēmos,* district). One of the primitive subdivisions of ancient Attica. The word originally meant "a country district" and was applied to the rural communities or to the people living in the country in distinction from those living in the city. The *demes* existed from an early period and, according to tradition, were made constituent parts of the Athenian territory by Theseus, but they do not become historically important until the time of Clisthenes (508–507 B.C.). When Clisthenes (q.v.) abolished, for all but religious purposes, the four old Attic tribes and substituted in their stead 10 new tribes, he first divided the people territorially into a certain number of demes and then formed his tribes by arbitrary groupings of these demes. (See ATHENS, *History.*) The demes were thus the fundamental political units of the state. The number of demes established by Clisthenes cannot be determined; the statement of Herodotus that he made 100 cannot be fitted into our other information concerning his reforms. The demes were variously named—some with gentile or patronymic names, some from the trades carried on in them, some from plants that grew in the neighborhood, and so on. Each deme had its presiding officer (*δήμαρχος, dēmarchos*), elected annually, its treasurer (*ταμίας, tamias*), its controller (*ἀντιγραφεύς, antigrapheus*), and other officers, besides its assembly, which, convened by the demarch, transacted the public business of the deme. There was also for each deme a register wherein were enrolled, for political and other purposes, all the members of that deme. Membership in the deme was hereditary; it was retained without regard to the place of actual residence. Consult: Hermann, *Griechische Alterthümer* (Freiburg, 1882); Leake, *Demes of Attica* (London, 1820); Haussouillier, *La vie municipale en Attique* (Paris, 1883); Wachsmuth, *Stadt Athen,* vol. ii (Leipzig, 1890).

DE MENDOZA. See SANTILLANA.

DEMEN'TIA. See INSANITY.

DEMERARA, dĕm'ĕ-rä'rà. A river of British Guiana (q.v.), South America, rising in the mountains of the interior, flowing north almost parallel with the Essequibo, and emptying into the Atlantic at Georgetown (Map: Guiana, British, F 2). It is about 200 miles long, 1½ miles broad at its mouth, and navigable by ships of considerable burden for 75 miles. Its affluents are numerous, though small. At its entrance into the ocean it affords a spacious harbor, obstructed, however, by a bar.

DEMESNE, dĕ-mēn', or **DEMAIN'** (OF. *demaine, domaine,* from Lat. *dominium,* right of power). In the feudal system of land tenure, the dominion over land. But the dominion connoted by the term was the actual dominion of the freehold tenant, and not the theoretical dominion of the king or the mesne lord. It did not signify lordship of land, but the rights and the authority of the immediate owner. Such a tenant was said to hold "in his demesne" (*in dominio suo*). Blackstone distinguishes accurately between the allodial, or absolute, owner, outside the feudal system, who was described as holding the land "in his demesne," and the feudal tenant, whose dominion was qualified by adding the phrase "as of fee," indicating a real and yet subordinate dominion. But he was probably wrong in using the same term to describe the king's paramount lordship. The king, indeed, held lands in his demesne; there were and still are "demesne lands" of the crown, but they are the immediate property of the crown, owned and controlled by it, and not lands held of the crown by freehold tenants. See CROWN LANDS; FEUDALISM; TENURE.

Ancient demesne is a species of privileged copyhold tenure, surviving in a few ancient manors which formed part of the demesne lands of the crown in the time of the Conqueror and are so recorded in Domesday Book. These manors may now be in the hands of subjects. Tenure of ancient demesne is sometimes known as customary tenant right, privileged villeinage, and villein socage. The abolition of the peculiar privileges which attended it, by statute in 1833, has assimilated it closely to ordinary socage tenure. Consult: Blackstone, *Commentaries on the Laws of England;* Vinogradoff, *Villeinage in England;* Pollock and Maitland, *History of English Law* (2d ed., Cambridge and Boston, 1899). See COPYHOLD; SOCAGE.

DEME'TER. See CERES.

DEME'TRIUS (Gk. *Δημήτριος, Dēmētrios*). A sculptor of Attica, who flourished in the early part of the fourth century B.C. He was espe-

cially celebrated for the realism of his portraits, though some censured his excessively close imitation of natural defects. Consult E. A. Gardner, *A Handbook of Greek Sculpture* (London, 1911), and P. Gardner, *The Principles of Greek Art* (New York, 1914).

DEMETRIUS, called PHALEREUS (Gk. *Δημήτριος Φαληρεύς, Dēmētrios Phalēreus*) (c.345–283 B.C.). A Greek orator and philosopher. He was born at Phalerum, Attica, and was a pupil of the philosopher Theophrastus. In 317 B.C. he was appointed Governor of Athens by Cassander (q.v.) and held that office successfully for 10 years. When Athens was taken by Demetrius Poliorcetes (q.v.) in 307 B.C., Demetrius Phalereus fled, first to Thebes, then to Ptolemy Lagus at Alexandria. Later he was banished from Alexandria and withdrew to Upper Egypt, where he died. Demetrius wrote many historical and philosophical works, but only fragments of these remain. The rhetorical treatise *On Style* (*Περὶ Ἑρμηνείας, Peri Hermēneias*), ascribed to him, is probably a composition of a later date. The treatise was edited, with notes, Eng. trans., etc., by Roberts (Cambridge, 1902). The ancient critics all praise the suavity, elegance, polish, and subtlety of his speeches; yet his style was "effeminate, emotional without being inspiring, florid, tricked out with the spurious charms, the paints and dyes of a courtesan." Consult: Wright, *A Short History of Greek Literature* (New York, 1907); Christ-Schmid, *Geschichte der Griechischen Litteratur*, vol. ii (5th ed., Munich, 1911); the article "Demetrios" No. 85, in Pauly-Wissowa, *Real-Encyclopädie der classischen Altertumswissenschaft*, vol. iv (Stuttgart, 1901).

DEMETRIUS. 1. A young Athenian in love with Hermia in Shakespeare's *Midsummer Night's Dream.* 2. The son of Tamora, Queen of the Goths, in Shakespeare's *Titus Andronicus.* 3. A friend of Antony in Shakespeare's *Antony and Cleopatra.* 4. Celia's princely lover in Fletcher's *The Humorous Lieutenant.*

DEMETRIUS. The assumed name of four pretenders to the throne of Russia between the years 1603 and 1613. In 1584 Ivan the Terrible died, leaving two sons, Feodor and Demetrius, the former of whom ascended the throne, but proved a weak ruler and fell completely under the control of his brother-in-law Boris Godunoff. The second son, Demetrius, was brought up at a distance from the court and when only 9 or 10 years old either was accidentally killed or was put to death. In 1598 Feodor died also, and Boris ascended the throne, but his tyrannical measures rendered him very unpopular. In 1603 a rumor spread through Russia that Demetrius was not dead, but had appeared in Poland. The fact was that a person calling himself Demetrius, but who, it is said, was in reality a monk named Gregory Otrepieff, belonging to the convent of Tehudov, had succeeded in persuading Prince Wisniewski in Lithuania, and afterward Mniszek, Palatine of Sandomir, that he was the true son of Ivan. The latter introduced him to Sigismund III, King of Poland, who saw in him a useful instrument for introducing Polish influence into Russia and so aided him in his designs against Boris. Towards the close of 1604 Demetrius, supported by a number of Polish nobles, invaded Russia, defeated Boris, who died in April, 1605, and entered Moscow in June, 1605, the people receiving him with great enthusiasm. He ruled for some months with vigor and ability; but his manifest predilection for the Poles soon excited the Russians against him, and the arrival of his bride, Marina Mniszek, the daughter of the Palatine of Sandomir, with a Polish retinue on May 8, 1606, brought the discontent to a head. Eleven days later an insurrection broke out in the capital, headed by Prince Vasili Shuiski. The pretender was slain, and a multitude of the Poles massacred. Vasili Shuiski now ascended the throne; but in 1607 an individual appeared alleging that he was Demetrius and that another had been mistaken for him in the Moscow massacre. He found a considerable number of adherents, and Marina acknowledged him to be her husband. The Poles helped him, and for some time it seemed likely that he would succeed; but at length he was killed at Kaluga in 1610. The third pretender gave himself out to be the son of the first. After a brief career he fell into the power of the Czar and was strangled. The fourth made the same pretensions, but, falling into the hands of the Cossacks, was carried to Moscow, where he was executed in 1613. Consult: Scipkin, "Wer war pseudo-Demetrius I," *Archiv für slavische Philologie*, vol. v (Berlin, 1898; 1900); Munro, *The Rise of the Russian Empire* (London, 1900); Kostomaroff, *Les faux Dmitri* (St. Petersburg, 1864); Merimée, *Les faux Demetrius* (Paris, 1858); Eng. trans. by A. R. Scoble.

DEMETRIUS I, called POLIORCETES (*Δημήτριος Πολιορκητής, Dēmētrios Poliorkētēs,* "Demetrius, Besieger of Cities") (c.337–283 B.C.). A king of Macedonia. He was the son of Antigonus Cyclops and Stratonice. At an early age he assisted his father in wars with the generals of Alexander, was defeated by Ptolemy, the son of Ptolemy Lagus, at Gaza in 312, but soon after retrieved his fortunes by gaining a victory over Cilles in Syria. In 307 he freed Athens from the rule of Cassander (q.v.), expelled the garrison under command of Demetrius Phalereus (q.v.), and was received in the city with divine honors. In 306 he defeated Ptolemy in a naval battle at Cyprus and destroyed the naval power of Egypt. In 305 he laid siege to Rhodes, but was unable to take the city. Afterward (301) he won the enmity of Seleucus, Cassander, and Lysimachus; he was defeated at Ipsus by Seleucus and Lysimachus. His power in Greece now passed from him for a time, but in 295 he recovered Ægina, Salamis, and Athens. In 294 he murdered Alexander, brother of Antipater, and seized the throne of Macedonia, but was afterward expelled by Pyrrhus and finally surrendered to Seleucus (286), whose prisoner he remained until his death (283). Demetrius is famous for having conducted his sieges on a grand scale, with all the paraphernalia known to the military science of that age. His ingenuity in devising new siege weapons was shown especially in his attack on Rhodes. His life was written by Plutarch.

DEMETRIUS I, called SOTER (Gk. *Δημήτριος Σωτήρ, Dēmētrios Sōtēr*) (c.187–150 B.C.). King of Syria from 162 to 150 B.C. He was the son of Seleucus IV Philopator and lived at Rome as a hostage during the reign of his father and that of Antiochus Epiphanes, who had usurped the throne, after the death of Philopator (175). He escaped from confinement in 163, overthrew and killed Antiochus V Eupator, and, with the aid of the Romans, established himself firmly in power. He carried on war against the Jews

and the Cappadocians and freed the Babylonians from the rule of the satrap Timarchus and so won the title of Soter, "Savior." He fought with the Maccabees. He fell in battle against the usurper Alexander Balas.

DEMETRIUS II. A king of Macedonia (c.239–229 B.C.). He was the son of Antigonus Gonatas (q.v.) and grandson of Demetrius Poliorcetes (q.v.) and was engaged in continual warfare with the peoples to the north of Macedonia and with the Achæan and the Ætolian leagues.

DEMETRIUS II, NICATOR (?–c.125 B.C.). A king of Syria, son of Demetrius Soter (q.v.). After his father's death he lived many years in exile, but with the assistance of Ptolemy Philometer, whose daughter he married, he secured the throne of Syria in 146 B.C. About 138, in an expedition against the Parthians, he was defeated and taken prisoner. After 10 years of captivity he was restored to power (c.128), but was vanquished by a pretender to his throne in a battle near Damascus. He fled to Tyre and there perished by assassination.

DEMETRIUS III, variously known as EUCERUS, EUERGETES, and PHILOMETOR, King of Syria from 94 to 88 B.C. He was the grandson of Demetrius Nicator and ruled jointly with his brother Philip, but was dethroned by him, with the aid of the Arabs and the Parthians, and died a prisoner among the Parthians.

DEMETRIUS OF BYZANTIUM, bĭ-zăn′-shĭ-ŭm. A Peripatetic philosopher. He is supposed to have been the man who tried to dissuade Cato Uticensis from suicide. Part of his book *On Poets* is quoted by Athenæus and Philodemus. Parts of book ii of this work have been recovered at Herculaneum. Consult Scott, *Fragmenta Herculanensia* (Oxford, 1886).

DEMETRIUS OF SU′NIUM. A cynic philosopher, who lived in Rome for the greater part of the years 40 to 80 A.D. He enjoyed the friendship of Seneca, who observes that Nature made him to be at once an example and a reproach to the world. (Consult *De Beneficiis,* vii, 8, 2.) He was a consistent opponent of the monarchy. He refused an offer of a large sum by Caligula, meant to win him from his opposition.

DEMETRIUS TRICLI′NUS (Lat., from Gk. *Δημήτριος Τρίκλινος, Dēmētrios Triklinos*). A Greek scholiast of the fifteenth century. In addition to his recension of the text of Sophocles, which served as the basis of several subsequent revisions, he composed scholia on the same poet, and on Hesiod, Pindar, and Aristophanes, and works on the metres and figures of Sophocles.

DEMETRIUS ZE′NUS (Lat., from Gk. *Δημήτριος Ζῆνος, Dēmētrios Zēnos*). A writer of Zacynthus, who lived in the sixteenth century. His works include a translation of the *Batrachomyomachia* (about 1530) into modern Greek in the *στίχοι πολιτικοί, stichoi politikoi,* or popular verses, and a poem in the same measure on Alexander the Great (printed at Venice, 1829). The former work has been edited by Müllach (Berlin, 1837). It was printed, with a Latin translation, by M. Crusius, in Ilgen's edition of the *Homeric Hymns* (Halle, 1796).

DEMETZ, de-mâts′, FRÉDÉRIC AUGUSTE (1796–1873). A French prison reformer, born in Paris. He studied law and was subsequently made a judge. In 1836 he was sent by the French government to the United States for the purpose of studying American penitentiaries. The results of his investigations were published in 1839 under the title *Rapports à Monsieur le comte de Montalivet sur les pénitenciers des Etats-Unis.* One of the conclusions of this report is that the penitentiaries of Pennsylvania, organized on the plan of isolating the young prisoners, were inefficient. Demetz's chief services, however, were in connection with a reformatory founded by him in 1840 on an entirely novel plan at Mettray, near Tours. Hundreds of young criminals were gathered by him into this reformatory at the expiration of their terms of imprisonment, and there they were given instruction and agricultural work which entitled them to moderate compensation. The results thus achieved led to the introduction of this system in several other European countries.

DEMI′, or **DEMY** (Fr. *demi,* Lat. *dimidius,* half). A term in heraldry. An animal is said to be demi when only the upper or fore half of it is represented. In inanimate objects the dexter half per pale is usually intended, when it is said to be demi, though a demi fleur-de-lis, e.g., may be a fleur-de-lis divided per fess.

DEM′ICAN′NON. A large gun used in the sixteenth and seventeenth centuries and perhaps later. It is said to have had a length of 12 to 14 feet, a diameter of bore of 6¾ inches, and to have fired a ball of 33 pounds' weight; there is some doubt about this, as a solid spherical shot for a 6¾-inch gun ought to weigh over 40 pounds. The point-blank range was estimated at 162 paces and its range at 2000. See GUNS, NAVAL.

DEMICUL′VERIN. A gun of about the same date as the demicannon (q.v.). It was about 9 feet long, had a bore of about 4.5 inches, and threw a ball of nine pounds' weight. Its point-blank range was about 174 paces and its range 1800. See ARTILLERY; ORDNANCE.

DEMIDOFF, dyĕ-mē′dôf, Princes of San Donato. A noble and wealthy Russian family, the most distinguished members of which are: 1. NIKITA DEMIDOFF (c.1665–c.1720), the founder of the family, a runaway serf, who amassed an immense fortune as a manufacturer of arms. He established numerous forges and foundries in the Urals and died after 1720. 2. AKINFI DEMIDOFF (died c.1740), son of Nikita, brought over skilled German miners to examine the rich deposits of gold, silver, and copper in the river valleys of Siberia. The government made him a councilor of state. 3. PROKOP (1710–1786), son of Akinfi, established a commercial school in Moscow in 1772. 4. PAUL DEMIDOFF (1738–1821), cousin of Prokop, traveler and scientist, gave a museum of natural history to the University of Moscow and founded the Demidoff Museum of Yaroslav. 5. NIKOLAI, COUNT DEMIDOFF (1773–1828), nephew of Paul, married the Countess Strogonoff and became a privy councilor and Imperial chamberlain. He distinguished himself in the war against the Turks. In 1812 he raised a regiment and fought at its head against Napoleon. 6. ANATOLE (1812–70), son of Nikolai, displayed great enthusiasm for letters and the sciences. His principal book, published in Paris in 1839, entitled *Travels in Southern Russia and Crimea,* is the record of a great scientific expedition undertaken at his expense. In 1841 he married Mathilde de Montfort, daughter of Jerome Bonaparte. The marriage was dissolved by mutual consent in 1846. Hospitals, schools, and

museums all over Russia testify to the munificence of the Demidoffs.

DE MILLE, dē-mĭl′, HENRY CHURCHILL (1850–93). An American playwright, one of the authors of *The Wife, Lord Chumley,* and other pieces. He was born in North Carolina and educated at Columbia College, from which he was graduated in 1875. In 1882 he became examiner of plays at the Madison Square Theatre, and later he was an actor under A. M. Palmer's management. His first play, *Delmar's Daughter,* was produced in 1883 without success. In 1884 he produced *The Main Line,* by himself and Charles Barnard. In collaboration with David Belasco he wrote *The Wife* (produced in 1887 at the Lyceum), which proved a great success, and in the following seasons they brought out *Lord Chumley, The Charity Ball,* and *Men and Women.* In 1891 he adapted from the German *The Lost Paradise.* Consult Montrose J. Moses, *The American Dramatist* (Boston, 1911).

DE MILLE, JAMES (1833–80). A Canadian author, born at St. John, New Brunswick. He graduated at Brown University in 1854, was professor of classics in Acadia College (Wolfville, Nova Scotia) in 1860–65, and from 1865 until his death occupied the chair of history and rhetoric in Dalhousie College (Halifax, Nova Scotia). De Mille wrote more than 30 novels, of which the best are *Helena's Household* (1868), a Roman tale of the first century, and *A Strange Manuscript Found in a Copper Cylinder* (1888), posthumously published. *The Dodge Club* (2 vols., 1866–69) is a humorous book of travel. His other publications include: *Andy O'Hara* (1860); *The Soldier and the Spy* (1865); *The American Baron* (1870); *The Lady of the Ice* (1870); *Comedy of Terrors* (1872); *The Living Link* (1874); *The Winged Lion* (1877; 2d ed., 1904); *A Castle in Spain* (1882–83); *A Treatise on Rhetoric* (1878).

DE MILLE, WILLIAM CHURCHILL (1878–). An American playwright, born at Washington, N. C. He graduated from Columbia University in 1900 and studied also at the American Academy of Dramatic Arts in New York City. He is co-author of the following plays: *The Genius* (1906), *Classmates* (1907), *The Royal Mounted* (1908), and is author of *Strongheart* (1905), *The Warrens of Virginia* (1907), *The Land of the Free,* and *The Woman,* which was novelized by Albert Payson Terhune in 1912.

DEMIMONDE, dĕm′ĭ-mŏnd *or* de-mē′mônd′ (Fr., half world). The better class of courtesans in Paris and other cities. The term originated with Alexandre Dumas fils, who used it in the phrase meaning "half-and-half society."

DEM′ING. A village and the county seat of Luna Co., N. Mex., 86 miles northwest of El Paso, Tex., on the Southern Pacific, the Atchison, Topeka, and Santa Fe, and the El Paso and Southwestern railroads, and on the Mimbres River (Map: New Mexico, B 6). It is a health resort, contains a hospital, and has important commercial interests, being the trade centre of a cattle and wool growing and mining region. Settled about 1881 and incorporated in 1901, it is governed under a charter of the latter date by a mayor, elected for a term of three years, and a unicameral council. Pop., 1910, 1864.

DEMING, CLARENCE (1848–1913). An American editor, born at Litchfield, Conn. Graduating from Yale University in 1872, he served as assistant editor of the Troy *Whig* (1872–73), as night editor of the New Haven *Palladium* (1874–75), and as assistant news editor, editorial writer, and traveling correspondent for the New York *Evening Post* (1875–84). For several years he edited the New Haven *News* and later he was associate editor and editorial writer for the *Railroad Gazette* (now *Railway Age Gazette*). Besides magazine articles, he is author of *By-Ways of Nature and Life* (1884).

DEMISE′ (OF. fem. of *demis,* from Lat. *demittere,* to hand down). In the most general sense, a transfer or conveyance of an interest in land. Technically the term is employed in two distinct senses: first, to denote a lease or letting of land for a term of years; second, to describe the transmission of the royal authority, dignity, and estates from one sovereign to his successor. The phrase "demise of the crown" does not signify the death of the sovereign, but the transfer or devolution of the kingdom, whether that occurs as the result of the death or of the voluntary abdication of the sovereign. Probably, however, it would be restricted to the case of a normal transfer of the crown in the succession established by law, and not to a change in the succession by revolution or otherwise. However this may be, the phrase "demise of the crown" is the legal expression of the notion involved in the popular phrase "The king never dies." It indicates that the government does not come to a full stop on the death or abdication of its head, but that the royal authority is continuous and permanent, passing at once, without a break or jar, to him who is to exercise it next. This conception of the matter, so important to the welfare of the kingdom and the stability of the government, is comparatively modern, the effect of the death of the sovereign in England having formerly been to paralyze for the time being many of the functions of government, including the administration of justice. The King's Peace had to be proclaimed anew by each sovereign at his accession, and the administration of government newly constituted. All these inconveniences have been remedied by a series of statutes enacted since the accession of William and Mary, and the principle of the immediate demise of the crown, as above described, firmly established. See Anson, *Law and Custom of the Constitution* (2d ed., Oxford, 1896).

DEMIURGE, dĕm′ĭ-ûrj *or* dē′mĭ- (Lat. *demiurgus,* from Gk. δημιουργός, *dēmiourgos,* handicraftsman, from δήμιος, *dēmios,* of the people + ἔργειν, *ergein,* to work). The name given in the cosmogony of the Gnostics to the creator of the world of matter and sense. He was variously conceived. In general, he was the archon or chief of the lowest order of the spirits or eons of the pleroma; mingling with chaos, he formed in it a corporeal animated world. He created man, but could impart to him only his own weak principle, the *psyche,* or sensuous soul; therefore the highest, the really good God, added the divine rational soul or *pneuma.* But the power of evil in the material body prevented the development of that higher element. The demiurge, ignorant of the highest God, could not bring his creatures to the knowledge of the true Godhead; as the Jehovah of the Jews he gave them the imperfect law of Moses, which promised merely a sensuous happiness, and even that not attainable; so that another revelation

was necessary. Christian Gnosticism usually held Christ to be the bearer of that revelation, and the opponent of the claims of the demiurge upon men. See GNOSTICISM.

DEMMIN, dĕ-mēn′ (formerly *Dymin, Demmyn, Dammyn, Timin,* from OChurch Slav. *dymŭ,* smoke, Lat. *fumus,* Skt. *dhūma,* vapor). A town of the Prussian Province of Pomerania, situated on the navigable Peene, 72 miles west-northwest of Stettin (Map: German Empire, E 2). Besides the town proper, Demmin comprises three suburbs. There are manufactures of machinery, woolens, hats, sugar, bricks, and leather. It has also distilleries and breweries, iron foundries, fisheries, and a large trade in lumber and grain. Pop., 1900, 12,085; 1905, 12,541; 1910, 12,378. Demmin, which had its origin in a Slavic settlement, was in the ninth century a place of some commercial importance. In 1164 it was taken by Henry the Lion, and in 1238 it became a member of the Hanseatic League. By the Peace of Westphalia it passed to Sweden, and in 1720 it came into the possession of Prussia.

DEMMIN, AUGUST (1823–98). A German-French art critic, born in Berlin. He went to Paris at the age of 17 to complete his education and made his home there until 1872, but traveled extensively throughout Europe and in Asia in pursuit of his studies, especially in the fields of ceramics and the science of arms. In 1873 he removed to Wiesbaden. The most important of his works is *Encyclopédie historique, archéologique, etc., des beaux-arts plastiques* (1872–80; 5 vols., with 6000 illustrations). He wrote also a series of manuals, both in German and French, designed to guide the amateur of the decorative arts, besides comedies, dramas, and novels.

DEMMLER, dĕm′ler, GEORG ADOLF (1804–86). A German architect and politician. He was born at Güstrow, Mecklenburg, studied at the University and at the Academy of Architecture in Berlin, and in 1824 entered the government service of Mecklenburg. Appointed court architect in 1837, he planned the Grand Ducal Palace, the Court Theatre, and the Arsenal. Much interested in the welfare of the workmen, he introduced a system by which they shared directly in the profits of their labor. His political activity in 1848–50 led to his dismissal from the government service in 1851. He traveled for several years in Europe. He was one of the founders of the National Association (Nationalverein), in 1859, of the League for the Promotion of Peace and Liberty, and in 1868 joined the so-called German People's Party at Stuttgart. He was elected by the Social Democrats to the Reichstag in 1877, but did not seek reëlection.

DEM′OCE′DES (Gk. Δημοκήδης, *Dēmokēdēs*). One of the most famous of the early Greek physicians. He was born at Crotona, in lower Italy, about the middle of the sixth century B.C. After living at Ægina, Athens, and Samos, as official physician of the commonwealth, or of Polycrates (q.v.), retained at a high salary, he was taken prisoner by the Persians and carried to the Persian court, where he rendered important medical assistance to Darius I and his wife Atossa. Though honored by the Persians, he was desirous of returning to his native city; and, through the favor of Queen Atossa, he secured appointment to a secret mission which was sent to Greece. Escaping on this expedition, he returned to Crotona. There he championed the aristocratic party and was obliged to flee to Platæa. Consult Herodotus, iii, 129–138 (a narrative not in all respects historical).

DEMOCHARES, dē-mŏk′ă-rēz (Lat., from Gk. Δημοχάρης). An Athenian orator and statesman, nephew of Demosthenes. He began his public career as leader of the anti-Macedonian party (322 B.C.) and, after the restoration of the democracy in Athens (307), became head of the patriotic party. He was exiled about 295, but returned in 287 or 286, after which he acted as Minister of Finance. He died after 280. Democharcs left orations and an elaborate history of his time, only fragments of which remain; for these consult Müller, *Fragmenta Historicorum Græcorum,* ii, 445–449. Consult Christ-Schmid, *Geschichte der griechischen Litteratur,* vol. i (5th ed., Munich, 1908).

DE′MOCLES (Lat., from Gk. Δημοκλῆς, *Dēmoklēs*). An Attic orator of the school of Theophrastus, a contemporary and opponent of Demosthenes. He is known best as the defender of the children of the orator Lycurgus against the calumnies of Mœrocles and Menesæchmus. Though none of his works is extant, he probably left some written orations, since Dionysius of Halicarnassus ascribes to him an oration which had been attributed to Dinarchus. Dionysius and Suidas call him Democlides.

DEMOC′RACY (Gk. δημοκρατία *demokratia,* government of the people, from δῆμος, *dēmos,* the people + κρατεῖν, *kratein,* to rule). A term of wide and variable signification, comprehending such diverse but related conceptions as (1) a society based on equality; (2) a state in which the actual power of government is lodged in the mass of the people; and (3) a form of governmental organization in which the authority of the state is directly administered by the people or their chosen representatives. The term is also often employed indefinitely to describe all of these taken together, in which case it may be defined as a form of society in which the social organization, the energy of the state, and the powers of government are directed and controlled by the mass of the people; and sometimes more vaguely to characterize the tendency of the progressive nations during the last 200 years towards the realization of such a social and political organization. It is in the first, or social, sense that the term "democracy" is most frequently employed by continental and especially French writers, and in the third or governmental sense by the Greek philosophers, while among English and American political writers, from Bentham to Lecky and Woodrow Wilson, the tendency has been to limit its use to the actual exercise of political power by the people, and therefore as coextensive in meaning with popular government.

A democratic society is one in which privilege, whether based on birth, on wealth, or on public service, has been abolished, and a substantial equality of legal rights and obligations and of social and industrial opportunity established. The existence of a caste, whether hereditary or intellectual, or of social classes is incompatible with a democratic organization of society, which is likewise menaced by the growth of centralization of wealth on the one hand, and, on the other, by the existence of extreme poverty and the growth of dependent classes. It can therefore, under the present industrial system, be

only imperfectly realized in a state of civilization, its best illustrations being found in primitive or simple communities, like certain of the Swiss cantons and the frontier settlements in the western portions of the United States and Canada. Democracy as a social principle rests upon the doctrine of the essential equality of all men and of their equal worthiness—a notion derived mediately from the Christian conception of the equality of all men before God, but owing its translation from religion to society and politics chiefly to the influence exercised by the writings of Jean Jacques Rousseau. In the form which he gave to it, and in which it claims our allegiance, the doctrine and the practice of it are wholly modern. Certainly there was no social equality in the "state of nature," in which Rousseau imagined himself to have found it, and the so-called democracies of the ancient world were anything but democratic in sentiment or in social structure. The triumph of the principle in the modern world has been checked by the unexpected persistence of the military spirit and the revival of militarism in Europe during the latter half of the nineteenth century, and by the wonderful industrial expansion of the same period, with the consequent increase and unequal distribution of wealth, in both Europe and America.

A government democratic or popular in form is a republic—i.e., a government in which the administration of the affairs of the state is committed to the people, to be exercised by them either directly in popular assemblies, like those of the Athenian democracy, or indirectly through representatives chosen by them, as in the republics of the modern world. Of this it may be observed, first, that the pure or direct form of democratic government, at which the criticisms of Greek political writers were directed, has never been completely realized and cannot be completely realized in practice. Certain of the functions of government must always be delegated. If the legislative power be exercised by the whole body of citizens, and the judicial power by large bodies of citizens chosen by lot or acting in turn, the executive power must always in fact be committed for longer or shorter periods to chosen representatives of the popular will. In the second place, even in this limited form, the direct form of democratic government is possible only in small and compact states, like the smaller Swiss cantons and the city states of antiquity; and even in these it has usually been found to be operative only on the undemocratic principle of rigidly limiting the number of citizens entitled to participate in the government. The town-meeting plan of government cannot be extended to the great aggregates of people which constitute modern states. In the third place, it is to be observed that, though the democratic state tends to act through republican forms, a representative republic is not necessarily democratic either in spirit or in its actual operation. A government republican in form may, like that of France, be essentially bureaucratic in structure and effect; or be, like that of the most of the Spanish-American states, a military tyranny; or be, like that of Mexico under Diaz, a virtual despotism. No one of these can properly be termed a democracy, though that designation would not be denied to England, which is a monarchy in form, or to Canada, which is a subordinate part of an empire. It would seem, therefore, that the term "democracy" is not properly used to describe the external form of government, but rather a type of political society in which the essential power of the state is wielded by the mass of the people.

As thus understood, the true antithesis of democracy is not monarchy or oligarchy, but absolutism, i.e., dominion exercised over the mass of the people by an individual or a group of individuals, however constituted, not responsible to the people nor bound by law or custom to consult their wishes. Democracy, on the other hand, is popular government—government actually directed and controlled by the people, under whatever constitutional forms. The terms "monarchy," "oligarchy," and "republic" properly describe the form, and not the essential character of a government. A democracy may exist under any one of these forms. A limited monarchy, like that of England, under which the power of the state is actually exercised by the people through their chosen representatives, may be more truly democratic than a republic, like the recent government of the Transvaal, in which the actual power is wielded by a financial or political oligarchy, or like the Athenian Republic, in which it is restricted to a small minority of the male inhabitants of the state.

Attention has been called to the fact that democracy as a social principle is of modern origin. This explains the curious differences between the ancient and the modern conceptions of political democracy. The Aristotelian notion of democracy as a community of free citizens ruling the state, not being based on any conception of the essential equality of all men, was not offended by the existence in the state of a numerous laboring class, servile or free, and of a large resident alien population, which together outnumbered the political citizens 10 to 1, and which were equally excluded from participation in the government. The modern idea of a political democracy, on the other hand, being derived from the social conception of the equal worth of all members of the state, is satisfied with nothing less than the substantial participation of the great body of the people in the affairs of the state. It rests upon the theory that the people, whose welfare is the true end of government, are better judges of what will conduce to their welfare than is any individual or group of individuals likely to arise by any hereditary or self-selective process—a sound and salutary doctrine, which, however, in political experience runs too easily into the extreme form of the assertion that for public purposes one man's opinion is as good as that of any other man, and that all men are entitled to equal weight in political affairs.

It is to England more than to any other nation, even than the United States, that the modern world owes the realization of the democratic ideal in forms of political action. The two great revolutions—that which resulted in the creation of the Commonwealth, and that which finally expelled the Stuarts—were essentially popular in character. Though the Parliament was throughout that period, and until the reforms of 1832 and 1867, an aristocratic body, its responsiveness to public opinion and its steadfast resistance to royal pretensions made it the type of a popular representative assembly in Europe. Before the middle of the nineteenth

century every considerable European state, with the exception of Russia and Turkey, had adopted a constitution limiting the power of the crown and vesting a considerable share of political power in the people, and in most of them a representative legislature of the parliamentary or British type was adopted. But nowhere on the Continent, excepting in France, Switzerland, Norway, and Sweden, has popular government reached a high degree of efficiency or attained any considerable measure of success. Even in England the complete triumph of the democratic principle has been delayed, both in politics and society, by the persistence of the aristocratic tradition, which still preserves a considerable number of legal rights and privileges to a social class based on birth and inherited wealth, and which gives that class a preponderating influence in the political organization of the state.

Democracy in the United States is historically the offspring of the democratic forces in English political institutions. The radical wing of English republicanism and Whiggery in the seventeenth and eighteenth centuries dominated the settlement of the English Colonies in America and dictated their political development. The simplicity of Colonial life and the absence of any considerable representative of the English aristocratic classes promoted the orderly growth of a homogeneous democracy, which stood clearly revealed when the shock of separation from the mother country came. The speedy adoption of a written constitution, however, fixed the forms of American democracy and in so far tends to control the evolution of its ideals. The result is that in most forms of political action the United States is now less democratic than Great Britain. In spirit the English democracy is doubtless more conservative than that of the United States.

Since the opening of the new century there has been a marked revival of the democratic spirit in western Europe and America and the birth of that spirit in the older civilizations in which society had for centuries been unresponsive to its influence. The unrest which has recently characterized the teeming millions of India, the recent revolution in China and the Young Turkish movement in Turkey, as well as the widespread demand for woman suffrage in Europe and the United States, indicate that the movement is world-wide. The transformation, still in progress, of the Liberal party in Great Britain into a radical party, the rapid success of the so-called progressive movement in the United States, and the growth of Socialism and the Socialist party in western Europe and the United States are marked instances of its success. The demand for the direct nomination of candidates for public office, for the direct election of United States senators (secured by recent amendment to the Federal Constitution), and for such political safeguards as "the initiative," "the referendum," and "the recall," are further indications of its purpose and strength. In the social, as distinguished from the political, sphere the democratic movement of the time is finding forcible expression in the feminist movement and in various important legislative devices to improve the condition of the working classes and the poor. See CONSTITUTION; GOVERNMENT; REPUBLIC; FEMINISM; EQUAL SUFFRAGE; SOCIAL LEGISLATION; SOCIALISM.

Most of the philosophical authorities are hostile critics of democratic government. For the ancient and mediæval view, consult Dunning, *History of Political Theories, Ancient and Mediæval* (New York, 1902); for the modern view, consult: De Tocqueville, *Democracy in America* (1835); Motley, *Historic Progress of American Democracy* (1869); Freeman, *Comparative Politics* (London, 1873); Maine, *Popular Government* (ib., 1885); Bryce, *The American Commonwealth* (new ed., London and New York, 1910); Lecky, *Democracy and Liberty* (London, 1896); Burgess, *Political Science and Constitutional Law* (Boston, 1891); Wilson, *The State: Elements of Historical and Practical Politics* (ib., 1892); Ostrogorski, *Democracy and the Organization of Political Parties* (2 vols., New York, 1902).

DEMOC'RATES (Lat., from Gk. *Δημοκράτης, Dēmokratēs*). An Attic orator who lived about 350 B.C., a contemporary of Demosthenes and an opponent of the Macedonian party. He accompanied Demosthenes to Philip to receive the latter's oath to the treaty with Athens and afterward assisted him in concluding a treaty against Philip with the Thebans. As an orator he was of only secondary importance.

DEM'OCRAT'IC PARTY. The term "Democratic," as used in American party politics, was occasionally and loosely applied in the years 1789–92 to the group of Anti-Federalists (q.v.), and thereafter, in the last decade of the eighteenth century and the first two decades of the nineteenth, to the party then commonly known as the Republican. The vigorous adoption by these Anti-Federalist Republicans, especially during Washington's administration, of French principles and sympathies led to the application to them of the term "Democratic Republican," which remained in quite common usage for more than 30 years. This general attitude was one of opposition to all centralizing tendencies in the interpretation of the Federal Constitution. They wished the national government to remain weak, somewhat as it had been under the old Confederation; and they regarded the States as sovereign in an extreme sense of that word. (See STRICT CONSTRUCTIONISTS.) Upon the disappearance of the Federalist party (q.v.) there gradually appeared within the only party then active two groups, one of which became known as the National Republicans, and the other of which retained the old name of Democratic Republicans. The former developed into the Whig party (q.v.), while the latter was compactly organized as the Democratic party, which has since 1828 maintained an unbroken existence. This party, when thus organized by Jackson, adhered to the orthodox tenets of the old Anti-Federalists, the strict construction of the Constitution, and the limitation of the powers of the Federal government. As slavery, however, soon became the most vital question in national politics, and as the Democratic party was largely controlled by its Southern wing, it became finally the party of conservatism, in opposition to the new Republican party's progressive platform of free men and free soil. The two sectional wings of this party became naturally separated during the course of the Civil War, and the subsequent process of rehabilitation was so prolonged that the party was not again able to elect a president (leaving out of account the disputed election of 1876) until 1884, when entirely new issues were involved. In its later course the

party, in accordance with its old traditions, became particularly conspicuous as the advocate of tariff reform, and upon that platform its first post-bellum President, Grover Cleveland, was elected.

The founding of the present Democratic party, although in large measure due to the bitter fight between the followers of John Quincy Adams and those of Andrew Jackson, occurred in a decade during which were effected certain significant changes in the American political system. Thus, the practice, which had been hitherto uniformly observed, of having the presidential electors chosen by the State legislatures, was in some States abandoned, and thereafter the present method, by which the voters at large were given a share in the choice of the electors, was gradually introduced. Moreover, the old method of leaving the choice of presidential candidates to a caucus (q.v.) of the members of a party in Congress was vigorously attacked in 1824, with the result that after 1828 the people at large, through the medium of the national nominating conventions, had a direct share in the choice of candidates. Furthermore, in the same decade was felt for the first time the real significance of the political power of the new States beyond the Alleghanies; for, with the rise to power of the new Jacksonian democracy, there was given full sway to the principles of equality and of thorough democracy, which were best illustrated in the region of which Jackson was the natural product. In large measure the first conflict, in addition to being a largely personal one between the followers of Adams and those of Jackson, became a struggle between the old aristocracy of the East and the new democracy of the West, in which the latter, having almost won in the campaign of 1824, triumphed decisively in 1828, and brought to the presidency the man who in eight years was to transform a personal following into a dominating national party. Jackson brought under his leadership not only the friends of Calhoun and of W. H. Crawford, but also the strong forces of the Albany Regency (q.v.), under the lead of his Secretary of State, Martin Van Buren. Accordingly the Democratic convention—the first national convention of the party—which met at Baltimore, May 21, 1832, had little more to do than to name a candidate for the vice presidency, and in that step they followed the will of their leader and named Van Buren. This convention originated the so-called "two-thirds rule." The election which followed indicated clearly that Jackson's policy as to the tariff and as to the national bank had been approved, inasmuch as he received 219 electoral votes, while Henry Clay received only 49, Jackson carrying besides the Southern States, excepting Kentucky, the States of Maine, New Jersey, New Hampshire, and New York. The next convention of the party, that at Baltimore on May 20, 1835, was peculiar in having some 626 delegates, of whom 422 came from four States, Maryland, e.g., sending as delegates every member of the State Democratic convention. As was commonly expected, Van Buren was given the nomination, Richard M. Johnson, of Kentucky, being named for the vice presidency. The vote of the Whig candidate, William H. Harrison (q.v.), was increased to 73, while Van Buren's electoral vote fell to 170, a part of this Democratic weakening being accounted for by the 26 votes which were cast for Judge White, of Tennessee, and the 11 votes which were cast for Mangum by South Carolina. The whole responsibility for the failure of the financial policy of Jackson and Van Buren was placed upon the Democratic party, with the result that in 1840 General Harrison received 234 electoral votes and Van Buren received only 60. The Democratic convention of May 4, 1840, had been especially uncertain in its action because of a pronounced difference of opinions as to the claims of Vice President R. M. Johnson. The convention adopted, in a series of resolutions, what was substantially a "platform," expressing their view of the limited authority of the central government and of the impropriety of Federal laws establishing a national bank, providing for internal improvements, or fostering particular industries. The same platform, with additions, was adopted by the convention held at Baltimore on May 27, 1844, which pronounced for the reoccupation of Oregon and the annexation of Texas. For the first time in a convention of the party there was then a serious contest for the presidential nomination. Upon the first ballot Van Buren received a majority of the votes, and, although in the lead for four ballots, for the four subsequent ballots the leading candidate was General Cass, of Michigan; but on the ninth ballot the convention was "stampeded" for an inconspicuous candidate, possibly advanced to preserve harmony, James K. Polk, of Tennessee. George M. Dallas, of Pennsylvania, was nominated for the vice presidency, and this ticket received 170 electoral votes, as against 105 votes cast for Henry Clay. The failure of Van Buren to secure the party's nomination in 1844 and the choice by Polk of William L. Marcy (q.v.), of New York, as his Secretary of State, brought into prominence the factional controversy between the "Barnburners" (q.v.) and the "Hunkers" (q.v.), in New York. Both of these factions sent delegations to the convention of May 22, 1848, at Baltimore, and both delegations were admitted to seats, the vote of the State being divided equally between them. Neither delegation took thereafter any part in the convention, although the Hunkers and Marcy supported the administration and the party's nominee. On the fourth ballot Gen. Lewis Cass, of Michigan, was nominated for the presidency; and for the vice presidency Gen. William O. Butler, of Kentucky, was named, the convention also readopting substantially the platform of 1844. The seceding Barnburners held a State convention in June, in which delegates from four other States were present, and nominated Van Buren for the presidency, and in August they took part in the national convention of the Free Soil party at Buffalo, which nominated their leader for the presidency and Charles Francis Adams for the vice presidency. This combination of "Free-Soilers" and Barnburners effected such a division of the Democratic vote in New York that Taylor carried the State and secured in the aggregate 163 electoral votes, while Cass received 127. Between 1848 and 1852 political conditions were materially changed, particularly through the progress of events attending the Compromise Measures of 1850 (q.v.), and also through the effect upon the Whig party of the differences between the "Conscience" Whigs and the "Cotton" Whigs. At the Baltimore convention of June 1, 1852,

Cass, Buchanan, and Douglas were prominent candidates, but on the forty-ninth ballot Franklin Pierce, of New Hampshire, was named, William R. King, of Alabama, being nominated for the vice presidency. The platform was similar to that of 1848, with the addition of the "finality" plank, with an approval of the doctrines of the Virginia and Kentucky Resolutions (q.v.), and with a declaration of the justness of the war against Mexico. The Free-Soilers nominated John P. Hale (q.v.), of New Hampshire, while the Whigs, for what was the last campaign of the party, nominated Gen. Winfield Scott (q.v.), who received only 42 electoral votes, as against 254 cast for Pierce. In the convention of June 2, 1856, Pierce was again a candidate, being supported largely by Southern delegates, while the Northern delegates supported James Buchanan, of Pennsylvania, who was chosen on the seventeenth ballot, John C. Breckinridge being named for the vice presidency. The platform introduced a declaration in favor of insuring the ascendancy of the United States in the Gulf of Mexico and contained a declaration of the right of the Territorial governments of Kansas and Nebraska to allow slavery in those Territories. The convention of the American party nominated ex-President Fillmore, who received the eight electoral votes of Maryland, and the new Republican party (q.v.) nominated John C. Frémont (q.v.), who secured 114 electoral votes, while Buchanan was elected with 174 electoral votes. The year 1860 was disastrous to the organization of the Democratic party, inasmuch as it had become impossible to hold all factions of the party to the support of any one platform. Thus, the convention of the party, which met at Charleston, S. C., April 23, adopted resolutions which represented the middle view as to slavery rather than the distinctively Southern view; and this led to the withdrawal from the convention of the solid delegations of Alabama, Mississippi, Florida, and Texas, as well as of many delegates from Georgia, Louisiana, South Carolina, North Carolina, Arkansas, and Delaware. The portion of the convention remaining in session adopted a resolution that a vote equal to two-thirds of a full convention should be necessary for a nomination, and after several days of ineffectual balloting, in which Stephen A. Douglas (q.v.) was easily in the lead, adjourned to meet at Baltimore on June 10. At that time the places of the Charleston seceders were filled so uniformly with followers of Douglas that a new secession took place, under the lead of some of the Virginia delegates, whose example was followed by most of the delegates from the other Southern States. Finally, the delegates still remaining virtually rescinded the two-thirds rule and declared Douglas to be their nominee for the presidency. Herschel V. Johnson, of Georgia, was nominated for the vice presidency. The delegates who had withdrawn from the Baltimore convention, representing in some manner 21 States, proceeded to nominate for the presidency John C. Breckinridge, of Kentucky, and for the vice presidency Joseph Lane, of Oregon. These nominations, furthermore, were adopted by those who had seceded at Charleston and had later met in convention at Richmond. In the following election the combined popular vote of Douglas and Breckinridge exceeded the popular vote of Lincoln by more than 350,000, although the electoral vote of Lincoln was 180, while that of Breckinridge was 72, and that of Douglas only 12. Douglas secured the whole electoral vote of Missouri and three votes from New Jersey. The Constitutional Union party (q.v.) carried Virginia, Kentucky, and Tennessee, and the rest of the South went solidly for Breckinridge. The strength of the Democratic party was thus plainly in the South, and the effect of the war was naturally to remove the party, for the time being, from its position as a factor in national politics. Even in 1868 three Southern States were still in such relation to the national government as to lose their electoral votes entirely. In the campaign of 1864 General McClellan (q.v.), standing as a candidate in the North on a platform which declared the war was a failure, secured only 21 electoral votes as against the 212 given to Lincoln. The party having taken an attitude of criticizing both the conduct of the war and its results, its defeat was assured by the Republican nomination in 1868 of General Grant, who received 214 electoral votes, while his opponent, Horatio Seymour, received only 80, of which 33 were from his own State of New York. The intrenchment of the Republicans in power was emphasized in the following campaign, when Grant's vote rose to 286, while for his Democratic opponents (the regular Democratic candidate, Horace Greeley, having died before the casting of the electoral votes) were cast only 63 votes. The character of the Republican administration and the vigorous attacks upon it (see CRÉDIT MOBILIER) made possible the return to effective activity of the Democrats, particularly as they had an especially strong leader who, as the reform Governor of New York and as the successful opponent of Tweed (q.v.), had become the most conspicuous Democrat of his day. The energetic campaign of 1876, however, while seeming to give Tilden substantial success, resulted in the election of Hayes, through the intervention of the Electoral Commission (q.v.). In the matter of popular vote the following election was equally favorable to the Democrats, the vote of Garfield exceeding that of Hancock by fewer than 1000. Garfield, however, received 214 electoral votes, while Hancock received only 155. In the ensuing campaign the Democrats were able to take advantage of the factional conditions within the Republican party, and this advantage was greatly increased, on the one hand, by the Republican nomination of James G. Blaine and the immediate development of the so-called Mugwump opposition to him (see MUGWUMP), and, on the other hand, by the Democratic nomination of the reform Governor of New York, Grover Cleveland. A revolt against the alleged Republican corruption, and other unusual elements, combined to bring about, for the first time since the war, the election of a Democratic president; although in 1888 Cleveland himself was defeated by Benjamin Harrison, only to be even more strikingly successful in 1892, receiving 277 votes to the 145 given to Harrison. The plank of tariff reform had thus within a decade carried the party through two successful campaigns, but the greatly increased power of the protectionists (see TARIFF) made doubtful any further success in that line by the Democrats, while at the same time a faction in the party forced to the front a new issue, seemingly a sectional issue, and, having se-

cured control of the convention of 1896, introduced the "free silver" plank into the platform and nominated William J. Bryan. In spite, however, of the aid given to the Democrats by the Populists (q.v.), the principles of the gold standard and a high tariff were indorsed in the election of William McKinley (q.v.). Four years later the Democratic party once more nominated Mr. Bryan. President McKinley received 292 electoral votes as against 155 cast for Mr. Bryan. The defeat had the effect of lessening the influence within the party of the silver and Populistic faction, so that in 1904 the party's candidate was Alton B. Parker, of New York, a conservative Democrat. He received 140 electoral votes as against 336 cast for Mr. Roosevelt. In the campaign of 1908 William H. Taft defeated Mr. Bryan, who had easily secured the nomination of the Democratic party in a convention held in Denver July 7. In the election Taft received 321 votes, and Bryan 162. In the campaign of 1912 Taft was again nominated by the Republican party. Roosevelt was the nominee of the new Progressive party in a national convention held at Chicago August 5. In an exciting convention held at Baltimore, June 25, Woodrow Wilson, Governor of New Jersey, was nominated by the Democratic party after several days' balloting, his chief rivals being Clark of Missouri, Underwood of Alabama, and Harmon of Ohio. The nomination of Wilson was due to Mr. Bryan. The Democrats declared for a tariff for revenue only, for the popular election of United States senators, for a Federal income tax, and for the nomination of candidates in primaries. In the election which ensued Wilson received 435 votes, Roosevelt 88, and Taft 8.

Consult: Gillet, *Democracy in the United States* (New York, 1868); Van Buren, *Political Parties in the United States* (ib., 1867); Johnston, *American Politics* (last ed., ib., 1902); Ostrogorski, *Democracy and the Organization of Political Parties* (ib., 1902); Woodburn, *Political Parties and Party Problems in the United States* (ib., 1903).

DEMOC'RITUS (Gk. Δημόκριτος, *Dēmokritos*). An illustrious Greek philosopher, often popularly spoken of in both ancient and modern times as "the Laughing Philosopher," just as Heraclitus was styled "the Weeping Philosopher." He was born at Abdera, in Thrace, about 470 or 460 B.C. Of his life little is known. The statement that he was first inspired with a desire for philosophic knowledge by certain Magi and Chaldæans whom Xerxes had left at Abdera, on his Grecian expedition, is as untrustworthy as that which represents him as continually laughing at the follies of mankind. His extensive travels, however, through a great portion of the East (he lived in Egypt seven years) prove his zeal for knowledge, as does also his ceaseless industry in collecting the works of other philosophers. Democritus was by far the most learned thinker of his age. He had also a high reputation for moral worth and appears to have left a strong impression of his disinterestedness, modesty, and simplicity on the mind of the community, for even Timon the Scoffer, who spared no one else, praised him. The period of his death is uncertain. He lived, however, to a great age. Of the 72 works which, according to Diogenes Laertius (q.v.), he wrote on physics, mathematics, ethics, and grammar, only a few fragments are extant. These have been collected by Mullach (Berlin, 1843; 1860). Consult also Ritter and Preller, *Historia Philosophiæ Græcæ* (9th ed., Gotha, 1913).

Democritus' system of philosophy is known as the atomic system. Its essence consists in the attempt to explain the different phenomena of nature, not—as the earlier Ionic philosophers had done—by maintaining that the original characteristics of matter were qualitative, but that they were quantitative. He assumes, therefore, as the ultimate elementary ground of nature, an infinite multitude of indivisible corporeal particles, atoms, and attributes to these a primary motion derived from no higher principle, existing from eternity to eternity. This motion brings the atoms into contact with each other, and from the multitudinous combinations that they form springs that vast and varying aggregate called Nature, which is presented to our eyes. Besides the atoms (matter) there is void; without void motion (and so life) would be impossible. Democritus did not acknowledge the presence of design in nature, but he admitted that of law. He believed strictly in secondary or physical causes, but not in a primary immaterial cause. With the aid of law all the phenomena of the world can be accounted for; there is no need, no room, for divine providence. Life, consciousness, thought, were, according to him, derived from the finest atoms; those images of the sensuous phenomena surrounding us which we call mental representations were to him only material impressions, caused by the more delicate atoms streaming through the pores of our organs. Democritus boldly applied his theory to the gods themselves, whom he affirmed to be aggregates of atoms, only mightier and more powerful than men. The ethics of Democritus set happiness as the aim, and by this he understood serenity of mind, undisturbed by fear or passions; hence temperance, uprightness, and noble actions are to be cultivated. The physical philosophy of Democritus, itself derived, in part at least, from that of Leucippus, was made the base of the system of Epicurus, who reared upon it a structure of ethical doctrine. See EPICURUS; LEUCIPPUS; LUCRETIUS. Consult: Zeller, *Philosophie der Griechen*, vol. i (Leipzig, 1892); Gomperz, *Greek Thinkers*, vol. i (Eng. trans. by Magnus, New York, 1905); Beare, *Greek Theories of Elementary Cognition* (Oxford, 1906); Hicks, *Stoic and Epicurean* (New York, 1910).

DEMOD'OCUS (Gk. Δημόδοκος, *Dēmodokos*). The bard at the court of the Phæacian King Alcinous, who entertained Odysseus after his shipwreck. His songs are described in books vii and viii of the *Odyssey*.

DEMOGEOT, de-mô'zhô', JACQUES CLAUDE (1808–94). A French author, born in Paris. He taught literature in the colleges at Beauvais, Rennes, and Lyons, became professor of rhetoric at the Lycée Saint-Louis in Paris in 1843, and finally was appointed to a chair in the faculté des lettres at the Sorbonne. His most important work is the *Histoire de la littérature française depuis ses origines jusqu'à nos jours* (1851; 26th ed., 1899), held in great esteem in the literary world. He published further: *Etude sur Pline le Jeune* (1845–50); *Les lettres et l'homme de lettres au XIXème siècle* (1856); *La critique et les critiques en France au XIXème siècle* (1857); *Tableau de la littérature française au XVIIème siècle* (1859); *Contes et causeries en vers* (1862); *Histoire des littéra-*

tures étrangères considerées dans leurs rapports avec le développement de la littérature française (3 vols., 1880–83); *Francesca da Rimini* (1882).

DE'MOGOR'GON (Gk. *δαίμων, daimōn*, demon + *γοργός, gorgos*, horrible). A mysterious being whose name first appears in some manuscripts of the commentary of Lactantius (or Luctatius) Placidus to the Thebaïs of Statius, iv, 516, as the name of the mighty being whom all the powers of the lower world obey (Luctatius wrote about 450 A.D.). Other manuscripts show varying forms, and it is very probable that we have to do with a copyist's corruption of the Greek *δημιουργός, dēmiourgos*. Mythological writers of the Renaissance, especially Boccaccio, took up the word as the name of a supreme power, and thence it passed into the works of Ariosto and other poets. Demogorgon is mentioned by Spenser and Milton; in Shelley's *Prometheus Unbound* he is introduced as the mighty power which overthrows Jove. Even if the form of the name is correct, there is no reason to suppose that name or being was known to any classical writer.

DEMOG'RAPHY (Fr. *démographie*, from Gk. *δῆμος, dēmos*, country, people + *γράφειν, graphein*, to write, describe). A branch of the science of statistics. In its narrower sense it deals exclusively with vital statistics, the statistics of population. In its broader sense it has been defined as "the science of statistics applied to questions concerning the social well-being of the people," and it has been considered as synonymous with statistics. The term was first used by Achille Guillard in his *Eléments de statistique humaine ou démographie comparée* (Paris, 1855), and since then it has been adopted in all countries, although it has not been accepted by all statisticians. Demographic statistics are so closely associated with anthropology that demography has been called a branch of anthropology. They are also of special importance for sociology.

Statistics of population are fundamental. In general they measure the growth and decay of population, the normal and abnormal conditions, the working of great social influences, and the pressure of antisocial forces in the community. In a more detailed form demographic data may include the following: 1. The composition of the population; the numbers, density, sex, age, parentage, defective classes, physical condition in relation to disease and epidemics, and manner of grouping from point of view of race, occupation, or civil position. 2. Changes in population, as expressed in births, marriages, and deaths. 3. Migrations and their effects, both individual and local, and their relation to economic conditions. 4. Morality, with statistics of crime, illegitimacy, and suicide. 5. Degrees of education. 6. Economic and social statistics, especially relating to insurance. In drawing conclusions from these statistics an important theoretical topic is their application to the doctrines of Malthus.

Demography is recognized as a cognate subject to hygiene, and since 1887 the International Congress of Hygiene and Demography has held annual meetings, one of which, 1912, was held in Washington, the others in various European cities. Demographic material is found in all national-bureau reports on population. In the United States the word is less widely used and in its narrow sense. For instance, Professor Mayo-Smith divides population for the study of social organization into demographic, social, and ethnographic classes, and includes in the first only the individuals who are distinguished by differences in sex, age, conjugal condition, and physical health. The American Statistical Association also publishes much demographic material without so distinguishing it. Consult Mayo-Smith, *Statistics and Sociology* (New York, 1895), and Levasseur, "History of Demography," in *Report of International Congress of Hygiene and Demography*, vol. i (Budapest, 1894). See STATISTICS.

DEMOISELLE, de-mwä'zĕl'. A fish of the family Pomacentridæ. These fishes are remarkable for their graceful form and brilliant colors and abound in tropical seas, haunting the coral reefs and feeding upon corals and other small creatures, much after the manner of coral fishes. A characteristically brilliant species is pictured on the Colored Plate of PHILIPPINE FISHES.

DE MOIVRE, de mwä'vr', ABRAHAM (1667–1754). A distinguished French mathematician. He was born at Vitry, Champagne, but spent the greater part of his life in England, whither he fled in 1688, with many others, after the revocation of the Edict of Nantes (1685). He supported himself by private tutoring and public lecturing and, towards the end of his life, by solving problems in chance, play, and annuities. He was a fellow of the Royal Society of London and a member of the Berlin and Paris academies. The *Philosophical Transactions* of London contain many of his contributions. He was so esteemed by the Royal Society that he was chosen to decide the famous contest between Newton and Leibnitz concerning the invention of the calculus. De Moivre's researches, with those of Lambert, created the part of trigonometry (q.v.) which deals with the imaginary quantities, and he contributed much to the advancement of the theory of numbers and of probability. Among his published works are: *Miscellanea Analytica de Seriebus et Quadraturis* (1730); *Doctrine of Chances* (1st ed., 1718; 2d ed., 1738); *Annuities upon Lives* (1725, and several subsequent editions). The well-known theorem which bears his name is connected with complex numbers (q.v.). It may be stated symbolically as follows: $(\cos\phi + i \sin\phi)^n = \cos n\phi + i \sin n\phi$.

DEMOLITION, dĕm'ō-lĭsh'ŭn (Fr. *démolition*, Lat. *demolitio*, from *demoliri*, to pull down, from *de*, down + *moliri*, to build). The scientific destruction of works or property. In modern warfare the destruction of material is often deemed by military commanders to be essential to the success of their operations. The material destroyed on various occasions has included every kind which might be of use to an army acting either on the offensive or the defensive. The motive for demolition by troops has likewise varied from the necessity of removing an obstacle in the way of their own operations, to the advantage of embarrassing an enemy by destroying or disabling some structure that might be useful to him. In some cases, as in the famous raid through the Shenandoah valley, Va., practically everything which it was thought might contribute to the success, directly or indirectly, of the Confederate army was destroyed by General Sheridan with a view of rendering it impracticable for the Confederate army to operate in the valley as it had been doing. At the other extreme lies the destruction of a single piece of material which acted as

a barrier to the progress of an army. A typical instance of this kind was the destruction of a door during the hostilities in China. The Japanese troops were delayed at one of the gates, or doors, the approaches to which were well covered by the fire of the Chinese. A Japanese corporal undertook to effect the demolition of the gate by an explosion. After he had placed the charge, ignited a fuse, and withdrawn from its immediate vicinity, the flame was extinguished by the Chinese. This operation having been repeated several times, he finally drew his sword after lighting the fuse and stood over the explosive, permitting himself to be killed by the explosion which broke in the gate.

The exercise of good judgment is enjoined upon the officer in charge of demolitions. He should carry the destruction as far as is necessary to aid the general military project of which his work is a part; but he should not knowingly go further. The demolition of material which may subsequently be of service to the friendly army should only be undertaken with great caution. The denial of its use to the hostile army may frequently be accomplished in some other way. For example, a blockhouse or other purely military structure about to be abandoned and likely to be of considerable value to the enemy's forces should be unhesitatingly razed to the ground. While a bridge, building, railroad, or telegraph line which is useful for nonmilitary as well as military purposes should, if practicable, be crippled only sufficiently to prevent its temporary use by the enemy. Its rehabilitation will thereby be simplified, whether for later use by the friendly army or for civil purposes.

The principal agents used in demolitions are fire, explosives, and tools. Where time allows and the material to be destroyed is inflammable, as in the case of food supplies, crops, frame buildings, wooden bridges, etc., it is burned if the flame and smoke will not be objectionably conspicuous. In other cases the demolition is effected by the use of explosives, assisted sometimes by the pick, axe, and other tools.

The materials most frequently to be demolished are guns, railroads, including their bridges and tunnels, walls, doors, telegraph and telephone lines. A large gun is most readily destroyed by removing the breechblock and exploding a charge on the chase or in the bore. A railroad may be put out of commission by destroying its rolling stock or its track. Wooden cars are easily destroyed by burning. Locomotives and other machinery can be quickly disabled by removing or destroying some vital part. A locomotive can be more seriously disabled by building a fire in the empty boiler or by setting off a charge of explosive in the boiler or near some other large vital part. Railroads have been destroyed by overturning sections of the track, removing and burning the ties; the rails placed on piles of burning ties, heated in the centre, and then bent and twisted. If simply bent, it is a comparatively simple matter to straighten them. If, however, they are well twisted, the rails must be re-rolled before they can be used again. A tunnel which is a critical point of a railroad line may be put out of commission for some time by a collision and wreck therein. If it is desired to quickly and temporarily disable a road in such a way as to leave the same material available for its rehabilitation in the near future, it may ordinarily be done by overturning the track on fills and throwing it down the sides of the embankment. Walls and doors may be broken down with picks and crowbars, or can be demolished by exploding charges against them.

The explosives ordinarily used for demolitions are gunpowder, dynamite, and guncotton. Experiments are in progress in various military countries to develop explosives still more suitable for such use. If gunpowder be used, it is necessary to tamp the charge. If guncotton, tamping is not essential. The rules governing the amount of explosive to be used are only approximate and must be considered in connection with the class of material to be destroyed. In general the amount of explosive force varies with the square of the thickness of the wall or pier to be demolished; and directly, as its length. For example, a brick wall 2 feet thick requires about two pounds per running foot of guncotton, while one 4 feet thick will require about eight pounds per running foot.

If in haste, the walls of a house may be blown down by the explosion of one or more charges of 50 pounds of dynamite in a central position. A tree 13 inches in diameter may be cut off by boring two radial holes, inserting a half-pound stick of 50 per cent dynamite in each, tamping behind the sticks with clay, and exploding the charge electrically. If the charges must be exploded with time fuses, one hole should be loaded and fired; and a second hole bored in the soundest part of the tree remaining and treated similarly. A steel rail can be cut by the explosion of three-fourths of a pound of guncotton against its web. The destruction of bridges requires judgment in the placing of the charge. In a wooden bridge the destruction can be accomplished by building a fire under one or more pieces, whose failure will cause the entire bridge to drop. Similarly, an iron or steel truss bridge may be destroyed by cutting simultaneously with explosives the lower chord of some tension member, usually near the abutments of the bridge, where the cross section is smallest. A pound and a half of dynamite is required per running foot for steel plate ¾ of an inch thick. Charges for cutting steel must be placed on the surface and extend completely across the member to be cut. Where practicable, they should be tamped. Tamping is facilitated by placing the charges at crossings or intersections of members. Arched masonry bridges and tunnels can best be destroyed by exploding the proper-sized charge on the top side of the arch near the haunches. When impracticable to reach the top side of the arch, the destruction may be effected by propping a large charge against the crown of the arch.

The method of destroying such purely military obstacles as abatis, trous-de-loup, palisades, barricades, will usually be simple and evident, but may be as varied as the variations in construction. It will usually include the refilling of places excavated below the general level of the ground and the tearing down or burning of structures above the ground surface. Wire entanglements placed as obstacles to the advance of the troops may be rendered ineffective by cutting with wire nippers, axes, or other edged tools. Telegraph and telephone lines can be destroyed by cutting down and burning the poles; the wires should be removed and twisted or buried. A telegraph line may be temporarily disabled by removing some instruments or establishing faults, crosses, and grounds in the line.

The explosives, tools, and fuses for military

demolitions are variously carried in small packages in the saddlebags of mounted troops and in larger quantities on pack mules and wagons in charge of engineer troops.

DE'MON (Lat., from Gk. Δήμων). A Greek writer who lived about 280 B.C. He is the author of *Atthis* (Ἀτθίς), a lengthy history of Attica, and of works Περὶ Παροιμιῶν, *On Proverbs*, and Περὶ Θυῶν, *On Sacrifices*. The extant fragments of his writings are collected in Müller, *Fragmenta Historicorum Græcorum*, vol. i (Paris, 1868).

DEMON (Gk. δαίμων, *daimōn*, from δαιοῦσθαι, *daiousthai*, to divide, to apportion). In popular usage, an evil spirit or fiend, but in allusions to the classics a tutelary deity or a godling. The development of the demon concept is an interesting one. In Hesiod the souls of the departed are called demons, and Æschylus in the *Persians* makes Atossa apply the term to her deified husband, Darius. Herein seems to lie the original meaning of the word. The *daimon* is one of the many spiritual beings that determine the fate, good or bad, of individual human beings. Denoting at first the ghosts of the benignant dead who, when duly propitiated, confer boons on those who observe their cult, and later deities in a vague sense, they become in Homer immortal gods, because responsible for the decrees of fate. Then the concept entered by the time of Socrates and Plato upon its meaning of guardian spirit. In this sense Socrates called his indwelling genius δαιμόνιον, and he fancied that it spoke within him to restrain him, but never to impel him. The sense of the word which is the most common one is a late Jewish and Christian development. Through Oriental influence there gradually arose a realistic doctrine of demons as good and evil spirits and as mediators between God and men. In the Greek version of the Old Testament the words indicating the gods of the nations are often translated as demons. This paved the way for the peculiar use among the Christians. In the New Testament, therefore, demon always has a bad sense. The spread of Christianity carried the use of the word with it, and demon thus became a synonym of devil, fiend, and maleficent spirit in general. See DEMONOLOGY. Consult Van der Veen, "De demonologie van het Judaisme," in *Theologische Studien*, pp. 301 ff. (1890), and Baljon, article Δαίμων, in *Grieksch-theologisch Woordenboek* (Utrecht, 1895).

DEMO'NAX (Lat., from Gk. Δημώναξ). A Cynic philosopher of Athens in the second century A.D. His character has been extolled by Lucian, and he seems to have been a benignant sort of person, quite as much Socratic as Cynic. Consult Fritzsche, *De Fragmentis Demonactis* (Rostock, 1866), and Bernays, *Lucian und die Kyniker* (Berlin, 1879).

DEMON'ETIZA'TION. See BIMETALLISM.

DEMO'NIAC (Lat. *dæmoniacus*, Gk. δαιμονικός, *daimonikos*, from δαίμων, *daimōn*, demon). A person supposed to be possessed by a demon. The idea of such a possession is as widespread as the belief in the existence of demons. There is evidence of it in the ancient civilizations of Egypt and Babylonia; it existed in Persia and Judæa, Greece and Rome, in the most flourishing periods of their history; it held a large place in the life of the Christian nations until the end of the eighteenth century; it is cherished by the mass of the people in India and China and is found among numerous savage tribes.

This conception has offered itself as the natural explanation of certain extraordinary and startling phenomena. The frenzy of the prophet and the dervish, the Pythoness and the Bacchant, the necromancer and the witch, could only be understood in earlier times as the obsession of a spirit, the temporary possession of a human being by a ghost. A frequent occurrence of such an unusual phenomenon would naturally give rise to the belief in a permanent possession, an incarnation of a god, a transmigration of an eminent ancestral spirit into the body of a descendant. As the divine frenzy was frequently connected with hysteria and epilepsy and seemed akin to insanity, these pathological conditions were naturally ascribed to the same agencies. Physical disabilities of long duration and apparently incurable, such as deafness, dumbness, and blindness, would also be accounted for in the same way and ultimately all bodily diseases. As in course of time the demons were differentiated as evil spirits in distinction from the good spirits, gods, angels, saints (see DEMON), persons possessed by them were thought to secure from such impure sources forbidden knowledge, heretical doctrines, unholy enthusiasm, suffering and misfortune, or a singular immunity from want and disease in exchange for everlasting perdition.

Although a belief in demoniacal possession must have grown up spontaneously among different peoples from the need of explaining such abnormal and striking phenomena found everywhere, historic contact no doubt hastened the process of development and gave shape to latent tendencies. The highly specialized demonology providing a spirit for each important organ of the body and for every familiar disease, which meets us at the very dawn of history in Egypt and Babylonia, has, directly or indirectly, influenced all nations of western Asia and Europe. Thus, in Iran, Zarathustra, by reciting the prayer called Ahuna-vairya, "caused all demons to vanish in the ground who aforetime flew about the earth in human shape" (Yasna, ix, 15). Already in Homer (*Odyssey*, v, 396) a demon causes wasting sickness; insanity and epilepsy, as well as the divine frenzy of the Bacchantes, are ascribed to demons by later writers. But there is every reason to believe that the increasing emphasis on the wickedness of the demons was occasioned by conflict with Persia on the one hand and Egypt on the other. How strong the native conception was is seen from the fact that even the Neo-Pythagoreans and Neo-Platonists did not limit the term to an evil spirit, as was done in Persia and Judæa. Possession by a spirit must have been a very familiar conception among the ancient Hebrews. Without it necromancy and witchcraft could not have flourished, and prophethood would have been impossible. The high moral ideals of the prophets whose words have come down to us cannot obscure the fact that they both considered themselves possessed by a spirit, whose spokesman they became by virtue of this possession, and also regarded other prophets as possessed in a similar manner by other spirits. The immunity with which they could make personal attacks upon kings, magistrates, and priests was undoubtedly due, in no small measure, to the general fear of the spirit that possessed them. The capacity for prophetic visions or conditions seems to have been connected with a certain epileptic or cataleptic tendency. The

prophet was looked upon as a madman; the insane man was possessed by a spirit. David was perfectly safe when feigning madness (1 Sam. xxi. 13); his lament over Saul shows that he did not associate with the King his deeds in moments of insanity (2 Sam. i. 17–27). In the same way the frenzy exhibited in battle was looked upon as possession. The spirit was said to clothe himself with a man. While we have no positive evidence that disease was explained by spirit possession, the prophetic character of the literary remains in part accounts for the silence. As leprosy and pestilence were considered as the result of blows inflicted by Yahwe or some other god, coming unawares and smiting, so other sicknesses may have been traced to purely external attacks of such spirits as the Seirim or the Shedim. The growth of monolatry and transcendental theism forced the transfer of certain functions of deity to intermediaries. Then it was that contact with Persian, Egyptian, and Græco-Macedonian thought helped to develop the idea of demoniac possession so manifest in the Synoptic Gospels and the Talmudic literature. It has been observed that in no Gospel are all diseases referred to demoniac possession, and that Mark confines possession to psychical maladies such as insanity and epilepsy, while Matthew and Luke add instances of purely bodily diseases. The selection of Mark may be connected with the great importance that his Gospel attaches to the superhuman insight possessed by the demons, and it can scarcely be asserted with safety that he drew a sharp distinction between psychical and physical disease, or that he differed from the other Synoptists in regard to the cause of ordinary maladies. Some scholars have maintained that Jesus did not really believe in demoniac possession, but only accommodated himself to the current belief. This is a highly improbable view; and the discussion recorded in Matt. xii. 22 et seq. seems to be decisive against it. Here Jesus assumes that members of the Pharisaic party are able to cast out demons, but points to his own extraordinary success as a sign that the kingdom of heaven is coming and attributes his own work to a spirit working through him that must not be blasphemed. That exorcists formed a recognized profession among the Jews of the period may also be inferred from Talmudic literature, in which demoniacal possession and the possibility of expelling the demons are in numerous places accepted as facts.

Among the Celtic, Germanic, and Slavic nations there were many higher or lower nature spirits to whose influence various distempers were attributed, and, though it cannot be definitely proved, there is reason to suppose that possession was not unfamiliar to them. But their conversion to Christianity made them at once acquainted with New Testament demonology and with an ecclesiastical organization that recognized exorcists as a clerical order. (See Exorcist.) Persons who contrived to worship in secret the ancestral gods, even after they had been officially declared to be demons by the Church, were regarded as possessed. This would be especially the case with old women who adhered most persistently to the ancient cults. Since obstinate clinging to wrong beliefs could only be accounted for by demoniac influence, heretics were also regarded as bewitched. In its battle with the demons the Church never struck a heavier blow than when Innocent VIII (q.v.), on Dec. 5, 1484, sent out his bull *Ad futuram rei memoriam*. The methods of carrying out its recommendations were set forth with brutal frankness in the *Malleus Maleficarum*, written by his chief inquisitor, Jacob Sprenger. It has been estimated that a vast number of lives were destroyed as a result of these methods of dealing with demoniacal possession. As Luther and other leading reformers continued to cherish the belief, it maintained its hold upon the Protestant churches and was responsible for much persecution, until, undermined by the attacks of deists and rationalists, it gradually disappeared before the progress of modern science. Consult: Semler, *De Demoniacis* (Halle, 1760); Stübe, *Jüdisch-babylonische Zaubertexte* (ib., 1895); Nevius, *Demon Possession* (Chicago, 1895); Maspero, *Dawn of Civilization* (Eng. trans., New York, 1894); Alexander, *Demoniac Possession in the New Testament* (Edinburgh, 1901); Townsend, *Satan and Demons* (Cincinnati, 1902); Duhm, *Die bösen Geister in Alten Testament* (1904); Lagrange, *Etudes sur les religions sémitiques* (1905); Marti, *Religion des Alten Testament* (1907); Henry Preserved Smith, *The Religion of Israel* (1914).

DE'MONOL'OGY. The branch of comparative theology which concerns itself with beliefs regarding evil spirits or demons. The worship of demons is one of the most widespread of all religious phenomena. Besides the beneficent godlings or ghosts, there exists a far greater number of maleficent beings who are either divinities or supernaturalized spirits. While the beneficent deities may, and often do, receive expressions of gratitude for past bounties and prayers for continued blessings in the future from their worshipers, it is the demon or maleficent godling or ghost who receives the greater amount of human tribute. The reason for this religious attitude in primitive society is not far to seek. The beneficent deity is, in the eyes of early man, an easy-going being who dispenses blessings as a matter of course, and he may therefore be trusted to continue on in his routine goodness. An occasional sacrifice as a token of gratitude or as an inducement to confer greater boons, or to recommence an interrupted course of beneficence, is quite sufficient for him. His blessings may even be overlooked in view of their quiet and orderly action, or be forgotten altogether on account of the number of painful events which befall man. With the demon things are altogether different. His power, which he constantly exerts for harmful ends, must be met with continued propitiation, in the shape of prayer or sacrifice. Furthermore, the malignancy of the demon cannot be overlooked and is far more prominent to the primitive mind than beneficence, which, as already suggested, frequently passes unnoticed. The worship of demons is in general directly proportionate to the low character of the cult. As religion develops in any community or tribe, the demon's scope of malignancy is circumscribed accordingly, while the degree of worship paid to beneficent ghosts and gods constantly increases.

Demons comprise several classes and occur in a vast variety of forms. The two main divisions are, as in the case of beneficent divinities, either superhuman, being personifications of the powers of nature, or what may be termed posthuman, being ghosts of dead ancestors, especially of the chiefs, or of men who had been otherwise con-

spicuous in the community during life. These two classes of superhuman and posthuman godlings and demons frequently overlap, and the dividing line between them must be regarded as a shifting boundary. Here in many cases syncretism, or the blending of divinities originally distinct into one, may be the source of confusion. In such a divinity as the Greek Apollo, e.g., might be syncretized a beneficent godling of light, a ghost of some early member of a tribe conspicuous for musical ability, and the maleficent godling of light, who causes death and damage as in sunstroke. It is, in consequence, sometimes hard to tell to which division a given godling or demon belongs. Such an uncertainty is not in itself a proof of error of method. It is probably incorrect to assume an excessively nice discrimination in this regard among primitive mankind, although there is a marked tendency to elevate posthuman into superhuman divinities either beneficent or maleficent, while the change of nature deities into ghosts is practically unknown. On the other hand, the attempt to reduce all gods and demons to the single category either of nature deities or of ghosts seems an unscientific one in its fundamental principle. There may even be other factors in the origin of belief in divinities, and it is an error to assume that the primitive is necessarily simple. Furthermore, the functions of the beneficent and maleficent deities, like the classification of superhuman and posthuman, are frequently fused, Thus the fire godling may be beneficent, as in the hearth fire, or maleficent, as in the conflagration of a village. Again, a malignant deity may, by proper sacrifices and ritual, become benignant to an individual or tribe, as in an invocation to smallpox to befall one's enemies.

The Semites furnish an admirable example of the course of development of demonology. In the earliest records of Babylonia and Assyria the antithesis between beneficent and maleficent deities is clearly marked. The conflict in the Babylonian creation myth of Marduk, the god of light, with Tiamat, the demon of darkness, a conflict which is indicated by Gen. i. 2–8, and more clearly in Rev. xii. 7–9, is an instance of enmity between two nature godlings. On the other hand, Lilith, according to Talmudic tradition, seems to have been originally a malignant ghost changed into a vampire or ghoul. The Old Testament contains allusions to demons, such as the "familiar spirits" of Lev. xx. 6, 27, the "devils" of Lev. xvii. 7, Deut. xxxii. 17, 2 Chron. xi. 15, Ps. cvi. 37, the creatures that haunt the desert, Isa. xiii. 21, 22, xxxiv. 14, 15, as well as the "terror by night" and the "pestilence" of Ps. xci. 5–6. On the other hand, the strongly Yahwistic tendency of the Old Testament was most unfavorable to any development of demonology in the Bible. Even the one demon who retained any real personality, Satan (see DEVIL), plays but a small part in the Old Testament. He is a servant (even, in Job i. 6, ii. 11, reckoned among the sons) of Yahwe and completely under his control, so that he is sharply rebuked by Yahwe in Zech. iii. 1–2 and is obliged to ask Yahwe's permission to tempt Job, in Job i. 6–12, ii. 1–7. That Jewish demonology was far more developed than the extreme Yahwism of the Old Testament would lead one to suppose is clear for several reasons. In the New Testament the power of demons is frequently mentioned. Insanity and disease are laid to demoniacal possession, and Jesus is tempted by Satan, who is represented as an independent agent of the utmost enmity to God. The existence of storm demons is distinctly implied in the account of the stilling of the tempest in Matt. viii. 26–27, Mark iv. 39, 41, and Jesus is mistaken for a spirit, either a storm demon or a malignant ghost, in Matt. xiv. 26. The Talmudic demonology, like the devil lore of other Semites, as shown by the Koran and the vast Arabic literature, of which the *Arabian Nights* furnishes a familiar example with its tales of the jinns, who are probably ghosts of benignant, or more frequently of malignant, dead, is another proof. Most conclusive of all, perhaps, is the rich demonology of modern Semitic peoples, with its superhuman and posthuman fiends.

In India the development of demonology is still more instructive. Besides the primitive nature gods, there existed nature demons no less ancient. Indra, the storm god, cleaves the dragon Ahi, who has confined the cows representing the rain clouds. Here, too, can be seen the process of syncretism more clearly than in any other religious system. For instance, Indra is the god of the monsoons and is beneficent, while the fearful Rudra typifies the ruin caused by the storm. Yet the benignant Indra and the malignant Rudra become blended into one deity, Indra, who is almost altogether beneficent. While nature demons are ancient, new ghost demons may be and are created constantly. There is an instructive story current in India of an irascible Englishman much dreaded by the natives. After his death his tomb was regularly visited, and propitiatory offerings of brandy and cigars were presented to appease his ghost. On the other hand, the ghost of Rama Krishna, a Hindu ascetic of recent date, has become a beneficent godling about whom the logopoetic tendency universal in religion has already created numerous myths.

Besides the superhuman and posthuman gods and demons, there is a third class of much later origin. These are abstract deities. They occur in nearly all the great religions, as in India, Greece, and especially in Rome. Thus, in India by the time of the later Rig Vedic period, Brahma, the prayer, is practically an abstract deity. The same we now know to be true of Mitra, 'the contract,' and Varuna, 'the oath.' Persia had a large number of abstract demons, as Tarōmaiti (Pride), Akoman (Evil Mind), Duzhyairya (Drought), and the like. In Greece and Rome it will be sufficient to refer to the long list of abstract demons enumerated by Vergil, *Æneid*, vi, 273–281. It is obvious that the abstract gods and demons are more closely allied to the nature divinities than to ghosts.

Demonology is everywhere closely associated with witchcraft. In this, two distinct processes are involved. In the first place the demon must be placed under the control of the wizard, or, more commonly, of the witch. In the second place the demon so controlled may become either noninjurious or malignant to some other person or persons. Control over the demons is gained in many ways. Thus, a beneficent deity or something belonging to him may confer the power over demons. Familiar examples are the magic ring given by Allah to Solomon in the *Arabian Nights*, which enables him to control all jinns, and the tetragrammaton, or mystic letters YHVH of the name Jehovah, or Yahwe (q.v.), during the Middle Ages. Demons may be exorcised or may be invoked against enemies

by an equal variety of methods. Possession of some object belonging to the person to be affected is one of the most common modes. For this reason many tribes have careful regulations, as the ancient Persians, who disposed of parings of nails and clippings of hair according to prescribed form. An extremely widespread superstition of this class is the so-called power of the name. According to this the knowledge of the real name of the individual gives all who possess it control over him, and this may be used for demoniacal purposes. For this reason it is customary in many tribes, as possibly among the North American Indians, to keep their personal names secret. The same view was held by the Jews, as is clear from Rev. ii. 17, xix. 12, Matt. vii. 22. Akin to this acquisition of demoniacal control is the selling of one's soul to the devil to gain some object, as in the famous Faust legend, or in the devotion of the Hindu Thugs to the malignant Kali, the wife of Shiva in his destructive aspect.

As has been suggested above, sacrifice is an important element of demonology. Since this class of offerings must be in general propitiatory, they are usually, in conformity to the nature of the demon, of a bloody or revolting character. Thus, among the Aztecs the war god, Huitzilopochtli, was honored by human sacrifices, the pulsating heart being the offering specially dear to him. The "customs" of Ashanti, with their enormous waste of life, and their cruelty to men and animals, were primarily based on the necessity of appeasing malignant gods. Even among the early Greeks a sacrifice of maidens was given each year to the Minotaur, and in early Rome the Tiber received an annual tribute of aged men. As civilization develops, the sacrifice becomes more and more ritualistic, and substitutes for the bloody offering may be made, as when, instead of sacrificing old men, dolls were thrown into the Tiber.

The change of gods into demons occurs frequently. When one tribe conquered another, it was customary for the pantheon of the defeated people to be incorporated into that of the conquerors. When, however, a nation has reached a monotheistic stage, or is inspired for any other reason by an intense hatred for the religion of the conquered, the gods of the subjected tribe may become demons. This is especially characteristic of later Judaism and Christianity and of Zoroastrianism. Thus, in Ezek. viii. 13–18, among the greatest abominations are classed the annual mourning for Tammuz, an ancient Semitic spring god, familiar to us from the Greek version of the myth in the story of Venus and Adonis, and the worship of the sun, which is most probably an allusion to Zoroastrianism. In this latter religion the gods of India (Skt. *dēva*) are demons (Av. *daēva*), and great Indra seems to have been turned into a fiend Andra by the Iranians. In like manner Ceylonese Buddhism sees demons in the old Brahmanic gods, and the jinns of Mohammedanism are the heathen Arabic deities in disguise.

The worship of demons has led to the cult termed diabolism or satanism (q.v.). The earliest mention of such a belief is in the Avesta (q.v.), where adherents of non-Zoroastrian faiths are called daevayasnians, or demon worshipers. Persia still has a numerous sect of devil worshipers, called Yezidis (q.v.), who endeavor to keep on good terms with the devil that he may not injure them in the future world. A similar tendency existed to a marked degree in early Christian Gnosticism (q.v.). The sect of the Ophites, e.g., regarded Yahwe as an evil divinity, but the serpent, because of his promise of knowledge (Gen. iii. 5), as the highest god and a benefactor of mankind. The modern cult of satanism seems to be a survival of early Gnosticism. This worship, which is, for obvious reasons, of an occult nature, seems to unite to diabolism the widespread notions of phallicism, or worship of the reproductive powers of nature. Satanism, which is now mainly a travesty of Christianity, finds its culmination in the so-called black mass, where the Christian ritual is parodied in most revolting ways.

Consult: Collin de Planey, *Dictionnaire infernal* (Paris, 1844); Lecanu, *Histoire de Satan, sa chute, son culte, ses manifestations, ses œuvres* (ib., 1861); Hild, *Etude sur les démons* (ib., 1881); Laengin, *Wunder und Dämonenglaube der Gegenwart* (Leipzig, 1887); Conway, *Demonology and Devil-Lore* (2 vols., New York, 1889); Bois, *Satanisme et la magie* (Paris, 1895); Carus, *History of the Devil and the Idea of Evil from the Earliest Times to the Present Day* (Chicago, 1900); Jaulmes, *Essai sur le satanisme et la superstition au moyen âge* (Montauban, 1900); Alexander, *Demoniac Possession in the Old Testament* (Edinburgh, 1902); Thompson, trans., *The Devils and Evil Spirits of Babylonia* (2 vols., London, 1903–04); Fischer, *Geschichte der Buhlteufel und Dämonen* (1906); Eichmann, *Die Angelologie und Dämonologie des Kernes* (1908); Soltan, *Das Fortleben des Heidentums in der altchristlichen Kirche* (1906); Dähnhardt, *Natursagen* (1907); Tambornino, *De antiquorum dæmonismo* (1909); Wendt, *Christentum und Dualismus* (1909); and see ANGEL; DEVIL; SOPHIOLOGY; SUPERSTITION.

DEM'ONSTRA'TION, MILITARY. An operation designed to deceive an enemy, persuading him that danger is threatening from another quarter, and inducing him to divide his force so as to meet the apparent as well as real danger. A demonstration made during the attack, in order to cover the development of the real point of attack, or to discover a vulnerable point in the defense, is called a feint. Before deciding the necessity for war, a *demonstration*, i.e., a concentration of military forces at strategic points, may be employed to demonstrate preparedness for war.

DE MOR'GAN, AUGUSTUS (1806–71). An English mathematician, born at Madura, India. He was educated at Trinity College, Cambridge, was graduated as fourth wrangler (1827), and was professor of mathematics in the University of London (afterward University College) from 1828 to 1831 and from 1836 to 1866. Besides being a mathematician of high rank, he was extensively versed in the history of mathematical and physical science. He gave much time in attempting to formulate Aristotelian logic into a symbolic system and contributed to the methods of calculating insurances and to the encouragement of a decimal coinage. De Morgan was the first president of the London Mathematical Society and was a member of the Royal Astronomical Society. He was a remarkable teacher and a suggestive writer, and his *Essay on Probabilities* (1838) is still one of the best in English. He died in London. The following are among his chief works: *Elements of Arithmetic* (1831); *Elements of Algebra, Preliminary*

to the Differential Calculus (1835); *Essay on Probabilities and on their Application to Life Contingencies and Insurance Offices* (1838); *Trigonometry and Double Algebra* (1849); *Formal Logic, or the Calculus of Inference Necessary and Probable* (1847); *Arithmetical Books* (1847); *Treatises on the Differential and Integral Calculus* (1842), published by the Society for the Diffusion of Useful Knowledge; contributions to the *Penny Cyclopædia* and to the *Encyclopædia Metropolitana*, and the *Budget of Paradoxes*, published in book form after his death. A memoir of De Morgan by his widow was published in London in 1882.

DE MORGAN, William Frend (1839–1917). An English novelist. He was born in London, the son of Augustus De Morgan, grandson of William Frend, and descendant of James Dodson (qq.v.). As a boy he attended University College School and later for three years University College itself. He then studied art in 1859 in the school of the Royal Academy—and from 1864 to 1871 (approximately) devoted himself to working in stained glass. Subsequently, for more than 30 years, he was known as a potter who made successful experiments in glazes and lustre and wrote about his craft. He was also of a mechanical turn and invented a duplex bicycle, a smoke-consuming grate, etc. As an illustrator he may be remembered for the illustrations to *On a Pincushion and Other Fairy Tales*, written by his sister Mary Augusta. In 1904, then in his 66th year, he wrote *Joseph Vance*, a novel of well-nigh 300,000 words, which achieved an immediate success on its publication in 1906. Other novels followed, resembling *Joseph Vance* in length and in deliberation of manner. They also were warmly welcomed. De Morgan calls Dickens his master, but in many ways he is more akin to Thackeray. In *Alice-for-Short* (1907) De Morgan has been accused of imitating Wilkie Collins. *Somehow Good* (1908) is the best of his books in construction and style. After *It Never Can Happen Again* (1909) De Morgan attempted in *An Affair of Dishonor* (1910) to write a historical romance of the eighteenth century; he might have succeeded better if the plot had been less improbable or distasteful. *A Likely Story* (1912), first called *Bianca*, is in part a historical romance, with an Italian setting which repeated sojourns in Italy enabled him to paint faithfully. *When Ghost meets Ghost* (1914) is nearer the earlier manner, and scene and coincidences are piled up one on another without direct or obvious bearing upon the main drift of his tale. In all his stories De Morgan leans heavily upon the long arm of coincidence for assistance in the resolution of his plots, but his skill as a storyteller often gives a chance conclusion the air of an inevitable dénouement. His milieu is now the London slum, now English higher society. In the naturalness of his dialogue, which has the quality of living speech, he excels. He is skillful also in the use of dialects and scores notably in the dialect passages of his stories. The company of adults to whom he introduces us is often memorable and charming, and his sketches of children are singularly happy. Character is more to him than plot, and his own rambling comments have an appeal at least as strong as the narrative itself. He must certainly be counted one of the most agreeable and beguiling novelists of his generation. Consult W. L. Phelps, *Essays on Modern Novelists* (New York, 1910), and F. T. Cooper, *Some English Story-Tellers* (ib., 1912).

DE'MOS (Gk. δῆμος, *dēmos*, people). A word used in Greek to denote both the body of Athenian citizens and a political subdivision of the city, a township. A statue of the Demos (the people) by Lyson stood in the Senate House at Athens. See Deme.

DEMOS'THENES (Gk. Δημοσθένης) (c.383–322 B.C.). The greatest orator of the ancient world. He was born in the deme Pæania, in Attica. His father, a wealthy manufacturer, died when Demosthenes was but seven years old; his fortune and his children he left to the care of three guardians, who abused their trust. As soon as Demosthenes came of age he prosecuted at law these trustees and gained a verdict against them; but much of the property had already been squandered, and we cannot tell whether he was able to collect the amount awarded to him by the court. His success in this and some other civil causes fixed his resolution to devote himself to public life, and he set himself to master the law and politics of his country with a labor and perseverance almost without parallel. His first appearance before the people was a failure, but this spurred him to overcome his defects. His first care was to conquer the physical disadvantages under which he labored; his health was naturally feeble, his voice harsh and tuneless, and his action ungraceful. To improve his delivery, he took instruction from Satyrus, the actor, and did not disdain to study effects before a mirror. His feebleness of health he never fairly overcame; but he obviated the defects of his early training by the severest study pursued for months at a time without an interruption. Throughout his life he gave much time to the writing of speeches to be delivered by himself, or more often by others, in private suits; 33 such orations have come down to us under his name, but only 14 of these are now regarded as by Demosthenes. He was less effective in such suits than in his political speeches.

Demosthenes first took part in public affairs when about 25 years of age; from that time his history is the history of Athens. The states of Greece were miserably weak and divided and had recklessly shut their eyes to the dangerous encroachments which Philip of Macedon was already making on their liberties. The first period of Demosthenes' public life was spent in warning his countrymen to forego their mutual jealousies and unite their forces against the common enemy, whose crafty and grasping policy he exposed, about 351 B.C., in the oration known as the *First Philippic*, the most eloquent and the most effective of his speeches against Philip and in condemnation of the supineness of the Athenians. In 347 Philip became master of Olynthus, the last outpost of Athenian power in the north, which, in a series of splendid harangues—the three *Olynthiacs*—Demosthenes had implored his countrymen to defend. Peace was now necessary for Athens, and Demosthenes and Æschines (q.v.) were among the ambassadors sent to negotiate with the conqueror; but Macedonian gold had done its work, and Demosthenes, as incorruptible as he was eloquent, saw with despair that Philip was allowed to seize Thermopylæ, the key of Greece, and become a member of the Amphictyonic League.

The peace, concluded in 346, lasted for six years, during which Philip's incessant intrigues were exposed and denounced by Demosthenes in orations hardly less remarkable for their political wisdom than for their eloquence. The most important were the second and third *Philippics*, and the speeches on *The False Embassy* and *The Affairs of the Chersonese*. When Philip entered upon a fresh course of aggression (340) and laid siege to Byzantium, he was baffled for a time through the assistance afforded by the Athenians to the besieged city at the instance of Demosthenes (339). In 338, when Philip threw Athens into consternation by passing Thermopylæ and seizing Elatea, Demosthenes brought about an alliance between his countrymen and Thebes. But the Macedonian phalanx proved invincible, and the battle of Chæronea (q.v.) laid Greece prostrate at the feet of the King. The Athenians were treated by Philip with the greatest consideration and accepted his terms of peace. Demosthenes pronounced the funeral oration over those who fell in the battle and urged the Athenians to repair their walls against their enemy, contributing to the expense from his own purse. For his services to Athens in the crisis before and after the battle of Chæronea Ctesiphon proposed that a golden crown be given to him; whereupon Æschines, Demosthenes' lifelong opponent, attacked Ctesiphon with the charge of having made an illegal proposal. Demosthenes defended Ctesiphon (330) in his oration *On the Crown*—essentially a review of his entire political career—which the almost unanimous verdict of critics has pronounced to be the most perfect masterpiece of oratory of ancient or modern times. Æschines was defeated and obliged to leave Athens and spent the remainder of his life in exile. In 324 the enemies of Demosthenes brought about his conviction on a charge of having received a bribe of 20 talents from Harpalus (q.v.), the absconding treasurer of Alexander. Unable to pay the fine imposed, he was thrown into prison, but succeeded in escaping. The death of Alexander the Great in the following year was followed by the triumphant return of the orator, and he was again at the head of affairs. But the disastrous issue of the Lamian War, waged by the Greeks against Antipater, was fatal to Demosthenes. Once more the power of Macedon prevailed. The surrender of Demosthenes was demanded by the conquerors. Finding escape impossible, the orator sought an asylum in the temple of Poseidon, in the island of Calaurea. Before his pursuers overtook him he died (322), as was generally believed, of poison administered by his own hand.

The personal character of Demosthenes is of the noblest. His bravery, the stainless purity of his public and private life (except in the Harpalus matter, if that conviction was in accord with the facts), his splendid and disinterested, if blind, patriotism, and his services as a statesman and administrator, entitle him to a place among the noblest men of antiquity. He has been rated among the foremost orators of the world by all critics since his own day.

There have come down to us 60 speeches, six letters, a letter from Philip of Macedon, and a collection of introductions (*προοίμια*). All the letters, introductions, and many of the speeches are regarded as spurious (19 out of 33). The works are best edited by Bekker (1824), Sauppe (1843), Dindorf-Blass (4th ed., 1889–92), and Butcher (Oxford, 1903 ff.). Dindorf edited all the speeches, with notes and Greek scholia, in 9 volumes (Oxford, 1846–51). Of the single speeches there are many special editions: of the oration *On the Crown* the best in English are by Goodwin (Cambridge, 1901), and Humphreys (New York, 1913). Consult also editions of *Select Private Orations*, by Sandys and Paley (1898), and of the Midias, by Goodwin (1906). There is a translation of the orations by Kennedy, in five volumes (London, 1853–63). On the life and art of Demosthenes, consult: Schäfer, *Demosthenes und seine Zeit* (2d ed., Leipzig, 1885–87); Jebb, *The Attic Orators from Antiphon to Isaeos* (2 vols., London, 1875–76); Blass, *Attische Beredsamkeit*, vol. iii (Leipzig, 1893); Wright, *A Short History of Greek Literature* (New York, 1907); Christ-Schmid, *Geschichte der griechischen Litteratur*, vol. i (5th ed., Munich, 1908); Adams, "Are the Political 'Speeches' of Demosthenes to be Regarded as Political Pamphlets?" in *Transactions of the American Philological Association*, vol. xliii (1913).

DEMOSTHENES (?–B.C. 413). A conspicuous Athenian general in the Peloponnesian War. He was one of the commanders sent (413 B.C.) to reënforce Nicias at Syracuse, but he was captured and put to death. See GYLIPPUS.

DEMOT'IC ALPHABET. See EGYPT.

DEMOT'IKA, often spelled **DIMOTIKA** (MGk. *Διδυμότειχον, Didymoteichon,* double-walled, from *δίδυμος, didymos,* twin + *τείχος, teichos,* wall). A town in European Turkey, in the Province of Adrianople, 26 miles south of Adrianople (Map: Turkey in Europe, F 4). It is situated on the Maritza, here navigable for small vessels, and is connected by rail with Constantinople. It contains an old palace and a citadel and is the seat of a Greek archbishop. The inhabitants are engaged in agriculture. Vegetables, tobacco, and the vine are cultivated. Demotika is noted as the temporary residence of Charles XII of Sweden after his defeat at Poltava. The town, occupied by the Bulgarians during the Balkan War (q.v.), was formally renounced by Turkey in the Treaty of London (May 31, 1913), but recovered from Bulgaria by the final Treaty of Constantinople (Sept. 29, 1913). Pop., about 8700, mostly Greeks.

DE MOW'BRAY, ROBERT. See NORTHUMBERLAND, EARL OF.

DEMPSTER. See DEEMSTER.

DEMP'STER, JOHN (1794–1863). An American clergyman and theologian, the son of the Rev. James Dempster, a Presbyterian minister who graduated from the University of Edinburgh and subsequently became one of the early helpers of John Wesley. John Dempster was born at Florida, N. Y. In 1816 he entered the Methodist ministry. Besides serving important churches, he was presiding elder for 12 years, and for one year he was a missionary in Buenos Aires. He was one of the founders and president (1840–54) of the first theological seminary of the Methodist Episcopal church, the General Biblical Institute, located first at Newbury, Vt., and then at Concord, N. H., in 1867 becoming the Boston School of Theology. He was also one of the founders and president (1855–63) of Garrett Biblical Institute, Evanston, Ill. The establishment of this "Central Salvation Seminary," as its opponents called it, aroused

DEMOSTHENES

FROM THE STATUE IN THE MUSEUM OF THE VATICAN, ROME

one of the greatest controversies of the Methodist Episcopal church. Dempster's *Lectures and Addresses* were collected and published in 1864. Consult this book and also an article in the *Methodist Quarterly Review* for 1864.

DEMPSTER, THOMAS (c.1579–1625). A Scottish scholar and author, born at Cliftbog, in Aberdeenshire. The details of his life are given in an untrustworthy autobiography, but from other sources it seems that he was educated at Cambridge and was professor first at Pisa and later at Bologna. He left a *Historia Ecclesiastica Gentis Scotorum* (1627), which, while curiously dishonest concerning earlier personages, is sometimes valuable for the information it gives of the author's contemporaries. The Ballantyne Club issued an edition of it in 1829. Dempster's best work is an annotated edition of Accolti's *De Bello a Christianis contra Barbaros Gesto* (1623), and he also enjoyed a good reputation as a Latin poet.

DEMUL'CENTS (Lat. *demulcere,* to stroke down, soften, from *de,* down + *mulcere,* to stroke). Bland and lubricating liquid substances taken by the mouth for the purpose of soothing irritation of the mucous membranes of the gastrointestinal tract and reflexly of the larynx and bronchi. The same substances are also given in enemata to relieve irritation of the lower portion of the bowels. Water must be classed as the most valuable of the demulcents. Demulcents are chiefly composed of starch, or gum, or of substances containing these, dissolved in water; sometimes also of oily matters, or the white of eggs, and other albuminous or gelatinous substances largely diluted. The decoction of althæa, or marshmallow, is a favorite form of demulcent; flaxseed tea is a common domestic remedy of this class. Gelatine, isinglass, glycerin, honey, and starch are other demulcents in common use.

DEMUR'RAGE (OF. *demorage,* from *demorer,* to delay, from Lat. *demorari,* to delay, from *de,* down + *morari,* to delay). In admiralty law, an allowance made to the master or owners of a ship by the freighter when she is detained in port by the latter beyond the specified time of sailing. A certain number of days, called running or working days, are allowed for receiving and discharging cargo, and it is usually stipulated in charter parties that the freighter may detain the vessel, either for a specified time or as long as he pleases, on paying so much per diem for overtime. All the ordinary causes of detention, such as port regulations, the crowded state of the harbor, and the like, are at the risk of the freighter, and demurrage must be paid, though it be proved that the delay was unavoidable, unless it is due to the shipowner's fault. The demurrage ceases as soon as the vessel is cleared for sailing, though she should be prevented from actually doing so by adverse winds. When the days of demurrage are limited by special contract, and the ship is detained beyond them, the sum due as demurrage under the contract will be taken as the measure of the loss for the further time which may be claimed in the form of damages. It will be open, however, to both parties to show that the rate thus fixed per diem is either too high or too low. Where there is no stipulation beyond the ordinary agreement that the usual time shall be allowed for loading and unloading, the master will be entitled, when this period expires, either to sail or to claim damages for detention. A suit for the recovery of demurrage is an admiralty and maritime case. Consult the authorities referred to under ADMIRALTY LAW. For the technical use of the word as a charge for the detention of freight cars, see RAILWAYS, *Freight Service.*

DEMUR'RER (Lat. *demorari,* Fr. *demorrer,* to wait or stay). A pleading which in legal effect admits the facts alleged by the opposite party to be true for the purpose of argument, but denies that they are sufficient, as a matter of law, to sustain his claim; or which sets up that there is some other defect on the face of the pleading which is a legal reason why the plaintiff should not be allowed to proceed under it. It is always based solely upon what is stated in the pleading to which it is interposed and cannot contain any other defense.

Its purposes vary somewhat in different jurisdictions; but generally, in addition to denying that the facts alleged constitute a cause of action, it may be used to put in issue the jurisdiction of the court, the capacity of the plaintiff to sue, that another action is pending between the parties for the same cause, that there is a defect of parties plaintiff or defendant, or that several causes of action are improperly joined in the same pleading. It may be interposed to any pleading of either plaintiff or defendant which alleges "new matter," i.e., something in addition to what was set out in the last previous pleading.

It is in the discretion of the court to allow the party whose pleading is thus attacked to amend if the objection is well taken and sustained, and great liberality is shown by the courts in this respect, especially where the defect is in some technical matter of form, and an amendment curing it would not prejudice the opposite party. On the other hand, if the demurrer is overruled, the demurrant is usually allowed to interpose an answer or reply to the pleading which he had attached by the demurrer if he can convince the court there is probable merit in his proposed defense. These privileges are usually granted upon terms, as the imposition of costs to date of the argument. The demurrer has been abolished in England, and other proceedings designed to accomplish like results substituted in the King's Bench and Chancery divisions of the High Court, but is retained and in constant use in most of the United States, both under the codes of civil procedure and the modified common-law system of pleading. See ANSWER; PLEADING.

DEMY, dē-mī' (Fr. *demi,* from Lat. *dimidius,* half). A term applied to those holders of scholarships in Magdalen College, Oxford, called demyships. The name would seem to be a shortened form of the Latin *demi-socii* (half-fellows), the formal term by which they are more elegantly distinguished. Of the 43 demyships, there are eight senior, each valued at £100, and 35 junior, of the value of £80 a year. Addison was a demy.

DEMY. A particular size of paper. In America writing demy is a sheet 16 by 21 inches, double demy being 21 by 32. In England writing demy is 15 by 20 inches; printing demy is 17½ by 22 inches; and double demy, 26 by 38½ inches.

DENAIN, de-năN'. A town in the Department of Nord, France, at the junction of the

Selle and the Scheldt, 5 miles southwest of Valenciennes (Map: France, J 2). It owes its prosperity to its situation in the centre of an extensive coal field. The immediate vicinity of iron mines also gives it unusual facilities for smelting, and its works of this kind are of considerable importance. It has some manufactures of beetroot sugar, glass, beer, oil, ships, steel, candy, and spirits. Pop., 1901, 23,204; 1911, 26,800.

DENA'RIUS (Lat. from *deni*, ten each, from *decem*, ten). The principal silver coin of ancient Rome. The earliest money of Rome was of bronze, and the standard was the *as* (q.v.), nominally, at least at first, a pound of bronze. In 269 B.C. the *as*, which had decreased in size and value, was fixed by law at a lower valuation, and a silver coinage was introduced. The chief silver coins were the *denarius* (= 10 *asses*), the *quinarius* (= 5 *asses*), and the *sestertius* (= 2½ *asses*). At first the normal weight of the denarius was 4 scruples, or $\frac{1}{72}$ of a pound (4.55 grams). About 217 B.C. the *denarius* was made equivalent to 16 *asses* (the *as* had been still further reduced), and remained so (about 17 cents) until the time of Nero, after which it underwent a gradual diminution until silver money disappeared entirely in the third century A.D. (See Plate II of NUMISMATICS.) For the earlier period, after Rome became a world power, the denarius was the basis of coinage outside of Italy, especially in the Adriatic territory and in western Europe. Consult Hill, *A Handbook of Greek and Roman Coins* (New York, 1899).

DEN'ARY SCALE. See NOTATION.

DE NATU'RA DEO'RUM (Lat., On the Nature of the Gods). A treatise on the nature of the gods by Cicero, containing an exposition of the Epicurean and Stoic philosophies, and a criticism of both from the point of view of the Academics; in the form of a conversation between representatives of the three schools.

DENATURED ALCOHOL. See METHYLATED SPIRIT; FUEL.

DENBIGH, dĕn'bĭ (Welsh, *Din-bach*, little fort). A municipal borough and the county town of Denbighshire, Wales, 30 miles west of Chester (Map: Wales, C 3), in a region of much historic interest. It stands in the vale of the Clwyd, on the sides and at the foot of a rugged, steep, limestone hill, crowned by the imposing ruins of a castle built in 1284 by Henry de Lacy, Earl of Lincoln. The town sheltered Charles I after the battle of Rowton Moor. It was taken by the Roundheads, but was dismantled after the Restoration. Other structures of interest are the Carmelite Priory (founded perhaps as early as the thirteenth century), the town hall, dating from 1572; the old parish church; a Bluecoat school (1514), and a free grammar school (1527). A lunatic asylum for the five counties of North Wales was erected near the town in 1848. The town's chief industries are bootmaking, butter making, poultry farming, and tanning and quarrying, and there is considerable timber trade. The Welsh vernacular newspaper, *Baner*, is published here. Pop., 1901, 6438; 1911, 6892. Henry M. Stanley, the African explorer, was born near Denbigh.

DEN'BIGHSHIRE. A county of North Wales, on the Irish Sea and between the Dee and the Conway. It contains 662 square miles with 8 miles of coast. The surface is rugged and mountainous in the north; about two-thirds is under cultivation. Its corn, cheese, butter, and live stock are greatly esteemed. Near Wrexham are coal measures more than 4 miles broad. The chief towns are Denbigh, the capital, Wrexham, Ruthin, and Llangollen. The county was formed in the reign of Henry VIII. Limestone caves in the mountainous regions yield many relics of prehistoric men and animals, and there are traces of several Roman roads. Pop., 1901, 131,582; 1911, 144,783.

DEN'BY, CHARLES (1830–1904). An American lawyer and diplomat, born at Mount Joy, Va. He studied at Georgetown University and the Virginia Military Institute, was admitted to the bar in 1855, and practiced law in Indiana. During the Civil War he rose to be colonel of the Forty-second and the Eightieth Indiana Volunteer Infantry. From 1885 to 1898 he was Minister to China and in the latter year became a member of the commission for the investigation of the conduct of the war with Spain. In 1899 he became a member of the United States Philippines Commission. He wrote a valuable book on *China and her People* (2 vols., 1906).

DENDERAH, dĕn'dĕr-ä (Gk. *Τέντυρα, Tentyra*, Coptic *Tentore*, perhaps "the goddess," evidently the end of a longer, mutilated name). A village of Upper Egypt, on the left bank of the Nile, opposite the large city of Keneh, in about lat. 26° 12′ N. (Map: Egypt, C 2). The ancient temple west of the village is one of the best preserved and most beautiful of ancient Egypt. The portico (51 yards wide) has 24 columns, bearing the head of the goddess of Denderah; the interior is divided into 27 rooms. This temple is said to stand on the site of a building dating from the time of King Cheops (q.v.), which was restored in the twelfth and eighteenth dynasties. The present structure was begun under Ptolemy XIII Auletes, and the temple was dedicated under Tiberius, although some details of the ornamentation date from his immediate successors. Among the many pictures and inscriptions, which are of rather moderate execution, a representation of the zodiac (or, better, the sky) aroused much interest after its publication in the *Description d'Egypte;* it has, however, proved to be merely a mythological representation and of no value for astronomical purposes. (Consult Letronne, *Observations sur l'objet des représentations zodiacales de l'antiquité* (Paris, 1824). For information about the cow-formed goddess Hathor of Denderah, see ATHOR.) The tombs of the ancient princes of Denderah of the fourth to the eighteenth dynasty were excavated by Flinders Petrie in 1898. Consult Petrie, *Denderah*, eighteenth memoir of the Egyptian Exploration Fund (1900). For the inscriptions, consult Mariette, *Denderah* (Paris, 1870–80), and Dümichen, *Baugeschichte des Denderatempels* (Strassburg, 1877).

DENDERMONDE, dĕn'dĕr-mŏn'de. A fortified town of Belgium, in the Province of East Flanders, at the confluence of the Dender and the Scheldt, 18 miles east of Ghent. It has a fine church, which contains a number of paintings by Van Dyck and De Crayer, an old citadel, and an elaborately decorated fourteenth-century town hall (Map: Belgium, C 3). It numbers among its institutions a bishop's college and an academy of drawing. There are bleacheries and manufacturing establishments for the pro-

duction of leather, cotton goods, soap, and linen. Dendermonde was besieged in 1667 by Louis XIV, from whose hands it was saved by the opening of the sluices, which resulted in the flooding of the surrounding country. It was taken by the French in 1745. Pop., 1900, 9953; 1910, 10,193.

DENDRID'IC AG'ATE. See MOCHA STONE.

DEN'DRITE (Gk. *δενδρίτης, dendritēs*, of or pertaining to a tree, from *δένδρον, dendron*, tree). The peculiar treelike or branching effect found in minerals and due to the crystallization in them of certain metallic oxides, especially that of manganese. The well-known moss agate or mocha stone is a typical illustration of the dendritic markings due to manganese oxide, which are distributed through the mineral, producing a mosslike appearance. Dendrites are frequently used as gem stones.

DENDRITE. A process which passes off from a nerve cell. See NERVOUS SYSTEM AND BRAIN.

DEN'DROLITES. See PETRIFIED WOOD.

DENDY, ARTHUR (1865–1925). An English zoölogist, educated at Manchester Grammar School and at Owens College, Manchester. He became an assistant in the zoölogical department of the British Museum in 1887; was demonstrator in the University of Melbourne in 1888–94, professor of biology in Canterbury College, University of New Zealand, in 1894–1903, and of zoölogy in South African College, Cape Town, from 1903 to 1905; and in 1905 was chosen professor of zoölogy in King's College, University of London. Besides contributions to technical journals on embryology, anatomy, etc., he wrote *Outlines of Evolutionary Biology* (1912).

DÉNÉ. A name frequently used for all the Athapascan-speaking Indians of the Mackenzie Basin and the Rocky Mountain region in Canada. See ATHAPASCAN STOCK.

DENEEN, *de-nēn'*, CHARLES SAMUEL (1863–). An American lawyer and public official, born at Edwardsville, Ill. He graduated from McKendree College in 1882, taught school, was admitted to the bar in 1886, and from 1890 to 1904 practiced law in Chicago. He was a member of the Illinois House of Representatives (1892), attorney for the Sanitary District of Chicago (1895–96), and State's attorney for Cook Co., Ill. (1896–1904). From 1905 to 1912 he was Governor of Illinois; he afterward served as attorney for the Butts legislative committee investigating (August, 1913) the voting-machine scandal in Chicago.

DENFERT-ROCHEREAU, *dăn'fâr' rō'she-rō'*, PIERRE MARIE PHILIPPE ARISTIDE (1823–78). A French officer, born at Saint-Maixent (Deux-Sèvres). He studied at the Ecole Polytechnique, entered the engineer corps, and served as a captain in the Crimean War. In 1864 he was appointed chief engineer of Belfort, of which fortress he became governor with the rank of colonel in 1870. During the Franco-German War he defended the fortress from October, 1870, to February, 1871, and surrendered only when ordered to do so by the government (February 16). He was elected to the National Assembly in 1871 and 1877. He assisted Thiers and De la Laurencie in the preparation of the *Histoire de la défense de Belfort* (Paris, 1871) and wrote *Des droits politiques des militaires* (1874). His heroic defense of Belfort is there commemorated by Bartholdi's colossal granite "Lion."

DENGUÉ, *dĕn'gâ* (Sp. *dengue*, prudery, fastidiousness, from Lat. *denegare*, to deny, refuse), or BREAKBONE FEVER, also called DANDY and BUCKET (corrupted from Bouquet) FEVER. The disease was first authentically observed in Spain (1764–68). It was accurately described by Brylon of Java in 1779 and by Rush of Philadelphia in 1780. In 1780 the fever was epidemic in Spain, India, and the United States; in 1827–28 in the West Indies and in Charleston, S. C.; in 1848–50 in South Carolina, Georgia, Alabama, Louisiana, and Texas. From 1870 to 1873 another epidemic spread over India, East Africa, and Java, reaching the Gulf States of the United States in 1873. In New Orleans alone 40,000 people were attacked. Other widespread epidemics occurred in 1880, 1883, 1885, 1895, 1897, and 1904, covering much the same territory. Its symptoms are chill, two febrile reactions, intense headache, pain and swelling about the joints, and severe pain in the bones, a rose-colored eruption over the body, and great prostration. It is rarely fatal. The names "dengué" and "dandy" are said to have been applied to the disease because of the stiff erectness and careful walk of those afflicted. It is now believed to be a mosquito-borne disease due to a hematozoön, differing in its life history from the malarial plasmodium in that it does not form pigment. Quinine is used in its treatment, but it has no specific effect. Calomel purges, followed by Dover's powder for sleeplessness, and the salicylates or coal-tar derivatives for pain, is the treatment generally followed.

DENHAM, *dĕn'am*, DIXON (1786–1828). An English explorer. He was born in London, educated at Merchant Taylors' School, and was articled to a solicitor, but joined the army in 1811. He fought in the Peninsular campaign, distinguished himself at the battle of Toulouse by his daring and gallantry, and subsequently served in the Netherlands. He was associated with Clapperton and Oudney in an exploring expedition to Central Africa, which reached Lake Chad by way of Tripoli and Murzuk in 1823. In 1828 Denham became Governor of Sierra Leone. Consult his *Narrative of Travels and Discoveries in Northern and Central Africa* (1826).

DENHAM, SIR JOHN (1615–69). An English poet, born in Dublin, Ireland, the son of an Irish judge bearing the same name. He was educated at Oxford and studied law at Lincoln's Inn. His first publication was a tragedy, called *Sophy* (1642), performed with applause at Blackfriars. To 1642 also belongs the first version of *Cooper's Hill*, which is the earliest of English descriptive poems, and became Pope's model for *Windsor Forest*. According to Johnson, he should be credited with first making the heroic couplet terse and epigrammatic. In 1665 appeared a corrected edition of Denham's poem, containing the famous address to the river Thames: "O could I flow like thee," etc. Denham was engaged in secret service for Charles I, but, being discovered, he was obliged to escape to France in 1648, returning thence to England in 1652. After the Restoration he was appointed surveyor-general of his Majesty's buildings and created Knight of the Bath. The latter part of his life was darkened by madness, but, recovering for a short time, he commemorated the death of Cowley in one of his happiest poems. He was buried in Westminster Abbey. Consult Chalmers, *English Poets* (London,

1810), and Ward, *English Poets* (London, 1880–83). The *Bibliotheca Curiosa*, vol. i (Edinburgh, 1885), includes Denham's political satires. There is no critical edition.

DENHARDT, dĕn'härt, CLEMENS (1852–) and his brother GUSTAV (1856–). Two distinguished German explorers, born in Zeitz. In association with the physician G. A. Fischer they undertook in 1878 a tour through the Tana River region, East Africa, which they endeavored to secure to German commerce. Six years later they entered upon a second expedition, extending from the island Lamu to Vitu (March, 1885), where the Sultan of the Swahili requested the establishment of a friendly treaty with Germany based upon proposals made by him 18 years previously. Part of the territory acquired by Clemens Denhardt was afterward transferred by him to the German colonial society known as the *Deutsche Witugesellschaft*. In 1890 all rights to this territory were ceded by Germany to England in exchange for Helgoland, the German government compensating the brothers with an indemnity of 150,000 marks. An important work by Clemens Denhardt was published in 1883 in the *Mitteilungen des Vereins für Erdkunde* at Leipzig under the title, *Anleitung zu geographischen Arbeiten bei Forschungsreisen*.

DENIA, dā'nē-à (Lat. *Dianium*, from a temple of *Diana* situated there). A seaport town of eastern Spain, situated on the east coast of the Province of Alicante (Map: Spain, F 3). It has a small harbor and a lighthouse and is the seat of an important trade in raisins and salt. In its vicinity are found some Roman antiquities. Pop., 1900, 12,431; 1910, 12,161.

DENIFLE, dā-nē'fle (FRIEDRICH) HEINRICH SUSO (1844–1905). An Austrian priest and historian, born at Imst, Tirol. He studied at Brixen and in 1861 entered the Order of the Dominicans at Gratz. Having received holy orders in 1866, he completed his studies in Rome and in 1876 became professor of theology in the Dominican monastery at Gratz and acquired high repute as a pulpit orator. Summoned to Rome in 1880 as representative of his order for Germany, he was appointed archivist in the Vatican in 1883 and intrusted with a new edition of the works of Thomas Aquinas. He was an authority on the mystic literature and the universities of the Middle Ages. Among his principal writings are: *Nikolaus von Basel* (1875); *Das geistliche Leben: Eine Blumenlese aus den deutschen Mystikern des 14. Jahrhunderts* (1873; 5th ed., 1904); *Die Schriften des seligen H. Seuse* (1878–80), an incomplete edition; *Das Buch von geistlicher Armut* (1877); *Die Universitäten des Mittelalters bis 1400* (1885), especially important as correcting Du Boulay on the early history of the University of Paris; *Die päpstlichen Registerbände des 13. Jahrhunderts, etc.* (1886); *Les universités françaises au moyen âge* (1892), supplemented by an edition (1889–97; with Chatelain) of the *Chartularium* of the University of Paris; and *Luther und Luthertum* (1904–09; last part ed. by Weis), which roused a great controversy in Germany—Denifle answering Seeberg, Harnack, and other critics of his first volume with *Luther in rationalistischer und christlicher Beleuchtung* (1904). He was associated with Franz Ehrle in editing the *Archiv für Litteratur und Kirchengeschichte Mittelalters* (1885–1900) and died on his way to Cambridge University where he and Ehrle were to receive honorary degrees. Consult the sketches by Grauert (Freiburg, 1906) and Grabmann (Mainz, 1905).

DEN'IKER, JOSEPH (1852–1918). A French anthropologist and ethnographer, born in Astrakhan, Russia, of French parents. He was educated at the St. Petersburg Technological Institute and, after working as an engineer in various European oil fields, at the University of Paris. In 1888 he was chosen librarian of the Paris Museum of Natural History. His book on *The Races of Man* (1900) is one of the most important works on the subject in English. In French his principal publications are: *Anatomie et embryologie des singes anthropoides* (1886); *Les races de l'Europe* (1896–1908); *Bibliographie des sociétés savantes de la France* (1889–95); *Les six races de l'Europe* (1904, Huxley Memorial Lectures); *Les races et peuples de la terre* (1913).

DENINA, dā-nē'nà, GIACOMO MARIA CARLO (1731–1813). An Italian historian, born at Revello, Piedmont. Educated at Saluzzo and Turin, he began his career as a teacher, becoming professor at Turin in 1770. Clerical opposition to his liberalism made an offer from Frederick the Great to come to Berlin acceptable in 1782. In 1804 he received a position from Napoleon in Paris. The most important of his many scholarly works is his *Delle rivoluzioni d' Italia* (1769–72), a synthetic, well-documented history of Italy, colored by French philosophy, and positioning the ancient Roman spirit, revivified in the mediæval communes, as the motive force of Italian life. Consult Surra, *Vita di C. D.* (Turin, 1902), and trans. of *Rivoluzioni* by Langhorne (London, 1773).

DENI'O, HIRAM (1799–1871). An American jurist, born at Rome, N. Y. Several years after his admission to the bar he removed to Utica, where he became distinguished as a lawyer. He was three times elected judge of the Court of Appeals and retired from that office in 1866. He was one of the most distinguished jurists of his day, and his decisions are often cited. His works include: *Reports of Cases Argued and Determined in the Supreme Court and in the Court for the Correction of Error* (5 vols., 1845–48); and an edition of the *Revised Statutes of New York*, in collaboration with William Tracy (2 vols., 1852).

DEN'IS, *Fr. pron.* de-nē', or DIONYSIUS, SAINT. The apostle of France and first Bishop of Paris, who according to tradition, suffered martyrdom in the third century. He was sent, it is said, from Rome about 250 A.D. to preach the gospel to the Gauls. He settled on an island in the Seine, near the present city of Paris, and made numerous proselytes. Sisinnius Fescennius, who was then the Roman Governor of this part of Gaul, ordered Denis to be brought before him, along with his two companions, Rusticus, a priest, and Eleutherius, a deacon. As they continued firm in their faith in spite of threats, he caused them to be cruelly tortured and afterward beheaded, 272 A.D., or, as others say, 290. Gregory of Tours, Fortunatus, and the Latin martyrologists state that the bodies of the three martyrs were thrown into the Seine, but taken up by a pious woman named Catulla and interred near where they lost their lives. At a later period a chapel was built over their tomb. In 636 King Dagobert founded on the spot the Abbey of St. Denis. The Greek church makes

St. Denis to be the same person as Dionysius the Areopagite, first Bishop of Athens (q.v.). The Roman Catholic church celebrates his memory on October 9. For a long time his name was the war cry of the French soldiers, who charged or rallied to the words *Montjoye Saint Denis*. Consult Vercelly, *Vie de Saint Denis* (Paris, 1854), and Tailliar, *Apostolat de Saint Denis* (Amiens, 1869).

DENIS, de-nē′, JEAN FERDINAND (1798–1890). A French traveler and author. He was born in Paris and early devoted himself to the study of the principal European and Oriental languages with a view to a diplomatic career. His love of travel, however, induced him to go to South America in 1816; he spent several years in Brazil, studying its condition and resources, and after his return home prepared to write a history of that realm and of some of the other South American countries and subsequently visited Portugal and Spain. In 1838 he was appointed librarian in the Ministry of Public Instruction, and in 1841 custodian of the library of Sainte-Geneviève, of which he became administrator in 1865. Among the great number of his writings may be mentioned: *Le Brésil, ou histoire, mœurs, usages, et coutumes de ce royaume* (1821); *Buenos Ayres et le Paraguay* (1823); *La Guyane* (1824); *Scènes de la nature sous les tropiques, et de leur influence sur la poésie* (1824); *Résumé de l'histoire littéraire du Portugal et de l'histoire littéraire du Brésil* (1826); *Chroniques chevaleresques de l'Espagne et du Portugal* (1837); *Le Brahme voyageur ou la sagesse populaire de toutes les nations* (1833); *Camoëns et ses contemporains* (1841).

DENIS, dā′nĭs, MICHAEL (1729–1800). An Austrian bibliographer and poet. He was born at Schärding, Upper Austria, and was educated at Passau by the Jesuits, whose order he joined in Vienna in 1747, devoting himself to the profession of teaching. In 1784 Denis was appointed custodian of the Imperial Library. He deserves much credit for having elevated the standard of bibliography as a science, but his chief merit is that he furthered literary taste in Austria, making that country participate in the revival of letters which was then agitating Germany. He translated Ossian into German and was a great admirer of Klopstock, in imitation of whose bard poetry he composed lyrics under the name of "Sined [anagram of Denis] the Bard." His poetic productions comprise: *Poetische Bilder der meisten kriegerischen Vorgänge in Europa seit 1756* (1760); *Die Lieder Sineds des Barden* (1773); *Ossians und Sineds Lieder* (1784–85). Among his valuable bibliographical writings are: *Grundriss der Bibliographie und Bücherkunde* (1774); *Einleitung in die Bücherkunde* (1777–78); *Merkwürdigkeiten der garellischen Bibliothek* (1780); *Wiens Buchdruckergeschichte bis 1560* (1782; supplement, 1793); *Lesefrüchte* (1797).

DENIS, dā′nĭs, PAUL CAMILLE (1795–1872). A German civil engineer, born at Mainz. He studied at the Ecole Polytechnique of Paris, entered the Bavarian civil service in 1817, and in 1834 became a member of the commission for the construction of the Danube-Main Canal. In 1835 he built from Nuremberg to Fürth the first railway in Germany. Subsequently he was known as a builder and director of railways.

DEN'ISON. A city and the county seat of Crawford Co., Iowa, 65 miles north by east of Council Bluffs, on the Boyer River and on the Illinois Central and the Chicago and Northwestern railroads (Map: Iowa, B 3). It is the seat of a normal and business college, contains a hospital, and carries on a considerable trade in live stock, grain, flour, poultry, and dairy products. The leading industrial establishments are flouring mills, a cold-storage and ice plant, and creameries. There are municipal water works. There was an Indian massacre at Fort Purdy, 1 mile from here, in 1849. Pop., 1900, 2771; 1910, 3133.

DENISON. A city in Grayson Co., Tex., 72 miles north by east of Dallas, on the Missouri, Kansas, and Texas, the Missouri, Oklahoma, and Gulf, the Texas and Pacific, the Houston and Texas Central, and the St. Louis and San Francisco railroads (Map: Texas, D 3). It is a railroad centre, containing shops of four systems, and has important manufacturing and jobbing interests. There are cotton, cottonseed-oil, and flouring mills, creosote works, a handle factory, grain elevators, and a mattress and felt factory. Among the noteworthy features are St. Xavier's Academy, Washington School, public library, Union Station, government building, Forest and Munson parks, and the city hospital. Settled in 1872, Denison was incorporated the same year. It has adopted the commission form of government and owns its water works. Pop., 1900, 11,807; 1910, 13,632; 1914 (U. S. est.), 14,409; 1920, 17,065.

DENISON, CHARLES WHEELER (1809–81). An American clergyman and author, born in New London, Conn. For a time he edited the *Emancipator*, one of the early antislavery periodicals; in 1853 was appointed United States Consul in British Guiana, and during the Civil War spoke in behalf of the Federal cause among English workmen in Lancashire, and was post chaplain at Winchester, Va., and a hospital chaplain at Washington, D. C. His publications comprise two volumes of verse, *The American Village and Other Poems* (1845) and *Out at Sea* (1867); a story, *Antonio, the Italian Boy* (1873); *The Child Hunters* (1877); and biographies of Generals Grant, Hancock, and Banks.

DENISON, GEORGE TAYLOR (1839–1925). A Canadian soldier and author, born in Toronto. He was educated at Upper Canada College and Toronto University (LL.B., 1861) and was called to the bar in 1861. He early entered the volunteer militia service and in 1866 became lieutenant colonel of the Governor-General's bodyguard. In the same year he was on active service during the Fenian raid. Although of Conservative affiliations, he was not a strict party man, his attitude being determined by his concern for the assertion of Canadian interests so far as these were consistent with the unity of the Empire. In 1867 he was one of the founders of the Canada First party. In 1872 he was an unsuccessful Liberal candidate for the House of Commons. In 1872 and 1873 he was sent by the Ontario government to England as a special commissioner on matters connected with immigration, and in 1877 he was appointed police magistrate of Toronto. He was again on active service during the rebellion led by Riel in the Northwest Territories in the spring of 1885. He was president of the Imperial Federation League in Canada in 1893–95 and became president of its successor, the British Empire League in Canada, in 1896. In 1903 he was appointed president of the Royal Society of Canada, and in 1910 vice president of

the Royal Colonial Institute. He began early to write on military subjects and also on problems of national defense. His *History of Cavalry* (1877) won the prize of 5000 rubles offered by the Czar for the best work on that subject, was translated into Russian and subsequently also into German and Japanese. He also wrote: *The Fenian Raid at Fort Erie* (1866); *Cavalry Charges at Sedan* (1872); *Canada and her Relations to the Empire* (1895); *Soldiering in Canada* (1900); *The Struggle for Imperial Unity* (1909).

DENISON, HENRY WILLARD (1846–1914). An American jurist, born in Guildhall, Vt., and educated in the Lancaster (N. H.) Academy and the Columbian Law College, Washington. In 1869 he was appointed United States Vice Consul to Kanagawa, Japan, and in 1880 left the consular service to become the legal adviser of the Japan Foreign Office. At Portsmouth, N. H., in 1905 he was the representative of Japan in the drafting of the peace treaty with Russia. He became a member of the Permanent Court of Arbitration of The Hague and of the Association de Législation Comparée, Paris, and was decorated with the grand cordons (first class) of the Imperial Japanese Order of the Rising Sun and of the Japanese Order of the Sacred Treasure.

DENISON UNIVERSITY. An educational institution, situated at Granville, Ohio. The university was organized by the Baptist Education Society in 1831 as a manual-labor school, under the name of the Granville Literary and Theological Institution. The manual-labor idea, however, did not prove successful and was soon abandoned. In 1856 the name of the institution was changed to Denison University in honor of William S. Denison, one of its principal benefactors. The theological department was discontinued in 1870. The university offers degrees in arts and science. In 1900 Shepardson College for women, established in 1887, became affiliated with the university. The property value of the two institutions, including their endowment funds, is estimated at about $1,250,000. The university had a registration in 1914 of over 600 students. The library contained about 35,000 volumes besides pamphlets.

DENI'TRIFICA'TION. See NITRIFICATION.

DEN'IZEN (AF. *denzein, denezyn,* OF. *deinz,* Fr. *dans,* within, from Lat. *de,* from + *intus,* within). One who was born an alien (q.v.) to his adopted country, but who has been granted some of the privileges of citizenship. In England "denizen" signifies one who has been admitted to become a citizen by letters patent from the crown, his rights dating from the time when they were conferred; and he is distinguished from a naturalized citizen, whose rights are granted by Parliament and are retroactive, giving him the same status as if he were a natural-born citizen. A denizen in England is also under certain political disabilities as to holding office, and he is subject to certain taxes from which other citizens are exempt. He is said, therefore, to occupy a middle position between an alien and a natural-born or naturalized subject. In the United States the terms "denizen" and "naturalized citizen" are used synonymously, there being no distinction. Naturalization (q.v.) is held here not to be retroactive; but when one becomes a denizen or naturalized citizen, he has from the date of his admission to citizenship practically all the rights and privileges of a natural-born citizen. The Constitution provides that no one not a natural-born citizen may become President, but otherwise there are no constitutional limitations on the rights of a naturalized citizen. See CITIZEN; NATURALIZATION; SUBJECT.

DENIZLI, dĕn'ĭz-lē' (Turk. *deniz,* sea). A town of Asiatic Turkey, in the Vilayet of Smyrna, on the Smyrna-Dineir Railway (Map: Turkey in Asia, C 4). In its vicinity are situated the ruins of ancient Laodicea. The situation of Denizli amid beautiful gardens and vineyards at the base of the Baba Dagh has earned it the title of the "Damascus of Anatolia." It has a bazar, khans, and leather-curing and manufacturing industries. Pop., about 20,000.

DENK, HANS (c.1495–1527). A German Anabaptist. He was born in Bavaria, studied at Ingolstadt, was proof reader in Basel, rector of a school at Nuremberg in 1523, and there met Thomas Münzer, and so first came in contact with Anabaptism, which he accepted with modifications. In consequence he was banished from the city, January, 1524, and forced upon that wandering life which he henceforth led until his death, in Basel, November, 1527. His writings are very scarce. He was essentially a mystic and, like his class, mingled truth and error. For his life, consult L. Keller (Leipzig, 1527).

DEN'MAN, THOMAS, BARON (1779–1854). An English jurist. He was born in London, educated at Cambridge, and was called to the bar in 1806. On the accession of George IV he was appointed Solicitor-General to the Queen, and in conducting her defense won a considerable reputation both as a lawyer and as a speaker, but earned the enmity of the King, who for some time thereafter opposed his advancement. In 1818 he was elected to Parliament, and took a seat with the Whig Opposition, serving there until 1826 and being returned again in 1830. In the latter year he was made Attorney-General, and two years later became Lord Chief Justice of the King's Bench. In 1834 he was raised to the peerage. He resigned the office of Chief Justice in 1850 and retired to private life. His character was marked by high moral and social virtues. As a jurist, he was especially interested in the subject of law reform and instituted important changes in the code. He also strove with great energy, both as a writer and as a judge, to effect the abolition of the slave trade.

DENMAN, WILLIAM (1870–). An American lawyer, born in San Francisco, Cal. A graduate of the University of California (1894) and of Harvard Law School (1897), he became a prominent member of the California bar. He defended the eight-hour law for women, was counsel in various important admiralty cases, and served as assistant professor of law and lecturer at the Hastings College of Law and the University of California. In 1908–10 he was chairman of a committee appointed by the mayor of San Francisco to report on causes of municipal corruption. A movement which he organized in 1908 to secure nonpartisan election of judges resulted in the passage of a law to this end in 1911. He also drafted a nonpartisan majority election law, which is now part of the San Francisco charter.

DEN'MARK. The smallest of the three Scandinavian kingdoms of Europe (Map: Eu-

DENMARK
WITH
SCHLESWIG-HOLSTEIN
SCALE OF MILES
0 10 20 30 40 50
SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80
ICELAND
SCALE OF MILES
0 20 40 60 80
Important towns are shown in heavy face type
Railways shown thus
Canals
FAERÖER
(FARÖE IS.)
SCALE OF MILES
0 10 20
Longitude West from Greenwich
JUTLAND
FUNEN
SEELAND
THISTED
ÅLBORG
VIBORG
RANDERS
ÅARHUS
HORSENS
VEILE
HOLSTEBRO
RINGKJÖBING
THE SKAGER RACK
THE KATTEGAT
THE BALTIC SEA
THE NORTH SEA
ATLANTIC OCEAN
ARCTIC OCEAN
ARCTIC CIRCLE
REYKJAVIK
FREDERIKSHAVN
FREDERIKSBORG
COPENHAGEN
(Kjöbenhavn)
ANHOLT
HESSELÖ
HELSINGÖR
(Elsinore)
HELSINGBORG
MALMÖ
LUND
KRISTIANSTAD
CHRISTIANSTAD
LANDSKRONA
HALMSTAD
HALLAND
SKÅNE
SWEDEN
STROMÖ
VAAGÖ
BORÖ
OSTERÖ
NOLSÖ
SANDÖ
SKUVÖ
SYDERÖ

NORTH SEA
BALTIC SEA
Esbjerg
FANO
Sönderho
Southern Boundary of Denmark
Graa Deep
Listerdyb
Elbogen
Lister Deep
ROMÖ
SYLT
Westerland
Keitum
Rantum
Morsum
Horsbüll
FÖHR
Wyk
DIE HALLIGEN
AMRUM
Föhrer Deep
Rugter Deep
NORTH FRISIAN ISLANDS
HELIGOLAND
HELIGOLAND (Ger.)
HELIGOLAND BAY
Hitzbank
EAST FRIESIAN IS.
NEUWERK
DIEKSAND
HELMSAND
Friedrichskoog
St. Michaelis-Donn
Cuxhaven
Otterndorf
Neuhaus
Glückstadt
Brunsbüttel
R. Elbe
The Jade
R. Weser
Bederkesa
Bremerhaven
Nordenhasi
Oldenburg
Bremervörde
Stade
Altona
Hamburg
Harburg
Lüneburg
Reinbeck
Schwarzenbeck
Ratzeburg
Schwerin
Crivitz
Gadebusch
Wismar
Wismar Bay
Neustadt Bay
Travemünde
Lübeck
Eutin
Plön
Preetz
Kiel
Kiel Bay
Holtenau
Laboe
Schönberg
Colberg Heath
Holwachter Bay
Eckernförde
Schleswig
Flensburg
Husum
Tönning
Rendsburg
Neumünster
Itzehoe
Wilster
Meldorf
Heide
Wesselburen
Wöhrden
Büsum
Hademarschen
Nortorf
Bornhöved
Segeberg
Bad Oldesloe
Ahrensbök
Eutin
Oldenburg
Dahmeshoved
Fehmern
Staberhuk
Fehmern Sound
Fehmern Belt
Darser Ort
Marketdorf Huk
Petersdorf
Flügge
Burg
Orth
Kiel Haven
Langeland
Svendborg
Gudbjerg
Sydfyn
Fyn
Nyborg
Odense
Middelfart
Horsens
Aarhus
Aalborg
Randers
Viborg
Skive
Holstebro
Esbjerg
Ringkjöbing
Ringsted
Sorö
Korsör
Slagelse
Kalundborg
Roskilde
Kjöge
Kjöge Bay
Falsterbo
Stevns Klint
Rödvig
Faxe
Præstø
Præstø Fjord
Vordingborg
Vordingborg B.
Möen
Möns Klint
Jungsberg
Gedser
Gedser Odde
Gjedser
Rödby
Rödby Fjord
Lolland
Laaland
Falster
Nakskov
Nakskov Bay
Kramnisse Gab
Sydhavn
Lolland Nor
Lolland Ridge
Bytlekrog
Kjöbing
Guldborg Sund
Grönsund
Vejrø
Vejrø Bay
Zealand
Sjælland
Stillinge B.
Ringsted
Sadler
Store Heddinge
Rodvig
Stevns Klint
Falsterbo
Ystad
Simrishamn
Ronne
Hammeren
Hammershus
Allinge
Sorte Odde
Hasle
Bornholm
Svaneke
Nexö
Aakirkeby
Rönne
Christiansö
Gotland
Visby
Visby Bay
Faludden
Hoburgen
Ronehamn
Slite
Fårösund
Nord Kalk
Hoburg Bank
Stolpe Bank
Stolpe Deep
Gotland Deep
Landsort Deep
Aland Islands
Mariehamn
Aland Sea
Aland Deep
Tryggeen
Marstrand
Arø Deep
Weno
Horup Haff
Knudshoved
Apenrade
Hadersleben
Tondern
Ribe
Ribe Fl.
Gram
Skjoldenæsholm
Kalundborg
Odden
Marsø
Rørvig
Nykjöbing
Kjöbing
Sakskjöbing
Rudkjöbing
Svendborg
Gudbjerg
Sydfyn
Nyborg
Odense
Middelfart
Horsens
Aarhus
Aalborg
Randers
Viborg
Skive
Holstebro
Esbjerg
Ringkjöbing
Ringsted
Sorö
Korsör
Slagelse
Kalundborg
Roskilde
Kjöge
Kjöge Bay
Falsterbo
Stevns Klint
Rödvig
Faxe
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Præstø Fjord
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Vordingborg B.
Möen
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Hadersleben
Tondern
Ribe
Ribe Fl.
Gram
Skjoldenæsholm
Kalundborg
Odden
Marsø
Rørvig
Nykjöbing
Kjöbing
Sakskjöbing
Rudkjöbing
Ruden
Darsser Ort
Zingst I.
Stralsund
Barth
Ribnitz
Rostock
Warnemünde
Rügen
Prussia
Pomerania
Mecklenburg
Lauenburg
Ratzeburg
Schwerin
Crivitz
Gadebusch
Wismar
Wismar Bay
Neustadt Bay
Travemünde
Lübeck
Eutin
Plön
Preetz
Kiel
Kiel Bay
Holtenau
Laboe
Schönberg
Colberg Heath
Holwachter Bay
Eckernförde
Schleswig
Flensburg
Husum
Tönning
Rendsburg
Neumünster
Itzehoe
Wilster
Meldorf
Heide
Wesselburen
Wöhrden
Büsum
Hademarschen
Nortorf
Bornhöved
Segeberg
Bad Oldesloe
Ahrensbök
Eutin
Oldenburg
Dahmeshoved
Fehmern
Staberhuk
Fehmern Sound
Fehmern Belt
Darser Ort
Marketdorf Huk
Petersdorf
Flügge
Burg
Orth
Kiel Haven
Langeland
Svendborg
Gudbjerg
Sydfyn
F

rope, D 3, and special map). It comprises the northern portion of the Cimbrian peninsula, called Jutland, the Danish Archipelago east of the peninsula, the island of Bornholm, and the Faroe Islands, making a total area of 15,582 square miles. Not reckoning the Faroe Islands, it lies between lat. 54° 33′ and 57° 45′ N. It is almost surrounded by the sea, Jutland being connected with the Continent only at the southern frontier, in which place the peninsula is less than 40 miles wide.

Topography. The west and northwest coasts of Jutland, which are washed by the North Sea and the Skagerrak, are low and girt by dunes and sand bars. Behind the dunes there are several large lagoons or inclosed bays, but they are usually too shallow to serve as harbors. The north extremity of Jutland is formed by the Skagen, a long, curved sand spit. The east coast along the Cattegat lies at a somewhat higher level and is indented by a series of inlets (fjords) that penetrate deeply into the interior; Limfjord, the most northerly, reaches across the peninsula and communicates through a tortuous course with the North Sea. Some of the inlets may be entered by ships of light draft. Between the south of Jutland and the south extremity of Sweden are Fyn and Zealand, the largest islands of Denmark, dividing the outlet of the Baltic into three passages—the Little Belt, between Jutland and Fyn; the Great Belt, separating Fyn and Zealand; and the Sound between Zealand and Sweden. Both islands have an irregular and sandy coast line. The surface of Denmark is uniformly low. A ridge of hills crosses the middle portion of Jutland from the southern frontier to the Limfjord, of which the highest point, Himmelberg, near Aarhus, a little more than 500 feet, is not exceeded. The ridge constitutes the water parting between the North Sea, which receives the Stor Aa, the Lönborg Aa, and the Varde Aa, and the Cattegat, which receives the Guden Aa, the largest river of Denmark, with a length of about 80 miles. Many lakes, characteristic of glaciated areas, abound.

Climate. The climate of Denmark is like that of eastern Scotland, but it is somewhat warmer in summer and colder in winter. The mean temperature at Copenhagen is about 60° F. in summer and about 32° F. in winter. In general the islands have a milder climate than Jutland. In winter the sound and other channels are sometimes filled with drifting ice; the blockade, however, does not continue for any length of time. Heavy rains are frequent in autumn, and mists in summer, especially on the west coast of Jutland. The annual rainfall ranges from 21 to 27 inches.

Flora. The flora of Denmark includes many of the common European plants and a number of species peculiar to the moorlands. Formerly there were extensive forests of beech, but these trees are now practically limited to cultivated lands. Besides the beech the tree most commonly found is the oak. About 5 per cent of the total area is forested.

Fauna. The fauna has no noteworthy characteristics. Fishes and aquatic birds abound. Salmon are found in the Guden Aa and oysters in a few localities. In 1911 the value of the fish caught was $4.193,000.

Geology. With the exception of Bornholm, which belongs physically to Sweden, the entire area of Denmark may be regarded as a continuation of the plains of North Germany. The surface consists of bowlder clay and sand, resting upon stratified rocks of generally Cretaceous age. The clay was deposited during the Pleistocene epoch by the Scandinavian ice sheet. West and north from Jutland there are large tracts of moorlands which yield peat, but no metallic ores occur in any part of the country. Bornholm is formed by Paleozoic and Mesozoic rocks and has the same geological structure as the southern part of Sweden. Kaolin and a poor grade of coal are mined on this island.

Agriculture. Denmark proper is essentially an agricultural country. Nearly 39 per cent of the population are engaged in agriculture. The laws forbid the uniting of small farms into large ones and favor the parceling out of landed estates. The peasant proprietors are consequently increasing both in number and importance. The division of the land into very small holdings is successfully associated with a well-developed system of coöperation, which enables small farmers to use the most improved and expensive machinery, etc. Tenants in good standing have absolute charge of their land. About 75 per cent of the total area of the country is productive land (not including woodland). In 1907, of the total area of 3,896,870 hectares, 1,122,761 were under cereals, 308,362 under roots, etc., 27,247 under other crops (excluding hay), 230,413 fallow, etc., 1,229,585 in herbage and pasture; of the remaining 978,502 hectares, 324,241 were woodland (including public parks), 382,450 were not utilized, and 56,459 were inland water. In 1912, 40,512 hectares were sown to wheat, yielding 983,875 metric quintals; rye, 276,009 hectares, 4,799,236 quintals; barley, 233,714 hectares, 5,439,031 quintals; oats, 402,939 hectares, 7,520,-647 quintals; sugar beet, 30,300 hectares, 9,860,-071 quintals. The production of raw sugar in 1912 was 1,530,000 quintals. (Hectare = 2.47 acres; quintal = 220.5 pounds.) Stock raising is an important industry. In 1910 horses numbered 535,018, cattle 2,253,982, sheep 726,829, goats 40,257, and swine 1,467,822.

Manufactures. The manufacturing industries are chiefly on a small scale. The industrial census of 1906 gives the number of establishments as 85,242, with a *personnel* of 317,086, of whom 208,444 were industrial laborers. Of these establishments but 1248 had between 21 and 100 hands, and only 218 over 100 hands each; 12,379 establishments, with 80,106 workers (out of the 208,444), were in Copenhagen. The principal manufactures are furniture, foodstuffs, articles of apparel, metal products, and porcelain. The textile industries are confined chiefly to the rural districts. Manufacturing is increasing in importance, partly in consequence of the industrial schools. Most of the important plants are in Copenhagen. In 1911 the distilleries in the whole country numbered 27, and their output of spirit (reduced to 100 per cent) amounted to 15,550,000 liters. In that year 1,115,000 hectoliters of excisable beer were produced and 1,550,000 hectoliters nonexcisable, 116,150 metric tons of sugar, and 35,400 metric tons of margarine. There is some manufacturing of machinery and also a little iron smelting. The industrial joint-stock companies of Denmark are a significant feature in its manufacturing development.

Transportation and Communication. Most of the towns of Denmark are situated on the coast or on navigable rivers. Steamboats ply

constantly between the islands. At the end of 1911 there were, outside of Copenhagen, 4344 miles of road and over 22,500 miles of byways. The first railway within the present confines of the country (Copenhagen-Roskilde) was constructed by a private company and opened for traffic in 1847. Prior to 1880 the state railway lines were confined to the mainland and the island of Fyn, while private companies controlled all lines on the islands of Seeland, Lolland, and Falster. In 1880 an Act was passed authorizing the acquisition of the Seeland lines. At the end of 1911 the length of railway open to traffic was 3691.3 kilometers (2293.7 miles), of which 1922.8 kilometers were owned by the state and 1768.5 by private companies. The cost of the state lines to the end of the fiscal year 1912 is stated at 270,649,217 kroner. (Krone = $0.268.) In 1913 the state telegraph lines had a length of 3621 kilometers, with 13,005 kilometers of wire and 1017 offices; there were 8 wireless telegraph stations besides 19 on board ship.

The merchant marine (including vessels of over 4 tons' register) on Jan. 1, 1913, comprised 642 steamers, of 415,436 tons' register, and 2062 sail, of 91,188 tons; total, 3564 vessels, of 522,143 tons. In the foreign trade there entered at Danish ports, in 1912, 38,667 vessels, of 4,387,258 tons (steam, 23,074 vessels, of 3,741,958 tons), and cleared 39,339 vessels, of 1,623,077 tons (steam, 23,578, of 1,399,639 tons).

Commerce. Although the foreign trade has not grown at so rapid a rate as that of some other countries, Denmark has had, nevertheless, a fair share in the modern commercial expansion of the world. In 1875 imports for consumption and exports of domestic produce (i.e., the special trade) amounted to $62,617,500 and $46,122,800 respectively; in 1890, $82,276,000 and $32,658,400; in 1900, $111,541,600 and $75,549,200; in 1905, $129,430,600 and $104,761,200; in 1910, $154,680,500 and $130,080,200; in 1912, $197,962,200 and $159,921,800. The development in both import and export values has been notable since 1900. The leading imports are cereals, oil cake, metals and hardware, textile manufactures, coal, wood manufactures, and timber. The principal exports are as follows (the values being for 1912): butter, $51,211,584; meat (largely bacon), $47,249,792; live stock, $14,521,580; eggs, $7,289,868; hides, 4,168,740. The general commerce (which includes, besides the special trade, imports of foreign merchandise for reëxportation) in 1912 amounted to $219,093,216 for imports and $182,797,976 for exports. In the general commerce of 1912 imports from and exports to the United Kingdom were valued at $36,417,716 and $9,999,872 respectively; Germany, $84,217,928 and $48,681,128; Sweden, $18,508,080 and $8,938,336; Norway, $2,456,488 and $4,968,988; Russia, $15,054,900 and $4,380,996. Imports from North America were $19,474,220, while the exports thereto were only $3,118,716. The largest share of the imports comes from Germany, and that of the exports goes to the United Kingdom. Imports from and exports to the United States in 1912 amounted to $15,767,348 and $2,832,418.

Banks. The only bank of issue is the National Bank at Copenhagen (established 1818); in 1912 its assets and liabilities balanced at 208,205,596 kroner. At that time there were 135 other banks, for general commercial and industrial purposes. The assets and liabilities of the 136 banks (including a number of affiliated institutions) balanced at 1,440,111,119 kroner, of which 1,068,892,157 kroner represented 12 banks at the capital (i.e., Copenhagen with Frederiksberg). The note issue amounts to about 154,000,000 kroner. At the end of the fiscal year 1911 there were 521 savings banks, with 1,353,384 depositors and deposits amounting to 803,007,171 kroner. The number of deposits was equal to nearly 49 per cent of the number of inhabitants; the average deposit was about 593 kroner, or $159.

Government. Denmark is a constitutional monarchy, hereditary in the male line of the house of Schleswig-Holstein-Sönderburg-Glücksburg. The constitution bears date of June 5, 1849, revised July 28, 1866.

The lawmaking power is vested in the king and in the Rigsdag, or parliament. The Rigsdag consists of the Landsthing, or upper house, and the Folkething, or popular chamber. The Landsthing is composed of 66 members, of whom 12 are appointed for life by the crown, and the remainder are chosen for a term of eight years, partly by the representatives of the highest taxpayers in the towns and rural districts and partly by the representatives of the people at large. The Folkething is composed of 114 deputies, elected for three years by all male citizens of 30 years or over not in receipt of public charity or engaged in menial household service and resident for a year in the district in which they enroll. While 30 is the age of franchise, 25 is that of eligibility to either house of parliament. Legislation may be initiated in either house, but financial bills must be submitted in the first instance to the Folkething, and only on the initiative of the executive. In practice the Landsthing enjoys a very large degree of influence, owing to its feature of comparative permanency; and in conjunction with the king, who wields an absolute veto on legislation, it is frequently in the position of directing the action of parliament. The executive power is vested in the king, who acts through a council of nine responsible ministers, who preside over the departments of Foreign Affairs, Finance, Interior, Justice, National Defense, Public Instruction and Worship, Agriculture, Public Works, and Commerce and Navigation. There is also a minister for Iceland.

Justice is administered in the first instance by the judges of the hundreds in the rural communities and by the city magistrates in the urban districts. Appeals from such courts lie to the superior courts of Viborg and Copenhagen, and in the last resort to the Supreme Court of 24 judges (Höjesteret) at Copenhagen. Together with four judges especially appointed by the Landsthing, the Supreme Court sits as a tribunal for the cases of impeached ministers.

Army and Navy. The Danish army is raised by conscription from among all citizens above the age of 20. Substitution is not permitted. The terms of service are eight years with the regular army and its reserve and eight years with the supplementary reserve. The standing army in 1913 approximated 975 officers and 13,200 men. The war footing of the nation is placed at about 84,000 men. The infantry is armed with the Krag-Jorgensen rifle, and the cavalry with the Remington carbine. The field artillery is armed with a Krupp gun firing a 14.88-pound shell. The navy is maintained only for purposes of coast defense. It consists of

several monitors, torpedo gunboats, torpedo boats, submarines, etc.

Finance. The standard of value is gold. The monetary unit is the krone (crown), par value 26.799 cents. Revenue and expenditure in the fiscal year 1910 were 81,948,924 and 113,120,921 kroner respectively; in 1911, 90,903,801 and 119,902,100; in 1912, 101,404,844 and 118,754,904. The budget for the fiscal year 1914 showed estimated revenue and expenditure of 112,214,910 and 104,804,334 kroner respectively. Indirect taxes (customs and excise) were estimated at about 60,000,000 kroner and direct taxes at about 35,000,000. A considerable reserve fund is maintained for emergency. At the end of the fiscal year 1913 the public debt was: foreign, 272,287,250 kroner; interior, 84,352,218; guaranties, 1,401,455; total, 358,040,923. Service of the debt (1914 budget), 12,337,162 kroner.

Colonies. Iceland, Greenland, the Faroes, and the West Indian islands of St. Croix, St. Thomas, and St. John belong to Denmark. The Faroes are not a colony, but form a department, or amt, of the kingdom and are represented in the parliament; however, their area (540 square miles) and population (18,000 in 1911) are not included with Denmark proper. Iceland has a parliament of its own. The area of Iceland is 40,457 square miles; its population in 1911 was 85,188. Greenland, whose commerce is a state monopoly, is directly under the home government. The area of the island of Greenland is not known with accuracy, but may be placed at about 889,400 square miles; the administered area, in the southwest part, is estimated at 34,015 square miles: pop., 1911, 13,462. The Danish West Indies have consultative representation in the administration directed by the home government. Their area is 139 square miles; pop., 1911, 27,104. See ICELAND; GREENLAND; ETC.

Population. The population of Denmark proper in 1801 is stated at 929,001; in 1840, 1,289,075; in 1880, 1,969,039; in 1890, 2,172,380; in 1901, 2,449,540; in 1906, 2,588,919; in 1911, 2,757,076; 1921, 3,268,807. By insular and mainland divisions the area and the population in 1901 and 1911 (census of February 1) are shown in the following table:

	Sq. miles	Pop. 1901	Pop. 1911
Islands:			
Zealand	2,895	960,053	1,096,897
Bornholm	227	40,889	42,885
Lolland-Falster	692	105,021	115,658
Fyn	1,341	279,785	303,179
Total islands	5,155	1,385,748	1,558,619
Jutland:			
Southeast Jutland	2,827	430,549	482,264
Southwest Jutland	4,144	313,764	364,620
North Jutland	2,920	319,479	351,573
Total Jutland	9,891	1,063,792	1,198,457
Denmark proper	15,046	2,449,540	2,757,076
Faroes	540	15,230	18,000
Total	15,586	2,464,770	27,75,076

The following table shows the population of the capital (Copenhagen with Frederiksberg), of other towns, and of the rural communes. The more rapid urban growth, as compared with the rural, is marked.

YEAR	Capital	Other towns	Rural comms.	Total
1870	198,169	245,298	1,341,274	1,784,741
1890	359,813	362,431	1,450,136	2,172,380
1901	476,806	482,099	1,490,635	2,449,540
1906	514,134	509,200	1,565,585	2,588,919
1911	559,398	550,328	1,647,350	2,757,076

Of the total population in 1911, 1,337,900 were male and 1,419,176 female. In respect of religion the population is remarkably homogeneous, the number returned in 1911 as of the national church (Lutheran) being 2,715,187. Roman Catholics numbered 9821, Anabaptists 5664, and Methodists 4284. The inhabitants born in Denmark numbered (1911) 2,655,522; Germany, 34,535; Sweden, 33,312; Norway, 4696. In 1912 marriages numbered 20,413; births and deaths (each including stillbirths), 76,405 and 38,170 respectively; excess of births, 38,235; emigrants, 8636. Population of the larger cities and towns in 1911: Copenhagen, 462,161; Frederiksberg (suburb of Copenhagen), 97,237; Aarhus, 61,755; Odense, 42,237; Aalborg, 33,449; Horsens, 23,843; Randers, 22,970; Esbjerg, 18,208; Vejle, 17,261; Fredericia, 14,228; Kolding, 14,219; Helsingör, 13,783; Svendborg, 12,667.

The Danes are a Teutonic people of the Scandinavian group. Height, 1.685 meters; hair, wavy, light brown or chestnut; eyes blue; complexion pale white, swarthy, or very light brown. Primary education is free and compulsory between the ages of 7 and 14 and is very thoroughly diffused. There are numerous secondary schools. Denmark has one university, that of Copenhagen (about 3000 students). There are also an agricultural and veterinary college, 19 agricultural or horticultural schools, the Royal Academy of Art (founded in 1754), the Polytechnic Institute, a college of pharmacy, and about 100 technical and commercial institutions.

History. Of the primitive history of Denmark little is known. The kitchen middens and other primitive remains indicate the early presence of paleolithic man in the Danish peninsula. The sagas hand down myths and traditions of later but still early ages, when the original inhabitants had been crowded out by wandering tribes of Germanic stock, and Jutland and the islands had become the homes of Saxons, Angles, and Jutes. This was probably completed about the second century of our era, but was followed by an invasion of the Danes in the fifth and sixth centuries. Less influenced than the other Teutonic peoples by the Romans, the inhabitants in the Scandinavian countries developed a striking and characteristic civilization, marked by a warlike and adventurous spirit, which sent them as Vikings and conquerors over all Europe and as far as America. Christianity was preached by Ansgar in Denmark in the ninth century, but the conversion of the land dates from the second half of the tenth century. After the ninth century we find a united Danish kingdom growing out of the petty principalities into which the country was divided. We hear of Danish kings as early as the eighth century, but know little of them; in the tenth century Gorm the Old is said to have been a bitter opponent of Christianity; but the first Danish ruler of prominence was Svend (Sweyn) I, of the Forked Beard (985 or 986–1014), a redoubtable sovereign who for a brief

period imposed his yoke upon England. Svend's son, Knut or Canute (died 1035), King of England and Denmark (see CANUTE), was a really great sovereign, under whom the conversion of the Danes to Christianity was completed, and much was done to civilize the kingdom and bring it into order. After his death the northern empire which he had created fell apart, and the Odinic dynasty of the Skjoldungs became extinct in 1047.

Svend Estridsen, son of Knut's sister, now ascended the throne. Internal dissensions and external wars led here as elsewhere to the introduction of a feudal system. A new era of brilliant achievements began with Valdemar I the Great (1157–82) and continued under Knut VI (1182–1202) and Valdemar II the Victorious (1202–41). These kings extended the conquests of Denmark far into German and Wendic lands and made the Baltic little more than a Danish sea. The jealousy of the German princes and the treachery of his vassals combined to rob Valdemar II of these conquests. His death in 1241 was followed by a century of anarchy, during which the kingdom was brought near to destruction under the vicious rule of his sons and grandsons. Under Valdemar III (1340–75), the last of the Estridsen line, Denmark recovered for a time the conquests of the elder Valdemars, and the national laws were collected into a well-digested code. From 1375 until 1412 Valdemar's daughter, the great Margaret, ruled Denmark, at first as Regent for her young son Olaf and after his death as Queen. Denmark, Norway, and Sweden were united under her sovereignty, and this was confirmed in 1397 by the act known as the Union of Kalmar. Margaret's successor, Erik (1412–39), the son of her niece, undid her work with fatal rapidity, lost his triple kingdom, and died in obscurity. After the short reign of his nephew, Christopher of Bavaria, the Danes, on the death of the latter in 1448, reasserted their ancient right of election to the throne and chose for their King Christian of Oldenburg, a descendant of the old royal family through his maternal ancestress, Richiza, the great-granddaughter of Valdemar II. Christian I was the father of the Oldenburg line, which continued unbroken till the death of Frederick VII in 1863. Christian was chosen ruler by the estates of Schleswig and Holstein in 1460, promising for his successors that they should forever leave the two lands united. As rulers of Holstein (which was included in the Holy Roman Empire), the kings of Denmark became members of the Germanic body. Christian I's reign was followed by half a century of continuous warfare and anarchy in Scandinavia. The tyranny of Christian II (1513–23) cost him his throne. His bloody atrocities in Sweden were followed by the successful vindication of the independence of that country by Gustavus Vasa. Christian's subjects chose his uncle, Frederick I (1523–33), to be their King, while Sweden was forever separated from Denmark. Under Christian II Denmark first began to enter into extensive treaty relations with other European states. Christian III (1534–59), in whose reign the Reformation was established, united the Schleswig-Holstein duchies in perpetuity to the crown. His partition of the greater part of these provinces among his brothers became a source of much mischief. Frederick II (1559–88) further complicated matters in regard to the duchies by making additional partitions in favor of his brother, the founder of the Holstein-Sönderburg family. He was succeeded by Christian IV (1588–1648), who was one of the ablest of Danish rulers, although his foreign wars were disastrous, while his liberal and wise internal policy was cramped in every direction by the nobles. He fought for Protestantism in Germany in the Thirty Years' War and was utterly defeated. Towards the end of his reign he engaged in an unsuccessful war against Sweden, which now became the dominant power on the Baltic. In the reign of Christian's son, Frederick III (1648–70), Denmark had to surrender all her possessions in the Swedish portion of the Scandinavian peninsula.

In 1660 Frederick III, with the assistance of the clergy and the burghers, who had joined him in opposing the pretensions of the nobles, declared the crown hereditary and the royal authority absolute and ushered in a new régime. The power of the nobility was reduced, but the peasantry and burghers profited little by the change. Many improvements were, however, effected in the mode of administering the laws, and the Danish kings, although autocrats, exercised a mild rule. The abolition of serfdom was begun in 1767 by Christian VII (1766–1808), but was not finally completed till 20 years later; it was extended to the Schleswig-Holstein duchies in 1804. The misfortunes due to the relations maintained by Denmark with Napoleon brought the country to the verge of ruin, by plunging it into war with Sweden, England, Russia, and Prussia, and although it speedily rallied from the losses inflicted in 1801 by the battle of Copenhagen, the fresh rupture with the Allies, which ended in the compulsory surrender to the English of the entire fleet, after the destructive bombardment of Copenhagen (September, 1807), completely paralyzed the nation. By the Peace of Kiel in 1814 Frederick VI of Denmark (1808–39) was compelled to cede Norway to Sweden. The discontent that had long been prevailing in Schleswig and Holstein developed after 1830 into mutual animosity between the Danish and German population. The anticipated failure of heirs to the throne complicated the questions at issue, and in 1848, immediately after the succession of Frederick VII, the German element in Schleswig and Holstein, being encouraged by the Frankfort Parliament (which voiced the revolutionary movement in Germany), and perhaps still more by Prussia, rose in arms against Denmark. After alternate hostilities and armistices the first Schleswig-Holstein War, in which the Danish troops fought bravely against the forces of Prussia and other German states and of the rebellious duchies, terminated in 1851, Prussia having abandoned the cause of the duchies, and Austria and Prussia having intervened to restore the former order. The liberal constitution which Frederick VII had in the meantime granted to his subjects did not reconcile the Germans in Schleswig-Holstein.

On the death, in 1863, of Frederick VII, Christian of Schleswig-Holstein-Sönderburg-Glücksburg ascended the throne under the title of Christian IX (q.v.) in conformity with the act known as the Treaty of London (1852), by which the European Powers had settled the succession to the Danish crown on him and his descendants by his wife, Princess Louise of Hesse-Cassel, niece of King Christian VIII of Denmark. With Frederick VII the direct Oldenburg line had expired, and at his death the ques-

tion of the succession to the duchies acquired an importance which it had never before possessed. Schleswig and Holstein declared for Prince Frederick of Augustenburg, a scion of a branch of the Oldenburg line, and appealed to the Germanic Confederation for support. The Germanic Diet sent an army into Holstein. Prussia and Austria had in the meantime concerted with each other to take the settlement of the Schleswig-Holstein affair into their own hands. Christian IX, reflecting upon the way in which the cause of the duchies had been betrayed by the German Powers in the War of 1848–51 and relying upon the support of England, allowed himself to be dragged into a war single-handed with Prussia and Austria, whose forces advanced into Schleswig in February, 1864. After a brave but utterly futile attempt at resistance the Danes saw their country overrun by the troops of Prussia and Austria, and by the Treaty of Vienna (Oct. 30, 1864) were forced to submit to the terms exacted by their powerful foes, and resign not only Holstein and Lauenburg, but the ancient crown appanage of Schleswig into the hands of the two Powers. As a result of the War of 1866 the duchies became permanently possessions of Prussia. The record of political occurrences in Denmark after 1864 was mainly concerned with the struggle between the Conservative and Liberal parties, the rise of a powerful Democratic party, and the development of the system of parliamentary government. In 1904 a special minister for Iceland resident at Reykjavik was created. On Jan. 29, 1906, the aged Christian IX died. He was succeeded by his son Frederick VIII (q.v.), whose second son Charles had been elected in the preceding year to the throne of Norway as Haakon VII. The new King proved immensely popular with his people and by his unpretentious and democratic ways stemmed the growing tide of Danish radicalism. On May 14, 1912, while visiting Hamburg incognito, he fell suddenly dead, his body being carried to the morgue as an unrecognized man. His son succeeded as Christian X and immediately found himself face to face with a Folkething that in 1913 passed a woman's suffrage bill and a further act depriving the King of his right of nominating certain members of the national legislature.

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DEN'NER, Balthasar (1685–1749). A German portrait and miniature painter. He was born at Hamburg and studied in Altona under Amann, in Danzig and afterward at the Berlin Academy. He is said to have painted good portraits when only 14 years of age. Rapidly acquiring reputation, he was invited to several European courts and painted the portraits of many princes and other distinguished persons of his time, including the Duke of Holstein-Gottorp, later Czar Peter III, King Christian VI of Denmark (Museum, Christiania), the poet Hagedorn, and many of the aristocracy of England, where he lived seven years. His chief peculiarity consisted in the fineness of his mechanical finish, which extended to depicting even the almost invisible furze of hair growing on smooth skin. He is particularly noted for his heads of old men and women. The Emperor Charles VI paid 4700 florins for a "Head of an Old Woman" by this artist. This and its companion piece, the "Head of an Old Man," are in the Vienna Museum. Specimens of his art are to be found in most of the principal galleries in Europe, especially at St. Petersburg.

DENNERY, dĕ'n'-rē', or **D'ENNERY,** Adolphe Philippe (1811–99). A French dramatist of versatile facility, born in Paris. He wrote or collaborated in nearly 200 plays. The more noteworthy of his dramas are: *L'Honneur de ma fille* (1835); *La perle de Savoie* (1842); *La Case d'Oncle Tom* (1853), a French version of the famous American novel; *Les deux orphelines* (1873), which as *The Two Orphans*, played for many years by Kate Claxton, has been exceedingly popular in the United States. Consult Jules Lemaître, *Opinions à répandre* (Paris, 1900).

DENNETT, Richard Edward (1857–). An English writer on the peoples of Africa. He was born in Valparaiso, the son of an English clergyman, and was educated at Marlborough College. At the age of 18 he became a clerk in a mercantile house and in 1879 went to Africa on business. About 1886 he began to attack the administration of the Congo Free State and soon afterward started a manuscript newspaper called the *Congo Mirror*. His agitation led to the organization of the Congo Reform Association. In 1902 he joined the Nigerian Forest Service, of which he became deputy chief conservator. His valuable books on native life in Africa include: *Seven Years among the Fjort* (1887); *At the Back of the Black Man's Mind* (1907); *Nigerian Studies, or the Religious and Political System of the Yoruba* (1910); *West African Categories* (1912).

DENNEWITZ, dĕn'*e*-vĭts. A small village in the Province of Brandenburg, Prussia, 42 miles south-southwest of Berlin. Here was fought, on Sept. 6, 1813, a battle between 70,000 French, Saxons, and Poles, commanded by Marshal Ney, and 50,000 Prussians, under Generals Bülow and Tauenzin. The fighting was obstinate to the last degree, and both armies more than once drove each other from their positions. Ney's army was finally defeated. The French lost 15,000 killed, wounded, and prisoners, and 43 pieces of cannon. The Prussians lost about 9000. The most important feature of this victory to the Prussians was that most of their troops were *Landwehr* ('militia'), for whom Napoleon had expressed the utmost contempt, designating them as "rabble."

DEN'NEY James (1856–1917). A Scottish Free church theologian and New Testament scholar. He was born in Paisley and was educated at Glasgow University and at the Free Church College, where, after 11 years (1886–97) as pastor in Broughty Ferry, he became professor of New Testament language, literature, and theology. His exegetical and theological works include: *The Epistle to the Thessalonians* (1892) and *Second Corinthians* (1894) in the "Expositor's Bible"; *Studies in Theology*

(1895); *The Epistle to the Romans* (1900) in "Expositor's Greek Testament," probably his most important commentary; *The Death of Christ* (1902) and *The Atonement and the Modern Mind* (1903), perhaps his greatest theological work; *Jesus and the Gospel* (1909); *The Way Everlasting* (1911), a volume of sermons.

DENNEY, JOSEPH VILLERS (1862–). An American rhetorician and university dean, born at Aurora, Ill., where, after graduating from the University of Michigan in 1885, studying law, and being engaged in newspaper work, he was principal of the high school (1888–90). He taught for a year at the University of Michigan and then went to Ohio State University to be associate professor of rhetoric (1891–94), professor of rhetoric and English literature (1894–1904), dean of the College of Arts, Philosophy, and Science (after 1901), and professor of English (after 1904). He also lectured at Columbia University in the summers of 1908 and 1911. Besides contributions to various journals, his writings include: *Burke's Conciliation Speech* (1898); *American Public Addresses* (1909); *Four Idylls of the King* (1911); *Washington, Webster, Lincoln* (1911); *Argumentation and Debate* (1911). In collaboration with Fred N. Scott he also wrote *Paragraph Writing* (1893); *Composition-Rhetoric* (1897); *Elementary English Composition* (1900); *Composition-Literature* (1902), and with Silas B. Tobey, *English Grammar, Designed for Intensifying the Study of English Grammar in Grammar Grades* (1913).

DEN'NIE, JOSEPH (1768–1812). An American journalist, born in Boston, Mass. He graduated at Harvard in 1790, studied law at Charlestown, N. H., and was admitted to the bar. From 1795 he devoted himself mainly to literature and journalism. He edited the *Farmer's Weekly Museum*, in Walpole, N. H., one of the first experiments in departmental journalism. He attained considerable reputation also as an essayist through *The Lay Preacher* (1796). In 1798 Dennie was nominated for Congress, but was defeated, and afterward went to Philadelphia as private secretary to Timothy Pickering, then Secretary of State (1799). Here he edited *The United States Gazette* and afterward established and conducted until his death *The Portfolio* (1801). This weekly became a monthly in 1806 and enjoyed high reputation. Its contributors included Brockden Brown and J. Q. Adams. Dennie wrote under the pseudonym of Oliver Old School, and he performed some service in keeping the cause of letters alive in America at a very gloomy period. His Addisonian compositions have long remained unread, but his *Portfolio* is of considerable value to students of the period.

DEN'NIS, FREDERIC SHEPARD (1850–). An American surgeon, born in Newark, N. J. After graduating from Yale University in 1872 and from Bellevue Hospital Medical College (New York University) in 1874, he studied also in England at the Royal College of Surgeons, by which he was elected a fellow in 1899. He became consulting surgeon to several hospitals in New York and vicinity, and from 1898 to 1910 he served as professor of surgery in Bellevue Hospital Medical College. In 1894 he was president of the American Surgical Association. He edited the *System of Surgery* (4 vols., 1895–96).

DENNIS, JAMES SHEPARD (1842–1914). An American Presbyterian missionary. He was born at Newark, N. J., graduated at Princeton College in 1863 and Theological Seminary in 1867, and was missionary in Syria from 1868 to 1891, during which time he was principal and professor of theology in the theological seminary in Beyrout (1873–91). Besides several theological treatises in Arabic, he published *Foreign Missions after a Century* (New York, 1893); the very elaborate work, *Christian Missions and Social Progress* (vol. i, 1897; vol. ii, 1899; vol. iii, 1906); *Centennial Survey of Foreign Missions* (1902); and *The New Horoscope of Missions* (1908). He was also joint editor of a *World Atlas of Christian Missions* (1911).

DENNIS, JOHN (1657–1734). An English critic and dramatist. He was born in London and graduated at Cambridge in 1679. After further study and foreign travel he devoted himself to literature. His play, *Liberty Asserted* (1704), was received with some favor. He was best known, however, as a political and critical pamphleteer and satirist. He is one of the best-abused men in English literature. Swift lampooned him, and Pope assailed him in the *Essay on Criticism*, and finally "damned him to everlasting fame" in the *Dunciad*. Of his critical writings, the chief is *The Advancement and Reformation of Modern Poetry* (1701). Consult H. G. Paul, *John Dennis: His Life and Criticism* (New York, 1911).

DENNIS, LOUIS MUNROE (1863–). An American chemist, born in Chicago. He graduated from the University of Michigan (Ph.B., 1885; B.S., 1886) and after further study abroad returned to teach chemistry at Cornell University. There he was advanced to a professorship in 1900 and to be head of the department of chemistry in 1903. Besides contributions to American and German chemical journals, he translated Walther Hempel's *Methods of Gas Analysis* (1902; new ed., 1913) and wrote *Chemical Problems in Inorganic Chemistry* (1890); *Elementary Chemistry* (1902) and *Laboratory Manual of Elementary Chemistry* (1902), with Frank W. Clarke; *Manual of Qualitative Analysis* (1902; rev. ed., 1912), with Theodore Whittelsey.

DENNIS, WILLIAM CULLEN (1878–). An American lawyer, born at Richmond, Ind. He graduated from Earlham College in 1896 and from Harvard Law School in 1901. Although admitted to the bar, he did not for some years take up the practice of law, but taught this subject at the University of Illinois (1902–04), Stanford University (1904–05), Columbia (adjunct professor, 1905–06), and George Washington University (professor, 1906–09). From 1906 to 1910 he was also assistant solicitor of the United States Department of State; he represented the United States in the matter of the Venezuela Arbitration, before The Hague Tribunal (1909–10) and in the Chamizal Arbitration with Mexico, before the International Boundary Commission (1910–11); and he acted as secretary to the Chief Justice of the United States in the Panama-Costa Rica Boundary Arbitration. He took up private law practice in 1911 at Washington, D. C.

DEN'NISON. A village in Tuscarawas Co., Ohio, 100 miles northeast of Columbus, on the Pittsburgh, Cincinnati, Chicago, and St. Louis Railroad and on the Panhandle Ohio Canal (Map: Ohio, H 5). The village contains a hospital and public library and has railway work-

shops and sewer-pipe works. Under the Ohio code in 1902 the government of Dennison is vested in a mayor and a unicameral council. Pop., 1900, 3763; 1910, 4008.

DENNISON, Walter (1869–). An American Latin scholar, born at Saline, Mich. He graduated in 1893 from the University of Michigan, where, after studying at the University of Bonn and at the American School of Classical Studies, Rome, he was instructor (1897–99) and junior professor of Latin (1902–10). He also held professorships at Oberlin College (1899–1902) and at the American School of Classical Studies, Rome (1908–09). In 1910 he became professor of Latin and Greek at Swarthmore College. Besides revising Kelsey's *Topical Outline of Latin Literature* (1899) and Frieze's *Virgil's Æneid* (1902), he is coauthor with John C. Rolfe of *A Junior Latin Book* (1898; rev. ed., 1911), and he also edited *Livy, Book I, and Selections from Books II–X* (1908).

DENNISON, William, Jr. (1815–82). An American politician. He was born in Cincinnati, graduated at Miami University in 1835, and practiced law until 1848, when he was elected to the State Legislature. He was Governor of Ohio from 1860 to 1862 and in answer to a call for 11,000 troops raised more than 30,000. From 1864 until his resignation in 1866 he was Postmaster-General in the cabinets of Presidents Lincoln and Johnson. One of the earliest prominent politicians who joined the Republican party, in 1864 he was chairman of the Republican National Convention. He was a benefactor of Dennison University (Granville, Ohio).

DEN'NY, Sir Archibald (1860–). A British marine engineer, born in Dumbarton, and educated there, at the Ecole Cantonal of Lausanne, and the Royal Naval College, Greenwich. He worked in the Leven shipyard and in 1883 joined the firm of William Denny & Brothers, prominent at Dumbarton since the middle of the century. He is an influential member of the Institution of Naval Architects and served on important committees of the British Corporation for the Registration of Shipping. He wrote professional papers for the Institution of Naval Architects.

DENNY, George Hutcheson (1870–). An American Latin scholar and university president, born in Hanover Co., Va. He graduated from Hampden-Sidney College in 1891 and received the degree of Ph.D. from the University of Virginia in 1896, was professor of Latin and German at Hampden-Sidney for three years, and was then called to Washington and Lee University to be professor of Latin, acting president, and (1902–11) president. In 1911 he became president of the University of Alabama. He was president of the Southern Association of Colleges and Preparatory Schools (1905) and of the Coöperative Educational Association of Virginia (1903–12) and chairman of the Virginia State Board of Charities and Corrections (1908–11). He was also chosen (1905) a trustee of the Carnegie Foundation for the Advancement of Teaching. He edited *Cicero's Letters* (1901), contributed "The South in the Building of the Nation" in the *Library of Southern Literature,* and wrote *The Subjunctive Sequence after Adjective and Substantive Predicates and Phrases* (1896).

DENON, *de-nôn'* Dominique Vivant, Baron (1747–1825). A French draftsman, art collector, and writer. He was born at Givry, near Châlons-sur-Saône, Jan. 4, 1747, and came early to Paris. While studying law, he wrote extensively, studied drawing with Noël Hallé, and became a great favorite in aristocratic society. Louis XV made him an attaché to the embassy at St. Petersburg and afterwards Ambassador to Switzerland. Here he repeatedly visited Voltaire at Ferney and painted his portrait and made the drawing "Déjeûner de Ferney" after which the well-known print was engraved. During his seven years' stay with the French embassy in Naples he collected works of art, reproduced the old masters, etched portraits of his contemporaries, and in conjunction with the Abbé Saint-Non published the *Voyage pittorcsque de Naples et de Sicile* (1788). He returned to France during the Revolution and was saved from the guillotine by the painter David, for whom in gratitude he etched the "Oath of the Jeu de Paume." He was chosen by Napoleon to accompany the expedition to Egypt in the capacity of a savant and in 1802 published his *Voyage dans la Basse et la Haute Egypte,* the engravings of which are very correct. Napoleon made him inspector general of museums, in which capacity he showed great ability. He accompanied the Emperor on various subsequent expeditions and suggested to him what art treasures of the conquered cities would be most suitable for the Louvre. After the restoration of the Bourbons he was dismissed from his office. The remaining years of his life were occupied in arranging his private collection and designing the illustrations for a history of art the text of which was furnished by Amaury Duval and published in 4 vols. (1829), under the title *Monuments des arts du dessin chez les peuples tant anciens que modernes.* Denon himself executed more than 300 etchings, which were published in *L'Œuvre originale de Vivant Denon* (1872–73) with introduction by La Frizelère. He designed most of the Napoleonic medals and coins and was one of the first to introduce lithography into France.

DE'NOTA'TION (from Lat. *denotare,* to mark out, from *de* + *nota,* mark). In logic, the group of objects of any one of which any term with a definite meaning can be predicated. Thus, every individual horse, past, present, and to come, is part of the denotation of the term "horse." Denotation and connotation (q.v.) are said to vary inversely, because, in general, with the increase of attributes in the connotation, the objects in the denotation are reduced. The number of bay horses is smaller than the number of horses in general; but the number of qualities connoted by "bay horse" is larger than that connoted by "horse." A *particular* color is included in the former connotation which is not included in the latter. Synonyms of denotation are extension, sphere, breadth. See Logic.

DÉNOUEMENT, *dā'nōō'mäN'* (Fr., an unknotting). In fiction, a term generally applied to the termination or catastrophe of a play or romance. More strictly speaking, it designates the train of circumstances unraveling the plot and hastening the catastrophe. A good dénouement in a novel or play should follow naturally from the plot without being so obvious as to be easily anticipated.

DENS, Peter (1690–1775). A Roman Catho-

lic theologian, born at Boom, in Belgium. He was reader in theology at Mechlin for 12 years and president of the College of Mechlin for 40 years (1735–75). He was also canon, penitentiary, synodical examiner, and archpriest of St. Rombold's—the metropolitan church at Mechlin. The work by which he is best known is the *Theologia Moralis et Dogmatica* (new ed., 8 vols., Dublin, 1832), published under his name in 1777. It is a systematic exposition and defense—in the form of a catechism—of every point of ethics and doctrine maintained by Roman Catholics and has been extensively adopted as a textbook in their colleges. The casuistical parts of the work have been severely criticized by Protestant moralists and were translated in a condensed form by J. F. Berg (Philadelphia, 1840).

DEN'SITY. See SPECIFIC GRAVITY; MOLECULES—MOLECULAR WEIGHTS; VAPOR.

DENT, FREDERICK TRACY (1820–92). An American soldier, born in White Haven, Mo. He graduated at West Point in 1843, was assigned as brevet second lieutenant to the Sixth Infantry, served in the Southern campaign during the Mexican War, and was brevetted first lieutenant and captain for gallant and meritorious conduct at Contreras and Churubusco and at Molino del Rey respectively. He served for 16 years on frontier duty, taking part in the Yakima expedition, and in 1863 was promoted to be major and was stationed in New York to suppress anticipated riots. In 1865 he was brevetted brigadier general of volunteers and in 1866 was made brigadier general of volunteers. In 1873 he served on the staff of the general in chief. He commanded Fort Trumbull, Conn., in 1875 and the post of St. Augustine in 1881. He retired in 1883. His sister Julia married his West Point classmate U. S. Grant and became the mother of Frederick Dent Grant.

DENT, JOHN CHARLES (1841–87). A Canadian journalist and historian. He was born at Kendal, England, was brought by his parents to Ontario during infancy, and was educated at the public schools. He studied law and was called to the bar in 1865, but after practicing his profession for a brief period went to England and became an editorial writer on the *Daily Telegraph*. In 1867 he returned to America and did newspaper work in Boston for three years and in 1870 went to Toronto to join the editorial staff of the *Globe*. He relinquished journalism after a few years to devote himself to historical investigation. His works are: *The Canadian Portrait Gallery* (1880), a series of biographical and historical studies which he edited and mostly wrote; *The Last Forty Years: Canada since the Union of 1841* (1881); *Rev. Henry Scadding: A Memorial Volume* (1884); *The Story of the Upper Canada Rebellion* (1885–86). In literary style, grouping of events, and political analysis Dent's books are a distinct advance beyond histories of Canada previously published in English. His writing is brilliant, lucid, forceful; his method such as to leave a clear and abiding sense of the relative importance of different phases of Canadian development. He was a painstaking and conscientious investigator, fearless in his conclusions, and his treatment of the political crises between 1841 and 1880 is, on the whole, impartial. This can scarcely be said of his estimate of the two leading characters in the Upper Canada Rebellion of 1837–38. He was biased against William Lyon Mackenzie (q.v.) and unduly praised John Rolph (q.v.); nevertheless the main features and issues of that contentious period are faithfully delineated. Consult: Marquis, "English-Canadian Literature," in *Canada and its Provinces*, vol. vi (Toronto, 1914); Casgrain, "Etude critique," in *Transactions of the Royal Society of Canada* (Ottawa, 1884); King, *The Other Side of the Story of the Upper Canadian Rebellion* (Toronto, 1886).

DEN'TAL FOR'MULA. A formal statement of the number and arrangement of the teeth. See TEETH.

DEN'TALS (Neo-Lat. *dentalis*, from Lat. *dens*, tooth). A name given to sounds formed or pronounced against or near the front upper teeth with the tip or front of the tongue, such as *d*, *t*, *th*, *l*, or *n*. This term is very imperfect, as the teeth bear no important part in the production of the sounds in question and sometimes, as in the English pronunciation of *l* and *n*, no part at all. For this reason phoneticians attempt often to avoid the term, substituting lingual, tongue point, lateral (for *l*), or the like.

DENTA'TUS, MANIUS CURIUS. A Roman eminent for his warlike exploits and the republican simplicity of his life. In his first consulship he triumphed over the Samnites and the Sabines (290 B.C.); by defeating the Samnites he ended a war that had lasted 50 years. During his second consulship (275) he defeated Pyrrhus, near Beneventum, and drove him from Italy. In 272 he became censor. On one occasion a Sabine embassy, sent to his farm with gifts, found him roasting turnips at the hearth. Rejecting the gifts, he declared that he preferred rather to rule those possessing gold than himself to possess it. It was he who, to drain the Valley of Reate, dug the canal from Lake Velinus to the river Nera, where it falls in the well-known cascade of Terni (q.v.). Pliny, *Historia Naturalis*, 7, 68, says his cognomen (q.v.) "Dentatus" was due to the fact that when he was born his teeth were already grown.

DEN'TICE (Lat. *dentix*, a kind of sea fish; from *dens*, tooth, on account of its voraciousness). A fish of the genus *Dentex*, family Sparidæ (sea breams, etc.), having a deep, compressed body and generally perchlike form; a single dorsal fin, the anterior rays of which are spinous; scaly cheeks, and large canine teeth. One species (*Dentex vulgaris*), "dentix" of the ancient Romans, abounds in the Mediterranean and attains 20 to 30 pounds' weight. It is excessively voracious, devouring other fishes, but is itself in much request as an article of human food, and great numbers are taken in southern Italy and in Dalmatia and the Levant, where it is a considerable article of commerce, being cut in pieces and packed in barrels with vinegar and spices as well as served fresh.

DENTIFRICE, dĕn'tĭ-frĭs (Lat. *dentifricium*, tooth powder, from *dens*, tooth + *fricare*, to rub). Any substance, generally a powder, which is employed as an aid in cleaning the teeth. Charcoal and cuttlefish-bone powder are useful as detergents; chalk, as a soft powder; and pumice, as a hard, gritty substance for occasional use, when the teeth are more than ordinarily discolored. Catechu, cinchona, and rhatany are employed to give astringency to the tooth powder; myrrh, to impart odor; and

bole armeniac, to communicate a red color. Common salt, cream of tartar, phosphate of soda, and sulphate of potash are occasionally used; and where the breath has an unpleasant odor, the addition of four parts of bleaching powder (chloride of lime) to 100 of the tooth powder removes the fetid character of the breath and also tends to whiten the teeth. An excellent mouth wash may be prepared by adding to a tumblerful of water 10 or 15 drops of a mixture containing equal parts of carbolic acid and essence of peppermint.

DEN'TILS (Lat. *denticulus*, dim. of *dens*, tooth). A series of small blocks, arranged in a row closely serried, especially under the corona in a classical cornice. They are used in the Greek Ionic and Corinthian orders and by the Romans also in the Denticulated Doric, Corinthian, and Composite orders. See ENTABLATURE.

DENTINE, dĕn'tĭn (Fr., from Lat. *dens*, Eng. *tooth*). The tissue forming the principal mass of the teeth. It is a modification of osseous tissue, but differs from this in structure and chemical composition. Microscopical examination shows numerous minute branching tubules embedded in a dense intertubular substance and opening into the cavity of the tooth, which contains the pulp. Externally the crown of the tooth is covered by a thin layer of enamel, which is extremely hard and compact.

DENTIROSTRES, dĕn'tĭ-rŏs'trēz (pl. of Neo-Lat. *dentirostris*, from Lat. *dens*, Eng. *tooth* + *rostrum*, beak, bill). A term no longer in use, formerly designating an artificial group of birds, mostly insectivorous, having a notch and "tooth" in the margin of the upper mandible.

DEN'TISTRY. The science of diseases or lesions of the teeth and adjacent organs, and the art of making and inserting appliances for the correction of loss, deformity, injury, or malposition of those organs. The two main branches of dentistry are prosthetic or mechanical dentistry, sometimes called prosthodontia, and operative or surgical dentistry. It is not easy to draw a distinct line of demarcation between these two branches, for much of the work considered to be in the province of the operative department is really prosthetic or mechanical and vice versa. Prosthesis in its surgical sense has been defined to be "the addition of an artificial part to supply a defect of the body." Many of the conditions about the mouth which call for treatment require on the part of the dentist an intimate knowledge of both branches, and the treatment is both prosthetic and operative. The operation of filling teeth, and also the insertion of inlays, although generally considered as belonging to the department of operative dentistry, are to a certain extent prosthetic, since they supply artificial substitutes for lost natural parts. Under the head of operative dentistry come also the operations of extracting teeth, implantation, replantation, transplantation (see below), removal of deposits from about the teeth, and the treatment of the various diseases or injuries of the dental organs or their surroundings. The making of artificial dentures, crowns, bridgework, obturators, and artificial vela is prosthetic; but the adjustment of such appliances, or perhaps the preliminary treatment, may require no small amount of surgical knowledge and skill. The operative dentist must also to a certain extent be qualified as an oral surgeon, in order that he may treat some of the ordinary diseases or injuries which may affect the mouth or maxillary bones. The correction of irregularities of teeth and the making of appliances for the purpose are largely mechanical, and for that reason usually classed under the head of prosthetic dentistry. Strictly speaking, however, the operation is not a prosthetic one, and many prefer to class this as a third branch or subdivision of dentistry, calling it orthodontia, and the operator an orthodontist.

As a distinct profession, dentistry has only developed during the past century. Prior to that period, so far as we can determine, it existed only as a somewhat unimportant branch of the healing art; and some of the operations now considered to belong only to the domain of dentistry were then performed by the medical practitioner, or perhaps by some artisan who made claim to a certain amount of proficiency in the performance of such operations. The time is not so long passed since it was not unusual for the barber or blacksmith to extract teeth and to receive a fee therefor, nor since it was customary for the silversmith or jeweler to make artificial dentures.

Certain branches of dentistry were practiced long before the modern profession came into existence, and dental operations were performed early in the history of civilized nations. The wearing of false teeth must have been common in Rome in the time of Martial, who frequently ridicules them. One couplet runs:

> "False teeth and hair flaunts Laelia shamelessly,
> But not false eyes, for these she cannot buy."

The Romans probably acquired their dental knowledge from the Etruscans, and the Etruscans and Greeks from the Egyptians. Specimens of dental work in the shape of natural teeth bound together with gold, or artificial teeth of ivory, bone, wood, or stone, attached to the natural ones by means of cord, or gold or silver bands or ligatures, have been found in the jaws of mummies, which were probably buried 500 or 600 years before the Christian era; but, so far as we know at present, there are no authentic examples of tooth filling of equal antiquity. In writings upon the subject of dentistry the statement is not infrequently made that teeth of mummies have been found filled with gold. But, according to the researches of Van Mater and others, the truth of such statements is certainly to be questioned. Van Mater, who had unusually good opportunities for archæological investigation, asserts that in his careful study of the teeth of many of the remains taken directly from excavations of ancient tombs in Italy, and also of the teeth of mummies in various museums and private collections, he was unable to find a single example of a gold filling in such teeth. The results of his investigations seem to show that cases hitherto supposed to be examples of gold filling were nothing more or less than specimens of bridgework, or perhaps the banding of teeth with gold for the support of loose ones or to hold artificial teeth in place. Many of the specimens found were so covered with the accumulated dust of centuries that it was impossible, before removing some of that accumulation, to tell whether they were examples of gold fillings in the teeth or gold bands about

the teeth. It is well known that the higher orders of Egyptians often caused the mummies of their deceased friends and relatives to be lavishly decorated with paint and gilding, and in several instances the supposed gold fillings in the mouths of Egyptian mummies have, on mere scratching with a knife, proved to be nothing but superficial gilding on the natural teeth.

References to dental operations are found in the writings of Herodotus and Hippocrates in the fifth century B.C. Aristotle wrote on this subject about 350 B.C., and Heraclides of Tarentum, Herophilus, and Erasistratus are recorded as dental operators three centuries before our era. According to the writings of C. Aurelinus, Erasistratus deposited in the temple of the Delphian Apollo a leaden "odontogogue" (forceps), "to prove that [only] those teeth ought to be removed which are loose or relaxed, and for which a leaden instrument will suffice." Celsus, who lived about 100 B.C., was the first to recommend the use of the file in the mouth, saying that the points of a decayed tooth, which hurt the tongue, should be removed with an iron file. Horace (65 to 8 B.C.), Ovid (43 B.C. to 17 or 18 A.D.), Martial (c.43–104 A.D.), already quoted, and other of the ancient Greek and Latin poets, allude in their writings to artificial teeth, as does Cicero. The further history of dentistry is meagre and uncertain. Before the invention of printing the methods of recording and transmitting knowledge were so laborious and expensive that only matters of great importance were transcribed, while other matters, of lesser importance, were transmitted and preserved only by word of mouth. Thus, the early history of the profession is imperfect and uncertain. The oldest printed book known to dental bibliography is one dated 1532, printed in German by Peter Jordan and containing extracts or quotations from the works of Galen, Avicenna, Mesua, Cornelius, Pliny, and others. This book was written for lay readers by an anonymous writer, and in the chapter treating of decay of the teeth the author, quoting from Mesua, advises, as one method of treatment, first to scratch and clean with a fine chisel, knife, file, or any other suitable instrument, the parts attacked, and then to fill the cavity with gold leaves for the preservation of the remaining parts of the tooth. If this quotation is reliable, the operation of filling teeth with gold must have been known more than 1000 years ago. Galen (150 A.D.) treated the subject of the teeth more extensively than any other of the ancient authors, and his writings on that topic were the best up to the time of Fallopius, Eustachius, and Ambroise Paré in the sixteenth century. Fauchard wrote on dentistry in 1728, and Bourdet in 1757. John Hunter in 1771 published his *Treatise on the Natural History of the Human Teeth*, and in 1778 *A Practical Treatise on Diseases of the Teeth*, as a supplement to his former work. Not being a dental specialist, however, he wrote anatomically and philosophically rather than practically. Woofendale's *Practical Observations on the Human Teeth* was published in London in 1783. Blake wrote on dentistry in 1798 or 1801. Since the beginning of the nineteenth century a considerable amount of original research has been carried on in all branches of dental science, and a large and increasing number of treatises have been devoted to dentistry exclusively.

Histology and Development. The microscope has done much to improve the practice of modern dentistry. Leeuwenhoek was the first to give an intelligent idea of the histological structure of the teeth (c.1682). The main work, however, on the embryology, histology, and pathology of the teeth was done during the nineteenth century. The first rational theory of the evolution of the teeth was advanced by Goodsir in 1837. In 1860 Robin and Magitot brought forth a better theory in regard to the mode of development of the teeth, and their theory, with very little modification, is accepted at the present time. See TEETH.

Artificial Dentures. Prior to the discovery of the method of making porcelain teeth the dentist made use of human teeth, animal teeth (those of cattle and sheep), hippopotamus tusks, elephant and other ivories, and bone. The human and animal teeth were fastened in the mouth by ligatures of gold or silver wire, unbleached thread, sea grass, or silkworm gut. The hippopotamus or elephant ivory, or the common bone, was carved in single teeth or blocks, and perhaps in the shape of full or partial dentures, to replace the lost natural teeth. The objections to this method of restoration were the difficulty of getting accurate adaptation in the mouth and the tendency, because of the porosity of the material, to absorb moisture, to become offensive, and ultimately to decay. The use of porcelain as a material for artificial teeth was first proposed by Fauchard in 1728; but the manufacture of porcelain teeth was first actually begun by Duchateau, a French chemist, assisted by Dubois, a dentist of Paris, somewhere between 1774 and 1776. The date of the introduction of *metal bases* in prosthetic dentistry is not definitely known. It is believed, however, that gold was the first metal used as a base for artificial teeth, and that Dr. Gardette, of Philadelphia, was the first to use the gold base in this country, in or before 1787. Among the other metals which have been used as bases for artificial dentures are silver, platinum, aluminum, tin, and various metallic alloys; but at the present time gold and platinum are the only metals in general use for that purpose. *Gutta-percha* as a base was introduced in England by Edwin Trueman about 1851. In 1851, also, Nelson Goodyear discovered a method of making a hard rubber compound, since named *vulcanite*, and in 1855 Charles Goodyear, Jr., obtained a patent in England for making a dental plate of hard rubber, in which the teeth were secured before the compound was vulcanized. *Rose pearl*, a preparation of collodion, was next experimented with as a base, but, owing to the difficulty of manipulating it and to its lack of durability, it fell into disuse. *Celluloid* was the next material tried, but, being more porous and less durable than vulcanite, it is seldom used at present. *Porcelain* and a combination of platinum and porcelain have been used as bases for artificial dentures. Porcelain alone did not come into general use because of the difficulty of manufacture, brittleness, and danger of shrinkage or warping during the process of firing. The combination of *porcelain and platinum* (continuous gum) is made as follows: A base of platinum is swaged to fit the mouth, the artificial teeth are lined with metal and soldered to the platinum base; a porcelain body of the proper shade is next molded about

the necks and root portion of the artificial teeth, as well as upon the exposed surfaces of the platinum, and carved and colored to imitate the natural mucous membrane of the mouth; the entire piece is then put in an oven and baked long enough and often enough to fuse the porcelain properly. This method of inserting artificial teeth is one of the best at our command, so far as beauty, cleanliness, durability, and correct imitation of nature are concerned.

Crown and Bridge Work. Modern bridge work (or the insertion of artificial teeth by means of bands, springs, or artificial crowns attached to the crowns or roots of natural teeth) is but a modification of methods pursued by the ancients many centuries before the Christian era. The use of bridges is not infrequently carried to extremes, and bulky bridges are sometimes attached to teeth which are incapable of bearing the strain for any length of time. Poorly made or improperly adapted bridges are frequently inserted and are prolific sources of pollution of the secretions of the mouth; and some cases of movable or immovable bridges require considerable sacrifice of natural tooth structure, or perhaps devitalization of the pulp, in order that the bridge may be properly adjusted. It is sometimes a difficult matter to determine the best means of restoration or prosthesis in these cases, but the conservative dentist will hesitate, and perhaps prefer a partial denture, rather than resort to the sacrifice of those tissues for the sake of introducing a bridge.

Gold shell crowns, for the purpose of covering teeth too badly broken down to be amenable to the operation of filling, are supposed to be of quite recent invention, but it is claimed that their use was suggested by M. Mouton, of Paris, as far back as 1746. It is said also that Mouton advised enameling the exposed surfaces of such crowns. Gold crown work has been abused even more than bridge work, and we frequently find gold crowns placed on the anterior teeth to protect them when injured or diseased, or to serve as abutments for bridges when crowns of porcelain or porcelain-faced crowns would answer the purpose as well and be much more sightly. Many patients will insist on a dentist placing a gold cap or shell crown on a tooth, when a filling of some sort would be very much better and much more artistic. Fortunately the laity, as well as the dentist, are beginning to appreciate the enormity of this offense against good taste.

Fillings, etc. The filling of teeth is now sometimes called *obturation.* Before the introduction of gold lead foil was used as the material for filling teeth. Celsus (100 B.C.) is sometimes referred to as the first to have advised filling cavities in teeth; but the only reference to the subject in his works is his recommendation to stuff with lead decayed and frail teeth that are to be extracted, in order that they may not break under the forceps. Tooth filling proper was, up to the beginning of the nineteenth century, practiced very seldom. The operation of filling teeth with *gold* was mentioned by Fauchard (died 1761). For years gold was used in the form of thin foil or rolled gold of the noncohesive variety. Sponge or crystal gold was introduced in 1846, but was little used until its application to dental purposes was patented, and its working quality improved by A. J. Watt, of Utica, N. Y., in 1853. In 1855 Dr. Arthur, of Baltimore, recommended the use of cohesive gold for filling teeth, and this variety is more used at present than any other. The use of mallet force in filling teeth with gold was first recommended by Dr. William H. Atkinson, of New York. *Platinum* has been tried as a filling material, but was found to be too harsh and to have too little ductility and plasticity to make it valuable for that purpose. It is sometimes used in combination with gold foil or rolled gold for a filling exposed to severe stress. *Silver* is not used alone for fillings because of its tendency to oxidize and because of its stiffness and want of ductility. *Tin,* in the form of foil, has been used for filling teeth since 1783 and is still used for certain kinds of cavities. The advantages of tin are that it is soft, pliable, easily condensed and adapted to cavity walls, a poor conductor of heat, and, in cases of disintegration, yields salts that seem to possess antiseptic properties. Yet its softness, its almost complete lack of cohesiveness, its property of becoming discolored in the mouth, and its disintegration under chemical and mechanical influences, also constitute serious disadvantages.

Owing to the difficulties in properly manipulating the simple metals in filling teeth, efforts were early made towards discovering some material of greater adaptability, and, as a result, we have the plastics so extensively used at the present day. The earliest of these materials were preparations of the gum resins, such as ethereal or alcoholic solutions of mastic, sandarac, damar, or copal. Then fusible metals were employed, until, in 1826 or thereabouts, Taveau, of Paris, introduced the use of *amalgams.* An amalgam is a combination of one or more metals with mercury, and that first tried was an amalgam of pure silver. The next amalgam to be used was one of coin silver. The amalgams as made at present usually consist of a combination of three or more metals with mercury. Such amalgams, manipulated by improved modern methods, constitute the only plastics that can be considered as permanent filling materials. The other plastics used at present include: gutta-percha (introduced in 1847–48); "Hill's stopping" (a mixture of gutta-percha with harder materials); oxychloride of zinc (oxide of zinc, with a solution of zinc chloride); zinc phosphate (oxide of zinc, with a solution of phosphoric acid); oxyphosphate of copper; aluminum phosphate; oxysulphate of zinc; and other varieties of the cements. Each of these cements has its definite uses and advantages, but all have the disadvantage of serving only as temporary fillings.

The *filling of pulp canals* in devitalized teeth was believed to have been introduced by Maynard and Baker, of Washington, D. C. It has been shown, however, that this operation was practiced by Bourdet and Fauchard, in Paris, as far back as the middle of the eighteenth century and, according to Bourdet, had been practiced by others many years before. The *capping* (covering over) *of exposed pulps* is said to have been first recommended by Koecker. The *dental engine,* in its original form, was introduced by Dr. Morrison, of St. Louis, Mo., in 1846; in its various improved forms it has become one of the most useful of dental appliances. The use of the *rubber dam* for the

purpose of excluding moisture from cavities during the operation of filling teeth was first suggested by Dr. S. C. Barnum, of New York, and this innovation has been as great a boon to dentistry as the introduction of the Esmarck bandage has been to general surgery.

Inlay Work. One of the latest innovations in the art of dentistry is inlay work, i.e., the use of plugs of porcelain, glass, gold, vulcanized rubber, and similar materials, which are cemented into a tooth cavity in such form and shape as to fit it exactly. With the improved methods and materials for making porcelain inlays this mode of filling carious cavities is becoming more and more popular, and when perfected will undoubtedly cause the abolition of gold fillings in the anterior teeth. It may be interesting to observe that inlays of green jade, placed in the teeth probably for ornamentation, have been found in the ruins of Copan, Honduras, and of Yucatan.

Uses of Electricity. Electricity has its practical applications in dentistry as well as in the arts and is utilized not only for the control of various mechanical appliances employed by the operative and prosthetic dentist, but in the form of the electric mouth lamp, the cataphoric current, etc., is used for diagnostic and therapeutic purposes as well. *Cataphoresis*, or the method of forcing drugs into the tissues by means of the galvanic current, was first proposed by Dr. B. W. Richardson as far back as 1857, but has come into general use only within recent years. The X-rays, or Roentgen rays, are now put to practical use in dental as well as in general surgery and as a means of diagnosis are sometimes of very great assistance. For the purpose of detecting unerupted or impacted teeth, abnormal growths on or about the teeth, imperfect root-canal fillings, resorption of roots, fractures of the jaw, or the presence of foreign bodies in the alveoli of the teeth, the X-rays are of great value and frequently utilized.

Treatment of Loose Teeth. The teeth frequently become loosened from their attachments in consequence of local or constitutional disturbances, and the treatment of this condition is still a somewhat knotty problem. When due to local causes, such as deposits of salivary calculus, or ordinary tartar, the treatment is principally local, and consists in first removing the deposits, getting the teeth as smooth as possible, and then adopting proper therapeutic and prophylactic measures, with a view to inducing a healthy condition of the soft tissues and preventing a return of the deposit. The constitutional cause, which is more often concerned than any other in bringing about the loosening of teeth, is the so-called "gouty" or "rheumatic" condition. In cases of this nature the treatment should be both local and constitutional or general.

Replantation; Transplantation; Implantation. *Replantation*, or the replacing of a natural tooth in the socket from which it has been extracted or forced out, is a very old operation, and its definite history is unknown. *Transplantation*, or the placing of a natural tooth in a natural socket other than the one it originally occupied, is also an old operation and was spoken of by Ambroise Paré in the sixteenth century. In this operation it was customary to use a freshly extracted tooth from the mouth of one person and place it in the socket of a newly extracted tooth in the mouth of another. In an advertisement inserted in a Philadelphia paper in 1784 Le Mayeur, a dentist, offers two guineas each for sound teeth to be obtained from "persons disposed to sell their front teeth, or any of them." *Implantation*, which may be defined to be the placing of a natural or artificial tooth in an artificially prepared socket, or the insertion of an artificial tooth in a natural socket, was suggested by Dr. William Younger, of San Francisco, Cal., in 1885; but it is asserted that Bourdet, in 1780, advised a similar operation. In the Peabody Museum, at Cambridge, Mass., there is a jaw, discovered in the ruins of Copan, Honduras, wherein is implanted (in the socket of a left lower lateral incisor) an artificial tooth of carved stone, which from the amount of tartar on it would indicate a considerable amount of use in the mouth of the individual. The exact age of those ruins is unknown, but this specimen of implantation probably antedates Dr. Younger's operation by about 1500 years. Experience has shown that implanted teeth are short-lived, so far as their usefulness goes. After a period varying from 2 to 10 or 12 years the implanted teeth almost invariably loosen and fall out, because of absorption of the roots when natural teeth are used, and incompatibility when artificial roots are inserted. In many cases of implantation the operation is unsuccessful from the start, and no union is obtained; in others a slight attachment seems to occur between the tooth and alveolus, which gives out after a few weeks or months; while in a fair percentage of cases the teeth may become firmly attached and remain for several years. As a rule, they seldom remain longer than three or four years and are much shorter-lived than replanted or transplanted teeth.

Anæsthetics. The action and history of the use of anæsthetics may be found described in the general article ANÆSTHETIC, and in a number of special articles on the more important anæsthetic substances in use at present. Here it may be stated that, while chloroform and ether were much used in dentistry formerly, practically the only general anæsthetic employed by dentists at present is nitrous oxide, or "laughing gas." The only local anæsthetic now used in dentistry to any extent is cocaine, which has almost entirely superseded the use of cold-producing volatile substances, like ordinary ether, ethyl chloride, or rhigolene.

Orthodontia. Orthodontia, or the art of regulating or correcting malpositions of teeth, has recently developed into a distinct specialty, although some attention has been given to it by dentists ever since the latter part of the eighteenth century. At the present time some operators devote their whole attention to this branch of practice, and the results obtained by those who have the necessary mechanical ingenuity and diagnostic ability are extremely gratifying.

Dentists. Woofendale, who came to America in 1766, seems to have been the first regular dental practitioner in the United States. Lemaire came to America probably in 1784. James Gardette, a native of France, began practice in the United States in 1781. He went to Philadelphia in 1784 and continued in successful practice there for 45 years. Josiah Flagg, who, as far as can now be accurately determined, was the first dentist native to the United States, began practice in 1782. He obtained his knowledge of

dentistry from Lemaire. Isaac Greenwood, the father of the John Greenwood who made sets of artificial teeth for George Washington, was probably the first dentist in Boston. John Greenwood and his younger brother, Clark, were in practice in New York about 1784. The increasing growth of the profession since 1820 is shown by the following figures: in 1820 there were about 100 dentists in the United States; in 1872 the number had increased to 5000; in 1893 the number was 13,500; in 1898, 18,000; in 1900 the number in the United States and Canada was 26,500; in 1902 the United States and Canada had over 27,600 dentists, of which number 16,390 were graduates of regular dental colleges.

Literature. L. and M. Greenbaum, *A Practical Treatise upon the General Practice of Dentistry* (New York and London, 1912); Richardson, *A Practical Treatise on Mechanical Dentistry*, ed. by Warren (Philadelphia, 1900); Kirk, *American Text-Book of Operative Dentistry* (ib., 1911); Dexter, *History of Dental and Oral Science in America* (ib., 1876); Brownell, *Anatomy and Histology of the Mouth and Teeth* (2d ed., ib., 1902); Burchard, *Text-Book of Dental Pathology* (2d ed., ib., 1914); Jackson, "*Orthodontia and Orthopædics of the Face*" (ib., 1904); Lischer, *Principles and Methods of Orthodontics* (ib., 1912); Guerini, *A History of Dentistry* (ib., 1909). See TEETH.

DENTI'TION. See TEETH.

DEN'TON. A city and the county seat of Denton Co., Tex., 35 miles north by east of Fort Worth, on the Missouri, Kansas, and Texas and the Texas and Pacific railroads (Map: Texas, D 3). It is the seat of the North Texas State Normal College and the College of Industrial Arts, and it contains a sanitarium. Denton trades extensively in cotton, wheat, corn, and cattle. The water works, electric-light plant, and sewage system are owned by the municipality. Denton was first settled in 1857 and incorporated in 1868. Pop., 1900, 4187; 1910, 4732.

DENTON (Danetown). A manufacturing and coal-mining town in Lancashire, England, 2½ miles southwest of Ashton. It owns remunerative municipal gas works. Reservoirs of 1,860,000,000 gallons' capacity, which supply water for Manchester, are within the township. Pop., 1901, 14,934; 1911, 16,880.

D'ENTRECASTEAUX ISLANDS, dän'tr'-kås'tō' (named in honor of their discoverer, Joseph Antoine *d'Entrecasteaux*). A group of islands, about 10 miles off the east coast of New Guinea, lying in lat. 10° S. (Map: East India Islands, J 2). They consist of three large islands, viz., Ferguson, Normanby, and Goodenough, and a number of islets, with a total area of about 1200 square miles. They are very mountainous, some peaks attaining the height of 7000 feet. Extinct volcanoes and hot springs are found on Ferguson Island. Tin and traces of gold have been discovered. In 1885 the group became a part of the administrative dependency of British New Guinea, which, by proclamation in 1906, was renamed the Territory of Papua. The inhabitants are Papuans.

DEN'UDA'TION. See EROSION.

DEN'VER. The capital of Colorado, the county seat of Denver County, and the largest city between the Missouri River and the Pacific Ocean. It is situated at the junction of the South Platte River and Cherry Creek, 2025 miles from New York City and 1457 miles from San Francisco, in lat. 39° 47′ N., long. 105° W. (Map: Colorado, E 2). It is one of the most important railroad centres in the West. Among the numerous lines entering the city are the Atchison, Topeka, and Santa Fe, the Chicago, Burlington, and Quincy, the Chicago, Rock Island, and Pacific, the Colorado Midland, the Denver and Rio Grande, the Missouri Pacific, the Union Pacific, the Colorado and Southern, and the Denver, Northwestern, and Pacific. The city is magnificently situated at an altitude exactly 1 mile above sea level and within 15 miles of the eastern base of the Rocky Mountains. Owing to the remarkable clearness of the atmosphere, a stretch of 200 miles of the mountains is discernible from north to south almost every day of the year. Denver has a climate peculiarly mild and adapted to people suffering with pulmonary complaints; the mean annual temperature is 48° F.; the average annual rainfall is about 14 inches, and the sun shines 275 days in the year.

The city occupies an area of 60 square miles. It is distinctively residential, with broad and shaded streets, and is substantially built of brick and stone. It has over 40 miles of thoroughfares paved with asphalt, while 140 miles are surfaced with disintegrated granite. Of the 30 public parks and 10 children's playgrounds within the city, with a total area of 1239 acres, the largest is City Park, a preserve of 390 acres, adorned with flowers, shrubbery, statuary, etc., and including a zoölogical garden, an aviary, a natural-history museum, lakes, race track, and driveways. In addition the city has a chain of five mountain parks and a beautiful drive connecting them. Among noteworthy buildings are the capitol on Capitol Hill, erected at a cost of $2,700,000; the new Federal building, costing $2,500,000; St. John's Cathedral (Episcopal); the cathedral of the Immaculate Conception (Roman Catholic); Trinity Methodist Episcopal Church; the Auditorium, seating 12,000 persons; the public library, the United States mint, the county courthouse, the First National Bank building, the Denver Gas and Electric building, and the Chamber of Commerce. Every educational advantage possible is available for the children and youth of Denver. There are 64 grade schools, 4 high schools, 1 trade school, 1 manual-training high school, and 1 technical high school. In addition kindergartens, special schools for retarded pupils, open-air schools, and night schools are maintained. The total school census in 1913 was 51,981. Denver is the seat of the University of Denver (Methodist; see DENVER, UNIVERSITY OF); the Jesuit College of the Sacred Heart, founded in 1888; Westminster College (Presbyterian); the Iliff School of Theology; Colorado Woman's College; Loretto Heights Academy, and various schools of music and dramatic art. The city has a magnificent public library, with five branch libraries and eight depositories, containing 165,000 volumes, besides the State library of 41,000 volumes, the Supreme Court library with 31,000 volumes, and numerous others.

A combination of favorable natural conditions has resulted in making Denver the leading industrial city of the western mountain region of the United States. Chief of these is its proximity to the great mining region of Colorado, which produces not only metals—lead, copper, iron, gold, silver, tungsten, vanadium, radium, and uranium—but also coal, the latter making

it possible to smelt the ores and thus avoid shipment to other parts for that purpose. The many railroads entering the city make it the best collecting and distributing centre in the Rocky Mountain States, and the great distance from the eastern manufacturing centres exempts it largely from trade competition. The value of the manufactured products of the 738 industrial establishments in 1913 was $62,950,381, exclusive of the smelting industry, whose products in 1913 amounted to $7,500,000. Much mining machinery is produced, and the output of the flouring and grist mills is large. The manufacture of malt liquors and railroad-car construction and repairs are considerable industries. Denver is becoming important as a live-stock market. In 1913 the Union Stock Yards handled about 1,385,000 head of stock, valued at $48,000,000, and the output of the packing plants was estimated at $12,775,000. The annual Live Stock Show is second only to the one held in Chicago. In addition the city has a large wholesale jobbing trade which is estimated at $45,000,000 annually. The Denver City Tramway Company operates 235 miles of electric railways, 203 miles of which are within the city limits. The water supply of the city is brought from the mountains. There are 11 reservoirs, of which the Cheesman Dam, located in the mountains 50 miles from Denver, has a capacity of 26,000,000,000 gallons. The commission form of government was adopted by Denver in 1913. All legislative, executive, and administrative powers and duties are vested in a council of five commissioners, who have charge of the departments of property, finance, safety, improvements, and social welfare. They are elected for four years and receive a salary of $5000 per year. The commissioners elect one of their number as mayor, who presides at the meetings of the council, but has no power of veto. With the exception of the auditor and the election commission, who are elected, the commissioner of each department appoints all officers, commissions, or boards under his control, subject to civil-service regulations. The total annual income of the city is about $3,800,000. The larger annual appropriations approximate $1,300,000 for schools, $300,000 for the fire department, $300,000 for the police department, $200,000 for municipal lighting, and $275,000 for parks.

Denver was first settled by miners in 1858, and in the following year was incorporated as a city by the provisional Legislature and named in honor of Gen. J. W. Denver, then Governor of Kansas. In 1861 it was reincorporated by the first Territorial Legislature. It became the capital of the Territory in 1867 and in 1870, on the completion of the Denver Pacific and Kansas Pacific railroads, was first connected by rail with the East and South. Destructive floods occurred in 1864, in 1876, and in 1912. In 1894 the town of South Denver was annexed. Since 1870 its growth has been exceedingly rapid; a population of 4759 in that year having increased to 35,629 in 1880, 106,713 in 1890, 133,859 in 1900, including 25,300 persons of foreign birth and 3900 of negro descent, and 213,381 in 1910. The population in 1914 was approximately 240,000; 1920, 256,369.

DENVER, University of. The earliest institution for higher learning in the Rocky Mountain States, founded in 1864 at Denver by Gov. John Evans. It was known as the Colorado Seminary until 1880, when the school was reorganized and the present name adopted in evidence of its increased educational scope. The departments at University Park are the College of Liberal Arts, the Graduate School, the Summer School, and the Warren Academy. The professional departments, in the heart of Denver, are the Law School, the Dental School, the School of Commerce, and the Teachers' College. The University buildings at University Park are University Hall, the Carnegie Library, the Carnegie Science Hall, the Alumni Gymnasium, the Chapel, the Chamberlain Observatory, one of the most important astronomical stations of the world, and the two dormitories known as Templin Hall and Wycliffe Hall. In Denver the buildings used for school purposes are the Law and Commerce Building and the Dental Building. Five other buildings in Denver and four others at University Park are now producing income. The enrollment for 1913–14 was 1159, of whom 816 (or 70 per cent of the total) reside in Denver. There were, in 1914, 2650 graduates in the regular courses in all departments. All properties and endowments aggregate $1,200,000 in value. The General Education Board has recognized the University of Denver by a conditional gift of $100,000. An addition of $400,000 was made to the productive endowment in 1914. The president in 1914 was Henry A. Buchtel, D.D., LL.D.

DENZINGER, dĕn'tsĭng-ĕr, Franz Joseph (1821–94). A German architect. He was born at Liége, Belgium, where his father was professor at the University. He studied at Würzburg, then in Munich at the Polytechnic Institute and under Gärtner at the Academy of Arts. In 1854 he entered the government service at Regensburg and in 1859 was appointed architect of the cathedral, the restoration and completion of which he carried out in the most successful manner. His next important work was the reconstruction of the cathedral at Frankfort-on-the-Main, which had been destroyed by fire in 1867. Here he also erected the building of the municipal archives and the Dreiköningskirche. Among his other structures may be mentioned the chemical laboratory of the University at Erlangen and the saline bathing establishment at Kissingen. He died in Nuremberg.

DE'ODAND (ML. *deodandum*, to be given to God, from *Deo*, to God + *dandum*, to be given). In English law, a term applied to any chattel which was directly instrumental in causing the death of a human being, either by accident or by homicide. Where a person was thus killed a jury was summoned, and, if any domestic animal or inanimate thing was found to be the immediate cause of his death, it was forfeited to the crown, usually for pious or charitable uses —"to appease God's wrath," as some of the early writers put it. Thus, if a horse and cart ran over a person and killed him, they were forfeited as accursed things, irrespective of whether they belonged to the deceased, the person having them in charge, or to some other person who was not otherwise connected with the accident. The right or franchise to have all deodands in a certain district was sometimes granted to individuals by the crown. This curious law, which has its analogies in many primitive legal systems, was not finally abolished in Great Britain until the year 1846 by statute (9 and 10 Vict., c. 62). It was never recognized in the United States. Consult Blackstone, *Commentaries on the Laws of*

England, and Stephen, *History of the Criminal Law of England* (London, 1883).

DE'ODAR'. See CEDAR.

DEO'DORI'ZER (from Lat. *de*, from, away + *odor*, smell, scent). Any chemical substance employed for the purpose of absorbing or destroying the odoriferous principles evolved especially from decomposing animal and vegetable matter. They strictly belong to the classes of substances known as antiseptics (q.v.) and disinfectants (q.v.).

DE OFFICIIS, dē ŏf-fĭsh'ĭ-ĭs (Lat., On Duties). A treatise on morals by Cicero, addressed directly to his son Marcus. The work is in three books, but is doubtless incomplete.

D'ÉON DE BEAUMONT, dā'ôN' de bō'môN'. See EON DE BEAUMONT.

DEOPRAYAG, dā'ō-prâ-yäg', or **DEVAPRAYAGA,** dā'vâ-prâ-yä'gâ (Skt., altar of the gods). A village of the State of Tehri, United Provinces, India, 2265 feet above sea level, remarkable chiefly for its situation at the fork of the Alaknanda and the Bhagirathi, which form the Ganges (Map: India, C 2). As the source of the sacred river, Deoprayag is a favorite place of pilgrimage for the Hindus. The temple of Raghunath, built on a high terrace, is capped by a white cupola, golden ball, and spire. A flight of steps in the rock leads down to the brink of the mingled streams, and there three basins have been excavated in the solid stone a little below the level of the surface of the current for ablutions. The permanent population, about 1000, consists chiefly of Brahmins.

DE O'RATO'RE (Lat., On the Orator). A dialogue in three books by Cicero (55 B.C.), treating of the studies necessary for an orator, the matter, and the form and delivery of a speech. The principal speakers are the great orators Lucius Crassus and Marcus Antonius.

DEPART'MENT (Fr. *département*, from Lat. *dispartire*, to divide). An administrative division in France. The old provincial divisions were abolished by the Constituent Assembly in 1790, and the country was divided into 83 departments. This was done at the instance of Mirabeau, who pointed out the necessity of wiping out the ancient territorial boundaries in order to concentrate power in the hands of the central government, and to destroy the influence of the aristocracy, which, based upon ancient custom, was still strong in the provinces. In the redistribution, care was taken to efface as far as possible ancient political divisions, and in a large number of instances a department was constituted out of territory taken from two or more provinces. Most of the departments were named after rivers or mountains. At the head of each is a prefect, appointed by the President of the Republic, and assisted by a *conseil de préfecture*. The departments are subdivided into arrondissements.

DEPAR'TURE. In nautical language, a distance along a parallel of latitude measured in nautical miles, especially the distance east or west made by a ship. When the course is neither east nor west, the *departure = distance sailed* × *sine of course*. Since minutes of longitude are in length proportional to the cosine of the latitude in which they are measured, we have *departure* (in nautical miles = *minutes of longitude* × *cosine of the latitude* in which the departure is measured. To determine the exact position of a ship when starting upon a voyage and after leaving port is termed *taking a departure*. It is usually done by observing the bearings of two or more objects and transferring those bearings to a chart whence the exact point is determined. For use of this term in surveying, see SURVEYING.

DE PAUW (dē-pą') **UNIVERSITY.** An institution of higher learning situated at Greencastle, Ind. It was founded by the Indiana Conference of the Methodist Episcopal Church in 1837 and was known until 1884 as the Indiana Asbury University. In recognition of large gifts by the Hon. Washington C. De Pauw during his life and the bequest of a share in his estate which has added more than a half-million dollars to the endowment of the university since his death, the name of the institution was changed to De Pauw University. Schools of Medicine, Law, Theology, Pedagogy, Music, and Art, as well as the College of Liberal Arts, were provided in the charter, and at some time every one of them has been instituted and conducted for a period of years. But for lack of sufficient income to support them on a high educational plane all of the professional schools have been suspended except the School of Music. At the present time the institution includes only the College of Liberal Arts and the School of Music. The plant includes 12 buildings and 50 acres of campus, valued at $528,000. Recent benefactions and bequests have raised the productive endowment to $1,200,000. There are 50 instructors in the faculty, and the student enrollment is slightly above 1000. Graduates to the number of 3157 (including all schools) are scattered throughout the world. The president in 1914 was Rev. George R. Grose, D.D.

DEPEND'ENT CHILDREN. A term applied to normal children who must be supported by other than their natural guardians. It does not include the deaf and dumb, blind, insane, epileptic, and feeble-minded, who are classified as *defectives*, nor those of perverse habits, known as *juvenile delinquents*.

In ancient times the Semites placed a higher value on children than did the Aryans. Among the Aryans, however, childless families sometimes adopted children. The father in Greece and Rome had practically power of life and death over his children and could sell them into slavery. Infanticide was common. Yet the children left alone were not entirely neglected, and their adoption was encouraged by decrees making them the slaves of those caring for them. Not until after the introduction of Christianity do we find any special attention paid to child saving. From that time to the present among Europeans and their descendants, and wherever Christian missionaries have gone, we find increasing attention paid to dependent children.

In the sixth century came the beginnings of special institutions for such children in France and a little later in Italy. (See FOUNDLING HOSPITAL.) From these humble beginnings the great institutions now found in all civilized lands have grown. The state has come to recognize that it is responsible for the proper care of the children and is gradually extending its efforts for the sake of its own future welfare as well as for that of the children.

From the practice of receiving young children into institutions to save their lives there naturally developed the belief that such institutions were even better places for the children than any family home. Here children would be kept from

the temptations of the world; here they would be cared for by skilled matrons and taught by chosen teachers; here, too, religious instruction would be planted in fruitful soil. The Church, under whose influence these institutions arose, encouraged this belief. This is the principle underlying all institutional care for dependent children. The highest development of this principle is found in the institutions of the Catholic church and of the Hebrews, in which it is possible for a child to pass from infancy to maturity constantly guarded from the world. Europe, except France, has largely followed this method, and it is widespread in America.

The older plan of rearing dependent children in family homes has, however, kept a foothold and is latterly coming rapidly to the front. It exists in two forms. In the first the children are boarded out in families, the board being paid by societies organized for the purpose of caring for children or by the state. This system has been successfully carried on in Scotland and England, but has found its greatest development in Australia and France. In France a special department of the government, with branches in the provinces, boards out the children and supervises them until they are 21 years of age. No board is paid after the twelfth year, the children being then indentured. In the second form the children are placed out for adoption or are indentured to persons willing to receive them and to assume all responsibility for their maintenance and education. After the initial expense of finding and investigating a home, this system costs the public nothing save the expense of supervision to safeguard the interests of the child. This plan has found its chief field in Canada and the United States.

In America during Colonial times children were apprenticed in families or were consigned to the almshouse. It was gradually recognized that the influence of the almshouse was degrading, and the leading States now forbid the practice. It still prevails in the Southern States. Illinois is the only prominent Northern State permitting it. The movement for institutions began about 1800 and rapidly spread in the larger cities. Organized effort for placing children in family homes started with the founding of the New York Children's Aid Society in 1853. Similar societies are now found in most cities. The first of the children's home societies was started in Illinois in 1883. They now exist in 24 States, chiefly in the West. Their work has been largely outside the big cities.

The advocates of the institutional plan and those who favor the placing-out system have long been at swords' points. Each has claimed that the other system did not produce the best results. There is taking place in America, however, a gradual amalgamation of the two systems. It is now admitted that the institution fosters a pride which tends to develop the institution at the expense of the child; that institutional life is artificial and cultivates dependence rather than independence. On the other hand, it is admitted that some children need for a time the training in obedience and in respect for authority which institutional discipline gives; that children in bad physical condition often receive better care in an institution than is possible in the average home; that the work of placing out children must be most carefully done to avoid putting children in bad homes; that it is sometimes hard to find the proper place for a particular child. To-day institutions are placing out many children, while placing-out agencies are sending children to institutions for temporary care. Both agree that the home is the normal place, and that the place of the institution is to give the necessary training to fit the child for home life. It has so far been possible to find free homes for most of the children placed out, and the boarding-out system has been in use only in the East.

The general interest in the subject has led to the active participation of the State. In New York, California, Pennsylvania, and to a lesser degree in other States, subsidies have been granted from public funds to private societies. The result has not been satisfactory. Large institutions have been built up which tend to receive children not really dependent for the sake of additional revenue. The result is plainly seen by comparing New York with 317.3 dependent children per 100,000 of population; California, 290.8; Pennsylvania, 153.6; Indiana, 110.1; Michigan, 65.6; West Virginia, 18.9; North Dakota, 18; Mississippi, 16.2; Arkansas, 12.7; Oklahoma, 8.8. These differences reflect not merely differences in institutions, but in greater degree differences in economic conditions. Child dependency is largely an urban condition. Michigan in 1874 opened what is known as the State Public School (q.v.). All children becoming public charges are sent to this school and are placed out as soon as seems best. The result has been an actual decrease in the number of dependent children. This system has been adopted in Rhode Island, Wisconsin, Minnesota, and Colorado. In Massachusetts and Pennsylvania the boarding-out system has been largely developed. The State homes for the orphans of soldiers and sailors, started soon after the Civil War, have been generally abandoned or turned into orphan asylums. There is now a strong movement towards State control and supervision of the work for dependent children. New Jersey has organized a State Board of Children's Guardians. Indiana has appointed a State agent. Consult: Wines, *Prisons and Child-Saving Institutions* (Cambridge, Mass., 1880); Hill, *Children of the State* (London, 1889); Folks, *Care of Destitute, Neglected, and Delinquent Children* (Albany, 1900); Henderson, *Introduction to Study of Dependents, Defectives, Delinquents* (Boston, 1893); id., *Modern Methods in Charity* (New York, 1904); *Report of Committee on History of Child-Saving* (Boston, 1893); Bartlett, *Supervision and Education in Charity* (New York, 1903); Devine, *The Principles of Relief* (ib., 1904); *United States Census: Benevolent Institutions* (Washington, 1904); Gray, *Philanthropy and the State* (London, 1908); Conyngton, *How to Help* (New York, 1909); Corrigan, *The Law and the American Child* (Worcester, 1911); Chicago School of Civics and Philanthropy, *The Child in the City* (Chicago, 1911); Engel, *The Elements of Child Protection* (New York, 1912); Webb, *The Prevention of Destitution* (London, 1912).

DEPENDENTS, DEFECTIVES, DELINQUENTS. Dependents are those who must be supported by other than their natural guardians or family. Defectives are those who are not normally developed, the blind, etc. Delinquents are those who commit acts forbidden by law. This classification is not satisfactory, but it is in very general use. See SOCIAL DEBTOR CLASSES.

DE PERE, dē pēr′. A city in Brown Co., Wis., 5 miles southwest of Green Bay, on Fox River, and on the Chicago and Northwestern and the Chicago, Milwaukee, and St. Paul railroads (Map: Wisconsin, F 4). Lake steamers ascend the river as far as De Pere. De Pere is the seat of St. Norbert's College and is the site of the first mission in Wisconsin. The city has good water power and manufactures of bricks, pottery, writing paper, steam boilers, gasoline engines, cigars, sash and doors, skiffs, yachts, launches, flour, woolen goods, foundry products, and dairy products. There are also several limestone quarries. Cattle, grain, and hay are among the exports. A steel bridge over the river 1600 feet long connects the east and west sides of the city. The water works are owned by the municipality. Pop., 1900, 4038; 1910, 4447.

DEPEW′. A village in Erie Co., N. Y., 8 miles east of Buffalo, on the New York Central and Hudson River, the International Electric, the Delaware, Lackawanna, and Western, the Erie and the Lehigh Valley railroads (Map: New York, B 5). Depew contains a public library and fine high-school building. Its chief manufacturing establishments are locomotive and coupler works, a large smelting plant, and storage battery, spring, and gear factories. The village was incorporated in 1894 and was named after ex-Senator Chauncey M. Depew. Pop., 1890, 3379; 1910, 3921.

DEPEW, Chauncey Mitchell (1834–). An American lawyer, railroad president, politician, and orator. He was born in Peekskill, N. Y., graduated at Yale in 1856, was admitted to the bar two years later, and soon took an active part in politics. He was in the State Assembly in 1861 and 1862 and Secretary of State of New York from 1863 to 1865. In 1872 he was candidate for lieutenant governor on the Liberal Republican ticket. In 1866 he became attorney for the New York and Harlem Railroad, and in 1869 for the New York Central. He was elected second vice president of the New York Central in 1882 and was president from 1885 to 1898, when he resigned this position and the presidency of the West Shore Railroad to become chairman of the entire Vanderbilt system. He was delegate at large to the Republican national conventions from 1888 to 1904 and nominated Benjamin Harrison in 1888 and Levi P. Morton in 1896. In 1888 he received 99 votes for the presidential nomination. In 1899–1911 he was United States Senator from New York. He had declined the State portfolio in President Harrison's cabinet in 1892. He delivered addresses at the Washington Centennial in New York in 1889 and the dedication of the World's Columbian Exposition at Chicago in 1893, and orations at the memorial services of President Garfield and General Sherman, and was a famous after-dinner speaker. He was a regent of the University of the State of New York in 1877–1904 and a member of the corporation of Yale University in 1893–1906. Senator Depew became involved in the investigation of certain New York life-insurance companies in 1905, with the result that he repaid to the Equitable Life Assurance Society, of which he was a director, a loan made to a concern in which he was interested; and he resigned from the directorate of the Equitable. In 1911 he was succeeded in the Senate by J. A. O'Gorman (Democrat).

DE PEYSTER, de pīs′tẽr, Abraham (1658–1728). An American merchant and Colonial official, son of Johannes de Peyster (q.v.), born in New Amsterdam (New York). He was mayor of New York from 1691 to 1695 and afterward Chief Justice of the province and President of the King's Council; and he acted as Governor in 1701. He served as colonel of the militia of the city and county of New York and as treasurer of the provinces of New York and New Jersey. There is a statue of him in Bowling Green, New York City, by G. E. Bissell.

DE PEYSTER, Arent Schuyler (1736–1832). An American soldier, born in New York City, and prominent as a Royalist at the time of the Revolution. From 1775 to 1783 he was in command, at different times, of Detroit, Mackinac, and several posts in Upper Canada, and endeavored to turn the Western Indians against the United States. After the war he removed to Dumfries, Scotland, where he became a friend of Burns.

DE PEYSTER, Johannes (1600–85). One of the early settlers of New York and the founder of a noted American family. In the Colony, then New Amsterdam, he held the offices of burgomaster and deputy mayor and resisted the cession of the province to the British in 1664 and 1674.

DE PEYSTER, John Watts (1821–1907). An American writer on military and historical subjects. He was born in New York City, was educated at Columbia, became colonel in the State militia in 1845, adjutant general in 1855, and brevet major general in 1866. Among his works are: *Life of Field Marshal Torstenson* (1855); *The Dutch at the North Pole, and the Dutch in Maine* (1857); *Personal and Military History of Gen. Philip Kearny* (1869); *Before, at, and after Gettysburg* (1887); *The Real Napoleon Bonaparte* (1897). Consult Law, *Here and There in Two Hemispheres* (Lancaster, Pa., 1903), and F. Allaben, *John Watts de Peyster* (2 vols., New York, 1908).

DEP′HAL. See Breadfruit Tree.

DEPIL′ATORIES, or Epilatories (Lat. *depilare*, to pull out hair, from *de*, off + *pilus*, a hair). Certain agents employed for removing hair from the skin. They were extensively used by the ancients, but are now restricted in their employment to the face and to the removal of the hair from the scalp in the treatment of certain diseases. The agents most commonly used are the caustic alkalies, arsenic, barium sulphide, calcium sulphide, and quicklime. One recipe consists of 5 parts of caustic or slaked lime, 10 parts of carbonate of soda, and 40 parts of lard. The trisulphide of arsenic (commonly known as orpiment) is occasionally used, but its employment is dangerous. A mixture of caustic lime and orpiment constitutes some of the depilatories to be purchased; and it is believed that the Turkish *rusma* is composed of these ingredients. Electrolysis, by means of a strong galvanic current, is used by physicians for the purpose, a needle electrode being applied to the root of each hair.

D'ÉPINAY, dā′pē′nā′, Madame. See Epinay, Madame d'.

DÉPIT AMOUREUX, dā′pē′ ä′mōō′rē′, Le (Fr., The Lovers' Quarrel). A comedy by Molière (1654).

DEPO′NENT. A term in Latin grammar applied to verbs having a passive form but an active signification. They are so called because

they, as it were, lay down (Lat. *deponere*) or dispense with the signification proper to their form. Such verbs had originally a reflexive meaning; thus, *aversor*, 'I shun,' means radically "I turn myself away from"; *versor in*, 'I engage in,' means properly "I turn myself about in." They thus correspond to the middle-voice forms of the Greek verb, which, though properly reflexive, became often indistinguishable from the active voice, so that middle forms were used with a direct object. Consult Lindsay, *The Latin Language*, pp. 519 ff. (Oxford, 1894).

DEPORTATION. See TRANSPORTATION, PENAL; IMMIGRATION.

DEPOSIT, or **DEPOSITUM** (from ML. *depositare*, from Lat. *deponere*, to lay down). In a legal sense, a term implying possession of personal property by some one not the owner, either by virtue of a delivery thereof, or from some other source as binding, and under such circumstances that he is legally bound to keep it for the benefit of the person who so delivers it, or whoever is, or rightfully becomes, entitled to the possession, and to give up possession at any time, on demand, to such person or persons. It is the most common form of bailment (q.v.), as every case where a person gives another something to hold, or keep for him, for however short a time, comes under this title and is subject to the rules of law governing it. The bailee or depositary, as the person who thus receives the property is called, must take such care of it as a reasonable man would of his own goods; but if he does this, he is not liable for any loss or damage occurring while it is in his hands. The depositary cannot use the property for his own benefit unless there is an express or implied agreement to that effect. Money in a bank to a person's credit, although ordinarily spoken of as a deposit, does not strictly come within the legal use of the term, and is for that reason sometimes designated as an "irregular" deposit. The reason for this is because the bank is only required to return an equivalent amount, and not the particular bills or specie originally delivered to it; and the chief characteristic of a true deposit is that the identical thing is to be kept and returned intact. See BAILMENT; COMMODATUM; DEBT; MANDATE; PLEDGE.

DEP'OSI'TION (OF. *deposition*, Fr. *déposition*, from Lat. *deponere*, to lay down). The testimony of a witness, legally taken and committed to writing, by or in the presence of a judge, referee, commissioner, notary public, or other duly qualified official person. It is usually taken by virtue of a commission or letters rogatory issuing out of the court in which the action is pending or which has jurisdiction of the subject matter if taken before trial.

The questions may be asked orally or may be submitted to the witness in the form of written interrogatories. The legal representatives of all parties to the action or proceeding are entitled to be present and to cross-examine the witness or submit cross-interrogatories to be answered. If the competency of the witnesses or the admissibility of the questions or answers is objected to, the objection may in some jurisdictions be stated to the court or officer taking the deposition, and he may either rule on the question at once, noting the objection, ruling, and exception, or reserve it for the opinion of the court from which the commission issued.

The laws of the state having jurisdiction of the litigation in which the evidence is to be used regulate the manner of taking the testimony, irrespective of the jurisdiction where it is taken. The competency and admissibility of the testimony are determined by the rules of evidence in force where it is offered in court. Depositions are used in all courts, and they may be ordered taken where witnesses are out of the jurisdiction, or, if within the state, if they are very old and infirm or in feeble health, in order to perpetuate their testimony in case of death before the trial. They cannot be used, however, where the witness himself can be produced. See EVIDENCE; TESTIMONY; LETTERS ROGATORY.

DEP'OSI'TION. The ecclesiastical penalty by which a clergyman is deprived of churchly authority to exercise the functions of his office. As long as ordination was connected with the right to serve in a particular church, the withdrawal of this right was equivalent to exclusion from all clerical rights; but with the development of the clergy as a privileged order, and when absolute ordinations and changes of place became common, deposition in the stricter sense was confined to the withdrawal of local rights, and the term "degradation" came into use in the twelfth century to signify entire removal of clerical rights. Owing to the belief among Roman Catholics that holy orders are indelible, the spiritual powers of a deposed priest are held to remain, but he has no right to exercise them, and if he attempts to do so commits an additional grave sin. In case the penalty is remitted upon his proved repentance, he needs, of course, no reordination. Bishops could formerly be deposed by their metropolitan with 12 other bishops as assessors; the right was later reserved to the Pope. The solemn degradation of a priest, after which there could be no reinstatement, included many awe-inspiring ceremonies, such as the removal, piece by piece, of all the sacred vestments designating the successive orders to which he had attained, the scraping of the thumb and finger which had been anointed at ordination, and the shaving of the head to obliterate the tonsure. At present deposition is rarely inflicted. Dismissal and suspension usually take its place. Only the bishop can depose a priest, and he requires for solemn degradation the assistance of at least six dignified clerics learned in the law.

In England a minister may be deposed by a bishop with the assistance of such of his advisers as may conveniently be had. In Scotland the power belongs to the Church courts. In the United States the power to depose is exercised by the various religious bodies. The reasons which may justify such action are scandalous or immoral conduct, preaching or publishing doctrines contrary to the Church standards, or contumacious disrespect for Church authority. See ORDERS, HOLY; DISCIPLINE, ECCLESIASTICAL. Consult Kober, *Die Deposition und Degradation nach den Grundsätzen des Kirchenrechts* (Tübingen, 1867), and Smitte, *Elements of Ecclesiastical Law* (New York, 1889).

DE'POT, *French pron.* dā'pō' (Fr. *dépôt*, OF. *depost*, from Lat. *depositum*, deposit, from *deponere*, to deposit, from *de*, down + *ponere*, to put). A place set apart for the storage of munitions of war or other army stores. All the supply departments of the United States army maintain reserve supplies of articles for which each is responsible. The places at which such

supplies are collected are designated quartermaster, ordnance, engineer, signal corps, or medical supply *depots*. They are located in different parts of the United States with reference to the facility for supplying troops in peace and in war. In addition to these there are five general *recruiting depots* located at Fort Slocum, N. Y., Columbus, Ohio, Jefferson, Mo., Fort Logan, Colo., and Fort McDowell, Cal., where recruits are received, trained, and distributed. Similarly for the collection of horses, *remount depots* have been established at Fort Royal, Va., Fort Reno, Okla., and Fort Keoh, Mont. In England and continental Europe generally the name refers specifically to the headquarters of regiments or divisions, or district headquarters of the territorial recruiting system, according to the country and its army organization. In England, in some instances, it has the same application as in the United States. An army in the field is supplied by depots designated from rear to front, as *base depots, intermediate depots, advance depots, subdepots.* Consult *Field Service Regulations* (U. S. Army, 1913).

DEP'PING, Georges Bernard (1784–1853). A French historical writer. He was born at Münster, Westphalia, settled in Paris in 1803, was employed for a time as a teacher in several institutions, and subsequently contributed to French and German periodicals. He wrote on a wide range of subjects. Two of his juvenile works attained wonderful popularity: *Merveilles et beautés de la nature en France* (1811); and *Les soirées d'hiver*, including the instructions of a father to his children on moral and scientific subjects. He assisted Malte-Brun in his geographical works and published a number of histories, books of travel, and biographies, including: *Histoire des expéditions maritimes des Normands* (1826); *Histoire du commerce entre l'Europe et le Levant depuis les croisades* (1832); *Les Juifs au moyen âge* (1834); *Livre des métiers* (1837); *Correspondance administrative sous le règne de Louis XIV* (4 vols., 1850 et seq.).

DEPRÈS, de-prâ', Josquin (c.1450–1521). A Flemish composer, and one of the greatest masters of that time, born at Condé, Hainaut. He was the successor of Okeghem and the immediate predecessor of Lassus and Palestrina in the evolution of music. Little is known of the details of his life, but there is record of his appointment as chapelmaster of Saint-Quentin and that he studied under Okeghem. From 1471 to 1484 he was at the court of Pope Sixtus IV. The library of the Sistine Chapel to this day treasures much of the fruits of his stay in Rome. During his lifetime he visited or held appointments from the greatest princes and courts of the world. Other composers of Josquin's school had developed the custom of taking a secular cantus firmus, the voice to which it was assigned singing the secular words, the remaining voices singing those of the mass proper. So grave an abuse did this custom become that a reform was brought about in Church music, and all such compositions were condemned. Josquin, however, had consistently striven to realize the emotional content of the words of the mass in his compositions so far as he was able. The invention of music printing by movable types at a time (1498) when Josquin was at the height of his fame as a composer did much to make his music universally popular. Consult Menil, "Josquin de Près," in *Revue Internationale de Musique, No. 21* (Paris, 1899).

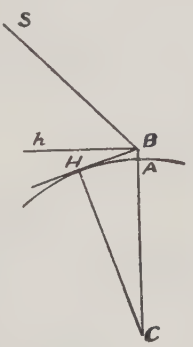
DEPRES'SION (Fr. *dépression*, from Lat. *deprimere*, from *de*, down + *premere*, to press), or Dip of the Horizon. The angle through which the sea horizon appears depressed in consequence of the elevation of the spectator above the surface of the water.

Let *A* be a point on the surface of the earth, *B* a point situated in a vertical line from *A*. Let *BH* be a tangent to the earth's surface drawn from *B*, *Bh* a line in the same vertical plane perpendicular to *AB*. The angle *hBH* is the *true* dip of the horizon to a spectator at *B*.

The true dip measured in minutes is equal to the distance in nautical miles of the visible horizon. Let *C* be the centre of curvature of the surface; then, since *CHB* is a right angle, the angle *hBH* = *HCA;* and the minutes in this angle are the nautical miles in the arc *AH*.

The true dip of the horizon, however, is not exactly the same as its apparent depression. The apparent sea horizon is raised above its true place by atmospheric refraction through an angle which varies according to the state of the atmosphere and the relative temperatures of the air and water, the variation ranging from one-third to one-twenty-third of the amount of the true dip. The rule commonly employed is to diminish the true dip by about one-fourteenth of its amount, to find the apparent dip.

If *S* be a star or the sun in the same vertical plane with *ABH*, and an observation of the altitude above the sea horizon be made by means of a sextant from the point *B* (as from the deck of



a vessel), the apparent dip of the horizon must be subtracted from the observed angle in order to find the altitude of the sun. Owing to the uncertainty of the amount of refraction, the nearest minute to the dip given in the tables is usually taken. The following table gives a notion of the amount of the apparent dip under ordinary conditions, the air and water being supposed to be at the same temperature:

Height, feet	Dip ′ ″	Height, feet	Dip ′ ″
0	0 0	8	2 46
1	0 59	9	2 56
2	1 23	10	3 6
3	1 42	20	4 23
4	1 58	30	5 22
5	2 11	40	6 12
6	2 24	50	6 56
7	2 36	100	9 48

DEPRETIS, dâ-prā'tês, Agostino (1813–87). An Italian statesman, born at Mezzana, in Stradella, Piedmont. He studied and practiced law in Turin, and, as an adherent of Mazzini,

early took an active part in the national movement towards bringing about the unity of Italy, especially after his election to the Piedmontese Chamber in 1848, where he vigorously supported the Opposition. He established in Turin the Liberal journal *Il Progresso*. Cavour appointed him civil Governor of Brescia in 1859, and Garibaldi named him pro-dictator at Palermo in 1860, where he displayed great zeal in urging the adherence of Sicily to the United Kingdom. He held various portfolios in the cabinet in the years 1862, 1866, 1876, and 1879, and was Prime Minister in 1876–78, 1878–79, and 1881–87. He became the leader of the Opposition after Rattazzi's death in 1873, and from 1876 on grew to be a more and more conspicuous figure in modern Italian history, promoting the adoption of many measures, such as the abolition of oppressive taxes, the creation of free ports, and electoral reform. He died at Stradella, where a monument was erected to his memory in 1893.

DEPREZ, de-prâ′, MARCEL (1843–). A French engineer and pioneer electrician. He undertook an expensive series of experiments at Munich in 1872 and in 1882 announced that he had succeeded in transmitting power by telegraph wire for a distance of 35 miles, between Munich and Miesbach, which is said to have been the first successful experiment in the transmission of electric power through a considerable distance. Further experiments were successfully carried out on the line of the Northern Railway of France. He became a member of the Academy, professor of electricity at the Conservatoire des Arts et Métiers, and professor of physics at the Collège de France.

DE PROFUN′DIS (Lat., Out of the depths). The first words of Psalm cxxx, which forms a portion of the office of the dead in the Roman Catholic church.

DE PRONVILLE, ALEX. See TRACY, MARQUIS DE.

DEPTFORD, dĕt′fĕrd (formerly *Depeford*, deep ford). A former town of Kent and Surrey, England, at the mouth of the Ravensbourne, on the right bank of the Thames, 3 miles southeast of London Bridge, now a metropolitan and parliamentary borough of Greater London (Map: London, E 8). The London cattle market here, covering 30 acres, occupies the site of the historic admiralty dockyard, established by Henry VIII, where Queen Elizabeth in 1581 knighted Drake in the ship in which he had encompassed the world and where in 1698 Peter the Great toiled as a shipwright. It was closed in 1869, but the immense victualing yard for the British navy with its extensive establishments remained, and there are also important marine engineering establishments and electric-lighting plants for illuminating the metropolis. Deptford is a favorite residential section for London merchants. Pop., 1901, of parliamentary borough, 110,398; 1911, 109,398.

DEPUTY (OF. *depute*, Fr. *député*, from ML. *deputare*, appoint, select). One authorized by law to exercise all, or certain, of the functions of an office held by another, as an assistant to the incumbent, and accountable to him. Acts done by a deputy in his official capacity are of the same force and effect as if done by the officer himself. A deputy does not need special authority for each particular act, but proceeds under the general powers vested in him by law, although usually his superior may limit his duties and supervise his work. An officer is generally responsible for the acts and conduct of his deputies to some extent and therefore is usually given the power of selecting and appointing them.

A deputy is required to take an oath of office; his salary is usually fixed by law; and he is frequently required to give a bond for the honest and faithful performance of his duties. Generally only administrative and executive officers, such as sheriffs, constables, county clerks, etc., are authorized to appoint deputies, as judicial officers, even of very limited jurisdiction, are usually accountable only to the government, and not to other officers of a higher rank. See CORONER; MARSHAL; SHERIFF.

DEPUTY (in French politics). See POLITICAL PARTIES, *France*.

DE PUY, *de* pū, WILLIAM HARRISON (1821–1901). An American Methodist Episcopal clergyman, born at Penn Yan, N. Y. He was educated at Genesee College, Union University, and Mount Union College. He was professor of mathematics in Genesee Wesleyan Seminary (Lima, N. Y.) (1851–55); editor of the *Buffalo Christian Advocate* (1855–59); editor of the *Methodist Almanac*, later called the *Methodist Year Book* (1866–89); assistant editor of the *Christian Advocate* of New York (1865–84). He was also editor of the *Daily Christian Advocate* for the general conferences of 1860 and 1872. His publications include: *Three Score Years and Beyond* (1872); *Compendium of Useful Information* (1878); *Home and Health and Home Economy* (1880); *The People's Cyclopædia of Useful Knowledge*, in 2, 3, and later 4 vols. (1882); *The Methodist Centennial Year-Book, 1784–1884* (1884); *The People's Atlas of the World* (1886); *American Revisions and Additions to the Encyclopædia Britannica* (1891); *University of Literature* (1896). Several of his works have had a large circulation.

DE QUEIROZ. See EÇA DE QUEIROZ.

DE QUIN′CEY, THOMAS (1785–1859). A great English prose writer. He was born, Aug. 15, 1785, in Manchester, where his father, of the same name, had been a successful merchant in the foreign trade and left at his death an estate producing about £1600 a year; to his son he seems to have bequeathed his love of books. The future essayist as a child was retiring and sensitive; and even before his opium eating had begun, his natural tendency was to live in a dreamworld of his own creation. His somewhat pugilistic elder brother tried without success to develop his character by street fights with town boys. Yet in some directions he made remarkable progress in his studies, especially in Greek, at the grammar schools of Bath and Manchester. "That boy," said one of his teachers, "could harangue an Athenian mob better than you or I could address an English one." At the Manchester school he suffered much from ill health and was unhappy with his fellow students. In 1802 he finally ran away and had a brief adventurous career among the Welsh hills and in London, where he remained a year and nearly starved before he was discovered by his family and sent to Worcester College, Oxford. Here he spent five years, though he left the university without a degree. During this period, in 1804, he resorted for the first time to opium as a cure for severe rheumatic pains in the head; and the habit grew upon him as rapidly and to almost as disastrous an extent as

it did upon Coleridge, gaining a hold upon him which he was never able entirely to shake off, though by 1821 he had succeeded in reducing the quantity sufficiently to allow regular and sustained work. In 1808 he took up his residence on the borders of Grasmere, attracted thither by his affectionate veneration for Wordsworth and Coleridge. Here he enjoyed their society and that of Southey and "Christopher North," read widely in classical, German, and English literature, and began to produce his own magnificent contributions to the latter. Except for his tragic struggle with the opium habit, the events of his later years are not very diversified or striking, and it is difficult to trace them accurately from his own autobiographical remains, which have at times the vagueness and inconsequence of his opium dreams. In 1816 he married and during the rest of his life supported himself and his family almost entirely by his pen, though often embarrassed by the money difficulties which seem inseparable from a certain type of literary genius and which in his case were aggravated by occasional relapses into his besetting sin. From 1819 to 1820 he edited the *Westmoreland Gazette*. After several years (1821–28) spent in London he found it convenient to be nearer *Blackwood's Magazine*, to which he made the first of many contributions in 1826. He therefore settled in Edinburgh, where his family joined him in 1830. After the death of his wife, in 1837, he had his headquarters with his daughters in a cottage at Lasswade, but for his privacy in writing he took lodgings in Edinburgh, often maintaining several workshops of the sort at one time. In one of these lodgings he died, Dec. 8, 1859.

Nearly all his work appeared first in periodicals—*Blackwood's*, *Tait's*, and the *London Magazine;* but its remarkable qualities led to its preservation from the fate of merely ephemeral literature. His first great success was the *Confessions of an English Opium-Eater*, which appeared in the *London Magazine* in 1821 and attracted universal attention. Only a small part of it is devoted to the results of the drug, the rest being a fascinating, if discursive, sketch of the scenes and surroundings of his life up to that time. It was ultimately supplemented by the darker *Suspiria de Profundis* (1845), made up of the marvelous and terrible imaginings inspired by opium. His grim humor is well represented by *Murder Considered as One of the Fine Arts* (1827), and the penetration of his imaginative criticism by his essay *On the Knocking at the Gate in Macbeth* (1823). Special mention may also be made of his *Letters to a Young Man* (1823), of *The Flight of a Tartar Tribe* (1837), and of his essays on *Style and Rhetoric* (1840); on *Joan of Arc* (1847), and *The English Mail Coach* (1849). A series of about 30 articles, collected in 1853 under the title of *Autobiographic Sketches*, is also of great interest. In criticism De Quincey must be regarded very highly; his view of things might be called essentially analytical. His *Literary Reminiscences* embraces broad views of Lamb, Coleridge, Wordsworth, Southey, and others, and there are also studies of Shelley, Keats, Goldsmith, Pope, Godwin, Hazlitt, Landor, etc. It is difficult to find critical matter so luminous and scientific, and the style, at its best incomparable, is as brilliant as the judgments are just.

His great importance to literature lies in the new possibilities which he revealed in English prose. He has himself in the *Confessions* associated together the names of the seventeenth-century authors who come nearest to being his models in style: "Donne, Chillingworth, Sir Thomas Browne, Jeremy Taylor, Milton, South, Barrow, form a pleiad of seven golden stars such as no literature can match in their own class." But the claim involved in his designation of the *Confessions* and *Suspiria* as "modes of impassioned prose ranging under no precedents that I am aware of in any literature," may be justified by the fact that the gorgeous, colorful, and rhythmical prose in which De Quincey equaled or surpassed his predecessors was in his hands a deliberate and formal style, whose "purple patches" are seldom out of place, and whose majestic and soul-stirring harmonies can be paralleled only among musical instruments by the rich fullness of a great organ. Ruskin is his most conspicuous successor in this style, but it had a wide influence throughout the remainder of the century. His writing is far from faultless; it has two considerable defects—a tendency to lapse, in the midst of a lofty strain, into pointless triviality, and a discursiveness which renders it impossible for him to go straight along the highroad of his main thought without darting off to right and left to explore little green lanes of whimsical fancy or erudite allusion. He will never, perhaps, be a popular writer. He postulates in the reader who is to enjoy him fully too similar an equipment in culture, in imagination, in wide knowledge of books and men; but for that very reason he must remain all the more valued by those who are able to appreciate him—an intellectual luxury and stimulus alike. According to his own famous distinction between the "literature of knowledge" and the "literature of power," it is to the latter class that his own work belongs; and of it may be predicated his general conclusion that such literature will remain "triumphant forever, as long as the language exists in which it speaks."

The first collected edition of his writings appeared in Boston, U. S. A. (1852–55), in 20 vols.; a more complete edition followed in 1877 in 12 vols. The first English edition appeared in 1853–60 in 12 vols.; a more complete edition in 1862 in 15 vols. For other editions and for criticism, consult: *Collected Writings*, ed. by Masson (14 vols., London, 1889–90); some additional *Uncollected Writings*, ed. by Hogg (ib., 1890); *Posthumous Works*, ed. by Japp (ib., 1891–93); Japp ("H. A. Page"), *Life and Writings of De Quincey* (2 vols., ib., 1877); Masson, *De Quincey* (ib., 1881); Findlay, *Personal Recollections of De Quincey* (ib., 1885); also essays by Saintsbury in *Essays in English Literature, 1780–1860* (1st series, ib., 1890); and Stephen, *Hours in a Library* (ib., 1874–79). There is an excellent study from the scholastic point of view in Minto, *Manual of English Prose Literature* (New York, 1886). Consult also *De Quincey and his Friends*, ed. by Hogg (1895); W. A. Dunn, *Thomas De Quincey's Relation to German Literature and Philosophy* (Strassburg, 1900); H. S. Salt, *De Quincey* (London, 1904); Arvède Barine, *Poètes et névrosés* (2d ed., Paris, 1908).

DE QUINCY. See QUATREMERE.

DE RABUTIN-CHANTAL. See SÉVIGNÉ.

DERA GHAZI KHAN, dĕr'â gâ-zē' kän. The capital of a district of the same name, Punjab, British India, on the right bank of

the Indus, 45 miles southwest of Multan (Map: India, B 2). Of many large and handsome mosques the chief are those of Ghazi Khan, Ghuta Khan, and Abdu'l Jawar. The chief industries of the district are agricultural; wheat and indigo are exported. The town has silk mills, a cotton-ginning factory, flour and oil mills. Pop., 1901, 23,731; 1911, 18,466.

DERAH, dĕ-rä'. The Egyptian unit of measure of length. The one most in use is 22.37 English inches, or 57 centimeters. The derah is divided into the *kadam*, one-half; the *abdat*, one-sixth; and the *kerat*, one-twenty-fourth. The derah by which dry goods are sold is 25½ inches, while the derah of Constantinople is 66.34 inches.

DERA ISMAIL KHAN, ēs'mà-ēl' kän. The capital of a district of the same name, Northwest Frontier Province, British India, 120 miles northwest of Multan (Map: India, B 2). The town, situated 4 miles from the right bank of the Indus, is of modern construction, dating from 1823, when a flood swept away the old town on the river bank. It is surrounded by a thin mud wall with nine gates. An important trade is carried on with Afghanistan, the town being on several of the main caravan routes; and there are two well-equipped bazars where the local manufactures of inlaid woodwork, scarfs, and cotton cloth are traded. Wheat and wool are exported. A military cantonment is stationed here. The old town was founded in the fifteenth century by Ismail Khan, a Baluchi chief whose dynasty lasted through three centuries. Pop., 1901, 31,737; 1911, 35,131.

DERAIYEH, or **DERAYEH,** de-rī'ye (from Ar. *dair*, camp, house). A ruined city of Arabia in the District of Nejd. It was formerly the capital of the Wahabis and residence of the Sultan of Nejd and was a town of considerable importance (Map: Turkey in Asia, R 11). It was destroyed by the Egyptian forces under Ibrahim Pasha in 1818, and since then it has been little more than a small settlement in the midst of the ruins of the old city, with a population of about 1500.

DERAJAT, dĕr'à-jät' (Ar., camps, pl. of *dair*, camp, house, from *dāra*, to abide). A level plain of the Punjab, British India, in the valley of the Indus. It derives its name from three districts: Dera Ghazi Khan (the most important), Dera Ismail Khan, and Dera Fateh Khan.

DERBE, dĕr'bē (Gk. Δέρβη). An ancient city of Asia Minor. Little is known of its history, though from notices in Strabo (535, 567, and 569) it may be inferred that it was a place of some importance. It was the chief city of a district which lay west of the old southern Cappadocian Kingdom of Amyntas and was originally a part of old Lycaonia. In the confusion resulting from the breaking up of the Greek kingdoms of Asia Minor, Derbe, in the first century B.C., became the independent capital of one Antipator, called by Strabo a "pirate," who was conquered by Amyntas about 28 B.C.

Throughout the various changes of local governments incidental to the Roman administration of Asia Minor Derbe continued in possession of the kings of Cappadocia until 41 A.D., when it was incorporated by Claudius into the large Province of Galatia.

Derbe was the last city reached by Paul on his first missionary journey (Acts xiv. 6, 20 f.). Here a Christian church was founded by the Apostle. On his second and third journeys he again visited the place (Acts xvi. 1; xviii. 23). Since Derbe and its district were governmentally a part of the *Provincia Galatia* in Paul's day, it was probably one of the cities whose Christians were addressed by Paul in the Epistle to the Galatians. See GALATIANS, EPISTLE TO THE.

The district has been carefully examined by Ramsay, after Sterrett, and the site of Derbe fixed as that now occupied by the ruins on and near the mound of Gudelissin, about 45 miles south by east of the modern Konieh (Iconium). Consult: W. M. Ramsay, *The Historical Geography of Asia Minor* (London, 1890); id., *St. Paul the Traveler and Roman Citizen* (New York, 1898); id., *The Cities of St. Paul*, pp. 385–404 (London, 1907), where practically all that is known of the city's history will be found.

DERBENT, or **DERBEND,** dĕr-bĕnt' (Pers. *Darband*, bond of the gate; Ar. *Bāb al-Abrāb*, gate of the gates, or *Bāb al-Kadīd;* Turk. *Demirkapu*, gate of iron). A seaport in the Caucasian Province of Daghestan, situated on the Caspian Sea and on the railway line from Baku to Petrovsk (Map: Russia, G 6). Its military and commercial importance was considerable before this century. It is surrounded by strong walls and commanded by a citadel. The surrounding district is abundant in gardens, fruit being the chief article of commerce. Cotton and tobacco are also cultivated. The exploitation of bituminous deposits constitutes the city's chief industry. The harbor is unprotected and shallow. The Caucasian or Derbend Wall, a line of fortifications of the sixth century and formerly strengthened by high towers and formidable gates, begins in the vicinity of the town. Another interesting relic of antiquity in the vicinity is the monument of Kirk-Lar or "forty heroes," dating from the conquest of Daghestan by the Arabs in the seventh century. Derbend was taken by the Mongols in 1220 and, after many changes of masters, by the Russians in 1722. After the Treaty of 1723 the town was returned to Persia, only to be formally annexed to Russia in 1813. Pop., about 15,000, of which 57 per cent are Mohammedans.

DERBY, där'bĭ (Dan. *Derwentby, Deoraby,* near the Derwent, Lat. *Derventio*). A municipal and parliamentary borough and manufacturing town, the capital of Derbyshire, England, in the wide and fertile valley of the Derwent, thence navigable to the Trent, at the junction of the main branches of the Midland Railway, 129 miles north-northwest of London, and 40 miles north-northeast of Birmingham (Map: England, E 4). The town lies mainly on the west bank of the Derwent. The houses are mostly of brick and the public buildings of stone. The most notable of the latter are All Saints' church, with a beautiful Perpendicular tower, 175 feet high, dating from the sixteenth century, the quaint little fourteenth-century chapel of St. Mary-on-the-Bridge, the Roman Catholic church of St. Mary, built by Pugin, a large market hall and corn exchange. Derby sends two members to Parliament. It owns and operates its electric tramways, water supply, an electric-light plant, public baths and washhouses, cemeteries, markets, and slaughterhouses. The net income from corporate property in 1910 was about $40,000. It maintains a technical school, a free library, museum, and art gallery. The

free grammar school founded in 1160 is one of the oldest institutions of its kind in England. There is also a large general infirmary. Derby is well situated for manufacture and trade, being connected by canals and railways with a great part of England. The Midland Railway has established large works here, which employ over 12,000 men. Since about 1750 Derby has been famous for its porcelain manufacture. Other manufactures are silk, cotton, lace, hosiery, and elastic fabrics. The first silk mill in England was erected on an island in the Derwent in 1718 by John Lombe. There is a resident United States Consular Agent. Pop., 1901, 114,848; 1911, 123,433. Derby is the birthplace of Herbert Spencer, and Erasmus Darwin wrote many of his works and died here. Opposite Derby was the Roman station *Derventio*, which stood on the east bank of the river. Roman brass, silver, and gold coins have been found, as well as a Roman pavement, and the foundations of a Roman bridge. Derby was first incorporated in the reign of Henry I. It was the southernmost point reached by Charles Edward, the Young Pretender, in his attempted march to London in 1745.

DERBY, dĕr'bĭ. A city in New Haven Co., Conn., 10 miles west of New Haven, at the confluence of the Naugatuck and Housatonic rivers, and on the New York, New Haven, and Hartford Railroad (Map: Connecticut, C 4). An important industrial centre, its manufactures include pins, typewriting machines, pianos, organs, piano players, heavy castings, engines, dairy and other machinery, files, woolen underwear, corsets, hosiery, combs, hairpins, curling irons, keys, guns, and ammunition. There are many places of interest in the vicinity—Sentinel Hill, Indian Well, Lake Housatonic, and the Housatonic Dam, 25 feet high and ¼ of a mile in length. Derby contains also the Griffin Memorial Hospital and two libraries. The government is administered by a mayor, elected biennially, and a unicameral council. City meetings are held to issue bonds and for action on matters over which power is not vested in the common council. Pop., 1890, 5969; 1900, 7930; 1910, 8991; 1914 (U. S. est.), 9441; 1920, 11,238. The town was settled about 1646 and was known as Paugassett until incorporated as Derby (from Derby, England) in 1675. It was the birthplace of Gen. David Humphreys, prominent in the Revolution. Until 1889 Ansonia was included within its limits. The city of Derby was formed in 1893 by the consolidation of the town of Derby and the borough of Birmingham, founded in 1834. Consult Orcutt and Beardsley, *The History of the Old Town of Derby* (Springfield, 1880), and *The Town Records of Derby 1655–1710* (Derby, 1901).

DERBY. A border town in Orleans Co., Vt., 100 miles by rail north by east of Montpelier, on the Boston and Maine Railroad, overlooking Lake Memphremagog (Map: Vermont, E 2). It contains the Derby Academy and a public library. Farming, dairying, and lumbering are carried on, and large quantities of granite, which is extensively quarried here, are shipped. Pop., 1900, 3274; 1910, 3639.

DERBY, dĕr'bĭ, or där'bĭ, Edward George Geoffrey Smith Stanley, fourteenth Earl of (1799–1869). An English statesman. He was born at Knowsley Park, in Lancashire, on March 29, 1799, was educated at Eton and at Christ Church, Oxford, and in 1820, immediately after leaving the University, he was made a member of Parliament. In 1830 he became Irish Secretary in the Whig ministry of Earl Grey, and by his ability as a debater he rendered very material assistance in the passage of the Reform Bill of 1832. Among his Irish measures were the Education Act, establishing a national board and admitting all children to the schools, but providing for Protestant religious instruction; the Irish Church Temporalities Act, abolishing 10 bishoprics and removing the grievances of first fruits and church rates; and a coercion bill for the trial of Irish rioters by courts-martial. This last measure rendered him unpopular with the advanced Liberals, and he was transferred to the colonial secretaryship in 1833. In that year he distinguished himself by securing the passage of the bill for the abolition of slavery in the West Indies. Becoming alarmed at the intention of the Whigs to appropriate the surplus of the Irish church revenues to purposes of secular education, he left the party in 1834. He soon united with the Tories, and in 1841 he became Colonial Secretary in Peel's ministry. This position he held until 1845, when he resigned because he was opposed to the repeal of the corn laws. He was the recognized head of the Protectionist opposition in the House of Lords, which he had entered as Baron Stanley in 1844, and soon became the leader of the Conservative party. In 1851 he succeeded his father as Earl of Derby. In 1852 the first Derby ministry was formed. But it was of short duration, as were also his second term of office (1858–59) and his third (1866–68), and Disraeli (q.v.) was the leading spirit in all of them. In 1868 he resigned the premiership to Disraeli, and in the following year he died.

Derby was a typical Lancashire magnate of the old school. Traditionally Whig, he left that party because of his repugnance to the rising democracy. While not a statesman of the first rank, he was nevertheless possessed of great ability. His doctrine of free trade with the colonies alone anticipates Conservative doctrine of our own day, and to him, as well as to Disraeli, is due the transformation of the Tories into the modern Conservative party. He was a debater of great ability, excelling especially in invective, and his skill earned him the title of "the Rupert of debate." His passages with O'Connell on the repeal of the Union and the disestablishment of the Irish church are well known. He was a man of high scholarly attainments, who distinguished himself at the university, and was afterward famous for his Latin speeches. He was elected Chancellor of Oxford in 1852 and devoted the leisure of his later years to a metrical translation, or rather paraphrase, of the *Iliad* (published in 1864).

For Derby's speeches, consult Hansard, *Parliamentary Debates* (London, 1803 et seq.). For his life, Kebbel, *English Statesmen Since the Peace of 1815: Derby* (London, 1869), and Saintsbury, in Reid, *Prime Ministers of Queen Victoria* (New York, 1892). Consult also Kebbel, *History of Toryism* (London, 1866), and Hamilton, in the *Dictionary of National Biography*, vol. liv (ib., 1898).

DERBY, Edward Henry Stanley, fifteenth Earl of (1826–93). An English statesman, son of the preceding. He studied at Rugby under Arnold and at Trinity College, Cambridge, where he was one of "the Apostles," and from

1848 to 1869 was a member of the House of Commons. In 1852 he was Undersecretary for Foreign Affairs in his father's cabinet, in 1858 Secretary for the Colonies and the first Secretary of State for India, and in 1866–68 and 1874–78 was Secretary for Foreign Affairs. He definitely left the Conservatives in 1880 and joined the Liberal party. From 1882 to 1885 he was Secretary for the Colonies in Mr. Gladstone's second administration and in 1884 negotiated the London Convention with the Boers. In 1886–91 he was a leader of the Liberal Unionist party. From 1891 until his death he was chancellor of the University of London. Consult the sketch by Lecky prefixed to Lord Derby's *Speeches* (London, 1894), by Sanderson and Roscoe.

DERBY, Frederick Arthur Stanley, sixteenth Earl of (1841–1908). A British statesman. After serving in the Guards for a short time, he entered the House of Commons as a Conservative. He was Financial Secretary for War (1874–77), and Financial Secretary to the Treasury (1877–78), in the Disraeli cabinet Secretary of State for War (1878–80), and in the first Salisbury cabinet Secretary of State for the Colonies (1885–86), and he served as President of the Board of Trade (1886–88). Created Baron Stanley of Preston in 1886, he was two years later appointed Governor-General of Canada, where he remained until 1893. In the latter year he succeeded his brother Edward Henry Stanley, as Earl of Derby. From 1900 to 1903 he was Financial Secretary to the War Office and from 1903 to 1905 Postmaster-General.

DERBY, dĕr'bĭ, George Horatio (1823–61). An American humorist, commonly known as "John Phœnix," born at Dedham, Mass. He graduated at West Point in 1846 and served in the Mexican War with gallantry. He was on the staff of the commanding general of the Department of the Pacific from 1854 to 1856 and did other engineering service, in the course of which he suffered the sunstroke that caused his death. He has a distinct place among American humorists for *Phœnixiana* (1855) and the *Squibob Papers* (1859), chiefly burlesque sketches of his official experiences, full of whimsicality and important as introducing the rough but amusing humor of the Pacific coast into American literature. Among his best squibs may be mentioned his *Musical Review Extraordinary* and his *New System of English Grammar.*

DERBY, Orville Adelbert (1851–1915). An American geologist, appointed chief of the geographical and geological surveys of São Paulo, Brazil, in 1886. He was born at Kelloggsville, N. Y., and graduated in 1873 at Cornell University, where he was instructor in geology from 1873 to 1875. He visited the Amazon valley in 1870–71 and was connected with Prof. C. F. Hartt's geological commission of Brazil from 1875 to 1878. In 1878 he was appointed curator of the geological department of the National Museum. He published several papers on the geology and geography of Brazil and headed many hydrographical, geographical, and geological surveys. In 1891 he published the first detailed topographical maps of South America based on actual surveys. In 1885 he organized the geographical and geological commission of São Paulo, serving as chief officer until 1904. In 1907 he went as chief officer of another geological survey of Brazil.

DERBY DAY, dăr'bĭ. An important day in the calendar of English horse-racing events. The name is derived from the "Derby Stakes" race, run on the second day (Wednesday) of the Epsom Summer Meeting, which takes place about the end of May or, in rare instances, at the beginning of June. The race itself was instituted in 1780 by the Earl of Derby, whence the name. The course is 1 mile, 4 furlongs, and 29 yards in length. Originally the weights carried were 112 pounds for colts and 109 pounds for fillies, but after several changes they are now permanently set at 126 pounds for colts and 121 pounds for fillies. Entries are usually made when the animals are yearlings, two years before the race takes place. The event owes its importance to the fact that the entries in the Derby race represent the highest development of race-horse breeding, besides affording an indication of the probable winners of the subsequent important races. The proximity of the race course (Epsom Downs, Surrey) to London makes possible the tremendous and heterogeneous attendance which is so conspicuous a feature of the race, and which, together with its value as a sporting event, has given the day its present importance. Parliament is adjourned over Derby Day, though of late not without protest on the part of a few of its members, and business generally is suspended as far as London is concerned. In America the term "Derby," preceded by the name of the track or "meeting," has been applied to the day on which the chief race of the year of such meeting is run. See Horse; Horse Racing.

DERBYSHIRE, dĕr'bĭ-sher *or* dăr'bĭ-. An inland county of England, lying between Yorkshire on the north and Leicestershire on the south (Map: England, E 3). Its area is 1029.5 square miles. It is hilly in the north and level in the south, with a very fertile soil. The Derby Highlands, which reach their maximum altitude in the Peak, 1880 feet, and the Kinder Scout, 2088 feet, form the Peak District, noted for its beautiful scenery, especially along the valleys of the Derwent and the Wye. The largest river is the Trent (which empties into the Humber), and the stream next in importance is one of its tributaries, the Derwent. Matlock and Buxton, among the hills, are fashionable health resorts on account of their warm mineral springs. Throughout the county there are numerous Celtic and Roman remains, mediæval ruins of abbeys, monasteries, and feudal castles, and among the many handsome, noble residences are Haddon Hall and Chatsworth, the seat of the Duke of Devonshire. Derbyshire is more a manufacturing and mining than an agricultural county, though its agricultural industries are important. In the northern portions sheep are raised. In the middle and southern sections good crops of wheat are produced. About seven-tenths of the country is cultivated land. The industries include the manufacture of woolens, cottons, silks, lace, and elastic web. The chief towns are Derby, Buxton, and Belper. Population of ancient or geographic county in 1891, 528,033; 1911, 683,423; of administrative county, 1901, 484,896; 1911, 560,013.

DERBYSHIRE NECK. See Goitre.

DERBYSHIRE SPAR. A name given to the splendid crystals of fluorite found in Derbyshire, England.

DER'CUM, Francis Xavier (1856–). An American neurologist, born in Philadelphia. He received the degrees of M.D. and Ph.D. from the University of Pennsylvania in 1877. In 1887 he became neurologist to the Philadelphia Hospital and in 1893 consulting physician to the Asylum for the Chronic Insane at Wernersville, Pa., and after serving the University of Pennsylvania from 1883 to 1892 as instructor in nervous and mental diseases he was appointed professor of the same subjects in the Jefferson Medical College. He was president of the American Neurological Association in 1895–96. Besides editing *Text-Book on Nervous Diseases by American Authors* (1895), he is author of "Rest, Mental Therapeutics and Suggestion," vol. viii of Cohen's *System of Physiologic Therapeutics* (1903), and *A Clinical Manual of Mental Diseases* (1913).

DERCYL'LIDAS (Lat., from Gk. Δερκυλλίδας, *Derkyllidas*). A distinguished Spartan general and diplomat of the fourth and third centuries B.C. He was sent in 411 B.C. to the Hellespont to arouse the cities to revolt against the supremacy of Athens and in 399, as successor of Thibron, received command of the army stationed in Asia for the defense of the Ionic Greeks against the Persians. At this time Xenophon and the other survivors of the followers of Cyrus the Younger served under him. He took advantage of the hostility existing between Pharnabazus (q.v.) and Tissaphernes (q.v.), concluded a truce with the latter, and successfully invaded Æolis, the satrapy of the former. In 398 he built a wall to guard the Thracian Chersonese against the inroads of the Thracians. He endeavored in 397, by threatening Caria, to obtain the independence of the Ionic Greeks and in 396, when Agesilaus (q.v.) had arrived in Asia, was one of the commissioners for the arrangement of an armistice with Tissaphernes. In 394 he conveyed to Agesilaus and the Greek cities of Asia the tidings of the battle of Corinth. At the time of the battle of Cnidus he was Spartan harmost at Abydus and succeeded in holding that town for the Spartans. He disappears from history after 389 B.C.

DER'ELICT (Lat. *derelictus*, from *de-* + *relinquere*, to abandon). Personal property cast away or abandoned by the owner, especially at sea. The seizure or "occupancy" of derelict property is one of the recognized modes of original, as distinguished from the derivative, acquisition of title. In order to constitute an article derelict, so as to make it available to the first person who chooses to make it his own, it is not sufficient that it should be lost, but it must have been deliberately cast away or abandoned, without expectation or intention of recovering it. Goods thrown away by a thief in his flight, known as *bona waviata*, are not properly derelict, inasmuch as he has no title to them. The same thing is true of treasure trove. The question of abandonment is one of fact, to be determined from the conduct of the owner at the time of the loss. A vessel or goods found abandoned on the high seas are presumed to be derelict, but not so personal property found without an occupant on land or even in a harbor or river; and the presumption in the former case may be rebutted by showing the circumstances under which the abandonment occurred. See Acquisition; Accretion; Salvage; Wreck. Consult: Blackstone, *Commentaries on the Laws of England;* Schouler on *Personal Property* (3d ed., Boston, 1896); Maclachlan, *Treatise on the Law of Merchant Shipping* (4th ed., London, 1892).

DER-EL-KAMAR. See Deir-el-Kamar.

DERENBOURG, de-rän'bo͝or', Hartwig (1844–1908). A French Orientalist. He was born in Paris, a son of Joseph Derenbourg, and studied there and at the universities of Göttingen and Leipzig. On his return to Paris in 1867 he was employed in the Bibliothèque Nationale and edited the catalogue of Arabic manuscripts. From 1875 he taught Arabic at the Ecole des Langues Orientales, was made professor there in 1879, and professor of religious science at the Ecole des Hautes Etudes in 1886. His numerous publications include: *De Pluralium Linguæ Arabicæ et Æthiopicæ Formarum Origine et Indole* (1867); *De Dîwân de Nâbiqâ Dhobyânî* (2 vols., 1869); *Le livre de Sîbawaihi, texte arabe* (2 vols., 1881–89), his principal work; *Les manuscrits arabes de l'Escurial* (1884); *Chrestomathis élémentaire de l'arabe littéral* (1885; 2d ed., 1892); *Ousâma Ibn Mounkidh, un émir syrien au premier siècle des croisades* (1886–89); *La science des religions et l'Islamisme* (1886); *Les monuments Sabéens et Mimyarites de la Bibliothèque Nationale* (1891); *Oumara du Yémen, sa vie et son œuvre* (1902).

DERENBOURG, Joseph (1811–95). A French Orientalist. He was born at Mainz, of Jewish parents, his real name having been Dernburg. He studied at the universities of Giessen and Bonn and, having spent some years at Amsterdam as private tutor, went to Paris in 1838 to complete his study of Oriental languages. In 1852 he was made corrector at the Imprimerie Nationale, in special charge of the Oriental publications. He was elected a member of the Academy of Inscriptions in 1871 and was appointed to the chair of Talmudic science at the Ecole Pratique des Hautes Etudes in 1877. His principal work is the *Essai sur l'histoire et la géographie de la Palestine* (1867). He edited the fables of Lokman (1846), with an introductory essay on their Christian origin, the Makamat of Hariri, *Les séances de Hariri* (1847–53), in collaboration with Reinaud, and an edition of Saadia in collaboration with his son Hartwig (1893). His other works comprise: *L'Histoire de la Palestine d'après le Talmud et les autres écrits rabbiniques* (1867); *Manuel du lecteur* (1871); *Notes épigraphiques* (1877); *Deux versions hébraïques du livre de Kalîlâh et Dimnâh* (1881); *Johannis de Capua: Directorium vitæ humanæ* (1889), being a Latin translation of the former work; *Version arabe des proverbes surnommés livre de la recherche de la sagesse de Saadia ben Josef al-Fayyoûmî* (1894); *Le livre des parterres fleuris* (1886); *Commentaire de Maïmonide sur la Mischnah Seder Tohorot* (1886–91); besides contributions to the *Journal Asiatique* and the *Revue Critique.*

DE REPUB'LICA (Lat., On the State). A philosophical treatise on politics by Cicero (c.54–51 B.C.), in six books. It was lost during the Middle Ages, but fragments were found on a palimpsest early in the nineteenth century. About one-third of the work is preserved, including the *Somnium Scipionis,* with which it closed.

DE RESZKE, Edouard and Jean. See Reszke, Edouard de; Reszke, Jean de.

DERFFLINGER, dĕr'flĭng-er, GEORG, BARON VON (1606–95). A field marshal of Brandenburg, born at Neuhofen, Austria, of a Protestant family. He entered the Swedish service during the reign of Gustavus Adolphus and advanced to the rank of colonel. In 1642 he was sent by Torstenson to negotiate an alliance with George Rákóczy in Transylvania. In 1654 he entered the service of the Elector of Brandenburg. He fought with distinction in the wars against Poland, Denmark, Sweden, and France, and was promoted to the rank of lieutenant general, in consideration of his splendid assault on Warsaw in 1656, field marshal (1670), and military Governor of Pomerania (1678). The formation and training of the cavalry of the electorate were due chiefly to him, and the celebrated battle of Fehrbellin (June 18, 1675) was decided by his brilliant cavalry charge at the head of 6500 horsemen. The conquest of Stralsund and Rügen (1678), where at the age of 72 he led the attack in person, and the subsequent campaign against Sweden, were among his military feats. The military greatness of Prussia in later times was partly due to the influence exerted upon the army of Brandenburg by men like Derfflinger. Consult Unger, *Feldmarschall Derfflinger* (Berlin, 1896).

DERG, dĕrk, LOUGH (Ir., clear lake). The name of two Irish lakes. 1. The larger is an expansion of the river Shannon, between Tipperary on the southeast and Galway and Clare on the northwest (Map: Ireland, C 4). It is 24 miles long from northeast to southwest and 2 to 6 miles broad. Its surface is about 100 feet above sea level; its average depth, 35 feet. It has several islands. 2. A lake in the south of County Donegal, on the border of Tyrone. It is 3 miles long, 2½ miles broad, and has many islets and rocks. On its wild shores are hills rising 700 to 1200 feet. Saint's Island possesses the remains of a priory founded about the year 600 and was the scene of St. Patrick's vision of purgatory. The place of penance on Station Island was for years the most celebrated spot for pilgrimage in Ireland.

DE RIGAUD. See VAUDREUIL, MARQUIS OF.

DER'IVA'TION. See ETYMOLOGY.

DERIVATION (Lat. *derivatio*, a leading or turning off, from *de*, away, off + *rivus*, small stream, channel, canal). An old term in medicine, descriptive of a method of treating disease, by which it was supposed that the *materies morbi*, or 'matter of the disease,' was drained away through some channel established for it by artificial means, as by a blister applied over an inflamed lung, or a discharge from the bowels established in a case of dropsy. The term is little used now, though applicable to certain methods of treatment as far as results are concerned.

D'ERLON, JEAN BAPTISTE DROUET, COUNT. See ERLON.

DER'MA, or **DER'MIS.** See INTEGUMENT.

DERMAT'OGEN (Gk. *δέρμα, derma*, skin, bark + root, *γεν-, gen-*, to produce, generate; cf. *γένος, genos*, stock, race, origin). A single layer of superficial cells at growing tips, which gives rise to the epidermis. A true dermatogen is found only in the seed plants (spermatophytes) and in the roots of fern plants (pteridophytes). While a distinct dermatogen is evident in many plants, it is by no means such a definitely differentiated generative layer as was once supposed. See MORPHOLOGY.

DER'MATOL'OGY (Gk. *δέρμα, derma*, skin + *λόγος, logos*, discourse, science). The science of the management of the skin and of its diseases. See SKIN.

DERMAT'OPHYTES (Gk. *δέρμα, derma*, skin, *φυτόν, phyton*, growth, plant). Cryptogamic vegetable growths, varieties of *Torula*, inhabiting the cuticle or epidermis, and giving rise to some forms of skin diseases, as favus, pityriasis, ringworm (qq.v.), etc.

DERMES'TID BEETLES (Gk. *δέρμα, derma*, skin + *ἐσθίειν, esthiein*, to eat, literally 'skin-eater'). A family (Dermestidæ) of small or moderately sized and very destructive beetles. Both the adults and the larvæ feed on a variety of animal and vegetable substances, making them museum and household pests, preserved meats, woolens, furs, feathers, silk, and even drugs being exposed to their depredations. The adults, which are oval or elongated and varicolored, feign death when disturbed, falling to the ground, ventral surface upward, and lying stiff with folded legs. The adults may frequently be found outdoors on flowers and on the windows of infested houses. The larvæ, which are short and woolly or fuzzy, do far more damage than the adults. There are 300 to 400 species in the family. The most common of them in the United States are the larder or bacon beetle (see BACON BEETLE), the carpet beetle (q.v.), the museum pest, and the raspberry worm (qq.v.). One form lives on cobwebs, feeding perhaps on the remains of insects caught there and possibly on the web itself. Species of the genus *Attagenus* are responsible for a curious and beautiful kind of felting, resembling moleskin, of pillows and bedticks, which often puzzles housekeepers. The fumes of carbon bisulphide, applied in a tight inclosure, are fatal both to the beetle and the larvæ. Carbon bisulphide, however, is very explosive, and its fumes are harmful to man, and hence it should be used with caution. Benzine and naphtha are helpful in keeping these pests from entering stored goods.

DERMIS. See INTEGUMENT.

DERNA, dĕr'nȧ, or **DERN.** A town of Barca, northern Africa, situated at the mouth of a ravine, 1 mile from the Mediterranean (Map: Africa, Tripoli, G 1). In 1805 it was captured by a force of natives and Americans, led by General Eaton. A fort was begun by the Americans at that time, and stands to-day incompleted. It is the only place on the African continent ever occupied by Americans. Pop. (est.), 7000.

DERNBURG, dĕrn'bŭrk, BERNHARD (1865–). A German administrator, born in Darmstadt. His father was an editor of the *Berliner Tageblatt* and his grandfather a privy councilor. He was educated at the Berlin gymnasium and went into the banking business, being employed for several years in the New York house of Ladenburg, Thalmann & Co. In 1901–06 he was a director of the Darmstädter Bank. His "business" administration (1907–10) of the Colonial Office markedly improved the condition of German colonies, especially German East Africa and German Southwest Africa, which he visited in 1907 and 1908. In 1913 he was nominated a member of the Prussian House of Lords. Consult Bongard, *Dernburg in Britisch- und Deutsch-Ostafrika* (Berlin, 1908).

DERNBURG, dĕrn'bŭrk, HEINRICH (1829–1907). A German legal scholar, born in Mainz.

He was educated at the universities of Heidelberg and Giessen, was appointed a professor at Zurich in 1852, and at Halle in 1862. In 1873 he became professor of Roman law and Prussian common law at Berlin. He represented the University of Halle in the Prussian Upper House from 1866 and the University of Berlin from 1873. His publications include: *Die Institutionen des Gajus* (1869); a *Lehrbuch des preussischen Privatrechts* (3 vols., 1871–80; 5th ed., 1893 et seq.); *Das preussiche Hypothekenrecht* (1877; 2d ed., 1891); *Die Phantasie im Rechte* (1894); *Persöniche Rechtsstellung im Bürgerlichen Gesetzbuch* (1896); *System des römischen Rechts* (ed. by W. H. Müller, 1911).

DE ROSNY, *de rô'nê'*, LÉON. See ROSNY, LÉON DE.

DÉROULÈDE, *dā'rōō'lād'*, PAUL (1846–1914). A chauvinistic French poet and political agitator, born in Paris. He wrote: *Chants du soldat* (1872); *Nouveaux chants du soldat* (1875); *Refrains militaires* (1888); *Chants du paysan* (1894); *Poésies militaires* (1896). Déroulède also wrote a patriotic cantata, *Vive la France* (1880); a religious drama, *La Moabite* (1880); and a patriotic play, *L'Hetman* (1877). Other patriotic historical works are *Messire du Guesclin* (1895) and *La mort de Hoche* (1897). Déroulède fought in the War of 1870–71 and subsequently, as the head of the Patriotic League, carried on a passionate agitation for a war of revenge against Germany. He was an ardent supporter of General Boulanger (q.v.). He was a leader of the anti-Dreyfus forces. He was in the Chamber of Deputies from 1893 to 1895 and in 1898–99. In 1900 he was found guilty of plotting against the Republic and sentenced to exile for 10 years, but returned to France in 1905 under a law of amnesty. He stood unsuccessfully as a candidate for election to the Chamber of Deputies in May, 1906.

DERR, LOUIS (1868–1923). An American physicist, born at Pottsville, Pa. He graduated at Amherst College in 1889 and studied also at Harvard and at Massachusetts Institute of Technology, where he taught physics after 1892, rising to a full professorship in 1909. From 1893 to 1898 he was also instructor in physics at Boston University and from 1895 to 1908 he supervised the teaching of this subject at the Boston Normal School of Gymnastics. He was elected a fellow of the American Academy of Arts and Sciences. Besides contributing to scientific journals, he edited the *Cyclopedia of Engineering* (1902; 2d ed., 1912) and published *Notes on the Principles of Dynamo and Transformer Design* (1902; 3d ed., 1905), and *Photography for Students of Physics and Chemistry* (1906).

DERRÉCAGAIX, *dĕr'rā'kā'gā'*, VICTOR BERNARD (1833–). A French soldier, born in Bayonne. He studied at the College of Saint-Cyr, served in the Crimea in 1854 as lieutenant of infantry, and rose to be lieutenant colonel in 1880. In 1883 he was appointed professor at the Ecole de Guerre and in 1888 became chief of the geographical service of the army. He was promoted in 1895 to be a general of division. He is known for his topographical surveys of France and for his works on military affairs, especially *Etude sur les états-majors des armées étrangères* (1869; 2d ed., 1871); *Histoire de la guerre de 1870* (1871); *La guerre moderne* (1885; Eng. trans. by Foster, *Modern War*, 3 vols., 1888–90).

DER'RICK (from *Derrick*, a Tyburn hangman). A device for hoisting heavy loads and conveying them short distances. In ordinary nomenclature the distinction between derricks and cranes is considerably confused. The most common form of derrick consists of a vertical mast pivoted at its bottom in a fixed bedplate and maintained in an upright position by guy cables or other forms of stays, which radiate from a loose collar or spider encircling a pin in the top of the mast; of a boom hinged to this vertical mast near the bottom so that it may be made to assume various inclinations relative to the mast; and of the tackle and motors necessary to impart motion to the boom and mast and to the load which they carry. The load is suspended from the end of the boom by ropes which pass through a block and thence to the motor at the foot of the mast. The end of the boom is sustained by a cable passing through a block at the top of the mast and thence to the motor at its foot. The mast is revolved on its bottom pivot by means of a horizontal wheel around which a rope passes or by some other simple mechanism. The motions permitted by such a derrick are the vertical hoisting of the load, a swinging motion through the rotation of the shaft on its pivot, and a radial motion due to the change in inclination of the boom. Perhaps the most salient distinction between a derrick and a crane is that the boom of the derrick is hinged at its connection with the mast, while the jib of a crane is always rigidly connected with the upright member. If this distinction is maintained in classifying these two sorts of hoisting and conveying devices, however, it throws many devices now called derricks into the class of cranes. Derricks of the type described are extensively employed in quarrying, masonry work, excavating, and building erection, and instead of wooden booms and masts, built-up lattice booms and masts of steel are employed. Such derricks may have a capacity up to 100 tons or more. For "floating derricks," see CRANE.

A hauling derrick, as distinguished from a hoisting derrick, is a drum and the necessary driving gearing from two cranks, mounted in a suitable frame. The rope from the drum leads horizontally to the object to be moved. The hauling derrick is like a geared capstan whose barrel is horizontal instead of vertical, as in the original form.

DERRINGER, *dĕr'rĭn-jĕr*. A short-barreled pistol of very large calibre and very effective at short range. It was usually carried in the side pocket of the coat, and in emergencies fired without being withdrawn. It derives its name from its inventor, an American gunsmith.

DER'RY. See LONDONDERRY.

DERRY. A town in Rockingham Co., N. H., 12 miles southeast of Manchester, on the Boston and Maine Railroad (Map: New Hampshire, G 8). It contains the Pinkerton Academy, a public library, and the homestead of Matthew Thornton, a signer of the Declaration of Independence. The chief industries are shoe manufacturing, milk shipping, and apple raising. There are also manufactories of plant stakes, tree labels, reed ribs, carriages, acetylene-gas machines, and witch hazel. The water works are owned by the town. Pop., 1900, 3583; 1910, 5123.

DERRY. A borough in Westmoreland Co., Pa., 45 miles east by south of Pittsburgh, on the Pennsylvania Railroad (Map: Pennsylvania, C 7). It is a summer resort and has bottling and

sand works and manufactories of china and high-voltage insulators. Pop., 1900, 2347; 1910, 2954.

DERVENTIO, dĕr-ven'shō. The Latin name of the town of Derby (q.v.), in England.

DERVISH (Ar. *darwish*, Pers. *darvīsh*, poor, Avesta *driγu*, poor; the Persian equivalent of Ar. *fakir*, poor ascetic). In Mohammedan countries, a class of persons who are supposed to lead a peculiarly religious life, resembling in some respects the monks of Christendom. There are many different brotherhoods or orders. D'Ohsson, in his work on the Ottoman Empire, enumerates 32 and Hammer-Purgstall 36, but the list is far from being complete. The first founders of such orders are supposed to have been Abd al Kadir of Jilan (died 1166) and Ahmad al Rifai (died 1182); and the establishment of orders has gone on until the present time. They live mostly in convents, well endowed, both in land and money, called Tekkije, and are under a chief with the title of Sheikh, i.e., 'elder.' Some of the monks are married and allowed to live out of the monastery, but most sleep there some nights each week. Their devotional exercises consist in meetings for worship, frequent prayers, religious dances, and mortifications. The main devotional exercise, however, is the *zikr*, which is conducted differently in the different orders. It consists in the repetition of certain formulas, accompanied by violent motions until the dervish falls into a cataleptic state. As the convent does not provide them with clothing, they are obliged to work more or less. Three of the orders—the Bastamiyah, the Nakshabandiyah, and the Bakatashiyah—claim to be descended from the original order established by the first Caliph, Abu-Bekr. Of these, the Nakshabandiyah are the most numerous. In their convents at Cairo and Constantinople and elsewhere they have services on Wednesdays and Sundays, when about 20 performers take part in the *zikr* ceremony. The orders are spread throughout the Mohammedan world and in India. The most popular one is that of the Muradiyah, to which most of the fakirs belong who crowd the bazars of India. The Rufaiyah (founded 1182) in India, Turkey, and Egypt, are known for their severe discipline and the castigations of their bodies. They are commonly known as the "Howling Dervishes." Another popular order is that of the Kalandariyah, known also as the "Wandering Dervishes," among whom constant traveling is an obligation. The Maulawiyah constitute the order familiarly known as the "Dancing Dervishes." At their *zikr* they follow one another about the floor in regular order, each with eyes closed and arms extended, turning around in a sort of waltz and intoning a monotonous chant. Each order has its own rules and principles, extending to the dress and the method of wearing the hair and beard. In many of the orders the initiation rites are most elaborate.

Tradition refers the origin of these orders to the earliest times of Islam, making the caliphs Abu-Bekr and Ali found such brotherhoods. While it is certain that Mohammed advocated poverty, the tendencies of thought that led to the founding of dervish orders developed later, when Mohammedanism came into contact with other religions, such as Persian and Hindu. Many Mohammedan princes have held dervishes in high respect and bestowed rich endowments on their establishments, and they are still held in high veneration by the people. For a time, however, they were regarded with suspicion by the government, since they decline to obey any authority except the religious head of the order. Hence Mahmud II in 1826 attempted to destroy the orders, actually putting to death some of the leaders. His attempt, however, failed. The relation of the dervish orders to the growth of mysticism in Islam and the religious vitality shown in these have been well brought out by Macdonald.

Besides those dervishes regularly affiliated with an order, there are individuals who travel from place to place and by feats of strength or sleight of hand manage to earn a livelihood. Consult: D'Ohsson, *Tableau général de l'empire Othoman* (Paris, 1787–90); Hammer-Purgstall, in *Geschichte des osmanischen Reiches* (Pesth, 1827–35); Lane, *The Modern Egyptians* (London, 1836); Malcolm, *History of Persia* (ib., 1829); Browne, *The Dervishes* (ib., 1868); Rinn, *Marabouts et Kholvan* (Algiers, 1884); Chatelier, *Les confréries musulmanes du Hedjaz* (Paris, 1887); Depont et Coppolani, *Les confréries religieuses musulmanes* (Algiers, 1897); Zwemer, *Arabia, the Cradle of Islam* (1900); Jacob, *Die Bektaschijje* (Munich, 1909); Macdonald, *Aspects of Islam* (New York, 1911).

DERVISH PASHA, dĕr-vĕsh' pä-shä', IBRAHIM (1817–96). A Turkish soldier and statesman, born in Constantinople. He studied mineralogy in London and Paris and taught chemistry and physics in the Constantinople military school. He attained the rank of general of division in 1862 and successfully commanded the Turkish forces in the campaign against Montenegro. He was Ambassador to St. Petersburg and then was placed in charge of the civil and military administration of Albania and Syria. He became Governor-General of Bosnia and Herzegovina in 1875 but, failing to quell the insurrection of that year, was recalled. In 1876 he was Minister of War. In the Russo-Turkish War of 1877–78 he distinguished himself by his successful defense of Batum. As Governor-General of Albania in 1880–81 he reëstablished Ottoman authority and brought as prisoners to Constantinople the leaders of the revolutionary league, whom he defeated at Dulcigno.

DERWENT, dĕr'wĕnt (clear water). One of the principal rivers of Tasmania. It issues from Lake St. Clair, in the centre of the island, flows tortuously towards the southeast, passes by Hobart, the capital, and after a course of 130 miles enters Storm Bay, in D'Entrecasteaux Channel, by an estuary 4 miles wide (Map: Tasmania, C 3). The Derwent is navigable as far as Hobart for ships of any burden.

DERWENTWATER, dĕr'wĕnt-wą'tĕr. An oval sheet of water in the south of Cumberland, England, one of the most beautiful lakes of that county (Map: England, C 2). It is 3 miles long, 1 mile broad, 72 feet deep, and 222 feet above sea level. Its banks are rocky and abrupt, and behind them rise rocky mountains, one of which, the Cat Bells, is 1448 feet high; another, Lodore, has a waterfall of 100 feet. Derwentwater is an enlargement of the Derwent River, which flows into the Irish Sea at Workington. It has several wooded isles, besides a remarkable floating isle—a mass of earthy matter, 6 feet thick, varying in size in different years from an acre to a few square rods, covered with vegetation and full of gas bubbles which buoy it on the surface of the water. The lake abounds in trout, pike, perch, and eels.

DERWENTWATER, dĕr'wĕnt-wą'tĕr, JAMES RADCLIFFE or RADCLYFFE, third and last EARL OF (1689–1716). An English Roman Catholic nobleman, one of the leaders in the Rebellion of 1715. He came of an ancient Northumberland family and was born in London, June 28, 1689. He received his education in France and at his father's death in 1705 became Earl of Derwentwater. He joined the Pretender in 1715 with 70 retainers and after fighting with great heroism was taken prisoner at Preston. He was convicted of treason and despite all efforts to save him was beheaded on Tower Hill, Feb. 24, 1716, his rank, youth, amiability, bravery, and simplicity of motives exciting widespread sympathy. His estates were forfeited and given to Greenwich Hospital.

DERZHAVIN, dyĕr-zhä'vĕn, GAVRIL ROMANOVITCH (1743–1816). A celebrated Russian lyric poet. Born of a noble family at Kazan, he entered there the newly opened gymnasium in 1759, joined the ranks of the Preobrazhensky Guard Regiment in 1782, became lieutenant captain in 1773, and later entered the civil service. His ode, *Felitsa* (1782), in which he extolled Catharine II, attracted her attention, and through her influence he received many promotions; he was Governor of Olonetz in 1784, of Tambov in 1785, Secretary of State in 1791, and Senator in 1793. Catharine's successor, Paul, appointed him President of the Board of Commerce in 1796, and Alexander I made him Minister of Justice in 1802; but he retired to private life in 1803. His earlier work, in general, was done in imitation of Lomonosov (q.v.). But he soon abandoned this style, for which his gifts were utterly unsuited, and adopted the manner of the odes of Horace. He was the greatest and most original poet before Pushkin and is best known as the "Singer of Catharine," his works forming a poetic chronicle of her achievements. So far from being a court poet, he was a really deep and sincere admirer of the northern Semiramis, with her liberal reforms and democratic leanings, as evidenced in her daily life and correspondence with Voltaire and Diderot. Though occupying a more exalted position after Catharine's death, he never wrote anything about the other monarchs that in power and loftiness of conception could even approach his odes about Catharine and the events of her reign. His language is quite modern in its purity and comparative freedom from Church-Slavonic expressions. Its chief characteristics are vigor united with pliancy, and a vivid imagery that sometimes verges on the hyperbolic. He was the first to introduce everyday expressions into odes, thus bringing down the grand style to modern realism. One of his greatest contributions to the development of Russian poetry consisted in introducing an element of realism and a touch of humor—even of whimsicality—into the labored and remote verse of Lomonosov. His own poetry reflects a clear, satirical mind, good judgment, and sound sentiment. Of his many poems, the ode *God* is the best known, having been translated into most Occidental languages and even into Japanese and Chinese. The best edition of his works appeared in 9 vols. (St. Petersburg, 1864–83), with a commentary and biography by the academician J. Grot. The eighth volume is devoted to the poet's biography.

DÉS, or **DÉES,** dâs. The capital of the Province of Szolnok-Doboka, Transylvania, Hungary, near the confluence of the Great and Little Szamos, 37½ miles northeast of Klausenburg by rail (Map: Austria-Hungary, H. 3). Its chief public buildings are the fifteenth-century Gothic Reformed Church, the Thokoly Palace, Franciscan abbey, the handsome town hall and municipal theatre. A sixteenth-century tower is a remnant of the ancient fortifications. Weaving, distilling, and salt mines are among the principal industries. Pop., 1900, 9888; 1910, 11,542.

DESAGUADERO, dâ-sä'gwå-dā'rō (Sp., outlet). A river of Bolivia, the outlet of Lake Titicaca. After a southeast course of 190 miles it empties into the landlocked lake of Aullagas, near the town of Oruro (Map: Bolivia, D 7). It is the loftiest stream of any length on the entire American continent, its source being 12,650 feet high.

DESAIX DE VEYGOUX, de-sâ' or de-zâ' de vâ'gōō', LOUIS CHARLES ANTOINE (1768–1800). A French general of the First Republic, born Aug. 17, 1768, at Saint-Hilaire d'Ayat. He studied at the military school of Effiat and in 1783 was made sublieutenant in a Breton regiment. He was in sympathy with the revolutionists, though he deprecated their violence, and in 1792 he was appointed aid to Prince Victor de Broglie, then commanding the Army of the Rhine. In 1793–94 he was made a general of brigade and then of division. He commanded the right wing of the Army of the Sambre and Meuse under Jourdan in 1795, and in the following year was again in the Army of the Rhine and Moselle, under Moreau, commanding the left wing in Moreau's famous retreat through the Black Forest. To Desaix was intrusted the fortress of Kehl, the only stronghold upon the right bank of the Rhine which the French retained after this retreat. The fort was in ruins, but behind its imperfect defenses Desaix held out against an Austrian army for two months, only surrendering in January, 1797, when his ammunition was exhausted. In the spring he was sent to Italy, where Bonaparte, recognizing his strong qualities, took pains to attach him to himself. Desaix accompanied the Egyptian expedition and there won his brightest laurels in the conquest of Upper Egypt from the Mamelukes under Murad Bey, after an eight months' campaign. By his equitable administration of the country after the conquest he won from the Arabs the title of "the Just Sultan." Returning to France at the command of Bonaparte in 1799, he joined the latter in Italy and was given the command of two divisions of reserves. This force, in June, 1800, was sent to Genoa on detached service, but in response to the sound of the distant fighting at Marengo (June 14), Desaix, by a sudden inspiration, returned, arriving just as Bonaparte was about to yield the field to Melas. Desaix saved the day by a vigorous attack with his divisions, but he was shot and instantly killed while leading the charge. He was an intrepid soldier, a skillful commander, and the idol of his troops. His body was embalmed and placed in the monastery of St. Bernard. A statue has been raised in his honor in Paris. Consult: Martha-Becker, *Etudes historiques sur le général Desaix* (Clermont, 1852); E. Bonval, *Histoire de Desaix* (Paris, 1881); C. Desprez, *Desaix* (ib., 1884).

DE SAL'ABERRY, CHARLES MICHEL D'IRUM-

BERRY (1778–1829). A Canadian soldier. He was born at Beauport, P. Q., and early entering the army was at the conquest of Martinique (1795), accompanied Major General Rottenburg as aid-de-camp in the Walcheren expedition, and was for 11 years in the West Indies under General Prescott. On returning to Lower Canada he organized and commanded the regiment of Voltigeurs, and was a chief of staff in the militia. During the War of 1812 he rendered valuable service. His first success was won near the close of 1812, at Lacolle, against the American General Dearborn; and in 1813, by his superior knowledge of the country through which General Hampton advanced to attack him and also in part by his skillful manœuvring of his troops so as to create the impression of a large force, he defeated that general at Chateauguay, a village about 24 miles southwest of Montreal. This success permitted Gen. Baron de Rottenburg, and afterward his successor, Gen. Sir Gordon Drummond, to resume active operations in Upper Canada. After the close of the war De Salaberry entered political life and in 1818 was appointed a member of the Legislative Council of Lower Canada. He died at Chambly.

DE SANCTIS, dā sänk'tēs, FRANCESCO (1817–83). A great Italian critic and teacher, born at Morra, Irpino. Imprisoned for revolutionary activities in 1849, he later went to Malta and Turin (1852); his brilliant lectures on Dante won him in 1856 a professorship at Zurich. Returning to Naples in 1860 as Minister of Public Instruction, he became deputy in 1861, and headed the Education Department of the kingdom in 1861–62, 1878, and 1879–80. He became professor at Naples in 1871. He founded the journal *L'Italia* in 1862. De Sanctis was a great force in the intellectual life of Italy, particularly in the south, where he took up the tradition left by Vico and passed it on reenforced to the greatest of his successors, Benedetto Croce. His criticism is an advance on the historical methods of Sainte-Beuve and on the systematic intellectualism of the Hegelians: rigorously scientific in procedure, it takes as its point of departure the immediate impression produced by the work of art itself, from that working back to the reconstruction of the consciousness of the author in all its varied aspects. The interpretations of great Italian writers in the *Storia della letteratura italiana*, in *Saggi critici*, and *Nuovi Saggi critici* are all classics, and in some cases seem to be definitive. Consult B. Croce, *Estetica* (Bari, 1908), chap. xv. The works are now appearing at Bari (1913–).

DE SANCTIS, LUIGI (1808–69). An Italian theologian. A distinguished prelate in Rome, he was converted by the study of the Bible and in 1847 fled to Malta, where he became a Protestant. From 1852 he worked as a preacher of the Waldensian congregation in Turin; became, in 1854, the head of the "Chiesa Libera," a radical offshoot of the Waldensians, which body he, however, joined again in 1864, accepting a professorship at their seminary in Florence, where he also established the Protestant periodical *Eco della Verità*. Consult Rönneke, *Luigi De Sanctis* (Halle, 1890).

DESARGUES, de-zärg', GÉRARD (1593–1662). A French mathematician, especially gifted as a geometer. He was born in Lyons and is chiefly known as one of the founders of modern geometry. Poncelet called him "the Monge of his century." Desargues and Pascal introduced the method of perspective and treated the conic sections (q.v.) as projections of a circle. Two important theorems are attributed to Desargues, one of which forms the basis of his remarkable theory of homological figures. To Desargues is further due much of the theories of involution and transversals, the elaboration of the conception that a straight line is a curve closed at infinity, and the definition of parallels as lines intersecting at infinity. The works of Desargues were long thought to be lost, but they were found and republished by Poudra in 1864. The chief ones are as follows: *Méthode universelle de mettre en perspective les objets donnés réellement ou en devis, avec leurs proportions, mesures, éloignement, sans employer aucun point qui soit hors du champ de l'ouvrage* (1636); *Brouillon project d'une atteinte aux événemens des recontres d'un cône avec un plan* (1639); *Brouillon project . . . pour la coupe des pierres* (1640); *Gnomonique* (1640). For his biography, consult Poudra, in Desargues's *Œuvres* (Paris, 1864).

DESART, dēz'art, WILLIAM ULICK O'CONNOR CUFFE, fourth EARL OF (1845–98). An English novelist. He was born in London and was educated at Eton and at Bonn. After serving as page of honor to Queen Victoria, he became lieutenant in the Grenadier Guards (1862) and then captain (1865). Much of his later life was passed in Canada. He died Sept. 15, 1898. He was the author of many novels, among which are: *Only a Woman's Love* (1868); *Children of Nature*, a story of modern London, which caused a sensation (1877); *Kelverdale* (1878); *The Honorable Ella* (1879); *Mervyne O'Connor and Other Tales* (1880); *Lord and Lady Piccadilly* (1887); *Love and Pride on an Iceberg, and Other Tales* (1887); *The Raid of the Detrimental* (1897).

DÉSAUGIERS, dā'zō'zhyā', MARC ANTOINE MADELEINE (1772–1827). A French writer of songs and vaudevilles. He was born at Fréjus and was a son of the composer Marc Antoine Désaugiers (1742–93). He was educated for the ministry at the Collège Mazarin, Paris, but discontinued his studies in order to visit Santo Domingo. His attitude here during the negro insurrection imperiled his life, and he was compelled to seek refuge on an American steamer bound for Philadelphia. In that city he devoted himself for several years to pianoforte instruction. Upon his return to France he acquired a considerable reputation as a writer of songs and vaudevilles and subsequently became director of the Vaudeville Theatre of Paris, a position which he held till his death. Several of his songs are still popular. Among them are *La treille de la sincérité* and *Paris à cinq heures du matin*. The complete works of this amiable and charming writer, who is held by some to surpass even Béranger, were published in Paris in 1827 under the title *Chansons et poésies diverses*. One of his most humorous productions is the one-act vaudeville entitled *Milord Go, ou le dix-huit Brumaire* (1804).

DESAULT, de-zō', PIERRE JOSEPH (1744–95). A French anatomist and surgeon. He became professor of anatomy in Paris in 1776 at the age of 32, was admitted to membership in the corporation of surgeons in the same year, and subsequently held various positions of honor.

In 1782 he was appointed surgeon major to the De la Charité Hospital and came to be regarded as one of the ablest surgeons of his time. He next went to the Hôtel Dieu, and after Moreau's death the surgical department of the hospital was intrusted to him. There he instituted a clinical school of surgery—the first of its type—attracting pupils from all over Europe. He introduced system and precision into surgery and made many valuable improvements in the instruments used in that profession. He established the *Journal de chirurgerie* in 1791. His pupil, the celebrated Bichat (q.v.), published his *Œuvres chirurgicales* (3 vols., 1798–1803; 3d ed., 1813; Eng. trans., 1814). Consult Labrune, *Etude sur la vie et les travaux de Desault* (Besançon, 1867).

DESBARRES, dā'bär', or **DES BARRES,** Joseph Frederick Walsh (1722–1824). An English military engineer and hydrographer. He graduated at the Royal Military Academy of Woolwich and was sent to America, where he was engaged in the French and Indian War as lieutenant of artillery. He was in the expedition against Louisburg and in the siege of Quebec was aid to Wolfe, who fell into his arms when he received his death wound. From 1763 to 1773 Desbarres was charged with important engineering surveys in Nova Scotia, Newfoundland, and other British colonies, with a view of establishing a chain of military posts. He was also engaged in correcting old and making new charts of the North American coast, which were published in 2 vols. in 1777, under the title of the *Atlantic Neptune.* In 1784 he became Governor of the island of Cape Breton and soon afterward began to build the town of Sydney, where he opened the coal trade. In 1805, at the age of 83, he was made Lieutenant Governor and commander in chief of Prince Edward Island and served until 1813.

DESBORDES-VALMORE, dā'bôrd' vàl'môr', Marceline Félicité Josèphe (1785–1859). A French poet, born at Douai. She began public life as a singer in comic opera (1801), but soon left the stage, and from 1819 till 1843 published sentimental verses of much sweetness and pathos, collected under the suggestive titles: *Elégies et romances* (1818); *Elégies et poésies nouvelles* (1824); *Les pleurs* (1833); *Pauvres fleurs!* (1839); *Bouquets et prières* (1843); *Poésies de l'enfance.* Her popular song "S'il avait su" is in most anthologies. For an elaborate study of her poems, consult Sainte-Beuve, *Nouveaux lundis,* vol. xii (Paris, 1869), and Potez, *L'Œuvre littéraire du Nord dans les temps modernes (Mme. Desbordes-Valmore, Soudan, A. Samain)* (Lille, 1909).

DESBOROUGH, dēz'bŭr-ō, John (1608–80). An English soldier, born at Eltisley, Cambridgeshire. During the Civil War he served as captain of horse and as major under his brother-in-law, Oliver Cromwell, and later, becoming colonel, was in command of the forces at Great Yarmouth. His relationship to the Lord Protector led to his preferment to many positions of honor, including a seat in the Council of State, the commissionership of the Treasury, and later also the commissionership of the Admiralty and Navy. He was a member of the parliaments of 1654 and 1656, of the Privy Council in 1657, and in the following year of Cromwell's House of Lords. After Oliver Cromwell's death he joined a conspiracy of officers against the Protector's nephew, Richard. Restoration following, Desborough was twice imprisoned, fled to Holland, was imprisoned a third time upon his return to England, but was soon released. He was a subject of Butler's ridicule in *Hudibras.*

DESCAMPS, dā'kăn', Baron Edouard (1847–). A Belgian jurist, born in Belœil and educated at Namur and Louvain. In 1872 he became professor of international law at Louvain, in 1892 he was chosen a member of the Belgian Senate, and in 1907 he became Minister of Science and Art. He was a member of The Hague (permanent) Arbitration Tribunal and was counsel for the United States in the California Pious Fund case and for Japan in the House-Tax case. Among his published works are: *Les offices internationaux* (1894); *L'Organisation de l'arbitrage internationale* (1896); *Le droit de la paix et de la guerre* (1898); *La neutralité de la Belgique* (1902); *L'Afrique nouvelle* (1903); *L'Avenir d'Albanie* (1913).

DESCAMPS, dā'kăn', Jean Baptiste (1706–91). A French author and painter, born at Dunkirk. He studied painting under Ulin and Largillière and in 1740 founded an academy of painting, sculpture, and architecture in Rouen, where he was professor for many years. There are pictures by him in the Louvre, the Dunkirk Museum, and the Rouen Museum. His subjects were usually peasant scenes, but he also painted a series of episodes from the life of Louis XV. Descamps is best remembered for his *Vies des peintres flamands, allemands, et hollandais* (4 vols., 1753–63), a work formerly much esteemed, but not very critical, and his *Voyage pittoresque de la Flandre et du Brabant* (1759).

DESCANT, dĕs'kănt, or **DIS'CANT** (OF. *descant,* ML. *discantus,* from *dis-,* asunder, apart + *cantus,* song, singing). A term which in mediæval times was applied to contrary motion in polyphony, as distinguished from the parallel motion of the parts of the so-called *organum.* In modern part music, the highest part, the treble or soprano voice.

DESCARTES, dā'kärt', René; Lat. Renatus Cartesius (1596–1650). One of the most distinguished modern philosophers, sometimes called "the father of modern philosophy." He was born at La Haye, in Touraine, and was sent at the age of eight years to the Jesuit school at La Flèche, where he soon became distinguished for his keenness of intellect and made great and rapid progress in languages, mathematics, and astronomy. It was not long, however, before he became dissatisfied with the doctrines and method of scholasticism and felt it impossible to acquiesce in what had hitherto been regarded as knowledge. The first thing that he did after leaving school in 1612 was to abandon books and endeavor to efface from his mind all that he had hitherto been taught, that it might be free to receive the impressions of truth whencesoever they should come. In pursuance of his plan he resolved to travel and in 1617 entered the army as a volunteer, serving successively under Maurice of Nassau, son of William of Orange, and under Tilly and Buquoy. However, the life of a soldier contributed little to his main object, and he quitted the army in 1621. After making journeys in different directions, he at last retired in 1629 to Holland, where he prepared most of his works, attracted many disciples, and at the same time became involved in several learned

controversies, especially with the theologians. A work, *Le Monde*, which he had planned to publish the latter part of 1633 he prudently suppressed when he learned of Galileo's condemnation. Although he loved independence, yet in 1649 he accepted an invitation addressed to him by Queen Christina to go to Sweden. His willingness to leave Holland was partly occasioned by his anxiety to escape from the hostility of his enemies. He died only a few months after his arrival at the court of Queen Christina. Sixteen years later his body was brought to Paris and buried in the church of Sainte-Geneviève-du-Mont.

The grand object towards which Descartes directed his endeavors was the attainment of a firm philosophical conviction. The way whereby he sought to attain this end is explained in the discourse on method (*Discours de la méthode*), published in 1637. This small but extremely interesting and important treatise contains a history of the inner life of the author, tracing the progress of his mental development from its commencement in early years to the point where it resulted in his resolution to hold nothing for true until he had ascertained the grounds of certitude. The author in the same treatise also explains the practical rules whereby he resolved to be guided while in this state of suspended belief, and by the observance of which he hoped to arrive at absolute certainty, if indeed it were at all attainable. The result of his inquiries, so conducted, he exhibited more particularly in his *Meditationes de Prima Philosophia* (1641) and the *Principia Philosophiæ* (1644). He begins philosophy anew with a resolve to doubt everything: for might not our beliefs be the result of the mischievous working of some evil demon? One fact he found indubitable—his doubting and his thinking. But in order to think he must exist; hence, in the fundamental fact of psychic experience he believed that he came into knowing contact with ultimate reality—a process of reasoning which Augustine had followed before him. In other words, he could not doubt that he felt and thought, and therefore he could not doubt that *he*, the feeler, the thinker, existed. This relation between consciousness and existence he expressed by the memorable words, *Cogito, ergo sum* (I think, therefore I exist). Upon examining the criterion for the certitude of this knowledge he found it in the clearness and distinctness of his thought about himself. Hence he argued that whatever is as clearly and distinctly thought as self-consciousness must be true. Among these clear and distinct thoughts he first recognized the idea of God as the absolutely perfect being. This idea, he reasoned, could not be formed in our minds by ourselves, for the imperfect can never originate the perfect; it must be innate, i.e., part of the original structure of our understanding, and implanted there by the perfect being himself. Hence, from the existence of the idea of perfection, Descartes inferred the existence of God as the originator of it; he inferred it also from the mere nature of the idea, because the idea of perfection involves the existence of perfection—a form of the so-called "ontological argument." Descartes's reasoning here is as follows: To think of anything as perfect is to think of it as not lacking anything valuable. But to lack existence is to lack something valuable. Hence, to think of anything as perfect is to think of it as existing. We cannot think of the perfect except as existing. We must think of God, therefore, as existing. But if God exist, then we have a guarantee of the previously determined ground of certitude, for God the perfect being cannot deceive, and therefore whatever our consciousness clearly testifies may be implicitly believed. This Cartesian position, that the truth of a proposition is tested by its clear and distinct intelligibility, is the principle of rationalism (q.v.).

One of the most fundamental general principles of the philosophical system of Descartes is the essential difference between spirit and matter—thinking and extended substances—a difference so great, according to Descartes, that they can exert no influence upon each other. Hence, in order to account for the correspondence between material and spiritual phenomena, he was obliged to have recourse to a constant coöperation (*concursus*) on the part of God—a doctrine which gave rise subsequently to the system called occasionalism (q.v.), the principle of which was that body and mind do not really affect each other, God being always the true cause of the apparent or occasional influence of one on the other. This doctrine received another development in the preëstablished harmony of Leibnitz (q.v.). In Descartes's thought it resulted merely in a strenuous insistence upon the differences between primary and secondary qualities (q.v.). Descartes maintained also that the lower animals belong merely to the world of extension, being unconscious automata. See DUALISM; AUTOMATISM.

Descartes did not confine his attention to mental philosophy, but devoted himself systematically to the explanation of the properties of the bodies composing the material universe. In this department his reforms amounted to a revolution, though many of his explanations of physical phenomena are purely a priori and quite absurd. His corpuscular philosophy—in which he endeavored to explain all the appearances of the material world simply by the motion of the ultimate particles of bodies—was a great advance on the system held up to that time, according to which special qualities and powers were assumed to account for every phenomenon. It was in pure mathematics, however, that Descartes achieved the greatest and most lasting results, especially by his invention of the analytic geometry, which is known from his name as Cartesian. In developing this branch of mathematics he had in mind, not the revolutionizing of geometry, but the elucidation of algebra by means of geometric intuition and concepts. He intended to establish a universal mathematic, to which algebra, arithmetic, and geometry (with its applications) should be entirely subordinate. He discarded Vieta's improvements in algebraic symbolism, introduced the present plan of representing known and unknown quantities, gave standing to the present system of exponents, placed the theory of negative quantities on a satisfactory basis, and set forth without demonstration the well-known rule for finding the limit of the number of positive and negative roots of an equation through inspection of the variations in the signs. While his expectations were, in one sense, not fulfilled, he nevertheless succeeded in imparting a powerful impulse to the progress of mathematics and in

giving to the science its modern trend. The establishment of a correspondence between geometry and analysis has been of incalculable assistance to both, and Descartes's invention may be said to constitute the point of departure of modern mathematics. In 1637 he published at Leyden a treatise entitled *Discours de la méthode pour bien conduire sa raison et chercher la vérité dans les sciences* (Eng. trans. 1850; recent ed., Chicago, 1903). This was followed in the same year by three appendices entitled *La dioptrique*, *Les météores*, and *La géométrie*. The new mathematical discipline was set forth entirely in the *Géométrie*. The first part shows how arithmetical operations may be represented geometrically by taking a certain unit of length, in which lay the sole novelty of the plan. The second part shows how to trace algebraic (which he calls geometric) and transcendental (which he calls mechanical) curves, explaining the use of coordinates and setting forth the general scheme (now discarded) of classification of curves according to the order of their equations. The third part treats of the theory of equations. The appearance of the *Géométrie* placed Descartes foremost among the mathematicians of his time.

His works in Latin were published at Amsterdam (1650). Modern editions of his collected works are those by Cousin (Paris, 1824–26), and by Adam and Tannery (ib., 1897–1910) in 12 vols., the last being devoted to an historical study of Descartes's life and works by Adam. English translations of portions have been made by Veitch (Edinburgh, last ed., 1907), by Lowndes (London, 1878), and by Torrey (New York, 1892). Consult: Mahaffy, *Descartes* (Edinburgh, 1881); Millet, *Descartes, sa vie, ses travaux, etc.* (Paris, 1867); Fouillée, *Descartes* (ib., 1893); Fischer, *Geschichte der neuern Philosophie*, vol. i (Heidelberg, 1897); Boutroux, *L'Imagination et les mathématiques selon Descartes* (Paris, 1900); Smith, *Studies in Cartesian Philosophy* (London, 1902); Iverach, *Descartes, Spinoza, and the New Philosophy* (New York, 1904); Hoffmann, *René Descartes* (Stuttgart, 1905); Haldane, *Descartes: His Life and Times* (London, 1905).

DESCARTES'S RULE OF SIGNS. According to this rule no numerical algebraic equation can have more positive roots than it has changes of sign from + to − and from − to + in the terms of the first member. By substituting $(-x)$ for (x) in $f(x) = 0$, the law may be applied to the case of negative roots. It is often possible to detect the existence of imaginary roots in equations by the application of this rule; for if it should happen that the sum of the greatest possible number of positive roots, added to the greatest possible number of negative roots, is less than the degree of the equation, we are sure of the existence of imaginary roots. The rule also bears Harriot's name, his knowledge of it being inferred from his algebra (1631). Consult Burnside and Panton, *Theory of Equations* (Dublin, 1899–1901), and Matthiessen, *Grundzüge der antiken und modernen Algebra der litteralen Gleichungen* (2d ed., Leipzig, 1896). See DESCARTES.

DESCAVES, dā'kāv', LUCIEN (1861–). French novelist and playwright, born in Paris. In 1900 he was elected a member of the Academy of the Goncourts. His novels include: *Le calvaire d'Héloise Pajadou* (1882); *Les sous-offs* (1889); *Les emmurés* (1894); *La colonne* (1901). For the stage he wrote: *La Clairière* (1899), with Donnay, and *L'Attentat* (1906), with Capus; *La Préférée* (1907); *La vie douloureuse de Marceline Desbardes-Valmore* (1910).

DESCENDANTS (from Lat. *descendere*, to descend, from *de*, down + *scandere*, to climb, Skt. *skand*, to spring). The issue of an individual, including all who have proceeded or descended from the issue of his body in any generation or degree. By American as well as English law, descendants take precedence over collateral relations and ascendants (q.v.) in the inheritance of the property of a deceased ancestor. See COLLATERAL; CONSANGUINITY; DESCENT; HEIR.

DESCENT'. The transmission of real property by operation of law to the heir or heirs of one who dies intestate. It is a principle common to most if not all legal systems, that the property of a decedent, if not otherwise disposed of by him, shall pass in a fixed line of descent to those related to him by ties of blood. Under some systems, as that of Rome, no distinction was made between the two classes of property which we distinguish as real and personal, the whole passing, along with the liabilities of the owner, to a personal representative, and this has been the nature of descent generally, both in ancient and in modern nations. In the common-law system of England and the United States, however, a different principle has prevailed, only the personal property passing to the representative of the deceased, the real property devolving upon a descendant, who became known as the heir. The personal representative was not necessarily a descendant, nor even related by any ties of consanguinity to the decedent, and the use of the term "descent" was therefore confined to the devolution of the real property—the terms "administration" and "distribution" being employed to describe the corresponding disposition made of the personal property after the owner's death. The transmission of the real property to a different individual from the one whose title, as personal representative, was affected with the obligation to pay the decedent's debts, was a consequence of the feudal system, and was due, among other things, to the necessity of holding the lands together, free from claims on the part of others than the feudal lords of whom the lands were held.

The exceptional and peculiar character of the law of land at the common law, due to its complete absorption in the feudal system, is strikingly exemplified in the history of the doctrine of inheritance. There was at first no general recognition of the right to transmit freehold lands by descent, nor to alienate them without the consent of the lord of whom they were held, and the right to dispose of one's real estate by will was not conceded until the reign of Henry VIII. The right of inheritance, once acquired, was strictly limited to freeholds which were in terms granted to a man and his heirs, and did not extend to such as were granted to a man absolutely, but without an express limitation to heirs. The latter, therefore, fell into the category of life estates, while the quality of heritability became the chief characteristic of the estate known as a fee. Thenceforth freehold estates were classified as "freeholds of inheritance" and "freeholds not of inheritance." It is with

the former, only, that the law of descent has to do. The right of free alienation of lands held in fee was not acquired until the quality of heritability had come to be considered an essential characteristic of such lands, and such alienation was long regarded as an infringement upon the expectant rights of the heir as well as upon the reserved rights of the lord of whom the fee was held. To-day, however, no fee can exist without possessing both the quality of free alienability and that of heritability within the limits prescribed by the laws of descent, and an attempt to create a fee which shall lack either of these characteristics is ineffectual and void.

The exigencies of the feudal system determined the course as well as the fact of descent at common law. The importance of holding an estate together, in the hands of a single heir, and that a male, nearest in blood to the decedent, fixed the canons of descent as they existed in England from the twelfth to the nineteenth century. Originally, it is true, and down to the time of Glanville (twelfth century), lands held by the tenure of free and common socage were governed by different rules from those which regulated the inheritance of military fees, or lands held by knight's service, and on the ancestor's death were divided among all his sons equally; but long before the time of Littleton this distinction had disappeared and all lands held in fee simple came under the operation of the feudal rules.

Briefly stated, these rules were as follows: 1. Inheritances shall lineally descend to the issue of the person who last died actually seised thereof, *in infinitum*, but shall never lineally ascend. A father or mother cannot inherit directly from a son or daughter. 2. The male issue shall be admitted before the female, to the total exclusion of the latter. 3. Where there are two or more males in equal degree of consanguinity to the ancestor, the eldest only shall inherit; but, there being no male of equal degree, the females inherit all together. 4. The lineal descendant *in infinitum* of any person deceased, who, if he had survived, would have been the heir, shall represent their ancestor, i.e., shall stand in the same place in the line of descent as he would have occupied, if living. Thus, the issue, whether male or female, of the eldest son will be preferred to the younger son or the daughter of the deceased ancestor. 5. On failure of lineal descendants, or issue, of the person last actually seised of the lands, the inheritance shall pass to his collateral relations of the blood of the first purchaser (i.e., of the first in the line of ancestors to transmit it by descent, having acquired it himself in some other way), on the same terms as to preference of males, primogeniture, etc., as it would have passed to issue if there had been any. Thus, an elder brother, or his issue, will take the inheritance to the exclusion of sisters and younger brothers. 6. The collateral heir of the person last seised must be his next collateral kinsman of the whole blood. The half blood is wholly excluded from the line of descent. 7. In collateral inheritances the male stocks shall be preferred to the female; i.e., kindred derived from the blood of the male ancestors, however remote, shall be admitted before those from the blood of the female, however near, unless, indeed, the lands have descended from a female ancestor, in which case the rule is reversed and the female stock preferred to the male.

These common-law rules of descent have been changed in some important respects by the Inheritance Act (3 and 4 Wm. IV, c. 106). The famous rule of primogeniture, embodied in the second canon and the first part of the third, remains unchanged, notwithstanding its complete rejection by the United States and the self-governing colonies of Great Britain as well as by the nations of continental Europe. The second half of the second canon and the seventh also remain unaltered. The first has been changed by deriving the descent from the last purchaser instead of the person last actually seised, and by admitting lineal ancestors in default of lineal descendants and in preference to collateral heirs. The sixth canon has also been altered by admitting collateral relations of the half blood in default of relations of the whole blood in the same degree.

So far as they are applicable, these common-law rules of descent govern all common law, as distinguished from customary inheritances, including the descent of fee-tail estates. These are the result of legislation of the end of the thirteenth century, and, as they are expressly limited to heirs of the body, i.e., to lineal descendants only, the rules relating to collateral inheritance have no application to them. Even the canons governing lineal inheritances, however, may be varied by the form of the fee tail, as a fee tail special, which confines the inheritance to the issue of a certain wife, a fee tail male (which may be general or special) which limits descent to the male issue, etc.

So, too, while the common-law rules have to a great extent come to be applied to copyhold estates, whose qualities are largely determined by local custom, they have no application whatever to certain other classes of customary estates. Thus, lands held by the custom of gavelkind (q.v.), which is the prevailing tenure in Kent and which occurs elsewhere, are still governed by the old rule of socage tenure and pass to the sons of the decedent equally, while in the case of lands held by the ancient tenure of borough English (q.v.) the common-law rule of primogeniture is reversed, and the inheritance passes to the youngest son. And it may be said, in general, that in many manors and boroughs in England the course of descent of certain lands may still be governed by local customs of great antiquity, which have successfully resisted the encroachments of the feudalized common-law doctrine.

In the United States there is much diversity in the law of inheritance. The course of descent is everywhere regulated by legislative enactment, and the statutes of the several States must be consulted by any one who desires to master its details. But there is a general and essential uniformity in the outlines of the law governing the matter throughout the nation.

In the first place, the law of the descent of real property has generally been kept distinct from that of the distribution of personal property, and the heir from the personal representative. In the second place, the descent of real property is still confined to those who are of the blood of the decedent, excepting in a few States in which the wife and the husband have been placed in the line of inheritance. In the third place, the principle of priority according to the degree of consanguinity has been preserved, the relatives of one degree not being entitled to share in the inheritance if there is any

representative of a higher degree living. In the fourth place, the rules in accordance with which the degree of consanguinity of collaterals is computed have generally in the United States been changed to those of the civil law, being the aggregate of both parties from the common ancestor.

On the other hand, as has been said before, the rule of primogeniture has been universally rejected in the United States, and with it the feudal preference of the male over the female heir. All the children of the decedent, and all the relatives of equal degree, share alike, usually as tenants in common, without distinction of age or sex. Generally, also, the disability of the half blood has been wholly or partially removed, and half brothers and sisters permitted to share equally with those of full blood, or, as now in England, admitted immediately after the latter. In all States the father and mother, and in some States all lineal ancestors, are admitted to the inheritance, usually immediately after lineal descendants and before the collaterals. The principle of representation has also been retained, but in general the descent is traced, not from the person last actually seised, as at common law, nor from the last purchaser, as under the present English statute, but from the person last entitled. The canons of descent, as given above from Blackstone, do not in terms exclude illegitimate children, but no principle of the common law is better established than the rule which denies the right of inheritance to a bastard; only persons born in lawful wedlock are within the legal limits of consanguinity, and no others are capable of lineal or collateral inheritance. This principle has been maintained in all its rigor in England and has been generally observed in the inheritance laws of the United States, but with the following exceptions and modifications. In most of the States illegitimate children inherit from the mother equally with legitimate children, in one State (New York) only in case the mother has no legitimate issue, and in one (Kansas) from the father also, if his recognition of them is notorious. In many of the States the milder rule of the civil and canon laws, that the subsequent marriage of the parents legitimates previously born children, has been adopted.

It remains to be said that the law of descent of a given jurisdiction is immutable and not to be varied by any form of grant or conveyance. An estate may, indeed, be taken out of its operation by previous conveyance or by last will and testament, but if real property be left undisposed of it passes according to an iron law of inheritance and not otherwise. No limitation of an estate to a different class of heirs, no provision excluding an individual or a class of individuals, has any validity. To attempt to create a different line of descent from that established by law, as by granting lands to A and his male heirs only, or to B and his paternal line only, is to undertake the creation of a novel kind of estate, unknown to the law and therefore not to be tolerated. Such a conveyance, if it creates an estate of inheritance at all, is at once subjected to the established rules of descent and the particular restrictions imposed by the donor disregarded. The only exception to this principle is the case of the fee-tail estate, referred to above, and that is only an apparent and not a real exception, the qualities of the various kinds of fees tail being as clearly defined as are those of the ordinary estate in fee simple. Consult: Blackstone, *Commentaries on the Laws of England;* Williams, *Principles of the Law of Real Property* (17th (International) ed., London and Boston, 1894; 19th Eng. ed., 1901); Jenks, *Modern Land Law* (Oxford, 1899); Digby, *An Introduction to the History of the Law of Real Property* (5th ed., ib., 1899); Pollock and Maitland, *History of English Law* (2d ed., Cambridge and Boston, 1899); Washburn, *Law of Real Property* (6th ed., Boston, 1902). See DISTRIBUTION; EXECUTOR; HEIR; INHERITANCE; and the titles of the various kinds of estates, as FEE SIMPLE; FEE TAIL; ETC.

DESCENT CAST. A doctrine of the ancient common law in England, whereby the right of entry of a person who had been disseised of lands was barred by the death of the adverse holder and the descent of the lands to the latter's heir. Entry upon lands was formerly by far the most convenient and expeditious method of recovering them from a disseisor, but so important in legal effect was the fact of actual possession by him, however wrongful, that he was invested with an inheritable title, and the passing of this title by descent operated as a limitation upon the right of entry of him who had been disseised. In the technical language of the common law, "a descent cast tolls [i.e., bars] entry." This effect of a descent cast might be avoided by the procedure known as making continual claim, which consisted in an annual demand for possession made by the claimant upon the disseisor. If such claim was made within a year and a day of the disseisor's death, the right of entry of the disseisee was saved. A descent cast had no effect upon the right of a claimant of lands to pursue his remedies by action, but only upon the summary process of entry. See ENTRY, RIGHT OF; DISSEISIN; LIMITATION.

DESCHAMPS, dā'shän', EMILE DE SAINT-AMAND (1791–1871). A French poet, born at Bourges. To forward the cause of romanticism, he founded with Victor Hugo *La Muse Française* (1824). To this journal he contributed verses and stories signed "Le Jeune Moraliste." Four years afterward he collected and published *Etudes françaises et étrangères* (1828), consisting of poems and translations. The preface of this book, an enthusiastic defense of the Romantic school, won the approval of Goethe. His other publications include: *La paix conquise* (1812), an ode which won the praise of Napoleon; *Contes physiologiques* (1854); *Réalités fantastiques* (1854). His *Œuvres complètes* were published in 6 vols. (1872–74).

DESCHAMPS, EUSTACHE (called MOREL because of his dark complexion) (c.1340–c.1410). A French poet. He was born at Vertus, studied law at Orléans, and was appointed bailli of Senlis by the Emperor Charles VI. His life was that of a popular trouvère. His verse, like most of that of his time, is quite artificial and possesses chiefly an historical value. One of his ballads is addressed to Chaucer. In addition to ballads and rondeaus, he wrote a *Miroir de mariage* in 13,000 lines, which contains the prototype of the mother-in-law so frequently found in French farces, and *De l'art de dicter.* His *Œuvres complètes* were edited by Saint-Hilaire (11 vols., 1878–1903). Consult E. Hoeppner, *Eustache Deschamps* (Strassburg, 1904).

DESCHANEL, dā'shȧ'nĕl', EMILE AUGUSTE ETIENNE MARTIN (1819–1904). A French critic and author, born in Paris. He became professor of rhetoric at the Normal School there, and the contributor of critical articles to the *Revue des Deux Mondes.* His essays on *Catholicisme et socialisme* (1850) brought him into difficulties with the government. He was arrested following the coup d'etat of Dec. 2, 1851, and was expelled from France. He took refuge in Belgium, where he met Victor Hugo. On his return to his native country Deschanel became one of the editors of the *Journal des Débats* (1859). He was elected deputy in 1876 and reëlected in 1877. In 1881 he was made professor of modern literature in the Collège de France and in the same year was elected a senator. His works include: *Les courtisanes grecques* (1859); *Histoire de la conversation* (1857); *Etudes sur Aristophane* (1867); *Le romantisme des classiques* (1882; 2d ed., 1883); *Racine* (1884); *Le théâtre de Voltaire* (1886); *Lamartine* (1893).

DESCHANEL, PAUL (EUGÈNE LOUIS) (1856–1922). A French statesman and author, born in Brussels, where his father, Emile (1819–1904), a former senator, had been exiled for opposition to Napoleon III. He was secretary to Marcères and to Jules Simon, and entered the administration as Vice Prefect in 1877. As an orator in the Chamber of Deputies, to which he was first elected in 1885, he displayed great eloquence. He was a leader of the Progressist Republicans and a strong exponent of the separation of church and state. From 1898 to 1902 he was President of the Chamber, and being again chosen to this office in 1912, he was reëlected in 1913 and 1914. In 1899 he was elected to the French Academy, and in the same year he received 10 votes (Loubet, 483) for President of the Republic. He wrote: *La question du Tonkin* (1883); *La politique française en Océanie* (1884); *Les intérêts français dans l'océan pacifique* (1887); *La décentralisation* (1895); *La question sociale* (4th ed., 1898); *La république nouvelle* (3d ed., 1898), a collection of speeches; *Politique intérieure et etrangère* (1906).

DESCHUTES (dā'shōōt') **RIVER** (Fr., the falls). A river which rises in the Cascade Range in Klamath Co., Oreg., flows north by east through Crook and Wasco counties, and empties into the Columbia River (Map: Oregon, D 5). It is about 320 miles long, and for 140 miles of its course it cuts into the great lava bed of the Northwest. The river has made a cañon, ranging from 1000 to 2500 feet in depth and exposing on its sides at least 130 layers of lava one above another.

DES CHUTES INDIANS. See WARM-SPRING.

DES CLOIZEAUX, dā klwä'zō', ALFRED LOUIS OLIVIER LEGRAND (1817–97). A French mineralogist, born at Beauvais (Oise). After scientific study and travel he was appointed assistant instructor in the Ecole Centrale des Arts et Manufactures and subsequently lecturer at the Ecole Normale. He was elected in 1869 to the Academy of Sciences. In 1876 he became professor of mineralogy at the Muséum d'Histoire Naturelle. He made important investigations in regard to the optical properties of crystals, particularly with a view to establishing a basis for a crystallographic system, and discovered the triclinic potash feldspar known as microcline ($KAlSi_3O_8$) and the circular polarization of cinnabar. He published: *Leçons de cristallographie* (1861); *Manuel de minéralogie* (2 vols., 1862–93); *Nouvelles recherches sur les propriétés optiques des cristaux* (1867).

DESCLOT, dĕ-sklō' (DESCLOS, DES CLOT, ESCLOT, SCLOT), BERNAT. A Catalan historian in the latter half of the thirteenth century. He wrote a *Libre del rey En Pere,* the oldest important composition in the Catalonian language. While as an historical narrative it is skillful and reliable, its chief interest is linguistic. The original text was first published and edited by Buchon under the title *Chroniques étrangères relatives aux expéditions françaises pendant le treizième siècle* (Paris, 1841), although it had appeared (in Barcelona) in a Castilian translation by Rafael Cervera as early as 1616, and (in Madrid) in a second Castilian edition in 1793.

DESCRIP'TIVE GEOMETRY. See GEOMETRY; MONGE.

DES'DEMO'NA. The young wife of Othello in Shakespeare's tragedy of the latter title, smothered by her jealous husband at the instigation of Iago. This is said to be the first character impersonated by an actress on the English stage.

DESDÉN CON EL DESDÉN, dâs-dān' kŏn ĕl dâs-dān', E. (Sp., Disdain with Disdain). A play by Moreto, produced about the middle of the seventeenth century. It was translated into English by Westland Marston (1864), from the German version of Schreyvogel.

DE SEN'ECTU'TE (Lat., On Old Age), or **CA'TO MA'JOR.** A popular essay by Cicero, applying the principles of philosophy to the endurance of the ills incident to old age. It was composed in 45 or 44 B.C., and is dedicated to Atticus. Scipio and Lælius are represented as meeting at the home of the elder Cato, in 150 B.C., and admiring the manner in which he bears his age.

DESERET, dĕz'ĕr-ĕt, STATE OF. The name given by the Mormons in 1849 to their settlement in the present State of Utah, *deseret* being a word taken from the Book of Mormon and meaning "land of the honeybee." In September, 1850, Congress created the Territory of Utah, and the old name gradually fell into disuse. See UTAH; MORMONS.

DESERONTO, dĕz'ĕr-ŏn'tō. A town of Hastings Co., Ontario, Canada, the best harbor on the Bay of Quinte, an inlet of Lake Ontario, 130 miles east of Toronto (Map: Ontario, G 5) and 200 miles west of Montreal. It is on the Canada Northern Railway, which connects it with the Grand Trunk and the Canadian Pacific railways. It also has steamship connection with all Canadian and American ports on the St. Lawrence River and the Great Lakes. The manufactories include a blast furnace, cannery, machine shop, and saw mills, and their products are boxes, cars, matches, sashes and blinds. Abundant supplies of lumber and fruit are in the surrounding district. The town owns the gas, sewerage, and water systems. The United States is represented by a consular agent. The beautiful Foresters' Island Park is near Deseronto. Pop., 1901, 3527; 1911, 2013.

DESERT, dĕz'ĕrt (Fr. *désert,* Lat. *desertum,* from *deserere,* to abandon, from *de,* from + *serere,* to bind). A region which supports little plant and animal life. As thus defined, the term includes all barren areas, whether their barren-

ness is caused by intense cold, lack of soil, or by insufficient moisture. Greenland, southern Patagonia, and the Arctic and Antarctic lands in general are deserts, determined as to character by their situation in high latitudes. In common usage, however, the term is limited to the great continental wastes lying within the tropical and temperate zones which are scantily watered by rains. The most extensive of these arid deserts are found in Asia, Africa, and Australia; they are much less extensive in area in North and South America, and in Europe they scarcely occur. The Sahara Desert is a part of an arid belt that reaches from the Atlantic coast across the northern limb of Africa to the Red Sea and is continued through Arabia, Persia, Turkestan, Sungaria, and Mongolia, almost to the Pacific shores of Asia. The eastern extension of this belt, which is wider than the central portion, is known as the Desert of Gobi. In South Africa the Kalahari Desert occupies a large area between the Zambezi River on the north and the Orange and Limpopo rivers on the south. The arid regions of Australia are situated in the central part of the continent and are of vast extent. The Atacama Desert, in northern Chile, and the Colorado Desert, in California, are of comparatively limited area, but they furnish perhaps the best illustrations of regions in America having an arid climate.

The arid deserts vary greatly in surface conformation, and often they are far from having the monotonous character which popular imagination has ascribed to them. The Sahara Desert consists essentially of a series of elevated plains rising in terraces to altitudes of several thousand feet. Within its compass there are sandy stretches with the surface formed by the winds into shifting dunes, and great areas underlain by stratified rocks, where the surface is strewn with bowlders and has been deeply eroded by the rivers that existed in past ages. Oases are found at intervals in deserts wherever there are natural springs or mountains of sufficient height to cause precipitation. The date palm and other food plants may flourish here, while in the less favored regions the plant life is limited to representatives of the more hardy families, such as cacti and artemisia. Under exceptional conditions, such as exist, e.g., in parts of the Sahara, artesian wells may supply water for irrigation; such supplies are found in porous strata like sandstones that come to the surface in some remote region of plentiful rainfall. The dryness of the desert climate and the scanty vegetation give rise to rock sculpturing in columnar, tabular, and fantastic forms. Violent windstorms, accompanied by whirlwinds, cloudless skies, extraordinary heat by day and rapid fall of the temperature at night, and an annual rainfall that varies from a few inches to an immeasurably small amount, are characteristic meteorological features.

The small rainfall, upon which the aridity of deserts depends, is due to the following causes: prevalence of dry winds; isolation by mountain barriers along the borders; great distance from areas of evaporation, or oceans. The Sahara is an illustration of a desert caused by dry winds. In the northern part the prevailing winds blow from the northeast, and rain falls only in winter, when cyclonic storms from the Atlantic pass over the region. The moist winds that have their source in the Gulf of Guinea bring rain to the southern Sahara, but in small amounts only, as their temperature—and consequently their capacity for holding moisture—is increased before they reach far into the interior. A similar condition prevails in the Desert of Atacama, where the prevailing winds are from the south. When mountain ranges occupy the borders of a region, the winds are deprived of their moisture before they pass beyond the interior slopes. Thus, the Kalahari Desert receives a very small rainfall from the east winds, which bring an abundance to the region lying between the South African highlands and the Indian Ocean. In America the arid region of Nevada, Utah, and Arizona is shut in from the Pacific Ocean by mountains. Finally, desert conditions may prevail in regions situated at great distances from oceans, owing to the gradual precipitation of moisture as the winds travel inland. The exploration of the deserts of Central Asia by Sven Hedin, Huntington, and others has brought to light numerous evidences of ancient cultivations which would appear to indicate that the present dry climate is a relatively recent development. This circumstance may be explained perhaps as the result of the evaporation of former lakes which came into existence during the Glacial epoch, and which for a long time thereafter may have provided sufficient moisture to give a moderate rainfall to that section. Consult Neumayr, *Erdgeschichte* (Leipzig, 1895), and Walther, *Das Gesetz der Wüstenbildung in Gegenwart und Vorzeit* (Berlin, 1900).

DESERT'ED VILLAGE, THE. A poem, partly descriptive and partly declamatory, by Goldsmith (1770). See AUBURN.

DESER'TION. A military offense, consisting in abandoning the service with the intention of not returning to it. To prove this offense it is necessary to show absence without leave and the intention not to return. The maximum penalty for desertion in time of war is death. In time of peace it is dishonorable discharge and confinement at hard labor for not more than two and one-half years in the most aggravated cases. The Act of April 27, 1914, permits the suspension of that part of the sentence directing dishonorable discharge until the soldier's release from confinement. This affords the soldier an opportunity to earn restoration to the colors by good behavior while in confinement. In cases of soldiers earning restoration that part of the sentence directing dishonorable discharge will be remitted before it is executed and the soldier restored to duty to complete his enlistment. The United States government pays a reward of $50 for the arrest, securing, and delivery of a deserter. This reward is payable to any civil officer or citizen who makes the arrest and is also payable when information and assistance is given which directly enables military authorities to make such arrest. A soldier who has deserted, and whose period of service has elapsed prior to his apprehension, is handed over to the military authorities for trial and sentence by a military court-martial, provided a period of two years, the extent of the period fixed by the Statute of Limitations, has not elapsed since the expiration of his enlistment.

In the British army desertion is a common offense, although in the majority of instances the soldier deserts to join another regiment immediately, in which case, should he confess or be discovered, he is tried by a district court-martial on the charge of fraudulent enlistment. Formerly the charge was "desertion and fraudulent

enlistment," and up to 1879 the rule was to brand a deserter by tattooing him with the letter D or B. C. (bad character). The punishment for a first offense is usually from three months' to two years' imprisonment in a military prison, and for succeeding offenses not more than five years may be inflicted. In Germany and continental Europe generally desertion in time of peace is difficult, and consequently infrequent, owing to the compulsory-service system which prevails. Desertion in time of war is treated by all countries alike, death being the usual punishment. Desertion from the naval services of European nations is also treated with varying terms of imprisonment, or the death penalty, according to the nature and circumstances of the offense.

In the United States navy absence without leave, with a manifest intention not to return, is always regarded as *desertion*. Absence without leave, with the probability that the person does not intend to desert, is at first regarded as *straggling*, and at the expiration of 10 days, if still absent, as *desertion*. In either case the commanding officer decides the point of intention and causes the person's name to be entered in the ship's log book and marked on the paymaster's books as a *deserter*. Commanding officers are authorized to offer a reward not exceeding $20 for the recovery of a deserter, and one not exceeding $10 for the recovery of a straggler. In addition to the reward there are paid such expenses attending their lodgment, subsistence, and traveling as have been fairly incurred. Any reward paid for the apprehension and necessary expenses of a straggler is charged to his account. The wages due a deserter are forfeited to the United States; if in debt to the government at the time of his desertion, his effects are sold and the proceeds applied to liquidate it. The letter R marked against a person's name on the ship's books signifies desertion, and no application for its removal is entertained unless the department is furnished with sufficient evidence that there was no intention to desert. Commanding officers of vessels at any United States naval station are not allowed to receive on board stragglers or deserters from other vessels, unless ordered so to do by the Bureau of Navigation, which has charge of the recruiting of the navy. In case of shipwreck or any other circumstance, except capture by an enemy, whereby any person belonging to a vessel in the navy becomes unavoidably separated from his command, it is his duty to proceed at once to the nearest ship, squadron, or station, and report himself to the officer in command. Should he not do so, he is regarded as a deserter, and no claim for wages is allowed unless he can prove that he was prevented by circumstances beyond his control. The punishment of death, or such other punishment as a court-martial may adjudge, can be inflicted on any person in the naval service who in time of war deserts or entices others to desert. In the merchant service absence without leave for 48 hours is regarded as conclusive evidence of desertion.

DESERTION. As applied to marital relations, the willful withdrawal of one of the married parties from the other, or the voluntary refusal of one to renew a suspended cohabitation without justification either in the nonconsent of the other party or the wrongful conduct of that party. In most of the States in this country willful desertion is made by law a cause of divorce. The statutes of the several States define what may be considered desertion and usually declare the length of time after which desertion will be deemed a good cause for divorce. This time varies from one year to five. In some States it has been held that willful abandonment of his wife by a husband will justify an action for divorce, even though he had continued during the period of his desertion to support her. In England, under the law at present in force, the wife is entitled to a decree of judicial separation, coupled with an order for alimony, on account of willful desertion by the husband for two years without cause, while either spouse may for willful desertion of the other maintain an action against the offender for the restitution of conjugal rights. See CONJUGAL RIGHTS; DIVORCE; HUSBAND AND WIFE, and the authorities referred to under the last-named title.

The desertion of children or other dependent persons is dealt with under the head of ABANDONMENT.

DES'ERT VEG'ETA'TION. Plants whose natural habitats are in deserts. They form one of the three great climatic groups of xerophytes and show the typical xerophytic structures and organs which need but brief statement here. Most of the modifications secure reduced transpiration—e.g., many plants show reduced leaves —or the leaves may even be wholly absent, as in some cacti; the deciduous habit is pronounced and reaches its highest expression in annuals, where the whole plant, so to speak, is shed during the dry season; anatomical structures, such as thick cuticles, coats of hair and also wax, protected stomata, etc., are highly developed. Adaptations which secure increased absorption are often found—e.g., root systems are highly developed—and absorptive hairs sometimes occur. Possibly the most characteristic of all desert responses are storage organs; succulent leaves and stems are particularly common, and there are many plants with fleshy underground stems (bulbs, tubers, etc.). The conditions that determine the nature of the vegetation are largely associated with the small amount of atmospheric moisture and its seasonal distribution. Most deserts are in semitropical regions, and hence the xerophytic conditions are accelerated by intense heat and light. The loss of water by evaporation rather than by drainage often gives rise to alkaline soils, which still further intensify the xerophytic characters. See HALOPHYTES.

The vegetation of deserts is characterized by monotony rather than poverty, there being but few species that can endure the severe conditions. The plants are scattered so that the soil gives the landscape tone. In comparing desert plants with Alpine and Arctic plants, many ecological differences are seen; the most striking are the deciduous and succulent habits—habits particularly adapted to regions where drought is the result of heat. Floristically deserts are noted for their endemism (q.v.), agreeing in this with Alpine, but disagreeing with Arctic, vegetation. The endemism of deserts is due in part to their geographic isolation; mountains and other barriers commonly cut off deserts on all sides and prevent effective migration. However, another factor which favors endemism is the intense modification that desert plants have undergone as a result of the severe conditions. See XEROPHYTE.

DESÈZE, de-zâz', RAYMOND, COUNT (1748–

1. PRICKLY PEAR CACTUS (Opuntia), covering the surface of an Arizona desert.

2. ARTEMISIA AND CACTUS. Scene in an Arizona desert, showing the bushy greasewood and sage-brush (Artemisia), and the columnar giant cactus (Cereus).

1828). A French lawyer. He was born and educated in Bordeaux and in 1784 became established in Paris, where, together with Malesherbes and Trouchet, he was subsequently intrusted with the defense of Louis XVI before the National Convention. Owing to the splendid oratory which he displayed on that occasion, he fell under suspicion of sympathizing with the royal cause and was imprisoned until the fall of Robespierre. He did not avail himself of the opportunities of advancement offered him by Napoleon, but remained faithful to the house of Bourbon, and upon the installation of Louis XVIII was appointed president of the Court of Cassation and grand warden of the royal orders.

DESFONTAINES, dā'fôN'tân', Pierre François Guyot (1685–1745). A French writer, born in Rouen. He entered the Jesuit Order and became professor of rhetoric in Bourges, but soon resigned and was editor of the *Journal des Savants* (1724–27). He wrote *Observations sur les écrites modernes* (1735), a shallow performance, yet so stinging that Voltaire bitterly replied in a *Critique des observations* (1738). Desfontaines countered with *La Voltairomanie* (1738), and then *Le médiateur* (1739). His *Dictionnaire néologique* (6th ed., 1750), likewise aroused Voltaire's ire.

DESFONTAINES, René Louiche (1750–1833). A French botanist, born in Tremblay. In 1783 he was elected a member of the Academy of Sciences, by which he was commissioned in the same year to explore the Barbary States. In 1786 he became director of the botanical gardens in Paris, which he greatly improved. His works comprise *Flora Atlantica* (1798–1800), compiled from his North African studies, and an *Histoire des arbres et arbrisseaux qui peuvent être cultivés en pleine terre sur le sol de la France* (1809).

DESFORGES, E. D. See Parny, Vicomte de.

DESFOSSÉS, dā'fô'sā', Romain Joseph (1798–1864). A French admiral, born at Gouesnon (Finistère). In 1830 he was appointed captain, in which capacity he participated in the capture of Algiers. He was also a member of the expedition against Mexico in 1838 and commanded a vessel at San Juan d'Ulloa. In 1844 he arranged a treaty of commerce with Muscat and later conducted a punitive expedition against Madagascar. He became rear admiral in 1848, Minister of Marine in 1849, vice admiral and member of the Admiralty Council in 1853, and chairman of the Council of Naval Construction in 1854. As commander of the Mediterranean fleet, he bombarded the forts at the entrance to the Tetuan River in 1859 during the conflict between Morocco and Spain. In the following year he was promoted to the rank of admiral.

DESGENETTES, dā'zhe-nĕt', Nicolas René Dufriche (1762–1837). A French physician, born in Alençon. He was made physician in chief to the army in Italy in 1794 and occupied the same position in the Egyptian campaign. He went afterward to Spain and Russia with the French army and was present at Waterloo. His works include: *Analyse du système absorbant ou lymphatique* (1792); *Histoire médicale de l'armée de l'orient* (1802); *Souvenirs de la fin du XVIII. et du commencement du XIX. siècle* (1835–36).

DESGOFFE, dā'gôf', Blaise Alexandre (1830–1901). A French painter of still life. He was born in Paris and studied there under Flandrin and Bougereau. His specialty was still life and objects of art, as, e.g., vases and ivories from the collection in the Louvre, grouped together with, perhaps, fruit or flowers. Hamerton calls them "precious copies of precious things." In the Luxembourg there is the study of an "Amethyst Vase of the Sixteenth Century" (1859) by him, and in the Corcoran Gallery, in Washington, are his "Souvenirs of the Sixteenth and Seventeenth Centuries." He is also represented in the Metropolitan Museum, New York; the Walters Gallery, Baltimore; the Brooklyn Museum, and many private collections in America. He renders texture, material, metals, and jewels with peculiar felicity and microscopic detail, but is less successful with fruit.

DESHAYES, dē-zā', Gérard Paul (1795–1875). A French geologist and conchologist. He was born at Boran (Oise), studied in Strassburg and Paris, gave private lectures on geology in Paris, and in 1869 was appointed professor of conchology at the Muséum d'Histoire Naturelle. From 1839 to 1842 he was a member of the scientific commission to Algeria. He was one of the founders of the Geological Society of France and frequently was elected its president. He assisted in the preparation of the statistical tables for Sir Charles Lyell's *Principles of Geology*, prepared the description of the recent and fossil mollusca obtained by the expedition to Morea, and began the compilation of a catalogue of the bivalve shells of the British Museum. It was as a student of fossil conchology that he was chiefly known. In this field he made important discoveries and wrote his most noteworthy work, the *Description des animaux sans vertèbres découverts dans le bassin de Paris* (1857–67), the result of more than 20 years of painstaking study. He also published a *Traité élémentaire de conchyliologie* (3 vols., 1834–58); *Mollusques de l'Algérie* (1848).

DESHIMA, dā'shē'mȧ, or **DECIMA,** dā-sē'-mȧ (Jap., Fore Island). A fan-shaped artificial islet connected by a single bridge with the city of Nagasaki (q.v.), Japan, on which the Dutch traders had their factory and residence from 1639 to 1859. Here the Dutch for 220 years enjoyed the European monopoly of trade with Japan, the recipients of honors as well as the subjects of rigid rule. In the renaissance of Japan Deshima played a most important part. Consult: Griffis, *Religions of Japan* (London, 1895); ib., *The Japanese Nation in Evolution* (New York, 1907); Rein, *Japan* (ib., 1884).

DESHNEFF, dĕsh-nyĕf'. The present official name of East Cape, the most northeasterly point in Asia, named after the Russian explorer Deshneff, who in 1648 discovered the strait named by Bering in 1728.

DESHOULIÈRES, dā'zo͞o'lyâr', Antoinette du Ligier de la Garde (1638–94). A French poet, born in Paris. She was married very young (1651) to the Seigneur Deshoulières, a gentleman attached to the Prince of Condé, and for eight years was separated from her husband, he following the Prince into Flanders, where she rejoined him in 1657 and soon afterward was imprisoned for a year because of her obnoxious efforts to collect her husband's pension that was long overdue. After 1672 she lived in Paris, holding a kind of salon and gathering about her the poets, philosophers, and wits of the day. She was the head of the cabal against Racine's *Phèdre* (1677) and composed a cruel epigram

on the subject. Boileau, who never forgave her, has described her in his tenth satire. Her plays are weak, and her reputation rests upon several poems she wrote in the *Mercure Galant* under the name of "Amaryllis" and was known by her flatterers as the "Tenth Muse." The best edition of her works was published in 1749.

DESHT. See DASHT.

DESIC'CANTS (for etymology, see DESICCATION). In medicine, the substances with astringent properties which are serviceable in checking secretion from a mucous membrane or causing scabbing over or cicatrization of an ulcer or wound.

DES'ICCA'TION (Lat. *de,* down from, away + *siccare,* to dry). The process of drying by the employment of heat, dry air, or chemical agents which have an affinity for water. Examples of the class of desiccants, or drying substances, are fused chloride of calcium, quicklime, caustic potash, fused carbonate of potash, sulphuric acid, and phosphorous pentoxide. Organic liquids are usually dried (i.e., freed of water) by introducing an appropriate desiccant into them: thus, alcohol is rendered absolute by allowing it to stand in contact with quicklime; benzene may be dried by letting it stand in contact with fused calcium chloride; etc. Solids, on the other hand, are dried, or kept dry, by leaving them within a desiccator or bell jar, in which the desiccant is contained in a separate vessel. A desiccator works most efficiently if a vacuum is established within it and if its desiccant is placed *above* the vessel containing the substance to be dried. See also FOOD, PRESERVATION OF.

DESIDERIO DA SETTIGNANO, dā'sē-dā'-rē-ō dä sĕt'tē-nyä'nō (1428–64). One of the foremost Florentine sculptors of the early Renaissance. He was born at Settignano, near Florence, of a family of stonemasons, the son of Bartolommeo di Francesco. He is traditionally supposed to have been a pupil of Donatello, whose influence appears in the naïve naturalism and the marble technique of his early works; but as the latter left Florence to remain 10 years in Padua in 1443 when his supposed pupil was only 15 years old, this influence must have been chiefly by example. Reminiscences of Luca della Robbia also occur in his earliest reliefs of the Madonna. Concerning his life only meagre details gleaned from public documents are known. He was received into the stonemasons' guild in 1453; in 1457 he lived near San Pietro Maggiore, Florence, and had a workshop with his elder brother near Ponte Trinità; took part in a competition for Siena in 1461, and died at Florence, Jan. 16, 1464. His masterpiece, the marble tomb of Carlo Marsuppini (church of Santa Croce), executed in 1455 or soon after, is probably the most beautiful Florentine grave monument of the fifteenth century. Within a frame surrounded by ornate carving of the most exquisite detail and elaborate invention the effigy of the dead man reclines upon his sarcophagus. A relief of the Madonna with two adoring angels is in the pediment, above which are the statues of two boys holding a garland, while below are two others with shields. Among his other works of large proportions was the celebrated ciborium of San Pietro Maggiore, unfortunately lost in 1784; others are the tabernacle of San Lorenzo, a magnificent marble chimney piece in South Kensington Museum, and a wooden statue of the Magdalen in Santa Trinità. His works on a smaller scale include the delightful cherub frieze of the Pazzi Chapel, the relief of St. John in the Museo Nationale, Florence, and a tondo of Christ and St. John the Baptist (Arconati collection, Paris)—all youthful works formerly ascribed to Donatello. Among his characteristic representations of the Madonna are the early reliefs in the Foulé collection, Paris, those in the Panchiatici Palace, Florence, and the Pinacoteca, Turin, and the terra-cotta statuette in South Kensington Museum. He carved also a number of naïve and characteristic busts of children, such as the well-known "Laughing Child" of the Benda collection, Vienna; the same subject in the Dreyfuss collection, Paris; busts of boys in the Bibliothèque Nationale, Paris, the Dreyfuss collection, and in that of Sir Charles Robinson, London, and the fine "Head of a Youth" in the Museo Nationale, Florence. Among his charming busts of young women are the well-known example in the Museo Nazionale, Florence, two others in the Berlin and the J. P. Morgan collections (Metropolitan Museum, New York) representing Marietta Strozzi; a sandstone bust and a painted plaster replica of a young woman thought to be a princess of Urbino, in the Berlin Museum. His other works include the spirited coat of arms with a lion rampant of the Gianfigliazzi Palace, Florence; a relief supposedly of St. Cecelia in the collection of Lord Wemyss (London), usually attributed to Donatello; and a portrait of a supposed courtesan, South Kensington Museum.

Desiderio may be termed the leader of the charming group of marble sculptors who flourished in the generation following Donatello; he is the founder of their style, characterized by naïve sincerity, refinement of treatment, and a certain meagreness of outline. In his decorative work he refined the architectural forms of the early Renaissance, invented many new motifs, and added greatly to the richness of detail. His sculpture is characterized by a masterly psychological interpretation, and his ideal types of the Madonna and child as well as young girls dominated sculpture for the rest of the century. Consult Bode, *Florentiner Bildhauer der Renaissance* (Berlin; Eng. trans., 1902), and *Die italienische Plastik* (ib., 1911). Nearly all of his works are reproduced in the monumental publication, Bode, *Denkmäler der Renaissance-Skulptur Toscanas,* plates 282–312 (Munich, 1892–1905).

DES'IDE'RIUS. The last King (756–774 A.D.) of the Lombards (q.v.). After the death of Aistulf there was a contest for the kingdom, and Desiderius obtained it largely through the influence of the Pope, to whom he promised to return part of the Lombard conquests. After obtaining the kingdom, however, he only partially fulfilled his promise. For 14 years he was able to keep his territory almost intact. Through the marriage of his daughter, in 770, to Charles the Great, he seemed secure from any Frankish intervention; but after a year Charles repudiated his wife, and a little later Gerberga, the widow of Karlomann, fled to Desiderius with her children for protection against Charles. Desiderius hoped to have the children of Karlomann recognized as the lawful heirs to the Frankish Monarchy, and tried by an attack on the papal territory to force the Pope to anoint them. The Pope appealed to Charles, who in

773 crossed the Alps and in the following year succeeded in capturing Desiderius and conquering his kingdom. Desiderius was held as a prisoner in a monastery until his death. Consult: Hartmann, *Geschichte Italiens im Mittelalter*, vol. ii (Gotha, 1903); Hodgkin, *Italy and her Invaders*, vol. vii (Oxford, 1899); Abel-Simson, *Jahrbücher des frankischen Reiches unter Karl dem Grossen*, vol. i (Leipzig, 1888).

DESIGN' (OF. *dessein*, from Lat. *de*, out + *signare*, to mark). In the fine arts, the art of originating and combining elements of form or color to produce a unified composition. It requires in the designer a grasp of all the exigencies, both practical and æsthetic, of the problem he is to solve, combined with the necessary imagination to devise a scheme that shall satisfy these exigencies and at the same time form a beautiful and unified whole. A knowledge of art history is an advantage, though truly great design should be creative and scholarly, but not archæological.

The solution of an artistic problem is also known as a design in a critical sense—as a good or bad design or as a design exhibiting certain qualities—but not otherwise. By an extension of this meaning the word "design" is loosely applied to those drawings, paintings, or models by which the artist expresses the conception he has originated; for these modes of expression are so closely bound up with the art they express as to be in the lay mind inseparable from them.

The word "design" is also used in analogous senses in the industrial arts, as in "textile design," "furniture design," etc.; and more loosely it is applied to any creative composition of many elements, even where the idea of beauty is totally lacking, as in "machine design," "aëroplane design," "bridge design," and analogous terms.

DESIGN, Schools of. In ancient times every master of an art or artistic industry was accustomed to impart the secrets of his craft to a number of pupils, who in return gave him such help as they could, working upon his masterpieces and learning by practice, under his supervision, his particular methods as well as the established traditions of the craft. In the Middle Ages this system of teaching was highly developed by the guilds, which controlled all the arts and trades, particularly in Florence and north Italy, in Germany and Flanders, and to a considerable extent also in France and England. The governing councils of these guilds regulated the terms of apprenticeship and the course of instruction, prescribed the tests for promotion from one grade to another, and instituted prize competitions to stimulate proficiency.

The Italian Renaissance, however, brought about a return from corporate to individual teaching. The guilds lost their controlling influence because of the personal preëminence of great artists like Perugino, Raphael, Da Vinci, and Michelangelo. These attracted groups of apprentice artists, who became their ardent disciples and imitators, reproducing often for a while not only the general style, but even the tricks and mannerisms of their masters. The term "schools" applied to these personal or local coteries and groups (school of Raphael, Venetian school) does not designate organized institutions at all.

The teaching of design by systematic instruction in organized schools is a comparatively modern idea. In the mediæval guilds, though the instruction was systematic in a measure, it was not given in schools or classes by specially appointed teachers. The first school of design to embody the new conception was the Royal Academy of Fine Arts, founded in 1648, in the reign of Louis XIV, in Paris. In this famous school, which has been in continuous operation ever since, five departments were established—those of painting, sculpture, architecture, engraving, and the cutting of gems and metals—in which instruction was given by regularly appointed professors, and proficiency encouraged by an elaborate system of awards, culminating in the Grand Prize of Rome in each department. See Ecole des Beaux-Arts; Prix de Rome.

In this school, to which France owes the training of many of her most illustrious artists, the first step was taken towards a scientific system of teaching design by analyzing the training required into its essential elements and teaching these separately by lectures and class work, with test examinations. Composition and the theory of design, the history of art, perspective, costume, and classical archæology, and in architecture the orders and the elements of constructive science, are the chief divisions of this teaching. The actual studio work has, however, from the first been conducted largely on the traditional lines of the apprenticeship system; and this is true of most of the schools of design, both European and American. A few have, on the other hand, endeavored to carry the scientific organization of the instruction into their studio work, as in the teaching of decorative design in the South Kensington Schools (see South Kensington, National Art Schools of) and like institutions in England, and in the American schools of architecture.

Since the middle of the nineteenth century the number of schools of design has greatly increased in Europe, and in the United States since 1876; in both cases this has been largely due to the stimulus of international exhibitions. Those of 1851 and 1862 in London, and in 1855 in Paris, opened the eyes of the English to the superiority of the French art industries and led to the establishment of the South Kensington Museum and Schools of Art and of scores of provincial schools for the training of skilled designers of textiles, ceramic wares, and other products of industry. Stimulated by the success of the British experiment, the various German states, the French government, and many municipalities in both these countries opened schools of design in the chief industrial centres. The marked feature of this movement, following the British precedent, was the recognition of the educational value of museums of industrial art.

In the United States the schools of design are, with but few exceptions, independent of municipal or State control, being managed by incorporated boards of trustees or influential art societies. Some of the museums of art are maintained or aided by the city or state; but in general both schools and museums have been founded by private munificence and are maintained without governmental aid. Besides the teaching in these special schools, drawing and elementary design are also taught in many public schools of Europe and America, as well as in evening classes conducted by the municipality or by philanthropic societies in the United States.

A broad distinction is generally made between schools of the fine arts, in which painting,

sculpture, and architecture are taught—sometimes also music and engraving—and schools of industrial art, which train their pupils for industrial design and the decorative arts. (See DECORATIVE ART.) In some cases the two kinds of training are offered in the same school, but this is rare. Architectural training, moreover, has in the United States been chiefly given in schools attached to universities or to technological institutions, and has been more thoroughly developed than any other branch of education in design in such schools as that of the Massachusetts Institute of Technology (1866), Cornell University (1869), Columbia University (1881), the University of Pennsylvania, and Harvard University.

In the modern schools of design free-hand drawing is universally recognized as the foundation upon which all the training must be based, since it involves the coördination of hand and eye. The grammar of design—i.e., the theoretic principles of good decoration and the rules which express these—is taught by lectures or textbooks and enforced by progressive exercises in design. Fertility and resource are cultivated by the study of the history of the decorative arts and of the examples of design in the museums, and the taste is trained both by this study and by the criticism of original designs prepared by the students. Finally, there is added to these branches the detailed technical instruction necessary for each particular industry, such as stained-glass work, carpet weaving, wall-paper making, pottery, and glasswork; and the graduate pupil is then qualified to enter the service of some industrial establishment or to make designs for sale to the manufacturers.

A number of the most important schools of design are treated in special articles, such as: ART STUDENTS' LEAGUE; BOSTON ART SCHOOL; ECOLE DES BEAUX-ARTS; NATIONAL ACADEMY OF DESIGN; ROYAL ACADEMY, LONDON; SOUTH KENSINGTON, NATIONAL ART SCHOOLS OF; SAINT LUKE, ACADEMY OF. Other important schools of design are: the Ecole Nationale et Spéciale des Arts Décoratifs in Paris, the Berlin Bau-Akademie, the Vienna Imperial Art Institute, the School of Applied Design for Women, the Cooper Union (q.v.), New York, the Chicago Art Institute, and the textile schools of Lowell and Philadelphia. Consult: Münsterberg, *The Principles of Art Education* (New York, 1904); Ludwig, *Ueber Erziehung zur Kunstübung und zum Kunstgenuss* (Strassburg, 1907); Kunzfeld, *Unter den gegenwärtigen Stand der Kunsterziehungsfrage* (Langensalza, 1909); Adams, *Theory and Practice in Designing* (New York, 1911).

DÉSIRADE, dā'zē'rād' (Sp. *deseada,* desired). A small island of the French West Indies, situated about 8 miles northeast of Guadeloupe, of which it is a dependency (Map: West Indies, G 3). It is about 7 miles long and 1½ miles broad and contains about 10 square miles; it is without a good harbor. Its population (1906) was 1484, chiefly emancipated slaves. The island was the first discovery of Columbus on his second voyage in 1493. He named it Deseada. It has been in the possession of the French since 1814. Pop., about 1500.

DESIRE' (OF. *desir,* Fr. *désir,* It. *desiro, desiderio,* from Lat. *desiderium,* desire, from *desiderare,* to desire). An imperfect volition. In both desire and volition an "attractive" object or "end" is set before consciousness; but in desire the individual is unable to attain the "end," unable even to attempt to attain it, while in volition he makes an effort to possess the object. He can hardly say that he is "baffled" in desire, for that would imply the making of an attempt; and although the object appears as desirable, it does not appear as a thing to be sought after—at least, not for the moment. The inhibition is an integral part of the situation in which the desired object is presented. The central process in desire is, then, a motive shorn of its power. One may desire an object which has fallen out of reach; but since it is out of reach, one does not "will" to get it. Only when the means of attainment come before the mind, or, at least, when the impossibility of reaching the object escapes the mind, does the volition arise; only then, i.e., does one actually endeavor, strive to obtain the object. Until experience teaches that some things are impossible of attainment, the distinction between desire and volition does not arise. Thus, the infant desires the moon and at the same time stretches forth his hands to grasp it. He may still desire it after he has learned that it is an object in the sky, but he does not "will" to possess it.

Some psychologists have given the word "desire" a wider meaning than that just explained. They leave out the element of inhibition or inability and assert that whenever an idea presents itself as a motive it arouses desire, whether the thing desired, e.g., a dinner or an ideal in moral conduct, is or is not realized. Under the first definition desire is akin to wishing; under the second it is a particular kind of conation (q.v.), an appetition, or an "endeavor towards." It is probably better to restrict the term to its narrower meaning and to retain the element of inhibition, the lack of means by which the desire-consciousness might be changed into the volition-consciousness. Thus considered, a dissection of desire reveals a strong affective element, which may consist in pleasantness or unpleasantness. The thought of restriction is inherently unpleasant, but the unpleasantness may be overcome by the agreeable thought of the object. Over and above the affection and the ideas attended to, there is in desire a complex of organic sensations, and, in case the desire is sufficiently powerful—as in longing or yearning—a well-marked feeling of effort (q.v.). Consult: Bain, *Mental and Moral Science* (London, 1884); Wundt, *Human and Animal Psychology* (ib., 1901); Stout, *Manual of Psychology* (ib., 1899). See EMOTION; WILL.

DESJARDINS, dā'zhär'dăn', ALPHONSE (1841–1912). A Canadian journalist and statesman. He was born at Terrebonne, P. Q., was educated at Masson College and Nicolet Seminary, and was admitted to the bar in 1862. For some years he practiced law, but in 1868 he abandoned it for journalism and served on the editorial staff of *L'Ordre* and as chief editor of *Le Nouveau Monde.* He took an active part in organizing the Canadian Papal Zouaves, sent to aid the Pope in 1868, and was one of the framers of the *Programme Catholique* (1871). For his services to the Roman Catholic church he was created a knight of the Order of Pius IX in 1872. In 1874 he was elected a Conservative member of the Dominion Parliament and retained his seat until 1892. He was mayor of Montreal (1893), Minister of Militia in Sir Mackenzie Bowell's administration in 1896, and in the same year was Minister of Public Works

in the administration of Sir Charles Tupper. Towards the end of 1896 he retired from political life.

DESJARDINS, MARTIN (1640–94). A French sculptor, whose real name was Martin van den Bogaert. He was born at Breda, in Holland, and studied under Verbruggen in Antwerp and later under Buirette in Paris, where he succeeded so well that he took up his residence there. He was made an academician in 1671, then professor (1681), rector of the Royal Academy (1686), and court sculptor to Louis XIV. His works are in several of the Paris churches, and at the Invalides and Versailles. His masterpiece was the colossal bronze statue of Louis XIV in the Place de la Victoire (1686), but this was destroyed in 1792, and there are only fragments of it left in the Louvre. It represented the King on foot, crowned by Victory. There are colossal statues of Louis XIV at Versailles and Lyons by Desjardins, and a fine bust of the painter Mignard, a bust of Edouard Colbert, and a statue of Hercules in the Louvre. His work is academic in finish, but has not much dramatic feeling.

DESJARDINS, MICHEL ALBERT (1838–97). A French writer and politician, born at Beauvais (Oise). He studied at the University of Paris and in 1871 was elected deputy for Oise in the National Assembly. From 1873 to 1875 he was Undersecretary in the Ministry of Public Instruction and in 1875–76 held the same post in the Ministry of the Interior. In 1877 he was appointed to the chair of legislation and criminal procedure in the University of Paris. He published *Le pouvoir civil au concile de Trente* (1869); *Traité du vol dans les principales législations de l'antiquité et spécialement dans le droit romain* (1881); *Code pénal russe* (1884); *Examen doctrinal: le droit criminel en Algérie et dans les colonies* (1887).

DES'MAN (Sw. *desman rått*a, desman, from *desman*, musk + *råtta*, Ger. *Ratte*, rat). A large, aquatic, shrewlike mole of the genus *Myogale*, or *Galemys*, and family Talpidæ, of which two species are known. They have completely webbed feet, the fore pair not adapted to digging and the hind pair enlarged into paddles, and a long and flexible proboscis. The best-known species is the Russian desman (*Myogale* [or *Galemys*] *moschata*), which inhabits the margins of streams and lakes throughout southeastern Russia. It is about 16 inches long, including the tail, which is long and laterally compressed, forming a powerful swimming organ, acting as a sculling oar; and it is clothed in soft, molelike fur, blackish above and whitish beneath, and salable to furriers. An element of value in its fur is said to be the musky odor which clings to the fur, which is derived from a cluster of sebaceous anal glands and which renders the flesh uneatable. Its home is an extensive burrow in the bank of a stream, opening underneath the water, in which the desman spends most of its time, and where it searches, by means of its long, flexible, and sensitive nose, for insects, leeches, small mollusks, and similar food in the mud and beneath the stones. The other species (*Myogale pyrenaica*, or *Galemys pyrenaicus*) inhabits the Pyrenees, is far smaller, and has a perfectly round tail, but its habits are much the same. Fossils show that the desman inhabited Europe until the last Glacial era.

DESMARETS DE SAINT-SORLIN, dā'-mâ'-râ' de săn sôr'lăn', JEAN (1595–1676). A French dramatic and historical writer. He attracted the attention of Richelieu and through his influence became one of the founders, and the first chancellor, of the Académie Française (1634–38). Richelieu appointed him counselor to the King and Secretary General of the Levant marine. In 1645 Desmarets became a devout Catholic. This led him to attack the Jansenists of Port Royal, and the pen war lasted three years. The most interesting of his works is *De la comparaison de la langue et de la poésie française avec la grecque et la latine* (1670), which opened the long quarrel between the ancients and the moderns. His works also include *Les visionnaires* (1637), *Erigone* (1638), *Scipion* (1639). Consult H. Rigault, *Histoire de la querelle des anciens et des modernes* (1850).

DESMARRES, dā'mär', LOUIS AUGUSTE (1810–82). A French oculist, born at Evreux. In Paris, in 1839, he established the *clinique* which he conducted for 25 years. He introduced the operation of iridectomy. He also invented an ophthalmoscope and contributed to the *Gazette des Hôpitaux*. His principal publication is a *Traité théorique et pratique des maladies des yeux* (1854–58).

DE SMET DE NAEYER, PAUL, COMTE. See SMET DE NAEYER.

DES'MIDS. One-celled algæ that exhibit the greatest possible variety of form and are often extremely beautiful. The cell is peculiar in being organized into two symmetrical halves, often separated by a deep constriction which makes the "isthmus." In each half there is a large chloroplast, while in the isthmus connecting the two halves the single nucleus is placed. Many of the desmids have the power of locomotion, and they are very sensitive to light, taking a position determined by the incident rays. On account of the structure of the cell its division is peculiar. The nucleus divides, and a wall is formed across the isthmus. The division thus results in two new cells, each consisting of half of the old cell and a portion of the isthmus, which enlarges into a new half. In sexual reproduction the cells pair, the walls are ruptured at the isthmus, the protoplasts escape and fuse, and a fertilized egg (zygospore) is formed.

DES MOINES, de moin' (Fr., of the monks). The capital and the largest city of Iowa, and the county seat of Polk County, near the geographical centre of the State, 138 miles east by north of Omaha, Neb., at the confluence of the Raccoon and the Des Moines rivers (Map: Iowa, D 3). It is an important manufacturing and commercial city and is noted for its extensive insurance interests and its exceptional railroad facilities, which include the lines of the Chicago, Rock Island, and Pacific, the Chicago, Burlington, and Quincy, the Chicago Great Western, the Chicago and Northwestern, the Wabash, the Minneapolis and St. Louis, the Fort Dodge, Des Moines, and Southern, and the Chicago, Milwaukee, and St. Paul, and also several interurban lines. Des Moines was settled in 1846, was incorporated as the town of Fort Des Moines in 1851, and in 1857 was chartered as a city and became the capital of the State, replacing Iowa City. It is built on gently sloping hills and contains, among its finest structures, the capitol, erected at a cost of $3,000,000, the United States Government building, the State Historical building, city library, the county courthouse, two hospitals, a large auditorium, and

three public high schools. Des Moines is the seat of Des Moines College (Baptist), established in 1865; Drake University, founded in 1881 by the Disciples of Christ, but now nonsectarian; Highland Park College (Presbyterian), founded in 1890; Grand View College (Danish Lutheran), founded in 1895; and the Capital City Commercial College, founded in 1884. It has also an extensive system of parks and several bridges across the two rivers. The Iowa State Fair is held here annually. Des Moines and the surrounding region are underlaid with vast deposits of bituminous coal, a material advantage which has contributed to the city's rapid industrial growth. Among its manufactures are books and magazines, patent medicines, brick, trunks, carriages, wagons, sleighs, engines and boilers, cotton and woolen goods, pottery, Portland cement, glue, incubators, clothing, tile, sewer pipe, agricultural implements, confectionery, crackers, mattresses, harness, scales, furnaces, plows, soap, brooms, white bronze, gloves, twine, tents, linseed oil, wall paper, washing machines, furniture, axle grease, baking powder, electrical appliances, etc. The annual income and expenditures of the city amount to about $2,200,000 and $2,600,000 respectively, the principal items in the budget being $75,000 for street lighting, $80,000 for the fire department, and $965,000 for schools. A city charter, embodying what has become known as the "Des Moines Plan" of municipal government, was adopted in 1907. It vests the government in a commission of five, chosen biennially, on a nonpartisan ticket, by the electors of the entire city, district divisions having been abolished. Other city officers are chosen by the commission, and city employees are selected by a civil-service board of three members appointed by the commission. Each of the administrative departments is controlled by a commission. The commissioners are subject to the recall on petition of 25 per cent of the registered number of voters. All franchises must be submitted to the people, and they can compel the commission to pass any law or ordinance. Fort Des Moines was established here in 1843 to protect the rights of the Sacs and the Foxes. Whites settled in 1851, and in 1900 the fort, with a full regiment of cavalry, was reëstablished. Pop., 1890, 50,093; 1900, 62,139; 1910, 86,368; 1914 (U. S. est.), 96,691; 1920, 126,468.

DES MOINES COLLEGE. An institution of higher education, situated at Des Moines, Iowa. It was established in 1865 by members of the Baptist church and was affiliated with Chicago University (see CHICAGO, UNIVERSITY OF) in 1892. The college offers the bachelor's degree in arts, science, and philosophy. It had in 1914 an enrollment of 507, including students in the musical and preparatory departments. The library contains 10,000 volumes. A special department for the training of teachers is maintained. Six college buildings stand on a wooded campus of 10 acres, including the athletic field. Buildings and grounds are valued at $250,000. The endowment is $200,000. The president in 1914 was John A. Earl, D.D.

DES MOINES RIVER. The most important river of Iowa. It is formed by the meeting of the east and west forks of the Des Moines in Humboldt Co., Iowa. The east fork is the outlet of Okamanpadu Lake, in Emmet Co., Iowa; the west fork flows from a chain of lakes, one of which is Lake Heron, in Jackson Co., Minn. (Map: Iowa, D 3). The Des Moines flows southeasterly across Iowa and empties into the Mississippi River (q.v.) 3 miles below Keokuk. It is 550 miles long and drains an area of 14,500 square miles. From Farmington to its mouth it falls 48 feet, or 1⅗ feet per mile. The chief tributary is the Coon River, which joins it from the west at Des Moines. The chief cities along its banks are Ottumwa, Des Moines, and Fort Dodge. Through Lee County it flows in a narrow, gorgelike valley noted for its picturesque scenery.

DES'MOSPON'GIÆ. See HEXACTINELLIDA.

DESMOULINS, dā'mōō'lăN', LUCIE SIMPLICE CAMILLE BENOIT (1760–94). A French politician and journalist of the time of the Revolution. He was born at Guise, in Picardy, March 2, 1760, the eldest son of the lieutenant general of the Bailiwick of Guise. Through the influence of a relative young Desmoulins obtained a scholarship in the Lycée Louis-le-Grand, Paris, where he had Robespierre as a fellow student. After his graduation young Desmoulins studied law and became an advocate before the Parlement of Paris in 1785, but met with little success, owing, it is said, to a stammer in his speech. In 1788 he published a philosophical work, *La philosophie du peuple français;* but it was the dismissal of Necker, July 11, 1789, that first brought Desmoulins to the front as a Revolutionist. He heard the news on the evening of July 12 and, in the excitement of the moment forgetting his stammer, sprang on a café table in the garden of the Palais Royal and harangued the crowd of people around him. This scene marked the actual beginning of the Revolution. The cry "To arms!" resounded, and two days later the Bastille was taken. A Republican pamphlet, *La France libre,* which he brought out, was received with instantaneous favor, and he was encouraged to follow it up with a journal of a revolutionary nature. His *Discours de la lanterne aux Parisiens* was less to his credit and earned for him the nickname of "Procureur de la lanterne." Desmoulins was a hero worshiper, but inconsistent in his allegiance, and, after making Mirabeau his idol, transferred his affections to Danton, to whom he clung until the end. In 1791 both men were in danger of arrest for the extreme boldness of their views, but both escaped. It was at this time that Desmoulins ceased publishing *Les Révolutions de France et de Brabant,* his first journal, and began *La Tribune des Patriotes,* which became the organ of the Cordeliers. He was also intimate with Robespierre, who persuaded him to attack the Girondists in a work entitled *Fragment de l'histoire de la Révolution* (usually referred to as the *Histoire des Brissotins*). This venemous attack helped greatly in overthrowing the opposite party, but it is said that later Desmoulins regretted his course. With Danton he began to call for moderation, and towards the end of 1793 the first number of *Le Vieux Cordelier* appeared and stood up for just and legal trials and less severe sentences. Desmoulins attacked the Hébertists as well as the Committee of Public Safety, and the breach between the Dantonists and ultra-Jacobins grew wider. After being twice accused before the Jacobin Club, where he was defended by Robespierre, Desmoulins was at length arrested, along with Danton and others of the party. The merest formality of a trial took place, and they were all executed, April 5, 1794. Desmoulins

did not face death with the unflinching courage of Danton. His beautiful young wife, Lucile Duplessis, sought in every way to rescue him, but was herself arrested and guillotined a fortnight later. Consult: *Œuvres de Camille Desmoulins, avec une notice biographique*, ed. by Matton (Paris, 1838); Claretie, *Camille Desmoulins, Lucie Desmoulins, étude sur les Dantonistes* (ib., 1875); Eng. trans., *Camille Desmoulins and his Wife*, by Mrs. Cashel Hoey (London, 1876); Aulard, *Les orateurs de la Législature et de la Convention* (Paris, 1885–86); Lenotre, *Paris révolutionnaire* (ib., 1904).

DESNA, dās'nȧ. A river of Russia, rising in the Government of Smolensk, 72 miles southeast of the town of that name (Map: Russia, D 4). It flows southeast through the Government of Smolensk until it reaches Bryansk, in Orel, where it makes a sharp bend and, after a southwesterly course through the governments of Orel and Tchernigov, joins the Dnieper nearly opposite Kiev. The Desna is 690 miles in length and is navigable for steamers as far as Bryansk. Many important towns are found in its basin. The river thus acquires considerable importance in the inland trade of Russia.

DESNOIRESTERRES, dȧ'nwär'târ', Gustave Le Brisoys (1817–92). A French author, born at Bayeux. He is the author of a number of poems and novels, but his principal works have been historical studies of the eighteenth century. These include: *Voltaire et la société française au XVIIIème siècle* (8 vols., 1867–76), which was crowned by the Academy; *Les cours galantes* (1859–64); *La comédie satirique au XVIIIème siècle* (1884); *Le chevalier Dorat et les poètes légers du XVIIIème siècle* (1887).

DESNOYERS, dȧ'nwä'yȧ', Auguste Gaspard Louis Boucher, Baron (1779–1857). A French engraver, born in Paris. He studied drawing with Lethieres, the dotted manner of engraving with Louis Darcis, and line engraving later under Tardieu. One of the most important engravers of his time, he became a member of the Institute in 1816, in 1825 was made engraver to the King, and three years later received the title of Baron. He is especially known for his engravings after Raphael, whose works he interpreted with peculiar sympathy and masterly technique. Among the best of his plates are Raphael's "La belle jardinière" (1801), Gérard's portrait of Napoleon (1808), the "Madonna della Casa d'Alba" (1827), the "Sistine Madonna" (1846), and especially "The Transfiguration" (1840). In 1821 he published a collection of 34 prints, entitled *Recueil d'estampes gravies d'après des peintures antiques italiennes.* His complete *œuvre* comprises 75 plates.

DESNOYERS, Louis Claude Joseph Florence (1805–68). A French author, born at Replonges (Ain). He contributed largely to the success of the *Journal des Enfants*, in which his *Mésaventures de Jean Paul Choppart* (1836, 1909) was published. This and the following story, *Aventures de Robert-Robert et de son ami Toussaint-Lavenette* (1840), are considered to be among the classics of the literature of education.

DESOLATION ISLAND. See Kerguelen Land.

DESOLATION LAND, also called **DESOLATION ISLAND.** An island of Chile, on the south side of the west end of the Strait of Magellan. It is 70 miles long and 15 miles broad. Its westernmost point is Cape Pillar.

DE SOLA, dē sō'lȧ, Meldola (1853–). A Canadian Jewish rabbi and opponent of reformed Judaism. He was born in Montreal and was educated under the direction of his father, A. de Sola, also a Jewish rabbi. For a few years he was engaged in commercial pursuits, but after an experience in 1876–82 as voluntary lay assistant in the Spanish and Portuguese synagogue of which his father was rabbi, he succeeded the latter in 1882. His controlling aim was soon known to be uncompromising opposition to the Liberal movement in North American Judaism. He preached and worked against it vigorously. He was foremost in promoting, and was first vice president of, a conference of the representatives of orthodox Judaism (New York, 1898), and he was also one of the three rabbis who formulated the principles governing the convention. A result of the conference was the formation of the Union of Orthodox Jewish Congregations of the United States and Canada. He became a firm supporter of the Zionist movement (q.v.).

DESOR, de-zôr', Edouard (1811–82). A Swiss geologist, born at Friedrichsdorf, near Homburg. He studied at the universities of Giessen and Heidelberg and in consequence of the part taken by him in political affairs was compelled to escape to Paris. Thence he went to Neuchâtel, where he became acquainted with Agassiz, whom in 1847 he accompanied to America. He subsequently became professor of geology in the Académie of Neuchâtel. He was elected a member of the Federal Grand Council and in 1873 became its president. His publications, dealing chiefly with the geology of Switzerland, include: *Gebirgsbau der Alpen* (1865); *Les palafittes du lac de Neuchâtel* (1865); *Echinologie helvétique* (1869–72); *Le paysage morainique* (1875).

DE SO'TO. A city in Jefferson Co., Mo., 43 miles south by west of St. Louis, on the St. Louis, Iron Mountain, and Southern Railroad (Map: Missouri, F 3). It is in the centre of a lead and zinc mining region, exports grain, flour, produce, and live stock, and has a shoe factory, flouring and planing mills and railroad machine shops. The water works are owned by the city. Pop., 1900, 5611; 1910, 4721.

DE SOTO, Hernando (or Fernando). See Soto, Hernando (or Fernando) de.

DESPAIR, Giant. The monstrous owner of "Doubting Castle," where Christian and Hopeful are temporarily imprisoned, in Bunyan's *Pilgrim's Progress.*

DESPARD, dĕs'pärd, Edward Marcus (1751–1803). An Irish conspirator, born in Queen's County. He entered the army as ensign in 1766 and in 1779 was appointed engineer in the San Juan expedition, in which he distinguished himself. In 1781 he became commander of the island of Rattan, with the rank of captain, and subsequently of the Bay of Honduras and the entire Mosquito Coast. Soon after the peninsula of Yucatan had been added to his domains by Spanish grant, he was accused of cruelty and other offenses by the prior English settlers, who resented the concessions made to logwood cutters from the Mosquito Coast. He was ordered to England, where he remained from 1790 to 1792, only to learn that there was no charge against him. An unjustifiable imprisonment from 1798 to 1800 so incensed him against the government that he devised a plot for the assassination of the King and the capture of

the Bank of England and the Tower. He was convicted of treason and executed at Newington.

DESPENSER, dē-spĕn'sẽr. A powerful English family of the thirteenth and fourteenth centuries.—HUGH LE DESPENSER (died 1265) was justiciar of England between 1260 and 1264 and was associated with Simon de Montfort in the rising against Henry III. He was killed at the battle of Evesham.—His son, HUGH LE DEPENSER THE ELDER (1262–1326), played a very prominent part in the reign of Edward II. He served in the Welsh Wars and in France and Scotland, being present at the battle of Dunbar in 1296. Subsequently he was employed on numerous diplomatic missions to various European Powers and to the Pope. Up to the year 1308 he was a member of the Barons' party, in which his property and rank assured him a high position, but about the time of the fall of Gaveston (q.v.), the King's favorite, he abandoned the cause of the Barons, and became the head of the Court party, and a bitter enemy of Thomas, Earl of Lancaster. Though undoubtedly avaricious and unscrupulous in the means he adopted for increasing his possessions, Hugh was probably no more selfish than most of the great nobles of his time, who took advantage of the presence of a weak king on the throne to further their own interests. In 1321 the Barons' party gained the upper hand, and Hugh was sentenced by Parliament to banishment. He was recalled, however, in the following year, when the King's faction was once more in the ascendant, and contributed no doubt to the fall and death of the Earl of Lancaster. In the same year he was made Earl of Winchester, and his position became more influential than ever. The feeling of hatred with which he was regarded by all the great nobles finally led to the outbreak of a rebellion, in which Isabella, the wife of Edward II, joined. The Queen's forces marched upon Bristol, which was defended by Hugh le Despenser. The King's favorite was forced to surrender and was speedily hanged.—HUGH LE DESPENSER THE YOUNGER (died 1326) was the son of the preceding. In his youth he was the intimate friend of the young Prince of Wales, afterward Edward III, and served with him in the Scottish wars. He obtained great wealth by his marriage to one of the heiresses of the house of Gloucester, and, like his father, was for a time a prominent leader among the Barons. It was not until 1318 that he went over to the King, being actuated in this move by an insatiable greed for land, which had brought him into repeated conflicts with many of the nobles of the Marches. A league was formed against him, headed by the Earl of Lancaster, and in 1321 he was banished with his father. With his father he was recalled in the following year, restored to his old possessions, and overwhelmed with grants and new titles. He met the same fate as the elder Hugh. In the Barons' rising of 1326 he was taken prisoner, brought to Hereford, tried upon the charge of piracy and complicity in the death of Thomas of Lancaster, and hanged. A grandson of Hugh the younger was the "warlike bishop," Henry of Norwich, who died in 1406. He was chosen by Urban VI to lead a crusade against the followers of Clement VII, the antipope, in Flanders. A great-grandson, Thomas (1373–1400), was created Earl of Gloucester. Consult: Tout, *Political History of England, 1216–1377* (London, 1905); Davis, *England under the Normans and Angevins* (ib., 1905); Vickers, *History of England, 1272–1485* (ib., 1912); Wylie, *England under Henry IV* (4 vols., ib., 1884–98).

D'ESPEREY, GENERAL FRANCHET. French commander. For his biography see VOL. XXIV.

DES PÉRIERS, dā pā'ryā', BONAVENTURE (?1510–44). A French satirist and story-teller, born at Arnay-le-Duc. Arriving at Lyons in 1535, he worked in collaboration with Dolet (q.v.) on his *Commentaries on the Latin Language.* In 1536 he became the secretary of Margaret of Navarre, sister of Francis I, and took a prominent part in the literary quarrel between Marot and Sagon. Two years later appeared the work by which he is probably best known, the satiric *Cymbalum Mundi,* suggesting Lucian in its mockery of superstition, old and new, with an occasional pensive seriousness very characteristic of the finer culture of the French Renaissance. The work caused such a sensation among the clergy that the Parlement of Paris immediately ordered its suppression. Whether through fear of persecution which Margaret was powerless to avert or through insanity, Des Périers committed suicide in 1544. Besides translations and poems of minor interest, among which is a curious literary courtship of a nun, he left a collection of 129 *Nouvelles récréations et joyeux deviz* (1558), written at different periods during his life and published by friends after his death. The best edition of Des Périers's works is that of Lacour (Paris, 1856). Frank published a separate edition of the *Cymbalum Mundi* in 1873. Consult: Chenevière, *Bonaventure Des Périers* (Paris, 1886); Frank and Chenevière, *Lexique de la langue de Bonaventure Des Périers* (ib., 1888); Rübner, *Syntaktische Studien zu Bonaventure Des Périers* (Leipzig, 1897).

DES PLAINES (dā plān') **RIVER** (Fr., of the plains). A river rising near Racine, Wis. (Map: Illinois, D 2). It flows south nearly parallel with the shore of Lake Michigan, and from 6 to 12 miles distant, to Lyons, just west of Chicago, Ill., thence southwest, uniting with the Kankakee River (q.v.) in Grundy Co., Ill., and forming the Illinois River (q.v.). It is separated from the lake by a low divide, over which during high water it discharges into the Chicago River (q.v.). For 13 miles its waters have been deflected to form the Chicago Drainage Canal (q.v.). It is 150 miles long and drains an area of 1700 square miles.

DESPORTES, dā'pôrt', (ALEXANDRE) FRANÇOIS (1661–1743). A French animal and still-life painter, born at Champigneul. He was the pupil of the animal painter Nicasius, but was in the main self-taught. In 1695 he went for two years to Poland to paint portraits of the King, the royal family, and magnates of the court. On his return to France he devoted himself to painting animals and scenes of the chase and later to still life and fruit and flower pieces, and was employed by the King and the grandees of the French court. At the castle of Marly he painted portraits (now in the Louvre) of the most valuable dogs of Louis XIV, with whom he stood in high favor. He designed compositions for the Gobelin and Savonnerie tapestries. There are 27 pictures by him in the Louvre, and he is represented in many other European galleries. Although a very productive and facile painter, Desportes was always careful in his execution. His work compares favorably with that of the best Flemish masters in his line.

DESPORTES, PHILIPPE (1546–1606). A French poet, born at Chartres. In his youth he went to Italy as secretary to the Bishop of Puy and there studied the Italian poets, especially Petrarch and Ariosto, whom he imitated in his sonnets and elegies. On his return he rose rapidly in favor and enjoyed during his lifetime the reputation of a Ronsard. He was essentially a courtier; he praised the loves of the last Valois and became Abbé and Canon of the Sainte-Chapelle and court poet. His talent, neither original nor profound, is best shown in such charming verses as *Contre une nuit trop claire* and *Rosette pour un peu d'absence*, although certain of his religious poems have a sober beauty. Editions of his works appeared in 1573, 1583, and 1592. They were also published with an introduction by A. Michiels, as *Œuvres de Philippe Desportes* (1858). *Le mariage honni* (1573) was republished in 1908.

DES'POT (from Gk. δεσπότης, *despotēs*, master, lord, ruler). An absolute ruler who carries on the government entirely in his own interests, pursuing generally a policy of cruelty and oppression. Like "tyrant," the word "despot" originally carried no odious meaning and denoted merely the possessor of unlimited power. In a modified sense, but still free from the imputations of tyranny, the title was applied to the rulers of the Greek towns of Asia Minor under the Persian domination and subsequently to the governors of the Asiatic provinces and towns of the Byzantine Empire.

DESPRÈS, JOSQUIN. See DEPRÈS, JOSQUIN.

DESPRÈS, dā'prĕ', SUZANNE ISABELLE (1876–). A French actress, born in Mexico. She studied at the Conservatoire in Paris and in 1897 won the first prize in comedy and the second in tragedy. She played at the Théâtre l'Œuvre and married its manager, Aurelien Lugné-Poë. She also appeared at the Antoine (in *Remplacantes*), the Porte Saint-Martin (in *L'Assommoir*), etc., and in 1902 made her début at the Comédie Française in *Phèdre*. In 1910 she played in *Elektra*. She was particularly successful in Ibsen's plays. She toured Germany in 1906 and appeared in London. Consult the appreciation by Sorel, *Nouvelle Revue*, pp. 25–34 (May, 1902).

DESPRETZ, dā'prā', CÉSAR MANSUÈTE (1789–1863). A French physicist, born at Lessines, Belgium. He was instructor of physical sciences at the Collège Henri IV in Paris and at the Polytechnic Institute and was appointed professor at the Sorbonne about 1837. His writings were published in the *Comptes Rendus* of the Paris Academy of Sciences, of which society he was a member, and in the *Annales de Chimie et de Physique* (1817–56). His *Traité élémentaire de physique* (1825; 4th ed., 1896) was adopted by the Council of Public Instruction. A product of carbon introduced by him is said to be almost as serviceable as diamond dust for polishing purposes.

DESSAIX, dā'sā', JOSEPH MARIE, COUNT (1764–1834). A French general and politician, born at Thonons, in Savoy. In 1791–92 he raised volunteers for France in Savoy and was present at the siege of Toulon and subsequently served under Napoleon in Italy. He was a member of the Council of Five Hundred and was one of the few who opposed the coup d'état of the Eighteenth Brumaire. Nevertheless, he was made a brigadier general in 1803 and rose to be general of division by 1809. His conduct at Wagram won him the title of "the Intrepid" from the lips of the Emperor. He was created a Count in 1810 and made Governor of Amsterdam. In the Russian campaign of 1812 Dessaix was severely wounded at Borodino. In 1814 he was successful against the Allies in Savoy. After the Revolution of 1830 he was appointed commander of the National Guards at Lyons. He died Oct. 26, 1834. For the details of his life, consult Dessaix et Folliet, *Etude historique sur la révolution et l'empire en Savoie: Le générale Dessaix—sa vie politique et militaire* (Paris, 1879).

DESSALINES, dā'sā'lēn', JEAN JACQUES (1758–1806). A negro military leader, known as Jean Jacques I, Emperor of Haiti. He was born in Guinea, Africa (according to some accounts at Grand Rivière, Haiti), and was sold as a slave at Cap Français (now called Cape Haitien). In 1791 he entered the insurgent ranks under Biasson, and subsequently, with rank of lieutenant general, became one of the trusty subordinates of Toussaint l'Ouverture. For some time he maintained a guerrilla warfare against General Leclerc, the officer sent by Napoleon to subjugate the island, but, upon the conclusion of peace in 1802, he professed allegiance to the French, and was appointed Governor of the southern division of Haiti with rank of a general of division. Angered at the severe repressive measures of General Rochambeau, who succeeded General Leclerc, he organized and directed an uncompromising revolt, which, with the assistance of an English squadron, ended in the utter expulsion of the French. In 1804 he was appointed Governor General for life. But, infuriated by the failure of his expedition against the Spanish part of the island, he had himself crowned Emperor and proceeded to a cruel despotism. He was assassinated by two of his officers, Pétion and Christophe, the latter of whom became President of Haiti. Consult Dubroca, *Vie de J. J. Dessalines* (Paris, 1804).

DESSAU, dĕs'sou (first called *Dissouwe*, then *Desso*). The capital of the German Duchy of Anhalt, on the Mulde, not far from its junction with the Elbe, 67 miles by rail southwest of Berlin (Map: Germany, E 3). The town lies in a well-wooded plain, surrounded by a very fertile and richly cultivated country. The streets are broad and well shaded. The palace, dating partly from the sixteenth century, contains a collection of paintings, including some excellent examples of the early Italian, Dutch, and Flemish schools. The palace is interesting also for its fine architectural features, its suite of Old German rooms, its relics of Prince Leopold (known as "the old Dessauer"), and Napoleon. Among the other buildings of note may be mentioned the old and new town halls, the new palaces of Princess Louise and the hereditary prince, the Parliament building, the new post office, and the theatre. The church of St. Mary, built in 1512 and restored in 1857, contains several pictures by the two Cranachs, and in the vaults the tomb of Prince Leopold, the sarcophagus being surrounded by the figures of six grenadiers. The town possesses all modern utilities. Its educational establishments include a gymnasium, several technical schools, and three large libraries, one maintained by the town. It has a number of art collections in two museums, and the Amalien Stiftung, founded by the daughter of Prince Leopold in the eighteenth

century. Dessau is the birthplace of the composer Friedrich Schneider, the poet Wilhelm Müller, and the philosopher Moses Mendelssohn, the two latter being commemorated by monuments. The bridge over the Elbe was the scene of the brilliant victory won during the Thirty Years' War by Wallenstein over Count Mansfeld on April 25, 1626. The city has grown very rapidly in the last 20 years. The refining of sugar is the principal industry, but manufactures of carpet, paper, cloth, machinery, railway cars, vehicles, and spirits have been greatly prospered. It is the centre of a fertile agricultural country, and by river it carries on a lively trade in grain. Pop., 1900, 50,846; 1910, 56,606. Dessau was founded in the twelfth century by Albert the Bear, received civic rights in 1213, and upon the division of Anhalt in 1603 became the residence of the Anhalt-Dessau line. It suffered severely during the Thirty Years' War, but began to recover its prosperity in the eighteenth century. Consult Würdig, *Chronik der stadt Dessau* (Dessau, 1876).

DESSOIR, dă'swär', Ludwig (properly Leopold Dessauer) (1810–74). A German actor, born in Posen. He was attached to the Leipzig Theatre from 1834 to 1836, that of Karlsruhe from 1839 to 1844, and the Hof-Theatre of Berlin from 1847 until his retirement in 1872. As an interpreter of tragic rôles from Goethe, Schiller, and Shakespeare, he took high rank. G. H. Lewes preferred his Othello to that of Kean.

DE STAAL, de stäl, M. G., Baron (1822–1907). A Russian diplomat, born in Esthonia and educated at the University of Moscow. In 1845 he entered the diplomatic service in the Asiatic department of the Ministry of Foreign Affairs, five years later becoming a member of the Russian embassy at Constantinople. Subsequently he served as consul general at Bucharest, on the staff of the legation at Athens (1859), and, beginning in 1864, again at Constantinople, as councilor to the embassy. There he obtained the Porte's permission for Russia to disregard the Black Sea clauses of the Treaty of Paris. From 1884 to 1902 he was Ambassador at the court of St. James's, and in this capacity he was instrumental in averting the threatened quarrel between England and Russia over the Afghan boundary. In 1899 he represented Russia at The Hague Peace Conference.

DE STAEL, de stäl. See Stael-Holstein.

DESTERRO, dă-stâr'rō. See Florianopolis.

DESTINN, dĕs'tĭn, Emmy (1878–). A Bohemian dramatic soprano, whose real name is Kittl. She was born in Prague, where she received her first musical instruction on the violin. When she discovered her musical voice, she studied with Madame Loewe-Destinn, who secured for her an engagement at the Berlin Royal Opera. Here her début as Santuzza in 1898 was so successful that she was permanently engaged for Berlin. Her European fame dates from her appearance as Senta in the first Bayreuth performance of *The Flying Dutchman* in 1901. In 1907 Strauss selected her to sing the title rôle in his *Salome* at the first Paris production. In 1908 she became a member of the Metropolitan Opera House of New York and one of the prime favorites. She is not only a great singer, but also a superb actress. Her repertoire includes 80 operas.

DESTOUCHES, dă'tōōsh', Philippe Néricault (1680–1754). A French dramatist, born at Tours, Aug. 22, 1680. Of his 17 comedies, *Le dissipateur* (1736) and *Le glorieux* (1732) are pronounced by Lessing "models of finer high comedy"; and the largely autobiographic *Le philosophe marié* (1727) is also a classic of the French stage. His works are commendable rather on account of the absence of great faults than from the presence of any real dramatic genius. Except in *La fausse Agnès* (1736), Destouches took his comic vocation too seriously, but he is important as a witness to the change in public feeling that was to welcome the "tearful comedy" (*comédie larmoyante*) of La Chaussée. Consult Al. Bürner, *Destouches et ses comédies* (Albe-Royale, 1906).

DESTROY'ING ANGELS, or Danites. See Danites.

DESTRUC'TOR, Refuse.. See Garbage.

DESTUTT DE TRACY, dă'stŭt' de trà'sē', Antoine Louis Claude, Count (1754–1836). A French philosopher. At the outbreak of the Revolution he was a colonel in the army and was sent to the States-General as a delegate of the nobility of Bourbonnais. In 1792 he accompanied his friend Lafayette into exile, but returned secretly to France not long afterward and was cast into prison, from which only the downfall of Robespierre released him. Under Napoleon he was a senator, and after the Restoration was created a peer by Louis XVIII. As a philosopher, he represented the doctrine of sensualism, following more especially Condillac, whose system he further developed to the so-called ideologism. His principal work is *Eléments d'idéologie* (1801–15). His other works include: *Grammaire générale* (1803); *Commentaire sur l'esprit des lois de Montesquieu* (1806; Eng. trans., 1811); *Traité de la volonté* (1815).

DE TAB'LEY, Lord. See Warren, John Byrne Leicester.

DETACH'MENT (Fr. *détachement*, from *détacher*, to detach, from *de*, away + *tacher*, to fasten, from It. *tacca*, tack, from Bret. *tach*, Ir. *taca*, Gael, *tacaid*, mail), Military. "A body of troops separated from a higher command and intrusted with a special mission. Nearly every command of any size is composed of troops from the different arms or special services, or both, and when not constituting a division, brigade, or other authorized unit, the question arises whether to call such a command a *detachment* or to give it the tactical designation of the predominating arm or special service; if there is a predominating element, the title of the command is that of the predominating element, unless the proportion of an auxiliary arm or special service equals or exceeds that prescribed for a division, in which case the command is a *detachment*. For example: a command consisting of one regiment of infantry and one squadron is a *detachment*, while the title of a command consisting of one regiment of infantry and a troop is that of the regiment." (*Field Service Regulations, U. S. Army*, 1913.)

DETAILLE, de-tä'y', Jean Baptiste Edouard (1848–1912). A French military painter. He was born in Paris, Oct. 5, 1848. A pupil of Meissonier, his early pictures evince the same devotion to detail and finish that marks the works of his master; but he developed a broader style with better atmospheric treatment. His "Repose during Drill in Camp Saint-Maur" (1869), painted when he was 21 years old, secured him his first medal. In 1870 he took up arms for his country, but he was never unmindful of his art and made sketches whenever he

could. It was in sketching scenes incident to camp life that he perfected his technique and made himself competent to reproduce vividly and correctly the movements of troops in preparation for battle or resting after a fight. The horrors of war he suggests rather than depicts, and his treatment may be observed in his "Salute to the Wounded" (1877). His "Movement of Troops" and "The Dream" (Luxembourg Museum), are well-known canvases. His "Passing Regiment" (1875), which is familiar by its reproductions, is the property of the Corcoran Gallery in Washington. The Metropolitan Museum of Art, New York, possesses three of his works, including the "Defense of Campigny," called by the artist his best work, and the Vanderbilt collection, on loan in the Metropolitan Museum, New York, has a like number. In collaboration with De Neuville he painted two panoramas of the campaigns of 1870–71, exhibited in Paris in 1882–83. Among his latest works are decorative paintings in the Hôtel de Ville, Paris (1902–04) and the Panthéon (1905); the "Rue du Petit Pont" (1910), an episode of the Revolution of 1830; and "General Lassalle at Wagram" (1912). He was made a chevalier of the Legion of Honor for his "Retreat." Consult: Claretie, *L'Art et les artistes français contemporains* (2d series, Paris, 1876); Goetschy, *Les jeunes peintres militaires* (ib., 1878); Valmy-Baysse, *Peintres d'aujourd'hui* (ib., 1910); and monographs by Carel (ib., 1882) and Vachon (ib., 1897).

DETAIN'ER (from Lat. *detinere*, from *de*, off + *tenere*, to hold). The technical term of the common law for a withholding of the possession of property. The gist of the act is not the manner in which the adverse possession was acquired—this may have been lawful or unlawful—but the continued detention of the property from one who claims the right to the possession thereof. No question of title or ownership is necessarily involved in the notion of a detainer, as one who is not the owner may nevertheless be entitled to the possession of the property, and, on the other hand, the owner may be guilty of an unlawful detainer of his own land or goods. A detainer is always an act of force and may be lawful or unlawful. The appropriate remedy where goods are unlawfully detained is *detinue*, or *replevin*, and if, after demand made, the holder refuses to return them, he is deemed to have converted them to his own use and becomes liable to an action in trover for damages. An unlawful detainer of lands gives rise to a right of entry or, in modern practice, to an action of ejectment. Trespass is not available if the original entry was rightful, nor can any action be employed whose purpose is to try the question of title, as that is not involved. When a detainer follows upon a wrongful entry, it may, nevertheless, be valid, as when one, in violation of law, forcibly recovers possession of his land from an intruder. Here the illegal entry is punishable, but in some jurisdictions the subsequent possession of the owner of the land will not be disturbed. See CONVERSION; DETINUE; FORCIBLE ENTRY.

D'ÉTAMPES, dā'tänp', DUCHESSE. See ESTAMPES, ANNE DE PISSELEU, DUCHESSE D'.

DETEC'TIVE (from Lat. *detectus*, from *detegere*, expose, from *de-* neg. + *tegere*, to cover). One who engages in the work of securing evidence respecting persons suspected of wrongdoing for the purpose of having it used for or against them in civil or criminal proceedings. He may be a public officer or a private employee. In many cities there are extensive detective bureaus, whose members are in no way connected with the official police or constabulary establishments. Some states forbid persons to act as detectives without a license from a court or other official source. A detective does not become an accomplice of a criminal even when his knowledge of the criminal's plans would have enabled him to prevent the commission of the crime. His act in entrapping a criminal, if limited to mere entrapment, does not render him liable to punishment, nor does it in any way excuse or exonerate the criminal.

DETER'MINANTS (Lat. *determinans*, pres. part. of *determinare*, from *de-* + *terminare*, to bound, limit). Certain algebraic functions remarkable for their brevity of notation and their wealth of significant properties. $\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}$, $\Sigma \pm a_1 b_2$, or $(a_1 b_2)$ are merely other notations for $a_1 b_2 - a_2 b_1$. The first form is commonly used in elementary mathematics. Similarly

$$\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

represents $a_1 b_2 c_3 + a_2 b_3 c_1 + a_3 b_1 c_2 - a_3 b_2 c_1 - a_2 b_1 c_3 - a_1 b_3 c_2$. Such functions are called determinants, and the quantities a_1, b_1, c_1, a_2, b_2, . . . are called elements. The first or square form of notation is called the array notation. If there are more columns than rows, the form is called a *matrix*. An array of two columns and two rows is called a determinant of the second order, one of three columns and three rows a determinant of the third order, and so on. In the expansion of a determinant of the second order there are two terms, each containing the letters a, b, but differing in the arrangement of the subscripts, 1, 2. In the expansion of a determinant of the third order there are six terms, each containing the letters a, b, c, but differing in the arrangement of the subscripts 1, 2, 3. Thus, there are two terms in the expansion of a determinant of the second order, and six in one of the third order, half of which are positive and half negative. The signs are selected according to the arrangement of the subscripts. If there is an even number of inversions in the order of the subscripts of any term, its sign is considered plus; if an odd number, its sign is considered minus; e.g., in the term $a_3 b_2 c_1$, 3 standing before 2 is an inversion, since the natural order is 2 before 3; likewise 3 before 1 and 2 before 1 are inversions; there being three inversions, the sign is minus. A determinant of the fourth order contains 16 elements, and its expansion contains 24 terms. In general, a determinant of the nth order contains n^2 elements, and its expansion $n(n-1)(n-2)\ldots 2 \cdot 1$, or $n!$ terms. Some of the leading properties of determinants are: 1. If two adjacent columns or rows of a determinant are interchanged, the sign only of the determinant is changed; if a column or row is transposed over an odd number of columns or rows, the sign only of the determinant is changed; if a column or row is transposed over an even number of columns or rows, the determinant is unchanged. 2. If the columns are made rows, and conversely, the determinant is unchanged. 3. If the elements of a row or column are added to the corresponding elements of another column or row, the value of

the determinant is unchanged. 4. Multiplying the elements of any column or row by a number multiplies the determinant by that number. 5. If two columns or two rows are identical, or if the elements of any row or column are all zeros, the determinant vanishes. Such properties are of great aid in evaluating determinants.

Various methods of expansion have been devised by which the terms, each containing one element and only one, from each column and each row, can readily and systematically be formed. While these methods can best be obtained from a textbook on the subject, minor determinants will be explained here, since they furnish a simple means for expanding determinants of degrees higher than the third. If the column and row to which any element belongs are suppressed, the resulting determinant is called a first minor of the given determinant, or the cofactor of the given element. If two rows and two columns are suppressed, the resulting determinant is called a second minor of the given determinant, and so on. Thus, in

$$\Delta = \begin{vmatrix} a_1 & b_1 & c_1 & d_1 \\ a_2 & b_2 & c_2 & d_2 \\ a_3 & b_3 & c_3 & d_3 \\ a_4 & b_4 & c_4 & d_4 \end{vmatrix}$$

$(b_2c_3d_4)$ is a first minor of Δ and a cofactor of the leading element a_1, and (a_1b_2) is a second minor of Δ.

If the cofactors of a_1, b_1, c_1, d_1, are denoted by A_1, B_1, C_1, D_1, then it can be shown that $\Delta = a_1A_1 + b_1B_1 + c_1C_1 + d_1D_1$. It should be observed that A_1, B_1, . . . involve their own signs, and that in the above equation B_1 and D_1 are negative. Thus, a determinant of the nth order may be expanded in terms of determinants of the $(n - 1)$th order, and so on. Determinants also admit, in their abridged form of notation, of the fundamental operations of addition, subtraction, and multiplication (including involution).

These functions are of great importance in the solution of simultaneous equations. The roots in the case of two linear equations, $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$, are expressed thus: $x = \frac{(c_1b_2)}{(a_1b_2)}$, $y = \frac{(a_1c_2)}{(a_1b_2)}$. In the case of three equations involving three unknowns, of the type $a_1x + b_1y + c_1z = d_1$, $a_2x + b_2y + c_2z = d_2$, $a_3x + b_3y + c_3z = d_3$, the roots are

$$x = \left(\frac{d_1b_2c_3}{a_1b_2c_3}\right),\ y = \left(\frac{a_1d_2c_3}{a_1b_2c_3}\right),\ z = \frac{a_1b_2d_3}{a_1b_2c_3}.$$

In the case of n linear equations involving n unknowns,

$$x = \frac{(l_1\, b_2c_3 \ldots k_n)}{(a_1b_2c_3 \ldots k_n)}.$$

For n homogeneous linear equations, the determinant notation serves to express the necessary and sufficient condition for the consistency of the system. Thus, in the system $a_1x + b_1y + c_1z = 0$, $a_2x + b_2y + c_2z = 0$, and $a_3x + b_3y + c_3z = 0$, if $(a_1b_2c_3) = 0$, the equations can be satisfied by a set of values of x, y, z. This determinant of the coefficients is called the *discriminant* or the *eliminant* of the system of equations. It is the expression which results from eliminating the unknowns from the given equations. The discriminants of higher equations also may be expressed in determinant form. Thus, the eliminant of two equations, one of the mth and the other of the nth degree, may be found by a method known as Sylvester's *dialytic process;* e.g., to form the eliminant of $px^2 + qx + r = 0$ and $ax^3 + bx^2 + cx + d = 0$, multiply the members of the first equation by x and x^2, and the second by x, and form a system of five equations considering x^4, x^3, x^2, and x as the unknowns. The eliminant is

$$\begin{vmatrix} 0 & 0 & p & q & r \\ 0 & a & b & c & d \\ a & b & c & d & 0 \\ 0 & p & q & r & 0 \\ p & q & r & 0 & 0 \end{vmatrix} = 0.$$

If u, v, w are functions of x, y, z, the determinant

$$\left(\frac{du}{dx}, \frac{dv}{dy}, \frac{dw}{dz}\right) \equiv \frac{d(u, v, w)}{d(x, y, z)} \equiv \mathrm{J}(uvw)$$

is called the Jacobian of the system u, v, w, with respect to x, y, z. In the particular case where u, v, w, are the partial differential coefficients (see Calculus) of the same function of the variables x, y, z, it is called the Hessian of the primitive function. These and other expressions play an important part in expressing the properties of certain curves (q.v.) and surfaces; e.g., it is shown in modern geometry that if the first polar of any point A, with respect to a curve $u = 0$, homogeneous in x, y, z, has a double point B, the polar conic of B has a double point A. The locus of the double point B is expressed by the Hessian

$$\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0$$

which is satisfied by x, y, z, and in which a, b, c, . . . are differential coefficients of the second order. This function is also an example of a covariant. See Forms.

The first idea of determinants has generally been attributed to Leibnitz (1693). There is no doubt, however, that Seki Kowa (1642–1708), the Newton of Japan, knew of these functions some years before the idea occurred to Leibnitz. Seki treats of them in his *fukudai* problems as early as 1683 and evidently knew of them even before this date. Leibnitz merely asserted that the condition for the simultaneous nature of the equations $10 + 11x + 12y = 0$, $20 + 21x + 22y = 0$, $30 + 31x + 32y = 0$, is that the expression $10 \cdot 21 \cdot 32 - 10 \cdot 22 \cdot 31 - 11 \cdot 20 \cdot 32 + 11 \cdot 22 \cdot 30 + 12 \cdot 20 \cdot 31 - 12 \cdot 21 \cdot 30$ shall vanish. Seki, however, treats of n equations; he knew that the number of terms in the expansion of a determinant of the nth order is $n!$; and he knew the law of interchange of rows and columns. Following the work of Leibnitz, but entirely ignorant of that of Seki, Cramer (1750) added somewhat to the theory, treating the subjects wholly in relation to sets of equations. The recurrent law was first announced by Bézout (1764). But it was Vandermonde (1771) who first recognized determinants as independent functions, giving a connected exposition of the theory, and hence he deserves to be called its formal founder. Laplace (1772) gave the general method of expanding a determinant in terms of its complementary minors. Immediately following, Lagrange (1773) treated determinants of the second and third orders, being the first to apply these functions to questions foreign to eliminations, and he discovered many special properties. Gauss (1801) introduced the name "determinants," although not in

its present sense; he also arrived at the notion of reciprocal determinants and came very near the multiplication theorem afterward given by Binet (1811–12) and Cauchy. With the latter (1812) the theory of determinants begins in its generality. The next great contributor, and the greatest save Cauchy, was Jacobi (from 1827). With him the word "determinant" received its final acceptance. He early used the functional determinant already mentioned, and which Sylvester has called the Jacobian, and in his famous memoirs, in Crelle for 1841, he specially treats this subject, as well as that class of alternating functions known as alternants. But about the time of Jacobi's closing memoirs, Sylvester (1839) and Cayley (qq.v.) began their great work, a work which it is impossible to summarize briefly, but which represents the development of the subject to the present time. The study of special forms of determinants has been the natural result of the completion of the general theory. Axi-symmetric determinants have been studied by Lebesque, Hesse, and Sylvester; per-symmetric determinants by Hankel; circulants by Catalan, Spottiswoode, Glaisher, and Scott; skew determinants and Pfaffians, in connection with the theory of orthogonal transformation, by Cayley; continuants by Sylvester; Wronskians by Christoffel and Frobenius; Jacobians and Hessians by Sylvester; and symmetric gauche determinants by Trudi. The theory as a whole has been most systematically treated by F. Brioschi (1824–97), well known as the editor of the *Annali di Matematica*, whose masterly treatise on determinants is a standard (French and German translations, 1856. Consult also his *Opere matematiche*, Milan, 1901–). Consult: Muir, *Theory of Determinants in the Historical Order of its Development* (London, 1906–11); Balizer, *Theorie und Anwendungen der Determinanten* (Leipzig, 1881); Doster, *Eléments de la théorie des déterminants* (Paris, 1877); Scott, *Theory of Determinants* (Cambridge, 1880; 2d ed., 1904); Salmon, *Lessons Introductory to the Modern Higher Algebra* (Dublin, 1876); Merriman and Woodward, *Higher Mathematics* (New York, 1898); Jacobi, *Ueber die Bildung und die Eigenschaften der Determinanten* (Leipzig, 1896); Kowalewski, *Einführung in die Determinantentheorie* (ib., 1909); Netto, *Die Determinanten* (ib., 1910).

DETER'MINATE PROBLEM. In algebra or geometry, a problem of a limited number of solutions; e.g., given the base, perimeter, and area of a triangle to construct it. In this problem there are, in general, four solutions. But if any one of the three elements is omitted, the problem becomes indeterminate. The equation $2x + 3y = 12$ can be satisfied by an indefinite number of values of x and y; hence it is indeterminate, but the equation $3x^2 - 12 = 0$ has only two roots, 2, -2; hence it is determinate. See DIOPHANTINE ANALYSIS.

DETER'MINING TEN'DENCY. A term used in experimental psychology to explain the continuity of thought or action. Hobbes, in the *Leviathan*, distinguishes between mental discourse that is unguided, without design and inconstant, and mental discourse that is regulated by some desire or design. The first of these kinds of discourse is evidently realized in dreams and revery. The phenomena here involved are explained by reference to associative tendencies. (See ASSOCIATION OF IDEAS; DISPOSITION.) The second mode of discourse, in which ideas seem to be regulated or guided, as happens when we are thinking out a problem, was supposed by Hobbes to be governed by the continued presence of some persistent idea; an emotion, e.g., would be especially effective because it would make a deep impression, would therefore frequently recur, and would thereby prevent the mind from wandering. Bain goes further and asserts the necessity of an habitual attitude, of an emotion, occupation, or pursuit, which not only determines some one out of many possible trains of ideas, but also "combines itself with every casual impetus given to the mental trains so as to constitute an element of the composite effect." Furthermore, he suggests the need of a "positive stimulus, a second starting point, to individualize and determine the bent of the suggesting power to one or other of many associated ideas." Thus, because of an habitual attitude, a naked circle is rich in associations to the geometer, but it does not follow that "every circle shall hurry the mind of the geometer all through the Third Book of Euclid." The associative links in this case are good and sound, but "some one of the properties of the circle is resuscitated by preference," and this arousal determines the bent, or affords a second starting point of the particular train.

Bain has here a complete mechanism for the explanation of a regulated course of ideas, though, as it stands, it cannot meet the requirements of our current psychology. In the first place, his "ideas" are logical, not psychological in character; and secondly, the presence of a persistent idea that holds throughout the course of a train of thought is not discoverable under experimental conditions. It is found that the idea which is present as a starting point soon drops out of consciousness, though not before the meaning of the idea has aroused a tendency, known as the "determining tendency," which directs the course of subsequent ideas. The nature of the determining tendency can, perhaps, be best explained by reference to experiments. The idea, the meaning of which arouses the determining tendency, is known in the psychology of action as the idea of end; in the psychology of thought, as the instruction or problem. When an observer comes for the first time to an experiment, he is *instructed* what to do (idea of end), or when and what to observe (instruction). The instruction sets up a determining tendency, which facilitates the appearance of ideas in accordance with the experimenter's meaning and blocks all others. The determining tendency is not always, however, immediately effective; if, for example, the observer has been instructed to react or to observe upon the appearance of a signal, the determining tendency set up by the instruction is, as it were, held in abeyance until it is touched off or released by the signal. Moreover, it frequently happens, when the experiment has been many times repeated, that the instruction is not consciously remembered; yet, on the appearance of the signal, the observer continues to act in accordance with the original instruction.

It is easy to find examples of these phenomena in everyday life; any purpose, aim or ambition, intention or resolution, may set up a determining tendency, and any opportunity, command, or suggestion may serve as a "signal" to touch off the determination. Here, too, the

original purpose with its idea of end may be entirely forgotten, but the opportunities and suggestions are nevertheless accepted as if the original idea were continually present in consciousness. There is, however, one exception to this statement. If two determining tendencies interfere, the stronger of the two will modify the weaker; an example of such interference is given under Abstraction (q.v.).

The determining tendency is physiological in nature; it is unconscious in its operation, though the determination itself may be represented in consciousness; and it must be both inhibitory and facilitative in character. The nature of the underlying physiological processes is, of course, hypothetical; we can only suppose that they are nervous coördinations and integrations, in part common to the race and transmitted from one generation to another, in part acquired in the individual lifetime, either by way of habit or under stress of some salient experience. See Action; Disposition; Discrimination.

Consult: Hobbes, *Works*, vol. iii (London, 1839); Bain, *The Senses and the Intellect* (ib., 1894); Ach, *Ueber d. Willenstätigkeit u. d. Denken* (Göttingen, 1905); Titchener, *Experimental Psychology of the Thought Processes* (New York, 1909); *Text-Book of Psychology* (ib., 1910).

DETER'MINISM. The name given to the view that every event in time, psychic as well as physical, has a cause (see Causality), and that, the cause being given, the event follows unvaryingly. It is opposed to indifferentism or indeterminism, which maintains that, at least in the phenomena of the human will, the temporal antecedents do not definitively determine the event. These opposing doctrines have their main interest in the sphere of ethics, as determinism is generally assumed to be true of all events except volition. The frankest of indeterminists, Prof. W. James (q.v.), admits that his doctrine is an advocacy of chance, pure and simple. The determination of will by motives has until recently been questioned, mainly because it was thought to carry with it a denial of moral responsibility. But this has been stoutly denied by many determinists with a good show of reason. Of late, however, indeterminists such as Bergson (q.v.) have based their views not so much on ethical as on experimental grounds. Bergson maintains that the very nature of time as experienced precludes the deterministic hypothesis. The argument may be stated briefly as follows: We never experience anything twice in exactly the same way. The memory of the former experience always modifies the second experience. Hence there can be no such thing as exact repetition; and where there is no repetition there can be no determinism, for determinism presupposes that the same antecedent upon repetition is always followed by the same consequent. Other opponents of determinism base their objections upon considerations derived from biology. Driesch is perhaps the best-known representative of biological indeterminists. The whole question of determinism is much more debatable now than it was two decades ago. See Ethics; Chance; Free Will; Will; Mechanism; Finalism; and consult the authorities referred to under Ethics; also James, *The Will to Believe* (New York, 1897); Fouillée, *La liberté et le déterminism* (2d ed., Paris, 1883); Ward, *Naturalism and Agnosticism* (New York, 1899); Bergson, *Time and Free Will* (London, 1910); Driesch, *Science and Philosophy of the Organism* (ib., 1907–08); Palmer, *Problem of Freedom* (Boston, 1911).

DET'INUE (OF. *detinu*, from Lat. *detinere*, from *de*, back + *tenere*, to hold). A common-law action for the recovery of specific chattels, wrongfully detained from the claimant, or their value, together with damages for their detention. It is immaterial whether the defendant came into possession of the chattels lawfully or unlawfully, so long as he has no present right to retain them as against the claimant. Thus, if the defendant held goods as a gratuitous bailee, his possession would be lawful until a demand was made by the proper party for their return; but in case of refusal to do so, the claimant might maintain detinue, as the detention would then be unlawful. Demand before suit is not necessary if the original taking was wrongful. The plaintiff need not be the owner of the detained chattel in order to maintain the action. It is sufficient if he has such an interest in the property as to have a right to its immediate possession. A judgment in detinue was formerly enforced by a special form of execution, called a writ of *distringas* (q.v.). This has been abolished in England, but is retained in several of the United States. See Common Forms; Common Law; Pleading; Replevin; Trover.

DETMOLD, dĕt'mōlt (OHG. *Theotmalli, Thiatmalli*, people's court). The capital of the German Principality of Lippe and residence of the Prince, situated on the Werre, at the eastern edge of the Teutoburg Forest, about 47 miles southwest of Hanover (Map: Germany, C 3). It consists of an old and a new town, the latter of which is well built, and adorned with many fine public walks and gardens. The chief buildings are the old and new palaces, the former of the sixteenth century, the Rathaus, and theatre. Its educational institutions include a gymnasium, a manual training school, a deaf and dumb school, and a library of 120,000 volumes. The industries include the manufacture of buttons, labels, tobacco, cloth, linen, leather, furniture, and beer. Marble and gypsum are quarried. Pop., 1900, 11,971; 1905, 13,157; 1910, 14,295. The sturdy "Senner" race of horses is bred near Detmold. The Externsteine, a much visited group of five rocks, with a grotto and a relief of the Descent from the Cross, are in the vicinity. About 2 miles to the southwest of the town, on the Grotenburg, one of the highest points of the Teutoburg Forest, stands the colossal Hermanns-Denkmal, or Arminius Monument, erected in honor of the famous Cheruscan Prince who gained here a signal victory over the Roman general Varus in the year 9 A.D. The poet Ferdinand Freiligrath was born here in 1810. Detmold was also the scene of a victory of Charlemagne over the Saxons in 783. In 1011 it was presented by King Henry II to the bishops of Paderborn, and from them it came to the Lippe family. It received civic rights in 1350.

DE TREVILLE, de trā'vĭl', Yvonne (1881–). An American prima donna, born at Galveston, Tex. She studied under Madame Marchesi at Paris, and made her début when only 16 years old, in New York, at that time creating the principal part in La Bohème. Thereafter she sang entirely abroad, in *Lakmé*

at the Opéra Comique, Paris, at the Stockholm Royal Opera and the St. Petersburg Symphony Concerts (1903-04), the Cairo Khedivial Opera, and the St. Petersburg Imperial Opera (1904–05), and from then until 1909 in Bucharest, Berlin, Budapest, Nice, Brussels, Vienna, Munich, and Cologne. In 1910–11 she made operatic and concert tours in Austria, Hungary, Germany, Poland, Rumania, and Russia.

DETRI'TUS (Lat., a rubbing away, from *deterere*, to rub away, from *de*, down + *terere*, to rub). A general geological term applied to fragmental accumulations formed by the disintegration of rocks. See EROSION.

DE TROBRIAND, (PHILIPPE) REGIS (DE KEREDERN). See TROBRIAND.

DETROIT, dē-troit'. The chief city of Michigan, a port of entry, and the county seat of Wayne County, on the Detroit River, 18 miles from Lake Erie. It extends 11 miles along the border of the Detroit River and the shores of Lake St. Clair and is in lat. 42° 19′ N. and long. 82° 58′ W., 85 miles east-southeast of Lansing, 285 miles east by north of Chicago, and 251 miles west by south of Buffalo (Map: Michigan, F 6). The altitude of Detroit is about 600 feet; mean annual temperature, 48.4° F.—January, 24.6°; July, 72°; average annual rainfall, 36.19 inches.

The river, sometimes called "The Dardanelles of the New World," which is here the boundary between the United States and Canada, is ½ mile wide and 30 to 50 feet deep. It affords a splendid harbor, with a water front of about 11 miles. Fort Wayne, with its extensive works, commands the channel. Ferries connect with the Canadian side. The river contains many beautiful islands, which, with those in Lake St. Clair, are popular as places of summer residence and as resorts. Grosse Isle is the largest of these river islands, and Belle Isle has been converted into the city's finest park.

The city has an area of 41.76 square miles and is finely situated on ground rising gradually from the river. It has a reputation for broad, clean, well shaded and paved streets. Of a total of about 650 miles of thoroughfares, more than one-half is paved, the principal streets being laid with brick or asphalt. Most of the streets cross at right angles, but these are intersected by several broad avenues, radiating from the Grand Circus, a semicircular park of 5½ acres in the heart of the city. Woodward Avenue extends through this and divides the city into nearly equal portions. This intersection of streets and avenues has resulted in a number of small triangular parks, some of which contain handsome fountains. Woodward Avenue, the principal business street and at its northern end the centre of a fine residence district, is the location of many of the city's most prominent buildings. The Campus Martius, a considerable plot of ground about ½ mile from the river, is a part of Woodward Avenue. Jefferson Avenue, in part also an important business centre, and West Fort Street contain costly dwellings. Michigan, Gratiot, and Lafayette avenues have many notable buildings. Fine residences are on the Grand Boulevard, on Cass Avenue, and on the streets in the northern section of the city, Virginia Park, Boston and Chicago boulevards, and Arden Park. The banking houses are in Griswold Street. Grand Boulevard, 150 to 200 feet wide and paved with macadam, has its head at Jefferson Avenue, and its terminus on the opposite side of the city. It surrounds the heart of the city, being about 12 miles long, and is a magnificent thoroughfare.

The street railway system of Detroit operates 533 miles of track, including the interurban systems to Mount Clement, Port Huron, Flint, Pontiac, Ypsilanti, Ann Arbor, Jackson, Trenton, and Toledo.

Buildings. The Wayne County courthouse is the largest and one of the most attractive of the public edifices. The City Hall, facing the Campus Martius, is 200 feet long by nearly 100 feet wide, built of sandstone, at an original cost of $600,000. On the campus is the Soldiers' and Sailors' Monument, by Randolph Rogers, 55 feet high, and surmounted by a representation of "Michigan." The Majestic, Ford, Dime Bank, Free Press, Hammond, and Penobscot buildings, near the City Hall, are Detroit's finest office buildings. The Post Office, Masonic Temple, Federal building, Chamber of Commerce, Board of Commerce, Detroit Athletic Clubhouse, Y. M. C. A. building, Harper, General, and Grace hospitals, and the Hotel Pontchartrain are notable. Among the finest ecclesiastical structures are First Unitarian, First Congregational, First Presbyterian, Fort Street Presbyterian, North Woodward Avenue Congregational, Second Church of Christ (Scientist), Sacred Heart of Mary (Roman Catholic), Woodward Avenue Baptist, Woodward Avenue Presbyterian, St. John's (Protestant Episcopal), and Christ Episcopal churches, St. Paul's Cathedral (Episcopal), and Temple Beth El. The Museum of Art has a library, and valuable collections on art, archæology, science, local and general history. Its special features are the Stearns collection of Oriental curios, one of the finest in America, and the Scripps collection of old masters, which includes valuable specimens of famous artists.

Parks. The most notable feature of the public-park system, which includes over 1200 acres, is the island park, Belle Isle, of 707 acres. It lies opposite the eastern section of the city, with which it is connected by an iron bridge, erected in 1889 at a cost of $315,000. The island with improvements has cost the city $9,000,000. The beauty of its river location is supplemented by a series of interior lakes and canals, which extend around the island, while a further improvement is projected in the reclamation of the shoal at the western end of the island, which will add at least 100 acres to its territory. On this projection will be erected the Scott Fountain, for which the late James Scott gave his entire fortune of nearly $500,000. Palmer Park (141 acres), on Woodward Avenue, 6 miles north of the City Hall, contains a famous log cabin and other historical relics and a large Colonial casino. It was acquired by gift in 1894 from the late Senator Thomas W. Palmer and his wife Elizabeth Merrill Palmer. The total park and boulevard area is 1243 acres.

There are several cemeteries in the city, the most notable of which are Elmwood (Protestant) and Mount Elliott (Roman Catholic), both in the eastern section of the city, of great natural beauty and containing handsome monuments. Just without the city are several large new cemeteries, notably Woodlawn, Evergreen, and Grand Lawn.

Institutions. Detroit has, besides numerous

public and parochial schools and private secondary institutions of learning, a normal school (city), Detroit University (Jesuit, opened in 1877 under the name of Detroit College), the Detroit College of Law, the Michigan College of Medicine, which maintains schools of dentistry and pharmacy. The Detroit Bar Library has over 10,000 volumes, and there are several educational and institutional libraries. The public library, founded in 1865, contains 278,100 volumes in the central library and has established nine branches, besides one in each of the six high schools.

The city has a poor fund, administered by a Poor Commission. There are about 30 private charities. The Detroit Association of Charities is a general organization, representing a number of allied institutions. The House of Correction, which has a plant valued approximately at $500,000, with accommodations for 600 inmates, has a wide reputation as a reformatory institution. Besides the United States Marine Hospital, there are five large general hospitals, including Grace, Harper, and General hospitals, in connection with which are training schools for nurses. There is also the Herman Kiefer Hospital for contagious diseases. Other institutions are St. Mary's and Red Cross hospitals, Home for the Friendless, St. Vincent's Orphan Asylum, Protestant Orphan Asylum, Arnold Home for the Aged and Hospital for Incurables, Thompson Home for Old Ladies, Florence Crittenton Home, Deaconess's Home, and Home for the Aged Poor.

Commerce and Industry. There are a number of conditions which favor Detroit as a commercial and industrial centre. Its position in the southeastern part of the Lower Michigan Peninsula gives it a natural command over the trade of that region and at the same time places it within easy reach of the country to the south; while its location upon the narrow strait leading from Lake Erie to Lake St. Clair and thence to Lake Huron brings it into relation with the immense lake traffic and with the Canadian trade, a number of the railroads of the Dominion naturally making their connection with those of the United States at this point. A new tunnel under the Detroit River, built for the Michigan Central Railroad, has greatly increased the volume of trade between Detroit and Canada and expedited travel between New York and the West.

Detroit ranks first among the northern border ports in the extent of its foreign trade and is first in the amount of its exports. For the year ending June 30, 1913, the imports amounted to $9,153,669, and the exports $62,222,404. About three-fourths of the total trade is with Canada and the larger part of the remainder with England. The principal exports are hog products, including hams, bacon and lard, manufactures of iron and steel, cotton, corn, lumber, and coal. The number of vessels in foreign trade entering the port in the fiscal year ending June 30, 1912, was 2232, with an aggregate tonnage of 662,356; the vessels clearing, 2172, with a total of 644,795 tons. The river is open to navigation about eight months in the year.

The manufactures are noted for their variety as well as their extent. Among the leading products are automobiles, stoves, freight cars, adding machines, alkaline products, drugs, varnish, paint, and oils, some of the establishments that produce these articles ranking among the largest in the world. Detroit has also extensive drydocks and shipbuilding plants and the largest seed house in the world. At one time the city was a leading lumber market of the country, and the sawing and planing mill industry was extensive; all this has declined considerably, but there are a number of allied industries, such as the manufacture of furniture and carriages, which have attained importance. The preparation of furs for market is of less importance than formerly. Detroit, being midway between the coal mines of Pennsylvania and Ohio and the iron and copper mines of Michigan, is the logical point for the manufacture of the iron, copper, and brass products. These industries have grown rapidly in recent years, as has also the manufacture of aluminum. The manufacture of pharmaceutical preparations and of malt liquors, and the slaughtering industry, though of recent development, have attained considerable dimensions. Other important manufactures are those of chewing and smoking tobacco, cigars and cigarettes, and clothing. The recent industrial growth of the city has been noteworthy; in the period between 1904 and 1909 the number of manufacturing establishments increased from 1362 to 2036. The capital invested in the various industries in 1909 was $190,125,000, the value of the product $252,992,000, and the value added by manufacture $122,775,000.

Government. The government is vested in a mayor and a unicameral council, elected biennially. There are a number of administrative boards and commissions, most of which, with other important municipal officials, are appointed by the Common Council on nomination of the executive. The Board of Health is appointed by the State governor. Commissioners of public works, parks and boulevards, and police are appointed by the mayor. The city clerk, treasurer, justice of the peace, police justices, and members of the Board of Education, who serve for four years, are chosen by popular vote. There is also a Board of Estimates, constituted of two representatives from each ward and five members from the city at large, with certain ex-officio members, which acts upon the general city estimates and all other measures for raising money. The United States District Court for Eastern Michigan sits at Detroit, and the United States Internal Revenue office and the department in charge of the lake lighthouses, are located here.

Finance. The net debt of the city on July 1, 1913, was $7,866,221, the per capita debt being exceptionally low. The legal borrowing limit is fixed at 4 per cent of the assessed valuation. The city tax budget for 1913 was $10,127,183, and in addition there was derived from licenses and franchises $225,000 and from special taxes (used to pay salaries of school teachers), $900,000. The school budget for the year was $4,801,389.85. The city owns and operates its light plant and water works. For the fiscal year ending June 30, 1914, the Public Lighting Commission was allowed $674,276.67, of which $239,942.78 was for operation and the balance for extensions. The water-works system comprises some 876.5 miles of mains, with the pumping station situated at the southeasterly part of the city. The supply is taken from the Detroit River. The plant, which was valued in 1913 approximately at $12,000,000, has a daily capacity of 184,662,480 gallons.

DETROIT

THE POST OFFICE (UPPER)
WAYNE COUNTY COURT HOUSE (LOWER)

Population. Detroit was in 1910 the third largest of the Great Lake cities and ranked ninth among those of the United States. The following figures indicate its growth: 1820, 1422; 1860, 45,619; 1880, 116,340; 1890, 205,876; 1900, 285,704; 1904, 317,591; 1910, 465,766; 1920, 993,739. Of the last, 156,565 were foreign born, the German and Canadian elements being the largest. About two-thirds of the native born were native white of foreign parents. The colored population numbered only 5741.

History. The site of Detroit was visited by Frenchmen as early as 1648 and again by La Salle in 1670, but no permanent settlement was made until 1701, when Sieur de la Mothe Cadillac, the first Commandant of the French territory in this vicinity, built here Fort Pontchartrain and established a small trading village. On Nov. 29, 1760, an English force, under Major Robert Rogers of "Rogers Rangers," took possession, and in 1763, from May 9 to October 12, the Indians under Pontiac besieged the village, making frequent attacks. After an heroic defense Detroit was saved, being the only frontier post west of Niagara and Fort Pitt which was not captured. In 1778, when a new fort, Fort Lernoult, was built, the place had only about 300 inhabitants, all of whom lived in rude log cabins. Throughout the Revolution it was the headquarters of the English forces in the Northwest and the point from which many Indian expeditions were sent to ravage the frontiers. In 1796 the English abandoned the fort to the Americans. The name of the fort was subsequently changed to Fort Shelby. After this the settlement grew slowly and in 1802 was incorporated as a town by the Legislature of the Northwest Territory. In 1805 it was almost completely destroyed by fire. All the buildings within the palisade, except one dwelling, were reduced to ashes. The town was immediately replatted on a larger scale with wide streets, and the rebuilding was begun at once. On Aug. 16, 1812, the fort was surrendered by General Hull to the English under General Brock. The Americans reoccupied the place Sept. 29, 1813. In 1815 Detroit was incorporated as a village, and in 1824 was chartered as a city by the Legislative Council of Michigan Territory. It was the capital of the Territory from 1805 to 1837 and of the State from 1837 to 1847, when the seat of government was removed to Lansing.

Consult: Farmer, *The History of Detroit and Michigan* (Detroit, 1889); Burton, *Cadillac's Village: A History of the Settlement, 1701–1710* (ib., 1896), and *The Building of Detroit* (1912); chapters in Parkman, *A Half Century of Conflict* (Boston, 1892), and the *Conspiracy of Pontiac* (ib., 1867); various papers in the *Michigan Pioneer Collections* (Lansing, 1874–1913); Farmer, "Detroit," in *Historic Towns of the Western States* (New York, 1901).

DETROIT. A city and the county seat of Becker Co., Minn., 194 miles by rail northwest of Minneapolis, on Detroit Lake and on the Northern Pacific and the Minneapolis, St. Paul, and Sault Ste. Marie railroads (Map: Minnesota, B 3). It is in a picturesque lake region with mineral springs and good hunting and fishing. The city contains a Carnegie library and owns its electric-light and power plant. Agriculture is the principal industry, and there are manufactures of cement products. Pop., 1900, 2060; 1910, 2807.

DETROIT RIVER. A river or strait connecting Lakes St. Clair and Erie, flowing nearly west to Detroit and then south, and separating Michigan from Ontario, Canada. It is so called from the French word meaning "strait." It enters Lake Erie just eastward of Pointe Mouillée and is about 28 miles long, from ½ to 3 miles wide, of considerable depth, swift in current, and admits the largest vessels. Its upper section between Fighting Island and Lake St. Clair is unobstructed, while its lower section from Detroit River Light to the same island is divided into several channels by a number of islands. It is the great waterway, with the St. Clair Lake and River, from Lakes Superior, Michigan, and Huron to Lake Erie. More tonnage of shipping is estimated to pass through this river than through any other stream in the world. There are many islands along its course, and the scenery is very beautiful. See DETROIT.

DETROYAT, dā'trwä'yà', PIERRE LÉONCE (1829–98). A French naval officer, journalist, and author, born at Bayonne (Basses-Pyrénées). He studied at the Ecole Navale, took part in the Crimean War and in the subsequent expedition to China, and accompanied to Mexico the Archduke Maximilian, of whose ill-fated Empire he was appointed Undersecretary of State for Naval Affairs and chief of the military cabinet. He accompanied the ill-fated Princess Charlotte on her return to Europe. During the Franco-Prussian War he was for a time in command of the camp at La Rochelle. From 1866 to 1869 he was a member of the staff of *La Liberté*, which he edited from 1869 to 1876. He subsequently founded *Le Bon Sens* and *L'Estafette*, the latter a conservative and Bonapartist journal, and in 1885–86 he edited the *Constitutionnel*. His works include the following: *La cour de Rome et l'empereur Maximilien* (1867); *L'Intervention française au Mexique* (1868); *Du recrutement, de l'organisation et de l'instruction de l'armée française* (1871); *Le sénat et le scrutin de liste* (1881); *Nos possessions françaises en Indo-Chine* (1887); *Les chemins de fer en Amérique* (1886).

DETTINGEN, dĕt'ting-*en* (Teut., the people's home, from OHG. *diot, diota*, MHG. *diet*, Goth. *þiuda*, AS. *þēod*, people + *ingen*, the patronymic suffix). A village in Bavaria (Lower Franconia), on the right bank of the Main. It is noted as the scene of a battle during the War of the Austrian Succession, June 27, 1743. George II of England headed the armies of the Allies. Cooped up in a narrow valley, 37,000 English, Hanoverian, and Hessian troops lay, surrounded by 60,000 French on the heights. Noailles's cannon swept the flank and rear of the Allies, and the only exit from the valley, the defile of Dettingen, was held by young De Grammont with 25,000 men. Impatiently charging upon the Allies, he was thrown back with slaughter and confusion. The French loss amounted to 6000 men; that of the Allies to 2000.

DEUCA'LION (Gk. Δευκαλίων). According to the Greek myth, a son of Prometheus, grandson of Iapetus, and husband of Pyrrha. The crimes of the race of men then living led Zeus to destroy them in a great flood, but Deucalion, warned by his father, saved himself and his wife in a chest (λάρναξ), which floated for nine days on the waters and then grounded on Mount Othrys in Thessaly. Later versions made

Deucalion land on Mount Parnassus, or on Athos, or even on Etna. Deucalion and Pyrrha now offered up sacrifices to Zeus and asked how the human race could be renewed. Bidden to throw the "bones of their mother" over their shoulders, they sought to obey by throwing stones; the stones thrown by Deucalion became men, those thrown by Pyrrha women. Deucalion's grave was shown at Athens, where he was said to have founded the temple of Olympian Zeus. Through his son Hellen (q.v.) he became the ancestor of the Greeks. Consult Ovid, *Metamorphoses*, i, 243–415, and Usener, *Die Sintflutsagen* (Bonn, 1899).

DEUCHER, doiK'ẽr, ADOLF (1831–1912). A Swiss statesman. He was born at Steckborn, Canton of Thurgau, and studied medicine at Heidelberg, Zurich, Prague, and Vienna. In 1855 he became a member of the council of his canton, and in 1868 he served as a member of the council established to formulate a new democratic constitution for Thurgau. From 1869 to 1873 he was a member of the National Council of Switzerland, and three years after his reëlection to that body became its President (1882). In 1883 he became a member of the Federal Council, and in 1885 its Vice President; and in 1886 was elected President of the Swiss Confederacy, serving until 1887. He was reëlected to that office in 1897 and 1903.

DEUNTZER, doin'tsẽr, JOHAN HENRIK (1845–). A Danish jurist and statesman, born in Copenhagen. He fought in the War of 1864 against Germany, became professor of Civil Law at the University of Copenhagen in 1872, and in 1901, when the system of ministerial responsibility to Parliament was established, became head of the first Liberal ministry. He resigned in 1905 owing to differences in his cabinet. He wrote extensively on Danish law in all its branches.

DE'USDE'DIT, or ADEODATUS. Pope from 615 to 618. He is honored as a saint on November 8.

DEUS EX MACHINA, māk'ī-nȧ (Lat., God from a machine, a translation of Gk. *Θεὸς ἀπὸ μηχανῆς, Theos apo mēchanēs*). An expression borrowed from the ancient classical theatre. The tragic poets often employed the intervention of a divinity to solve abruptly a tragic difficulty and to bring about quickly the dénouement. The god was brought on by stage machinery; hence the name. Examples of the use of this device are the appearance of Heracles in the *Philoctetes* of Sophocles and of Athena in the *Iphigenia in Tauris* of Euripides. From the ancient usage the term has been extended to mean any device by which a dramatic situation is abruptly solved. On the *mechane* or *machina* in general, as used in the Greek theatre, consult Haigh, *The Attic Theatre*, pp. 209–217 (3d ed., Oxford, 1907).

DEUS-RAMOS, dā'oosh rä'mȯsh, JOÃO DE (1830–96). A Portuguese poet, born March 8, 1830, at San Bartholomeu de Messines, in the Province of Algarve, and educated in law at the University of Coimbra, although he left in 1859 without taking his degree. In 1862 he left Coimbra for Beja, where he had been appointed editor of *O Bejense*, the most influential newspaper in the Province of Alemtejo. In 1866 he edited the *Folha do Sul*. At the request of friends he entered politics, and was elected Liberal deputy from Silves in 1869. But he felt it necessary to act independently of all parties and consequently resigned, although he knew such action would kill all chance for future advancement. For several years thereafter he devoted himself to educational problems, throwing himself heart and soul into an attempt to improve the educational condition in Portugal. This was highly important work, and he did it extremely well. But many critics are inclined to the belief that the country paid too high a price for it, since he was naturally forced thereby to limit the output of his exquisite lyrics. In this field, even as things stand, João de Deus is now considered as having no equal in his generation and, saving only Camões and Garrett, no equal in the literary history of his country; and prophecy concerning his repute with posterity is especially favorable with regard to his poems of love. He has been called "the foremost poet of love, not only in Portugal, but in Europe." And this repute is his despite his incredible carelessness about public opinion, for he seldom kept copies of his poems (contenting himself generally with dictating them to his friends) and was not responsible for a single edition of his works; these were collected by friends and admirers, who were not always well informed as to what poems were, and what were not, from his pen. A great popular and scholastic festival in his honor was held on his sixty-fifth birthday. He died at Lisbon, Jan. 11, 1896, was granted a public funeral, and was buried in the National Pantheon, the Jeronymite Church at Belem. Consult: João de Deus, *Campo de flores: Poesias lyricas completas* (2d ed. by Theophilo Braga, Lisbon, 1896); Maxime Formont, *Le mouvement poétique contemporain en Portugal* (Lyons, 1892); Marco Antonio Canini, *Libro dell' amore*.

DEUSSEN, dois'sen, PAUL (1845–). A German philosopher and Sanskrit scholar, born in Oberdreis. He studied at the universities of Bonn, Tübingen, and Berlin, in 1889 was appointed professor of philosophy at Kiel, and in 1907 was made a member of the governing council of that university. His philosophy combines the systems of Kant, Schopenhauer, and the Indian sages. His works include: *Commentatio de Platonis Sophistæ, Compositione et Doctrina* (Bonn, 1869); *Das System des Vedânta* (ib., 1883); *Der kategorische Imperativ* (Kiel, 1891); *Erinnerungen an Friedrich Nietzsche* (Leipzig, 1901); *Allgemeine Geschichte der Philosophie mit besondred Berücksichtigung der Religionen* vols. i, ii (ib., 1894–1913); *Die Elemente der Metaphysik* (2d ed., 1890; Eng. trans. by Duff, London, 1894); *Philosophy of the Upanishads*, Eng. trans. by Geden (Edinburgh, 1906); *Outlines of Indian Philosophy* (Berlin, 1907); *Jakob Böhme: über sein Leben und seine Philosophie* (1911); *The System of the Vedânta According to Bâdarâyana's Brahma-sûtras and Çankara's Commentary thereon*, trans. by Charles Johnston (Chicago, 1912).

DE'US VULT (God wills it). The rallying cry of the First Crusade, originating in the exclamation of the multitude after the completion of Pope Urban II's address at the Council of Clermont, 1095.

DEUTEROCANONICAL BOOKS. A designation of certain books which are recognized as canonical by the Roman Catholic church and the Oriental churches, rejected by the Protestant churches generally as apocryphal, and at present withdrawn from public use and treated as apocryphal by the Greek Orthodox church in Russia, Servia, and Bulgaria, and regarded as

of doubtful authority in Greece. They are Judith, Tobit, Baruch, 1 and 2 Maccabees, Ecclesiasticus, and Wisdom of Solomon; some parts of Daniel and Esther in the longer recension preserved in the Greek Bible are likewise deuterocanonical. All these works are found in the great codices of the Old Testament in Greek and in the versions made from the Greek text, and are referred to by early Christian writers in such a manner as to leave room for no doubt that they formed a part of the Scriptures which the first Greek-speaking converts to Christianity received from the Hellenistic Jews. But they were not included in the collection of books that, in the judgment of the Aramaic-speaking Jews of Palestine, possessed such a sanctity that it was necessary to wash one's hands after contact with them. Some of them, like 2 Maccabees, Wisdom of Solomon, and the Additions to Esther, were written originally in Greek and could not therefore have been considered at all in reference to this ceremony by the Palestinian rabbis. Among those that were composed in Hebrew or Aramaic some, like Baruch and Ecclesiasticus, are likely to have been thought of in this respect inasmuch as, even long after the decision, they were occasionally read and quoted as Scripture. How far this was true of the rest cannot be determined. It may be said, however, that, unless these books in the original had enjoyed a great prestige in Palestine, they would probably not have been translated into Greek and been cherished with the other biblical books by the Alexandrian Jews. As to the reasons why they were not included in the Palestinian canon, if they actually had for several generations been held in high repute and read for purposes of edification, the attitude of Josephus and the author of 4 Esdras, our earliest witnesses to the reduction of the collection to 22 or 24 books, seems to show that one consideration that had much weight was age, and that no work was included which was supposed to be later than Ezra's time. But the prevalent opinion among the Jews of Alexandria made no such distinction. They knew from the preface to Ecclesiasticus that this book could not have been written before the second century B.C. and no doubt inferred as much in regard to Esther from the preface to this book. There is no evidence that they immediately followed the example of the Palestinian rabbis in reducing their canon, or collection of religious classics, to a fixed number. On the contrary, the quotation of Enoch i–xxxvi and the Assumption of Moses by New Testament writers, and the introduction into their Bibles by various churches in early Christendom of many Jewish works clearly translated from the Greek (see APOCRYPHA), seem to indicate either that the canon of the Alexandrian Jews never was absolutely fixed or that, in addition to a canon which was itself more inclusive than the Palestinian, there was a group of antilegomena recognized by some and rejected by others. The Old Latin and Saidic versions made from the Greek towards the end of the second century A.D. contained the deuterocanonical group, but not many, if any at all, of the antilegomena. Origen, who would not limit himself to the Hebrew canon, seems to recognize certain boundaries set for the larger canon; and Athanasius, Rufinus, and Jerome, who would not recognize as canonical any books not in the Hebrew canon, enumerates the deuterocanonical books as a special group cherished by the Church; though the great Greek codices are not quite consistent, and Sinaiticus contains 4 Maccabees, Alexandrinus 3 and 4 Maccabees, and both 3 Esdras, they make no distinction between proto- and deuterocanonical books and, like most of the later versions, do not contain such works as the Psalter of Solomon, the Testaments of the XII Patriarchs, Jubilees, the Assumption of Moses, and the Apocalypses of Enoch and Baruch; and the councils of Hippo (393 A.D.) and those of Carthage (397 and 419) accepted the same deuterocanonical group as among the books received by the fathers to be read in the church and to be held as canonical. From these considerations it would seem extremely probable that, as a rule, the Hellenistic Jews in the second half of the second century A.D. recognized the deuterocanonical books as part of their canon, though some may have adopted the narrower canon of the Aramaic-speaking Jews of Palestine, and others no doubt counted as Scriptures quite a number of additional books. This would account for the dominant view among the early Christian fathers, and also for the disappearance in most cases of the Greek translations of the apocrypha, or pseudepigraphal books, as they are often called by Protestant writers.

There is no means of determining how extensive Philo's canon was. In his discussions with the Jew Trypho, Justin would naturally quote no book that was not recognized by him; and Melito of Sardes reports the Jewish canon he found in Palestine. Origen called the attention of the Church to the differences between its text and its canon and those of the synagogue. Athanasius, Cyril of Jerusalem, Rufinus, Jerome, Epiphanius, Gregory of Nazianzus, Amphilochius, and Johannes Damascenus regarded the ecclesiastical books not found in the Hebrew Bible as noncanonical; and Jerome, whose learning gave great weight to his opinion, called them apocrypha. But in practice little distinction was made between proto- and deuterocanonical books, as the writings of these fathers, the manuscripts, the versions, and the general usage show. The Greek Orthodox church has continued the somewhat vacillating attitude of the early Greek fathers. Jugie seeks to account for the exclusion of the deuterocanonical books from the Russian Bible and the frequent failure to recognize them in Greece by Protestant influence. But Ph. Meyer (*Theologische Literaturzeitung*, 1909, pp. 490 ff.) has shown that Cyril Lucaris, who was influenced by Protestantism, in theory rejected, but in practice used, these books, and that men like Metrophanes Critopulos, Korais (a very independent and scholarly theologian), Eugenius Bulgaris, and Athanasius Parsios, were not Crypto-Protestants, but only influenced by the attitude of Athanasius, Gregory of Nazianzus, and Johannes of Damascus. The Russian church is also more likely to have been influenced by opposition to Rome than by Protestantism. In the Roman Catholic church during the Middle Ages the canonicity of these books was questioned or denied by Notker (died 912), Peter of Clugny (died 1185), John of Salisbury (died 1180), Hugo a S. Caro (died 1260), Nicolas Lyranus (died 1341), and others, but in the main their authority was upheld. Cardinal Cajetan (died 1534) also followed Jerome. But at the fourth session of the Council of Trent, in 1546, the decision of the African councils in the time of Augustine was reaffirmed,

and the deuterocanonical books were recognized as of equal authority with the protocanonical. The Prayer of Manasse and 3 and 4 Esdras were not counted among them. It has been maintained that 3 Esdras was excluded through a misunderstanding, since Augustine quotes it as Scripture (*De Civitate Dei*, xviii, 36); but this is not certain. Even after the Tridentine Council a distinction has been thought justifiable by Lamy, Jahn, and others, though the language used in the decree does not seem to admit of the construction they have attempted to put upon it.

The decision of the Roman Catholic church was no doubt to some extent influenced by the attitude of the Reformers, as that of the African councils had been affected by the position taken by Jerome. Carlstadt had pursued the question historically and pointed out the distinction made in the early church. Luther was also led by his opposition to certain doctrines that found their support in the deuterocanonical books. He translated them, and declared them to be valuable for purposes of edification, but not for the establishment of doctrine, and he placed them in an appendix by themselves. The distinction he made, which was essentially the same as had already been made by many eminent fathers and mediæval teachers, was expressed in the Gallic Confession of 1559, the Anglican Confession of 1564, and the Second Helvetian Confession of 1564. More radical was the action of the Council of Dort (1618), which declared them to be human works and likewise apocrypha, and the Westminster Confession (1648), which maintained that they were not inspired, did not belong to the canon, and had no more authority than any other human writings. Nevertheless Protestants had the opportunity of reading these books until the struggle about their canonicity in the beginning of the nineteenth century led the London Bible Society in 1826 to discontinue the spread of any Bible that contained these books. The example was followed, though less rigidly, on the continent of Europe, and the effect, in an era of unprecedented missionary activity on the part of the Protestant denominations, was to deprive converts abroad as well as members of these churches at home of access to the deuterocanonical books. The Church of England, however, always permitted the use of readings from them. When the Revised Version was made, they were also translated, but published separately. In recent years their value has been more and more appreciated, and an International Society for the Apocrypha has been established on whose council are many bishops of the Church of England as well as English, American, and German scholars. The interpretation of these books for a long time suffered greatly from the controversy as to their canonicity. Roman Catholic scholars felt themselves in duty bound to defend the historical accuracy of every statement occurring in them and often had to resort to violent textual emendations, improbable interpretations, and questionable apologetic methods, while Protestant scholars took an unseemly delight in exhibiting historical inaccuracies, and lost all sense of their beauty and power in the anxiety to show their unworthiness of a place in the canon. The spirit that teaches men to approach all such Scriptures with reverence and yet with critical judgment is to-day bringing about a healthy coöperation of scholars, representing very different doctrinal positions, but eager to find out what the original text was, what the authors meant to say, and what the real significance of their writings is. Even that larger circle of books which won canonical recognition only in some smaller church province receives at present careful study on the part of Roman Catholics and Protestants alike. (See Apocrypha.) The great collections of Kautzsch and Charles are valuable aids to the study of this literature. It would be an advantage, however, if the historically justifiable and unobjectionable term "deuterocanonical books" could be substituted for "apocrypha," which has no special appropriateness as applied to them and only causes needless offense. See Baruch; Ecclesiasticus; Judith; Maccabees; Solomon, Wisdom of; Bel and Dragon; Susannah; Daniel; Esther, Deuterocanonical Fragments of; and consult: Diestel, *Geschichte des Alten Testaments in der christlichen Kirche* (Jena, 1869); Cornely, *Introductio in U. T. libros sacros I* (Paris, 1894); Kautzsch, *Die Apokryphen und Pseudepigraphen des Alten Testaments* (Tübingen, 1900); Andrée, *Les apocryphes de l'ancien testament* (Paris, 1903); Jugie, *Histoire du canon de l'ancien testament dans l'église grecque et l'église russe* (ib., 1909); Charles, *The Apocrypha and Pseudepigrapha of the Old Testament* (Oxford, 1913).

DEU'TERON'OMY. The name of the fifth book of the Pentateuch, derived from the Greek translation of the two Hebrew words in Deut. xvii. 18, which signify "repetition of the law." Deuteronomy contains the last injunctions of Moses to his people, delivered in the land of Moab. With the exception of chaps. xxvii–xxviii, xxxiv, and a few verses elsewhere, the book is in the form of an address. There are, however, in reality, three distinct speeches: (*a*) chaps. i–iv; (*b*) chaps. v–xxvi; (*c*) chaps. xxix–xxxi; together with two poems, chaps. xxxii and xxxiii. The book closes with an account of the death of Moses (chap. xxxiv). It was already recognized by some of the Church fathers, e.g., Chrysostom and Jerome, that Deuteronomy is the book referred to in 2 Kings xxii as having been found in the eighteenth year of Josiah (620 B.C.) by the High Priest Hilkiah. (See Josiah.) But while critics are now unanimous in dating the beginning of Deuteronomy from this period, it does not follow that the book, as we have it, was composed in the days of Josiah. In the first place, the law book brought to the King could not have been as extensive as the present book of Deuteronomy. The two poems are clearly additions, and the same may be said of the short prophetic discourse in chaps. xxix–xxxi, and of the blessings and curses, chap. xxvii. There remain the two speeches, (1) chaps. v–xxvi, to which chap. iv. 45–49 forms the introduction, and (2) chaps. i–iv. Since the former discourse contains no reference to the latter, the two are independent of one another; other evidence can also be brought forward. Between the two the choice is not difficult. Since Hilkiah speaks of a "book," a document of some bulk is evidently intended, and the references to specific laws in the narrative of 2 Kings confirm the view adopted by most critics that chaps. v–xxvi represent the law book of Hilkiah, which may have been composed in the earlier years of Josiah's reign or possibly under Manasseh or Hezekiah. This discourse may be again divided into two sections: (*a*) chaps. v–xi;

(*b*) chaps. xii–xxvi. The former is an historical narrative put into the mouth of Moses; the latter an exposition of the law. The two divisions, however, formed an organic whole, and everything points to a single origin for them. The historical narrative forms the justification, as it were, for the authority claimed for the law. Naturally, even in this original portion of Deuteronomy, insertions and amplifications have been introduced by those who in the course of time enlarged the book by adding to it the other discourses, the blessings and the curses, and the poems; and who inclosed the whole in an historical frame and attached it to the four preceding books. (See EXODUS; LEVITICUS; NUMBERS; PENTATEUCH.) In these codes three distinct strata are recognized: (*a*) Ex. xxi–xxiii, called the Book of the Covenant; (*b*) Lev. xvii–xxvi, the Law of Holiness; (*c*) various priestly regulations found here and there in Exodus, Leviticus, and Numbers. Hence a question arises as to the position to be accorded to the original Deuteronomic code. As a result of the investigations of modern scholars—notably Kuenen, Graf, Wellhausen, and Stade—it may now be regarded as definitely established: (1) that Deuteronomy is older than (*b*) and (*c*), but younger than (*a*); and (2) that the Deuteronomic code is based upon the Book of the Covenant, enlarged and adapted to new conditions and introducing as an entirely new feature the recognition of Jerusalem as the only legitimate centre of Yahwe worship. Everything points to Jerusalem as the place where the original Deuteronomy was written, and there is nothing strange in the supposition that, as a result of prophetic agitation for the purification of Yahwe worship, an attempt should have been made, particularly after the profound impression made in Judæa by the catastrophe to the northern kingdom, to formulate an ideal code which should carry out the views of the Yahwe purists; and since the prophets pointed to the days of the wanderings in the wilderness as the period when the people showed the greatest fidelity to Yahwe, it was also natural that the tradition should arise and gather strength which ascribed the Deuteronomic code, as subsequently the other codes, to the great leader of the past, Moses. It is this tradition which, shaping the subsequent history of Israel, gave to the codes their authority in the eyes of the people. How long after this the second discourse (chaps. i–iv) was added has not yet been ascertained by the investigations of scholars, though it probably dates from the exilic period. The same may be said of chap. xxix, while chap. xxviii appears originally to have been the conclusion to the enlarged book. Chap. xxvii is an independent composition, which again impresses one as the natural conclusion of a book, and is therefore a "doublet" to chap. xxviii. It may be admitted that the problems involved in the relationship of these two chapters (xxvii–xxviii) to the rest of the book have not yet been satisfactorily solved, and further investigations are needed. Of the poetic supplements, (*a*) the Song of Moses and (*b*) the Blessing of Moses, the former is now regarded as an exilic or even postexilic composition, while the latter is considerably older and reflects political conditions as they existed in the days of Jeroboam II (782–743 B.C.), before the disappearance of the northern kingdom.

Bibliography. Consult, besides the commentaries of Dillmann, Driver, Keil, Oettli, Montet, Steuernagel, etc., Stark, *Das Deuteronomium* (1894); Steuernagel, *Der Rahmen des Deuteronomiums* (1894); Addis, *Documents of the Hexateuch*, vol. ii (1898); A Harper, *Book of Deuteronomy* (1900); Stade, *Biblische Theologie des Alten Testaments* (1905); Boetticher, *Das Verhältnis des Deuteronomiums zu 2 Kön. 22–23 und zur Prophetie Jeremias* (1906); Klostermann, *Der Pentateuch II* (1907); Cornill, *Einleitung in das Alte Testament* (1907); Puukko, *Das Deuteronomium* (1910); Driver, *Introduction to the Old Testament* (1910); Sellin, *Einleitung in das Alte Testament* (1911); Jordan, *Commentary on the Book of Deuteronomy* (1911).

DEUTSCH, doich, EMANUEL OSCAR (1829–73). A distinguished Semitic scholar. He was born of Jewish parents, at Neisse, in Silesia. His education was begun by an uncle, to whose inspiration he owed his interest in Oriental languages and literature, and was finished at the University of Berlin. In 1855 he was called to England to fill an appointment in the library of the British Museum and labored there until his death in 1873. He acquired an extraordinary mastery of the whole range of Hebrew, Aramaic, and Rabbinical literature, and is best known for his articles on the Talmud and Islam in the *Quarterly Review*. He also wrote excellent articles on the Targum and the Samaritan Pentateuch for Smith's *Dictionary of the Bible*. The monument of his official work in the British Museum is to be found in the *Phœnician Inscriptions*, edited by Mr. Vaux, to whom Deutsch rendered most valuable assistance. His engrossing public duties and comparatively short life prevented Deutsch from fulfilling the dream of his life, an elaborate work on the Talmud. Consult his *Literary Remains*, containing reprints of his most important articles, with memoir (London and New York, 1874). The essay on the Talmud has also been reprinted by the American Jewish Publication Society, *Special Series No. 3* (Philadelphia, 1897).

DEUTSCH, LEO GRIGOREVITCH (1855–). A Russian revolutionist. He was born at Kiev, where, too, he received his education. In 1874 he joined the Russian revolutionary movement and two years later was arrested, ostensibly for deserting the army (in which he served as a volunteer), but really for his revolutionary sympathies. He escaped, however, while awaiting trial by court-martial. In 1877 he, together with another famous revolutionist, undertook to organize a revolt among the peasantry in the Government of Kiev. When this secret organization was discovered, Deutsch was again arrested, this time for a real political offense punishable with death; a year afterward, however, while still lingering in the Kiev prison pending trial, he again made his escape. Going to Switzerland, he joined a group of Russian terrorists known as the Land and Liberty party, became a Socialist, and in 1883 helped to found the Russian Social-Democratic party in Switzerland. A year later, while conveying literature of this new organization, he was accidentally arrested in Germany and, through the influence of Prince Bismarck, extradited to Russia. He was sent to Siberia for 13 years and 4 months, but once more outwitted his guards in 1901 and again fled, by way of

Japan and America, to Switzerland. There he rejoined the Socialist party and became connected with its leading organ, the *Spark*. In 1905, much encouraged by the Czar's manifesto promising Russia a constitution, Deutsch returned to his fatherland. The reaction that came in 1906, however, again made him a political prisoner. On the way to Siberia, whither he was being exiled, Deutsch eluded his convoy and fled to France. In 1911 he came to the United States and for a year edited the newly founded Russian Socialist weekly, *Novy Mir*. An interesting account of his 40 years of revolutionary activity, including his prison life and thrilling escapes will be found in his *Sixteen Years in Siberia* (New York, 1903) and *Viermal Entflohen* (Stuttgart, 1907).

DEUTSCHBRÓD, doich'brôt. The capital of a district in Bohemia, Austria, on the Sazawa, 16 miles north of Iglau (Map: Hungary, D 2). It has woolen factories, lumber and grist mills, glassworks, and breweries. The chief event in its history is the defeat of the Emperor Sigismund by Ziska in 1422, and the destruction of the town by the Hussites. Pop., 1900, 6526.

DEUTZ, doits. See COLOGNE.

DEUTZIA, dūt'sĭ-a *or* doit'sĭ-à (after the Dutch botanist *Deutz*). A genus of shrubs of the family Saxifragaceæ, natives of the north of India, China, and Japan. They produce an abundance of beautiful white flowers. The leaves of *Deutzia scabra* are so rough with siliceous hairs that they are used by joiners in Japan for polishing wood. *Deutzia scabra* and *Deutzia gracilis*, of which there are numerous varieties, including some with rose-colored flowers, are common ornamental shrubs in the United States. Other species are often used for forcing in greenhouses.

DEUX-PONTS, dē'pôn'. See ZWEIBRÜCKEN.

DEUX-SÈVRES. See SÈVRES.

DĒV, dāv, less accurately **DĒW**, or **DĪV**. The Persian word for demon, identical with Avestan *daēva*, and the same as Sanskrit *dēva*, Avestan *daēva*, although the latter means "god," not "demon." According to Zoroaster the Daēvas were created by Ahriman (q.v.), and in Firdausi's Persian epic, *Shāh Nāmah*, the Dēvs are a constant source of guile, cunning, evil, and alarm. Consult Geiger and Kuhn, *Grundriss der iranischen Philologie*, vol. ii (Strassburg, 1896–1904). See AVESTA; ZOROASTER.

DE'VA. The old Roman name of Chester and the river Dee.

DEVA-DĀSĪ. See BAYADERE.

DE VALERA, EAMON. Irish republican leader. See IRELAND, *History*.

DĒVANĀGARĪ, dā'vȧ-nä'gȧ-rē, or NĀGARI. The name given to the character in which Sanskrit is generally written, especially in northern and middle India. The Hindus commonly employ the second term rather than the first. The word *nāgarī* means "of the city, urban" (writing); *dēvanāgarī* signifies "(writing) of the divine city." As the Arab chronographer Albīrūnī in his account of India (about 1030 A.D., trans. Sachau, i, 173) mentions a kind of writing called *Nāgara* as in use in Mālwa, whose chief city is Ujjain, it has been thought that the name of this script, *urban, urbane*, may possibly have some connection with King Vikrama's capital, which was a famous seat of learning and literature. The Nāgarī alphabet consists of 48 letters, and it is written from left to right. It is believed to have assumed its present characteristic form about the eighth century A.D., and, like the other Hindu scripts, it is traceable back to the oldest form of Indian alphabet, the *Brāhmī lipi*, or Writing of Brahma, which is known from coins and inscriptions of about 350 B.C. The Brahmī itself is held to be an adaptation of a form of Semitic writing that may perhaps have found its way into India as far back as the eighth century B.C. In modern times one of the earliest instances of Dēvanāgarī letters being employed in a printed European book is found in five tables contributed to Kircher's *China illustrata* (Amsterdam, 1667) by Heinrich Roth, a German who had lived a number of years in India as a missionary. On the Nāgarī script and its paleographic sources, consult the standard work of Bühler, *Indische Paläographie* (Strassburg, 1896), and Taylor, *The Alphabet*, vol. ii (London, 1899), who is the exponent of a view differing from that of Bühler. See ALPHABET, SANSKRIT.

DEVAPRAYAGA. See DEOPRAYAG.

DEVAUX, de-vō', PAUL LOUIS ISIDOR (1801–80). A Belgian statesman. He was born at Bruges and was educated at Liége. The establishment of the so-called "Doctrinal party" after the revolution of 1830 was largely due to his efforts and to those of his chief associates, Rogier and Lebeau, with whom he had six years previously founded the *Journal Politique*. This publication, by unifying the Liberal and Catholic elements, agitated the opposition to King William I of the Netherlands and eventually became largely instrumental in promoting the separation from Holland and the establishment of an independent government. Devaux assisted in framing the constitution and in the negotiation of the Treaty of London. In 1831 he became Minister of State, resigning upon the installation of King Leopold, whose election he had advocated. He later became the head of the Moderate Liberals in the Chamber, and for many years conducted the official organ of that party, the *Revue Nationale*, founded by him in 1840. Towards the close of his career he was stricken with blindness. His publications include: *Mémoires sur les guerres mediques* (1874), and *Etudes politiques sur les principaux événements de l'histoire romaine* (1880).

DÉVAY, dā'voi, or **DÉVAI** (i.e., of Déva), MÁTYÁS BIRÓ (c.1500–74). The founder of the Reformed church of Hungary. He was born at Déva, Transylvania, studied theology at Cracow, became a priest, but in 1529 embraced the Reformation, and spent nearly two years with Luther at Wittenberg. On his return home he preached the new faith boldly and at the risk of his life until, in 1534, he came under the protection of a powerful noble. In 1541 he fled to Switzerland to escape the oncoming Turks and there imbibed Zwinglian views of the sacraments, much to Luther's sorrow. He died at Debreczin, Hungary, where he had faithfully labored for a few years.

DEVEL'OPMENT, EMBYRONIC. See EMBRYOLOGY; GASTRÆA THEORY.

DEVELOPMENT, EVOLUTIONARY. See EVOLUTION.

DEVELOPMENT IN PHOTOG'RAPHY. See PHOTOGRAPHY.

DEVELOPMENT OF DOCTRINE. The process by which Christian doctrine has been

slowly and successively divided into different departments of thought, these one after another more carefully defined, subdivided, and elaborated, and more thoroughly grounded in revelation and reason, and the whole thereby reduced to a systematic and relatively complete form.

The fact of such a development is at once evident upon the most superficial examination of Christian history. The earliest writers of the Church possess no system of theology and employ few expressions which indicate any thought upon the great questions with which theology is engaged. The development has proceeded with unequal pace; now one subject and now another being the centre of attention. In a sense it is true that heresies have determined the development of doctrine: for a heresy must be met by a more careful study and restatement of the doctrine attacked. Such a study is seldom without modifying influence upon the form in which the doctrine is held.

In the second century Gnosticism (q.v.) came into Christianity and compelled the formation of the New Testament canon and the statement of the relation of Christianity to Judaism. The fourth century brought a discussion of the relation of Christ to God, resulting in the formation of the Nicene Creed. The fifth century brought the completion of Christology (q.v.) by the definition of the relation of the divine nature of Christ to his human nature, culminating in the Creed of Chalcedon (451). Augustine formulated the doctrines of grace and of original sin, under the influence of the Pelagian controversy; and of the Church, under that of the Novatian controversy. The doctrine of the Church took more definite form in the Middle Ages, when the doctrines of the sacraments were defined. The doctrine of the atonement was first clearly stated by Anselm (1098). The Protestant Reformation caused a twofold development. On the Catholic side it issued in a formulation and statement, in the Creed of the Council of Trent, of the ecclesiastical and sacramental interpretation of Christianity. This statement was so full that Catholic development of doctrine has proceeded more slowly since then, the most prominent points being the definition of the doctrine of the immaculate conception (1854) and of the papal infallibility (1870). The Protestants formulated anew the doctrines of the Church, the priesthood of believers, the sacraments, and justification by faith. Both Luther and Calvin regarded their doctrines, not as new developments, but only as restatements of biblical and Augustinian positions. Calvin emphasized the sovereignty of God. This led to the Arminian protest against any doctrine which destroyed a real free will. This controversy was one of the factors in the development of the New England theology, which gradually modified Calvinism, till little of its old form was left. Modern times have produced, instead of developments of special doctrines, an attitude towards all doctrines which demands (1) that they be made ethical. This has caused changes in the doctrines of everlasting punishment and of the atonement. (2) That they be in accord with present philosophical conceptions, as in the case of the problems of free will. (3) That they be so stated as to possess a practical value for life.

Two theories of development have been held. One is best expressed in English in Newman's famous *Essay on Development*. It holds that all doctrine was latent in the teaching of Christ and the Apostles, but that it unfolds gradually under the guardianship of a divinely inspired and infallible Church. Protestants have often held a modification of this theory, regarding all true Christian doctrine as lying in the New Testament, but denying the infallibility of the Church. The other theory holds that doctrine has developed under natural influences, and that the results may be at some points quite out of accord with the spirit of the gospel. Consult: Cardinal Newman, *An Essay on the Development of Christian Doctrine* (London, 1878), and criticism by Prof. F. H. Foster in his *Christian Life and Theology* (New York, 1901); Brown, *The Essence of Christianity* (ib., 1902); Allen, *The Continuity of Christian Thought* (Boston, 1884). See CREEDS AND CONFESSIONS.

DEV'ENS, CHARLES (1820–91). An American jurist and statesman. He was born in Charlestown, Mass., graduated at Harvard in 1838, and was admitted to the bar in 1841. He was a member of the State Senate in 1848–49, and from 1849 to 1853 was United States Marshal for the District of Massachusetts. In this capacity he was called upon in 1857 to remand Thomas Sims (q.v.) to slavery and strongly against his own inclination caused the process to be executed, but subsequently made every effort to secure Sims's freedom. He served with the Union army in the Civil War from 1861 to 1866, rose from the rank of major to that of brigadier general, and was brevetted major general. At the conclusion of the war he resumed the practice of law, was associate justice of the Superior and Supreme courts of Massachusetts from 1867 to 1877, and was United States Attorney-General under President Hayes from 1877 to 1881. From that time until his death he was again in the State Supreme Court. He was a brilliant orator and public speaker. In 1886 he presided over the exercises in celebration of the two hundred and fiftieth anniversary of Harvard University. Consult his *Orations and Addresses*, with a memoir by John Codman Ropes (Boston, 1891).

DEV'ENTER. A thriving town of Holland, situated at the junction of the Schepbeek and Yssel, 66 miles east of Amsterdam (Map: Netherlands, E 2). The town retains the mediæval plan of streets, but is very neat. The principal buildings are the early Gothic church of St. Lebuinus, the Brothers' Church, and the Bergkerk of the twelfth century, the townhouse, the courthouse, and the Gothic weighhouse, now a high school for girls. There are a number of carpet factories and a Royal Smyrna rug factory. Erasmus received his early training at Deventer. The town is also famous throughout the country for its honey cakes, a kind of gingerbread, called "Deventer koek." Other industries are iron molding, cotton spinning, cigar manufactures, rope making, and glue making. There is also a large trade in grain, linen, and animal products. Pop., 1900, 26,212; 1910, 28,223. Deventer is mentioned as early as the eighth century, when it was taken by the Saxons. It was the seat of a bishopric from 1559 to 1591.

DE VERE, *de vēr'*, SIR AUBREY (1788–1846). An Irish poet. He was the son of Sir Vere Hunt of Curragh Chase, Limerick, Ireland. In 1832 he took the name of De Vere. He

studied under a tutor at Ambleside and subsequently at Harrow. His sonnets were greatly admired by Wordsworth. He also wrote three dramatic pieces: *Julian the Apostate* (1822); *The Duke of Mercia* (1823); and *Mary Tudor* (posthumous, 1847). Consult *Sonnets* (1875) and *Mary Tudor* (1884), edited by his son, Aubrey Thomas de Vere (q.v.). Consult also Gunning, *Aubrey De Vere* (Limerick, 1902), and Ward, *Aubrey De Vere* (New York, 1904).

DE VERE, Aubrey Thomas (1814–1902). An Irish poet, son of Sir Aubrey De Vere, and second Baronet of Curragh Chase, Limerick. Educated at Trinity College, Dublin, he first appeared as a poet in 1842, with *The Waldenses.* Next year his *Search after Proserpine* made him widely and favorably known as a writer of verse, graceful, refined, and fluent. Among later volumes are: *Poems, Miscellaneous and Sacred* (1853); *The Sisters* (1861); *Irish Odes* (1869); *Legends of Saint Patrick* (1872); *Legends of the Saxon Saints* (1879); *The Foray of Queen Meave and Other Legends of Ireland's Heroic Age* (1882); and *St. Peter's Chains* (1888), which enriches England's rather slender store of devotional verse of fine quality. De Vere also published poetical dramas on *Alexander the Great* (1874) and *Saint Thomas of Canterbury* (1876), which show no marked dramatic gift; *Essays Chiefly on Poetry* (1887); *Essays Chiefly Literary and Ethical* (1889); and *Recollections* (1897). Many of his best poems, edited by G. E. Woodberry, were published as *Selections* (New York and London, 1894). As a poet, he was inspired by Wordsworth. He was a classical scholar of fine culture, and his appreciation of the Greek spirit is manifest in all his work relating to those ancient myths. Of permanent practical achievement may be mentioned his interest in the Celtic renaissance, and not the least attractive of his poems are those reviving the beauty of Irish legend. Consult: *Recollections* (London, 1897); Brooke and Rolleston, *Treasury of Irish Poetry* (New York, 1900); W. P. Ward, *Aubrey de Vere* (New York and London, 1904).

DE VERE, Maximilian Schele (1820–98). An American philologist. He was born in Sweden, studied in Germany, and in 1842 emigrated to the United States. In 1844 he became professor of languages at the University of Virginia, but during the Civil War entered the Confederate army, and afterward acted as the Commissioner of the Confederacy in Germany. At the close of the war he resumed his professorship. He was one of the founders of the American Philological Society and published: *Comparative Philology* (1853); *Stray Leaves from the Book of Nature* (1856); *Wonders of the Deep* (1869); *Americanisms* (1872); *Romance of American History* (1872); several translations from Spielhagen; X. B. Saintine's *Myths of the Rhine* (1874).

DEVEREUX, dĕv'ĕr-ūō, Penelope. See Stella; also, Dark Lady, The.

DEVEREUX, Robert. See Essex, third Earl of.

DEVI, dā'vē (Skt., goddess), or **MAHADEVI,** mä'hà-dā'vē. In Hindu mythology, the wife of Shiva, also called Durga and Parvati.

DE'VIA'TION (Lat. *deviatio,* from *deviare,* to go out of the way, from *de,* off + *via,* way). The deflection of the compass needle, due to local attraction, such as the magnetic forces of an iron or steel ship. It consists of two parts—that produced by permanent magnetism of parts of the vessel's structure and that produced by induced magnetism in other parts. The *angle of deviation* is the angle between the magnetic meridian and the compass needle. (See Compass; Declination; Magnetism, Terrestrial.) The term also may signify a departure from the usual course of a voyage without justifiable cause; if lack of sufficient cause is proved, the insurers are discharged from all further responsibility. It differs from a *change* of voyage, which is planned and decided upon before the sailing of the ship. Permission to touch at, stay at, or trade in any particular place not in the usual course of the voyage must be expressly given in the contract. Deviation is justified by the following causes: (*a*) stress of weather; (*b*) urgent need of repairs; (*c*) to join convoy; (*d*) to succor ships in distress; (*e*) to avoid capture or detention; (*f*) sickness; (*g*) mutiny of the crew.

DEVIATION OF THE PLUMB LINE. See Deflection of the Plumb Line.

DEVICE' (ME. *devise;* OF. *devise,* will, intention, *devis,* division, plan, will, from Lat. *divisus,* p.p. of *dividere,* to divide). An emblem which, with its accompanying motto or legend, was assumed as an ingenious expression, generally containing a hidden meaning of some particular conceit of the wearer. Devices became general in the fourteenth century and reached their full development during the period of the French wars in Italy. Mary Stuart solaced her captivity by inventing devices which she afterward executed in embroidery. A device was composed of two parts—the body and soul, as they were called by the Italians. The body, or painted metaphor, was not to represent the human form, but was to be pleasing in appearance. The soul was to be short and in a foreign language. The combined emblem was not to be so plain as to be understood by all, nor so obscure as to require a sphinx to interpret it. Devices were borne only by the person who assumed them, and not, like the crest or cognizance, by his family or descendants. Thus, Louis XIII of France had a falcon as a device, with the words *Aquila generosior ales* (a nobler bird than the eagle), by which he implied a claim of superiority to the Emperor; Louis XIV had the sun in its splendor, with the motto *Nec pluribus impar.* Consult Radowitz, *Die Devisen und Mottos des spätern Mittelalters* (Stuttgart, 1850).

DE VIGNY, dẽ vē'nyē', Alfred, Comte. See Vigny, Alfred, Comte de.

DEVIL, or Satan (OE. *dēofol,* Lat. *diabolus,* Gk. διάβολος, *diabolos,* slanderer, from διά, *dia,* across + βάλλειν, *ballein,* to throw; Heb. *Sātân,* adversary, from *satan,* to persecute). In later Jewish and Christian belief, a mighty spirit of evil who has during unknown ages ruled over a kingdom of evil spirits and is in constant and restlessly active opposition to God. This belief, however, was very gradually developed in the Jewish mind; and it is beyond all question that it acquired clearness and prominence through extranational influences. The older Hebrews who lived before the period of the Babylonish captivity—judging from the silence of Scripture — knew nothing, and certainly taught nothing, of evil spirits in the later sense —i.e., of beings separated from God, who were evil in the essence of their nature and worked

evil only. *Moral* evil was rather looked upon as properly the act of man; *physical* evil, or adversity, on the other hand, as punishment merited through sin and inflicted by a just and holy God, who was thus necessarily conceived as the true source of all calamity. The angels who foretold God's purposes and executed His will, however great might be the physical evil they occasioned, are never accused of *moral* evil. The spirit from God which brought insanity upon Saul (1 Sam. xvi. 14) was called "evil" because of its effect, not its moral nature. It is probable that the Hebrews conceived of spirits like the Arabic jinn haunting lonely places, but there is little demonology till the period of the exile, when they came into contact with the vigorous demonism of Babylonia and Persia. Then appears for the first time an angel called *Satan*, who, however, still figures as a minister of God and, along with the others, appears in heaven before the throne of Jehovah, but with the function assigned to him of accuser and seducer. It is he who (1 Chron. xxi. 1) stirs up David to number the people; while in the older Hebrew version (2 Sam. xxiv. 1) the same act is attributed to an angry God. Satan also throws suspicion on the piety of Job and, with the permission of Jehovah, causes a series of misfortunes to befall him (Job i. 2); while in Zach. iii. 1 he is represented as "resisting" the angel of God and as a false accuser of the high priest Joshua. As yet, however, an evil nature is not *expressly* ascribed to him, although it is assumed that he takes a pleasure in evil. It is a purely arbitrary and untextual interpretation of Isaiah xiv. 12 ("How art thou fallen from Heaven, O Lucifer, son of the morning!") that would force these words to refer to the fall of the Devil or determine from them his name. In the Apocrypha, of which only a small part is Palestinian, the rest being either *Chaldaico-Persian* (as, e.g., Tobias and Baruch) or *Ægypto-Alexandrian* (as, e.g., Wisdom) in its origin, the older Hebrew doctrine of misfortune coming from the angel of Jehovah disappears, and demons or evil spirits, in the New Testament sense of the term, are for the first time mentioned (and in Tobias and Baruch frequently) as the authors of calamities. According to the representations of these writings, the evil spirits dwell in waste places, but associate themselves for the injury or destruction of men, enter into them as tormentors, and can be expelled only by magical or mysterious means. To this class of beings the heathen deities were reckoned to belong. But even here there is no mention of an *organization* or kingdom or prince of demons. The first trace of a *Diabolos* or Devil proper (and one in all probability springing from a foreign source) shows itself in the Book of Wisdom (ii. 24), in relation to the seduction of Eve, where it is said that through the Devil the necessity of death has come into the world.

During the period immediately preceding the appearance of Jesus the Jewish ideas of angels, as well as of demons and the Devil, received an extensive development. Much of this angelology and demonology, wholly foreign to the older Hebrew religion, was derived from Persian Zoroastrianism. The idea of spiritual hierarchies and orders, and the names of specific spirits and demons, as Asmodeus in Tobias, are drawn from the Persian system. In Persia the evil power was supposed to have existed from the beginning, but to be destined to defeat at last. The Hebrew represented the Devil and his demons as having been originally *angels*, who had fallen from their "high estate," been punished by God, and had therefore assumed a position of hostility, without, however, being able materially to frustrate the divine purposes. These opinions found an almost universal reception among the people. Indeed, the only Jewish sect which rejected them was that of the Sadducees, who considered them, as also the doctrines of the resurrection from the dead, of the Messiah, of the Messianic kingdom, of the last judgment, of rewards and punishments, and of angels and demons, to be new, outlandish anti-Mosaic myths and theories. This conflict of opinion among the Jews prevented their ideas of the Devil and demons from obtaining, in spite of their broad diffusion, a dogmatic and systematic stability. The populace and the Pharisees believed fervidly in the existence of such evil spirits; but their conceptions had not only all the heat, but all the confusedness of superstition.

The New Testament contains distinct recognition of the prevalence of this extended popular demonology, by which, in particular, various diseases were ascribed to the agency of the evil spirits. (See DEMONIAC.) The chief demonic power bears a great variety of names, as Satan (Matt. iv. 10 et seq.), the Devil (as Heb. ii. 14), the Adversary (1 Pet. v. 8), the Enemy (Matt. xiii. 39), the Adversary (1 Tim. v. 14), the Accuser of the Brethren (Rev. xii. 10), the Old Serpent (Rev. xx. 2), the Great Dragon (Rev. xii. 9), frequently Beelzebub (Matt. x. 25), once Belial (2 Cor. vi. 15). These names describe well the character imputed to him. He is the "evil one," the "tempter," who opposes Jesus and seeks to draw the disciples as well as their Saviour into sin, has power over the world, of which he is the "Prince" and "God," and shows his power in the moral corruption of heathenism.

The primitive Church assumed the personality of the Devil as an unquestionable fact. The New Testament ideas on this point were not only greatly enlarged, but in many respects entirely changed, partly through the introduction of a considerable number of heathen notions, and partly through the dogmatic tendencies of the time, in consequence of which the various statements in the Bible regarding Satan and evil were uncritically and unhistorically heaped together, and a doctrine of satanic agency elaborated logically. Holding firmly to the belief of a satanic kingdom of darkness opposed to Christ's kingdom of light, the majority of the early Christians ascribed all evil, physical as well as moral, to the Devil and his demons: failures of the crop, sterility, pestilence, murrain among cattle, mental maladies, persecutions of the Christians, individual vices, heresies, astrology, philosophy, and especially the whole body of heathenism, with its mythology and religious worship. The heathen gods were believed to be conquered by the work of Christ, but not to be wholly powerless; they sank down into demons, and so a part of their mythology passed into the doctrine of the Devil. It was they who, as demons, meaning to deceive, uttered oracles, were present at sacrifices, and inhaled the sacrificial incense. The doctrine of the lordship of the Devil over the human race, so

far as it was unregenerate, gave rise to the custom of exorcising, not only those in whom special signs of demoniacal possession appeared (see ENERGUMENS), but all candidates for baptism, whether infants or adults. (See EXORCISM.) But while the power of the Devil over all not guarded by Christian faith and rites was supreme, over those who were so protected it was utterly weak. No Christian, even the weakest, could be forced to do evil; and the sign of the cross, the commemoration of Satan's defeat in the decisive combat, sufficed to put him to flight. During the Middle Ages theologians speculated as to the reason for the fall of Satan. Some held that he was originally the highest of all angels; others, that he was a prince in one of the lower orders. Pride was usually assigned as the reason for the revolt which led to his fall. The general theological speculations on the subject are expressed in Milton's *Paradise Lost*.

The old German and Norse mythologies poured a flood of heathen fancies into the "doctrine of the Devil." Even Ulfilas, at a much earlier period, had translated the New Testament word *daimon* or *daimonion* by *unhulthó*, i.e., she devil or sorceress, because the old Germans believed in *female* demons, while the Christian *usus loquendi* contains no trace of such. The peculiarly German conception of a now malignant, now gentle *female* lives to this day in the German phrase, "The Devil is beating his mother" (when rain and sunshine quickly alternate). In England and Scotland, too, the phrase is or was recently current, "The Devil and his dam." The Germans have also the proverb, "Where the Devil cannot come, there he sends his grandmother." Soon, however, the word *diabolus*, in violation of the New Testament distinction between it and *daimon*, came to signify devils of every or any sort. The dwelling of the Devil was hell, which, however, according to old Germanic and Scandinavian notions, was placed in the dreary regions of the north. Although his mischievous powers are to be pretty well controlled till the coming of Antichrist, when he expects to hold carnival, yet, like ancient gods and demons, he occasionally appears on the earth. He then assumes at times a purely human form, but, like Vulcan, who was thrown down from heaven like himself, and the smith, Wieland, of German mythology, he is somewhat lame. He is covered with a gray, green, or red cloak, like the kobolds and dwarfs (see GIANTS; DWARF), the spirits of the suppressed heathenism; sometimes, also, he appears black and sooty, as befits his dwelling place and his opposition to a pure God. But as the old deities, both classical and German, possessed the power of transformation to a most remarkable degree, the Devil, through his relationship with these, inherited this power when they vanished from the scene. The form he most frequently assumed was that of an animal, approximating in this respect to the German forest spirits and the Greek satyrs and fauns. At one time he shows the foot of a horse or goat with horns and tail; at another he appears as a black horse, a he goat, a hog, a wolf, a hell hound, a raven, a serpent, a worm, a dragon, or a fly. The conception of the power of the Devil was vastly enlarged by the influx of these new fancies. In fact, it rose almost to a new dualism; but on the other hand, also, many mild and friendly traits of the heathen gods passed over into the popular conception of the Devil and gave to his nature a quite new, humorous, and even merry side. As, after the introduction of Christianity, offerings were still occasionally made to the old gods, the Devil shared in these honors. A horse, a he goat, or a hound was at times sacrificed to him; and to the present day the expression has survived, "To kindle a fire for the Devil"—obviously an allusion to altar flames. Various features of the old Norse gods, especially of Loki and Donar (Thor), the gods of fire and thunder, were also transferred to him. Hence the still current phrases in Germany when thunder is heard: "The Devil must be striking," and "The runaway goose is gone to the Devil." (*Donner*, 'thunder,' is the word used for devil in this case.) Every power, too, which, according to the older heathen belief, was lodged in the lesser demons, giants, etc., had now its proper centre in the great fiend himself, who could perform all the pranks attributed to the more grotesque creations of the Norse mythology, and work all the evil of the more malignant spirits; but, in general, these beings were rather pressed into his service than absorbed by him or incarnated in his person.

Thus decked out in the costumes of many different climes and ages, the image of evil passed into the light of the modern world. In this light the Devil began to fade away. Men first lost faith in his occasional incarnation; then medical science destroyed his claims to the origination of mental phenomena, which he was once supposed to have caused directly; natural science deprived him of his control over the elements; historical criticism plucked from him his borrowed feathers; while philosophy and a study of the New Testament in its historical background have combined to annihilate his personality. The tendency has been to regard the personal Devil as a part of the mythology with which men in early times were wont to clothe the forces of the world in personal form. Consult: Mayer, *Historia Diaboli* (Tübingen, 1780); Horst, *Dämonologie* (Frankfort, 1818); id., *Zauberbibliothek* (Mainz, 1821–26); Grimm, *Deutsche Mythologie* (4th ed., Berlin, 1875–78); Conway, *Demonology and Devil Lore* (London, 1878); Lecanu, *Histoire de Satan, sa chute, son culte, ses manifestations, ses œuvres* (Paris, 1861); Carus, *History of the Devil* (Chicago, 1900); and see DEMONOLOGY; WITCHCRAFT; ANGEL; ETC.

DEVIL, TASMANIAN, or DEVIL-DEVIL. See DASYURE.

DEVIL, THE. Once a tavern near Temple Bar, in Fleet Street, London, the former place of meeting of the Apollo Club (q.v.). Child's Bank now stands on its site.

DEV'ILFISH. A name applied to various large marine creatures of terrifying or grotesque appearance. 1. Any of various large cephalopods. See KRAKEN; OCTOPUS; SQUILL. 2. The gigantic ray (*Manta birostris* or *vampyrus*). See RAY. 3. The angler (Lophius), and its relatives. See ANGLER.

DEVIL-IN-THE-BUSH. See NIGELLA.

DEVIL IS AN ASS, THE. A comedy by Jonson (1616), the avowed object of which was to substantiate the thesis laid down by the title.

DEVILLE, de-vēl'. See SAINTE-CLAIRE DEVILLE.

DEVILLE, JEAN ACHILLE (1789–1875). A

French scholar and antiquarian, born in Paris. He became director of the museum in Rouen. He wrote works on local history and archæology, such as an *Histoire du Château-Gaillard* (1829); *Tombeaux de la cathédrale de Rouen* (1838); *Essai sur l'exil d'Ovide* (1859); *Histoire de l'art de la verrerie dans l'antiquité* (1874)—the last-named volume, finely embellished with numerous plates, being his best.

DE VILLIERS, de vĭl'yērz, JOHN A. J. (1863–). An Anglo-Dutch geographer, born in London, the son of a Hollander living in Cape Colony. He was educated at the City of London College, became superintendent of the map room in the British Museum, and was expert adviser to the British Foreign Office in the Venezuelan and Brazilian boundary arbitration cases. In 1911 he lectured throughout Holland. He published some translations from the French, notably Bourget's *Mensonges*, and edited for the Hakluyt Society—of which he was honorary secretary—early works on British Guiana, etc.

DEVIL OF ED'MONTON, THE. See MERRY DEVIL OF EDMONTON, THE.

DEVIL'S ADVOCATE. See ADVOCATUS DIABOLI.

DEVIL'S-APRON. The large brown algæ, usually called kelps, in the order Laminariales. See PHÆOPHYCEÆ; ALGÆ.

DEVIL'S BIBLE, THE. The name given to a manuscript Bible taken to Stockholm after the Thirty Years' War. It is beautifully written on 300 asses' skins, and the legend makes it the work of a monk condemned to death, who by selling himself to Satan was enabled to save his life by meeting the condition that he should copy the whole Bible on asses' skins in one night.

DEVIL'S-BIT. See SCABIOUS.

DEVIL'S BRIDGE (translation of Ger. *Teufelsbrücke*). A curious bridge formerly in the Canton of Uri, Switzerland, over which the St. Gothard Railway crosses the Reuss at a point where there are often violent gusts of wind (Map: Switzerland, C 2). Built in the Middle Ages, it was partially destroyed by the French in 1799, in which year it was the scene of fierce conflicts between them and the allied Austrians and Russians. The remains of the bridge were carried away by a flood in 1888. "The Hole of Uri" is the name given to the tunnel near by, through which the road passes. The new bridge was built close to the old site in 1830, and a monument to the Russian general, Suvaroff, was erected in 1899 in a niche above.

DEVIL'S-CLAW. A heavy split hook attached to a chain or hawser and used for working the chain cable in mooring, unmooring, clearing hawse, etc. The points of the hook pass on each side of one link and grip the next one at right angles to it. The chain or hawser is secured to a bitt, ringbolt, capstan, windlass, or the like.

DEVIL'S-CLUB. See ARALIA.

DEVIL'S-COACHHORSE, or Cow. A rove beetle (*Ocypus olens*), common in Great Britain. See ROVE BEETLE.

DEVIL'S DARNING NEEDLE. See DRAGON FLY.

DEVIL'S DOZEN. See BAKER'S DOZEN.

DEVIL'S DYKE. 1. A prehistoric earthwork in Cambridgeshire, England, built as a barrier between the Mercians and the East Anglians. 2. A natural formation near Brighton, said by a legend to represent the attempt of the Devil to let in the waters in order to inundate the country.

DEVIL'S-FINGER. A British name for (1) a belemnite; (2) a starfish.

DEVIL'S ISLAND. A small barren island off the coast of French Guiana, South America, about 30 miles northwest of Cayenne (Map: Guiana, French, G 2). It became famous through the confinement there of Capt. Alfred Dreyfus (q.v.). Near Devil's Island are the two small French penal islands of Saint-Joseph and Ile Royale, which were formerly known, with Devil's Island, as Iles du Diable, but which later received the name Iles du Salut.

DEVIL'S LAKE. A city and the county seat of Ramsey Co., N. Dak., 89 miles west by north of Grand Forks, on the Great Northern and the Farmers Grain and Shipping Company's railroads, and on Devil's Lake (Map: North Dakota, F 2). It contains a school for the deaf, a Carnegie library, St. Mary's Academy, General Hospital, and shops of the Great Northern. There are also creameries and grist mills. The city has adopted the commission form of government. Pop., 1900, 1729; 1910, 5157.

DEVIL'S PARLIAMENT. The name given to an English Parliament convened by Henry VI, which met at Coventry in 1459 and unjustly attainted the Duke of York and his adherents of high treason.

DEVIL'S RIDING HORSE. See PIRATE BUG.

DEVIL'S THOUGHTS, or **DEVIL'S WALK, THE.** A short doggerel of 14 stanzas written in collaboration by Southey and Coleridge (1799), republished in Coleridge's *Sibylline Leaves* (1817), and in Southey's poems with additional verses referring to Porson.

DEVIL'S WALL. The popular name for the Pfahlgraben, the old Roman wall between England and Scotland, because of its strength.

DEVIL UPON TWO STICKS, THE. An English adaptation by Foote of Le Sage's *Le Diable Boiteux*.

DEVIL WORSHIPERS. Specifically, a sect called Yezidis, living in Asiatic Turkey and Armenia, and claiming several hundred thousand adherents. Their religion is a survival of primitive worship of the evil mysteries, the essential feature of many savage and barbaric beliefs, though the chief object of their devotion is borrowed from the Old Testament, and the Koran. They practice circumcision and baptism.

DEVINE, dê-vīn', EDWARD THOMAS (1867–). An American leader in social work, born at Union, Iowa. He graduated in 1887 at Cornell College (Iowa), and from 1894 to 1896 was secretary of the American Society for the Extension of University Teaching. In 1896 he was appointed general secretary of the Charity Organization Society of New York, and in addition he was from 1897 to 1913 editor of *Charities*, later known as *Charities and the Commons*, and, since 1909, as *The Survey*. He was appointed professor of social economy at Columbia University in 1905, was director of the New York School of Philanthropy from 1904 to 1907, had charge of Red Cross relief work after the San Francisco earthquake and fire in 1906, served in the latter year also as president of the National Conference on Charities and Correction, and prominently identified himself with various congresses and organizations aiming to

better social conditions. He wrote: *Economics* (1898); *The Practice of Charity* (1901); *Principles of Relief* (1904); *Efficiency and Relief* (1906); *Misery and its Causes* (1909); *Social Forces* (1909); *The Spirit of Social Work* (1911).

DE VINNE, dē vĭn'nē, THEODORE LOW (1828–1914). An American printer, born at Stamford, Conn., and educated in the common schools of the various towns where his father had pastorates. He learned the printing trade in a shop at Fishkill, N. Y., and later was employed on the Newburgh (N. Y.) *Gazette*. In 1849 he entered the establishment of Francis Hart in New York City, and was a junior partner in the business from 1857 to 1877. The firm name having been altered in 1883 to Theodore L. De Vinne & Co., he removed in 1886 to a model plant designed by him on Lafayette Place. He began to print the *St. Nicholas Magazine* when it was founded in 1873, and the *Century Magazine* in 1874. He founded the National Typothetæ Society, and was elected its president in 1896. A great advocate of what he called "masculine printing,"—good paper, bold, readable types, and simple composition, strongly printed in black ink, De Vinne did much for the improvement of American typography. For years his publications ranked at the head of American presswork, and his firm gained an international reputation. He was the most prolific of writers on printing, publishing besides a great many magazine articles: *The Invention of Printing* (1876); *Historic Printing Types* (1886); *Plain Types* (1890); *The Practice of Typography* (1900); *Correct Composition* (1901); *Title-Pages* (1902); *Modern Methods of Book Composition* (1904); and *Notable Printers of Italy during the Fifteenth Century* (1910). He contributed to the NEW INTERNATIONAL ENCYCLOPÆDIA.

DEVINS, dĕv'ĭnz, JOHN BANCROFT (1856–1911). An American clergyman and editor, born in Brooklyn, N. Y. In 1882 he graduated from New York University, and in 1880–88 he was a member of the staff of the New York *Tribune*. Ordained to the Presbyterian ministry in 1888, he served from that year until 1905 as pastor of churches in New York City. From 1890 to 1911 he was managing editor of the New York *Observer*. He organized the Federation of East Side Workers and the New York Employment Society, wrote several hymns, assisted in preparing the *Life of Dwight L. Moody*, and wrote *The Church and the City Problem* (1905); *An Observer in the Philippines* (1905); *On the Way to Hwai Yuen* (1905); *The Classic Mediterranean* (1910).

DEVISE (same as *device;* OF., Fr. *devise*, from ML. *divisa*, judgment, contrivance, will). Strictly speaking, a testamentary gift of real property. As a verb, the term is frequently, though improperly, employed interchangeably with *bequeath* (properly, to make a legacy, or testamentary gift of personal property), as signifying any disposition of real or personal property by will. The person making the devise is known as the *devisor*, or, more generally, the testator; the person to whom the devise is made is called the *devisee*. The power to dispose of one's estate by last will and testament is fully recognized in all systems of law of which we have any record, but the peculiar conditions, due to the feudal system, under which our land law developed created a curious exception to this general rule in the case of freehold estates in land. While the common law fully recognized the right of testament as applied to personal property of all kinds, including leasehold interests in land, it did not admit the corresponding right of disposing by will of freehold interests.

The invention of the system of uses, whereby lands were conveyed on a passive trust to one man "to the use" and for the benefit of another, opened the door to an evasion of this feudal restriction. The right of the beneficiary of such a trust, called the *cestui que use*, not being a legal estate and so not cognizable by the courts of common law, was protected by the Chancellor as a conscientious claim against the nominal trustee, in whom the bare legal title to the land was vested. The *cestui que use* was thus, by the grace of the Chancellor, permitted to make dispositions of his beneficial interest, as it was termed, which were denied by the common law to the legal tenant of freehold lands, and among them to make deathbed or testamentary dispositions thereof. See TRUST; USE.

This practice of devising the use of lands became so common that, upon the abolition of such equitable interests by the Statute of Uses (27 Hen. VIII, c. 1) in 1525, the demand for a convenient and legalized method of disposing of freehold interests in land by testament became irresistible, and resulted five years later in the passing of the first Statute of Wills (32 Hen. VIII, c. 1). This statute was the origin of devises of lands, as we understand the term, and granted "full and free liberty, power, and authority" to dispose by last will and testament in writing of all lands, tenements, and hereditaments, saving only one-third of all lands held by the tenure of knight's service. This restriction was removed by subsequent legislation, and in 1837 a comprehensive statute, the present Wills Act (7 Wm. IV and 1 Vict., c. 26), was enacted, by which all devises of lands in England have since been regulated.

The earliest American statutes were modeled upon the Statute of 32 Hen. VIII, excepting the restriction upon the devising of lands held by knight's service, which, as that tenure never existed on this side of the Atlantic, had no application in this country. Everywhere in the United States freehold interests in lands may now be devised by last will and testament in substantially the same manner as personal property, the matter being regulated by statutes of the several States. See WILL.

Notwithstanding the general assimilation of the process of disposing of lands to that of bequeathing personal property by will, devises retain many of the distinctive characteristics impressed upon them by their origin and early history in chancery. They are subject to peculiar rules of interpretation and they have, under the title of executory devises, contributed a large and important body of doctrine to the law of future estates. See EXECUTORY DEVISE; FUTURE ESTATE; and the authorities referred to under those titles.

DEVIZES, dē-vī'zez. A municipal borough and market town of Wiltshire, England, near the Avon and Kennet Canal, 22 miles north-northwest of Salisbury (Map: England, E 5). It has two ancient Norman churches and a spacious corn exchange, the town being an important grain market. There are also manu-

factures of tobacco, snuff, silk and farming tools, the formerly important woolen industry having declined. The town owns its gas and water supply. Pop., 1901, 6532; 1911, 6741. Roman household gods and coins have been found here. The name of the town is apparently derived from its Roman name, *Castrum Divisarum* or *Ad Divisas*. Its first charter was granted by Queen Matilda when the town was called *De Vies*. It grew up back of the castle built by Roger, Bishop of Salisbury, in the time of Henry I, on a promontory bordered by two ravines. This castle, which was repeatedly captured during the wars of Stephen and Matilda, and was demolished by Cromwell in 1645, has almost disappeared.

DEVOE, dē-vō′, Frederick William (1828–1913). An American manufacturer, born in New York City. After working as a clerk in stores for nine years he became a partner in the firm of Raynolds & Devoe (1852–64) and head of F. W. Devoe & Co. (1864–90), and after 1890 he was president of the F. W. Devoe & C. T. Raynolds Co., manufacturers of paint and varnish. He was at various times president of the New York Board of Education, the Board of Commissioners of Greater New York, and the New York Juvenile Asylum.

DEVO'NIAN SYSTEM. A division of the Paleozoic group of rocks, next above the Silurian and below the Carboniferous; so named from Devon, England, where the strata were early studied and described. The name was suggested by Murchison and Sedgwick to replace that of Old Red Sandstone. It is sometimes called the Age of Fishes on account of the prevalence of these vertebrates in the seas in which the rocks were deposited. The passage of the Silurian into the Devonian is so gradual that the exact boundary between the two systems is rather indefinite. Between the Devonian and the Carboniferous exists a somewhat variable relation; in most parts of North America the two are practically continuous, but in New England and the Acadian provinces a marked unconformity occurs in places, owing to the upturning of the strata at the close of Devonian time. A similar unconformity is represented, also, in parts of Europe. The American section of the Devonian as worked out in the classic New York area is as follows:

Upper	Chemung-Catskill (Sandstones and shales)
	Portage (Shales and sandstones)
	Genesee (Shale)
	Tully (Limestone)
Middle	Hamilton (Shale)
	Marcellus (Shale)
	Onondaga (Mainly limestone)
Lower	Oriskany (Sandstone)
	Helderberg (Mainly limestone)

This classification is now quite generally followed in the United States, although some geologists consider the Helderberg as a part of the Silurian system.

Conditions in Devonian Time. At the opening of the Devonian period the North American continent already existed in its present general shape. Several large embayments and troughs indented the coast or extended deeply into the interior, notably the St. Lawrence sea and the Appalachian trough on the northeast, the Gulf embayment on the south, and the Pacific and Arctic embayments on the west and north, and within their basins mainly the strata accumulated. Oscillations of level increased or diminished these areas of submergence and sedimentation from time to time. During the first part of the Devonian, deposition in the northeastern waters seems to have proceeded quietly and slowly, resulting in the accumulation of limestones; with Hamilton time the seas became more turbid so that shales accumulated in great thickness. By that time, also, the Gulf embayment had extended itself to the north through the Mississippi region to the Great Lakes and spread eastward so as to connect with the New York basin. The Pacific and Arctic waters likewise reached far inland, and in the Rocky Mountain and Great Basin regions the Hamilton was a time of limestone formation on a great scale. The Upper Devonian was a period of shale and sandstone accumulation chiefly, with a brief interval of limestone in the early part (Tully) and more or less conglomerate in the closing or Chemung stage. A variation of the regular phase of the Chemung strata is presented by the Catskill formation (q.v.), which consists of shales and sandstones that were deposited in fresh and brackish waters.

Distribution of Individual Formations. The Helderberg strata are mainly confined to the eastern section of the United States, Nova Scotia, New Brunswick, the Appalachian belt, and the lower Mississippi region. They are mostly limestones which have a thickness of from 300 to 400 feet in eastern New York.

The Oriskany sandstone is developed in central New York and extends thence south along the Appalachians through Pennsylvania, Maryland, and Virginia. It also appears in Ohio, Indiana, southern Illinois, and Missouri. At Oriskany, N. Y., it is 30 feet thick, in Illinois 300 feet. Although sandstone is the prevailing rock, there is some limestone in places.

The Onondaga has a rather widespread distribution, extending from New York to the Mississippi River and being found on James Bay far to the north as a probable continuation of the main area. The limestone is largely made up of corals, sometimes in recognizable reefs, of which a famous example exists at the falls of the Ohio, above Louisville. It is from 100 to 200 feet thick in New York, where it contains strata that are partly made up of chert and are known as the Corniferous limestone.

The Marcellus and Hamilton strata are shales and shaly sandstones, but in the central west include considerable limestone. They extend across New York from east to west and attain a thickness of 1500 feet near the centre of the State. They extend along the Appalachians to Tennessee and are found as far west as Iowa and Missouri; they occur also in the valley of the Mackenzie and in Manitoba, where they represent an accumulation in the Arctic basin which may have reached southward into the United States.

Of the Upper Devonian formations the Tully limestone is a thin band represented in central New York. The Genesee consists of black bituminous shale, 150 feet thick in New York and 300 feet in Pennsylvania. The Portage contains much sandstone and is from 1000 to 1400 feet thick in western New York. The Chemung is still more arenaceous and includes local beds of conglomerate, indicative of very shoal waters: it has a thickness of 1500 feet in the vicinity of Cayuga Lake and of several

thousand feet in Pennsylvania, but thins to the south and west. In eastern New York the Chemung rocks are succeeded by 3000 feet of sandstone and red shales which are separately distinguished by the name "Catskill," as they are thought to have been accumulated under fresh-water conditions.

Devonian Life. The life of the Devonian was abundant, but chiefly marine. Sea plants, such as fucoids, continued up from the Silurian, and land plants appeared, including ferns, lycopods, conifers, and equisetæ, many of them being of large size. Some, indeed, are so well preserved that the cellular structure of the wood is observable in their sections. Among the animals great variety abounded. Crinoids of the blastoid or budlike type, also the plumose ones; brachiopods were not lacking, especially the long-winged species; there were also the early forms of ammonites, trilobites, and insects. An important feature is the great abundance of marine vertebrates—fishes, which fairly swarmed in the Devonian seas. They include sharks, cestraciont and hydobont; ganoids, whose modern representative is the gar pike, having the body covered with shining plates of mail, and placoderms, having the body covered with bony plates, such as are worn by the turtle fishes which seem to have linked the ganoids with the sharks. Among the genera were *Cephalaspis* (q.v.), *Pterichthys* (q.v.), *Coccosteus* (q.v.), *Dinichthys* (q.v.). The latter, found in the Ohio Devonian, was at least 18 feet long; another, *Titanichthys*, probably reached 30 feet. Both were covered with heavy plates.

Economic Products. The Devonian rocks are of vast importance economically, for they contain the great stores of petroleum and natural gas obtained in Pennsylvania, New York, West Virginia, and other Appalachian States. The pools of oil and gas are mainly found in the sandstones of the Middle and Upper Devonian. The Hamilton, Portage, Chemung, and Catskill sandstones are the familiar bluestone, much used for flagging stones, while the Helderberg and Onondaga yield lime and cement materials.

Foreign Devonian. In Great Britain the Devonian system includes sandstones, slates, and limestones similar in general character to those appearing in America. The "Old Red Sandstone," a fresh-water phase of the Devonian in Scotland, admirably described by Hugh Miller, is the British equivalent of the Catskill formation. A large area of Devonian rocks is found in northern France, Belgium, and north Germany, also in Russia, China, and Australia.

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DEV'ONPORT (before 1824 called PLYMOUTH DOCK). A municipal borough, maritime and fortified town, and naval arsenal of Devonshire, England, situated on a promontory between Stonehousepool and the Hamoaze or estuary of the Tamar, 2 miles west-northwest of Plymouth (Map: England, B 6). It stands on high ground, with ramparts defended by batteries. The streets are regularly laid out and well paved, and there are a number of handsome public buildings. The town was incorporated in 1837, although its existence dates from the establishment of a dockyard there in 1689 by William III. It sends two members to Parliament. The town maintains electric-light and power stations, gas and water works, bath houses, a fine park, a technical school, and a public library. It is a very important military and naval station, being the seat of the military and naval government of "The Three Towns," i.e., Devonport, Stonehouse, and Plymouth. The institutions include the Naval Engineering College (1880), the municipal technical schools (1890), the naval barracks, and naval and military hospitals. Its dockyard and naval arsenal are among the most important establishments of this kind in the United Kingdom. The dockyard, together with the Keyham Steam Yard farther up the Hamoaze, with which it communicates by a tunnel, covers an area of about 240 acres, its capacity having been about doubled by the addition in 1907 of 118 acres, including 77 acres of mud flats which formerly flooded at high water. Mount Wise is a fine parade ground and contains the residences of the Lieutenant Governor and the Port Admiral. Devonport has important steamship communications. Pop., 1901, 70,437; 1911, 81,694.

DEV'ONSHIRE (AS. *Defena scir*, shire of the Defons). A maritime county, in the southwest peninsula of England, between the Bristol and English channels (Map: England, C 6). Its area is 2604.9 square miles, three-fourths being in pasture or arable. The north coast, 60 miles long, is steep and rocky, the chief indentation being Bideford Bay. The south coast, 100 miles long, is also lined with cliffs and is indented by Tor Bay and Plymouth Sound. The general surface is hilly. The conspicuous feature is Dartmoor (q.v.). Devonshire is an important agricultural and dairy county (about three-fourths of the surface is under cultivation) and has considerable mining, manufacturing, and fishing industries. The chief towns are Exeter (the county town), Plymouth, and Barnstaple. Population of ancient or geographic county, 1901, 661,314; 1911, 701,944; of administrative county, 1901, 436,938; 1911, 457,343.

DEVONSHIRE, SPENCER COMPTON CAVENDISH, eighth DUKE OF (1833–1908). An English statesman, long and familiarly known as the Marquis of Hartington. He was the eldest son of William, the seventh Duke, and was born in London, July 23, 1833. He graduated at Trinity College, Cambridge, 1854; was attached to Earl Granville's special mission to Russia, 1856, and entered Parliament as a Liberal, 1857. In 1859 he moved the vote of want of confidence that resulted in the fall of the Derby ministry. He became Lord of the Admiralty and Undersecretary for War in 1863 and was Secretary for War for a brief period in 1866. He held the office of Postmaster-General in Mr. Gladstone's cabinet, 1868–71, resigning in the latter year to become Chief Secretary for Ireland. In 1875 he succeeded Mr. Gladstone as the leader of the Opposition in Parliament, and on the downfall of the Conservative administration, 1880, was sent for by the Queen to form the new cabinet; this task being declined both by him and by Lord Gran-

ville, it finally devolved upon Mr. Gladstone. In the new cabinet Lord Hartington was first Secretary of State for India and then Secretary of State for War (1883–85), during which period occurred Lord Wolseley's memorable expedition to relieve General Gordon (q.v.) at Khartum. Opposed to Mr. Gladstone's Home Rule policy, in 1886 he became the acknowledged leader of the Liberal Unionists (q.v.), and subsequently gave a vigorous support to Lord Salisbury's administration. He became eighth Duke of Devonshire in 1891, and the following year married the Dowager Duchess of Manchester, widow of the seventh Duke. The same year he received the order of the Garter. From 1895 to 1903 he was Lord President of the Council and from 1900 to 1902 President of the new Board of Education. He retired from the ministry in 1903 as a protest against the protectionist views advocated by Mr. Joseph Chamberlain and became president of the Unionist Free Food League. He received the academic honors of the lord rectorship of Glasgow University, 1877, lord rectorship of Edinburgh University, 1879–91, the chancellorship of Cambridge University, 1892, and presidency of Owens College, Manchester, 1900.

DEVONSHIRE CLUB. A Liberal club, founded in 1875, on St. James's Street, London.

DEVONSHIRE HOUSE. The London residence of the dukes of Devonshire, in Piccadilly, near Berkeley Square. It contains fine collections of portraits, gems, and the "Kemble Plays," including the first editions of Shakespeare.

DE VRIENDT, *de vrēnt.* See FLORIS, FRANS.

DEVRIENT, *de-vryän′,* GUSTAV EMIL (1803–72). One of a distinguished German family of actors, he and his elder brothers, Karl August (1797–1872) and Philipp Eduard (q.v.), being nephews of Ludwig Devrient (q.v.). Emil Devrient, as he is known, was born Sept. 4, 1803, in Dresden, and began life in a manufacturing business, but, having the family preference for the theatre, made his début as an actor and singer in Brunswick in 1821, as Raoul in Schiller's *Jungfrau von Orleans.* In 1825, in Leipzig, whither he had come about two years before from Bremen, he married Dorothea Böhler, a popular actress. After playing also in Magdeburg (1828) and Hamburg (1829), he, in 1831, began his connection with the Court Theatre of Dresden, where he spent most of the remainder of his life. He died Aug. 7, 1872. He was an artist of great ability, excelling notably in the use of his voice. When he played Hamlet in London, his performance was considered equal to that of either Kean or Kemble. Among his greatest rôles were Hamlet, Posa, Tasso, and Uriel Acosta.

DEVRIENT, LUDWIG (1784–1832). A celebrated German actor, first of the noted theatrical family of this name. He was born Dec. 15, 1784, in Berlin, the son of a silk merchant, and had begun the commercial career that his father planned for him, when, in 1804, he joined a traveling dramatic company. He made his début in Gera, as the messenger in Schiller's *Braut von Messina.* The next year he secured an engagement in Dessau, and in 1809 he went to Breslau. In 1815, having made the acquaintance of Iffland (q.v.), he appeared for the first time on the stage in Berlin, as Franz Moor in Schiller's *Räuber.* He won distinction also in the rôles of Talbot, Schewa, Lorenz Kindlein, the Moor in *Fiesco,* and the Shakespearean parts of Shylock, Lear, Richard III, and Mercutio. His acting was characterized by great originality, and he excelled alike in pathos and humor. His power was due more, it is said, to his natural gifts than to study. His habits of life were dissipated, and his premature death, which occurred in Berlin, Dec. 30, 1832, was hastened by the use of stimulants. Consult Funck, *Aus dem Leben Zweier Schauspieler, Iffands und Devrients* (Leipzig, 1838).

DEVRIENT, OTTO (1838–94). A German actor and dramatist, son of Philipp Eduard Devrient (q.v.). He was born Oct. 3, 1838, in Berlin, and made his début on the stage in Karlsruhe in 1856. He had engagements in Stuttgart, Berlin, and Leipzig; then returned to Karlsruhe in 1863 and remained till 1873, after which he was manager successively of theatres in Weimar, Mannheim, and Frankfort. In 1879 he retired to Jena and there produced his *Luther,* a play written on the occasion of the Luther jubilee in 1883. The next year he became director of the Court Theatre in Oldenburg and in 1889 was called to a similar position in Berlin, from which he retired in 1890. He died June 23, 1894. He is the author of several dramas, among them *Zwei Könige* (1867), *Tiberius Gracchus* (1871), and *Kaiser Rotbart* (1873); and other works, including *Zwei Shakespeare-Vorträge* (1869); and an edition of letters of Iffland and Schröder (1881).

DEVRIENT, PHILIPP EDUARD (1801–77). A German actor and dramatist, brother of Karl August and Gustav Emil Devrient (q.v.). He made his début as an opera singer in Berlin when 18 years old, but after 1835 devoted himself to the drama and was manager for a time of the Dresden Theatre. From 1852 to 1870 he directed that of Karlsruhe. He wrote a number of dramatic pieces, among them the libretto for the opera *Hans Heiling* (1827), and the plays *Das graue Männlein, Die Gunst des Augenblicks* (1833), *Die Verirrungen* (1837), and *Treue Liebe* (1841); and also several historical and critical works upon the drama, notably his *Geschichte der deutschen Schauspielkunst* (1848–74).

DE VRIES, *de vrēs,* DAVID PIETERSZEN. A Dutch colonist. Nothing is known of his early history except that he served for a time as master artilleryman in the Dutch army. He was a member of an association or company which was organized in 1630 for the purpose of settling the tract of land in the present State of Delaware bought from the Dutch West India Company by Samuel Blommaert and Samuel Godyn in the previous year. A small settlement was made early in 1631, on Lewes Creek, just within Cape Henlopen, and the surrounding country was christened Swaanendael. In a few months, however, the colony was destroyed by the Indians, and De Vries, who had been chosen governor or director, found on his arrival (1632), says Bancroft, "only the ruins of the house and its palisades, half consumed by fire, and here and there the bones of colonists." He left a portion of his party there, while he himself spent some time in Virginia; but concluding that the colony would never be a commercial success, he carried the colonists back to Holland in 1634. He visited Manhattan several times thereafter; attempted to establish a patroonship on Staten Island, where in 1640 his settlement was destroyed by the Indians; and for some time lived on a plantation, Vriessendael, about 25 miles

north of New Amsterdam, on the site of the present Tappan, N. Y. He published a volume entitled *Korte historiaal ende Journaels Aenteyckeninge van verscheyden Voyagien in der vier Teelen des Wereldts Ronde* (1655) ('A Short History and Notes of a Journal Kept during Several Voyages in the Four Quarters of the World'), which contains a valuable account of conditions in New Netherland during the administration of Van Twiller and Kieft. The parts of it relating to America have been translated into English and may be found in vols. i and iii, 2d series, of the *Collections of the New York Historical Society*.

DE VRIES, Hugo (1848–). A Dutch botanist, born at Haarlem and educated at Leyden, Heidelberg, and Würzburg, and after 1871 connected with the University of Amsterdam, first as lecturer and then as professor of botany. His great work was done in connection with the development of the theory of mutation (q.v.) as a method of evolution. It is the best-known explanation of organic evolution since Darwin's theory of natural selection. The most important contribution of De Vries to science is probably the changing of the method of studying evolution from observation to experimental work. Among his numerous publications the following are the best known: *Intracellular Pangenesis* (1889); *Die Mutationstheorie* (1901–03); *Plant Breeding* (Chicago, 1907).

DE VRIES, Marion (1865–). An American lawyer and public official, born near Woodbridge, San Joaquin Co., Cal. In 1886 he graduated from San Joaquin Valley College and in 1888 from the Law School of the University of Michigan. He settled in Stockton, Cal., was assistant district attorney of San Joaquin County (1893–97), was admitted to practice before the Supreme Court of the United States in 1897, and from that year until 1900 served as a member of the United States House of Representatives. He was appointed to the Board of United States General Appraisers, New York, in 1900, and of this board was president from 1906 to 1910. In the latter year he received an appointment as associate judge of the United States Court of Customs Appeals.

DEW (AS. *dēaw*, Ger. *Thau;* cf. Skt. *dhav, dhāv,* to flow). Dew is said to be formed when atmospheric moisture is condensed by cold into drops of water upon grass, trees, rocks, roofs of buildings, or other solid surfaces, while the adjacent air remains clear. The moisture which gathers on the outside of a vessel containing cold water is also termed dew. A thermometer placed in the cold water within this vessel so as to give the temperature of the external surface when that is just cold enough to cause the dew to deposit, indicates the so-called temperature of the dew point, or the temperature to which the free air must be cooled in order to begin depositing dew, and this combination of thermometer and vessel is a *dew-point apparatus.* Many forms of such apparatus have been devised in order to secure accuracy in the use of this method for the measurement of atmospheric moisture and are described in Abbe's *Meteorological Apparatus and Methods* (Washington, 1888). The apparatus usually preferred is that of Regnault, which, with occasional slight modifications, is used in many fundamental determinations of temperature of the dew point. This apparatus consists essentially of a very sensitive thermometer, whose bulb dips into a thimble of polished gold or silver, while the upper end of the graduated stem protrudes beyond this thimble. If the thimble is filled with ether and a current of air blown through it in order to evaporate the ether, the latter soon cools down to the dew point. When this is reached, a slight deposit of dew is seen on the outside of the polished thimble. At this moment the reading of the thermometer is to be noted, and as the temperature of the ether has probably already fallen below the dew point, one waits a minute until the dew on the polished tube evaporates and disappears, when another reading of the thermometer is made. The mean of these two readings should give the temperature of the dew point. By a skillful manipulation of the apparatus the dew appears and disappears with a scarcely appreciable variation in the reading of the thermometer.

When dew is thus deposited, it indicates that the air from which the moisture comes has been cooled to what is known as the point of saturation and all the vapor associated with the air can no longer remain as vapor. This cooling process takes place naturally every clear night, so that in the course of the early morning not only are the grass and other exposed objects often covered with dew, but the quiet layers of the air near the ground begin to condense their moisture in the shape of fog. The deposition of dew, and especially the formation of fog, retards the cooling of leaves and other objects near the ground and delays the occurrence of freezing temperatures and frosts. The actual quantity of dew accumulating on the leaves and dripping to the ground, so as to become available for the use of the roots of the plants, is in cloudless regions, such as Arizona, California, Syria, and Arabia, so large as to be an important matter in agriculture. Many attempts have been made to devise apparatus for measuring the absolute quantity of dew per unit of area of surface, but these drosometers (q.v.) almost necessarily employ as the collecting surface something different from the natural leaves, grass, and stones, and their measurements are at best not absolutely, but only relatively, representative of the natural phenomenon.

The discovery of the true explanation of the formation of dew is commonly ascribed to Dr. W. C. Wells, of Charleston, S. C., and London, England, who published his *Essay on Dew* in 1814, but is equally due to Musschenbroek, Peclet, Wilson, and others. The air that lies near the surface of the ground receives its moisture to a considerable extent from the soil beneath it, and therefore only a small part of the dew comes from a great distance. The ground is perpetually either absorbing or giving out moisture, and the nearer the bedewed surface is to the ground the more of this fresh moisture it will contain, so that the idea that dew falls from above, whence its Spanish name, *serena,* and its French name, *serein,* is not correct, as was shown by Musschenbroek and Wells and very recently restated by Stockbridge. The formation of dew and fog in the night can only take place when (and therefore indicates that) the sky is sufficiently cloudless to allow of almost uninterrupted radiation of heat. Consequently, when any object is covered by even the slightest screen, no dew is found on it.

If the dew point is below the temperature of freezing, then, instead of dew, we have a formation of frost. When the wind is blowing, dew is

not formed except in damp weather. In dry weather the wind brings a supply of relatively warm, dry air to the cooling surfaces of the leaves and prevents them from cooling to the dew point.

When the air is exceedingly dry, the process of radiation (counteracted, as it always is, in part by the conduction and convection of heat) may not be sufficiently intense or proceed far enough to cool ordinary surfaces down to the dew point: temperatures will, of course, steadily fall during the night, but a stationary temperature may be reached above the dew point that represents the balance between the heat losses by radiation and the gains by conduction from the relatively warmer surrounding air. Moreover, the sun may rise and warm up the ground before the dew-point temperature is passed. This can occur only in dry air, viz., that in which the dew point is very low. Under the most favorable conditions in the dry climate of Arizona the temperature at the surface may thus be lowered in the course of a night by as much as 20, 30, or 40 degrees, when the depression of the dew point below the temperature of the dry air is still greater, so that on such a night no dew is recorded.

The number of degrees by which the dew point is lower than the temperature of the air is known as the *complement of the dew point*. In addition to the dew-point apparatus there are other indirect methods of determining the dew point, which are less exact, but frequently more convenient. The apparatus most commonly used in such cases is the so-called dry and wet bulb thermometer, or psychrometer, which will be found described under HYGROMETER.

For many details with regard to dew and cognate phenomena, consult the works of Charles Tomlinson, especially *The Dewdrop and the Mist* (London, 1860), and his historical article in the *Edinburgh New Philosophical Journal*, vol. xiii (Edinburgh, 1861).

DEW, THOMAS RODERICK (1802–46). An American educator and writer. He was born in King and Queen Co., Va., and graduated in 1820 at William and Mary College, where he was professor of history, metaphysics, and political economy from 1827 to 1836 and served as president from 1836 until his death. In 1832 he published a review of the celebrated debate of 1831–32 over slavery in the Virginia Legislature, under the title *An Essay in Favor of Slavery*, which went far towards putting a stop to a movement, then assuming considerable proportions, to proclaim emancipation in Virginia. His most important work is a *Digest of the Laws, Customs, Manners, and Institutions of Ancient and Modern Nations* (1853).

DEWALQUE, *de-vâlk'*, GILLES JOSEPH GUSTAVE (1826–1905). A Belgian geologist, born at Stavelot. He became curator of the mineralogical and geological cabinet at the University of Liége in 1855, and professor there of mineralogy, geology, and paleontology in 1857. In 1870 he was elected president of the Belgian Academy. In addition to a considerable number of contributions to scientific periodicals, he has published a *Description du Lias dans le Luxembourg* (1857), an *Atlas de cristallographie* (1860), *Prodrome d'une description géologique de la Belgique* (2d ed., 1880), and other works.

DEWAR, SIR JAMES (1842–1923). A British chemist, born at Kincardine-on-Forth, Scotland. He was educated at Edinburgh University and was assistant there to Lord Playfair when he occupied the chair of chemistry. Subsequently he became Jacksonian professor of experimental philosophy at Cambridge and Fullerian professor of chemistry in the Royal Institution. In 1897 he was elected president of the Chemical Society and in 1902 of the British Association. He received the degrees of LL.D. and D.Sc. from various universities, was chosen to honorary membership in many foreign societies, and in 1904 was knighted. His scientific researches include studies in regard to the physiological action of light and the liquefaction of gases and in particular investigations of low temperatures. By means of the evaporation of liquid hydrogen under a reduced atmospheric pressure he obtained the lowest temperature yet reached (13° absolute; 470° F. of frost). With Sir Frederick Abel (q.v.) he invented cordite, a smokeless gunpowder used by the British government, and he also introduced vacuum flasks (commonly known as thermos flasks) for keeping foods cold or hot for long periods.

DEW'ART, EDWARD HARTLEY (1828–1903). A Canadian clergyman and author, born in County Cavan, Ireland. In 1834 he was brought to Canada by his parents, who settled in Peterborough Co., Ontario. He was educated mainly at the Normal School, Toronto, and in 1855 was ordained a Wesleyan Methodist minister. After a number of successful pastorates he was elected editor of the *Christian Guardian*, the chief organ of Canadian Methodism, and held that position until 1894. His editorship was forceful and of marked controversial ability. The first step towards the union of the various Methodist denominations in Canada (Wesleyan Methodist, Methodist Episcopal, New Connexion, Bible Christian, and Primitive Methodist) was taken at a private meeting in his house. After union was accomplished in 1883, though not on the basis acceptable to him, he loyally strove to make it a success. He took a foremost part in the federation of Victoria University (Methodist) with the provincial University of Toronto. A Liberal in politics, he did not hesitate to vote accordingly, and excited strong prejudice by his support of a Roman Catholic candidate for Parliament. In 1898 he was an unsuccessful candidate for the Ontario Legislature. Twice he was a delegate to Ecumenical Methodist conferences—once in London in 1881 and once in Washington in 1891. He favored prohibition of the liquor traffic. Though not narrowly orthodox in theology, in the latter part of his editorship he took strong ground against the tenets of the higher criticism. He had a leading share in compiling and editing a new hymn book for the Methodist church. His poetic gift was proved by his *Songs of Life* (1869), a volume of original verse; and he also published a volume of *Selections from the Canadian Poets* (1864). Among his other works are: *Jesus, the Messiah* (1892); *Essays for the Times* (1898); *Outlines of Christian Doctrine* (1899).

DEW'BERRY (from *dew* + *berry*, apparently as being a trailing plant), *Rubus canadensis* or *Rubus villosus*. A representative of the blackberry tribe, familiarly known as running brier, and recognized as a common weed of worn-out or neglected fields and waste places. It is also known as the running blackberry. There are several species of *Rubus* which have

a decumbent habit, but the above is the only one which has given a cultural product of merit. The cultivation of this form of blackberry began with the discovery and introduction of the *Lucretia*, a large-fruited and strong-growing form which has given good returns under skillful management. It is usually planted 3 × 6 feet apart, given clean culture, and the vines tied to stakes or provided with a rack or trellis. It propagates readily by layers. Hybrids between the blackberry and dewberry are in cultivation and are not uncommon in nature. See also RUBUS.

DEWD'NEY, EDGAR (1835–). A Canadian civil engineer and statesman. He was born in Devonshire, England, and was educated as a civil engineer. In 1859 he went to British Columbia, surveyed the site and laid out the town of New Westminster, and afterward in his professional capacity explored many parts of the province, then little known, at the same time superintending the construction of important public works. He was elected a Conservative member of the Provincial Legislature (1868), was a member of the Dominion House of Commons (1872–79), was Indian Commissioner of the Northwest Territory (1879–81), and Lieutenant Governor of the same (1881–88). In 1888 and 1892 he was again elected to the Dominion Parliament and appointed Minister of the Interior in the cabinet of Sir John A. Macdonald. In 1892–97 he was Lieutenant Governor of British Columbia, after which he resumed business life.

DEWEES', WILLIAM POTTS (1768–1841). An American physician and obstetrician, born at Pottsgrove, Pa. Adjunct professor from 1826, in 1834 he became professor of obstetrics and the diseases of women and children in the University of Pennsylvania, but resigned in the same year. Among his publications are: *System of Midwifery* (1826; 12th ed., 1854); *Treatise on the Physical and Medical Treatment of Children* (1825; 10th ed., 1854); *Treatise on the Diseases of Females* (1826; 10th ed., 1853); *Practice of Medicine* (1830).

D'EWES, dūz, SIR SIMONDS (1602–50). An industrious English chronicler and antiquarian. He was the son of Paul D'Ewes, of Milden, Suffolk, one of the six clerks of chancery, and was born at Coxden, Dorsetshire, on Dec. 18, 1602. His preparatory education was gained under several private teachers. Through Henry Reynolds, of St. Mary Axe Parish, London, he became strongly indoctrinated with the Puritan theology, and to John Dickinson, upper master of Bury School, he owed his first enthusiasm for scholarly research. In 1618 he entered St. John's College, Cambridge; but two years later, before taking a degree, he was removed by his father to the Inner Temple, where he was called to the bar in 1623. He abandoned the law three years later, partly in consequence of his marriage with the rich heiress of Sir William Clopton, of Lutons Hall, Suffolk. In the same year he was knighted. He now began to devote himself zealously to those antiquarian studies which he never abandoned, although he represented Sudbury in the Long Parliament and was one of the members expelled by Pride's Purge in 1648. He wrote and collected a vast number of manuscripts and made many transcripts from monastic and other records, and these now form a part of the Harleian collection preserved in the British Museum. His greatest work is the *Journal of All the Parliaments of the Reign of Queen Elizabeth*, finished in 1629, but first edited and published by his nephew, Paul Bower (London, 1682). This work was incorporated by Cobbett in his *Parliamentary History*. Consult: Jessopp, in the *Dictionary of National Biography*, vol. xiv (London, 1888), and Halliwell-Phillipps's edition of the *Autobiography and Correspondence of Sir Simonds D'Ewes during the Reign of James I and Charles I* (London, 1845).

DE WET, *de* vĕt', CHRISTIAN RUDOLPH (1854–1922). A distinguished Boer commander and statesman. He won a name for gallantry in the war between the Transvaal and the British in 1880–81 and became famous for his skill in hunting. In 1897 he was a member of the Orange Free State Volksraad. During the latter stages of the Boer War of 1899–1902 he proved a formidable adversary to the British who for a time made him their principal objective. Frequently he would appear to be completely enmeshed in a girdle of blockhouses, wire entanglements and fences, and pursuing columns, but as often, through the exercise of a clever ruse, completely evaded his pursuers and inflicted damage on some British convoy or outpost in the most unexpected direction. On Feb. 6, 1902, his capture between Lindley and Kroonstad, by the British columns under Lord Kitchener, seemed certain. He was driven into a corner from which escape was rendered difficult by strong wire fences and entanglements; but, to the consternation of his pursuers, he hurled a large drove of cattle, goaded almost to madness, against the wire obstacles, and in the confusion made his escape. In common with other Boer leaders, he made submission to Lord Kitchener and afterward served on a Boer committee to raise funds in Europe and America for the distressed Boer families. During the war he never wore the slightest badge of rank, and he was always taciturn to a degree. He had the complete confidence of his soldiers, but, in common with all the other Boer leaders, suffered the defeat of his best schemes because of the individuality and independence of the burghers under his command. He was regarded by the British government as one of the most influential of the Boer leaders, and great satisfaction was evinced at the dignified manner of his acceptance of the inevitable. He wrote *Three Years' War* (New York, 1902). After 1907 he was a member of the new Parliament of the Orange Free State and also Minister of Agriculture. In the Closer Union Convention of 1908–09 he was a delegate. In 1912 he was appointed to the South African Council of Defense.

DE WETTE, *de* wĕt'*te or* vĕt'*e*, WILHELM MARTIN LEBERECHT (1780–1849). A German theologian. He was born at Ulla, near Weimar, and studied at the University of Jena. In 1807 he was appointed extraordinary professor of philosophy at Heidelberg, in 1809 professor of theology, and in 1810 was called to Berlin. By his excellence as a teacher, as also by his writings, De Wette soon acquired a great reputation. In 1819, on account of a friendly letter which he wrote to the mother of the assassin of Kotzebue, he was deprived of his chair. In 1822 he was appointed professor of theology in the University of Basel, where his prelections and sermons in a short time secured him universal esteem and applause. In 1829 the Grand Council

of Basel made him a member of the Council of Education and granted him the freedom of the city. In 1849 he was elected rector of the university, but died the same year. De Wette was a man of comprehensive learning and acute philosophic discernment. His antipathy to the shackles of dogmatic theology gave keenness and vigor to his criticism. He is one of the forerunners of the modern study of the Bible. A temperate but very decided historical rationalism, on a broad basis of moral reverence, would perhaps best express his biblical standpoint. His principal works are: *Beiträge zur Einleitung in das alte Testament* (1806–07); *Commentar über die Psalmen* (1811); *Lehrbuch der historisch-kritischen Einleitung in die Bibel, alten und neuen Testaments* (1817–26; Eng. trans. of Old Testament part by Theodore Parker, 1843); *Lehrbuch der christlichen Dogmatik* (1813–16); *Christliche Sittenlehre* (Eng. trans. by Samuel Osgood, 1842); *Theodor* (1828; Eng. trans. by James Freeman Clarke, 1849); *Vorlesungen über die Religion, ihr Wesen, und ihre Erscheinungsformen* (1827); *Das Wesen des christlichen Glaubens* (1846); *Exegetisches Handbuch zum neuen Testament* (1836–48). With J. C. W. Augusti he made a German translation of the entire Bible (Heidelberg, 1809–11, 5 parts; 4th ed., 1858, 3 vols.). Besides these, De Wette published a critical edition of the correspondence of Luther (Berlin, 1825–28). For his life, consult A. F. J. Wiegand (Erfurt, 1879). For an estimate of his biblical work, consult Cheyne, *Founders of Old Testament Criticism* (London, 1894).

DEW'EY, Charles Melville (1849–). An American landscape painter. He was born at Lowville, N. Y. Confined to his bed from his twelfth to his seventeenth year by a hip disease, he formed the poetic conception of nature which appears in his pictures. He studied in the schools of the National Academy of Design, New York (1874–76), and in Paris under Carolus-Duran, whom he assisted to paint a ceiling in the Louvre. In 1878 he returned to New York. Dewey's work is full of a highly individual, poetic sentiment and generally depicts subdued morning and evening effects. His landscapes in oil and water color are in many public galleries and private collections of the United States. Among the best are: "Indian Summer" and "A November Evening" (1904); "Morning Bay of St. Ives" and "The Brook" (1905); "The Edge of the Forest" (Corcoran Gallery, Washington); "The Harvest Moon" and "The Close of Day" (National Gallery, Washington); "The Gray Robe of Twilight" (Buffalo Gallery); and "Old Fields" (Pennsylvania Academy, Philadelphia). He was made a member of the National Academy of Design in 1907.

DEWEY, Chester (1784–1867). An American scientist. He was born in Sheffield, Mass., and, graduating from Williams College in 1806, was professor of mathematics and natural philosophy there from 1810 to 1827. From 1850 until 1860 he was professor of chemistry and natural philosophy in the University of Rochester. Dr. Dewey made many contributions to science.

DEWEY, Davis Rich (1858–). An American economist and statistician, born at Burlington, Vt., and educated at the University of Vermont and Johns Hopkins University. He became professor of economics and statistics at the Massachusetts Institute of Technology and secretary of the American Statistical Association, Boston, Mass. He was a member of the commission on public charitable and reformatory institutions in 1897, and of the State board on the question of the unemployed. He was special expert agent on wages for the twelfth United States census (1902), secretary of the American Statistical Association (1886–1906), president of the American Economic Association (1909), and became managing editor of the *American Economic Review* in 1911. He wrote: *Syllabus on Political History since 1815* (1887); *Financial History of the United States* (1902; 4th ed., 1912); *Employees and Wages: Special Report of the Twelfth Census* (1903); *National Problems* (1907). He was a contributor to the first edition of the New International Encyclopædia.

DEWEY, George (1837–1917). An American naval officer, born in Montpelier, Vt. He graduated at the United States Naval Academy in 1858 and began active service on the Mediterranean station. In 1862, under Farragut, he was present at the passage of Forts Jackson and St. Philip on the lower Mississippi and in 1864–65 participated in the attack on Fort Fisher. He became lieutenant commander in 1865, commander in 1872, captain in 1884, and commodore in 1896. In 1898, at the outbreak of the war with Spain, he was appointed to the command of the Asiatic station and on May 1 entirely destroyed the Spanish fleet in Manila Bay without the loss of a man in his own fleet. In recognition of this achievement he was immediately appointed rear admiral and was especially honored by Congress. He aided General Merritt in the capture of the city of Manila (Aug. 13, 1898) and subsequently was a member of the Schurman Philippine Commission. His reception in the United States on his return in 1899 was an enthusiastic ovation. The same year he was made admiral of the navy and is the only officer who has ever held that rank, Farragut and Porter having been admirals but not "admirals of the navy." Admiral Dewey has served on the Lighthouse Board, as Chief of the Bureau of Equipment, and as President of the Board of Inspection and Survey. In the months preceding the presidential campaign of 1900 his name was prominently before the country for a time, but his candidacy from a political standpoint was not seriously considered. In 1901 Admiral Dewey served as president of the Schley Court of Inquiry. (See Schley.) He signed the unanimous report delivered by the court to the Secretary of the Navy on December 13, but further submitted a minority report in which he dissented from certain specifications of the principal document.

DEWEY, John (1859–). An American philosopher, psychologist, and educator, born in Burlington, Vt. He graduated in 1879 at the University of Vermont and in 1884 received a Ph.D. from Johns Hopkins. He was professor of philosophy at the universities of Minnesota (1888–89), Michigan (1889–94), and Chicago, where he was also director of the School of Education (1894–1904), and in 1904 he was appointed professor of philosophy in Columbia University. The degree of LL.D was conferred on him by the universities of Wisconsin and Vermont. Dewey became actively interested in the reform of educational theory and practice,

and while at the University of Chicago he put his educational principles to the test in the University High School. Among his philosophical colleagues he stands with William James as one of the two great American leaders of the pragmatic movement, although with his aversion to scholastic labels he is reluctant to call himself a pragmatist. (See PRAGMATISM.) His first original work in philosophy was in the field of ethics, and then he turned to logic, applying there the methods that he had worked out in the study of morality. Just as in morality new situations call for new ideals, so in thought, he maintains, new meanings are given to old categories by the new uses to which they are put in dealing with new problems. "If we put ourselves in the attitude of a scientific inquirer in asking what is the meaning of truth per se, there spring up before us those ideas which are actively employed in the mastery of new fields, in the organization of new materials. This is the essential difference between truth and dogma, between the living and the dead and decaying. Above all, it is in the region of moral truth that this perception stands out." Ideas are plans of action, and "truth means the effective capacity of the idea 'to make good.'" Dewey's logic is thus instrumentalistic (see INSTRUMENTALISM), and it is connected with the theory that reality is experience, that everything is what it is experienced as being. This view he calls "immediate empiricism." (See EMPIRICISM.)

Dewey's publications include: *Outlines of a Critical Theory of Ethics* (1881); *Study of Ethics* (1894); *The Significance of the Problem of Knowledge* (1897); *My Pedagogical Creed* (1897); *The School and Society* (1900); *Studies in Logical Theory* (1903); *Ethics*, in collaboration with Tufts (1908); *How We Think* (1909); *Influence of Darwin on Philosophy and Other Essays* (1910); *Interest and Effort in Education* (1913). Consult: James, *Pragmatism* (1907) and *The Meaning of Truth* (1909); DeLaguna, *Dogmatism and Evolution* (1910); Moore, *Pragmatism and its Critics* (1910); and recent volumes of the *Philosophical Review* and the *Journal of Philosophy, Psychology, and Scientific Methods*, where his views have been assailed and defended by many writers.

DEWEY, LYSTER HOXIE (1865–). An American botanist, born at Cambridge, Mich. In 1888 he graduated from Michigan Agricultural College, where for the next two years he taught botany. He was an assistant botanist of the United States Department of Agriculture from 1890 to 1902 and thereafter botanist in charge of fibre investigations. In 1911 he was the representative of the United States to the International Fibre Congress at Soerahaia, Java. His publications comprise bulletins of the United States Department of Agriculture on the production of fibre from flax, hemp, sisal, and manila plants, on the classification and origin of the varieties of cotton, and also investigations on grasses and troublesome weeds.

DEWEY, MELVIL (1851–). A pioneer American librarian and educator. He was born at Adams Centre, N. Y., and graduated at Amherst College in 1874. In 1876 he published his *Decimal Classification* (7th ed., 1911, as *Decimal Classification and Relativ Index*), and founded the *Library Journal*, the organ of American librarians. He took an active part in founding the American Library Association, of which he was secretary for 15 years and twice president. At this period he also edited the *Spelling-Reform Bulletin*, the *Metric Bulletin*, and similar educational publications. From 1883 to 1888 he was librarian of Columbia College, where he established (1884) a school of library economy. This was transferred to Albany in 1890 as the State Library School, Dewey remaining director until 1906. He was from 1888 to 1900 secretary and executive officer of the University of the State of New York, from 1888 to 1906 director of the New York State Library, and in 1904–06 also State director of libraries. He prepared cataloguing rules that are widely used; his "decimal classification" has been adopted in most American and in many foreign libraries. He contributed to the first edition of the NEW INTERNATIONAL ENCYCLOPÆDIA.

DEWEY, ORVILLE (1794–1882). An American Unitarian clergyman. He was born in Sheffield, Mass., graduated at Williams College, and later became a divinity student at Andover. He preached in Boston for two years, as assistant to Dr. Channing. In 1823 he became pastor of the Unitarian Church in New Bedford. He went to New York in 1835 and there secured the erection of the church of the Messiah. About 1844 he quitted the pulpit and lectured in various parts of the country. Among his works are: *Letters on Revivals; Discourses on Human Nature; Discourses on Human Life* (1841); *Discourses on the Nature of Religion; The Unitarian Belief; The Problem of Human Destiny* (Lowell lectures, 1864). A collected edition of his works appeared in New York (3 vols., 1848–52). Consult his *Autobiography and Letters*, ed. by his daughter (Boston, 1883).

DEWEY, RICHARD (SMITH) (1845–). An American alienist and neurologist, born at Forestville, N. Y. He graduated (M.D.) from the University of Michigan in 1869 and in 1870–71, during the Franco-Prussian War, was volunteer assistant surgeon at the field hospital at Pont à Mousson, France, and at the Reserve Hospital at Hesse-Cassel, Germany. Part of 1871 he spent in study under Virchow at Berlin. He was assistant physician at the State Hospital for the Insane at Elgin, Ill. (1872–79), medical superintendent of the State Hospital for the Insane at Kankakee, Ill. (1879–93), professor of mental and nervous diseases at the Chicago Postgraduate Medical School (1893–1909), and after 1895 head of the Milwaukee Sanitarium. In 1896 he was president of the Medico-Psychological Society. He is a contributor on mental diseases to medical journals.

DEW'EYLITE. A hydrated magnesian silicate, related to serpentine. It is amorphous and ranges in color through shades of white, yellow, red, and brown. Deweylite was named from Prof. Chester Dewey, an American chemist and naturalist.

DEWI, SAINT. See DAVID, SAINT.

DE WINDT, HARRY (1856–). An English explorer, born in Paris and educated at Magdalene College, Cambridge. In 1876–78 he was aid-de-camp to Rajah Brooke, of Sarawak, who had married De Windt's sister. Among his journeys were one to the prisons of western Siberia in 1890, another to those of eastern Siberia in 1894, one to the Klondike in 1897, and trips through the Sahara and Morocco in

1911–13. He wrote: *On the Equator* (1882); *From Pekin to Calais by Land* (1887), a record of his ride across the two continents; *A Ride to India* (1890), describing a trip from Russia via Persia; *Siberia as It Is* (1892); *The New Siberia* (1895); *Through the Gold Fields of Alaska to Bering Straits* (1898); *True Tales of Travel and Adventure* (1879); *Finland as It Is* (1901); *From Paris to New York by Land* (1903), an account of his travels in 1896 for *Pall Mall Gazette; Through Savage Europe* (1907), a tour of the Balkan states for the London *Daily Express; My Restless Life* (1908); and some poems and novels.

DEW'ING, THOMAS WILMER (1851–). An American figure and portrait painter. He was born in Boston, May 4, 1851, and studied in Paris under Boulanger and Lefebvre from 1876 to 1879. His canvases are small in size, delicate and subtly refined in conception and treatment, soft and evanescent in color, and full of poetic charm. Among his best paintings are: "The Days" (Clark prize, 1887); "The Lady in Yellow"; "The Lady in White"; "The Letter" (Metropolitan Museum, New York); "The Recitation" and "The Lady in Green and Gray" (Art Institute, Chicago); "Summer" (National Gallery, Washington); and 20 paintings in the Freer collection (Detroit), including "A Lute Player" and "A Musician." On the death of the owner these will pass to the National Gallery. He was a member of the Society of American Artists, was elected to the National Academy of Design in 1888, and received many medals.—His wife, MARIE OAKEY DEWING (1857–), paints still life, especially flowers, with a delicacy and refinement reminiscent of her husband's figure pieces.

DE WINTER, *de vĭn'tẽr*, JAN WILLEM (1750–1812). A Dutch admiral. He was born at Kampen and entered the navy at the age of 12. He fought in the French ranks under Dumouriez and Pichegru, rising to the rank of brigadier general. Upon his return to Holland in 1795 he became commander of the Dutch fleet, consisting of 15 ships of the line and 12 frigates. On Oct. 11, 1797, he was attacked by a British fleet under Admiral Duncan and defeated in the hotly contested battle of Camperdown, his own ship, the *Frijheid*, and seven others falling into the hands of the British. He was taken as a prisoner of war to England, but was treated there with distinction, and upon his return to Holland was not only exonerated from blame, but commended for his gallantry and skill. In 1798 he became Minister Plenipotentiary to France, and in 1802 was reappointed to the command of the Dutch fleet and attempted to put down piracy in the Mediterranean. He was buried in the Pantheon, his heart in the Nicholas Church of Kampen.

DE WITT, *de vĭt*, CORNELIUS (1623–72). A Dutch naval officer. He was born at Dort and was educated at Leyden. In 1652 he and Ruyter succeeded Tromp in command of the Dutch fleet, which Blake defeated in September off Kentish Knock. Under Admiral de Ruyter he participated in the burning of the British shipping in the Medway (1667) and in 1672 took a conspicuous part in the battle of Solebay (Southwold). He was charged by Tichelaar with participation in the plot to murder the Prince of Orange and after being tortured was sentenced to banishment. As he was leaving his prison, he was attacked by the burghers of The Hague and murdered, with his brother, Jan De Witt. He was an able officer and a man of broad general culture.

DE WITT, JAN (1625–72). A celebrated statesman of Holland, born at Dort, Sept. 24, 1625. He was the son of Jacob De Witt, a vehement opponent of William II, Prince of Orange. Young De Witt was carefully educated and soon exhibited remarkable ability. He was one of the deputies sent by the states of Holland in 1652 to Zealand for the purpose of dissuading that province from adopting the cause of Orange. There his eloquence secured him such universal confidence that he was made Grand Pensionary of Holland, an office to which he was several times reëlected. The Orange party, supported by the populace and the clergy, was ever striving to increase the power of the young prince (afterward William III), who was then a mere infant; the Republican, or Oligarchic, party, composed of the nobles and the wealthier burgesses, at the head of which was De Witt, sought, on the other hand, to strip the house of Orange of all power and to abolish entirely the office of stadtholder. During William's minority the advantage was with De Witt and the Republicans. In 1654, on the conclusion of the war with England, a secret article was inserted in the treaty drawn up between De Witt and Cromwell, in virtue of which the house of Orange was to be deprived of state offices for all time. The accession of Charles II severed the friendly relations of England and caused De Witt to lean towards France. A commercial treaty between France and Holland was followed, in 1665, by another English-Dutch war, which lasted until the Peace of Breda, in 1667. The result was that the power of the Republican party in Holland seemed firmly established, for in the same year a perpetual edict was proclaimed abolishing forever the office of stadtholder. But in reality, however, the power of De Witt was diminished, and he was soon compelled to concede a larger measure of influence to the house of Orange. His prospects became still more clouded when the designs of Louis XIV upon the Spanish Netherlands became manifest. The Orange party carried their point in the elevation of William to the family dignity of stadtholder. On the invasion of the Netherlands by Louis XIV, in 1672, the Prince of Orange was appointed commander of the Dutch forces; and when the first campaign proved unfortunate, the popular clamor against De Witt greatly increased. He had previously resigned his office of Grand Pensionary, and now his brother Cornelius, accused of conspiring against the life of the stadtholder, was imprisoned, tortured, and condemned to perpetual banishment. De Witt went to see him on his release from prison, and as they were coming out they were attacked by an infuriated mob and were both murdered, Aug. 20, 1672. The States-General demanded an investigation and the punishment of the murderers, but the stadtholder did not take the necessary steps. De Witt was personally a man of the most upright character. Consult: Portalis, *Jan De Witt* (Eng. trans., 2 vols., London, 1885); Geddes, *The Administration of John De Witt* (ib., 1879); Motley, *History of the United Netherlands* (4 vols., New York, 1860–68); Beck, *History of the Netherlands* (ib., 1898–1907).

DE WITT, JOHN (1821–1906). An Ameri-

can Reformed Dutch scholar. He was born at Albany, N. Y., Nov. 29, 1821; graduated at Rutgers College in 1838 and at New Brunswick Theological Seminary in 1842; was professor of Oriental literature (1863–84) and of New Testament exegesis (1884–91) in the latter institution. He was a member of the Old Testament Company of the American Revision Committee (1872–85) and author of *The Praise Songs of Israel; A New Rendering of the Book of Psalms* (1885).

DE WITT, John (1842–1923). An American Presbyterian scholar. He was born at Harrisburg, Pa., Oct. 10, 1842; graduated at Princeton College in 1861 and at Union Theological Seminary, New York City, in 1865. He became professor of Church history in Lane Theological Seminary, Cincinnati, Ohio, in 1882, and of the same in Princeton Theological Seminary in 1892. He wrote a *History of Princeton University* (1896).

DE WOLFE, Elsie (1865–). An American decorator and actress, born in New York City. She made her theatrical début in Sardou's *Thermidor* in 1891, playing the rôle of Fabienne with Forbes-Robertson. In 1894 she joined the Empire Company under Charles Frohman. In 1901 she brought out *The Way of the World* under her own management at the Victoria Theatre, and later she toured the United States with this play. She also appeared in the title rôle of Hubert Davies's play, *Cynthia* (1903), as Estelle Kitteridge in *The Other Girl* (1903), and as Mrs. Lovette in *A Wife without a Smile* (1904). She retired from the stage in 1905 and took up as a specialty artistic interior decorating. In 1913 she published *The House in Good Taste.*

DEWSBURY, dūz'bĕr-ĭ. A parliamentary and municipal borough and manufacturing town in the West Riding of Yorkshire, England, on the Calder, 8 miles south-southwest of Leeds (Map: England, E 3). Dewsbury is noted for its manufactures of worsted, carpets, blankets, and various kinds of heavy woolen goods. There are collieries and iron works in the immediate neighborhood. It is on three railway lines and connected by the Calder and its branches with Hull and Liverpool. Among its notable buildings are the town hall, chamber of commerce, infirmary, and grammar school. The town received its charter of incorporation in 1862 and sends one member to Parliament. It owns its water and gas works, operates its electric-light plant, and maintains public baths, cemeteries, markets, technical schools, and free libraries. A modern sewerage system has been installed in connection with a sewage farm. Pop., 1901, 51,246; 1911, 53,358. At Dewsbury, in 627, Paulinus first preached Christianity to the Northumbrians.

DEW'WORM'. A British name for the earthworm. See Earthworm.

DEXIP'PUS (Lat., from Gk. Δέξιππος). A Greek philosopher, a follower of the Neoplatonist Iamblichus, belonging to the middle of the fourth century A.D. He wrote commentaries on Plato and Aristotle, of which one, in explanation and defense of the Aristotelian categories, has appeared in both Latin and Greek texts. The former, under the title *Quæstionum in Categorias Libri Tres,* was edited by Félicien (Paris, 1549); the latter by Spengel (Munich, 1859).

DEXIPPUS, Publius Herennius (c.210–273 A.D.). A Greek rhetorician, historian, and soldier. He was born at Athens and, after holding the highest offices in his native city, commanded the army against the Heruli (q.v.) when they invaded Greece and captured Athens in 269 A.D. Photius describes three of his historical works: Τὰ μετὰ Ἀλέξανδρον, a history of Macedonia from the time of Alexander the Great, an epitome, apparently, of a work of the same title by Arrianus (q.v.); Σύντομον Ἱστορικόν (or Χρονικὴ Ἱστορία), a chronological history from the earliest times down to the accession of the Emperor Claudius II, 268 A.D.; and Σκυθικά, an account of the war against the Scythians or the Goths, in which Dexippus himself had fought. The last-named work is frequently referred to by the writers of the *Augustan History* (q.v.). For the fragments, consult Bekker and Niebuhr, *Scriptores Historiæ Byzantinæ* (Bonn, 1829), and Müller, *Fragmenta Historicorum Græcorum,* vol. iii (Paris, 1883). A public statue was erected in his honor, the base of which with its inscription has been preserved. Consult *Corpus Inscriptionum Atticarum,* 3. 716.

DEX'TER. A town in Penobscot Co., Me., 40 miles west-northwest of Bangor, on the Maine Central Railroad and on the Sebasticook River (Map: Maine, C 3). It contains a public library. There are woolen mills, machine shops and foundries, and vegetable canneries. The water works are owned by the town. Pop., 1900, 2941; 1910, 3530.

DEXTER, Edwin Grant (1868–). An American educator, born at Calais, Me. He graduated in 1891 from Brown University, where he taught for a year and then (between 1892 and 1899) was science master of Colorado Springs High School, director of the Colorado Springs Summer School of Science, Philosophy, and Languages, and professor of psychology in the State Normal School at Greeley, Colo. In 1899 he gained a Ph.D. at Columbia University and the higher diploma of Teachers College. From then until 1907 he served at the University of Illinois in various capacities—as professor of pedagogy and psychology, director of the summer term, director of the School of Education, and dean. He became commissioner of education in Porto Rico and chancellor of the University of Porto Rico in 1907. He was president of the National Society for the Scientific Study of Education in 1905–06 and president of the child-study section of the National Education Association in 1905–07. Besides serving as associate editor of the *Internationales Archivar für Schulhygiene* and of the *Jahrschrift für Körpeliche Erziehung* and contributing some 50 articles to scientific and educational journals, he is author of *A History of Education in the United States* (1904) and *Weather Influences* (1904).

DEXTER, Henry Martyn (1821–90). An American clergyman and historian. He was born in Plympton, Mass., son of a Congregational minister, graduated at Yale in 1840 and at the Andover Theological Seminary in 1844; and was pastor of a Congregational church at Manchester, N. H., from 1844 to 1849, and of the Berkeley Street Congregational Church in Boston from 1849 until 1867. He edited the *Congregationalist* from 1851 till his death, becoming in 1867 editor in chief of the *Recorder,* in which the *Congregationalist* had been merged; and he edited the *Congregational Quarterly* from 1859 to 1866. He held a pastorate at Dorchester, Mass., from 1869 to 1871, and from

1877 to 1880 delivered annual courses of lectures on Congregationalism at Andover Theological Seminary. He wrote on the history of the Congregational church and the ecclesiastical history of New England and left his library to Yale University. Among his publications are: *The Voice of the Bible the Verdict of Reason* (1858); *Congregationalism: What it is, Whence it is, How it Works, Why it is Better than Any Other Form of Church Government, and its Consequent Demands* (1865); *The Church Polity of the Pilgrims the Polity of the New Testament* (1870); *Roger Williams and his Banishment from the Massachusetts Colony* (1876); *The Congregationalism of the Last Three Hundred Years with a Bibliographical Appendix*, of 7250 titles (1881) —his most valuable work and the most important book on the subject; *A Handbook of Congregationalism* (1880); *The True Story of John Smythe, the Se-Baptist* (1881); *Common Sense as to Woman Suffrage* (1885); *Early English Exiles in Amsterdam* (1890); and with his son, Henry Morton Dexter, *The England and Holland of the Pilgrims* (1905), posthumous. He also edited *Church's Eastern Expeditions* and *Entertaining Passages Relating to King Philip's War*, and Mourt's *Relation;* and left in manuscript *A Bibliography of the Church Struggle in England during the Sixteenth Century* and the *Pre-History of Plymouth Colony, with the English and Dutch Life of the Plymouth Men.*

DEXTER, Henry Morton (1846–1910). An American clergyman, historian, and editor, born at Manchester, N. H., son of Henry Martyn Dexter. He graduated from Yale University in 1867 and from Andover Theological Seminary in 1870, spent three years in travel, was ordained to the Congregational ministry, and served as pastor of the Union Church at Taunton, Mass. (1873–78). From 1878 to 1891 he was editor of the *Congregationalist.* During several visits to England and Holland he made investigations particularly of the history of the Pilgrims and early American colonists, and he prominently promoted the erection of a memorial tablet to John Robinson at Leyden, Holland, in 1891. Besides magazine articles on historical subjects, he is author of *The Story of the Pilgrims* (1899) and *England and Holland of the Pilgrims* (1905).

DEXTER, Samuel (1761–1816). An American jurist. He was born in Boston, graduated at Harvard in 1781, and was admitted to the bar in 1784. He was a member of the State Legislature and served in Congress both as Representative and Senator. He was appointed Secretary of War in June, 1800, and from December of this year until the inauguration of Jefferson was Secretary of the Treasury. He published a *Letter on Freemasonry; Progress of Science*, a poem (1780); *Speeches and Political Papers.*

DEXTER, Timothy (1743–1806). An American merchant, born at Malden, Mass. He rose to great affluence, but is memorable chiefly for his eccentricities. Assuming the title of Lord Timothy Dexter, he built extraordinary bizarre houses at Newburyport, Mass., and Chester, N. H. The garden of the former he adorned with about 40 colossal wooden statues of famous men, including himself. He also maintained a poet laureate and formed a collection of paintings composed entirely of daubs. He was the author of *A Pickle for the Knowing Ones* (1838; reprinted, 1881). Having been troubled by his printers in regard to punctuation, he retaliated by writing a pamphlet without a comma or any other point, but displaying at the end half a page of points in a mass, with the invitation to his readers to "pepper the dish to suit themselves." He also rehearsed his own funeral procession in the most elaborate manner and caned his wife for not weeping at the sight of the cortège.

DEXTRIN, dĕks'trĭn (from Lat. *dexter*, right, referring to its power of turning to the right the plane of polarized light). A name applied to several organic substances produced by the action of malt extract, saliva, or pancreatic juice upon starch paste, the first product of the transformation being soluble starch, and dextrin being produced by the hydrolysis of the latter. A continuation of the hydrolytic action results in the formation of sugars. The principal dextrins are erythrodextrin, achrodextrin, and maltodextrin, all of which have the same relative composition as starch ($C_6H_{10}O_5$); their molecular weights, however, are unknown, and the first two are very probably mixtures. Achrodextrin may be prepared by the prolonged action of saliva or pancreatic juice on starch paste; when the solution ceases to be colored by the addition of iodine, i.e., when all the starch has been transformed, the solution is concentrated by evaporation and precipitated with alcohol. The substance thus obtained is completely freed from maltose by warming with mercuric cyanide and caustic soda and may be further purified by dissolving in water and reprecipitating with alcohol. Maltodextrin appears to be a pure chemical compound, and its molecule is known to contain an aldehyde group. See Aldehydes.

Dextrin (British gum or starch gum) is often used as a substitute for gum arabic in the processes of calico printing and for stiffening different goods; it is also applied to the back of postage stamps. Its value as a substitute for gum consists in its being more flexible and less brittle, when dry, than that substance. For commercial purposes it is prepared on a large scale either by moistening potato starch with weak nitric acid, then drying and heating to 110° C., or by simply heating the starch to about 250° C. When thus prepared, dextrin contains considerable amounts of dextrose and unaltered starch. An excellent substitute for dextrin as a textile finish is now made by heating equal weights of starch and glacial acetic acid at 90° C. (194° F.) for two or three hours. The product, which is commercially known as *feculose*, is chemically a polyacetate, or rather a mixture of acetates, of dextrin.

DEX'TROSE. See Glucose.

DEY, dā (Turk. *dāi*, maternal uncle). A title applied colloquially to any elder, especially in former times among the Janizaries; hence, when the commander of that corps was associated with the Turkish pasha in the government of Algeria, the name was retained for him and then, by extension, came to be applied to any pasha or regent. Early in the eighteenth century the Dey of Algiers emancipated himself from the authority of the Sultan. Tunis and Tripoli were also sometimes ruled by deys in place of the bey (q.v.).

DHABB, dăb, or **DHOB,** dŏb. See Dabb.

DHAKA. See Dacca.

DHAK TREE, dąk *or* däk. See Butea.

DHAL, däl. See Pigeon Pea.

DHAMAR. See Damar.

DHAMMAPADA, d'hŭm'mà-pŭd'à (Pāli, footprint of right). The name of a division of the sacred writings of the Buddhists. It has been translated by Max Müller, in vol. x of the *Sacred Books of the East;* while the Pāli text was published, with a Latin translation, by V. Fausböll (Copenhagen, 1855), and an important Pāli commentary was edited by H. C. Normand (London, 1909–12). For selections, consult Anderson, *Pāli Reader* (London, 1901–07).

DHANIS, dà'nēs', François, Baron (1859–1909). A Belgian explorer, born in London. He early went to Africa to aid in extending the Belgian possessions there, in 1888 founding several stations on the Middle Congo and in 1890 exploring the Stanley Falls region to the river Kwango. Attacked by Arab slave raiders, he marched against several fortified Arab towns and succeeded, after two years of hostilities (1892–93), in establishing the supremacy of the Congo Free State. He returned to Belgium and was raised to the rank of Baron; but in the next year (1895) he was sent back to the Congo as Vice Governor. During an attempted expedition to the Nile in 1896–97 the black troops mutinied, Dhanis's brother was killed, and Dhanis himself barely escaped. The last 10 years of his life were spent in retirement in Belgium.

DHAR, där. The capital of a native state of the same name in Central India, situated 33 miles west of Mhow and 1908 feet above the sea (Map: India, C 4). It is surrounded by brick walls and contains two large mosques. Ruins of an ancient fortification, a mosque, houses of worship, and tombs testify to the former greatness of the city, which is said to have had a population of 100,000. It is the centre of grain trade for the district. Pop., 1901, 17,792; 1911 (est.), 15,000.

DHARMAŚĀSTRA, d'här'mà-shäs'trà. The name given to the metrical law books of Manu, Yajnavalkya, and others. The law book of Manu is relatively recent, but its date cannot be definitely fixed. It is translated by Burnell (London, 1884). Yajnavalkya's work dates from the third century A.D. A collection of these texts is given in the *Dharmaśastrasangraha,* ed. by Pandit Jibananda Vidyasagara (Calcutta, 1876). Consult Jolly, "Recht und Sitte," in Bühler's *Encyclopœdia of Indo-Aryan Research* (Strassburg, 1896), with bibliography.

DHARMASUTRA, d'här'mà-sōō-trà. A division of the Sūtra, or ritual literature connected with the Vedas. They are works which fix the rules of life in relation to others, and are the source of the Dharmaśāstra.

DHÂRWÂR, där'wär. The capital of a district of the same name in the Presidency of Bombay, India, close to the frontier of Madras (Map: India, B 5). It has a strong fort, and government and native schools, and is an important railway centre. It has railway connection with Marmagoa in the Portuguese Colony of Goa, through which port it carries on an extensive export trade in cotton. It has a large jail, and prisoners manufacture carpets, table linen, cloths, and cane goods. It is the headquarters of the Southern Mahratta Railway. Pop., 1901, 31,279; 1911, 30.289.

DHAUN, Count von. See Daun.

DHAWALAGIRI, dä'hwà-lä-gē'rê, or **DHWALAGIRI,** or **DHAULAGIRI** (Hind., white mountain). One of the highest peaks of the Himalayas (about 27,000 feet), situated in Nepal, near the parallel of 29° N. (Map: India, D 3).

DHEGIHA (d'hā'gē-hä) **INDIANS.** A group of Siouan tribes, which included the Osage, Omaha, Quapaw, Kansa, and Ponca Indians. See Siouan Stock.

DHOLE, dōl. A wild dog of India. See Dog.

DHOURRA, dōōr'rà. See Sorghum, paragraph *Nonsaccharine.*

DHOW, dou. A vessel common to the Arabian Sea and the east coast of Africa. It is usually from 150 to 250 tons' burden by measurement and is built like a grab (q.v.) with 10 or 12 ports. The rig is usually lateen with a single mast and sail, and the latter is set on an enormous yard which is as long as the vessel. The halliards of the yard consist of a pendant and threefold purchase. The lower block of the tackle is secured to the weather rail, and the end of the fall is also made fast there; the tackle thus becomes the backstay for supporting the mast, the only other rigging on it being three shrouds each side. Vessels of this type were regularly employed in the slave trade on the east coast of Africa.

DHULIP, d'hōō-lēp', or **DHULEEP SINGH** (1838–93). An Indian maharajah, son of the famous Ranjit Singh, ruler of the Sikhs. Upon the death of his brother Charak Singh, Dhulip, although still in his minority, succeeded to the throne, but, after a prolonged but ineffectual warfare against the English, was compelled by the Peace of Lahore (1846) to turn over the administration to the British. A rising of the Sikhs in 1849 resulted in his renouncing the throne in consideration of an annuity of £40,000. He was educated in England and became a Christian. He married a German in 1864 and after her death an Englishwoman. An attempt to reestablish his authority in 1886 (when he abjured Christianity) proved unsuccessful and resulted in the loss of his pension. After a desultory career in Russia and France, he was pardoned by the Queen, and his pension was renewed. He died in Paris from an attack of apoplexy.

DHUNCHEE, dŭn'chē (E. Ind.), *Sesbania aculeata.* A plant of the family Leguminosæ. The dhunchee is an annual herbaceous plant, much cultivated in India on account of its fibre; it has an erect, sparingly branched stem, 6 to 10 feet high. It is a plant of rapid growth and succeeds best in low and wet soils. Its fibre is coarser than hemp, except when it is cut at a very early period of its growth; is durable in water, but contracts considerably when wetted. It is steeped and prepared very much like sunn (q.v.). It is native to the Malabar coast and is also grown in China. It is sown at the rate of 30 pounds of seed per acre. The yield varies within wide limits, about 500 pounds of fibre per acre being a fair average.

DHYAL BIRD, dī'ăl-bērd', or **DAYAL** (native of E. Ind.). An Oriental bird of the genus *Copsychus,* of which six or seven species are familiar visitors to gardens and villages throughout southeastern Asia. They belong to the thrush family, subfamily Ruticillinæ. The best known is *Copsychus saularis,* common from Ceylon to China, and reminding British residents of their robin redbreast by its confiding and cheerful ways. It builds a rude nest in a hole in a tree and during the breeding time is comically pugnacious. It has a pleasing song, and all the species are kept as cage birds and are

susceptible of learning tricks. The dress of the male is black and white; that of the female brownish.

MALACCA DHYAL BIRD
(*Copsychus musicus*).

DHYĀNI BUDDHA, d'hĭ-ä'nē bo͝od'dȧ (Skt., meditation Buddha, from *dhyāni*, devoted to meditation, from *dhyāna*, Pali *jhāṇa*, meditation, from *dhyā*, to meditate + *buddha*, enlightened, p.p. of *budh*, to awake). One of five Buddhas, named Vairocana, Akshobhya, Ratnasambhava, Amitabha or Amitayu, and Amōghasiddhi, with their female counterparts, called Taras or Saktis. In some Buddhist texts their number is raised to 6, 10, or even more. They are distinguished from the Adi Buddha (q.v.), or primeval Buddha, and all other incarnate Buddhas (Manushi Buddhas), as well as from the potential future Buddhas or Bodhisattvas, by being eternal, noncorporate, and produced from meditation alone. Thus they correspond to the archetypal ideas of the Platonic philosophy, the human Buddhas and the Bodhisattvas being conceived as incarnations or emanations of the ideal Buddhas, and may in a certain sense be considered as the gods of the essentially atheistic Buddhism. In art the Dhyani Buddhas are of the customary Buddha type, but are distinguished by varieties of ornamentation of their lotus seats and also by the positions of their hands and sometimes by different colors of paint. Their sanctuaries, which have the shape of a pile of rice, are termed *caityas*, instead of *viharas* and *stupas*. See BUDDHISM.

DI'ABASE (from Gk. *δι-*, *di-*, double + *βάσις*, *basis*, base, a going, from *βαίνειν*, *bainein*, to go; influenced in form by Gk. *διάβασις*, *diabasis*, passage, from *διά*, *dia*, through + *βάσις*, *basis*, a going, base). A crystalline igneous rock, of which the essential constituent minerals are lime-soda feldspar and pyroxene (augite). The texture of diabase, while generally crystalline throughout, differs from that of granite in that the augite incloses the feldspar, owing to the later period of augite crystallization. The feldspar of diabase is usually in bladed crystals, which take all directions in the augite and give the rock a peculiar interlocking radial texture, which is especially noticeable in specimens of coarse grain. If the grains of augite be large in comparison with the size of the feldspar blades, the effect produced is a noteworthy mottling which is described as "lustre mottling." The average chemical composition of diabase varies but little from that of gabbro (q.v.), the difference of the two rocks being chiefly of structural nature. The closest affinities exist chemically, mineralogically, and texturally between diabases and basalts (q.v.), and, indeed, most American petrographers recognize no important difference between them; the rocks of greater geologic age, which consequently show greater decomposition, being, however, more generally described under the term "diabase" and the more recent occurrences as "basalt." Olivine, if present in a diabase, makes the rock an olivine diabase. Diabase is quite subject to alteration, the augite being replaced by hornblende and the olivine (if present) by serpentine. Both of the newly developed minerals being green, the rock assumes by this alteration a greener color. Important occurrences of diabase are those of the copper-bearing Keweenawan series of Lake Superior; the Palisades of the lower Hudson River, and the Hanging Hills of Meriden, Conn., of Jura-Triassic age; and those of the Deccan plateau of southern India. See GREENSTONE; BASALT; TRAP.

DIABELLI, dyȧ-bĕl'lē, ANTONIO (1781–1858). An Austrian composer and music publisher, born at Mattsee, near Salzburg. He studied with Michael Haydn and in 1803 settled in Vienna as a teacher of piano. In 1824 he established the publishing house of Diabelli & Co., which became one of the chief publishers of the works of Schubert. As a composer, he was exceedingly productive and cultivated all the forms. But his works are now forgotten, with the exception of his sonatinas written for pedagogical purposes. These are still highly valued and likely to retain a permanent place among the best instructive works for pianoforte.

DIABETES, dī'ȧ-bē'tēz (Neo-Lat., from Gk. *διαβήτης*, *diabētēs;* first used by Aretæus c.150 A.D.), siphon, from *διαβαίνειν*, *diabainein*, to stride, go through, from *διά*, *dia*, through + *βαίνειν*, *bainein*, to go). A disease of which the principal symptom is an abundant flow of saccharine urine. Diabetes is of two kinds: 1. *Diabetes insipidus* is a mere symptom of a functional condition now generally termed *polyuria*, or an increased flow of normal (nonsaccharine) urine, excessive thirst accompanying it; it is infrequent and not dangerous. 2. *Diabetes mellitus* (Lat. *mel*, honey) is a grave disease in which the liver does not perform its proper work in transforming starches and sugars during assimilation, and large quantities of liver sugar (resembling grape sugar) appear in the urine. Inosite (q.v.), or "muscle sugar," also appears in some cases in the urine. The cause of the disease is obscure, the pathology is uncertain, and the treatment is unsatisfactory. It is more common in males than females, and in Jews and Hindus than in other races. Although no age is exempt, the disease is most likely to develop in late middle life (40 to 60). The sedentary and well-fed classes are peculiarly liable to attack, although severe cases occur among the very poor. There is often a history of prolonged worry, or of fright or injury to the nervous system. Patients suffering from diabetes, besides urinating very frequently and in

large quantities, experience distressing thirst, with dryness of mouth and lips; loss of appetite, muscular weakness, emaciation, occasional ulcers, altered sight, and mental changes, generally consisting of confusion of ideas, indecision, and melancholia. In treating diabetic patients a diet is prescribed of gluten bread, skim milk, cheese, eggs, meats, fresh fish, green vegetables, tomatoes, and sour pickles. Sugars, starches, and indigestibles should be absolutely avoided. Bread made of gluten flour is very unpalatable, and, practically, the strict diet is rarely observed by the patient. Van Noorden showed, in 1903, that oatmeal may be substituted for bread without increase of glycosuria; Mossé reports similar results with potatoes, in a smaller proportion of diabetics and in the less severe cases. Several drugs are used, with varying success, including bromides and salicylates, opium, arsenic, and digestants. Milk soured with the Bulgarian bacillus has enjoyed some little repute in late years. It probably benefits by decreasing intestinal fermentation. Recovery is very rare. Death occurs either from diabetic coma or from lung complications or gangrene, to which such individuals are very susceptible. Temporary *glycosuria*, or sugar in the urine, occurs in some people after the use of chloral or the administration of an anæsthetic. Some always have a little sugar in the urine without having any other symptom of diabetes, especially gouty or very fat people. Diabetes is not, as is popularly supposed, a disease of the kidneys. No pathological changes are characteristic. Lesions of the medulla have been described, but the theory of a distinct "diabetic centre" in the medulla seems as yet to lack sufficient confirmation. Probably the most constant lesions are those found in the pancreas as noted by Lancereaux. The most common change is a simple atrophy of the pancreatic tissue, with or without an increase in the interstitial connective tissue. Complete extirpation of the pancreas was shown to cause permanent diabetes in animals by Minkowski and V. Mering, in 1889. Opie, in 1900, discovered a connection between diabetes and disease of certain groups of pancreatic cells, called the "islands of Langerhans." It is now believed that these cells secrete a starch ferment which finds its way into the general circulation through the rich capillary network that surrounds them. Children of diabetic parents exhibit glycosuria during psychic strain or under amylaceous diet and need most careful rearing. Consult Fuchter, in Osler's *Modern Medicine*, vol. i (New York, 1907), and authorities there mentioned, and Allen, *Studies Concerning Glycosuria and Diabetes* (Boston, 1913). See DIET.

DIABLE BOITEUX, dē'ä'bl' bwä'tē', LE (Fr., The Lame Devil). A famous satirical romance in dialogue form, by Le Sage (1707). It deals with the wonders wrought by a spirit, Asmodeus, whom Don Cleofas has accidentally released from imprisonment in a glass jar, and is chiefly derived from *El diablo cojuelo*, a Spanish work by De Guevara (1641). The satire furnished the basis for Foote's comedy *The Devil upon Two Sticks*.

DIABLERETS, dē'ä'bl'-rā' (Fr., little devils). A group of peaks in the western Bernese Alps, Switzerland, situated about 15 miles southeast of Lake Geneva, in the bend of the Rhone, in lat. 46° 20′ N. (Map: Switzerland, B 2). They range from 900 to over 10,500 feet high and are covered with glaciers on the north and east slopes. Owing to their strata of limestone, sandstone, and gypsum, the Diablerets are gradually being undermined, and their mountain masses fall from time to time with destructive effect.

DIACHYLON, dī-ăk'ī-lŏn (Gk. *διάχυλος, diachylos*, very juicy, from *διά, dia*, through + *χυλός, chylos*, juice. A deceptive etymology). The common healing or lead plaster, made by combining litharge with olive oil. *Diachylon ointment* contains 500 parts of diachylon plaster, 490 parts of olive oil, and 10 parts of oil of lavender flowers.

DIACRITICAL MARK or **SIGN**, or **DIACRITIC** (Gk. *διακριτικός, diakritikos*, distinctive, from *διακρίνειν, diakrinein*, to distinguish, from *διά, dia*, through + *κρίνειν, krinein*, to judge). A mark or sign used to distinguish different sounds or values of the same letter or character, such as those used in indicating the pronunciation or accent in this ENCYCLOPÆDIA. Such marks or signs may arise, (a) as a degradation or gradual corruption of some combination of previously used characters, as in the case of the German umlauted vowels, *ä, ö, ü*; or (b) they may be deliberately invented or chosen for some special purpose, as in most of the systems used for phonetic respelling in works of reference or in philological works.

Some of those in the first class were developed by writing one letter above, as a means of saving time or space, especially at the end of a line, when books were made by copying by hand. Thus, the German *ä, ö, ü* were originally a^e, o^e, u^e, and the superior letters were, for convenience sake, reduced to two dots. So the Swedish *å* or *Å* was originally *ao* or *Ao*, written with the *o* over the *a* or *A*, this *o* being finally changed into a simple circle. The cedilla (literally, little zed or *z*), on the other hand, is a degradation of a variant form (ȝ or ʒ) of the letter *z*, which was formerly written after the letter *c* to show that it was to be pronounced like *s*, when without the cedilla it would have had the sound of *k*. It is now chiefly used in French and Portuguese words. Likewise in Greek, the *iota subscript* was originally the second vowel of a diphthong and was written on the line and sounded, as in other diphthongs. But afterward (about 100 B.C.) it ceased to be pronounced, being swallowed up by the long *ᾱ, η, ω*, before it. The custom of writing it under the line originated about the eleventh century. The dot over the *i* was originally a stroke similar to our modern acute accent (′), which served for the purpose of distinguishing it from the shaft of an *n* or an *m*. It is still used in that form over the Roman numerals in the prescriptions of physicians. So in the angular German running hand the sign ~ is placed over the vowel *u* to prevent confusion with *n*. The number of these diacritical marks resulting from degraded forms now or formerly employed in the various civilized languages is very large; but most of those now in use have either lost their primitive meaning or are of forgotten origin. To the class of arbitrarily invented or chosen diacritical marks belong most of those now in use in the alphabets of the civilized nations or races, such as those used in phonetic respelling and those used in the ordinary alphabets of many European nations whose alphabets have become fixed during comparatively recent times, as in the various Slavic alphabets, the Hungarian alpha-

bet, etc. The points used in the Hebrew and Arabic alphabets, as well as those used in Avestan, are arbitrary inventions used to indicate the vowels or modifications of the consonantal sounds of the original characters.

The diacritical marks which occur in the printing of common English words are the diæresis [¨], the hyphen [-], the cedilla [ç], the acute accent [′], the grave accent [`], and the tilde [˜]. By some authors the letter *h* when written after *c* or *s* or *t* is treated as a simple diacritic, although it is not properly a diacritical mark. The diæresis is a survival of the Greek use of two dots over *ι* or *υ* to show that they did not form a diphthong with the preceding vowel. It is used in the same way in English. The tilde is used in English only over foreign-derived words, as in the word *cañon*. It is a degradation or corruption of the letter *n*, which was formerly indicated in many words by making the sign ~, or even a straight mark [–] over the preceding letter, as *año* = *anno*. When final *-ed* is to be pronounced contrary to the usual rule, the fact is customarily indicated by using the grave or acute accent, thus, *reachèd;* and in the same way the fact that a final *-e* is to be pronounced is often indicated, thus *Brontè*. The hyphen sometimes serves the purpose of the diæresis, as in *re-entry*. Some of the characters used in phonetic respelling have by long usage become more or less fixed in significance; thus, the signs – and ˘ placed over vowels are practically always used to denote long and short sounds respectively; and the sign ^, called by many the circumflex accent, also usually denotes a long sound, as it did in Greek. In many modern English scientific works the acute accent [′] is used to denote a short accented vowel, and the grave accent [`] is used to denote a long accented vowel. So the scheme of diacritical marks used in this ENCYCLOPÆDIA is in very general use to indicate the sounds here denoted by them, being essentially the same as those employed in Webster's International Dictionary, and in various other preceding or abridged editions of the same work, and in the majority of the school books of the country. The system of the Century Dictionary is in many respects quite different; and that of the great English dictionary edited by Dr. Murray (*A New English Dictionary on Historical Principles*) is still different and extremely complex. The system used by the Standard Dictionary contains fewer diacritical marks, the differentiation being obtained by the use of the alphabet arbitrarily devised and selected for use by the American Philological Association. At present there is a growing tendency to adopt the alphabet of the International Phonetic Association, which is in almost universal use among phoneticians. For a list of these characters, see the articles PHONETICS; PRONUNCIATION, etc., and for the various diacritical marks employed in any language, consult a grammar of that language.

DI'ADEM (Lat. *diadema*, Gk. *διάδημα, diadēma*, fillet, from *διαδεῖν, diadein*, to bind round, from *διά, dia*, through + *δεῖν dein*, to bind). The name given to the fillet of silk, woolen, or linen which served as the distinguishing ornament of kings. It was generally narrow, being only a little broader on the forehead. The diadem of Bacchus, as it appears in ancient sculpture, was a plaited band going round the forehead and temples and tied behind, with the ends hanging down. Among the Persians the diadem was bound round the tiara or turban and was of a blue color worked with white. The early Roman emperors refrained from using this ornament in order not to call up recollections of the hated kingly office. Diocletian was the first to introduce it again.

DIADEM SPIDER (so called from the marking). The common cross spider (*Argiope diadema*), common everywhere in European gardens. See SPIDER.

DI'ADU'MENOS (Gk. *διαδούμενος, diadoumenos*, binding round, from *διαδεῖν, diadein*, to bind round). A celebrated statue by Polyclitus (q.v.), representing a youthful athlete binding the fillet about his head.

DIÆRESIS, dī-ĕr′ê-sĭs. See DIACRITICAL MARK.

DI'AGEOT'ROPISM (Gk. *διά, dia*, through + *γῆ, gē*, earth + *τρόπος, tropos*, a turning). That form of geotropism, i.e., sensitiveness to gravity, wherein the bending organ comes to grow in a direction at right angles to the direction of gravity. Rhizomes and runners of many plants possess this property. See GEOTROPISM.

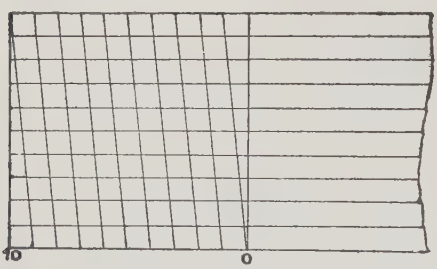
DI'AGNO'SIS (Gk. *διάγνωσις, diagnōsis*, discrimination, from *διαγιγνώσκειν, diagignōskein*, to discriminate, from *διά, dia*, through + *γιγνώσκειν, gignōskein*, to know). The determination of the nature of a disease as well as of the condition of the organ or tissues affected. This is the most important and difficult element in the practice of medicine. The methods of diagnosis are based on a study of symptoms, such as chill, fever, pallor, delirium; and physical signs, such as are appreciated by examination of the throat, chest, abdomen, eyes, urine, etc., with the aid of the thermometer, stethoscope, microscope, ophthalmoscope, electric battery, etc. To learn to make a diagnosis, the pupil must study disease at the bedside, and diseased and normal tissues, fluids, and organs, in the autopsy room and the laboratory, following the course of symptoms and signs from the invasion of disease to recovery or death.

DIAG'ONAL (Lat. *diagonalis*, from Gk. *διαγώνιος, diagōnios*, diagonal, from *διά, dia*, through + *γωνία, gōnia*, angle). In plane geometry, a straight line joining any two nonadjacent vertices of a rectilinear figure. A line between two adjacent vertices would coincide with a line of the figure, and hence a triangle has no diagonal. An ordinary four-sided figure, a quadrilateral, has two diagonals; a pentagon, five; a hexagon, nine, and so on. The general expression for the number of diagonals in such figures of n sides is $\frac{n(n-3)}{2}$, where n represents the number of sides. Thus, the number of diagonals in a dodecagon (q.v.), a polygon of 12 sides, is $\frac{12(12-3)}{2} = 54$. If the polygons are general, i.e., composed of lines of indefinite extent intersecting in the maximum number of points, the number of diagonals is given by the formula $\frac{n!}{8(n-4)!}$, where n is the number of sides; e.g., in a general quadrilateral, a figure formed by four lines of indefinite length intersecting in six points, there are $\frac{4!}{8} = 3$ diagonals, as is easily seen by drawing the figure.

Similarly, in a general dodecagon the number of diagonals is $\frac{12!}{8(12-4)!} = 1485$.

A diagonal of a solid bounded by limited planes is a line joining any two vertices so situated that the line does not lie in any face. The number of diagonals that can be drawn in any regular polyhedron (q.v.) is given by the formula $ns\left\{\frac{ns - v^2(s-2) - v}{2v^2}\right\}$, where n is the number of faces, s the number of sides of a face, and v the number of faces grouped about the polyhedral vertices. Thus the cube has $6 \cdot 4 \cdot \left\{\frac{6 \cdot 4 - 3^2(4-2) - 3}{2 \cdot 3^2}\right\} = 4$ diagonals.

DIAGONAL SCALE. A system of lines by means of which fractional parts of a unit, usually hundredths, may be laid down or measured with compasses (q.v.). Such scales are of particular value in plotting maps from given data. (See SURVEYING.) In the figure the line from 0 to 10 represents one inch. The diagonal line which ends at 0 cuts off on the lines above



fractions of an inch, $\frac{1}{100}$, $\frac{2}{100}$, $\frac{3}{100}$; and so on. The next diagonal line cuts off $\frac{11}{100}$, $\frac{12}{100}$, . . . of an inch; the next $\frac{21}{100}$, $\frac{22}{100}$, . . . of an inch; and so on. A pair of compasses may be set by such a scale so that its points are 1.01, 1.02, . . . 1.11, 1.12, . . . 1.21, 1.22, . . . 1.99 inches apart, and thus be used to plot chains and links on a map of a given scale.

DIAG'ORAS (Gk. Διαγόρας). A Greek poet and philosopher of the fifth century B.C., born in Melos, an island of the Cyclades. He is said to have been a disciple of Democritus (q.v.) and to have resided long in Athens, where he won considerable distinction as a lyric poet, but only the scantiest fragments of his verses survive. He is better known to the later world, however, as an atheist, and as such is alluded to (some think) by Aristophanes in the *Clouds*, 830 (423 B.C.); he is definitely assailed by Aristophanes in the *Birds*, 1073 (414 B.C.). He was banished eventually for his opinions and died in Corinth. Besides his lyrics, he is said to have written a work called Φρύγιοι Λόγοι, exposing the sacred Mysteries of Cybele and Dionysus (see BACCHUS), and a treatise entitled 'Αποπυργίζοντες Λόγοι, 'Arguments to Dethrone the Deities.' Consult Zeller, *Philosophie der Griechen*, i (1892), and Starkie's edition of the *Clouds*, pp. 331–332 (London, 1911).

DI'AGRAM (Lat. *diagramma*, Gk. διάγραμμα, figure from διαγράφειν, *diagraphein*, to describe, from διά, *dia*, through + γράφειν, *graphein*, to write). A figure so drawn that its geometric relations may illustrate the relations between other quantities. The area of a rectangle is the product of the numbers representing its length and breadth; the diagram of a rectangle is the visible symbol, corresponding to the equation $a = bl$; and, by analogy, the rectangle may be used to symbolize any quantity which is the product of two factors. Similarly, a parallelepiped may symbolize any quantity which is the product of three factors.

The purpose of mathematical diagrams in mathematical treatises is to assist the reader to follow the reasoning set forth in the text. It serves its purpose if those features which form the subject of the discussion are clearly brought out. The object in many cases, however, is simply illustration, and it is necessary only that the idea be clearly presented, accuracy of drawing being relatively unimportant—e.g., those showing electric connections require only a proper representation of the parts in their association with one another. Other diagrams, as those drawn for workmen by architects and engineers, are intended to furnish magnitudes or distances by actual measurement, and their execution cannot be too accurate.

A *profile* diagram shows such an outline as would be formed, e.g., if a hill were cut through by a vertical plane, and the material on one side of the plane were removed. Evidently a succession of such profiles might be laid on the same sheet of paper, the lines being distinctly drawn, and the whole would serve to compare several vertical profiles of the same mass. It is not necessary that vertical and horizontal measurements should conform to the same scale, provided each series of measurements is consistent in itself. Thus, *geographic* profiles, which include upon a single sheet the outlines of entire continents and ocean beds, usually have the vertical measurements on a scale several times as great as that used for horizontal distances; otherwise the diagram would be made inconveniently long, or the heights would be inconspicuously small. A *topographer's contour map* exhibits a series of curves, such as would be formed if a series of horizontal sections were made, and the outlines carefully drawn on paper. The drawing really shows the horizontal projections of the contour lines upon a surface parallel to the system. In *mechanical drawings*, particularly those designed to guide workmen in the construction of machinery, several connected views of the same object are required, each view giving some information which the others cannot furnish. Suppose that three planes are perpendicular to one another, like the bottom, one side, and one end of a rectangular box, and let an object, as a hexagonal nut, be placed within the trihedral angle thus formed. Looking from the front, we see an image of the nut projected against the back of the box; from the side, a different image is seen against the end of the box; from above, a third form appears against the bottom, while from some or all of these figures the necessary measurements may be obtained. If now the end of the box is swung outward into the plane of its back, and then both together are laid back into the plane of the bottom, we have the three coexistent drawings in one plane, and they may be transferred to, or be constructed on, one sheet of paper. In many cases the same points will find representation upon each diagram, and the fact may be indicated by the same letter; while the eye may be led from one position of the point to another by lines distinctively drawn to show that they are merely guides and not parts of the outline. See GEOMETRY, *Descriptive*.

Many devices have been invented by which diagrams illustrating natural phenomena may be automatically described. The physical experiment which produces the *parallelogram of forces* is a familiar example. As a more general illustration, suppose a spring *dynamometer* (q.v.) placed where it may receive the draft of a horse when moving a carriage. Let the movement of the spring be shown by an index whose motion is back and forth along a line in the direction of the draft. Fix a pencil to the index, and let its point rest upon a sheet of paper on a plane or a cylinder which moves at a uniform velocity in a direction perpendicular to the motion of the index. The combined movements of the pencil and paper beneath it will trace a more or less irregular line. If the force of draft is constant, the pencil will remain at a constant distance from the edge of the paper, and the trace will be parallel to the edge. If the paper does not move while the pencil varies, the line will be perpendicular to the edge. If both move, and the pencil is subject to a diminishing force, the trace will be oblique, approaching one edge; while, if the force increases, the oblique trace will diverge from the same edge. Such mechanism is often arranged for instruments which indicate meteorological, physiological, or other changes, as the force and direction of winds, or the pulsation of the arteries (see SPHYGMOGRAPH), or the movements of a clock combined with the observations of an astronomer. (See CHRONOGRAPH.) An important application of the same principle is found in the *indicator diagram*, by which the pressure of the steam in the steam engine and the work done by each stroke of the piston become matters of record. The paper moves with the movement of the piston, both in its excursion and return; the pencil moves at right angles to the direction of the motion of the paper, under the influence of the steam pressure, and the diagram drawn shows for each instant of the stroke the volume and pressure of the steam, while the total area of the diagram indicates the amount of work done. A mechanical device to illustrate the luminosity of various colors was invented by Newton and is known as *Newton's diagram*. In mechanics the stresses on the various parts of a frame or bridge are graphically exhibited by a form known as a *stress* or *funicular* diagram. The *seismometer*, *seismograph*, or *seismoscope* is an instrument to record the velocity, direction, and magnitude of seismic waves. See HODOGRAPH.

DIAKOVA, dē'ä-kō'vä. A town in the extreme southeastern corner of the Kingdom of Montenegro, on a tributary of the White Drin, 20 miles northwest of Prisrend (Map: Turkey in Europe, C 3). Pop., about 15,000 mostly Mohammedan and Roman Catholic Albanians. For over three centuries Diakova belonged to the Turks, constituting an important town in the Ottoman Vilayet of Kosovo, but was occupied by Servian troops in the course of the Balkan War of 1912–13, and subsequently, by arrangement of the Great Powers and by agreement between Servia and Montenegro, was surrendered to the latter country.

DI'AL, THE. A well-known American magazine, founded at Boston, Mass., in 1840, as the official organ of the so-called "Transcendental" school of thought. As early as 1835 the idea was conceived by members of that school of idealists of starting a paper to be called the *Transcendentalist*, and Emerson, the same year, went so far as to suggest that Carlyle should be invited to come to America to assume the editorship of it. The scheme was not in that form realized, and the paper which finally appeared, the *Dial*, was not issued till July, 1840, with Margaret Fuller (see FULLER, SARAH MARGARET) as editor. At the end of two years she was succeeded by Emerson. The paper, through lack of funds, came to an end with the April number of 1844, after a career marked by unusual brilliance in its material and extraordinary fame on the part of its contributors. In it had been published, among others, Emerson's prose essays entitled "The Transcendentalist," "The Conservative," and some of his best-known poems, as "The Sphinx," "Woodnotes," "The Problem," and "Fate." Constant contributors were Margaret Fuller, Amos Bronson Alcott, George Ripley, James Freeman Clarke, Theodore Parker, W. H. Channing, W. E. Channing, and Henry David Thoreau, who wrote for nearly every number. A reissue of the *Dial* has been published by the Rowfant Club. Consult Cooke, *Historical and Biographical Introduction* to the Rowfant reissue (London, 1902).

DIAL AND DIALING. The sundial is an instrument for measuring time by means of the motion of the sun's shadow. It is an instrument of very great antiquity, the earliest mention of it being in Isa. xxxviii. 8; and before clocks and watches became common it was in general use as a timekeeper. The art of constructing dials to suit any place and situation was then an important branch of mathematical study; now the subject is more an object of curiosity than utility.

A dial consists of two parts—the *stile*, or gnomon, usually the edge of a plate of metal, made parallel to the earth's axis, and pointing towards the pole; and the *dial plane*, which may be of any hard substance, and on which are marked the directions of the shadow for the several hours of the day, their halves, quarters, etc. Dials receive various names, according, mostly, to the positions which they are constructed to occupy. When the dial plane is on the plane of the horizon, the dial is called a horizontal dial; when perpendicular to that plane, a vertical dial. An equinoctial dial is one whose plane is parallel to the equator. Besides these names, there are others, such as the south dial, north dial, east dial, west dial, polar dial, declining dial, of which it is useless to write at length. These names all depend on the position of the dial plane. The cylindrical dial is a dial drawn on the curved surface of a cylinder. The ring dial is an ingenious small portable dial, but rather a curious toy than a scientific instrument.

A *night* or *nocturnal dial* is an instrument for showing the hour of the night by the shadow of the moon or planets. Moon dials may be constructed relative to the moon's motion; or the hour may be found by the moon's shadow on a sundial by computation.

Dialing. The *stile* of a dial being parallel to the earth's axis, those familiar with spherical trigonometry will readily see that the problem of constructing a dial resolves itself into that of ascertaining where the hour lines cut a given circle, with a view to the graduation of the dial plane. But even without a knowledge of trigonometry the principle may be readily understood from the following illustrations. Suppose a hollow and transparent sphere, as of glass, to represent the earth; and suppose its equator divided

into 24 equal parts by the meridians, one of them passing through a given place—say, London. (See HORIZON.) If the hour of 12 be marked at the equator, both on the latter meridian and that opposite it, and all the rest of the hours in order on the other meridians, those meridians will be the hour circles of London, because, as the sun appears to move round the earth in 24 hours, he will pass from one meridian to another in one hour. Then, if the sphere has an opaque axis, terminating in the poles, the shadow of this axis would fall, in the course of the day, on every meridian and hour, as the sun came to the plane of the opposite meridian, and would thus show the time at London and at all other places on the same meridian as London. If the sphere were cut through the middle by a plane in the horizon of London, and if straight lines were drawn from the centre of the plane to the points where its circumference is cut by the hour circles of the sphere, those lines would be the hour lines of a horizontal dial for London; for the shadow of the axis would fall upon each particular hour line of the dial when it fell upon the like hour circle of the sphere. Similarly, if we suppose the sphere cut by *any* other plane facing the meridian, the hour circles of the sphere will cut the edge of the plane in those points to which the hour lines must be drawn straight from the centre, and the axis of the sphere will pass a shadow on these lines at the respective hours. The like will hold in general of any plane, whether it face the meridian or not. The positions on the dial plane of the several hour lines can be calculated if we know the latitude of the place where the dial is to be used and the position of its plane relatively to the horizon and meridian. For a horizontal dial, the positions of the hour lines are given by the formula, $\tan h = \sin l . \tan t$, where h is the angle between the hour and meridian lines on the plate, l is the latitude of the place, and t is the hour angle (in degrees = 15 times the number of hours between noon and the hour corresponding to the line).

The universal dialing cylinder, invented by Ferguson, is a glass cylindrical tube closed at both ends with brass plates, to the centres of which a wire axis is fixed. The tube is either fixed to a horizontal board at an angle equal to the latitude of the place, or moves on a joint, so that it may be elevated till its axis is parallel to the earth's at any latitude. The 24 hour lines are drawn on the outside of the glass, equidistant from one another and parallel to the axis. The XII on the upper side of the cylinder stands for midnight; the XII next the board for noon. When the axis is adjusted for the latitude and the board leveled, with both XII noon and midnight in the plane of the meridian, and the end towards the north, the axis, when the sun shines, will serve as stile, and cast a shadow on the hour of the day among the parallel hour lines. As the plate at the upper extremity of the cylinder is perpendicular to its axis and parallel to the equator, right lines drawn from the centre to the extremities of the parallels will be the hour lines of an equinoctial dial, and the axis will be the stile. A horizontal plate, if put into the tube, with lines drawn from the centre to the several parallels cutting its edge, will be a horizontal dial for the given latitude; and similarly, a vertical plate fronting the meridian and touching the tube with its edge, with lines drawn from its centre to the parallels, will be a vertical south dial, the axis of the instrument in both cases serving for the stile, and similarly for any other plate placed in the cylinder. Consult: Littrow, *Gnomonik* (2d ed., Vienna, 1838); Sonndorfer, *Theorie und Konstruktion der Sonnenuhren* (Vienna, 1864); Dawbarn, *The Sun Dial* (London, 1891); Gatty, *The Book of Sun Dials* (new ed., ib., 1900); Loeschner, *Ueber Sonnenuhren* (2d ed., Graz, 1906). Among the numerous earlier works on the subject may be mentioned: Leybourn, *The Art of Dialling* (London, 1681); Leadbetter, *Mechanick Dialling* (3d ed., ib., 1769); Emerson, *Dialling* (ib., 1770); Ferguson, *Select Mechanical Exercises* (ib., 1773).

DI'ALECT (Lat. *dialectus*, from Gk. διάλεκτος, *dialektos*, dialect, discourse, from διαλέγεσθαι, *dialegesthai*, to converse, from διά, *dia*, through + λέγειν, *legein*, to say). The name "dialect" is given to those varieties or peculiar forms which a language assumes among the various tribes or other local divisions of a people. It is clear that the wider the separation comes to be between the several tribes, and the more they differ in mode of life and other circumstances, the more marked will become the differences of dialect. Also, when a particular tribe of this people increases in numbers and extends its territory, the same process is repeated, and its dialect is broken into a number of subdialects. The principal check upon this tendency to seemingly endless subdivision of language is furnished by an increasing degree of common culture and civilization. Where this is wanting, as in Africa and among the native populations of America, the subdivision is practically endless.

Another element is introduced into the problem by the fact that the civilization of some tribes develops more richly and ripens earlier than that of others, while some even undergo decline; this must occasion corresponding differences of dialect. Further, one dialect may become dominant over one or more of the others, through various influences, the chief of these being the power of poetry, especially if favored by external relations. Finally, if to superior manifestations of oratory and poetry in any dialect, the conservative aid of writing be added, there is created a written language; and this passes current among other tribes to the same extent that the literature of which it is the vehicle finds favor. It is not always the dialect most perfect in itself, nor yet that of the most powerful tribe or division of a people, that comes to be the written language. Accidental circumstances have in many cases decided the rivalry. The Bible happened to be translated by a High German, Luther, into his native dialect; other works on the all-engrossing subject of religion followed in the same dialect; happily, too, the art of printing had just attained the perfection necessary to give these productions general circulation. It was this concurrence of circumstances that decided that High German should in the future be the spiritual bond between the widespread German people. For there were other dialects whose claims to the distinction were at that time equal, if not higher. Likewise the Tuscan dialect owes its ascendancy over the other Italian dialects principally to the fact that Dante, being a native of that district, used it as his means of expression. In France the government became centralized

at an early date in the city of Paris, with the result that the dialect of Ile-de-France soon overshadowed all of its competitors. See ENGLISH LANGUAGE.

When a dialect has thus become the vehicle of written communication, and of the higher kinds of oral address, its character and position become changed, and it stands henceforth in a sort of antagonism to the other dialects, and even to that out of which it sprang. As written language is chiefly employed in the higher departments of human thought and activity, the intellectual and moral elements predominate in it over the sensible; and what it gains in dignity, precision, and pliancy, it loses in richness of inflection, in friendly familiarity, and naturalness. In conflict with this standard speech, the dialects must go to the wall. They live for a considerable time, it is true, even in the mouth of the educated classes, but they are gradually more and more confined to the most necessary and familiar forms of intercourse and lose their characteristics in the stream of the written language. They thus become, after a time, the exclusive possession of the illiterate, in which position they preserve many relics of old grammatical forms long after these have disappeared from the language of literature. But so long as a language lives, the literary standard and the dialects never cease to act and react on one another.

The chief points of difference between dialects and the standard tongue fall under four heads. 1. The first consists of differences in the elementary sounds, each dialect having a tendency to substitute some one or more vowels or consonants for others. Thus, the standard English *bold* is, in Ireland, *bowld;* in Scotland, *bauld; what,* where the *h* is nearly evanescent, becomes, in a Scotchman's mouth, or rather throat, *chwat,* and, in Aberdeenshire Scotch, *fat—f* in this dialect being regularly substituted for *wh,* or rather *hw.* 2. Each dialect has peculiarities of grammar. In many parts of England and in Scotland the plural of *eye* is not *eyes,* but the archaic *eyen,* or *een,* like *oxen.* The habitual use of *be,* where the standard grammar prescribes *am, is, are,* etc., is prevalent in large districts of England. Of this kind is the use of the strong conjugation for the weak, or vice versa; as *loup, lap, luppen,* for *leap, leaped, leaped.* 3. Peculiarities of vocabulary. Those individual words current in one or more districts, but unknown to the standard vocabulary, are properly *provincialisms.* They are usually genuine words of an older stage of the language, that have survived longer in some localities than in others. Some provincialisms, as *bearn* or *bairn,* for 'child,' *marrow* for 'fellow' or 'match,' to *greet* for 'to weep,' are common to Scotland and the north of England. Others are more local, as to *cleam,* for 'to fasten' or 'cement'; *heppen,* a Yorkshire term for 'pretty near'; *thrippa,* in Cheshire, 'to cudgel.' The exclusion of such words from the standard language is often accidental, and many of them might be and are with advantage resumed; as *marrow, gloaming,* etc. 4. Peculiarities of intonation. This is sometimes, though with little propriety, called accent, which means strictly the stress laid upon a particular syllable of a word. There are no doubt local peculiarities of this kind too. The tendency of standard English, especially the more recent, is to throw the accent towards the beginning of the word; in Scotland, the tendency lingers to say *envy'* for *en'vy.* But peculiarities of intonation lie in the different ways in which the *pitch* of the voice is managed—in the musical accompaniment of articulation. Differences in this respect give rise to the monotonous drawl of one district, the angry, querulous tone of another, the singsong of a third, etc.

So long as dialectic varieties of language were looked upon indiscriminately as corruptions and barbarisms, they were noticed by schools only that such corruptions might be avoided. A more rational philology, without trenching upon the rules of good writing, considers them essential parts of the speech of a people, and a knowledge of them necessary to any thorough investigation of the genius of that speech. It is obvious that *dialect* is entirely a *relative* term, and that what we call by that name in one connection we may call a language in another connection. Thus, Greek, Sanskrit, and Latin may be called sister dialects of that primitive language from which it is held that they, as well as the other members of the Indo-Germanic family, branched off. (See INDO-GERMANIC LANGUAGES.) Greek spoken of by itself, however, is a language, and Ionic, Doric, Attic, etc., are dialects of it. The same holds good with the others. In practice, however nearly related the speech of two peoples may be, we do not apply the term "dialects" unless the peoples are mutually intelligible and have a common literary standard.

For several centuries collections of dialectic words have been made, but it is only within recent years that the subject has been studied scientifically and with reference to the exact sounds of dialectic words. The last stage in the study of the English dialects is marked by the publication of J. Wright's *English Dialect Dictionary* (London, 1898 et seq.), and *English Dialect Grammar* (Oxford, 1905), which comprise the dialects of England, of the Shetland and Orkney islands, and of those parts of Scotland, Ireland, and Wales where English is habitually spoken. Skeat's *English Dialects from the Eighth Century to the Present Day* (Cambridge, 1911), Joyce's *English as we Speak it in Ireland* (London, 1910), and Sparke's *Bibliography of the Dialect Literature of Cumberland, Westmoreland, and Lancashire* (Kendal, 1907) are also worthy of note. A list of the most important glossaries and grammars of the English dialects is given in Paul, *Grundriss der germanischen Philologie* (Strassburg, 1900–09), and a shorter list may be found in Sonnenschein, *Best Literature* (London, 1895). A study of the American dialects is being conducted by the American Dialect Society, the results of which are appearing in the *Dialect Notes* (Norwood, Mass., 1890 et seq.). The investigation of the German dialects is summarized in Paul's *Grundriss,* and in Reis's *Die deutschen Mundarten* (Berlin, 1912). Of the Scandinavian languages the Swedish has been most carefully studied in this respect, several journals being devoted to the subject. For the dialects of the Romance languages, consult Gröber, *Grundriss der romanischen Philologie,* vol. i (Strassburg, 1904–06), and Gilliéron and Edmont's *Atlas linguistique de la France* (Paris, 1902–12). Consult also the *Bibliothèque de dialectologie romane* (Hamburg, 1912 et seq.), a periodical devoted to this subject. For Italian, consult Monaci's *Crestomazia italiana dei primi secoli* (3 vols., Turin, 1913). For the Greek dialects: Meister, *Die griechischen*

Dialekte (Göttingen, 1889); Hoffmann, *Die griechischen Dialekte* (Göttingen, 1891–93); Smyth, *Greek Dialects* (Oxford, 1894); Thumb, *Handbuch der griechischen Dialekte* (Heidelberg, 1909); Buck's *Introduction to the Study of Greek Dialects* (Boston, 1910). For the Italic dialects, consult Conway, *Italic Dialects* (Oxford, 1900). See AMERICANISMS; ENGLISH LANGUAGE; and articles on other languages.

DI'ALEC'TIC (Lat. *dialecticus*, Gk. διαλεκτικός, *dialektikos*, from διάλεκτος, *dialektos*, discourse, dialogue). A philosophic term that was probably first used by Plato to designate the Socratic method of taking up some conception and showing the inadequacy of popular views concerning it, by debating about their deficiencies and inconsistencies; hence the name given it. Aristotle used "dialectic" in the sense of probable reasoning. After this, "dialectic" came to imply a sort of word fence, the art of so using the forms of reasoning as to confound your opponent and "make the worse appear the better cause." Kant used the term to designate that part of his *Critique of Pure Reason* which exposes the fallacies into which one falls who tries in knowledge to transcend the limits of experience. Hegel restored the word to its original Socratic meaning, and called his system dialectical, meaning thereby that it sought to show the insufficiency of the conceptions in ordinary use, and to discover the missing elements,—the process of letting each conception develop its antithesis and then later with its antithesis into a synthesis which harmonizes the two. Dialectic is sometimes used as synonymous with logic.

DIALLAGE, dī'al-lāj (Neo-Lat., from Gk. διαλλαγή, *diallagē*, interchange, from διαλλάσσειν, *diallassein*, to interchange, from διά, *dia*, through + ἀλλάσσειν, *allassein*, to change). A thin foliated or lamellar variety of pyroxene of a green to brown color. It is seldom found crystallized, but usually massive, with a pearly lustre. Its composition is similar to that of *diopside* (calcium magnesium silicate), but it sometimes contains alumina, when it should properly be classed with *augite*. By some authorities it is believed to be an altered augite. It is widely distributed, and is found in the early rocks. Certain varieties, especially those possessing a characteristic lustre, have been cut and polished. The name "diallage" is also applied to the mineral *enstatite* and its ferriferous variety *bronzite*.

DI'ALOGUE (Lat. *dialogus*, Gk. διάλογος, *dialogos*, speech, from διά, *dia*, through, across + λόγος, *logos*, speech, from λέγειν, *legein*, to speak). A conversation between two or more persons, implying, however, greater unity of subject and formality than an ordinary conversation. The Socratic dialogue is a conversation in the form of question and answer, so contrived that the person questioned is led himself, to all appearances, to originate the ideas the questioner wishes to bring before him. The dialogues of Plato are philosophical dramas, in which the Socratic method of investigation is brought to bear upon speculative subjects. Among the ancients the dialogue was a favorite form for didactic literature. Aristotle employed it, but in less dramatic form than Plato; he himself always played far the larger rôle in the conversation. Heraclides (q.v.) introduced as the *dramatis personæ* famous men of a bygone time. Cicero commonly chose the Aristotelian dialogue form for his philosophical works; his *Lælius* (*De Amicitia*) and his *Cato Maior* (*De Senectute*) are rather Heraclidean. Lucian employs the dialogue for purposes approaching those of the drama. One of Tacitus' works was entitled *Dialogus de Oratoribus*. Of the more eminent modern writers in this form, we may mention Erasmus in Latin; Hutten, Lessing, Herder, Wieland, and Schelling among the Germans; Petrarch, Macchiavelli, Tasso, and Galileo in Italy; Fénelon, Fontanelle, and Voltaire in France; Valdés and Carducchi in Spain; and Berkeley, Hurd, and Harris in England. Landor's *Imaginary Conversations* also are a happy effort of this kind. When dialogue is combined with action, we have the drama. On the ancient dialogue, consult: Reid, edition of the *Academica* of Cicero, p. 25 (London, 1885); Hirzel, *Der Dialog* (Leipzig, 1895); Christ, *Geschichte der griechischen Litteratur*, vol. i, pp. 621 (5th ed., Munich, 1908).

DIALOGUE OF DEATH. A religious work by William Bullein, written and published during the London Plague (1664–65).

DI'AMAG'NETISM (from Gk. διά, *dia*, through + μάγνης, *magnēs*, magnet, from Μάγνης, *Magnēs*, Magnesian, from Μαγνησία, *Magnēsia*, a city of Thessaly, in Greece, where magnetic stones abounded). A name given certain magnetic phenomena observed in the case of bismuth and some other substances. If a small piece of bismuth is brought near one pole of a strong magnet, it will be seen to be repelled. This is owing to two things: (1) the magnetic field at the end of the magnet is not uniform, being strong near the magnet and feeble at a distance; (2) the surrounding medium is air. If the field of magnetic force were uniform, there would be neither repulsion nor attraction, the piece of bismuth would simply turn and take up a definite position. Further, Faraday has shown that the question of attraction or repulsion depends not on the body itself, but on its magnetic properties with reference to those of the surrounding mediums. (See MAGNETISM.) Faraday showed that the following substances and a few others were diamagnetic when placed in air: bismuth, antimony, tin, zinc, cadmium, mercury, silver, copper, gold, lead, sulphur, sugar, wood, water, alcohol.

DIAMANTE, dē'ä-män'tā, JUAN BAUTISTA (fl. last half of the seventeenth century). A Spanish dramatist. He was born in Madrid, but at what date we do not know; 1626, 1630, and 1640 all have been suggested with queries, probability pointing to c.1630. In his native city about one-half of the 50 plays written by him and still extant were published in book form (2 vols., 1670 and 1679). His earliest surviving work is the tragedy entitled *El honrador de su padre* (1658), a free rendering of Corneille's *Cid*. Among the other pieces attributed to him *La judia de Toledo* has probably enjoyed the greatest popularity, but modern scholarship deprives him of the chief credit concerning this play by showing that it is probably only a slight reworking of Mira de Mescua's *La desgraciada Raquel*, with a different name. He was a knight of St. John of Jerusalem and probably, like Calderón, Lope de Vega, and several other celebrated poets, spent the closing years of his life in the midst of his brotherhood. The date of his death is not known, but we have no mention of him as a

living author after 1684. Consult: H. A. Rennert, "Mira de Mescua et 'La Judía de Toledo,'" in *Revue Hispanique*, vol. vii (Paris, 1900); A. L. A. Fée, *Etudes sur l'ancien théâtre espagnol: Les trois Cid* (ib., 1873); and for four of Diamante's plays, vol. xlix of the *Biblioteca de autores españoles*.

DIAMANTINA, dē'ȧ-mȧn-tē'nȧ. An episcopal city in the State of Minas Geraes, Brazil, situated 146 miles northeast of Ouro Preto and 3710 feet above sea level (Map: Brazil, J 7). It has an episcopal seminary and numerous public buildings. It is the centre of a diamond-producing district, and has diamond-cutting and goldsmiths' establishments, as well as cotton and leather manufactures, and a trade in diamonds amounting almost to $1,000,000 annually. Diamantina was founded in 1730. It formerly bore the name Tejuco. Pop., 1890, 17,980; 1905, est., 14,000.

DI'AME'NIA. A genus of elapine venomous snakes of Australia. See GRAY SNAKE.

DIAM'ETER (Lat. *diametros*, from Gk. *διάμετρος*, diameter, from *διά*, *dia*, through + *μέτρον*, *metron*, measure). A diameter of a conic section (q.v.) is any chord which connects the points of contact of parallel tangents. In the circle, ellipse, and hyperbola all diameters pass through the centre (see CURVE) and are bisected by it. Only the circle has all diameters equal, and each bisects the chords perpendicular to it. In the ellipse only the diameters called the minor and major axis bisect the chords perpendicular to them. In the parabola all diameters are parallel to the axis. (For conjugate diameters, see CONJUGATE.) Certain solid bodies also have diameters. In the sphere and the ellipsoid the lines passing through the centre are called diameters and are bisected by the centre. See AXIS.

DI'AMOND (OF., Fr. *diamant*, It., Sp. *diamante*, from Lat. *adamas*, adamant, diamond, from Gk. *ἀδάμας*, *adamas*, adamant, from *ἀ*, *a* priv. + *δαμᾶν*, *daman*, Skt. *dam*, to subdue). A precious stone composed of pure carbon, remarkable for hardness, lustre, and flash of color. It crystallizes in the isometric system, usually in octahedrons, or in combinations of several forms, including the octahedron, cube, rhombic dodecahedron, trisoctahedron, and hexoctahedron; the faces and edges of the crystals frequently are curved. It has a very perfect cleavage by which the primary form of the octahedron may be derived. The diamond is not acted upon by acids or alkalies, but if heated to a high temperature in the presence of oxygen it burns to carbon dioxide. Its brilliant lustre and display of prismatic colors are due to the property of refracting and dispersing the light rays, a property possessed in the highest degree by colorless stones. The specific gravity of the diamond is 3.52; its hardness, which is assumed to be 10 on the mineral scale, exceeds that of any other known substance. By friction it becomes phosphorescent and positively electric. The diamond has a great variety of natural colorings; white, yellow, and brown specimens are the most common, but pure white and fine shades of brown and yellow are quite rare and command high prices. Red in rich, deep tints is perhaps the most prized of all colors, while blue and green are also highly valued owing to their beauty and rarity. The amorphous steel-gray to black diamond, known as "bort" or "carbonado," which is unsuitable for gems, is extensively used on the cutting edge of drills for tunneling and prospecting.

Occurrence. Previous to the discovery of the Brazilian mines in 1727, diamonds were found chiefly in India and Borneo. In India they have been obtained near Kadapa, Karnul, and Bellari in Madras Presidency; near Nagpur, in the Central Provinces; and at Panna, in Bundelkhand. The famous Golconda was a market in Madras Presidency where the diamonds were collected from the mines. Formerly the diamond-mining industry gave employment to a large number of people, but, owing to the gradual exhaustion of the deposits and the crude methods of working, it has steadily declined. The diamond mines of Borneo, which supply about 3000 carats annually, are located in the western part of the island near Pontianak. The Brazilian diamonds come from a small district within the states of Bahia, Minas Geraes, Goyaz, and Matto Grosso, being found for the most part in placers. Diamantina, Bagagem, and Abaete in Minas Geraes are the principal localities for gem stones, and Lençoes, Sincorá, and Santo Ignacio for carbonados. The alluvial deposits consist of water-worn quartz pebbles, and ferruginous clay, carrying rutile, hematite, ilmenite, and other minerals besides the diamonds. In one locality (Bagagem) the stones are found in a weathered, decomposed phyllite; they are also known to occur elsewhere in conglomerate. The total output of the Brazilian mines up to the year 1899 has been estimated by one authority at 13,105,000 carats. The most valuable specimen from this source is the "Southern Star," found in 1854, which weighed 254 carats in the rough and 124 carats after cutting.

The South African diamond fields yield about 98 per cent of the total product. Their discovery in 1867 came from the purchase of a stone that had been picked up by the children of a Boer farmer, and which was subsequently sold in Paris for $2500. The diamonds are found in both river diggings and dry diggings. River diggings occur along the Vaal River from Potchefstroom down to the confluence with the Orange and up the latter river as far as Hopetown. Mining is conducted in a similar manner to gold washing, the operations usually being on a limited scale. The dry diggings are in Griqualand West, on the borders of the Orange River Colony, about 640 miles northeast of Cape Town. They comprise a number of small areas of circular or oval form, ranging in diameter up to ¼ of a mile. They are worked by a single company, the De Beers Consolidated Mines, Limited. The mines are opened on a large scale and yield enormous profits. It is stated that the output from 1867 to 1897 was over 33,000,000 carats, or about 7½ tons, valued after cutting at $450,000,000. Quite recently another diamond field has been opened in Transvaal, near Pretoria. The largest mine is the Premier, which has been proved to be very rich. The South African diamonds in the average do not equal the Brazilian for purity, although some of the most valuable stones, remarkable for quality as well as for size, have been found in these mines. Other countries where diamonds are known to occur are the United States, British Guiana, Russia, China, Sumatra, and Australia. In the United States there are no deposits, so far as discovered, of sufficient value to warrant mining operations,

the stones being found only occasionally in alluvial materials and drift. More than 50 specimens have been identified, of which the largest, weighing nearly 24 carats, was found at Manchester, Va., in 1855. Their occurrence is generally confined to the regions of the southern Appalachians, the Great Lakes, and to the Coast and Sierra Nevada ranges of California and Oregon. The diamond fields of British Guiana are about 250 miles up the Mazaruni River, and, while new, they give some promise of future importance. New South Wales produces about 25,000 carats annually from alluvial washings near Mudgee and on the Macquarie River. In Russia diamonds occur on the western slopes of the Urals and are obtained in the washing of sands and gravels for gold.

It is estimated that the output of the Arkansas diamond field from the time of its discovery in 1906 to 1912 was approximately 1400 stones, weighing 550 carats and valued at about $12,000. The production of the South African mines in 1912 amounted to 2,087,392 carats, valued at about $27,200,000, and the mines of German Southwest Africa produced in the same year 766,465 carats valued at $4,712,831.

The import of cut and uncut diamonds into the United States for the calendar year 1913 reached a value of $37,358,995, as compared with $32,739,812 in 1912 and $35,559,715 in 1911. The growth in the diamond-cutting industry in the United States is indicated by the fact that the census returns show that the value of materials used in lapidary work increased from $124,852 in 1889 to $4,655,765 in 1899 and $6,560,449 in 1909. The Tariff Law of 1913 fixed a duty of 20 per cent ad valorem on diamonds cut, but not set. The duty in the Law of 1909 was 10 per cent. The year 1912 witnessed a slight falling off in the value of the diamond imports, which was probably due to unsettled tariff conditions. This, however, was met by a stronger market, indicating an increase even over the year preceding 1912. The bulk of the imports come from Holland and Belgium. Some efforts are being made to establish a diamond-cutting industry in South Africa to obviate the necessity of sending the uncut stones to Holland to be cut. This matter has been taken up by the government, and there is hope of an established cutting industry in the future. A similar movement is on foot in Germany to establish local diamond-cutting schools in Hanau and Berlin.

Origin of Diamonds. The problem as to the origin of the diamond, once a favorite subject of speculation, has been studied recently by scientists with some success. In this connection the South African fields are most significant. As previously stated, the deposits are circular or oval in form, and it has been found that they are inclosed by a wall of carbonaceous shale. For a considerable distance below the surface the deposits consist of a yellowish, friable material called by the miners "yellow ground," but when, with depth, the limit of atmospheric weathering has been reached, they pass into a partially serpentinized olivine-pyroxene rock of igneous character, known as "blue ground." These facts indicate that the deposits occupy the vents or pipes of ancient volcanoes, and it is therefore probable that the presence of the diamond is connected with volcanic activity, the stones either having been brought up from the interior of the earth, or having been formed in place under the influence of the molten rock in contact with the carbonaceous shale. The French geologist De Launay has argued that the diamonds have come up from below. This view seems to be supported by the fact that their occurrence is apparently independent of the inclosing rock, whether this be the carbonaceous shale found at the surface or the underlying diabase and quartzite. The conditions necessary for the crystallization of carbon in the form of diamond would seem to be intense heat and great pressure, such as exist during the formation of igneous rocks. Successful attempts to reproduce these conditions artificially have been carried out by Professor Moissan, of Paris, and also by the English chemist Professor Crookes. The method employed consists in heating pure prepared carbon and iron in an electric furnace. By sudden cooling of the molten iron the surface contracts and exerts a powerful pressure upon the interior mass. When cold, the iron is dissolved in acid, and small black particles remain which exhibit the properties of genuine diamonds.

Value. The value of gem diamonds cannot be determined by absolute standards. Weight, cut, brilliancy, color, and perfection of the stones are factors that must be considered in estimating the value, which is, moreover, subject to fluctuation. Colorless stones bring higher prices than off-colored stones, but if decided tints of red, blue, or green are present they may increase the value abnormally. The value ordinarily increases in a ratio increasing with the weight, but this rule does not hold good for the largest stones, the prices of which cannot be fixed. Diamonds in the rough generally average $8 to $15 the carat for the run of the mine.

Remarkable Diamonds. The most valuable gems are generally owned by royal families or are treasured by governments as state jewels. One of the largest is the Orloff, owned by the Czar of Russia, which weighs 195 carats and is cut in rose form. Its origin is doubtful; according to one account, it was stolen from a Brahman temple in India, while another indicates that it was owned by Nadir, Shah of Persia, and came after his death into the hands of an American merchant. In 1772 it was purchased by the Empress Catharine II at a price said to have been $450,000, besides an annuity of $4000 and a Russian title. The Koh-i-nûr (q.v.), weighing 102¾ carats and owned by the royal family of England, was found, according to legend, in India long before the Christian era. After having been handed down through a long line of Indian princes, it was seized during the British invasion of the Punjab and carried to England, where it was presented to Queen Victoria by the East India Company. The Regent or Pitt diamond in the Louvre, in Paris, weighs 136 carats and is valued at $2,500,000. It is perhaps the finest of large brilliants. The Hope diamond, weighing 44¼ carats, is a beautiful blue stone, valued at $125,000. Among the most valuable stones in recent times are the Victoria, weighing 180 carats, which was purchased by the Nizam of Hyderabad; the De Beers, weighing 225 carats; and the Tiffany, weighing 125 carats.

The largest and in many respects the most remarkable diamond of which there is any record was found on Jan. 26, 1905, in the Pre-

REMARKABLE DIAMONDS.

1 and 4. SOUTHERN STAR. **2 and 5.** NATURAL CRYSTAL FORMS. **3 and 6.** KOH-I-NUR—Old and new cuttings
7. GREEN DIAMOND, in Green Vault, at Dresden. **8.** GREAT MOGUL. **9.** SANCY. **10.** FLORENTINE
11. ORLOFF. **12.** REGENT, or PITT.

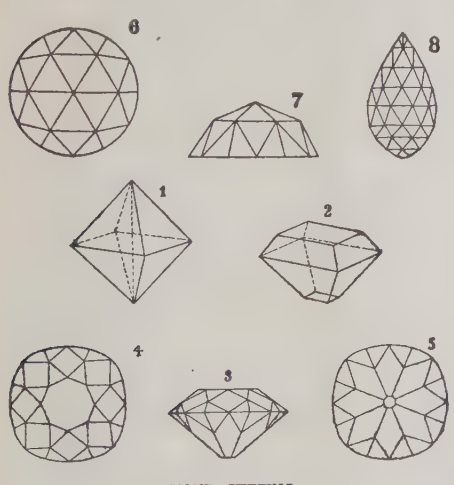
THE CULLINAN DIAMOND

No. 1. CULLINAN DIAMOND. Stone before cutting (natural size).
Nos. 2 to 10. THE NINE LARGEST STONES WHICH WERE CUT FROM No. 1 (natural size).
No. 9. THE PENDANT-SHAPED BRILLIANT KNOWN AS CULLINAN I WEIGHING 516½ KARATS. This is the largest cut stone known to exist in the world.
No. 10. THE SQUARE CUT BRILLIANT KNOWN AS CULLINAN II WEIGHING 309 3-16 KARATS.

mier mine near Pretoria, Transvaal. The stone—called the Cullinan diamond from the name of its finder—weighed 3024¾ carats, or 1.37 pounds, and measured 4 inches by 2.5 inches by 1.25 inches. It shows five cleavage planes, indicating that it is only a portion of a large crystal. The color is reputed to be the purest of any of the large stones. Its value has been estimated at from $2,500,000 to $5,000,000. This diamond was purchased by an English syndicate and has been cut into nine stones, which were presented in 1908 to King Edward VII to be placed among the English crown jewels. The largest of these, a pendent-shaped brilliant weighing 516½ carats, is mounted in a removable setting in the sceptre. It is known as Cullinan I. The second largest stone, Cullinan II, weighs 309 $\frac{3}{16}$ carats and is mounted in the crown of England.

Diamond Cutting. The art of diamond cutting was not developed until the middle of the fifteenth century, although crude methods of polishing were in use long before that time. About 1470 a guild of lapidaries was established at Bruges, under the direction of Louis de Berquem, who is thought to have been the first to devise a regular plan for the arrangement of facets so as to increase the color effects in gems. Other guilds were soon founded in Antwerp and Amsterdam, and these cities rapidly gained preëminence in the industry—a position they still maintain.

In diamond cutting the operations are performed with the single object of producing the most valuable gem from a crude stone. The apparatus used is simple, but its manipulation requires both skill and experience. In the first place the stone must be examined carefully to determine its shape, color, and the possible pres-



DIAMOND CUTTING.

Figs. 1–5—the Brilliant: 1 and 2, fundamental form; 3, 4, 5, side, top, and back views of the cutting. Figs. 6 and 7, top and side views of the Rose cutting. Fig. 8, view of the Briolette cutting.

ence of flaws, as these features will govern the operation of cutting. If the shape is such that it cannot be reduced readily to one of the usual forms, the stone may be divided into two or more parts by taking advantage of the natural cleavage. The diamond is cemented to a wooden holder, and a steel blade is applied in a direction parallel to an octahedral face. A sharp blow upon the back of the blade is sufficient to accomplish the cleaving. The next process (bruting) brings out the facets. Two rough stones, fixed at the end of holders, are held in either hand of the operator, who presses them against each other, at the same time giving them a rubbing motion. The friction wears away the surfaces gradually until they coincide in position to two of the facets. The diamonds are then cemented in new positions, and the operation is continued. The waste particles of dust are collected and used in the final process of polishing. For this the apparatus consists of a small disk of spongy cast-iron, turning on a vertical spindle at a speed of 2000 to 3000 revolutions per minute. The stone, imbedded in the apex of a metallic (lead-tin) cone, is held by a clamp against the surface of the disk, which is smeared from time to time with a mixture of olive oil and diamond dust. This operation requires constant attention, as the stone may be permanently damaged by overheating.

Of the several forms in which diamonds are cut, the *brilliant* is the favorite. It is derived from the fundamental octahedron and requires, when perfect, 58 facets. In the middle is an octagonal facet called the "table," which is surrounded by 32 smaller facets, reaching to the line of union (girdle) between the upper and lower portions. On the lower portion there are 24 facets symmetrically arranged around the "culet." The *rose* form is used for thin stones. It consists of a number of triangular facets, the apices of which meet in the crown, and whose bases are supported by a second row of facets extending to the girdle. The lower part is perfectly flat. In the *briolette* the stone is cut into triangular facets, but the form is pear-shaped and there is no girdle.

Bibliography. Kunz, *Gems and Precious Stones* (New York, 1900); Streeter, *Precious Stones and Gems* (London, 1894); id., *The Great Diamonds of the World* (ib., 1882); Church, *Precious Stones* (ib., 1883); Bauer, *Edelsteinkunde* (Leipzig, 1896); Cattelle, *Precious Stones* (Philadelphia, 1903); De Launay, *Les diamants du Cap* (Paris, 1897); Beaumont, *Report on a Journey to the Diamond Fields of Minas Geraes* (London, 1899); Claremont, "The Cutting and Polishing of Precious Stones," *The Mineral Industry*, vol. viii (New York, 1900); Williams, *Diamond Mines of South Africa* (2 vols., New York, new ed., 1905); Herbert Smith, *Gem-Stones* (London, 1913). Consult also Claremont, in *The Mineral Industry*, vol. vii (New York, 1899). See GEMS; CARBON.

DIAMOND, CAPE. See CAPE DIAMOND.

DIAMOND-BACK. See TERRAPIN.

DIAMOND BEETLE. The common name of a South American weevil (*Entimus imperialis*), so named because of its brilliant coloration. It is an inch or more in length, with a black surface covered with punctures lined with oval scales that reflect such a brilliant green that the entire elytra appear green instead of black. The color changes with varying reflected light and is purely optical and not due at all to any pigment.

DIAMOND BIRD (so called from the peculiar marks on the plumage). A small insectivorous bird of the Australian genus *Pardolotus*, of uncertain affinities, but allied to the honey suckers (q.v.) and by some placed in the Dicæidæ. (See DICÆUM). The commonest species is the well-known *Pardolotus affinis*. "It

would be in vain," says Wheelwright, in *Bush Wanderings* (London, 1865), "to attempt to do justice . . . to the varied and beautiful plumage of this handsome little bird. The general color is ashy gray and white, but spotted and spangled all over with red, yellow, orange, and black, and the tail coverts dark red." It is migratory, frequents in summer the open gum forests of southern Australia, especially about the honeysuckles and other tree flowers; has a loud, sweet call note; and breeds in holes in old logs and sometimes in the ground. Consult Campbell, *Nests and Eggs of Australian Birds* (Sheffield, 1900).

DIAMOND CUTTING. See DIAMOND; LAPIDARY WORK.

DIAMOND NECKLACE, THE AFFAIR OF THE. A celebrated scandal involving the royal family of France in the years preceding the outbreak of the French Revolution. The affair has remained a puzzling incident in the history of the French court, in spite of time and a fairly generous literature. It revolves about a magnificent collar of diamonds which Messrs. Boehmer and Bassange, jewelers to the French court, had brought together at vast expense for Madame du Barry, mistress of Louis XV. The King, however, died before the necklace was completed. Towards the end of 1784 Boehmer and Bassange attempted to induce Marie Antoinette to purchase the necklace, through the efforts of an intermediary, a certain Countess Lamotte-Valois, a friend of the Queen. For some time before this the Countess had been acting as the agent in a remarkable intrigue revolving about Cardinal Rohan, Grand Almoner of France and Bishop of Strassburg, who, previous to 1774, had been Ambassador at Vienna and had been recalled in disgrace. Hoping to regain power through the favor of the Queen, this good-natured libertine, generous, vain, and easily imposed upon, fell a victim to the cunning of the Countess, who persuaded him that Marie Antoinette was inclined to look with favor upon him. A remarkable correspondence ensued, in which Rohan's hopes were fed by letters purporting to come from the Queen, but in reality written by the Countess. In July, 1784, the Cardinal was made to believe that the Queen had consented to give him a private audience. A woman of the streets, a certain Mademoiselle Oliva, in form and general cast of features remarkably resembling Marie Antoinette, was hired to impersonate the Queen. A brief interview in the park of Versailles at midnight served to keep up the prelate's ardor, and his gratitude showed itself in substantial favors to the Countess.

When Boehmer and Bassange sought her services with the Queen, the Countess probably conceived the idea of uniting the two enterprises into one profitable undertaking. In January, 1785, she informed Bassange that the Queen was willing to purchase the collar, but she made it a condition that the negotiations must be carried on through a third person. Rohan was designated as the one from whom the jewelers were to take their sureties as to payment. The Cardinal, who had been persuaded that his services in the matter would insure his success with the Queen, agreed to pay 1,600,000 livres for the necklace in four installments, beginning with August 1. On January 29 the jewelers signed a contract of sale, and on the 31st the instrument was returned to them signed "Marie Antoinette de France." This is generally brought forward as a proof against the genuineness of the signature, inasmuch as the Queen was accustomed to sign herself "Marie Antoinette d'Autriche." On February 1, at Versailles, in the presence of Rohan, the Countess delivered a casket containing the necklace to Desclaux, an attendant of the Queen, after the smaller stones and pendants had been removed for the purpose of securing the money necessary for the payment of the first installment. This is the version given by the Countess in her *Memoirs* and is accepted by Michelet. Whether the account be true or false, nothing more was ever seen of the collar as a whole. The failure of Rohan to pay on August 1 led the jewelers to complain to Breteuil, Minister of Police, who, as an enemy of Rohan, rejoiced exceedingly and informed the Queen of the scandalous reports which were being circulated in Paris concerning the Cardinal and herself. The affair was quickly brought to the notice of the King, upon whom it produced an extremely painful impression. On August 15, Ascension Day, the Cardinal Rohan, in full pontifical robes, was arrested in the midst of the court and sent to the Bastille. The Countess was arrested three days later, and this was followed by the imprisonment of the wonder-working magician Cagliostro (q.v.), who had been Rohan's chief adviser in the affair, as well as of Lamotte's lover. The Parlement of Paris was charged with the trial of the case, which, however, was conducted in a half-hearted manner, for it would seem that the King, fearing the odium which a full revelation might bring upon the Queen, prevented in a large measure an impartial investigation. On May 3, the Countess was found guilty of the theft of the necklace and was sentenced to be scourged, branded, and imprisoned for life. Her husband, who had succeeded in avoiding arrest, was condemned to the galleys as her accomplice. Rohan and Cagliostro were found guilty of criminal intent, and the Cardinal was declared an innocent dupe. The Countess succeeded in escaping from prison, and took up her residence in London, where she died miserably in 1791. Consult Funck-Bretano, *The Diamond Necklace* (New York, 1901).

DIAMOND RATTLESNAKE. See RATTLESNAKE.

DIAMOND SNAKE (so called from the diamond-shaped marks on its skin). 1. An Australian python, or rock snake (*Python spilotis*), which was long regarded as one of the two species of the genus *Morelia*, the other being the so-called carpet snake (*Morelia variegata*). The two are now considered varieties of a single highly variable species of true python, the richly colored variety called diamond snake being especially abundant in Victoria, while the so-called carpet snake is widely scattered throughout Australia. It is about 6 feet long, of rather heavy form, and inhabits nearly every region that offers shelter, though stony ridges supplied with trees and well watered seem to be its favorite haunt. Its food consists of small mammals, birds, and birds' eggs and young, and it frequently raids the poultry yards of the farmers. Though able to bite severely when irritated, it is not poisonous. It makes a sort of nest of dry grass or other soft materials within a hollow log, or similar place, and lays its eggs in a pile, which it guards. The colors vary from glossy black with bright yellow spots, one on each scale and forming an arrangement of lozenge-shaped markings, with the abdomen yellow and black, as in the true diamond snake, to the greenish,

irregularly marked coloration of the carpet variety.

2. In Tasmania, a local venomous serpent (*Holocephalus superbus*). See DEATH ADDER.

DIAMOND STATE, THE. Delaware. See STATES, POPULAR NAMES OF.

DIAMOND WEDDING. See WEDDING ANNIVERSARIES.

DIA'NA. A Roman goddess, identified by the Romans with the Greek Artemis. According to the common myths, Artemis, as daughter of Zeus and Leto, was the twin sister of Apollo and was therefore worshiped with him at Delos, Miletus, and many other places. There seems good reason for believing that this connection with Apollo is one of the later developments of the worship of Artemis. It exercised in time a powerful influence on literature, art, and religion. To this aspect of Artemis belongs the conception of her virgin purity—a quality which she was supposed to require strictly from others, especially from her priests and priestesses. From the fifth century B.C. Artemis is frequently identified by the poets with Selene, the moon goddess, and with Hecate. The Roman Diana, it may be noted here, was probably originally a deity of the sky, of light (her name would seem to be connected with the Latin adjective *dius*, 'heavenly, divine,' which yields the noun *dium*, 'heaven,' seen in the phrase *sub dio* 'under the skies'). Still later Artemis was connected with numerous foreign deities, in whose worship the Greeks thought they found kindred rites. Such were the Persian Anaïtis from the Oxus, the Thracian Bendis, the Cretan Britomartis or Dictynna, the goddess of the Tauric Chersonese (the Crimea), who was worshiped with human sacrifices (see IPHIGENIA; ORESTES), and, above all, the great nature goddess who was the chief deity of Ephesus, where her temple was the wonder of the world. (See DIANA, TEMPLE OF.) In archaic art Artemis often appears as winged and grasping two lions or other wild animals, the so-called "Persian Artemis"; but later the prevailing type is that of the huntress, with high-girded tunic, armed with bow and quiver, and sometimes grasping a deer. She also appears in long, flowing robes. As Selene, she wears the crescent moon on her forehead. The Romans identified with the Greek Artemis their Italian goddess Diana, who was also a nature goddess. As Noctiluca ('Giving Light by Night'), she had a shrine on the Palatine in which lights burned throughout the night. Her worship was rapidly Hellenized, but the native cult in the grove at Nemi (q.v.) was long preserved. The distinguishing feature of this sanctuary was that the priest must win his position by killing his predecessor; as a result of this requirement this place was in historic times filled with runaway slaves. Consult Frazer, *Golden Bough* (parts i–iii, 2d ed., London, 1911). This custom was perhaps a survival from a time when human sacrifices were offered to Diana. At Nemi Diana was worshiped together with a deity called Virbius, who was identified with Hippolytus (q.v.), the son of Theseus.

The worship of Diana was early transferred from Latium to Rome; her great temple on the Aventine was built, so tradition said, by the Latins and the Romans conjointly. For the ceremonies connected with this temple and for the special reverence in which Diana was held by the plebeians at Rome, consult Fowler, *Roman Festivals* (London, 1899).

The conception of this goddess is singularly devoid of unity, and there is much in the legends and cults which suggests the union under a common name of originally diverse local divinities. Even the Greek name is still unexplained. In many phases of her cult Artemis appears as a nature goddess, as bringing fruitfulness, and as worshiped on mountains and in meadows or sacred groves, or even as connected with the swamps and streams or with husbandry. More prominent in the literature and art is the conception of Artemis as ruler and guardian of the animal world, not merely of deer, bear, and other wild creatures, but also of domestic cattle, for the bull is one of her chosen victims, and the bucolic poetry of the shepherds is said to have arisen at her festivals. Artemis (sometimes directly identified with Eileithyia) was supposed to protect women in childbirth; she also watched over the growth of children. To her they offered their hair on attaining maturity, and to her maidens, before marriage, dedicated their toys, dolls, and garments. But Artemis does not always appear as the friendly deity. She is also a goddess of death, especially in the case of women, whom she slays with her gentle arrows as Apollo does men. In this aspect she demanded human sacrifices, and there are numerous traces of such bloody rites in such Greek legends as that of Iphigenia and in later symbolism. See BRAURONIA; MYTH; MYTHOLOGY. Consult: Farnell, *Cults of the Greek States*, vol. ii (Oxford, 1896); Fairbanks, *Greek Religion* (New York, 1910); Wissowa, *Religion und Kultus der Römer* (2d ed., Munich, 1912).

DIANA, TEMPLE OF. A magnificent structure at Ephesus, built at the public charge and regarded as one of the seven wonders of the world. From the eighth century B.C. the site was the seat of the worship of the Asiatic nature goddess, whom the Greeks identified with Artemis (see DIANA); legend told of many temples burned before the Ephesians, at the close of the seventh or the beginning of the sixth century B.C., began the erection of a series of famous temples to Artemis. Of the first of these Chersiphron, of Cnosus, was the chief architect, and the work was continued by his son Metagenes. In the time of Crœsus (q.v.) a much larger temple, known now as the Archaic Temple or the Crœsus Temple, was begun (c.550 B.C.). This temple was laid bare by Wood in 1869–74. (See below.) It seems to have had two rows of eight columns across the front and the rear, and two rows of 20 columns on each side (in this statement the corner columns have been counted twice). According to Pliny, 120 years elapsed before it was completed, but this statement has been challenged, on the ground that the sculptured bases of the columns and the frieze and cornice belong to the same era, the time of King Crœsus, who contributed largely to the building. This temple was burned in 356 B.C. by a certain Herostratus, who wished to immortalize himself; the myth mongers asserted that the fire occurred on the night when Alexander the Great was born. The fire seems to have destroyed only a part of the temple, and its reconstruction was at once begun, under the direction of Dinocrates (q.v.). It was this structure that came to be regarded as one of the wonders of the world; its columns, of great diameter, were over 60 feet high. This temple, known as the Hellenistic Temple, seems to have been plundered and perhaps burned by the Goths in 262 A.D. The

temple was, however, restored, and lasted till Theodosius (q.v.) closed by an edict the pagan temples. Its stones were then used in the building of a great cathedral of St. John on a hill near by. Of these structures, some remains were found by J. T. Wood, who conducted excavations at Ephesus from 1863 to 1874, though not till Dec. 31, 1869, was the true site determined. In 1904–05 D. G. Hogarth, under commission from the British Museum, reëxamined the site. Beneath Wood's earliest temple he found remains of three earlier shrines and a rich array of offerings belonging to the earliest sanctuary; these offerings, which included many fine objects of Hellenic workmanship, among them the earliest-known coins of electrum (q.v.), prove that there was a sanctuary on this site long before the time of Crœsus. Sculptures and fragments of the architecture of the various temples are now in the British Museum; so too is part of the treasure found by Hogarth. In the temple were many fine works of art, e.g., statues of Amazons by Phidias, Polyclitus, Cresilas, and Phradmon, and a painting by Apelles which represented Alexander the Great as holding a thunderbolt. The temple also had a famous right of asylum, which continued down at least to the days of Tiberius. Consult: Wood, *Discoveries at Ephesus* (London, 1877); Ferguson, "The Temple of Diana at Ephesus," in *Transactions of Royal Institute of British Architects* (ib., 1883); Murray, "Sculptured Columns of the Temple of Diana at Ephesus," in *Journal of the Royal Institute of British Architects* (ib., 1895); Hogarth, *Excavations at Ephesus: The Archaic Artemisia* (2 vols., ib. 1908).

DIANA ENAMORADA, dē-ä′nȧ ā′nȧ-mō-rä′dȧ (Sp., Enamored Diana). An extremely popular pastoral romance, by Jorge de Montemayor, first printed at Valencia in 1542, left incomplete, and finished in 1564 by Antonio Perez, of Salamanca.

DIANA MONKEY. A well-known monkey (*Cercopithecus*, or *Lasiopyga, diana*) of the west coast of Africa, which takes its name from a crescent of upstanding white hair on the forehead. Its general color is black, with the ridge of the back and the rump bay color, sharply defined and strikingly set off by the pure white of all the fore parts, including a long beard. Like its congener, the Mona monkey, this guenon (q.v.) is gentle and easily tamed when young, but it is rarely seen in menageries on account of its delicacy. See Plate of MONKEYS OF THE OLD WORLD.

DIANE DE FRANCE, dē′ȧn′ de fräns, DUCHESSE DE MONTMORENCY ET D'ANGOULÊME (1538–1619). A French lady, born in Piedmont. Her father was Henry II of France and her mother, Fillipa Duca, a low-born Piedmontese of great beauty, whom he met during the campaign in Italy (1537). Diane was educated in France and solemnly legitimatized and always afterward signed herself Diane de France. She was the favorite daughter of her father and was married with much pomp to Orazio Farnese, Duc de Castro, second son of the Duke of Parma (1553). Six months later this prince was killed by the Spanish at Hesdin. Four years afterward Diane was married to François de Montmorency. Upon his death she declined to enter again into matrimony and turned her attention to pious deeds and the delicate rôle of mediator in the differences between the members of her family. Thus she brought about the important reconciliation of Henry III with Henry of Navarre. Her gentleness and real goodness, in a time so corrupt, made her honored by all. She is one of the most agreeable figures in that period of French history.

DIANE DE POITIERS, dē′ȧn′ de pwä′tyā′ (1499–1566). Duchess of Valentinois and mistress of Henry II of France. When but 13 years of age, she was married to the Count of Maulevrier, Grand Seneschal of Normandy, by whom she had two daughters. She was a widow at 32, and some seven years later became the mistress of Henry (then dauphin), who was but 18 years old. At that time the Duchesse d'Etampes was the favorite of Francis I, and the two women ruled the court; but when Henry became King, Diane was the real ruler and at once sent her rival into exile. Notwithstanding the beauty and the rights of his wife, Catharine de' Medici, Henry was controlled by Diane during his whole reign. At the death of Henry, however, Catharine de' Medici recovered her position and pursued her rival with considerable vindictiveness. Diane retired into obscurity, and died in 1566.

DIANIUM. See DENIA.

DIANO MARINA, dē-ä′nō mȧ-rē′nȧ. A winter resort, on the Ligurian Sea, in the Province of Porto Maurizio, northwest Italy, 20 miles east of San Remo and just adjoining the Riviera (Map: Italy, C 4). It was partly destroyed by the earthquake of February, 1887, but has since been rebuilt. Its chief trade is in olive oil. Pop. (commune), 1901, 1859; 1911, 1929.

DIANORA, dē′ȧ-nō′rȧ. The wife of Gilberto in the fifth story of the tenth day in Boccaccio's *Decameron*. The story is the source of Chaucer's *Franklyn's Tale*.

DIAN'THUS. See CARNATION; PINK.

DI'APA'SON (Lat., octave, from Gk. *διαπασῶν, diapasōn*, through all, sc. *χορδῶν, chordōn*, chords). A term in music by which the ancient Greeks designated the octave. In modern music diapason is used to denote the range or compass of the voice or of an instrument. The French used the term as equivalent to "pitch." The diapason normal is the standard or international pitch which is now almost universally adopted. The French Academy, in 1859, fixed the number of vibrations of the a^1 at 870 (or 435 double vibrations) per second. Diapason is also the English name given to certain stops of pipes in the organ, commonly of eight-foot pitch, which are considered the fundamental stops, of which there are generally two—a stopped diapason and an open diapason—on each manual. See ORGAN.

DI'APER (OF. *diapre, diaspre*, It. *diaspro*, from Lat. *jaspis*, Gk. *ἴασπις, iaspis*, jasper, possibly of Semitic origin; cf. Heb. *yashpheh*, Ar. *yasb, yasf, yashb*, jasper). A term in decoration derived from the early mediæval practice of incrusting jewels (jasper) in metal work, filigree, and even textile fabrics. It is now used to designate any all-over patterning in which an ornamental unit is repeated or inclosed in each mesh of a network of intersecting lines. The more common types of diaper consist of two systems of intersecting lines forming a quarry (q.v.) of diamond-shaped meshes with a simple flower or rosette or like motive repeated in each. The origin of diaper patterning is to be sought in the basketry and grass weaving of primitive tribes. So soon as decorative patterns begin to be generated by the interweaving of grasses of

different colors, zigzags and quarries begin to appear in primitive design, followed by quarries with central ornaments forming diapers. Patterns of this sort have continued to be used in the textile art of all ages. They early passed from textile art to other fields of design. In the Middle Ages, especially, diapers abounded, both in Christian and Mohammedan art. The shafts of Romanesque and Norman columns (e.g., Saint-Denis in France) and in Gothic art, especially in England, the spandrels of arcades (e.g., Westminster Abbey) were often adorned with diapers in very flat relief. The Moslem artists of the Middle Ages, especially those of Spain, developed extraordinary systems of intricate surface decoration of walls in color, in which diapers played an important part; the framework or mesh, however, being composed, not of straight lines, but of a species of vine pattern forming meshes of complex shapes in which appeared portions of a running ornament on a lower plane, as in the Alhambra (q.v.). (See MOHAMMEDAN ART.) Diaper patterns are common in modern art on wall papers, carpets, oilcloths, mosaic and pavement decorations, and textile fabrics. In heraldry the term is applied to fields and charges, relieved by arabesque and geometrical patterns. These patterns were generally of a darker shade of the same tincture. This, being merely an ornamental device, not affecting the heraldic value of the objects to which it was applied, was generally left to the fancy of the printer.

DI'APHAN'OSCOPE (Gk. *διαφανής, diaphanēs,* transparent + *σκοπεῖν, skopein,* to see). A dark box, constructed for exhibiting transparent photographs or other pictures. It may or may not be furnished with a lens. The photograph, which is generally a glass positive, is placed at a distance from the eye equivalent to the focal length of the lens with which the original picture was made.

DI'APHORE'SIS (Lat., from Gk. *διαφόρησις,* perspiration, from *διαφορεῖν, diaphorein,* to carry off, from *διά, dia,* through + *φορεῖν, phorein,* to carry, frequentative of *φέρειν, pherein,* to bear). The excretion of sweat or perspiration, whether perceptible or not. The term is generally used to denote the excessive perspiration caused by certain drugs called diaphoretics (q.v.) or sudorifics.

DIAPH'ORET'ICS (Gk. *διαφορητικός, diaphorētikos,* promoting perspiration, from *διαφορεῖν, diaphorein,* to carry off). Remedies used to excite the secretions of the skin. When acting very powerfully, they are called sudorifics. The simplest diaphoretic agents are baths, which may be either warm baths of water or vapor baths, and may be either simple or medicated. (See BATH.) The most powerful of all, however, as regards inducing perspiration, is probably the so-called Turkish bath, which consists essentially in the use of air heated to a temperature of 140° F., or even more. Diaphoretic drugs may act either by stimulating the sweat centres in the spinal cord, or the nerves proceeding from them to the glands, or on the terminations of these nerves in the glands; or they may stimulate the glandular cells directly. The following substances, used internally, are powerful diaphoretics: antimony, Dover's powder (ipecacuanha and opium), ammonia, and the carbonate, or acetate, of ammonia (spirit of Mindererus), sweet spirits of nitre, pilocarpine, camphor, and alcohol.

DIAPHRAGM, dī'ă-frăm (Lat., *diaphragma,* Gk. *διάφραγμα,* partition, midriff, from *διαφραγνύναι, diaphragnynai,* to barricade, from *διά, dia,* through + *φραγνύναι, phragnynai,* to fence in). A thin musculofibrous partition separating the cavity of the thorax from that of the abdomen. It is roughly elliptical, with the longest diameter from side to side and almost horizontal in its anterior part, while the posterior portion is nearly vertical. The diaphragm is attached in front to the ensiform cartilage of the breastbone (sternum) and laterally to the inner surface of the cartilages and bony parts of the six or seven lower ribs; posteriorly the attachment is to two aponeurotic arches on each side (*ligamentum arcuatum externum* and *internum*), and to the second, third, and fourth lumbar vertebræ by means of firm fibrous tendons (the crura of the diaphragm), which terminate above in large fleshy bellies. The central portion of the diaphragm is tendinous and shaped like a trefoil leaf, the muscular fibres radiating from this to the points of attachment. There are three large and several smaller openings in the diaphragm. Through the former pass the abdominal aorta, the vena azygos major, the thoracic duct, the œsophagus, pneumogastric nerves, and vena cava. The diaphragm is convex above and is in relation with the pleuræ of the lungs and pericardium; while its concave dome is invested by the peritoneal lining of the abdomen. During respiration the height of the diaphragm constantly changes; it descends during inspiration and thus increases the capacity of the thorax, so that air rushes in to fill the vacuum formed. This contraction of the diaphragm also raises the ribs and widens the chest laterally. In expiration the diaphragm returns to its former position. The descent of the diaphragm encroaches upon the abdomen and lessens its capacity. In all expulsive acts the diaphragm by its contractions gives increased power to the effort and is accordingly an important factor in sneezing, coughing, laughing, and crying, as well as in the expulsion of urine and fæces. Hiccoughing is due to spasmodic contraction of the diaphragm.

DIAPHRAGM. A partition with a hole in it, employed not only in landscape and portrait lenses for photography, but also in telescopes, microscopes, and other optical instruments, for the purpose of cutting off the superfluous rays of light, and producing greater intensity or sharpness of the image by decreasing the amount of spherical aberration. (See ABERRATION, SPHERICAL.) The diaphragm only permits those rays to pass which go through the central portion of the lens. The aberration of these rays is much less than those which pass through the lens nearer its circumference. With a photographic lens the diameter of the diaphragm or stop is usually stated in terms of its focal length, as $\frac{f}{8}$, $\frac{f}{16}$, $\frac{f}{32}$, $\frac{f}{64}$.

DIARBEKIR, dē-är'bĕk'ĕr, or **DIARBEKR,** dē-är'bĕk''r (the land of Bekir). A town of Asiatic Turkey, capital of a vilayet of the same name, situated near the right bank of the Tigris, from which it is separated by extensive gardens (Map: Turkey in Asia, J 4). It is circular in shape, and is surrounded by high, strong walls, flanked with towers and pierced by four gates. The streets are dirty, and the houses for the most part are built of rough stone, plastered with a composition of mud and straw, but some of the better class are of black basalt. It has

over 50 mosques and several Christian churches. Extensive manufactures of silk, cotton, and other goods were at one time carried on at Diarbekir, and the trade between Aleppo and Bagdad contributed greatly to the importance of the town, but the manufactures and trade have now greatly declined. Its present manufactures consist of red and yellow morocco, silk, and copper ware. The region environing the city is rich in minerals, especially copper. Diarbekir occupies the site of the ancient Amida, which was a place of importance in the reign of Constantius, by whom it was strengthened and enlarged. In this reign it was taken by the Persians, from whom it was again captured by the Romans; but in 502 the Persians once more became masters. After many vicissitudes it passed into the hands of Sultan Selim in 1515. Its population is estimated at 38,000, chiefly Mohammedans.

DIARRHŒA, dī'ar-rē'à (Lat. *diarrhœa,* from Gk. *διάῤῥοια, diarrhoia,* a flowing through, from *διάῤῥεῖν, diarrhein,* to flow through, from *διά, dia,* through + *ῥεῖν, rhein,* to flow). A symptom of many diseases, consisting in frequent fluid discharges from the bowels. It occurs in catarrhal or inflammatory diseases of the various parts of the bowels, as enteritis, colitis, and duodenitis, in cholera, typhoid fever, Bright's disease, dysentery, and tuberculosis. It is often a temporary affection, due to an effort of nature to remove poisonous or indigestible substances from the intestine. It follows the use of purgative medicines, as is intended. It sometimes occurs in wasting diseases, from the relaxed condition of the blood vessels of the intestines, whereby the water of the blood soaks through and escapes with the fæces. A form of *nervous diarrhœa* is due to suspense or dread; and there is another variety, called *morning diarrhœa,* occurring in neurasthenic individuals. If the stools contain undigested particles of food, the diarrhœa is termed *lienteric.* Pain, some weakness, and soreness accompany the disorder in most cases. The treatment must be directed, as usual, to removing the cause. If the diarrhœa is caused by indigestibles, a cathartic like castor-oil or rhubarb should be used, and very little simple food should be given for a day afterwards. In other cases carminative and astringent drugs are used, such as ginger, catechu, cardamom, bismuth, chalk, or boiled flour. Opium, lead, iron, capsicum, and camphor are sometimes prescribed. Before using drugs it is, however, necessary to determine, in all but simple cases, whether the diarrhœa is beneficial and therefore should not be checked. See CHOLERA.

DIARRHŒA, WHITE, OF CHICKENS. This is probably the most destructive disease of chickens with which the poultryman has to deal, the loss varying in different years, and placed at from 10 to 90 per cent. Sometimes it is impossible to raise any of the chicks. A good authority states that more than 50 per cent of the chicks hatched throughout the United States are lost from white diarrhœa in its various forms. It is more common among artificially hatched and brooded chicks than among those hatched and cared for by hens. The disease is limited to the first three weeks of the chick's life so far as serious mortality from it is concerned, the heavy loss occurring between the ages of one and three weeks; where the brood is badly affected, the chicks may continue to die until the fourth or fifth week.

The most prominent symptom of the disease is more or less profuse diarrhœa, the droppings consisting almost entirely of mucus from the intestinal tube and the white secretion of the kidney. The affected chicks are first observed to huddle together and remain under the hover or the hen more than young chicks should. Soon they appear listless, stupid, and sleepy—standing or sitting in one position with their eyes closed—few efforts being made to pick up food. Their plumage loses its lustre, the wings droop or project slightly from the body, and the characteristic diarrhœa soon appears. The droppings may be slight or profuse, white or creamy in color, more or less mucilaginous and glairy, and they may be mixed with a brownish material. Often the sticky excrement adheres to the downy feathers about the vent, dries, and continues to accumulate until it completely covers and plugs the opening. This condition, known as "pasting up behind," will, unless soon relieved, bring about an early death of the chick. The diarrhœa results from irritation of the intestines and the increased secretion of mucus, while the large quantity of white material secreted by the kidneys is due to fever and rapid breaking down of the elements of the tissues. Many of the diseased chicks chirp or peep almost constantly; they gradually waste away and become weaker and more emaciated until their legs are scarcely able to support their bodies.

There appear to be two principal causes of this disease—one, referred to as coccidiosis, caused by a protozoan parasite of the genus *Eimeria* (*Coccidium*); the other, known as bacillary white diarrhœa, caused by the *Bacillus pullorum* of Roettger. The *B. pullorum* often infects hens and the eggs which they lay. Such eggs produce chicks which have the germs of the disease within them when they are hatched, and these chicks show symptoms within the first few days of their lives. The bacillus may also be spread from chick to chick through being scattered with the droppings which contaminate the food and drink and cause the appearance of like symptoms when the chicks are from one to two weeks old. Incubators and brooders, as well as coops, become infected and preserve the contagion indefinitely. Adult fowls are resistant and do not show any symptoms when laying infected eggs.

Medicinal treatment of affected chicks has but little effect upon the course of the disease. The feeding of sour milk to chickens appears to be a good means of preventing or at least holding in check epidemics of bacillary white diarrhœa, and it should be fed early and kept before the chicks constantly. Preventive measures should begin with the eggs used for hatching. When purchased, they should be only from flocks known to be healthy. Before placing the eggs in the incubator or under the hen they should be wiped with a cloth wet in grain alcohol of 70 or 80 per cent strength to remove any germs that may be on the surface of the shell. The place should be thoroughly disinfected by saturating the premises with a 5 per cent solution of carbolic acid or a strong solution of a coal-tar disinfectant. The drinking water should be changed frequently and should contain 10 grains of copperas to every gallon, or enough potassium permanganate to give the water a rather deep wine color. Any chicks which sicken should be immediately re-

moved and isolated or killed. For complete elimination of white diarrhœa from a poultry yard it is necessary to reject for breeding purposes stock which harbors the infection and to obtain eggs or live stock from sources where it has not been known to exist.

Consult: Rettger, Kirkpatrick, and Stoneburn, "Bacillary White Diarrhœa of Young Chicks," *Bulletin 74* (Conn. Storrs Expt. Sta.), and Morse, "White Diarrhœa of Chicks, with Notes on Coccidiosis in Birds," *Circular 128* (U. S. Dept. Agr., Bur. Anim. Indus.).

DI'ARY (Lat. *diarium*, from *dies*, day). A word which means simply a daily record. It does not, however, as the word is generally used, include every sort of daily record, but rather such as have reference to the writer personally. In it the man of letters inscribes the daily results of observation, reading, thought, or feeling. To the man of affairs it is a chronicle of memorable events, to the physician a register of engagements and professional memoranda, and to men in general a record of what has been of especial interest to them. The usual diary is a book with a separate blank space for each day in the year, these spaces varying in size and form, as the particular bent or profession of the diarist may render necessary. It usually contains some general information and a calendar. Any convenient blank book, however, often serves the purpose. The Greeks had the diary, which they called the *ephemeris* (meaning 'of the day'). This word in its plural form, *ephemerides*, has been adopted by some scholars; it is the name that Casaubon gave to the records of his daily studies. The word "journal" is also in use as synonymous with "diary"; we have, e.g., the *Journal of Sir Walter Scott*. Diaries have often furnished the historian with invaluable material, supplying the absence of public records, furnishing minute and graphic details of social conditions and the secret springs of public events that are not to be looked for in more formal records, and illuminating the lives and characters of men of mark. Notable among English diaries are those of Pepys and Evelyn (qq.v.).

DÍAS, dē'ăsh, Gonçálves Antonio (1823–66). A Brazilian poet, born at Caxias. He was educated at the university of Coimbra, Portugal, and for a time practiced law at Maranhão, Brazil. He was afterward professor of history in the College of Dom Pedro II at Rio de Janeiro. His works include a report, *Brazil e Oceanía;* several papers of value on the migrations of the South American Indian tribes; and a number of volumes of poetry, among them the series *Primeiros Cantos* (1846), *Segundos Cantos* (1848), and *Últimos Cantos* (1850).

DÍAS, Henrique (?1600–?61). A Brazilian soldier of African blood, born in Pernambuco. He fought with the Portuguese against the Dutch under Gen. Matias de Albuquerque (1633), and did valuable service. He defended Arraial do Bom Jesus and upon its fall was permitted by the Dutch to escape and rejoined the Portuguese army. His brave conduct caused him to be made commander in chief of the negro forces, and he was rewarded with the cross of the Order of Christ. In 1645 he rose against the Spaniards and incited the districts of Sergipe, São Francisco, and Alagoas to revolt. For the next 10 years he fought continuously, but after the Dutch and independent Spaniards were beaten, Días was not remembered and promoted with the other generals who fought in Pernambuco. He died in poverty, although his name has always been given to a negro regiment commanded by one of its own race. The date of his death is not known, since nothing is heard of him after his share in the recovery of Arrecifes (1654) and his presence at the capitulation that put an end to the war of 24 years.

DÍAS (dē'ăs) **DE NOVAES,** Bartholomeu (?–1500). A Portuguese navigator and the discoverer of the Cape of Good Hope. He came of a family of famous sailors.—João Días was associated with Gil Eannes in the voyage of 1434, when Cape Bojador was first doubled, and Diniz Días was the discoverer of Cape Verde in 1445. In 1478 a Bartholomeu Días, presumed to be identical with the subject of this article, made a voyage to Guinea for ivory and slaves. In any case we find that in 1481 he was in command of a vessel sailing to the Gold Coast. Días was a cavalier of the King's household and superintendent of the royal warehouses when, in October, 1486, King John of Portugal selected him to bear a message to Prester John by sailing around Africa. After several months of preparation Días sailed for the south in the early summer of 1487 with three vessels. One, a slave vessel, was left at a harbor near the limit of previous exploration, and then Días began his long voyage along the unknown African coast, to a part of which he gave the expressive name of Hell. Just after New Year's Day, 1488, he was caught by a storm which drove him southward for 13 days, until his crews, fresh from the tropics, began to suffer from the cold. As soon as the storm subsided Días steered eastward, but, not meeting with land for several days, he turned his prow northward. After sailing 150 leagues he sighted high mountains, and anchored, Feb. 3, 1488, in the modern Mossel Bay, in Cape Colony. Finding that the coast ran east and west, he followed it to Algoa Bay, where the coast began to trend more towards the northeast. Días proceeded as far as the mouth of the Great Fish River, but was induced by the complaints of his sailors to turn back. It was probably on May 16 that he passed Cape Agulhas, the actual southernmost point of Africa, and a day or two later he saw the striking Table Mountain and the cape which he is commonly said to have named Cabo Tormentoso (Cape of Storms), in memory of the perilous experiences with which it was associated, but which the Portuguese King rechristened Cabo da Bõa Esperança, the Cape of Good Hope, though, according to Christopher Columbus, who was present at the royal interview, Días himself proposed the name. In December Días reached home, with the news that the point of Africa had been turned, and that the way lay open towards the spice markets of the East. He had added 1200 miles of coast to the knowledge of European sailors and geographers. Between 1490 and 1495 Días was in command of a vessel engaged in the African trade. When, in 1497, Vasco da Gama was dispatched to complete Días's discovery of the way to the East, the latter accompanied him as far as the Cape Verde Islands and thence sailed to the Gold Coast to trade. Three years later he commanded one of the ships in Cabral's fleet. Leaving Brazil in

May, 1500, Días perished in a storm which wrecked his vessel. Consult E. J. Ravenstein, "Voyages of Cão and Días," in *London Geographical Journal* (1900).

DI'ASPORE (Gk. *διασπορά, diaspora*, a scattering, from *διασπείρειν, diaspeirein*, to scatter, from *διά, dia*, through + *σπείρειν, speirein*, to scatter). A hydrated aluminum oxide that crystallizes in the orthorhombic system, is transparent to translucent, and usually white or light gray, though sometimes of a brownish or yellowish color. It occurs with corundum and emery in dolomite and chlorite schist. This mineral is found in granular limestone with emery, in the Ural region, in Hungary, Sweden, Asia Minor, and in the United States at the emery mines of Chester, Mass., where it occurs in large plates in crystals, and is also found with massive corundum near Franklin, Macon Co., N. C.

DI'ASTASE (Gk. *διάστασις, diastasis*, separation, from *διιστάναι, diistanai*, to separate, from *διά, dia*, apart + *ἱστάναι, histanai*, to stand). An enzyme, or more likely a group of enzymes, found in both animals and plants, which has the power of converting starch into a sugar. It has also been called amylase, and in the saliva is known as ptyalin. In plants, where it is practically universal, diastase occurs in at least two modifications, viz., secretion diastase and translocation diastase. These differ in their distribution, their mode of action on starch grains and starch paste, the optimum temperature for activity, etc. Translocation diastase is the more widely distributed of the two, being formed by fungi and bacteria, and in leaves, shoots, storage organs, and pollen grains, as well as in the seed. Its function seems to be to make possible the translocations of carbohydrate food, temporarily or permanently stored as starch, by digesting it into a soluble sugar. Translocation diastase is therefore of the utmost importance in plant nutrition. Secretion diastase is formed by special secreting cells in the embryo as well as the aleurone layer of seeds, especially in grasses, and plays its chief rôle in germination by making available the food stored as starch in the seed. Translocation diastase digests and liquefies starch paste slowly, and erodes starch grains uniformly at the surface or in the centre until they disappear. Secretion diastase liquefies starch paste rapidly and corrodes starch grains by forming irregular pits, which, penetrating the grain in various directions, deepen and widen until it falls to pieces. There is some evidence that the secretion diastase of malt consists of at least two enzymes, one hydrolizing starch to dextrine and the other hydrolizing the dextrine to maltose. When heated to 80° C., the dextrine-forming power is still retained, but the maltose-forming power lost.

Diastase cannot be obtained in a pure state; and because its composition has not yet been ascertained, no test for purity can be established. Late work indicates that diastase is a carbohydrate associated with many times its weight of protein as a substrate and impurity. It may be obtained by crushing or grinding the tissue containing it, e.g., malt, and extracting it for 24 hours with three or four times its bulk of water or glycerine. The liquid may be filtered off, and the various substances dissolved along with the diastase may be partially eliminated by adding about three volumes of absolute alcohol, collecting on a filter the precipitate formed, washing it with absolute alcohol and ether, and drying. The powder so obtained may be still further purified by solution in water, reprecipitation with alcohol, and dialysis. In the dry state it may be kept indefinitely and retains its digestive power.

The action of diastase on starch is one of hydrolysis, i.e., it causes the starch to combine with water and break up into simpler compounds. The intermediate steps in the process are not known. Diastase readily hydrolizes 80–85 per cent of the starch grain to maltose, while 15 to 20 per cent is very slowly transformed. It appears that the amylose constituent of the grain is the readily hydrolized portion, while the amylopectin is far more resistant. (See STARCH.) Diastase is affected in its rate of action by various reagents. Some accelerate, while others inhibit or entirely stop its action. Very dilute solutions of acids and salts of the lighter metals (sodium chloride, aluminium salts, etc.) and considerable concentration of asparagin belong to the first class; while concentrated solutions of all salts, dilute solutions of salts of the heavy metals, and various organic substances (formaldehyde, etc.) represent the second. Variation of the concentration of certain of these substances in plant organs undoubtedly is of great importance in regulating the rate of diastatic activity. With the exception of formaldehyde, diastase is much more resistant to the action of poisons than is the protoplasm; hence a digesting mixture can be protected from the action of microörganisms without interfering with the action of the diastase. Chloroform and thymol are especially used for this purpose.

Diastase is largely made use of in the manufacture of beer and alcohol, small quantities of the enzyme being capable of effecting the transformation of a considerable amount of starch. A preparation of diastase has of late also been used with some success in the treatment of fermentative dyspepsia. See ALCOHOL; BEER; DEXTRIN; ENZYME.

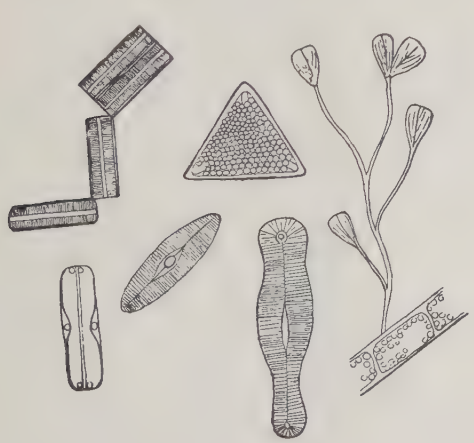
DIAS'TROPHISM. A general term applied to the geological processes which cause the upheaval and subsidence of continental lands and the building of mountain systems. Such processes may result from the strains produced in the earth's crust in adjusting itself to the nucleus or possibly from the shifting of load upon the superstructure by erosion in one place and deposition in another. See GEOLOGY; CONTINENT; MOUNTAIN.

DI'ATHER'MANCY (from *διά, dia*, through + *θέρμανσις, thermansis*, a heating). A term used to express that quality of a body in virtue of which those ether waves are allowed to pass which produce thermal effects to a marked degree. All ether waves carry energy; and in many cases when these waves are absorbed their energy is spent in producing heat effects. (This is not so when the energy of the waves goes to chemical or electrical action.) It is found that in the spectrum of ether waves emitted by any body, e.g., the sun, the energy carried by waves of different wave number is in general different; similarly, the transparency of a body to ether waves varies with their wave number. In discussing diathermancy, therefore, it is necessary to consider both the total radiation transmitted and also the wave numbers of these waves. (See RADIATION.) The greater portion of the energy carried from the sun and from other bodies by

ether waves is associated with waves which do not affect our sense of sight; and other instruments have to be used to detect the waves and measure their energy. Such are thermometers, bolometers, etc. It is possible to have bodies which are absolutely opaque to those waves which affect our eyes and yet are transparent to waves which have a less wave number; and the converse is true. Lampblack, which is opaque to nearly all radiations, has been found to transmit certain heat waves of great length, i.e., small wave number. Ebonite is transparent to long-wave radiations, so that an ebonite prism spreads some of the radiation from a hot body into an invisible heat spectrum, which is quite sensibly detected by a radiomicrometer. The diathermancy of a body depends upon its temperature and upon its thickness. Consult Tyndall, *Heat as a Mode of Motion* (6th ed., London, 1880).

DIATH'ESIS (Neo-Lat., from Gk. *διάθεσις*, disposition, from *διατίθεσθαι, diatithesthai*, to dispose, from *διά, dia*, apart + *τιθέναι, tithenai*, to place). A word applied in medicine to the predisposition or constitution of the body which renders it prone to certain diseased states. Thus the tubercular, scrofulous, gouty, rheumatic, cancerous, or hemorrhagic diatheses are mentioned. A person with gouty diathesis is one in whose case exposure to cold, eating indigestible food in large quantities, or drinking beer causes gouty pains and increased amount of uric acid in the urine; who is likely to have eczema; whose blood is deficient in hæmoglobin; and whose arteries are inelastic. The study of diathesis is of great importance, as avoidance of disease through choice of occupation and habits is often possible, if predisposition to disease is recognized.

DI'ATOMA'CEÆ (Neo-Lat. nom. pl. from Gk. *διατομή, diatomē*, severance, from *διατέμνειν, diatemnein*, to cut through, from *διά, dia*, through + *τέμνειν, temnein*, to cut). A group of one-



DIATOMS.

celled plants commonly known as diatoms. They occur in profusion in fresh and salt water and in damp soil, approximately 6000 species being known. They exist in such numbers in the ocean as to form a large part of the floating plankton (q.v.), a free-swimming and free-floating world of minute organisms. They are solitary or free-swimming forms, or are attached by gelatinous stalks excreted by the cells, the stalks often branching profusely. The forms of the cells are extremely numerous, one of the most common free-swimming forms being boat-shaped (*Navicula*); there are also rods, wedges, disks, etc.

A special feature of diatoms is the cell wall, which consists of two siliceous valves, one overlapping the other like the two parts of a pill box. This wall forms a complete and resistant skeleton, so that diatoms occur as fossils, often forming large deposits. It has been stated that these siliceous skeletons are falling as a continuous shower from the plankton to the sea bottom. As fossils, they are found especially abundant in the Tertiary period, where the deposits are known as siliceous earths. Such deposits are also abundant in rocks of other ages, and probably diatoms will be recognized in the oldest formations. These deposits constitute an important source of abrasive materials, and the products are known under such names as tripoli, diatomaceous earth (qq.v.), Richmond earth, electrosilicon, kieselguhr, etc. In many cases the valves are sculptured with fine transverse lines, which are really rows of dots, the markings being so regular and minute as to serve as a test of the definition of microscopic lenses. There is also a longitudinal line which represents a series of openings, through which pseudopodia are thrust for locomotion. The protoplast has a very characteristic structure, the central nucleus being swung in a bridge of cytoplasm, and the characteristic brownish-yellow pigment occurring in two or more plates. The pigment is really due to a mixture of a green constituent (possibly chlorophyll) and a golden-brown constituent called diatomin. In cell division the growth of the protoplast separates the two valves, and, the division occurring in the plane of the valves, each new protoplast possesses one of the old valves and forms a new one on the naked side. It follows that one of the two cells thus produced is of the same size as the parent cell, while the other is smaller, for the small valve of the parent cell becomes the larger valve of the daughter cell. This means that among the progeny there are series of individuals of diminishing size. When this diminution in size has reached a minimum, auxospores are formed, the name meaning "enlarging spores." Auxospores are produced in a variety of ways, the simplest being the separation of the valves and the escape of the protoplast, which in this free condition grows to the maximum size and develops new valves. In other cases the protoplast divides into two daughter protoplasts that escape and enlarge. In still other cases two liberated protoplasts fuse, the product being an auxospore, which behaves as described in the other cases. The relationships of diatoms are very obscure. They seem to stand apart from the other groups of thallophytes. In certain particulars the cell structure suggests that of the desmids (q.v.), while the brown pigment associated with the green suggests brown algæ. At present the group is kept apart from others as a distinct assemblage of thallophytes.

DI'ATOMA'CEOUS EARTH (Ger. *Bergmehl*). This material, often incorrectly called infusorial earth, tripolite or fossil meal, occurs usually in the form of a white or grayish powder of extremely fine texture, less often in consolidated form. When pure, it is composed almost entirely of the indestructible siliceous

cases of diatoms (see DIATOMACEÆ), but is often more or less impure, due to the presence of clay, sand, or organic matter.

The two following analyses represent the composition of (I) pure earth from California, and (II) impure material from Virginia:

SiO_2	86.89	63.17
Al_2O_3	2.32	19.30
Fe_2O_3	1.28	6.32
CaO	.43	.06
MgO	tr.	.69
Alkalies	3.58	3.14
FiO_2	——	.88
H_2O	4.89	6.39

The earth has accumulated in beds of considerable thickness in the Tertiary formations in some regions, and deposits are now being formed on the bottoms of some fresh-water lakes and on the sea floor. Owing to the angular nature and hardness of its component particles, diatomaceous earth has valuable abrasive properties; it is also employed as an insulating material for boilers and steam-pipe coverings, and mixed with clay for hollow partition blocks. Deposits of diatomaceous earth abound in the Tertiary and Quaternary formations of many countries. In the United States it has been dug in Virginia, Maryland, Connecticut, New York, and in some of the Western States, notably California, where the deposits are several thousand feet thick. The supply far exceeds the demand.

Consult Ries, *Economic Geology* (New York, 1910), and Merrill, *Non-Metallic Minerals* (ib., 1910).

DIATOMS. See DIATOMACEÆ.

DI'ATON'IC SCALE (Lat. *diatonicus*, from Gk. *διατονικόν, diatonikon*, from *διάτονος, diatonos*, outstretched, from *διατείνειν, diateinein*, to stretch out, from *διά, dia*, through + *τείνειν, teinein*, to stretch; connected with Lat. *tenuis*, Skt. *tanu*, Ger. *dünn*, Eng. *thin*). This scale in music is one in which there are seven notes in the interval of an octave at intervals given by the ratios

24 : 27 : 30 : 32 : 36 : 40 : 45

Thus, if a note whose frequency is 240 is taken as the keynote, there will be the following notes in the interval of an octave:

240, 270, 300, 320, 360, 400, 450,

and the octave of 240 will give the frequency, 480. The notes in the lower and upper octaves would then be

120, 135, 150, 160, 180, 200, 225, and
480, 540, 600, 640, 720, 800, 900, etc.

It is evident that the ratios of these various notes are the simplest possible. Thus the ratios 1 : 2, 1 : 3, 1 : 4, 2 : 3, 3 : 4, etc., occur. For this reason chords on this scale are in the greatest possible harmony. (See ACOUSTICS.) If, however, music composed with the keynote 240 is transposed to the key 300, the diatonic scale required would be

300, $\frac{27}{24}\times 300$, $\frac{30}{24}\times 300$, $\frac{32}{24}\times 300$, $\frac{36}{24}\times 300$, etc.; that is,

300, 337½, 375, 400, 450, etc.

But some of these notes do not occur in the original scale with the keynote 240, and for this reason the diatonic scale is unsatisfactory. Other scales are now used, which include a greater number of notes in the interval of the octave. See MUSIC.

DI'ATRIBE (ML. *diatriba*, discussion, Gk. *διατριβή, diatribē*, disputation, from *διατρίβειν, diatribein*, to discuss, from *διά, dia*, through *τρίβειν, tribein*, to rub). A disputation or critical exercise. The name was originally applied to a critical examination of a literary work, but was later extended to bitter and violent criticism, written or spoken, on any subject.

DIAULOS. See OLYMPIC GAMES.

DIAZ, DON JUAN MARTIN. See EMPECINADO.

DÍAZ, dē'ȧs, PORFIRIO (1830–1915). A president of Mexico. He was born at Oaxaca, of Spanish parentage, and was studying law in his native town when the war with the United States broke out. Young Díaz entered a militia regiment in 1847 and thenceforth devoted himself to a military career. In 1854 he commanded a battalion under Alvarez in the contest against Santa Anna. A few years later he identified himself with Juárez and the Liberal party and in 1861 was elected deputy to the National Congress. He soon resigned to take the field and won a victory over the reactionist Marquez at Jalatlaco. During the French intervention he won a high reputation as one of the most skillful and courageous of the patriot leaders. In May, 1863, while directing the defense of Puebla, he was forced to surrender, but escaped shortly after and went to Oaxaca, where he raised a new force and made considerable headway against the French. In February, 1865, he was again captured, but escaped once more, and once more reappeared at the head of an army he had brought together at Oaxaca. He gradually forced the invading troops to adopt the defensive, and after the evacuation of Mexico by the French he advanced to Puebla and took the city, April 2, 1867. On June 21 he entered the city of Mexico. In the same year he was a candidate for the presidency against Juárez, but, being defeated, withdrew to his estates. He never ceased plotting against the government, however, and his intrigues occasionally broke out in the form of armed revolts against Juárez and his successor, Lerdo de Tejada. He was twice forced to flee the country—in 1872 and again in 1876. Returning quickly on both occasions, Díaz succeeded in the latter year in defeating his enemies at Tecoac (November 16). He finally drove Lerdo out, and in May, 1877, he became President. Order was restored in a remarkably short time. Díaz soon managed to win the confidence of European investors, the country was opened up, industries were developed, and the modern period of prosperity was firmly established. As the Mexican constitution provided that no man should hold the office of President for two consecutive terms, General Díaz was succeeded in 1880 by his close personal friend General Gonzalez. It soon became evident, however, that only one man could win the trust and support of the Mexican people and of the foreign capitalists upon whom the welfare of the nation depended, and so, after Díaz had been again elected President in 1884, the constitution was amended in order to provide for his continuance in that office. The forms of election by popular vote were duly complied with at each recurring period since, but no serious opposition to Don Porfirio, as he was affectionately called by the Mexican populace, devel-

oped. Opposition to what was considered his dictatorial rule culminated in the early part of 1911 in a revolution headed by Francesco Madero. This was successful, and Díaz abdicated in May, 1911. He died in Paris, July 2, 1915.

DÍAZ, dē'äth, Ruy, rōōē (1503–38). A Spanish soldier, born at Seville, Spain. In 1532 he accompanied the expedition of Diego de Almagro to Peru, participated in the capture of Cuzco (1534), and displayed remarkable skill and courage in his encounters with the Indians. He was subsequently selected by Pizarro to choose the site of a city to serve as the capital of the province and thus became the founder of Los Reyes (now Lima), the building of which was begun Jan. 18, 1535. He afterward took an active part in the campaign in Chile and supported the cause of Almagro.

DÍAZ DE LA PEÑA, dē'äz' de là pā'nyä', Narcisse Virgille (1807–76). A French landscape painter, of the Barbizon school. He was born in Bordeaux, of Spanish parents, refugees from Salamanca. His father died in England when the boy was three years old, and his mother, returning to France, supported him by teaching Spanish and French. She died at Sèvres, near Paris, when he was 10 years old, and Narcisse was adopted by a Protestant clergyman of Bellevue. He rambled through wood and dale, acquiring that love of nature which afterward made him a great landscape painter. In one of these rambles Narcisse was bitten by a poisonous insect, which necessitated the amputation of his leg. He was apprenticed to a porcelain maker at Sèvres, an uncle of Dupré, who worked there and became his stanch friend. This work, no doubt, helped to develop his wonderful sense of color, but Díaz was too independent a genius to become a porcelain painter. While studying painting, he lived in great poverty in Paris, even having to beg. François Souchon, an historical painter, was his teacher, but Díaz was much attracted by the works of Correggio in the Louvre and seems also to have been influenced by Leonardo and Prudhon. But he always went his own way, and was in the main self-taught. About 1836 he went to Barbizon, where, under the influence of Rousseau, he devoted himself to landscape painting, producing the best of his works. He continually exhibited at the Salon, receiving medals in 1844, 1846, and 1848 and the cross of the Legion of Honor in 1851. He was very prolific, and, as his pictures sold well, he became quite wealthy. He was fond of life, and in his magnificent studio in Paris he dispensed great hospitality. He died at Mentone, Nov. 18, 1876, in consequence of a cold taken at the opera.

Díaz was a man of unusual gifts, but he lacked the application and perseverance essential to a genius of the very first order. He was an admirable colorist, brilliant in execution, and of a striking originality, but his drawing was often weak. His landscapes are usually treescapes, showing the play of light and shade among forest trees. He peoples them with nymphs, cupids, Oriental women in gaudy costume, gypsies, and the like. He loved the summer with its bright sunshine and especially excelled in depicting rich autumn tints. Díaz is magnificently represented in the Louvre, particularly since the acquisition of the Thierry collection with eight examples and the Chauchard with 15. Among the best of these are: "The Fairy with Pearls," "Venus and Adonis," "Foolish Girls," the brilliantly tinted "Descent of the Gypsies," and a magnificent landscape, "Sous bois." Fine collections of his paintings are also in the Museum of Rheims with 10 examples, and at Montpellier with five, in the Alexander Young collection, London, and in the Metropolitan Museum, New York (including the Vanderbilt collection), with 11 examples, including a splendid landscape, the "Forest of Fontainebleau." He is represented also in other American public and private collections, such as the Art Institute of Chicago, the Walters collection, Baltimore; in many French provincial museums; in the National Gallery, Berlin, the Mesdag Gallery, The Hague, and many other European galleries. Consult: Muther, *History of Modern Painting* (London, 1907); Balluins, in *Les artistes contemporains* (Paris, 1877); Hoeber, in Van Dyke, *Modern French Masters* (New York, 1896); Hustin, in *Les artistes célèbres*, and the authorities cited under Barbizon, Painters of.

DÍAZ DEL CASTILLO, dē'äth děl kä-stē'lyō, Bernal (c.1492–?1593). A Spanish soldier and author, born at Medina del Campo. In 1514 he sailed for America to better his fortunes, and he landed, after a short residence at Nombre de Dios, in Cuba, whence he made several expeditions to the west. He accompanied Cortés to Mexico in 1519 and after the conquest settled in that country. His *True History of the Conquest of New Spain* is important because narrated by an eyewitness. The style of it, however, is far from elegant. The first edition appeared at Madrid in 1632 in three volumes, under the auspices of Friar Alonso Remón, who very badly garbled the text. Within the next few years four other editions appeared. English versions of these corrupt editions appeared in 1800 (by Maurice Keatinge) and in 1844 (by John Ingram Lockhart). The work was done into German in 1838 by Ph. J. von Rehfues and in 1848 by Karl Ritter. Two French versions were made simultaneously and independently by D. Jourdanet (who published his in 1876) and José María de Heredia (in 1877). Hungarian also had two translations, by Károly Brózik (1878) and by Moses Gaal (1899). Some of these translations went to second editions—Keatinge (1803), Rehfues (1843), and Jourdanet (1877). None of these editions or translations did justice to the original, and certain strictures have consequently been made concerning Castillo's *History* that can no longer be maintained. The original manuscript has always been kept in Guatemala, first by the author, then by his descendants, and later by the municipality of the capital, in whose archives it rests to-day. This manuscript consists of one large folio volume, containing 297 leaves, written on both sides, and bound in old leather. It was published and edited critically for the first time by Genaro García in Mexico, 1904. An English translation of this edition was made by Alfred Percival Maudslay and published, with introduction and notes, for the Hakluyt Society (3 vols., London, 1908). These two new publications throw a world of new light upon the importance and credibility of Castillo's account and prove it to be second only to the account of Cortés in his letters to the Emperor.

DÍAZ DE PINEDA, dā pē-nā'dä, Gonzalo (? –1545). A Spanish soldier in Peru, born in Torrelavega. In 1531 he accompanied Francisco

Pizarro on the latter's final expedition to Peru, in 1535 explored the Magdalena River to its mouth, in 1536 discovered the country of the Canelos Indians, and in 1540 went with Gonzalo Pizarro on the ill-fated expedition for the conquest of that region. Sent with a small band in an unsuccessful search for Orellana, who had been dispatched down the Napo River for supplies, he returned to assist them at last in reaching Peru with a half-starved remnant of the expedition. When, in 1544, Gonzalo Pizarro rebelled against the Viceroy, Nuñez de Vela, he at first sided with the latter, but subsequently joined Pizarro. Defeated by the Viceroy at Colliquén, he escaped, but died from the mistaken use of poisonous plants for food.

DÍAZ DE SOLIS, sō-lēs'. See SOLIS.

DI'AZEUC'TIC TONE (Gk. *διαζευκτικός, diazeuktikos,* disjunctive, from *διαζευγνύναι, diazeugnynai,* to disjoin, from *διά, dia,* apart + *ζευγνύναι, zeugnynai,* to join). In Greek music, that tone which separates the tetrachords (q.v.) of the three oldest modes. In the Dorian mode the diazeuctic tone was the step from b to a. In the later modes the tetrachords were constructed so that the lowest tone of the higher tetrachord was at the same time the highest tone of the lower tetrachord. Then the diazeuctic tone was either above the highest or below the lowest tetrachord. (See GREEK MUSIC.) In the following modes the diazeuctic tone is marked+:

Dorian $e^1—d^1—c^1—b—a—g—f—e.$ (+ over b—a)

Æolian $a—g—f—e—d—c—B—A.$ (+ over B—A)

Mixolydian $b—a—g—f—e—d—c—B.$ (+ over b—a)

DIAZO COMPOUNDS (from Gk. *δίς, dis,* twice + *azo-te,* old name of nitrogen, from Gk. *α, a,* priv. + *ζώειν, zōein,* to live). An important group of carbon compounds discovered by Peter Griess in 1860. They are produced by the action of nitrous acid on salts of aromatic amido compounds, such as aniline hydrochloride. Thus, diazo-benzene chloride is produced according to the following equation:

$$\underset{\text{Aniline hydrochloride}}{C_6H_5NH_2.HCl} + \underset{\text{Nitrous acid}}{HNO_2} = \underset{\text{Diazo-benzene chloride}}{C_6H_5N = N.Cl} + 2H_2O$$

The diazo compounds are usually obtained in solution and are immediately transformed into other compounds: the given aromatic amido-compound (say, aniline) is introduced into aqueous hydrochloric acid, and the solution is "diazotized" by the addition of an aqueous solution of sodium nitrite, drop by drop, with stirring, until the nitrous acid produced by a drop fails to be absorbed. The solution now contains the required diazo compound, and further transformation is effected by treating the solution as a whole. But diazo compounds have also been isolated as such. When pure and dry, they are colorless crystalline solids, chemically unstable and even more or less explosive.

The following are the principal transformations of these peculiar substances:

1. When an aqueous solution of a diazo compound is warmed, the compound is transformed into the corresponding phenol. (See PHENOLS.) Thus, diazo-benzene nitrate (obtained by the action of nitrous acid on aniline nitrate) gives ordinary phenol (carbolic acid), according to the following equation:

$$\underset{\text{Diazo-benzene nitrate}}{C_6H_5N = N.NO_3} + \underset{\text{Water}}{H_2O} =$$

$$\underset{\text{Carbolic acid}}{C_6H_5OH} + \underset{\text{Nitrogen}}{N_2} + \underset{\text{Nitric acid}}{HNO_3}$$

Similarly,

$$\underset{\text{Diazo-benzene chloride}}{C_6H_5N = N.Cl} + \underset{\text{Water}}{H_2O} =$$

$$\underset{\text{Carbolic acid}}{C_6H_5OH} + \underset{\text{Nitrogen}}{N_2} + \underset{\text{Hydrochloric acid}}{HCl}$$

The best salt to use for this transformation is diazo-benzene sulphate, which yields practically no by-products. The transformation is, further, greatly aided by the action of light.

2. Diazo-benzene *iodide* would react differently: instead of combining with water, it would, if warmed in aqueous solution, simply lose its nitrogen and change into iodo-benzene:

$$\underset{\text{Diazo-benzene iodide}}{C_6H_5N = N.I} = \underset{\text{Iodo-benzene}}{C_6H_5I} + \underset{\text{Nitrogen}}{N_2}$$

Iodo-benzene is thus usually prepared by diazotizing aniline in hydrochloric acid solution, adding potassium iodide (which changes the diazo-benzene chloride in solution into diazo-benzene iodide), letting the mixture stand for several hours, and distilling, the iodo-benzene being readily isolated from the mixed distillate. Iodine derivatives of other hydrocarbons than benzene are similarly obtained with the aid of potassium iodide.

3. From the above it is clear that an NH_2 group in an aromatic compound can be readily exchanged, through diazotization, for either an OH group or an iodine atom. A chlorine or bromine atom cannot thus be introduced; in 1884, however, Sandmeyer discovered that if, before a solution of a diazo chloride or bromide is warmed, cuprous chloride or bromide is added to it, the result is, not combination with water and the entrance of an OH group, but the entrance of a chlorine or bromine atom. This modification of the method is known as the *Sandmeyer reaction.* Later Gattermann found that finely divided metallic copper, added to a solution of a diazo chloride or bromide, produces the same effect as the cuprous salt.

The Sandmeyer reaction is explained by the assumption that the diazonium salt, i.e., the diazo chloride or bromide, forms a double compound with the cuprous salt, and that it is the double compound that breaks up, yielding the desired halogen substitution product:

$$\underset{\substack{\text{Diazo-benzene chloride,}\\ \text{cuprous chloride}}}{C_6H_5N = N.Cl.Cu_2Cl_2} =$$

$$\underset{\text{Chloro-benzene}}{C_6H_5Cl} + \underset{}{N_2} + \underset{\text{Cuprous chloride}}{Cu_2Cl_2}$$

$$\underset{\substack{\text{Diazo-benzene bromide,}\\ \text{cuprous bromide}}}{C_6H_5N = N.Br.Cu_2Br_2} =$$

$$\underset{\text{Bromo-benzene}}{C_6H_5Br} + \underset{}{N_2} + \underset{\text{Cuprous bromide}}{Cu_2Br_2}$$

4. The Sandmeyer reaction permits of exchanging an NH_2 group also for a nitril group (CN). For example:

$$\underset{\substack{\text{Diazo-benzene cyanide,}\\ \text{cuprous cyanide}}}{C_6H_5N = N.(CN).Cu_2(CN)_2} =$$

$$\underset{\text{Benzo-nitril}}{C_6H_5CN} + \underset{}{N_2} + \underset{\text{Cuprous cyanide}}{Cu_2(CN)_2}$$

And as the nitril group can be readily transformed into the acid group (carboxyl, COOH), it is obvious that by diazotization and the Sandmeyer reaction an NH_2 group can be exchanged for a carboxyl group; i.e., an amido compound can be changed into an acid.

5. If the solution of a diazonium salt is rendered alkaline with sodium hydroxide, mixed with an alkaline solution of sodium stannite, and the mixture gently warmed, the result is that the unstable diazo-hydroxide formed at first loses its nitrogen together with the oxygen of its OH group, and a hydrogen atom alone remains in the place of the original NH_2 group. For example:

$$\underset{\text{Aniline}}{C_6H_5NH_2} \longrightarrow \underset{\text{Diazo-benzene chloride}}{C_6H_5N=N.Cl} \longrightarrow$$

$$\underset{\text{Diazo-benzene hydroxide}}{C_6H_5N=N.OH} \longrightarrow \underset{\text{Benzene (a hydrocarbon)}}{C_6H_5.H \text{ or } C_6H_6}$$

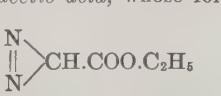
A similar transformation takes place when a diazonium salt is heated with alcohol, but then a second reaction takes place simultaneously and in many cases even predominantly.

6. If the solution of a diazonium salt is strongly acidified with hydrochloric acid, mixed with stannous chloride, and the mixture warmed, the result is a derivative of hydrazine (q.v.)—the well-known phenylhydrazine, e.g., being thus readily obtained from diazo-benzene compounds:

$$\underset{\text{Diazo-benzene chloride}}{C_6H_5N=N.Cl} \longrightarrow \underset{\text{Phenylhydrazine}}{C_6H_5NH—NH_2}$$

The reactions noted above suffice to indicate that a great many aromatic compounds of several important classes may be produced, through diazotization, from the corresponding amido compounds. And as amido compounds are readily made by starting with the hydrocarbons abundantly contained in coal tar, it is easy to see why the diazo reaction is so extensively used, and diazo compounds regarded as so important, both in the industries (particularly in the manufacture of dyestuffs) and in the scientific laboratory. See also AZOBENZENE; COAL-TAR COLORS.

Derivatives of the aliphatic series cannot as a rule be diazotized; in these, an NH_2 group is directly transformed, by the action of nitrous acid, into the group OH. For instance, ethylamine, $C_2H_5NH_2$, would give ordinary alcohol, C_2H_5OH; but no intermediate diazo compound would be formed. The esters, however, of certain aliphatic amino acids do give diazo compounds, and these are of no little value. The best known among these substances is the ethyl ester of *diazo-acetic acid*, whose formula is



This remarkable substance, first obtained by Curtius in 1883, melts at 24° C., and under a pressure of 72 millimeters of mercury boils without decomposition at 143° C.

In conclusion, it may be mentioned that Kekulé's constitutional formulæ of the diazonium salts, used above for the sake of convenience, have now been superseded by formulæ first recommended by Blomstrand as far back as 1869. Thus, diazo-benzene chloride is now preferably written:

$$C_6H_5N.Cl$$
$$\|$$
$$N$$

DIBBS. An English name for a game of great antiquity, played by boys and girls. In Russia it is sometimes played even by old men. It consists in throwing up the small joint bones of the legs of sheep and catching them first on the palm and then on the back of the hand. The antiquity of this simple kind of play is proved by figures on Grecian vases on which women are seen kneeling and engaged in the sport. In Scotland, where the game is more usually played with small pebbles or shells, it is called the "chucks" or "chuckie stanes." Out of dibbs developed the game of jackstones.

DIB'DIN, CHARLES (1745–1814). An English dramatist and song writer. He was born at Southampton and began his literary career with an opera called *The Shepherd's Artifice,* produced at Covent Garden Theatre in 1762. Already a popular actor, he gained great celebrity, in 1789, by a series of musical entertainments entitled *The Whim of the Moment.* He died in straitened circumstances. Dibdin wrote about 70 dramatic pieces and, according to his own account, 900 songs, of which the best known are "Poor Jack" and "Tom Bowling." He composed the music of his songs and sang them himself. Of his sea songs, he said, they "have been the solace of sailors in long voyages, in storms, in battle; and they have been quoted in mutinies to the restoration of order and discipline." His sons, Charles and Thomas John, wrote songs and dramas. Consult: his *Professional Life* (1803), an autobiography; a brief *Life* in G. Hogarth's edition of his songs (1843); Dibdin, *The Dibdins* (London, 1888).

DIBDIN, THOMAS FROGNALL (1776–1847). A British bibliographer. He was born at Calcutta, India, studied at Oxford, and, after a short career as a lawyer, entered the Established church in 1804. He began his work in 1797 and until 1844 produced a great number of publications of a bibliographical and antiquarian character, which while they show an immense amount of labor, are so full of inaccuracies as to be almost totally unreliable. His *Bibliomania* (1809) was effective in stimulating interest in rare and early editions and led to the hearty reception of his proposal for an association of bibliophiles, which was organized as the Roxburghe Club (q.v.) in 1812, Dibdin being its first vice president. In addition to the *Bibliomania,* Dibdin's principal works are: An *Introduction to the Greek and Latin Classics* (1802); *Typographical Antiquities of Great Britain* (4 vols., 1810–19); *The Bibliographical Decameron* (1817); *Bibliotheca Spenceriana* (1814); *Bibliographical, Antiquarian, and Picturesque Tour in France and Germany* (1821); *The Library Companion* (1824); *Reminiscences of a Literary Life* (1836).

DI'BON. The name of two cities mentioned in the Bible. 1. A city in Moab, the modern Dhiban, about 4 miles north of Arnon (Wady Mojib) on the road between Heshbon and Petra. According to Num. xxxii. 34, it was built by the Gadites, and, in harmony with this account, the place is referred to as Dibon-Gad in Num. xxxiii. 45. In Num. xxi. 30 the Amorite King, Sihon,

is said to have reigned over Moab "from Heshbon to Dibon." It has been held by Meyer, Stade, and many scholars that the ancient song whence this fragment is taken celebrated victories of Israel over Moab in the ninth century B.C. But Schmidt, in *Messages of the Poets* (1911) and "Songs of the Conquest," in *Journal of Biblical Literature* (1914), and Böhl, in *Kananäer und Hebräer* (1911), have shown that there is no reason to doubt the existence of Sihon's kingdom in the light of what is now known concerning the Amorites (q.v.), and no situation in the ninth century that can be reflected in the song. That is also emphasized by the Mesha inscription found by Klein at Dibon in 1868. (See MOABITE STONE.) Mesha is here called the Dibonite, or Daibonite, as the presence of the *yod* and the Greek Δαίβων suggest that the true pronunciation was. It is not quite clear whether the name is limited to the city or extended to the adjacent territory, and it has therefore been supposed that the proper name of the city in earlier times was Qorcha, and Daibon the name of the district. But it is more probable that Qorcha was the name of a certain quarter of the city where the royal residence was, and that the relation between Qorcha and Daibon was analogous to that between Zion and Jerusalem. 2. A place in Judah, mentioned in Neh. xi. 25, the present Dhaib, 5 miles north of Arad.

DIBRA, dē'brȧ. A city in the Kingdom of Servia, 3 miles from the juncture of the Black Drin and Radika rivers, near the Albanian frontier (Map: Turkey in Europe, C 4). The population, numbering about 16,000, are mainly Albanians, but there are influential Serb and Bulgarian colonies, the latter of whom support the only bishop of the Bulgarian exarchate among the Albanians. Dibra is a fortified city, and the centre of an important agricultural trade. It was long the capital of the sanjak of Dibra in the Turkish Vilayet of Monastir, but was taken by the Servians in the Balkan War (q.v.) and confirmed to them by the treaty adjustments of 1913.

DIBRAN'CHIA'TA (Neo-Lat. nom. pl., from Gk. *δίς, dis,* twice + *βράγχια, branchia,* gills). A group of cephalopod mollusks, characterized by the presence of a pair of gills and by the internal position of the shell, as contrasted with the two pairs of gills and external shell of the tetrabranchiate nautiloids; the dibranchiate skeleton supporting the internal organs; the tetrabranchiate shell serving as an external protective covering to the animal. The Dibranchiata have undoubtedly been evolved from the Tetrabranchiata, probably in Triassic time, and there are even yet a few living forms, as *Spirula,* which are relics of the early intermediate stages between the two groups. Modern examples are the cuttlefish, squid, octopus, and sepia (qq.v.); while *Belemnites* (q.v.), *Belemnoteuthis, Geoteuthis* (q.v.) are a few of the many fossil forms which range from Triassic to recent times. For illustration, see Colored Plate of DECAPODS, ETC.

DI'CÆAR'CHUS (Lat., from Gk. *Δικαίαρχος, Dikaiarchos*). A Greek philosopher of Messina, in Sicily, a contemporary of Aristotle, and friend of Theophrastus (q.v.). The ancients, including Cicero, warmly praise his works. Of these it is quite impossible to determine an accurate bibliography, since many referred to as independent works were probably sections of larger volumes. His *Βίος* 'Ελλάδος ('The Life of Greece,' in 3 books), in addition to political affairs, took some account of poetry, music, and the games, and was thus the pioneer attempt in what the Germans style *Kulturgeschichte.* The fragments of this work were edited by Fuhr (1841). His *Τριπολιτικός, Tripoliticos,* was an account of the ideal form of government: this Dicæarchus found in a mixture of monarchy, aristocracy, and democracy, such as existed at Sparta. In his *Λεσβιακοὶ Λόγοι, Lesbiakoi Logoi,* and his *Κορινθιακοὶ Λόγοι, Korinthiakoi Logoi,* cast in dialogue (q.v.) form, he sought to prove the soul mortal. (Consult Cicero, *Tusculanæ Disputationes,* i, 21 and 77, and editors there.) He wrote also a description of the world, illustrated by maps; in this field he was the most important forerunner of Eratosthenes (q.v.). Consult the article "Dikaiarchos, 3," in Pauly-Wissowa, *Real-Encyclopädie der klassischen Altertumswissenschaft,* vol. v (Stuttgart, 1905), and Christ, *Geschichte der griechischen Litteratur,* vol. ii (5th ed., Munich, 1913).

DICÆ'UM (Neo-Lat., coined by Cuvier, 1817). A genus of Oriental and Australasian small birds, typical of a family, Dicæidæ, closely allied to the sunbirds. They are sometimes called honey peckers or flower peckers (in India), but without much reason, and the scientific name has become English in Australia, where the family is most prominent. All are small, brilliant-colored, insect-eating birds, with melodious voices, and most of them build elegant purse-shaped nests of soft materials suspended from bushes. The swallow dicæum (*Dicæum hirundinaceum*) is one of the best known, and resembles in size, shape, and habits one of the northern kinglets, but is purple blue, with a red throat and under tail coverts. Some ornithologists put here also the diamond bird (q.v.), but most class it elsewhere. See Plate of PENSILE NESTS OF BIRDS, with NIDIFICATION.

DI'CAST (Gk. *δικαστής, dikastēs,* from *δίκη, dikē,* right, justice). A member of the popular courts of Athens. These courts seem to have been instituted by Solon, and from the fifth century B.C. were a most important part of the democratic government. From the body of Athenian citizens over 30 years of age there were chosen annually by lot 6000 in the fifth century, 5000 or possibly fewer in the fourth century. From this number sections, of not over 501, were chosen daily to hear cases. In very important trials two or more sections might be combined, and we hear of one court of 2500 jurors; sometimes, on the other hand, but 20 or 40 formed the court. The evidence was taken beforehand by a magistrate, who presided at the trial, and the dicasts merely listened to the speeches of the parties to the suit and the reading of the evidence. The voting was secret, and the dicasts were sworn to render their decision in accordance with the laws and the evidence. Unlike a modern jury, they were the sole judges of the law as well as of the facts, a condition which hindered the development in Athens of any such body of judicial precedents as grew up in Rome. Consult Meier and Schömann, *Der attische Process* (Berlin, 1883–87), and Lipsius, *Das attische Recht und Rechtsfahren* (Leipzig, 1905–). See HELIÆA.

DICE (OF. *de, det,* Fr. *dé,* Sp., Portug., It. *dado,* die, from Lat. *datus,* p.p. of *dare,* to give). The origin of dice is variously ascribed by some authors to occult sources, but more authentically to Psalmedes of Greece (1244 B.C.).

Without question the games played with them are the simplest and most universal games of chance in the world. The dice exhumed from Thebes differ in no respect from the six-sided cubes of bone or ivory in use to-day, with spots ranging on each side from 6 to 1, the sum of the spots on the opposite sides of a cube always making 7. Dice are thrown nearly universally from a cylindrical hollow case, but among the negroes, in the game of craps (q.v.), they are cast from the hand. Mostly they are thrown from the box upon a table, but it was not uncommon in some parts of England until quite recent times to throw them into a bowl. According to the purposes of the cast, any number, from one to five dice, are cast. The highest aggregate numbers exposed on the top of the dice when they settle, in one or more throws, as agreed, win. There are a variety of other purely dice games, such as "round the spot," wherein only those spots which lie round a centre spot are counted, such as three or five—the first counting two and the other four; "multiplication," in which the first throw is three dice, the highest being left on the table and the two thrown again, the highest being again left and the last one thrown again; and "draw poker," played with five dice, each player having one throw and the privilege of a second. In the first throw all the dice are thrown, but the player need not take them all up; he may select only those which are satisfactory to him or leave the whole. The throws rank as in the card game of poker (q.v.), beginning with the lowest: one pair, two pairs, triplets, a full hand, four of the same; the highest throw is five alike. *Vingt-un* is played with a single die, each player throwing as often as necessary to get the sum of the spots equal to, or as near as possible, not over, 21. "Ace in the pot" and "help your neighbor" are other combinations of throwing the dice, or, in other words, "casting the die." Unscrupulous gamblers adopt the practice of loading dice by plugging them with lead on a particular side, so that the highest number may turn up, by gravitation, as the dice roll out of the box. Consult *Foster's Complete Hoyle* (New York, 1909).

DICEN'TRA (Neo-Lat. nom. pl., from Gk. *δίκεντρος, dikentros*, two-pointed, from *δι-, di-*, double + *κέντρον, kentron*, point). A genus of hardy perennial plants of the family Fumariaceæ. *Dicentra spectabilis*, bleeding heart, a native of Siberia and the northern provinces of China, was introduced into Great Britain from the island of Chusan in 1846 and rapidly became a general favorite on account of its long racemes of drooping, delicate, rosy-pink flowers. The common squirrel corn (*Dicentra canadensis*) is one of the first spring flowers of the northern and eastern United States, as is also Dutchman's-breeches (*Dicentra cucullaria*). Dielytra is an old name for the genus *Dicentra*.

DICEY, dī'sĭ, Albert Venn (1835–1922). An English barrister and author. He was educated at Balliol College, Oxford, was admitted to the bar in 1863, from 1882 until 1909 was professor of English law in the University, and later became a fellow of All Souls' and an honorary fellow of Trinity College. He received in 1890 an appointment as Queen's Counselor and in 1899–1912 was principal of the Workingmen's College. His publications include: *The Privy Council* (Arnold prize essay, 1860 and 1887); *The Law of Domicil* (1879); *England's Case against Home Rule* (1886); a *Treatise on the Conflict of Laws* (1896); *Lectures on the Relation between Law and Public Opinion in England during the Nineteenth Century* (1905); *Introduction to the Study of the Law of the Constitution* (7th ed., 1908).

DICEY, Edward (1832–1911). An English journalist and author. He was educated at Trinity College, Cambridge, was for a time a leader writer for the *Daily Telegraph*, and from 1870 to 1889 was editor of the *Observer*. In 1875 he was called to the bar. He was regarded as an authority on matters appertaining to South Africa, Bulgaria, and Egypt. He was created C.B. in 1886. His publications include: *Rome in 1860* (1861); *The Schleswig-Holstein War* (1864); *The Morning Land* (1870); *England and Egypt* (1884); *Bulgaria, the Peasant State* (1895); *Story of the Khedivate* (1902); *The Egypt of the Future* (1907).

DICHOGAMY, dī-kŏg'ą-mĭ (Gk. *δίχα, dicha*, in two + *γάμος, gamos*, marriage). Flowers whose anthers and stigmas do not mature at the same time are said to be dichogamous. "Protandry" is the condition in which the anthers mature first; "protogyny" that in which the stigmas mature first. See Pollination.

DICHOTOMY, dī-kŏt'o-mĭ (Gk. *διχοτομία, dichotomia*, a cutting in two, from *δίχα, dicha*, in two + *τέμνειν, temnein*, to cut). In botany, a form of branching in which the axis forks at the apex and hence continues no farther. It is specially characteristic of cryptogams. (See Branching.) In logic, the method of exhaustive division in classification, of which the device known as the Tree of Porphyry may be considered typical (consult, e.g., *Lessons in Logic*, W. Stanley Jevons, London, 1880). In metaphysical anthropology, the theory of man as a twofold being, physical and spiritual, or consisting of body and soul.

DI'CHROISM (from Gk. *δι-, di-*, double + *χρόα, chroa*, color), **TRI'CHROISM, PLE'OCHRO'ISM.** Crystals not only absorb in different amounts the light of different wave lengths, but, unlike uncrystalline or amorphous substances, the amount and kind of absorption differ according to the direction in which light is transmitted through the crystal. This selective and differential light absorption is rarely perceived by the unaided eye, because so many rays from a crystal enter the eye simultaneously. If, however, polarized light be employed to bring successively into the eye light rays which at any given instant vibrate along a single direction of a colored crystal, a change in color is generally noticeable. This selective light absorption along the different directions within a crystal is termed dichroism or pleochroism. Crystals of the isometric system alone possess no pleochroism. Crystals of the tetragonal and hexagonal systems exhibit two extreme colors (dichroism), between which all the other colors produced clearly graduate. Crystals of the remaining crystal systems exhibit three extreme colors (trichroism), with regard to which all the other colors produced by the crystal are intermediate. The dichroscope is a simple device for measuring both the quality and quantity of dichroism. See Crystallography.

DI'CHROITE. See Iolite.

DICHRO'MATISM IN BIRDS (Gk. *δι-, di-*, double + *χρῶμα, chrōma*, color). The name given to that peculiar occurrence of two phases of color in the plumage of a species of bird,

not due to age, sex, or locality, which is so well illustrated by the common eastern screech owl of the United States (*Otus asio asio*), some individuals of which are gray and some rusty red. This phenomenon is not infrequent among birds, but it is not always easy to determine what constitutes a clear case of it. Thus, some ornithologists regard the various species of flicker (*Colaptes*) as di- or rather tri-chromatic forms of a single species, while others do not regard this as the same sort of a phenomenon as the color phases of the screech owl. There are at least three distinct forms of dichromatism, known as *albinism*, *melanism*, and *erythrism*. The first is that form in which one of the phases is white, and a number of examples occur among the herons as well as in other groups of birds. One of the best-known cases is that of the little blue heron (*Florida cærulea*), some specimens of which are pure white, while others are slaty blue. It was at one time supposed that the former were the young, the latter the adults; but careful study on their breeding grounds has shown that the differences are not associated in any way with age or sex. Some evidence has been produced to show that geographical conditions may have something to do with the matter, for the white birds are said to be most common on the Atlantic coast of Florida, while the colored phase is most abundant on the Gulf coast. Melanism is a form of dichromatism in which one color phase becomes very dark, almost or quite black. Examples of this occur among the large hawks of the genus *Buteo*. It should be stated that in these cases the color phases are not sharply set off from each other, as in the herons, and the melanism is rather closely associated with distribution. Erythrism is the form shown by the screech owls, already referred to, in which one phase tends to become red.

A satisfactory explanation of dichromatism is still to be offered, but recent investigations have thrown some light upon it. In the screech owl the red phase is due to a "quantitative difference" in the distribution and relative amounts of pigment, and it is said that gray individuals may become red. For these experiments consult Chadbourne, *The Auk*, vols. xiii, xiv (New York, 1896, 1897). These results should be confirmed before they are accepted as absolute. In other cases, such as the herons, it is more than possible that we have examples of species in the process of formation, and that at some future day the slaty-blue individuals of the little blue heron, e.g., will breed only with slaty-blue individuals and produce only slaty-blue offspring, while the white birds will breed only with white birds and produce white young. We should then have just such a condition as now exists in the ibises of the genus *Guara*. The white ibis (*Guara alba*) and the scarlet ibis (*Guara rubra*) are exactly alike, except for the striking difference in color, but they never breed together and are therefore regarded as two distinct species and not as dichromatic forms of one. The whole question is one of exceptional interest and seems to be closely bound up with that of the origin of species.

DICHTUNG UND WAHRHEIT, dĭk'tụng ụnt vär'hīt. See GOETHE.

DICK, CHARLES (1858–). An American legislator, born at Akron, Ohio, where, after admission to the bar in 1893, he took up the practice of law. During the Spanish-American War he served with the Eighth Ohio Volunteers. He was auditor of Summit Co., Ohio (1886–93), chairman of the Republican County Committee (1887–91) and of the Republican State Executive Committee (1892–94 and 1899–1907), secretary of the Republican National Committee (1897–1900), and delegate to the Republican National Convention (1892, 1896, 1900, and 1904). While a Representative in Congress (1898–1904), he introduced the Dick Militia Bill, which became law. He was United States Senator from 1904 to 1911.

DICK, JOHN (1764–1833). A Scottish Secession theologian. He became pastor in Glasgow in 1801 and theological professor in 1820 and is remembered for his *Lectures on Theology* (4 vols., with memoir, 1834; Am. ed., 2 vols., 1836).

DICK, MR. A household abbreviation for Mr. Richard Dabley, a demented character in Dickens's *David Copperfield*.

DICK, SIR ROBERT HENRY (c.1785–1846). A Scottish soldier, son of a doctor in the East India Company's service. He entered the army in 1800 and served as an officer in the Peninsular War, fighting at Busaco, Fuentes de Onoro, and Salamanca. He distinguished himself at Quatre Bras and Waterloo; in 1837 was promoted to be major general, and in 1841–42 was acting commander in chief at Madras. In 1846 he assumed command of the Third Infantry Division in the Sikh War. He fell while leading a second charge against Sikh intrenchments at Sobraon.

DICK, THOMAS (1774–1857). A Scottish scientific writer. He was born near Dundee and studied science and theology at the University of Edinburgh. After a brief pastoral charge in connection with the Secession church of Scotland, he devoted himself to teaching, lecturing, occasional preaching, and authorship. Towards the close of his life a small pension was granted him in consideration of his literary services, his books having brought him very little pecuniary return, in spite of their great popularity both in England and the United States. He died at Broughty Ferry, near Dundee. Dick's principal works are: *The Christian Philosopher, or the Connection of Science and Philosophy with Religion* (1823; 8th ed., 1842); *The Philosophy of Religion* (1825); *The Philosophy of a Future State* (1828); *Celestial Scenery* (1837); *The Sidereal Heavens* (1840); *The Practical Astronomer* (1845). Several of Dick's writings have been translated into foreign languages, one even into Chinese. Consult Chambers, *Eminent Scotsmen* (Edinburgh, 1868).

DICK BEQUEST. A fund now amounting to some £122,000, established in 1828 by James Dick, of Finsbury Square, London, for the benefit of the parish schoolmasters of Moray, Banff, and Aberdeen, Scotland. These funds yield about £4000 a year, which is distributed as an honorarium among the schoolmasters on the basis of their acquirements in the English language and literature, geography, mathematics, Latin, Greek, history, physics, and the art of teaching. Mr. Dick's object was to encourage active schoolmasters and gradually to elevate the literary character of the parochial schoolmasters and schools. His purpose has been so far successful that the grade of these schools has been advanced, and in many cases students go directly from them to the universities. Consult J. Kerr, *Scottish Education, School and University from Early Times to 1908* (Cambridge, 1910).

DICKCIS'SEL (imitative). The black-throated bunting (*Spiza americana*) of the open regions of the central United States, one of the most pleasing of American fringilline birds. Its back is black, chestnut, and grayish; bend of the wing, bright chestnut; chin, white; throat, black, in a conspicuous crescent; breast, yellow, changing to white towards the tail. The female lacks the black breastmark and the chestnut colors. The species is migratory, coming northward to make its nest on the ground, or in a low bush, where pale-blue eggs are laid. It is a loud and persistent singer. "All day long," says Ridgway, "in spring and summer, the males, sometimes to the number of a dozen or more for each meadow of considerable extent, perch upon summits of tall weed stalks or fence stakes, at short intervals, crying out: 'See, see, dick, dickcissel, cissel'; therefore 'Dick Cissel' is well known to every farmer's boy." See illustrations on Plate of BUNTINGS, ETC., and of EGGS, I.

DICK'ENS, CHARLES (1812–70). An English novelist. He was born at Landport, a suburb of Portsea, Feb. 7, 1812, and was baptized Charles John Huffham. His father, John Dickens, who held a post in the navy pay office, was then stationed at Portsmouth, but about 1816 they moved to Chatham and afterward to London. The family was poor and improvident. His father, whom he afterward portrayed in Mr. Micawber, was imprisoned for debt in the Marshalsea, and the family for a time resided in the prison with him. Dickens worked for a while in a blacking warehouse, but after his father was relieved from his embarrassments by a fortunate legacy, Charles attended private schools. His opportunities on the whole, however, were slight, but he read considerably at home and in the British Museum and learned shorthand. He was educated by contact with life itself. After a period of reporting in the courts and in the House of Commons Dickens began in the *Monthly Magazine* (December, 1833), and continued in the *Evening Chronicle*, a series of essays and tales, collected and published in 1836, under the title *Sketches by Boz*. Encouraged by their success, he undertook to write the letterpress of the *Posthumous Papers of the Pickwick Club*, the illustrations of which were to be executed by Robert Seymour, a comic draftsman. As soon as Dickens introduced Sam Weller, the plates became of secondary interest. The *Pickwick Papers*, which appeared in monthly numbers (1836–37), not only had enormous commercial success, but they also mark an era in English literature. It was the first of a series of fictions exhibiting the life and manners of the middle and lower classes, which up to that time had rarely found an exponent, and in one respect this book probably had neither predecessor nor progeny. Neither before nor since, if we except *Humphrey Clinker*, has there ever been such a literary embodiment of healthy animal spirits. There is none like it for unflagging but never unwise merriment—for humor that is very much the reverse of dry. *Pickwick* was followed by *Oliver Twist* (1837–39) and *Nicholas Nickleby* (1838–39), adventures in the picaresque manner. They are among the first of those social novels which form so marked a feature of modern literature. The former was an exposure of workhouses and of the city conditions that lead the children of the poor into crime; the latter was aimed at the wrongs and cruelties inflicted upon their wretched pupils by the cheap schoolmasters of Yorkshire. Both hit their mark. After this beginning Dickens set lance in rest against many a social monster. He may be sometimes wrong, but in spite of his exaggerations he can scarcely be accused of want of honesty of purpose; while quite as little can partisanship (except that he is always for the poor) be laid to his charge, since at the very time when the country gentlemen were shaking their heads at him for his want of reverence for "land," he incensed the manufacturing interest by the publication of *Hard Times* (1854). His sarcasm is of a rather peculiar character; too good-natured to sneer, and with eyes, notwithstanding their indignant fire, that never lose sight of the ludicrous side of things; his style is mocking argument. After *Nicholas Nickleby* came *The Old Curiosity Shop* (1840) and *Barnaby Rudge* (1841). In the former, in the character of Little Nell, he first exhibited a power of setting forth child life and child thought unequaled before the appearance of George Eliot. *Barnaby Rudge* was his first and, with the exception of the *Tale of Two Cities* (1859), his only attempt to describe the past; and it was not entirely successful. A disposition of mind towards the weird and the grotesque, which showed itself in *The Old Curiosity Shop*, was subsequently developed with greater success in his *Christmas Stories* (1853), especially in *A Christmas Carol*. After a voyage across the Atlantic Dickens published, in 1842, *American Notes for General Circulation;* but a much more admirable result of that visit to the United States appeared in *Martin Chuzzlewit* (1844), which was perhaps the greatest of his humorous works since *Pickwick;* at least, the English scene is made delightful by the immortal Pecksniff and Mrs. Gamp, but the rascality in the American part of the book had no such good humor, and the violence of his satire does not become more attractive with time. After this work his animal spirits—a rare gift among even comic authors, and seldom lasting so long as in his own case—began to desert him. Humor, except in some rich creations, such as Mr. Micawber, was no longer so apparent; while, on the other hand, satire and pathos increased. In February, 1844, he went to Italy for rest, but returned at the end of the year to read to his friends *The Chimes*. His two other famous Christmas stories, the *Christmas Carol* and *The Cricket on the Hearth*, he wrote in 1843 and in 1845. After another year in Italy he tried for a month to edit the *Daily News*, from January to February, 1846, but he had no equipment for editing a newspaper. In June he was in Switzerland, at work on *Dombey and Son* (1848), which, in spite of its popular success, was considered a falling off in one who stood so high. Yet, when men were expecting that he would wane and weaken like other prolific writers before him, he produced *David Copperfield* (1850), a favorite with many, and preferred by Dickens himself to all his other novels. In this novel he adopted the form of an autobiography, and that perhaps offered him some advantages; at all events, the result was admirable. *Bleak House* (1853); *Hard Times* (1854); *Little Dorrit* (1857); *A Tale of Two Cities* (1859); *Great Expectations* (1861), regarded by Swinburne as the best and most artistic of Dickens's books; and *Our Mutual*

Friend (1865), by many readers thought to be his masterpiece, afterward succeeded one another with almost periodical punctuality, and each was awaited by an immense audience. In 1850 he commenced a weekly periodical entitled *Household Words*, and in 1859 a similar publication called *All the Year Round*. In 1858 he began his long series of public readings, which brought him applause and money, but which in the end broke down his health. In 1867 he again visited America, giving numerous readings and meeting with a brilliant reception. He was at the last engaged in writing a new novel, *The Mystery of Edwin Drood*, which was left unfinished. He died at Gadshill, June 9, 1870, and was buried in Westminster Abbey, June 14.

The work of Dickens has been variously estimated. All admit his great humor, but to some his pathos seems much overdrawn. He possessed immense creative power, the number of his characters running into the thousands. The essence of his art is caricature, and for comic effect he exaggerated the abuses he attacked. He was a great amateur actor, of a broad, slightly burlesque type; his method on the stage and on the page was the same. In character building he hit upon some oddity and transformed it into a delightful type never to be forgotten. Consult: Forster, *Life of Dickens* (London, 1872–74); Fields, *Yesterdays with Authors* (Boston, 1872); Kent, *Charles Dickens as an Actor* (London, 1872); *Letters*, ed. by Miss Hogarth and Miss Dickens (ib., 1880–82); Ward, *Dickens* (ib., 1882); Marzials, *Life of Charles Dickens* (1887); Pemberton, *Charles Dickens and the Stage* (ib., 1888); Gissing, *Charles Dickens: A Critical Study* (New York, 1898); Fitzgerald, *The History of Pickwick* (London, 1891); Kitton, *The Novels of Charles Dickens* (ib., 1897); Hughes, *Dickens as an Educator* (New York, 1900); Fitzgerald, *Life of Charles Dickens as Revealed in his Writings* (London, 1905); Chesterton, *Life of Charles Dickens* (New York, 1906); Thomson, *Bibliography* (Warwick, 1904); Lehmann, *Charles Dickens as an Editor* (New York, 1912); Pugh, *The Charles Dickens Originals* (London, 1912); P. H. Fitzgerald, *Memoirs of Charles Dickens* (London and New York, 1914). Essays and editions are numerous. Collected editions appeared in England in 1847, in 1861, and in 1874. One of the most recent editions is Kitton, *The Autograph Edition of Complete Works* (56 vols., New York, 1902).

DICK'IE, George William (1844–). An American naval engineer. He was born at Arbroath, Scotland; studied mechanical and naval engineering, came to the United States in 1869, and was connected with steamship designing on the Pacific coast. From 1893 to 1905 he was manager of the Union Iron Works, San Francisco, Cal., and in that capacity became identified with the execution of much naval work for the United States government. In 1905 he became consulting marine and mechanical engineer of San Francisco. He was at one time president of the Technical Society of the Pacific Coast. He wrote *Pumping and Hoisting Works* (1876) and numerous papers and articles.

DICKINS, John (1747–98). An American clergyman. He was born in London and was educated at Eton, but, removing to America before the Revolution, he became one of the most efficient promoters of the Methodist Episcopal church in this country. A Latin, Greek, and Hebrew scholar, he had much to do with the founding of Cokesbury College at Abingdon, Md., the first institution of higher learning established by the Methodists. He preached in Virginia and North Carolina and in 1783 was sent to New York City to take charge of the John Street congregation. In 1789 he was transferred to Philadelphia, where he established the Methodist Book Concern. This was subsequently removed to New York. The first book published was *The Imitation of Christ* by à Kempis. Dickins did an important work in gathering and publishing the minutes of the annual Methodist conferences. Consult Atkinson, *Centennial History of American Methodism* (New York, 1884); also the volume entitled *Centennial of the Methodist Book Concern* (ib., 1890).

DICK'INSON. A city and the county seat of Stark Co., N. Dak., 310 miles west of Fargo, a division point on the Northern Pacific Railroad (Map: North Dakota, B 4). The city contains a Carnegie library, a hospital, and a State agricultural experiment station. Its chief industries are stock raising, milling, the shipping of agricultural implements, wheat growing, and pressed brick works. Clay and lignite coal abound in the surrounding regions. First settled in 1880, its government in 1906 was vested in a mayor, elected biennially, and a unicameral council. It owns and operates its water works. Pop., 1900, 2706; 1910, 3678.

DICKINSON, Anna Elizabeth (1842–). An American lecturer, author, and actress, born in Philadelphia. She became prominent through her fiery addresses on total abstinence, abolition, politics, and woman suffrage. After a time she devoted her whole attention to lecturing and to the drama, writing *A Crown of Thorns* (1876), in which she herself played; *True to Herself*, and *What Answer?* (1868), a novel; *Mary Tudor* and *Aurelian*, dramas; and *A Ragged Register of People, Places, and Opinions* (1879). In 1880 Fanny Davenport appeared with success in her *American Girl*.

DICKINSON, Daniel Stevens (1800–66). An American statesman, born in Goshen, Conn. He was admitted to the bar in 1828, was elected to the Senate of New York State in 1836, became Lieutenant Governor in 1842, and in 1844 was appointed by the Governor to a vacancy in the United States Senate. In 1861 he was elected Attorney-General of New York, and in 1865 was appointed district attorney for the southern district of the State. During the Civil War he actively supported the cause of the government. He was an able debater, and for a time leader of the Democratic party in New York. In the Republican National Convention of 1864 he received 108 votes for the vice-presidential nomination. Consult Dickinson's *Life and Works* (2 vols., New York, 1867).

DICKINSON, Donald McDonald (1846–1917). An American lawyer and politician. He was born at Port Ontario, N. Y., graduated at the University of Michigan in 1867, and was admitted to the bar in the same year. He was Postmaster-General in 1888–89, chairman of the National Democratic Campaign Committee in 1892, and senior counsel for the United States before the Bering Sea Claims Commission in 1896–97. He was a member of the Court of

Arbitration to adjust the controversy between the United States and the Republic of Salvador in 1902.

DICKINSON, Emily (1830–86). An American poet, born at Amherst, Mass. She lived a secluded life and published almost nothing during her lifetime. At her death T. W. Higginson, with Mrs. Mabel Loomis Todd, edited a volume entitled *Poems by Emily Dickinson* (1890), which attracted considerable attention and was followed by another volume of poems as well as by a volume of selected letters. In thought her introspective lyrics are striking, but are deficient in form. Her *Letters* (ed. by Mabel L. Todd) appeared in 1906.

DICKINSON, G(oldsworthy) Lowes. An English writer on historical and religious topics, son of a well-known artist, Lowes Dickinson. He was educated at the Charterhouse and at King's College, Cambridge, of which he became fellow and lecturer. He also lectured at the London School of Economics and Political Science. Particularly felicitous in his use of the dialogue as a literary form, he wrote: *The Greek View of Life* (1890; 3d ed., 1906); *From King to King: The Tragedy of the Puritan Revolution* (1891; 2d ed., 1907), dialogues; *Revolution and Reaction in Modern France* (1892); *The Development of Parliament During the Nineteenth Century* (1895); *Letters from a Chinese Official* (1903; in England, 1901, called *Letters of John Chinaman*), which came out anonymously, being reprinted from the *Saturday Review*, and which was answered by William Jennings Bryan in his *Letters to a Chinese Official* (1906), taking seriously the Chinese authorship; *Religion: A Criticism and a Forecast* (1905); *A Modern Symposium* (1905) on philosophic schools of thought; *Justice and Liberty* (1908); *Is Immortality Desirable?* (1909), the Howard Ingersoll Lectures; *Religion and Immortality* (1911). Consult Chesterton's *Heretics* (London, 1909) for an interesting, but unsympathetic criticism of "Paganism and Mr. Lowes Dickinson," and More, *Shelburne Essays*, vol. vii (New York, 1910).

DICKINSON, Jacob McGavock (1851–). An American lawyer and cabinet officer, born at Columbus, Miss. After graduating from the University of Nashville in 1871, he studied law at Columbia Law School, the University of Leipzig, and in Paris. Admitted to the bar in 1874 he practiced in Nashville until 1899 and in Chicago from 1899 to 1909. Several times he was called upon to serve on the supreme bench of Tennessee by special commission. He was also Assistant Attorney-General of the United States (1895–97), Federal solicitor (1899–1901), and general counsel (1901–09) of the Illinois Central Railroad Company, and counsel for the United States before the Alaskan Boundary Tribunal (1903). From 1909 to 1911 he was Secretary for War in the cabinet of President Taft. He served as president of the American Bar Association in 1907–08.

DICKINSON, John (1732–1808). An American statesman and publicist, known as the "Penman of the Revolution." He was born in Talbot Co., Md., but in 1740 removed with his father to Delaware. He began the study of the law in Philadelphia in 1750; entered the Middle Temple, London, England, in 1753, and in 1757 began practice in Philadelphia. In 1760 he became a member of the Delaware Assembly and in 1762 was elected to the Pennsylvania Assembly, where he served with great distinction until 1765 and again from 1770 to 1776. He was also a member of the Stamp Act Congress and from 1774 to 1776 of the Continental Congress; served for a time in the American army, first as a private and afterward as a brigadier general in the Delaware militia; was Governor of Delaware from 1781 to 1782, again a member of the Continental Congress in 1779–80, and Governor of Pennsylvania from 1782 to 1785; and afterward took a prominent part in the debates of the Constitutional Convention of 1787, and in the discussions in Pennsylvania and Delaware over the ratification of the Constitution. He is best known, however, as a writer of state papers and pamphlets, in which capacity up to 1776 he ranked foremost among his contemporaries. Among the important state papers which he drafted or wrote were the "Resolutions in relation to the Stamp Act," adopted by the Pennsylvania Assembly in 1765; the "Declaration of Rights" and the "Petition to the King," adopted by the Stamp Act Congress; the "Essay on the Constitutional Power of Great Britain over the Colonies in America," adopted by the Pennsylvania Convention; the "Address of Congress to the Inhabitants of the Province of Quebec"; the "Petition of Congress to the King"; the "Declaration by the United Colonies of North America . . . Setting Forth the Causes and Necessity of Their Taking up Arms"; the "Articles of Confederation" (first draft); and the "Address of Congress to the Several States on the Present Situation of Affairs" (1779). In addition, he wrote numerous pamphlets and newspaper articles, the most famous of which were the celebrated *Farmer's Letters*, published at Philadelphia in 1767. These "letters" had a wide circulation and produced such an effect on both sides of the Atlantic that their appearance has been regarded as "the most brilliant event in the literary history of the Revolution." Dickinson's influence waned after 1776 on account of his opposition to the Declaration of Independence, which he refused to sign; but a series of papers written by him in 1787–88, under the pseudonym "Fabius," were widely read and contributed much towards inducing Pennsylvania and Delaware to ratify the Constitution. In the literature of the Revolution, says Ford, the editor of Dickinson's writings, he was "as preëminent as Washington in the war, Franklin in diplomacy, and Morris in finance." He helped to found Dickinson College at Carlisle, Pa., in 1783. His *Writings*, edited by Paul L. Ford, were published, in part, at Philadelphia in 1895. Consult Stillé, *The Life and Times of John Dickinson* (Philadelphia, 1891), and an excellent estimate of Dickinson's literary work in Tyler, *Literary History of the American Revolution* (New York, 1897).

DICKINSON, Jonathan (1688–1747). An American clergyman. He was born in Hatfield, Mass., and graduated at Yale in 1706. He was for 30 years a Presbyterian minister in Elizabethtown, N. J., and was a leader in this denomination. In 1746 he became president of the College of New Jersey (now Princeton University), and its first sessions were in his home in Elizabeth. He wrote a number of theological works, collected at Edinburgh (1793).

DICKINSON COLLEGE. An institution for higher education, founded in 1783, under the auspices of the Presbyterian church at Carlisle,

Pa. The charter of the college was granted by the General Assembly of the State as a result of an appeal made by the leading men of the Commonwealth, including Benjamin Rush and John Dickinson. It was named after the latter "in memory of the great and important services rendered to his country . . . and for the commemoration of his very liberal donation to the institution." This donation was a plantation of 200 acres in York County, another 500 acres in Cumberland County, $500 in cash, and a number of valuable books. The college began its work on April 6, 1784. Its first president was Rev. Charles Nisbet, D.D., and the faculty included, in addition to him, four instructors. In 1798 the present site of the college, comprising a town square, was purchased from the Penns for $150. The first building erected on the site was destroyed by fire before its completion. By popular subscription funds were raised to erect another building, completed in 1804. This is known as West College. The college continued under Presbyterian auspices until 1833, when, on account of difficulties which overtook it, representatives of the Methodist Episcopal church agreed to become responsible for its continuance, and a board of trustees composed of representative Methodists, with Bishop John Emory as chairman, was elected. The college has since been under Methodist Episcopal auspices. In addition to West College, the college buildings are South College (1835), East College (1836); the Law School (1877), Tome Scientific Building (1884), Gymnasium (1884), Bosler Memorial Library Hall (1885), Denny Memorial Hall (1896). The college has adhered to approved courses of study based upon four years of preparation in a good preparatory school. The degrees given by the college *in cursu* are B.A. and B.S. The students numbered in 1913–14 about 325, and the faculty 15. The annual income amounts to about $50,000. The president in 1914 was Eugene A. Noble.

DICK'S COFFEE HOUSE. A London coffee house, originally called "Richard's," after Richard Torner or Turner, who was its first proprietor (1680). The building still stands, on the south side of Fleet Street (No. 8), near the Temple.

DICK'SON, Sir James Robert (1832–1901). An Australian statesman. He was born at Plymouth, England, was educated in Glasgow, Scotland, and worked in the City of Glasgow Bank. He emigrated to Victoria in 1854, whence he removed to New South Wales and in 1862 to Queensland. In 1872 he was elected to the Queensland House of Assembly. In 1876 he entered the cabinet of Arthur Macalister as Minister of Public Works. He was Treasurer of the colony from 1876 to 1879 and from 1883 to 1887. From 1889 to 1892 he lived in Europe, returning in the latter year to conduct a campaign in favor of Polynesian labor in the Queensland sugar plantations. He was elected to the House of Assembly in 1892, 1893, and 1896. In 1897 he entered the Nelson cabinet as Secretary for Railways. In March, 1898, he became Secretary for Home Affairs, and in October following became Premier. He fought for an Australian commonwealth, secured a referendum of the question to the people, and after an active campaign obtained a majority at the polls in favor of federation. He resigned the premiership in November, 1899, but in December became Chief Secretary in Robert Philp's ministry, and early in 1900 visited London as a delegate from Queensland to discuss the affairs of the proposed commonwealth. On his return to Australia he was selected Minister of Defense in the first federal cabinet and was made K.C.M.G., but died about a week after the inauguration of the new government.

DICKSON, Leonard Eugene (1874–). An American mathematician, born at Independence, Iowa. After graduating from the University of Texas in 1893, he studied at the universities of Chicago, Paris, and Leipzig. He was instructor and assistant professor of mathematics in 1897–99 at the University of California, associate professor for a year at the University of Texas, and then assistant and associate professor at the University of Chicago until 1910, when he was appointed to a full professorship. He was also research assistant at the Carnegie Institution at Washington (1900). He became in 1910 one of the editors of the *Transactions* of the American Mathematical Society (of which he was a vice president in 1909–10), and of the *American Mathematical Monthly.* His publications include: *College Algebra* (1902); *Introduction to the Theory of Algebraic Equations* (1903); *Elementary Theory of Equations* (1914).

DICKSON, dĕk'sŏn, Baron Oskar von (1823–97). A Swedish merchant. He was born at Göteborg, of Scottish ancestry. He was a member of many learned societies, both in London and abroad, and gave liberal pecuniary support to North Pole enterprises, particularly those undertaken by Baron Nordenskjöld after 1868. In recognition of his distinguished public services he was ennobled in 1880, the title of Baron being conferred on him in 1885. Dickson Harbor and various other points in the Arctic regions have been named in his honor.

DICK'SON, Samuel Henry (1798–1872). An American physician. He was born in Charleston, S. C., graduated at Yale in 1814, and in 1819 received the degree of M.D. at the University of Pennsylvania. He was appointed to the professorship of the institutes and practice of medicine in the medical school of Charleston, S. C., in 1824; was professor of the practice of medicine in the University of New York from 1847 to 1850; in 1858 accepted the chair of the practice of medicine at Jefferson College in Philadelphia. His publications include: *Elements of Medicine* (1835); *Essays on Life, Sleep, Pain, etc.* (1852); *Studies in Pathology and Therapeutics* (1867).

DICKSON, William Purdie, D.D. (1823–1901). A Church of Scotland theologian. He was born at Pettinain Manse, Lanarkshire, Oct. 22, 1823; graduated at St. Andrews; was from 1863 to 1895 a divinity professor in Glasgow University, and then professor emeritus. Besides translating Mommsen's *History of Rome* (4 vols., rev. ed., 1895) and *Roman Provinces* (1887), and Meyer's *Commentary on the New Testament* (10 vols., 1873–80), he delivered the Baird lectures of 1883, *St. Paul's Use of the Terms Flesh and Spirit* (1883).

DICKSON CITY. A borough in Lackawanna Co., Pa., 4 miles north of Scranton, on the Delaware and Hudson Company, and the New York, Ontario, and Western railroads (Map: Pennsylvania, K 3). It is in a coal-mining region and has foundries and machine shops and silk mills. It is governed by a burgess and a unicameral

1

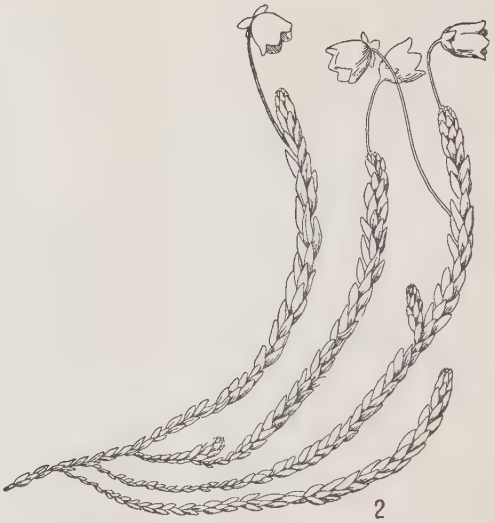
2

3

4

1. CARROT (Daucus Carota).
2. BUTTERCUP (Ranunculus sp.).
3. RED CLOVER (Trifolium pratense).
4. ELM TREE (Ulmus sp.).

1



2

3

4

1. MORNING-GLORY (Ipomœa sp.).
2. A HEATHER (Cassiope sp.).
3. ARNICA (Arnica sp.); *a*, general habit; *b*, ray-flower; *c*, disk-flower.
4. CATNIP (Nepeta Cataria); *a*, general habit; *b* single flower.

council. Pop., 1900, 4948; 1910, 93311914 (U. S. est.), 11,198; 1920, 11,049.

DIC'LINOUS PLANT (Gk. δι-, *di-*, double + κλίνειν, *klinein* to incline). A plant which has stamens and pistils in separate flowers. If the two kinds of flowers are on the same individual, the plant is called monœcious; if on different individuals, diœcious. See POLLINATION.

DI'COTYLE'DONS (Neo-Lat., from Gk. δι-, *di-*, double + κοτυληδών, *kotylēdōn*, cup-shaped, hollow, from κοτύλη, *kotylē*, cavity). One of the two great divisions of Angiosperms (q.v.). The Angiosperms are the most advanced, the most recent, the most conspicuous, and the most useful of plants. Approximately 120,000 species of Angiosperms have been described, about 105,000 of which are Dicotyledons. The chief characters which distinguish them from Monocotyledons, the other group of Angiosperms, are an embryo with lateral cotyledons (usually two); the vascular bundles of the stem forming a hollow cylinder, which means an annual increase in the diameter of woody stems; a net-veined system of venation, which means that the veinlets end freely in the tissues of the leaf or in the margins, often resulting in various forms of toothing, lobing, and branching; and flowers whose tendency is to display their parts in fives or fours or their multiples.

Two great groups of Dicotyledons are recognized—the Archichlamydeæ and the Sympetalæ. In the former there is either no perianth (calyx and corolla), or its parts are separate (dipetalous); in the latter the corolla is gamopetalous (petals coalesced). Formerly the Archichlamydeæ were divided into two groups—the Apetalæ, in which there are no petals, and the Polypetalæ, in which petals are present; but this division has been found to be too artificial to stand, as several natural families have both apetalous and polypetalous members.

Archichlamydeæ. This vast group contains approximately 62,000 species and 180 families. They are the primitive Angiosperms from which both the Monocotyledons and the Sympetalæ have been derived. At present they are grouped under 26 great orders. The first 12 orders, including about 6000 species, include many of the most common trees, as willows, walnuts, beeches, oaks, etc. Many of these were formerly grouped as Amentiferæ, a name referring to the characteristic flower cluster called ament, or catkin. This group of 12 orders does not seem to be related to any of the higher ones. Orders 13 and 14 also represent an apparently isolated group, including such plants as smartweeds, pigweeds, pinks, etc. Order 1 (Ranales), with approximately 4000 species is the great genetic order, which means that all the higher orders are thought to have been derived from it. Familiar families are buttercups, water lilies, magnolias. This order as not only given rise to the higher Archichlamydeæ and to the Sympetalæ, but also to the Monocotyledons. Orders 16 and 17, with approximately 3000 species, represent special branches from Ranales, the most specialized one probably being the mustards. Order 18 (Rosales), with over 15,000 species, is the greatest one among the Archichlamydeæ, with approximately 12,000 species. Another prominent family is the rose family, which gives the name to the order. Orders 19–25, including nearly 30,000 species, represent a tangle of relationships leading off in every direction from the preceding order. Order 26 (Umbellales), with over 25,000 species, is the highest one of the Archichlamydeæ. The dominant family is the parsley family, and associated with it are the dogwoods.

Sympetalæ. This is a much better defined group than the Archichlamydeæ, from which it is derived, including approximately 43,000 species in 51 families, which are grouped under eight orders. The sequence of orders from lowest to highest is as follows: Ericales, with approximately 1700 species, include the heaths, so characteristic of northern latitudes. Primulales, with approximately 1000 species, are represented by the primroses. Ebenales, with nearly 1000 species, are mostly tropical shrubs and trees, represented in the northern flora by the persimmon, but, as the name suggests, the characteristic family is the ebony family. Gentianales, with over 4000 species, are characterized by the gentians, from which the highly specialized milkweeds have come. Tubiflorales, with nearly 15,000 species, include those plants with conspicuous tubular corollas which are often irregular, and are represented by morning glories, polemoniums, mints, figworts, etc. Plantaginales, containing only about 200 species, comprises only the cosmopolitan plantains. Rubiales, with nearly 5000 species, are characterized by the madders, and associated with them are the honeysuckles. Finally, the Campanales, with about 14,500 species, stand as the highest order of Angiosperms, which means the culmination of the plant kingdom. The dominant family is known as the Compositæ, which includes such forms as sunflowers, asters, goldenrods, dandelions, etc. This great family is not only highest in rank, but greatest in numbers, including 12,500 species.

DICTAM'NUS. See DITTANY.

DICTA'TOR (Lat., from *dictare*, to dictate, frequentative of *dicere*, to say). In the earliest times, the name of the highest magistrate of the Latin confederation; and in some of the Latin towns the title was continued long after these towns were subjected to the dominion of Rome. In the Roman Republic the dictator was an extraordinary magistrate, irresponsible and endowed with absolute authority, whose original name was *magister populi*. This title, it has been suggested, described the dictator as head of the (infantry) host; at any rate, his chief subordinate was regularly known as *magister equitum*. In this view the dictatorship was a military office. Later, at times a dictator was appointed to suppress civil strife. The frequency of *crises*, or critical periods, in the quick, aggressive growth of the Roman state, necessitated such an office. The first dictator (T. Larcius or M. Valerius) was appointed in 501 B.C., nine years after the expulsion of the Tarquins. According to Livy, the immediate cause of this dictatorship was a formidable war with the Latins. In general no one could be appointed dictator who had not been previously consul, and this condition was very rarely dispensed with. It is possible that the dictator was originally created or elected by the curiæ, like the kings; but it is more probable that the Senate passed a decree ordering one of the consuls to name or proclaim (*dicere*) a dictator. Originally, of course, the dictator was a patrician; the first plebeian to fill the office was Marcius Rutilus (356 B.C.), who was nominated by the plebeian consul, M. Popillius Lænas.

The dictatorship could not lawfully be held longer than six months; nor was it ever held for a longer period, except in the cases of Sulla and Cæsar, which were altogether peculiar. During a dictatorship the consuls and other regular authorities continued to discharge their proper duties, but in subordination to the dictator, being for the time simply his officers. The superiority of his power, when compared with that of the consuls, appears chiefly in three points: he was far more independent of the Senate; he had a more extensive power of punishment, without any appeal; and he could not be called to account after his abdication of the dictatorship for anything he had done during the period of his office. The limits of his power were as follows: he could not touch the treasury; he could not leave Italy; and he could not ride through Rome on horseback without previously obtaining the permission of the people. While the consuls had only 12 lictors, the dictator was preceded by 24, bearing the *secures* and *fasces*. To him also belonged the *sella curulis* and the *toga prætexta*. The last legally elected dictator was M. Junius Pera, who entered on his office 216 B.C. From this time *nominal* dictators were frequently appointed for the purpose of holding the elections, but even these finally disappeared (202 B.C.). Henceforth, in critical times, a sort of dictatorial power was conferred on the consuls by the Senate by the well-known formula: "That the consuls should see to it that the state should receive no damage." This practice rendered the appointment of dictators no longer necessary. In 44 B.C. Antonius carried a law making the dictatorship no longer a part of the Roman constitution. Consult Mommsen, *Römische Staatsrecht*, ii, 133 ff. (3d ed., Leipzig, 1887), and Greenidge, *Roman Public Life* (London, 1907).

The term is loosely applied in modern use to a ruler enjoying or exercising extraconstitutional power. Gen. Porfirio Díaz and Gen. Venustiano Huerta were styled Mexican dictators.

DIC'TIONARY (ML. *dictionarius*, word book, from Lat. *dictio*, word, from *dicere*, to say). In its original and most common application, a work which is linguistic in character, being a compilation of all or a portion of the words of a language arranged according to some exact order, usually the alphabetical one, with brief explanations and definitions. In later and more elaborate dictionaries additional information of an appropriate character is included within the scope of the work. Thus, etymologies, indications of pronunciation, and variations in orthography may be given, while a still further expansion includes citations which illustrate the uses of words. The name is said to have been used for the first time by Joannes de Garlandia, who died in 1252 A.D. He described his book containing a classified list of words as a *dictionarius*. In its use the word "dictionary" is no longer confined to a simple linguistic compilation, but is applicable to works on special or technical subjects, which, through the medium of an alphabetical classification of words belonging to that subject, give appropriate and detailed information. Such dictionaries are very numerous; and we have biographical, historical, bibliographical, geographical, philosophical, mathematical, zoölogical, medical, musical, architectural, and other dictionaries.

The following terms are more or less synonymous with the word "dictionary": *vocabulary*, which is a list of words restricted to a single work or to some division of the language, e.g., the vocabulary of Cæsar's *Gallic War; lexicon*, a word applied by English-speaking peoples to a dictionary of some foreign language, as Hebrew, Greek, or Latin; *glossary*, a partial dictionary of words of a certain dialect or of antiquated or technical terms accompanied by glosses or explanations; *thesaurus* (*verborum*)—i.e., a treasury of words—an elaborate dictionary with many references and full explanations. More unfamiliar are *idioticon*, from Greek *ἰδιωτικός*, *idiōtikos*, belonging to an individual, and *onomasticon;* the former, common in Germany, indicates a dictionary of words of a dialect; the latter, from the Greek *ὄνομα*, *onoma*, name, is a dictionary of names, as the *Onomasticon* of Julius Pollux of the second century—a Greek dictionary in 10 books containing words arranged according to their meaning. *Index* (q.v.) is a list of names, topics, etc., generally placed at the close of a book to indicate more exactly and definitely the contents thereof. The *gazetteer* and *concordance* should be mentioned as having certain characteristics of dictionaries. The first is a geographical dictionary with names of places, seas, rivers, etc., in alphabetical order, accompanied with a brief account of each. The word "gazetteer" was first used by Lawrence Echard, whose work was entitled *The Gazetteer; or, Newsman's Interpreter—A Geographical Index* (11th ed., London, 1716). In part ii the author speaks of his work as "The Gazetteer." A concordance is an index of various passages in a book classified according to certain leading words arranged in an alphabetical order. As this was first made for the Bible, Johnson defines it as "a book which shows in how many texts of Scripture any word occurs." As examples, we may cite: Cruden, *A Complete Concordance to the Old and New Testaments* (London, 1859); Clarke, *Concordance to Shakespeare* (ib., 1827); Brightwell, *A Concordance to the Entire Works of Alfred Tennyson* (ib., 1869).

History. The earliest dictionary of which there is any mention is that made in Nineveh in the reign of Assurbanipal in the seventh century B.C., which is impressed on a number of clay tablets in cuneiform letters. Arabic scholars early busied themselves with dictionary making, a work very necessary for a language as rich as theirs. The first to attempt to gather the entire Arabic vocabulary in one work was probably Khalil ibn Ahmed of Oman (died 791), who adopted an arrangement not alphabetical, but one based on certain phonetic and physiological principles. The worthiest of Khalil's many successors were Mukarram ibn Mansur, an Egyptian (died 1311), and al-Firuzabadi, a Persian by birth, whose travels entitled him to be called a citizen of the Oriental world (died 1414). The work of the former (Cairo, 1300 et seq.) filled 20 volumes, while the *Camus* ('dictionary') of the latter, preserved only in part, extended to 60 (according to some accounts, to 100) volumes. While in a certain sense Hebrew lexicography began with the Massoretic (sixth to eighth centuries), the real production of Hebrew dictionaries began in the tenth century, taking its origin in, and being stimulated by, the study of Arabic. Rabbi Saadia Gaon (died 942) was the first Hebrew lexicographer;

David Kimchi (c.1200), author of the *Book of Roots*, was the greatest. Menahem b. Sarug (c.960) made a dictionary arranged according to stems. Judah Hayyuj (c.1000) propounded the theory of triliteral roots, and his work was continued by Rabbi Jonah (Ibn Janah, c.1030). Sanskrit dictionaries begin at a very early date in the glossary of Yaska to the Rig-Veda (about the fifth century B.C.) and continue to date for the most part collections of rare words and meanings, being designed especially for the authors who composed the artificial poetry so prevalent in India. These dictionaries, most of them written after the fifth century A.D., are invariably in verse and are divisible into the two general classes—lexicons of synonyms and homonyms. Alphabetical arrangement begins only in the latter period of the homonymous dictionaries. The older works of this class arrange the words in order of importance, while in the synonymous dictionaries words are classified according to subjects. Other modes of classification are according to the number of syllables in the word, its gender or its final letter.

The number of native Sanskrit lexicons is over 50, and of them the Amara-kōś (see AMARASINHA) is the most frequently quoted. There are also special dictionaries on botany, medicine, and astronomy, as well as Buddhistic glossaries in Pali, and polyglot lexicons of Sanskrit, Tibetan, Mongolian, and even Chinese. (Consult Zachariæ, *Indische Wörterücher*, Strassburg, 1897.) Of Old and Middle Iranian (Avestan and Pahlavi) there are but two native dictionaries—one Avestan-Pahlavi, and the other Pahlavi-Pazand (both edited by Hau and Jamaspji, Bombay and London, 1867–7; the former also by Reichelt, Vienna, 1900. In Modern Persian there is a long list of lexicons, both general and special, based upon Arabic models, the oldest one, perhaps, written by Asadi, Firdusi's teacher, dating from the eleventh century. In the classical languages, Greek and Latin, we find evidences of lexicographical work at an early period.

But dictionaries of language in a form with which we are familiar are of modern origin. They are an outgrowth of the importance of Greek and Latin literature to the scholars of the Middle Ages and may be traced to the mediæval custom of inserting marginal glosses or explanatory words in texts of classical authors. The bilingual dictionary in particular is due to the closer intercourse of the various nations of the more modern world. The Greeks and Romans did not conceive of a work containing all the words of their own or of a foreign language, and their early dictionaries were simply glossaries of unusual words or phrases. Athenæus tells of Alexandrian scholars such as Zenodotus, librarian of the great library, who compiled books containing foreign phrases and a glossary of Homer; and of Artemidorus of 240 B.C., who prepared a book of technical terms on cooking. All these have been lost. According to Suidas, Apollonius, the Sophist of the days of Augustus, wrote the earliest Greek lexicon, which was entitled Λέξεις Ὁμηρικαί, (*Lexeis Homērikai*), or *Homeric Words*, published last by Bekker, of Berlin, in 1833. This is the most ancient dictionary extant. Other Alexandrian lexicographers were Ælius Mœris (190 A.D.), the Atticist, who wrote a Greek (Attic) lexicon (ed. by Hudson, Oxford, 1712), and Harpocration (fourth century), who composed a lexicon of the Attic orators (ed. by Dindorf, ib., 1853).

Ammonius, professor of grammar at Alexandria, prepared a book of homonyms, published by Valckenaer in 1739 (also Leipzig, 1822). In this same book is edited the work of Zenodotus on the cries of animals, which is similar to Vincento Caralucci's *Lexicon Vocum quæ a Brutis Animalibus Emittuntur* (Perugia, 1779). Hesychius of Alexandria, of the latter part of the fifth century A.D., wrote a lexicon, based supposedly on that of Pamphilus (another Alexandrian grammarian), containing short explanations of Greek words with quotations from authors. The first edition is the Aldine (Venice, 1514); the latest, that of Schmidt (Jena, 1867). Orion, of Thebes, Egypt, of about the same period, wrote an etymological dictionary, which was last printed in 1820 at Leipzig by Sturz. Erotian, a physician of Nero, prepared a lexicon on Hippocrates arranged in alphabetical order by a later writer and edited by Klein at Leipzig in 1865. Julius Pollux, of Naucratis, Egypt, who was made professor of rhetoric at Athens by the Emperor Commodus, wrote the *Onomasticon* referred to above, which is a work of great value for the language and for the study of antiquities. It first appeared in the Aldine edition (Venice, 1500) and long after (1824) in a Leipzig edition by Dindorf. The most famous of Greek writers of glossaries is Suidas, whose period is thought to be the tenth century A.D. He prepared an alphabetical dictionary of words, with place and personal names and many quotations from Greek writers and scholars. This book was first printed at Milan in 1499 and again in an excellent edition by Bernhardy at Halle in 1853. Other Byzantine lexicographers are Photius of the ninth century (ed. by Naber, Leyden, 1864), and John Zonaras, a celebrated twelfth-century historian and theologian (ed. by Tittmann, Leipzig, 1808). In 1848 Gaisford, at Oxford, published a Greek glossary of the eleventh century known as *Etymologicum Magnum*, which contains numerous passages from various famous writers and copious historical and mythological references. Eudocia Augusta, of Macrembolis, wife of Constantine XI and Romanus IV (1059–71), is credited with the compilation of an historical and mythological dictionary which she called Ἰωνία, *Iōnia*, 'Bed of Violets.' In the work of Crastoni, a native of Piacenza, we have the first Greek and Latin lexicon. There is an Aldine edition of 1497. To the same time belong Guarina's *Thesaurus* and a similar work by Thomas, who was known as the monk Theodolus. In 1572 at Geneva appeared the *Thesaurus Græcæ Linguæ* of Henri Estienne (Stephanus), reëdited by Valpy at London in 1816–26 (6 vols.) and by Dindorf at Paris in 1831–65 (9 vols.). This is the most complete Greek lexicon ever published. The first Greek-English lexicon is that of John Jones (London, 1823), although the work of John Pickering, which was not completed, bears the date 1814. The most useful Greek-English lexicon is the Liddell and Scott (8th ed., New York, 1897); also in abridged form. Pape, *Wörterbuch der griechischen Eigennamen* (Brunswick, 1875–80) is of value for proper names. Special Greek lexicons worthy of mention are: *Greek-English Lexicon of the New Testament*, by J. H. Thayer, a revision of Grimm's Wilke's *Clavis Novi Testamenti* (London, 1889); *Greek Lexicon of the*

Roman and Byzantine Periods, by E. A. Sophocles, revised by J. H. Thayer (ib., 1887), and for modern Greek, Λεξικόν Ἑλληνοαγγλικόν, Modern-Greek-English and English-Modern-Greek, by Contopoulos (3d ed., Athens, 1889).

In Latin lexicography we think first of M. Terentius Varro, who wrote *De Lingua Latina*, a work on etymology and the uses of words; then of Verrius Flaccus, living in the days of Augustus, who wrote *De Verborum Significatu*, which is extant in the compilation of Pompeius Festus, entitled *De Significatione Verborum*, abridged by Paulus Diaconus of the eighth century. This work, in which the words are arranged alphabetically, has been of great service in giving information on antiquities and grammar. Less familiar are the dictionary of Papias of the eleventh century, based on glossaries of the sixth and seventh, and the *Catholicon* or *Summa* of Giovanni Balbi, dating about 1286 and, as printed by Gutenberg in 1460, now a curiosity. It passed through 20 editions. The earliest polyglot was the work of an Augustine monk, Colepinus, dated at Reggio, 1502. At first it was a Latin-Greek lexicon, then came to be extended to include Italian, French, and Spanish, and finally in the 1590 Basel edition it included 11 languages. The great Latin dictionaries are *Thesaurus Linguæ Latinæ* of Robert Estienne (Paris, 1531, reëdited down to 1734), and the *Totius Lexicon Latinitatis* by Forcellini (Padua, 1771, an edition published with the names of Facciolati and Forcellini as editors; 3d ed., 1831). In this work the Latin words are given Greek and Italian equivalents and are illustrated by examples from classical literature. The latest (fifth) edition is that of De Vit (Prato, 1858–79), with the *Onomasticon Totius Latinitatis* as a supplement. This is the greatest of all Latin lexicons. The first Latin-English lexicon of any account was edited by Sir Thomas Elyot (London, 1538; 3d ed., 1545). Before this there had appeared the *Promptorium Parvulorum* by Galfridus Grammaticus (1499), the *Medulla Grammatica* in manuscript (1483), and the *Ortus Vocabulorum* of Wynkyn de Worde (1500), of which there were 13 editions between 1509 and 1523. Then in 1552 a Richard Huloet published his *English-Latin Abecedarium*, with English definitions; in 1570 appeared *Manipulus Vocabulorum Puerorum*, a rhyming dictionary of English and Latin words by Peter Levins; and finally came the *Alvearie* by John Baret, which had three languages—English, Latin, French. In 1736 Robert Ainsworth published his *Latin-English Dictionary*, which passed through many editions. The best Latin lexicons of to-day are: *Latin-English Dictionary*, White and Riddle (London, 1880), and *English-Latin Dictionary* (ib., 1869); Harper's *Latin Dictionary*, which is based on Freund's *Latin-German Lexicon*, in English, by Andrews (New York, 1856), and which is revised by Lewis and Short (ib., 1886); Georges, *Deutsch-Lateinisches und Lateinisch-Deutsches Wörterbuch* (4 vols., Leipzig, 1880–85). This last is most accurate and satisfactory and, next to the Forcellini, contains the most words of all Latin lexicons. The greatest Latin lexicon of modern times is the *Thesaurus Linguæ Latinæ* (Leipzig, 1900 et seq.), which is due mainly to the genius of Edward Wölfflin of Munich. It is edited, under the supervision of the five great German academies—those of Berlin, Göttingen, Leipzig, Munich, and Vienna—by the most distinguished classical scholars of Germany. For mediæval Latin the only lexicon of importance is the Du Cange, *Glossarium ad Scriptores Mediæ et Infimæ Latinitatis* (1733–36, ed. by Henschel; 16 vols., Paris, 1882–88).

English Dictionaries. The earliest work on lexicography in England aimed to extend our knowledge of Latin. To such an aim are due the Latin-English dictionaries of the latter period of the fifteenth century and the beginning of the sixteenth, mentioned above. With a similar purpose Minsheu in 1617 published his great polyglot *Guide to the Tongues*, explaining English words by those from 10 foreign languages. The *English Expositor* of John Bullokar (1616) was the first English dictionary in the strict sense of the term, as it gave both words and definitions in English. In the seventeenth century we find the *English Dictionarie* of Henry Cockeram (1623); the *Glossographia* of Thomas Blount (1656); *The New World of English Words* by Phillips (1658); and the *English Dictionary* of Elisha Coles (1677). In the early part of the eighteenth century appeared the first dictionary aiming to give a complete collection of words of the language—the *Universal Etymological English Dictionary* of Nathan Bailey (1721). In his preface to the first volume the author declares that he is the first to attempt in English to trace the derivation of English words on a large scale, although he refers to the work of Blount in his *Glossography* and to that of Skinner in his *Etymologicon* (1671). He also marked accents to aid in pronunciation. Bailey's dictionary passed through 24 editions before the close of the century and was the standard until the publication of Johnson's Dictionary. In 1755 Dr. Samuel Johnson, after seven years of labor, published his famous dictionary. This was a most remarkable achievement and was epoch-making in the history of the language, for it determined the form, meaning, and use of English words. Dr. Johnson also introduced the custom of illustrating the use of words by quotations from the best writers. This work passed through many editions, of which the last is that of Robert Gordon Latham (London, 1866), which is to-day only of historic interest. Johnson's Dictionary simply imitated Bailey's in the use of accents to indicate pronunciation. The first dictionary to give attention to orthoëpy is that of Kenrick (London, 1773). Perry, *Royal Standard English Dictionary* (Boston, 1777), and the *Complete Dictionary of the English Language* by the famous elocutionist, Thomas Sheridan (London, 1780), followed suit. The object of the latter work is stated to be "to establish a plain and permanent standard of pronunciation." In 1791 John Walker published his *Critical Pronouncing Dictionary and Expositor of the English Language*. In this work pronunciation is the main object, the author declaring his design to be "to give a kind of history of pronunciation and to register its present state." This dictionary has had a wide circulation and still has a reputation, although it is not, of course, a reliable guide for present-day pronunciation, but rather supplies information as to the pronunciation at the beginning of the nineteenth century. In 1836 B. H. Smart published his *New Critical Pronouncing Dictionary of the English Language*, designated also as "Walker Remodelled." The *New Dictionary* by Richardson, published also in London

in 1836 (new ed., New York, 1863)a for many citations from authors ir-cal arrangement, which have, u, been abridged in the later edition. *'l Dictionary of the English Languan* Ogilvie (London, 1850) is an encyc.- con—literary, scientific, and techn\ new edition by Charles Annandale wd in 1883. This formed the model of *y Dictionary*, mentioned below. Sine *Imperial Dictionary* is the *Encyclo- tionary* by Robert Hunter (Londo1. In 1806 Noah Webster published *dious Dictionary*, and in 1828 he brois great *American Dictionary of the h- guage*, which was followed by abridgs. Besides many editions containing mis, complete revisions of the large dictre made in 1847 by Chauncey A. Goodn 1864 and 1890 by Noah Porter. Its pe is *Webster's New International Dictiy-* right, 1909). This is a complete reue entire work. It has an appendix wuable introduction and a pronouncinical dictionary and pronouncinger. The Webster dictionaries were the pks in lexicography in the United State*ictionary of the English Language*, bE. Worcester, dates from 1859 and wevised in 1881, so that it is now ut of date. The last edition (1886) a supplement of 12,500 words. The on contains a History of English Ihy and a Catalogue of English DictiIn 1898 appeared the *Webster's Colic- tionary* (an 8vo abridgment from*ernational*), which underwent radicon, based upon the *New English Dicti*entioned below, and was published agd3. In its present form the octavo Weberhaps the most reliable small dictiothe English language. In 1889–95 appea*entury Dictionary*, an encyclopædic Exicon of 7046 pages, based upon *Ogilvial Dictionary* (mentioned below) anred under the direction of Dr. W. D. Vtogether with an added *Dictionary per Names* of 1085 pages, edited by B. E.and geographical atlas. This was revisecublished together, under the editorshi E. Smith, in 1911. A small, one-volu*ury Dictionary*, based upon the larger wonoroughly compared with the great dic- tionary, is to be published. In 1893–red the large one-volume (2 vols. whenublished) *Standard Dictionary of the Language*, under the editorship of Isaunk and Francis A. March. This has beenghly revised for the new edition, publish913. The great work, *A New English Di on Historical Principles*, founded mainlaterial accumulated by the English (Bhilological Society, was at first editecmes A. H. Murray, but later there have sociated with him Henry Bradley and W.gie. It is the greatest of all dictionariesfullness of illustration by citations anrate analysis of the meanings and etymol the words treated. The great scope anarliness of this work is such that, althegun in 1884, it is still uncompleted—the l and S, being done simultaneously undrate editorships, were in 1914 still unf; in July the work was practically comp the letter U. It is strongest in literar etymological matters and covers systematically the period from 1200 A.D. to date.

There are many dictionaries on special subjects, and their number is rapidly increasing, both in English and in many of the foreign languages. Some of the more important special dictionaries in English are: ARCHITECTURE AND BUILDING—Sturgis, *Dictionary of Architecture and Building* (3 vols., 1901–02). BIBLE—*Dictionary of the Bible*, by James Hastings (5 vols., 1898–1904); T. K. Cheyne and J. S. Black, *Encyclopædia Biblica* (4 vols., 1900–03). BIOGRAPHY—Appendices to *Webster's International Dictionary*, *Standard Dictionary*, and *Century Dictionary;* Stephen (1885–91) and Lee (1891–1901), *Dictionary of National Biography* (66 vols., 8vo, including 3 supplementary vols., London, 1885–1901), and *Index and Epitome* of this (ib., 1903; 2d ed., 1906)—a new edition of this monumental work was published in 22 volumes (ib., 1908–09), with a new *Index and Epitome* (ib., 1913); Adams, *Dictionary of American Authors* (New York, 1898; 5th ed., revised and enlarged, ib., 1905); *Who's Who; Who's Who in America;* in German, *Wer Ist's* (these last three being revised annually); Thomas, *Universal Pronouncing Dictionary of Biography and Mythology* (new 3d ed., Philadelphia, 1910). BIRDS—Newton and Gadow, *Dictionary of Birds* (new ed., 1899). CHEMICALS AND CHEMISTRY—G. H. Hurst, *Dictionary of Chemicals and Raw Products Used in Manufacture of Paints, etc.* (1901); A. I. Cohn, *Dictionary of Tests and Reagents* (1903); Watts, *Dictionary of Chemistry* (4 vols., 2d ed., 1888–94); Thorpe, *Dictionary of Applied Chemistry* (new ed., 5 vols., New York, 1912–13); Rawson, Gardner, and Laycock, *Dictionary of Dyes and Mordants* (1901). DIALECTS—Wright, *The English Dialect Dictionary* (1898–1905), including a grammar of English dialects (a quarto work in 6 large vols.). This, like the Oxford *New English Dictionary*, is the most complete dictionary of its kind ever published. It is founded on the publications of the English Dialect Society and a large amount of new material gathered from new contributors and voluntary readers throughout Great Britain and Ireland. It contains a very complete vocabulary of all dialect words or senses now in use or known to have been in use since the beginning of the eighteenth century, with copious illustrative citations. Then there are also Bartlett, *Dictionary of Americanisms* (4th ed., revised and enlarged, Boston, 1896); Farmer, *Americanisms, Old and New* (New York, 1899), the latter very incomplete. ECCLESIASTICAL SUBJECTS—Addis and Arnold, *A Catholic Dictionary* (6th ed., London, 1903); Hook, *A Church Dictionary* (15th ed., London, 1896). GEOGRAPHY AND PLACE NAMES—Heilprin, *Lippincott's Gazetteer of the World* (2d ed., large 8vo., Philadelphia, 1906; supp., 1911); Chisholm, *Times* (London) *Gazetteer* (reissue, ib., 1906); Blackie, *Dictionary of Place Names*, with derivations (ib., 1887). HISTORY, ETC.—Haydn, *Dictionary of Dates* (25th ed., New York, 1911); *Dictionary of Races and Peoples* (Washington, 1907). MEDICAL—Gould, *Illustrated Dictionary of Medicine* (6th ed., New York, 1910); Dunglison (ed.), *Dictionary of Medical Science* (23d ed., ib., 1903); Harris, *Dictionary of Dentistry* (6th ed., ib., 1899). MUSIC—L. C. Elson, *A Dictionary of Music* (Boston, 1905); Grove, *Dictionary of Music* (revised ed., 5 vols., New York, 1904–10). MYTHOLOGY—*Harper's Dic-*

tionary of Classical Literature and Antiquities (New York, 1898); J. Dawson, *Dictionary of Hindu Mythology, etc.* (London, 1903). Military and Naval—J. P. Wisser and H. C. Gauss, *A Military and Naval Dictionary* (New York, 1905). Needlework—Caulfield and Saward, *Dictionary of Needlework* (London, 1885). Philosophy and Psychology—Baldwin, *Dictionary of Philosophy and Psychology* (new ed., 3 vols., New York, 1911); in French, Pierre Nova, *Dictionnaire de terminologie scolastique* (Paris, 1885; out of print). Economics—Palgrave (ed.), *Dictionary of Political Economy* (revised ed., London, 1910). Proper Names in Fiction, History, etc.—Harbottle, *Dictionary of Historic Allusions* (2d ed., London, 1904). Quotations—Dalbiac, *Dictionary of German Quotations* (London, 1906); Harbottle and Dalbiac, *Dictionary of French and Italian Quotations* (2d ed., ib., 1904); Harbottle, *Dictionary of Classical Quotations* (3d ed., New York, 1906); Harbottle and Hume, *Dictionary of Spanish Quotations* (ib., 1907). Slang—Barrère, Albert, and Leland (eds.), *Dictionary of Slang, Jargon, and Cant* (London, 1907); Farmer and Henley, *Dictionary of Slang and Colloquial English* (ib., 1905). This is a one-volume abridgment of the larger work *Slang and its Analogues*, edited at first by John S. Farmer, later by him and W. E. Henley, as joint editors, containing many illustrative citations (7 vols., 1890–1904). Synonyms—Crabb, *English Synonyms* (1st ed., London, 1816). This work contains a considerable body of selected citations and has extended discriminations between words that are more or less synonymous. It has passed through many editions practically unchanged and, though not a scholarly work, is still perhaps the best book of the kind for English synonyms. Based upon and largely taken from it, is Smith's *Synonyms Discriminated* (London, 1882), a book of the same general character. Other dictionaries of synonyms, without citations and consisting essentially of mere lists of words more or less related in meaning, are: Roget, *Thesaurus of English Words and Phrases Classified* (1st ed., London, 1852; new editions, enlarged and improved, have appeared in 1911 and 1913, both containing a full index by J. L. Roget)—this is considered by many a more discriminating and hence more helpful work than even Crabb's; Soule, *Dictionary of English Synonyms* (New York, 1871, 1891, 1910, 1911); Fernald, *English Synonyms and Antonyms* (1896, 1906); Fleming, *Synonyms, Antonyms, and Associated Words* (ib., 1913). The best treatments of English synonyms at present are those contained in the larger dictionaries (the *International*, the *Standard*, and the *Century* dictionaries). Technological—Goodchild and Tweney, *Technological and Scientific Dictionary* (London, 1905).

The best dictionaries from English into foreign languages and vice versa, and the dictionaries entirely in foreign languages will be found in the bibliographies given under the various special articles in this Encyclopædia; thus, under the article Portuguese Language will be found a list of the best native and bilingual dictionaries of Portuguese; and the case is similar with other like articles, such as Spanish Language, Italian Language, etc. Several really great foreign dictionaries should be mentioned here, however. Among these is the great German dictionary, *Deutsches Wörterbuch*, of Jacob and Wilhelm Grimm, begun in 1852, of which the first volume was published in 1854. It aims to give the words only of the literary language (being far less full than the *New English Dictionary*), from the beginning of the sixteenth century. Since the death of the Grimm Brothers the work has been carried on by other scholars. The work is now (1914) about five-sixths completed. Among the monumental French dictionaries we have *Dictionnaire de la langue française*, by M. P. E. Littré, a large quarto rich in literary citations and the history of French words, published in Paris in 1863–72 (a supplement in 1878–82); and the grand *Dictionnaire universelle du XIXème siècle* (15 vols., 4to) of Larousse, published at Paris in 1866–76. This is perhaps more properly an encyclopædia, since it contains essays of some length on various subjects. The revised edition, published in 7 volumes under the title *Nouveau Larousse illustré* (Paris, 1898–1904; supplement, 1907), and under the editorship of Claude Augé, contains less discursive matter, but a greater variety of articles covering the entire field of knowledge—all in one general vocabulary—combining fiction, history, biography, geography, dictionary of words, etc.

Among the modern dictionaries in two or more languages, those treating of technical terms are of special interest. There are now numerous dictionaries of this class, many of them having a vocabulary in three languages, commonly German, French, and English. Their definitions are usually merely by synonyms or the briefest kind of description, their purpose being to meet the needs of the technological or scientific student. A recent dictionary of this class is the *Technological Dictionary*, edited by Alexander Tolhausen, published in 1901 at Leipzig, in three thick duodecimo volumes. The vocabulary is in German, French, and English respectively in the three volumes.

The form and contents of the modern dictionary are the outcome of long experience. The first dictionaries were mere word lists arranged according to subjects or even miscellaneously. The alphabetic arrangement is comparatively recent and has entirely replaced the older ones. The plan of giving scientific etymologies and of arranging definitions in the order of their historic development, both now typical of the best dictionaries, first began to take definite shape in the work of Noah Webster. The use of illustrations in dictionaries is old, but heretofore only those illustrating the mechanical arts were generally dependable for scientific accuracy. The general and free use of illustration of animals and plants with a reasonable approach to accuracy dates from the publication (about 1850) in England of a revision of *Webster's Dictionary* under the name of *Ogilvie's Imperial Dictionary*. This was well and copiously illustrated, many of its illustrations still finding a place in the standard dictionaries of to-day. The most notable general English dictionary with illustrations prior to Ogilvie's was that entitled *Dictionary of Arts and Sciences* (2 vols., 4to, London, 1806) by G. Gregory. The work is profusely illustrated with steel engravings of the arts and sciences and natural history and combines the features of a dictionary and an encyclopædia. The illustrations in natural history, however, lack the scientific accuracy characteristic of modern dictionaries and encyclopædias. The dictionary of to-day is distinguished also by being no longer a one-man work, as in the days of Johnson and

Webster, but a coöperative product, agaging the services of many special and genral editors working under a chief of staff, o managing editor, the whole work being subject o the direction of an editor in chief, who endeavors to give it unity, uniformity, and completeness.

DICTOGRAPH. This instrument which has figured in many criminal trials since 1912, consists of the adoption of an ordinary telephone circuit with a sensitive granular cabon transmitter with a diaphragm somewhat greater than usually employed, so as to increase the reproduction of the sound at the receiving end of the line. Such a transmitter, small and inconspicuous, could be placed in the room where suspected persons would hold conference or conversations, and wires led to a recording station, where a stenographer could record the spoken words. In large auditoriums a number of transmitters have been used to reproduce the sounds at different parts of the hall, and a smilar device with a loud-speaking telephone receiver has been installed in the waiting rooms of various railway stations.

DIC'TUM (Lat., a saying, utterance response of an oracle), sometimes called *obiter dictum*, i.e., an opinion pronounced 'by the way.' In legal parlance, an unauthoritative expression of opinion on a point of law uttered by a judge in a judicial proceeding. In a legal system based, as is that of England and America, largely upon precedent, only so much of a judicial opinion as is directly concerned with the decision of the case in hand has commanding authority. This is due to the fact that the courts have no power to decide cases not before them for adjudication. The principle of *stare decisis*, i.e., of abiding by a rule once settled by a formal decision, invests such a decision with the force of law and makes it a binding authority upon the courts in similar cases. But a decision upon a collateral point, or upon a state of facts not before the court for its determination, has no such binding force. It is a mere pronouncement, or expression of opinion, which derives its authority solely from the learning and personal weight of the judge declaring it. It is usual, therefore, to distinguish between the "law of a case" and the dicta, or judicial opinions expressed in it, which, however important and influential they may be, have not the force of law. This process of "sifting" the law from the dicta of a judicial opinion is one of the chief, as it is one of the most difficult, functions of the lawyer and the judge.

It is not to be inferred, however, that judicial dicta are entirely without legal authority. The opinions of eminent and learned judges have the same weight with the courts as that which attaches to the disinterested opinions of great lawyers and legal writers, and are classified as having "persuasive" as distinguished from "imperative" authority. It is often desirable and sometimes necessary to resort to such opinions as an aid to the formation of a sound though independent judgment upon a question of law, and many cases have been decided and many important legal doctrines established in deference to such authority. In this view of the matter judicial dicta constitute a long and valuable series of commentaries on the law of the land, scattered through the law reports, to which resort may be had as to the more systematic writings of eminent lawyers and judges, as those of Coke, Blackstone, Kent, and Story. Consult Wambaugh, *The Study of Cases* (2d ed., Boston, 1894). See JUDGMENT; OPINION.

DICTUM OF KENILWORTH. An agreement between Henry III and the rebellious barons, so called because made during the siege of Kenilworth in 1266.

DIC'TYN'IDÆ (Neo-Lat. nom. pl., from Gk. *δίκτυον, diktyon*, net + *εἶδος, eidos*, form). A family of spiders that weave irregular webs in which two kinds of silk are used. See SPIDER.

DIC'TYONE'MA (Neo-Lat., from Gk. *δίκτυον, diktyon*, net + *νῆμα, nēma*, thread). A genus of fossil graptolites in which the colony, when found pressed out on the surface of a slab of shale, has the appearance of a network of delicate filaments made up of heavier cell-bearing branches that radiate from a common base and are united at frequent intervals by slender horizontal threads. The genus ranges from the uppermost Cambrian to the Carboniferous and is especially abundant in lowest Ordovician "Dictyonema shales" which form such a persistent zone in the Baltic Provinces, Scandinavia, England, eastern Canada and New York. *Dictyonema flabelliforme*, the best-known species, had a colony 5 to 10 inches long that grew in the shape of a funnel from a single rootstock. See GRAPTOLITE.

DIC'TYOSPON'GIDÆ (Neo-Lat. nom. pl., from Gk. *δίκτυον, diktyon*, net + *σπόγγος, spongos*, sponge). A family of usually large, fossil lyssacine sponges somewhat closely allied to the existing grass sponges (Euplectella), and found in rocks of Lower Devonian to Lower Carboniferous age, but chiefly in those of Upper Devonian age in New York State. In form these sponges vary from ovate, cylindrical, and prismatic to funnel-shaped. They have a large central cavity, and thin walls in which the siliceous spicules formed a skeleton of great regularity, so that the surface of the fossil is ornamented by a network of fine rectangular meshes. As the sponge substance itself was decomposed and the siliceous spicules dissolved during the processes of fossilization, these organisms appear at present as casts of the original organic matter, imbedded in shaly sandstones, and their structure is indicated by the impressed lines upon their surfaces, and in some cases by the iron oxide (limonite) which occupies the cavities once filled by organic tissue or spicules. Some of these sponges have very simple form with smooth surface; others are radially or transversely ribbed, and still others are spiny or nodulose, while a few have pouched nodes upon their surfaces.

In the region where these fossil sponges have been found in greatest abundance—viz., in Allegany, Cattaraugus, and Steuben counties of New York State—they occur in sandy shales or sandstones in such manner as to indicate that they lived often in extensive colonies on sandy or muddy bottoms, and they are not as a rule associated with any considerable number of other kinds of fossil organisms. The earliest species, *Dictyospongia Danbyi*, from the Upper Ludlow rocks of England, has a simple, subovate form. The more ornamented forms appear in the Upper Devonian and Lower Carboniferous rocks. The principal genera are *Dictyospongia, Uphantœnia, Hydnoceras, Prismodictya*, and *Thysanodictya* of the Chemung rocks, and *Phragmodictya* and *Physospongia* of the Keokuk group of Lower Carboniferous age. About 200 species are known, of which number scarcely

more than half a dozen are European. An elegant monograph, with fine lithographic plates of these fossil sponges, was published by James Hall and J. M. Clarke as "A Memoir on the Paleozoic Reticulate Sponges of the Family Dictyospongidæ," in *Memoirs of the New York State Museum of Natural History*, vol. ii (Albany, 1898). See SPONGE; SPONGIOZOA.

DICTYOTALES. A small group of marine algæ of very uncertain affinities. They are chiefly interesting on account of the combination of characters. They have a brown pigment characteristic of the brown algæ, tetraspores characteristic of the red algæ, and sperms peculiar to themselves. In general, they are regarded as an aberrant group of red algæ.

DIC'TYS (Lat., from Gk. Δίκτυς, *Diktys*) OF CRETE. A Greek writer. He was supposed to have been a companion of Idomeneus in the Trojan War, of which he wrote an account. The Latin version (dating from the fourth century A.D.) of this fabulous history was long alone extant. The Greek original was used by Malalas in his chronography (c.570 A.D.) and by other Byzantine writers. A fragment of the version on a papyrus of the third century A.D. was found by Grenfell and Hunt in 1904–05 and published in the *Tebtunis Papyrit*, 2 (1907). The prologue of the Latin version and Suidas (q.v.) inform us that the original work of Dictys was written in Phœnician letters on bark and buried with him at Cnosus, in Crete, but that in the thirteenth year of Nero's reign (66 A.D.) the tomb was burst by an earthquake and the Phœnician book thus discovered. This was then presented to Nero, who ordered it translated into Greek. The Latin version bears the name of one Septimius as its author and conforms closely to the newly discovered Greek version. The work belongs to the body of fictitious literature which began to be written in the Hellenistic period. In the Middle Ages it was much read and, with the spurious history of Dares the Phrygian (q.v.), became the source of romance. Consult: Griffin, *Dares and Dictys: Introduction to the Study of the Medieval Versions of the Story of Troy* (Baltimore, 1907); Christ-Schmid, *Geschichte der griechischen Litteratur*, vol. ii (5th ed., Munich, 1913). For the text, in both Latin and Greek, consult Ihm, in *Hermes*, 44 (1909).

DICYC'LIC PLANTS. See BIENNIALS.

DICYNODON, dī-sī'nō-dŏn (Neo-Lat., from Gk. δι-, *di-*, double + κύων, *kyōn*, dog + ὀδούς, *odous*, tooth). A genus of fossil reptiles found in the Permian and Jurassic rocks of South Africa and Russia, while closely allied forms occur in India and Scotland. The animal was a land reptile of heavy build, with limbs constructed for walking with the body well raised off the ground. Some forms are as small as a rat, but the majority of the species vary in size from that of a new-born to a half-grown pig. A few only are of large size, the largest known having a skull about 2 feet in length. In most points of structure the animal closely agrees with the mammals, having the temporal arch similarly built and having a mammal-like shoulder girdle and pelvis and the same number of joints in the toes, viz., 2, 3, 3, 3, 3. The striking specialization from which its name is derived is the presence of a pair of large canines which often form walrus-like tusks. In most species these are absent in the female. The front of the jaws is covered with a horny beak like that of a tortoise. In an allied genus *Endothiodon*, there are no tusks, but a row of small molar teeth. See THEROMORPHA.

DIDACHE, dĭd'ȧ-kē. See TEACHING OF THE TWELVE APOSTLES.

DIDAC'TIC POETRY. That kind of poetry which aims or seems to aim, at instruction as its object, making pleasure entirely subservient to this. It has been disputed whether the existence of a kind of poetry especially entitled to the name "didactic" consists with the true nature and object of the poetic art, for it is held that to point out instruction as the peculiar object of one kind of poetry is to overlook the high aim of all poetry, and that a poem may be in the highest sense ethical without any obvious aim at instruction. The drama of Shakespeare has an immense ethical or moral value, but it is not didactic. Examples of purely didactic poetry are Vergil's *Georgics*, Horace's *Ars Poetica*, Pope's *Essay on Criticism* and *Essay on Man*.

DIDELPHIA (Neo-Lat., from Gk. δι-, *di-*, double + δελφύς, *delphys*, womb), or METATHERIA. The second of the three great subclasses of mammals (q.v.), containing only the single order Marsupialia (q.v.). The name is derived from the "double" condition of the womb in the female, where the uterine dilatations of the oviducts continue through life distinct from each other. There are also two vaginæ, each with its own opening into the cloaca, into which the rectum and ureters likewise open. There is no well-developed placenta, and it is generally entirely wanting, though it is now thought that its absence is a secondary condition and not primitive, as it has been shown to be present in the early stages of development in the bandicoots (Perameles).

DIDEROT, dē'd'-rō', DENIS (1713–84). One of the most brilliant, versatile, and prolific writers of the French "philosophic" generation, nicknamed "Pantophile Diderot" by Voltaire, because of his unbounded interest in almost every branch of human activity. He was born at Langres, Oct. 5, 1713, and was educated by the Jesuits. He declined to study law, quarreled with his family, and eked out a meagre livelihood in young manhood by literary hack work and teaching mathematics. After several discreditable Bohemian adventures he married (1743) and became definitely estranged from his father. In this year he published translations of Stanyan's *History of Greece*, and in 1746 a translation of James's *Dictionary of Medicine*, with an *Essai sur le mérite et la vertu*, a paraphrase of Shaftesbury. The *Pensées philosophiques* of this year was his first independent work and is said to have been inspired by a caprice of his mistress, Madame de Puisieux, who certainly prompted his anonymous and most indecent novel, *Les bijoux indiscrets* (1748), of which he was ashamed in his later years. Diderot's first work of philosophic importance is the *Lettre sur les aveugles à l'usage de ceux qui voient* (1749), which, though apparently a hypothetical study of the philosophy of sensation, really involved an undermining of ethical standards and so of social order. This essay abounds in strange previsions of later discoveries and hypotheses, such as the suggestion of developing the sense of touch among the blind. Its immediate result was the imprisonment of its author at Vincennes be-

cause a passage in it offended a lady of great though unavowable influence. From imprisonment Diderot was released at the urgency of the publishers who had undertaken to bring out the famous *Encyclopédie*, originally conceived by Diderot as an enlargement of *Chambers's Encyclopædia* (1727), but becoming, under his editorship and for a time that of D'Alembert, the organ of intellectual emancipation rather than of any school of ethics or philosophy. To this Diderot gave 20 years of unremitting labor, writing, revising, editing, correcting, supervising, and combating the intrigues and threats of theological opponents and the prohibitions of a censorship that, fortunately for his publishers, was venal as well as corrupt. The *Encyclopédie* counts 28 volumes (1751–72), with a six-volume supplement (1776–77) and two volumes of tables (1780). It was not primarily or chiefly revolutionary, but practical. All branches of science, manufacture, and agriculture were treated with great fullness. It is only occasionally, and then often by mocking insinuation rather than direct attack, that it touches religion or morals, in which it has no consistent theory to uphold. The attacks on legal abuses and feudal survivals are quite as marked a feature. The work was greeted with immense enthusiasm and was reprinted several times. Though engaged in this Herculean work, Diderot managed, with characteristic superabundance of energy and bigness of heart, to help his literary comrades, when he did not actually rewrite their works entirely for them, and even composed two plays—*Le fils naturel* (1757) and *Le père de famille* (1758)—that mark the beginning of the modern domestic drama, and by his critical *Paradoxe sur le comédien* had great influence on Lessing and so on the German stage. The French classic tragedy had confined itself to "noble" themes. Diderot took his tragic situations from everyday middle-class life, thus sowing the germs of the melodrama in France. To this period belong also an essay on painting in the *Encyclopédie*, which Goethe translated, adding a luminous commentary; his posthumously published novel, *La religieuse* (1759); the eccentric *Jacques le fataliste* (1773), also posthumous; and the yet more eccentric *Le neveu de Rameau*, which first appeared in print in a translation by Goethe (1805). In his critiques on the annual exhibition of painting, the famous Salon, Diderot established the first bond between art and literature; still he can hardly be considered an art critic, owing to his ignorance of its technique and his undue insistence on the mere subject or idea of the work. In 1773 Diderot, who had received but $600 a year for his work on the *Encyclopédie*, felt constrained to sell his library to furnish a suitable dowry for his daughter. It was purchased by Catharine II and presented to him as salaried caretaker. He went to St. Petersburg to thank the Empress and spent some months there in her intimate society. He returned in 1774 and passed his last decade in ephemeral writing and conversations that, full of powerfully stimulating ideas as they were, left lasting impressions. In talk his contemporaries thought him unrivaled; this is borne out by the fact that his influence on his contemporaries was tremendous, even though most of his really original compositions were published after his death. "He who knows Diderot in his writings only," said Marmontel, "does not know him at all." He worked and talked with disinterested enthusiasm, greeting the mention of a collected edition of his writings with laughter, so well did he know the reckless haste of their composition. A certain sentimental strain infused into him by the works of Sterne and Richardson, his own sincere appreciation of nature, and his natural though unselfish lyricism, easily mark him as a precursor of the Romanticists, even ahead of Rousseau in point of time. His works have been well edited by Assezat and Tourneux (20 vols., 1875–79). Diderot's *Correspondence* with Mademoiselle Volland gives the best clue to his antithetical character. The best study, in English, of his place, environment, and influence is John Morley, *Diderot and the Encyclopædists* (London, 1891). Consult also: Rosenkranz, *Diderot's Leben und Werke* (Leipzig, 1866); Brunetière, *Etudes critiques* (2d series, Paris, 1881); Carlyle, *Essay on Diderot* (London, 1881); G. Lanson, *Histoire de la littérature française* (Paris, 1912); A. Collignon, *Diderot* (ib., 1907); A. Tornézy, *La légende des philosophes* (ib., 1911); R. L. Cru, *Diderot as a Disciple of English Thought* (New York, 1913).

DIDIER, dē'dyā', Jean Charles Henry (1805–64). A French writer, born in Geneva. After a visit to Italy he published his *Rome souterraine* (1833), a work of fiction which affords a brilliant picture of the revolt against Austria and other matters of Italian history. He wrote: *Une année en Espagne* (1837); *Campagne de Rome* (1842); *Promenade au Maroc* (1844); *Séjour chez le schérif de La Mecque* (1856); *Cinquante jours sur le Nil* (1857); *Cinq cents lieues sur le Nil* (1858).

DIDION, dē'dyōn', Isidore (1798–1878). A French soldier and author, born at Diedenhofen. He was educated at the Ecole Polytechnique and the Academy of Metz; in 1848 was appointed director of the percussion-cap manufactory of the French army in Paris. In 1858 he became a general of brigade. He wrote on the science of projectiles, including *Traité de balistique* (1848; 2d ed., 1860); *Cours élémentaire de balistique* (1854; 3d ed., 1859); *Progrès des sciences et de l'industrie* (1875).

DID'IUS SAL'VIUS JU'LIA'NUS, Marcus. A Roman emperor, March to June, 193. He had commanded the army in Germany and held high military and civil posts in Italy and the provinces, and been named consul more than once. On the murder of Pertinax in 193, the prætorian soldiers offered to support as emperor whoever would give them the largest price. Didius gave them 25,000 sesterces each and gained the throne, but was soon deposed by the Senate on the approach of Septimius Severus, and murdered by a soldier.

DI'DO (Lat., from Gk. Διδώ), or Elissa. According to the legend, the founder of Carthage. She was the daughter of a king of Tyre, called by some Agenor or Belus, by others Mutgo or Matgenus. His successor, Pygmalion, the brother of Dido, murdered her husband (who was also her uncle), a priest of Hercules named Acerbas or Sicharbas, called Sychæus by Vergil. With the treasures of Sychæus, which Pygmalion had sought for in vain, and accompanied by many Tyrians, Dido escaped to sea. She landed in Africa, not far from the Phœnician colony of Utica, and built a citadel called Byrsa (a Phœnician word, confused with Gk. *βύρσα*, the hide of a bull), on a piece of ground

which she had bought from the Numidian King, Iarbas. The meaning of the word "Byrsa" gave rise to the legend that Dido purchased as much land as could be encompassed with a bullock's hide, and that after the agreement she cut the hide into small thongs and thus inclosed a large piece of territory. Here she built the city of Carthage. To avoid being compelled to marry Iarbas, she stabbed herself on a funeral pile, which she had caused to be erected (consult Justinus, xviii, 4–7); after her death she was honored as a deity by her subjects. Vergil, however, ascribes the death of Dido to her unrequited passion for Æneas (*Æneid*, i–iv, especially iv); but many of the ancient writers conceived that the poet had committed an anachronism in making her contemporary with the Trojan prince. The more general opinion was that Dido had built Carthage somewhere between 50 and 100 years before the foundation of Rome. Consult Meltzer, *Geschichte der Carthager*, vol. i (Berlin, 1879), and his article "Dido," in Roscher's *Lexikon der griechischen und römischen Mythologie*, vol. i (Leipzig, 1884–90), and Rossbach's article "Dido," in Pauly-Wissowa, *Real-Encyclopädie der classischen Altertumswissenschaft*, vol. v (Stuttgart, 1905).

DIDON, dē'dôn', Jean Henri (1840–1900). A French Dominican who in the latter half of his life stood in the front rank of French pulpit orators. He was born at Touvet, entered the Order of St. Dominic in 1862, and during several years preached a famous series of Lenten conferences at Notre Dame in Paris. He died at Toulouse, March 13, 1900. Of his publications there have been translated into English: *Science Without God* (1882); *The Germans* (1884); *Jesus Christ* (2 vols., 1891–92); *Belief in the Divinity of Jesus Christ* (1894). Lives have appeared by De Coulanges (Paris, 1901); Reynaud (ib., 1904), and Brisson (ib., 1905).

DIDOT, dē'dō'. The name of a family of French printers and publishers founded by François Didot (1689–1757).—Of his eleven children, François Ambroise (1730–1804), who introduced the vellum paper into France, and Pierre François (1732–95) were distinguished printers, and the latter's eldest son, Henri (1765–1852), was a noted type caster, engraver, and mechanician. A descendant of Pierre married Bernardin de Saint-Pierre, who wrote *Paul et Virginie* at a country house near the Didot paper manufactory at Essonne.—Pierre Didot (1760–1853), the eldest son of François Ambroise, produced then unexcelled editions of French and Latin classics; his brother, Firmin (1764–1836), was greatest of them all as printer, engraver, and type founder. He invented the word "stereotype," and used the process largely, revolutionizing the book trade by his cheap editions. His manufactory was a place of pilgrimage for the printers of the world. He was also a respectable dramatic author and translator of the classics and achieved reputation as a moderately liberal politician and deputy. His sons and grandsons have continued the business with honor, but with no increase of fame. France is indebted to this family for the publication of the *Biographie Nationale*, and Belgium is likewise for the establishment of her Royal Press. Consult E. Weret, *Etudes biographiques sur la famille des Didot* (Paris, 1864), and Alfred Cecil Piper, "Some Great Printers and their Work: the Didots," in *Library World* (London, 1914).

DIDON, dē'drôn', Adolphe Napoléon (1806–). A French archæologist, born at Hautevlers (Marne). Acting on the advice of Victor Hugo, he turned his attention to Christian archæology, examined nearly all the old church edifices of France, and extended his knowledge by travels in Greece, Germany, England, and Italy. In 1835 he was appointed secretary to the Historical Committee of Arts and Monuments, founded by Guizot, and in 1844 he established the *Annales Archéologiques*, which became the main source of information in France on mediæval art and antiquities, and was edited by him until his death. He founded a special publishing house for archæological works in 1845, and established a manufactory of stained glass in 1849, and one for bronzes and goldsmith's ware in mediæval style in 1858. Among his works are: *Histoire de Dieu: iconographie des personnes divines* (1843); *Manuel d'iconographie chrétienne, grecque et latine* (1845); *Manuel des objets de bronze et d'orfévrerie du moyen âge: Iconographie de l'opéra* (1864).

DIDSBURY COLLEGE. One of the theological institutions maintained by the Wesleyan church of England. It is situated near Manchester. It was founded in 1842–43 as the result in part of the effort made in 1839 to raise a large fund to commemorate the centenary of the founding of Methodism. Among the many noted men who have been members of its faculty are to be numbered W. B. Pope, the distinguished theologian, and Professor Geden, the learned biblical scholar. It has always been noted for the strength of its faculty and the quality of its work.

DIDUN'CULUS (Neo-Lat., diminutive of *didus*, from Portug. *doudo*, dodo, foolish). A genus of a family (Didunculidæ) of pigeons, peculiar to Samoa and characterized by a hooked upper mandible and a toothed lower one —the toth-billed pigeons. See Pigeon.

DIDYMA. See Branchidæ.

DIDYMI, or **DID'YMOI.** See Branchidæ.

DIDYM'IUM (Neo-Lat., from Gk. *δίδυμος, didymos*, twin, from *δι-, di-*, double + *δύο, dyo* two; so called from being found in the same mineral which yields lanthanum). A metal discovered in 1842 by Mosander, in the mineral cerite. It is also found in gadolinite, orthite, and other cerium minerals. Recent investigations have shown that didymium consists of two elements, *neodymium* (symbol Nd, atomic weight 143.6), and *praseodymium* (symbol Pr, atomic weight 140.5).

DID'YMOGRAP'TUS (Neo-Lat., from Gk. *δίδυμος, didymos*, double + *γράφω, grapho*, I write). A genus of graptolites, of which the rhabdosome consists of four symmetric branches growing from an axillary sicula. The thecæ are simple and tubular. The genus furnishes important index fossils for the Ordovician and contains about 40 species, found abundantly in the graptolite shales of the lower and middle Ordovician in Europe, America, and Australia. Some species, as *Didymograptus bifidus* and *Didymograptus nitidus*, have a world-wide distribution. See Graptolite.